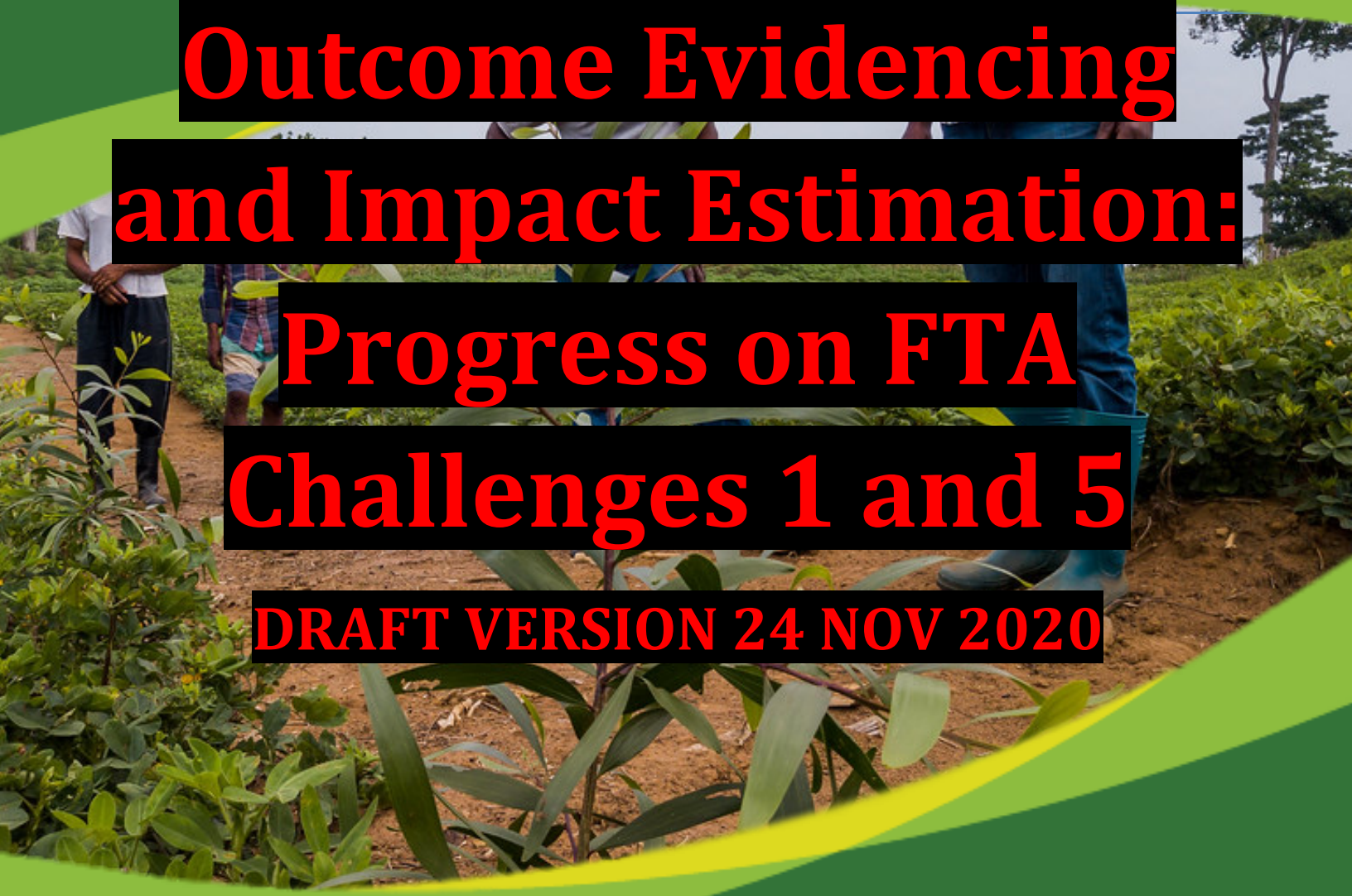
# Outcome Evidencing and Impact Estimation: Progress on FTA Challenges 1 and 5



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**An Integrative Study of the Forests, Trees and Agroforestry Research Program (2010-2020)**

CGIAR RESEARCH PROGRAM ON Forests, Trees and Agroforestry

CIFOR

World Agroforestry

Bioversity International

Royal Roads UNIVERSITY

Cover photo: Pilot farm in Yangambi, DRC. Yangambi, Democratic Republic of Congo. Photo: Fiston Wasanga/CIFOR



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# List of Acronyms

| | |
|---|---|
| 3E | Effective, Efficient, Equitable |
| ACOFOP | Association of Forestry Communities of Peten (Guatemala) |
| AFC | Agroforestry concession |
| AFDB | Beyond Timber: Reconciling the Needs of Logging Industry with those of Forest-dependent People |
| AFSP | Agroforestry Food Security Program |
| ANCOVA | *Association Nationale du Collectif des Vendeurs et Assimilés de Bois* (National Association of Collective of Sellers and Assimilated Wood, Cameroon) |
| ANTAV | *Association nationale des transformateurs artisans et vendeurs de bois débités* (National Association of Artisanal Processors and Lumber Sellers, Cameroon) |
| BRG | Peatland Restoration Agency (Indonesia) |
| BMZ | *Bundesministerium für Wirtschaftliche Zusammenarbeit* (German Federal Ministry for Economic Development Cooperation) |
| CATIE | *Centro Agronómico Tropical de Investigación y Enseñanza* (Tropical Agricultural Research and Higher Education Center) |
| CFE | Community Forest Enterprise |
| CFS | World Committee on Food Security |
| CGIAR | Consultative Group on International Agricultural Research |
| CIFOR | Center for International Forestry Research |
| CIRAD | *Centre de coopération internationale en recherche agronomique pour le développement* (French Agricultural Research Centre for International Development) |
| COMIFAC | Commission of Central African Forests |
| CONAP | *Consejo Nacional de Areas Protegidas* (National Council of Protected Areas, Guatemala) |
| COP | Conference of Parties |
| CRP | CGIAR Research Program |
| CSO | Civil society organization |
| CUF | CIFOR-USAID Fellowship |
| DEVCO | European Commission Directorate General for International Cooperation and Development |
| DFID | Department for International Development (United Kingdom) |
| DRC | Democratic Republic of Congo |
| DRYAD | Improving Livelihoods and Land Use in Congo Basin Forests - Financing Sustainable Community Forest Enterprises in Cameroon |
| EADD | East Africa Dairy Development |
| FAO | Food and Agriculture Organization |
| FCCC | Forests and Climate Change in Congo |
| FKPB | *Forum Komunikasi Perkebunan Berkelanjutan* (Sustainable Plantation Communication Forum, Indonesia) |
| FLEGT | Forest Law, Enforcement, Governance and Trade |
| FORETS | Formation, Recherche, Environment dans la Tshopo |
| FORSIBU | Forum of Haze-Free Country (Indonesia) |
| FP | Flagship Program |
| FREL | Forest Reference Emission Level |

| | |
|---|---|
| FTA | Forests, Trees and Agroforestry |
| FTS | Fertilizer Tree Systems |
| FTT | Fertilizer Tree Technology |
| GCF | Green Climate Fund |
| GCS | Global Comparative Study |
| GFEP | Global Forest Expert Panel |
| GGGI | Global Green Growth Institute |
| GHG | Greenhouse gas |
| GLF | Global Landscapes Forum |
| GML | Governing multifunctional landscapes in Sub-Saharan Africa: Managing trade-offs between social and ecological impacts |
| GOLS | Governing Oil Palm Adaptive Landscapes |
| HCV | High conservation value |
| ha | hectare |
| IARC | International Agricultural Research Centre |
| ICAR | India Council of Agricultural Research |
| ICCN | *Institut Congolais pour la Conservation de la Nature* (Congolese Institute for Nature Conservation) |
| ICRAF | World Agroforestry |
| IDO | Intermediate Development Outcome |
| INBAR | International Network for Bamboo and Rattan |
| INCAS | Indonesia National Carbon Accounting System |
| INDC | Intended Nationally Determined Contributions |
| IPCC | International Panel on Climate Change |
| IREDD+ | Impacts of Reducing Emissions from Deforestation and Forest Degradation and Enhancing Carbon Stocks |
| ISPO | Indonesian Sustainable Palm Oil |
| ITPC | International Tropical Peatland Centre |
| IUFRO | International Union of Forest Research Organization |
| LORTA | Learning-Oriented Real-time Impact Assessment |
| LUWES | Land-Use Planning for Low Emission Developing Strategies |
| MECNT | Ministry of Environment, Nature Conservation and Tourism (Democratic Republic of Congo) |
| MELIA | Monitoring, Evaluation, Learning and Impact Assessment |
| MINFOF | *Ministère des Forêts et de la Faune* (Cameroonian Ministry of Forests and Wildlife) |
| MINMAP | *Ministère des Marchés Publics* (Cameroonian Ministry of Public Procurement) |
| MINTP | *Ministère des Travaux Publics* du Cameroun (Cameroonian Ministry of Public Works) |
| MLG | From Climate Research to Action under Multilevel Governance: Building Knowledge and Capacity at Landscape Scale |
| MMRV | Monitoring, Measurement, Reporting, and Verification |
| MoU | Memorandum of Understanding |
| NDC | Nationally Determined Contribution |
| NGO | Non-governmental organization |

| | |
|---|---|
| OPAL | Oil Palm Adaptive Landscapes |
| PARA | Piloting approaches to rural advisory services in support of scaling of the Agroforestry Concessions scheme in Peru |
| PERDA | *Peraturan Daerah* (Indonesian Provincial Regulation) |
| PERGUB | *Peraturan Gubernur* (Indonesian Governor Regulation) |
| PFES | Payment for Forest Environmental Services |
| PGIS | Participatory Geographic Information Systems |
| PoU | Prevalence of Undernourishment |
| PROFEAAC | Promote and Formalise Artisanal Timber Production in Central Africa |
| PROFORMAL | Policy and regulatory options to recognise and better integrate the domestic timber sector in tropical countries |
| RANKSB | *Rencana Aksi Nasional Perkebunan Kelapa Sawit Berkelanjutan Tahun* (Indonesian National Action Plan for Sustainable Oil Palm Plantations) |
| RCT | Randomized control trial |
| REDD+ | Reducing emissions from deforestation and forest degradation |
| REDD-ALERT | Reducing emissions from deforestation and degradation through alternative land-uses in rainforests of the tropic |
| REFORCO | *Appui à la politique Nationale de conservation et gestion des forêts et de la biodiversité en République Démocratique du Congo* |
| RPP | Readiness Preparation Proposal |
| RSPO | Roundtable for Sustainable Palm Oil |
| S4C | Shrubs for Change |
| SERFOR | *Servicio Nacional Forestal y de Fauna Silvestre* (National Forest and Wildlife Service of Peru) |
| SERNANP | *Servicio Nacional de Áreas Naturales Protegidas por el Estado* (Peruvian National Service of Natural Protected Areas) |
| SFM | Sustainable Forest Management |
| SFX | São Félix do Xingu (Brazil) |
| SISA | State System of Incentives for Environmental Service (Brazil) |
| SLO | System-level Outcome |
| SME | Small and medium enterprise |
| SPDA | *Sociedad Peruana de Derecho Ambiental* (Peruvian Society of Environmental Law) |
| SRE | Sustainability Research Effectiveness |
| SRF | Strategy and Results Framework |
| SUCCESS | Support to the Development of Agroforestry Concessions in Peru |
| SWAMP | Sustainable Wetlands Adaptation and Mitigation Program |
| T4FS | Trees for food security |
| ToC | Theory of Change |
| UNFCCC | United Nations Framework Convention on Climate Change |
| UNIKIS | University of Kisangani |
| UNMUL | Mulawarman University (Indonesia) |
| USAID | United States Agency for International Development |
| USD | United States Dollar |

| | |
|---|---|
| VIP4S | Value Chains Innovation Platforms for Food Security |
| VND | Vietnamese đồng |
| VNFF | Vietnam Fund for Forest Protection and Development |
| VPA | Voluntary Partnership Agreement |
| W1-2 | Window 1 and 2 |
| WWF | World Wildlife Fund |
| YPS | Yangambi, pôle scientifique au service de l'homme et des forêts |

# Executive Summary

## Introduction

The integrative study "Outcome Evidencing and Impact Estimation: Progress on Challenges 1 & 5" aims to assess the extent to which FTA has contributed to solving key global challenges since its inception in 2011. This report was prepared by the FTA Monitoring, Evaluation, Learning and Impact Assessment (MELIA) specialists in CIFOR-ICRAF, Bioversity International, FTA, and in close collaboration with the Royal Roads University's Sustainability Research Effectiveness (SRE) team.

The Forests, Trees and Agroforestry (FTA) CGIAR Research Program (CRP) represents a substantial investment of over half a billion USD over the past ten years. Its research agenda aims to develop solutions to major societal problems as a way to contribute to developmental and environmental impacts on a large scale. In practice, FTA is an umbrella for different and often interrelated research initiatives. At present, hundreds of research initiatives have been implemented in diverse country contexts, policy and research environments, geographies, landscapes, and socioeconomic conditions of local communities, to address pressing issues related to FTA. In 2016, FTA set aspirational impact targets to which it aimed to contribute. Nearing the end of the program, this study seeks to evidence and understand the extent and nature of FTA's contributions and the likelihood that the high-level targets will be realized over time. To do so, the MELIA team has focused its efforts on evidencing outcomes and laying the ground for estimating impacts of FTA in five distinct, albeit inter-related, areas or "challenges":

- Challenge 1: Accelerating rates of deforestation and forest degradation;
- Challenge 2: High prevalence of degraded land and ecosystem services;
- Challenge 3: Unsustainable land use practices widespread;
- Challenge 4: Persistent rural poverty with increasing levels of vulnerability; and
- Challenge 5: Rising demand and need for nutritious food for both current and future generations

This report addresses FTA contributions to Challenges 1 and 5, while the other Challenges will be assessed in a subsequent edition of this report, in 2021.

## Methodology

This report aims to assess the importance and scale of the challenges and document and evaluate what has been done to address them. The team applied the following methodological steps. First, a comprehensive mapping of projects to frame FTA contributions to the five challenges was conducted. The team carried out multiple interviews and desk reviews to identify research clusters by theme and geography. All available information was used to develop and document composite ToCs (i.e., combining ToCs for related programs/projects) for each of the five challenges. Available evidence was collected and organized to test each element in the ToCs. while critical data and knowledge gaps were identified. A subsequent step will focus on collecting additional data as needed to assess outcomes, estimating impacts using projections from available documentation and evidence, and making plausible connections between FTA contributions to outcomes and the likelihood for potential impacts to be realized in the future.

## Challenge 1: Deforestation and Forest Degradation

### Theory of Change

An overarching theory of change (ToC) as well as eleven cluster-level ToCs were developed retrospectively based on data collected through interviews and desk review. Key drivers of deforestation and forest degradation, such as poor forest management and lack of transparency of information and governance, have been addressed by providing knowledge that frames issues, generating data on forests to understand current conditions and trends over time, developing policy solutions and innovations, offering guidance and support for implementation, and/or social process contributions via capacity-building and targeted engagement to multiple actor groups through different processes. FTA's research and engagement efforts aims to contribute to the reduction of deforestation and forest degradation by informing and influencing a wide range of actors, from researchers, government policy-

makers, NGOs, boundary partners and allies, the public, to the corporate-scale and small-scale private sector actors. FTA aims to contribute to enhanced forest protection through the establishment of better regulated conservation areas (in particular in Guatemala, Nicaragua, Mozambique, Congo Basin, Peru, and Indonesia), improvement of forest monitoring systems and market function (in particular in Cameroon, Ghana and the DRC), improvement of REDD+ policies and practices (in particular in Vietnam, Indonesia, Cameroon, Tanzania, DRC, Ethiopia, Peru and Brazil), reduction of instances of forest fires (in Indonesia) and of agricultural expansion into natural forests for cash crop production (in Indonesia and Peru).

#### Results

The assessment to date indicates that FTA has made some notable achievements to influence policies, practices and research to contribute to reductions in deforestation and forest degradation. Some examples are: a FTA research-informed new Forest Law in Cameroon, the development of a national Payment for Forest Environmental Services (PFES) policy in Vietnam, the contribution to the 2011 Forest Moratorium in Indonesia, the support to Indonesia's FREL through refined greenhouse gas (GHG) accounting in wetlands, the contribution to the development of the Intended Nationally Determined Contributions (INDC) in Peru and Colombia. Yet, the assessment highlights that additional data collection is required to get a fuller picture and more robust assessment for what has been achieved to date to address the challenge and make impact estimations.

### Challenge 5: Food and Nutrition Security

#### Theory of Change

An overarching ToC and four cluster-level ToCs were developed retrospectively based on data collected through interviews and desk review. FTA's research aimed to contribute to improved food and nutritional security through scaling up food trees on farm, integrating trees in cropping fields for sustainable staple food production, improving dairy production through tree fodder, and improving policy interventions to support nutrition outcomes.

FTA knowledge products and technologies were expected (implicitly) to have translated into improvements in policy and practice through targeted engagement with relevant stakeholders, involving both a) the co-production of evidence and fit-for-purpose farmer engagement approaches and agroforestry practices; and b) the direct provision of technical support and improved tree and fodder germplasm and the strengthening of delivery systems. The evidence generated through FTA-related research in particular was (and is) expected to galvanise more donor and government support on the role of trees and forests in promoting food and nutritional security, particularly for smallholder farmers and forest proximate communities.

This, in turn, was expected to have reinforced work undertaken with NGOs, local governments and research institutions, and the private sector to scale-up the production of food tree crops, tree fodder, and agroforestry technologies, such as fertilizer tree systems, on-farm, as well as reinforce forest conservation efforts while allowing continued and enhanced access for local communities. Small-scale producers were expected to have engaged in large numbers in these initiatives, taking up the contextually appropriate agroforestry practices and improved tree germplasm. Increases in the production of more diverse and nutritious foods are expected to follow suit, as well as sustainable improvements in total farm productivity (c.f. the sustainable land use and restoration ToC) and enhanced smallholder income (c.f. the persistent rural poverty ToC). Forest proximate communities are expected to maintain or (re)gain enhanced (and safer) access to forest resources, including to wild foods (reinforced for the deforestation/forest degradation ToC). Improved or sustained consumption and marketing of nutritious foods for both small-scale producers and forest proximate communities is finally expected to take place, benefiting both groups, as well as other consumers further down the value chain.

#### Results

The assessment to date indicates FTA has made notable achievements to reach farmers and households across Asia, Africa, and Latin America to improve their food and nutritional security. As depicted in Table 5, FTA research has succeeded to support scaling up food tree production on farm (24,000 households across ten target countries adopting food trees), the integration of trees in cropping fields for sustainable food production (at least

31,000 households adopting Fertilizer Tree Systems in Malawi, a further 32,000 households integrating trees into cropping fields more generally in eight other countries) improving dairy production (over 19,300 dairy farmers adopting Fertilizer Tree Technology in Kenya and Uganda), and engaging donors and policy stakeholders to co-develop policy interventions for nutrition (Ethiopia has drawn on FTA research to design government's nutrition sensitive interventions). Similar to the results in the deforestation and forest degradation challenge, there is scope for further data collection to gain a more robust assessment for what has been achieved to date and estimate the impact of FTA contributions.

**Lessons**

Some lessons learned are discussed in the report, focusing on the study process itself. It is worth noting that the different project information databases at FTA center-level vary in terms of completeness, which made the mapping exercise quite challenging. Not all projects have explicit ToC narratives or models that are already documented, hence substantial desk review and a targeted series of interviews was required to situate these projects in the composite models. Developing these composite ToCs was also challenging, as some research efforts and outcomes were sometimes unclear, or the use of MELIA terms was not consistent from one project to another, thus making connections between projects not always easy.

**Next Steps**

A subsequent edition of this report will fill identified gaps at impact level for both Challenge 1 and 5. A preliminary prioritization based on the evidence appraisal indicates that clusters require variable levels of data collection (and therefore time and resource investment) to make plausible impact estimations, and for some clusters (i.e., those with many projects and no reliable evaluation data), data collection will be so time and resource intensive, that the clusters may not be worth pursuing. In parallel, the team will expand the FTA Integrative study to address the remaining Challenges 2, 3, and 4, using a similar approach and building on what has been learned to date from assessing Challenges 1 and 5.

# Introduction

FTA, as an integrated program, is particularly challenging to evaluate. It comprises five distinct research themes (i.e., Flagship Programs (FPs)), and each FP comprises multiple projects, most of which are funded bilaterally. Moreover, the Windows 1 and 2 funding targets a set of 25 demand-driven operational priorities focusing on different areas of the program. Arguably, therefore, FTA can be characterized as an umbrella for several distinct, albeit related, research initiatives. However, as with Grand Challenge Programs and other large transdisciplinary programs, FTA is expected to devise solutions to pressing societal problems and, in turn, contribute to tangible developmental and environmental impacts on a large scale. These expectations (Table 1) are manifested in a set of objectives and targets contributing to the ambitious targets (set in 2016) that the CGIAR is expected to deliver by 2022:

- 31 million more farm households have adopted improved varieties, breeds or trees, and/or improved management practices
- 19 million people, of which 50% are women, helped to exit poverty
- Improve the rate of yield increase for major food staples by 0.1845%/year
- 17 million more people, of which 50% are women, meeting minimum dietary energy requirements
- 0.225% increase in water and nutrient (inorganic, biological) use efficiency in agroecosystems, including through recycling and reuse (same target)
- Reduce agricultural-related greenhouse gas emissions by 0.2 Gt $CO_2^{-e}$ yr compared with business-as-usual scenario in 2022
- 30 million ha degraded land area restored
- 2.5 million ha of forest saved from deforestation

The causal links between research and impact are long and complex, making it impossible to precisely measure FTA's contribution to these targets. This document presents FTA's integrated impact estimation strategy. Its development was motivated, in large part, by the need to generate evidence of contributions to the above targets.

**Table 1.** FTA's Expected Results (as noted in FTA's Phase II Proposal)

| End of Program Outcomes | Intermediary Development Outcomes (IDOs) | System-level Outcome (SLO) Target | FTA Target Contribution |
|---|---|---|---|
| 1. 25 countries improve governance mechanisms, institutions & tools for a) safeguarding forests/tree diversity and b) equitably managing forests & trees within mosaic landscapes | Improved ecological integrity, equitable mgt. & protection of forests & non-forest-based tree resources (IDOs 3.1 & 3.3)<br>1. Enhanced ecosystem service provision (e.g., carbon storage, nutrient cycling, water filtration & soil health) (IDOs 2.3 & 3.2)<br>2. Increased resilience of female, male & poor smallholders & other forest/tree users to climate change & other shocks (IDO 1.1)<br>3. Productivity, food & nutritional security & incomes for female, male & poor smallholders & | 1. 100 million more farm households have adopted improved varieties, breeds or trees, and/or improved management practices<br>2. 30 million people, of which 50% are women, helped to exit poverty<br>3. Improve the rate of yield increase for major food staples from current <1% to 1.2-1.5% per year<br>4. 30 million more people, of which 50% are women, meet minimum dietary energy requirements<br>5. 5% increase in water and nutrient (inorganic, biological) use efficiency in agroecosystems, including through recycling and reuse (target same)<br>6. Reduce agricultural-related GHG emissions by 0.2 Gt $CO_2^{-e}$ $yr^{-1}$ (5%) compared with business-as-usual scenario in 2022<br>7. 55 million ha degraded land area restored | 1. 31 million<br>2. 19 million<br>3. 0.1845%<br>4. 17 million<br>5. 0.225%<br>6. 0.2 Gt $CO_2^{-e}$ $yr^{-1}$<br>7. 30 million<br>8. 2.5 million |
| 2. About 20 multinational companies and 500 private sector actors pursue models & investments for a) improved mgt. & safeguarding of forest & tree resources and b) enhancement of inclusive landscape-based livelihoods & ecosystem services | | | |
| 3. National and sub-national public & private sector actors in 25 countries deliver more effective & equitable tree related breeding, delivery, extension & pedagogical services | | | |
| 4. At least 40 million smallholders & other users access more productive tree planting material & uptake higher performing, context | | | |

| | | | |
|---|---|---|---|
| appropriate & inclusive AF & small-scale forestry mgt. option | other forest/tree users (IDOs 1.2-1.4, 2.1) | 8. 2.5 million ha of forest saved from deforestation | |

To structure this study, FTA's strategy is framed as addressing five challenges:

- Challenge 1: Accelerating rates of deforestation and forest degradation;
- Challenge 2: High prevalence of degraded land and ecosystem services;
- Challenge 3: Unsustainable land use practices widespread;
- Challenge 4: Persistent rural poverty with increasing levels of vulnerability; and
- Challenge 5: Rising demand and need for nutritious food for both current and future generations

To address each of these challenges, multiple strands of research are being spearheaded by various global, regional, and country research teams. Assessing both the importance and scale of the challenges (as they manifest in the contexts in which FTA operates) as well as documenting and evaluating what has been done to address the challenges are expected to support two things: i) the generation of coherent 'impact narratives' on what FTA and its partner institutions (i.e., CIFOR, ICRAF, Bioversity International, CIRAD, CATIE, INBAR and Tropenbos) have done and are doing to address some of the most pressing challenges of our times; and ii) the estimation of outcomes and impacts of this work.

This report will focus on progress made to date on outcome evidencing and impact estimation for Challenge 1 (Deforestation and Forest Degradation) and Challenge 5 (Food and Nutrition Security). We begin by describing the methods and process for outcome evidencing and impact estimation. We then present the overarching Theory of Change (ToC) for Challenge 1, and report on results of FTA's contributions to address deforestation and forest degradation in terms of outcomes realized and impacts estimated for each cluster of work under Challenge 1. Similarly, for Challenge 5, we present the overarching ToC followed by results. The results for Challenge 1 and Challenge 5 are presented separately, with accompanying tables and narratives that are linked to their respective ToC analytical frameworks. The following section leads into a discussion of the lessons to date in terms of common and distinct barriers encountered through the assessment processes for the two Challenges under review. We conclude with next steps in the outcome assessment and impact estimation for Challenges 1 and 5 as well as Challenges 2, 3, and 4 which will begin in 2021.

## Methodology

This assessment examines whether and how FTA contributed to government (subnational, national, and international) and organization policy and development practice changes that would influence social and environmental change in the contexts where FTA research operates, and beyond. The assessment uses a theory-based evaluation approach (Belcher, Davel, & Claus, 2020) to model collective FTA activities and outputs as well as intended outcomes and impacts and to estimate (potential) FTA contributions to aforementioned impact targets (Table 1).

The assessment investigates how FTA has generated new knowledge, attitudes, skills, and relationships among key actors to address deforestation and forest degradation (Challenge 1), land degradation (Challenge 2), unsustainable land management (Challenge 3), poverty (Challenge 4), and food security and nutrition (Challenge 5). The objective of this report is to critically assess the portfolio of FTA research by collecting and analyzing information about its activities, outputs, and outcomes to provide plausible impact estimations, as well as support learning for research effectiveness and impact.

The assessment is guided by the following questions:

***1. Research Outcome Evaluation:*** To what extent and how did FTA's research portfolio realize outcomes in each of the five challenges?

*i. What is the evidence that outcomes have been realized?*
*ii. Could the outcomes have been realized in the absence of FTA?*
*iii. Were there any positive or negative unexpected outcomes?*

iv. *Were the ToC assumptions valid?*

2. ***Impact Estimation:*** What is the scope and scale of impacts to which FTA's research portfolio has contributed in each of the five challenges?

i. *What is the spatial location and extent where the impact is (likely to be) realized?*
ii. *What plausible ranges of effects have and are likely to manifest (e.g., reduced carbon emissions per ha; increased income per household)?*
iii. *What key assumptions are required to estimate the impact?*
iv. *How sensitive is the estimation to varied assumptions?*

The assessment uses a set of composite ToCs as the main analytical frameworks. A ToC is a set of projected causal relations, hypotheses, and assumptions that describe and model how and why a project or program is expected to contribute to a change process. The ToC details the main activities and outputs, identifies key actors involved in the change process, specifies their actions as a sequence of steps or stages (i.e., outcomes) in the process, and exposes the theoretical reasoning for the expected changes (Earl, Carden, & Smutylo, 2001; Vogel et al., 2007). The ToC aims to explain who (i.e., individuals and organizations) is expected to do what differently and why as a result of FTA research and engagement. Given that FTA is diverse and comprises numerous individual research-for-development projects, efforts will be made to systematically document what work has and is being undertaken vis-à-vis each challenge. The iterative process for developing the overarching ToCs and cluster-level sub-ToCs is explained below.

*Step 1. Mapping projects to frame FTA contributions to addressing the five challenges*

As an overarching FTA-level ToC did not exist to guide FTA's programs to address the specific challenges, the first step was to retrospectively map FTA-funded projects to the five challenges. Owing to the integrative nature of the challenges, many projects could relate to one or more of the five challenges, so primary and secondary challenge categories were mapped by project when possible. This first step defined research clusters by theme and geography. We could then specify the evidence required to assess whether the ToC was realized, and to qualify and quantify the scope of outcomes and impacts.

*Step 2. Explicating composite overarching and sub-ToCs for Challenges 1 and 5*

Following the initial sorting of FTA projects according to the challenges and distinct research clusters within those challenges in Step 1, the evaluation team selected two challenges to begin ToC documentation to develop, test and refine the method before moving on to the remaining three challenges. The evaluation team divided the task of ToC documentation for Challenge 1 and Challenge 5.

Each team undertook a thorough desk review of project materials mapped to the respective challenge and consulted with scientists and Flagship leaders to guide the development of the ToC logic models. Some projects had explicit ToCs documented, but most had only implicit or very general ToCs available. Key ToC components were mapped in a database to identify key activities, outputs, outcomes, and impacts at the project-level. Population of the database and the mapping exercise enabled the evaluation team to first organize ToC components by project and then group similar projects by topic and/or geography into distinct clusters within the database. For example, clusters of projects addressing particular sub-challenges (e.g., fire and haze, REDD+, FLEGT, tree crops, fodder tree technologies, etc.) were identified through this process. Clusters could also be specified by the location of the research and engagement and by the intended application domain; that is where the intended outcomes and impacts were expected to manifest (e.g., extensive research efforts on sustainable forest management (SFM) have been supported by FTA, but in different geographies such as Mesoamerica, the Congo Basin, and Southern Africa that each aim to influence different actor groups and processes specific to each region). Eleven clusters were identified for Challenge 1 and four clusters were identified for Challenge 5. Following the clustering of projects, ToC components were aggregated to conceptualize the key activities, knowledge and social process contributions, outcomes and impacts for each cluster, resulting in a cluster-level sub-ToC. Cluster-level sub-ToCs were sufficiently broad to convey the logic of the challenge, with specific

project-level details mapped within each component (in Changeroo for Challenge 1; in Miro for Challenge 5[1]). The clusters then helped specify where and how FTA research and engagement have addressed each of the challenges, and it was possible to derive an overarching ToC and narrative for each challenge. This was an iterative process, which enabled and continues to enable subsequent identification and integration of additional projects (and clusters) that could be mapped to the challenges.

This analytical framework provided the structure for a review of available evaluation documents and data to both provide evidence to test the ToCs and identify gaps that can inform the empirical data collection phase, which are further described in the following steps.

*Step 3. Collating existing evidence by challenge to identify gaps*

FTA has commissioned theory-based evaluations and impact assessments of several of its projects, which provide an initial base of evidence that can be built upon in this study. In order to identify where the evidence base is strong and where additional empirical evidence needs to be collected to fill gaps, we mapped the available evaluation evidence (i.e., use/uptake of outputs, outcomes, impacts) and systematically reviewed evidence for each project. In cases where external evaluations were not available, other documents were reviewed to collate available evidence or indications of potential evidence (e.g., annual reports, outcome stories, midterm/quarterly reports, final reports, peer-reviewed articles, theses, briefs, etc.).

Evaluation evidence sources for Challenge 1 included:

- 8 evaluation reports
- 4 annual reports (CIFOR/FTA)
- 5 outcome stories
- 30 midterm/quarterly reports
- 14 final reports
- 12 peer-reviewed articles
- 2 theses
- 2 briefs

Evaluation evidence sources for Challenge 5 included:

- 5 impact evaluation papers
- 7 adoption surveys
- 7 final project reports
- 3 quantitative datasets

Evidence sources were then assessed for reliability and confidence. The reliability of evidence sources was determined by an assessment of whether the source was internally produced (lower reliability) or conducted by an external evaluation (higher reliability). It was thought that external reports are providing an additional level of quality control of the evidence. The confidence of evidence sources was determined by an assessment of the quality of the evidence source (criteria included methodological approach (e.g., theory-based evaluation, quasi-experimental design), primary versus secondary/tertiary data collection, level of detail, indications versus clear realization, triangulation of evidence, etc.).

This exercise has highlighted which clusters (and projects within those clusters) have: i) strong and likely sufficient evidence to make a reliable assessment; ii) key evidence gaps that are relatively low-hanging fruits to supplement; and iii) key evidence gaps that will be time and resource-intensive to assess. This will enable the evaluation team to prioritize which clusters (and/or projects to represent the clusters) across the two challenges to focus on for additional empirical data collection and planning the next steps of the assessment process.

*Step 4. Impact estimation*

This step will use evidence and information from the preceding methods to estimate plausible ranges of FTA's

[1] The team applied different tools for testing purposes in order to identify the best one for working on Challenges 2,3 and 4 later

impact vis-à-vis the intended targets for each challenge, as well as other potential impacts including those that may be negative. Impacts will be estimated on the basis of projections and estimations from available documentation and evidence, making plausible connections between FTA contributions to outcomes and the likelihood for potential impacts to be realized in the future. The previous steps surfaced, assumptions underpinning the documented impact targets, and some preliminary projected impact figures. It will be critical for the impact estimation exercise to explicitly discuss the sensitivity and implications of the underlying assumptions as part of the reasoning and demonstration of likelihood for impact realization. Where no impact projections or targets were listed in documentation, the team has provided some suggestions for how to collect and estimate corresponding impacts by cluster (if possible).

*For Consideration*

The FTA research framework is implemented by CIFOR, ICRAF, Bioversity International, in close partnership with CIRAD, CATIE, INBAR, Tropenbos. Together with other partners they deliver technologies, innovations, and policy recommendations that have different stages of maturity along intricate and non-linear impact pathways that span from farm to landscape to policy levels.

CIFOR, ICRAF, and Bioversity International approach the implementation of FTA research in different ways, with different focal points, and aim to exert influence through different pathways[2]. CIFOR covers a broader range of pathways to influence policy, practice, and research. CIFOR conducts demand-driven research, co-producing knowledge with relevant stakeholders from these areas, while the level of engagement with actors of these stakeholder categories (policy, practice, research) differs between projects. ICRAF aims to work closely with communities and implementing partners (e.g., NGOs) to exert influence at the farm- and community-level through development-style projects. Similarly, Bioversity International focuses their research on delivering innovations and technologies developed with local communities and implementing partners (e.g., NGOs) that are directly impacting the livelihoods at the farm and community-level, and the resilience of the ecosystem.

These differences in approach are the reason why the following two sections assessing FTA's contributions to Challenge 1, which has a strong CIFOR-research component, and Challenge 5, which has a strong ICRAF research component, are structured in a slightly different manner, as they attempt to document and evidence different types of impact pathways.

[2] Given the strong weight of these centers in the FTA program in terms of number of projects and hence their prominence in this study, the following approach description refers to these only.

# Challenge 1: Accelerating Rates of Deforestation and Forest Degradation

## Theory of Change

Deforestation and the degradation of forests constitute an important focal area of scientific and applied research for the FTA CRP. FTA works globally, supporting research across Asia, Africa, and Latin America. FTA's research addresses the following drivers of deforestation/forest degradation:

1. Poor forest management, transparency of information, and governance;
2. Illegal logging;
3. Anthropogenic burning and natural forest fires;
4. Agricultural expansion in forested areas (in many cases overlapping instances of burning)

FTA research addresses the following effects of deforestation/forest degradation:

1. Resulting carbon emissions exacerbating the effects of climate change;
2. Resulting haze and health impacts from anthropogenic forest fires;
3. Resulting livelihood impacts from forest resource scarcity

FTA addresses these inter-related aspects of deforestation and forest degradation by providing knowledge that frames issues, generating data on forests to understand current conditions and trends over time, developing policy solutions and innovations, offering guidance and support for implementation, and/or social process contributions via capacity-building and targeted engagement to:

1. Improve governance and management of natural forest resources by informing and supporting the development of legal frameworks (FLEGT, fire prevention, regulations for specific agricultural commodities, agroforestry concessions) that provide incentives to change practices in order to reduce deforestation and forest degradation;
2. Improve mechanisms for climate mitigation (REDD+, wetlands, agroforestry) to align mechanisms for reducing deforestation with the climate change agenda;
3. Garner support from development NGOs and other organizations with similarly aligned objectives;
4. Improve private sector and community practices to reduce deforestation and forest degradation

There are multiple pathways to these goals, which involves the engagement of multiple actor groups and multiple processes. FTA's research and engagement aim to influence the following actors/action arenas (Figure 1):

1. Researchers advancing issues on the topics of deforestation to improve the knowledge base and advance research agendas (via collective academic efforts, publishing, engaging in academic debates, engaging research funders);
2. Government policymakers developing and revising national and sub-national policy (via improving technical capacity, data access, framing issues to garner attention for action) and government agencies tasked with policy implementation;
3. NGOs', (boundary) partners', and allies' advocacy to push for mechanisms and ways to reduce deforestation (via framing issues and improving access to quality data), this applies to both policy and practice;
4. The public, better informed through networks and the media, hold governments and large corporations accountable for more sustainable policies and practices, and change their own consumption patterns.
5. Corporate-scale private sector (i.e., large-scale companies) changes its practices, including:
    a. Supply chain transparency and management
    b. Compliance with regulations and adherence to principles of zero deforestation commitments and corresponding certification schemes
    c. Better agricultural practice that does not contribute to forest loss and degradation
6. Small-scale private sector (i.e., smallholders and SMEs) changes its practices, including:
    a. Formalization;

b. Awareness-building for available policy mechanisms and certification schemes;
c. Eligibility identification and compliance capacity development with available policy mechanisms and certification schemes;
d. Piloting and long-term compliance support with available policy mechanisms and certification schemes

Through the realization of the above outcomes, it is expected that FTA's research will contribute to reduced deforestation and forest degradation through:

- Enhanced forest protection through the establishment of better regulated conservation areas and more sustainable forest management (in Congo Basin, Indonesia, Peru, Mozambique, DRC, and Guatemala)
- Improved forest monitoring systems (e.g., FLEGT/VPA) and market function to reduce instances of illegal logging globally, with a particular focus in Central and West Africa (e.g., Cameroon, Ghana, Gabon, Ghana, Liberia, Sierra Leone, Tanzania, Cote d'Ivoire, Zambia, and DRC)
- The effective implementation of REDD+ policies and practices to reduce deforestation-driven climate change (globally, with a particular focus in Indonesia, Vietnam, Brazil, Peru, Tanzania, DRC, Cameroon, and Ethiopia)
- Reduced instances of forest fires (in Indonesia)
- Reduced agricultural expansion into natural forests for cash crop production (in Indonesia and Peru)

Key assumptions underpinning FTA's contributions to reduced deforestation:

- FTA holds a significantly credible position in the academic realm in research for/in development, and is therefore able to exert influence over the way research agendas advance
- The policies to which the research has contributed are effectively implemented and enforced to reach intended targets for reductions in deforestation (i.e., policy changes are sufficient to influence practice and reduce deforestation)
- NGOs, partners, and organizations with sustainability objectives are actively seeking out evidence to support their campaigns and programs to continue to work with policymakers, communities, and the private sector in efforts to reduce deforestation and reverse forest degradation
- The public is aware and informed of possible ways to reduce deforestation and forest degradation and is actively campaigning for change at policy, practice and individual levels
- Large companies uphold commitments to zero deforestation as a result of policy and market pressures
- As smallholders and SMEs gain access to formal markets and tenure via enabling policies that reduce barriers, these groups are better equipped to comply with sustainability requirements
- All actor groups that receive training from FTA interventions benefit and obtain new knowledge, skills, and relationships as a result, and are both motivated and capable of leveraging their knowledge and relationships and applying their skills in their work

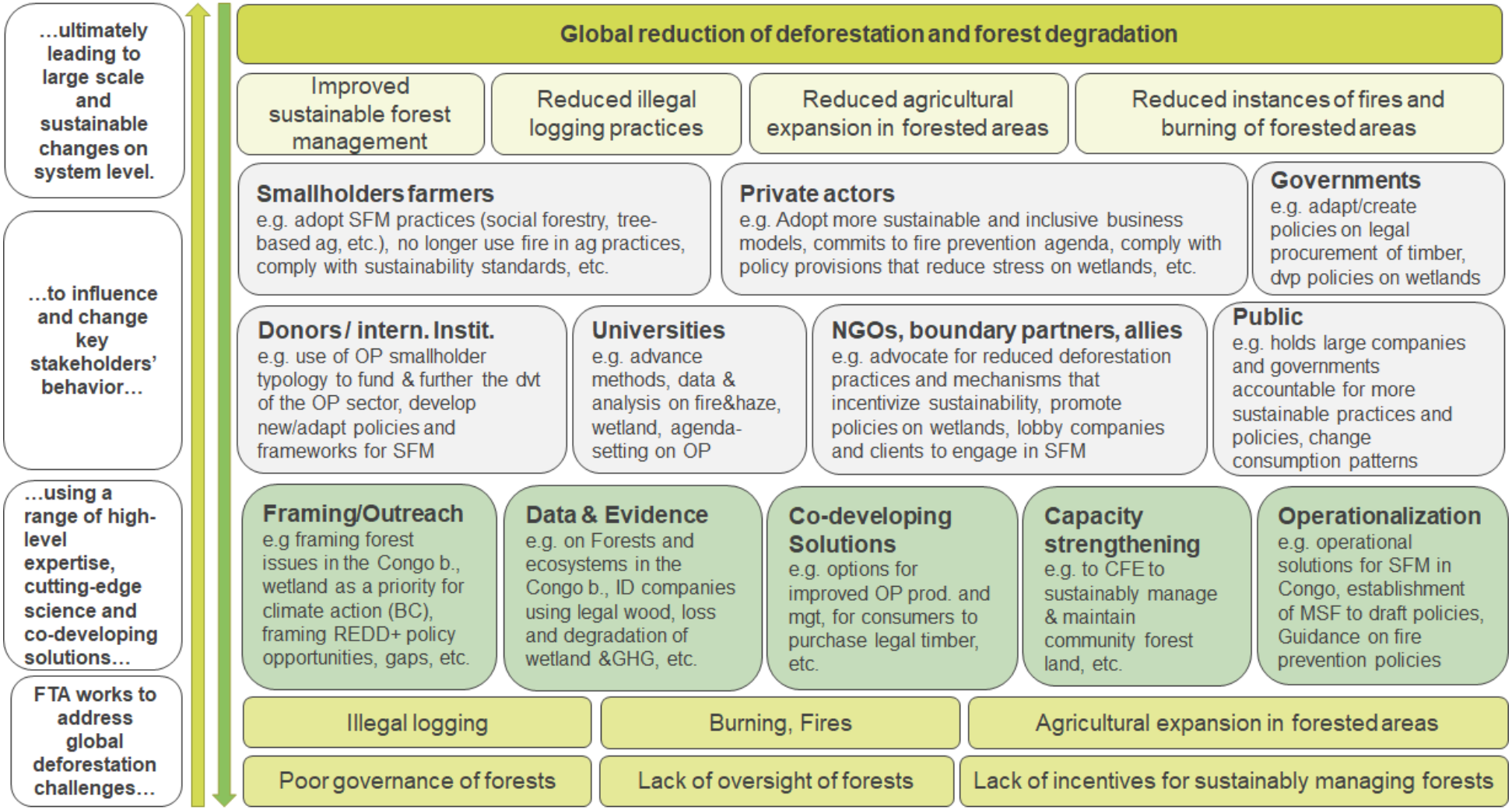


**Figure 1.** Overarching ToC outlining FTA contributions to Challenge 1 (Deforestation and Forest Degradation).

Detailed cluster-level sub-ToCs for Challenge 1 can be found Appendix 1 (see also Changeroo).

## Results

The preliminary results presented in this report begin to answer the guiding research question for the research outcome evaluation: To what extent and how did FTA's research portfolio realize outcomes in each of the five challenges? In this section, we summarize the extent to which there is reliable evidence that outcomes and impacts in the overarching Deforestation and Forest Degradation ToC (Figure 1) and the respective cluster-level sub-ToCs (see Figures 3-13 in Appendix 1) were realized. The results focus on: i) the available evidence of outcome realization (Table 2); ii) an assessment of evidence available (i.e., in terms of reliability, confidence, and gaps of current evidence) (Table 4); and iii) what evidence remains to be collected and a plan to collect additional outcome evidence and estimate associated impacts.

Table 2 illustrates the main contributions to outcomes in terms of policy[3] influence, practice influence, and research influence that have been realized for each cluster of research and engagement. The assessments are based on available evaluation evidence (i.e., theory-based outcome evaluation reports, outcome stories, final reports, annual reports, etc.). The purpose of the table is to build connections between outcomes and the intended potential impact estimations based on available evidence to date.

**SFM in Mesoamerica Cluster Results:** To enhance the conservation of forest resources and socio-economic benefits in Mesoamerica, FTA supported a project that investigated the socio-economic benefits and governance-related constraints and opportunities of community forestry in the Guatemalan and Nicaraguan contexts, as well as supported participatory germination trials with communities. There are indications that the study contributed to policy influence in Guatemala through CONAP and ACOFOP who have advocated for renewal of community forest concessions. The project also supported community practices changes in Peten, Guatemala through experiential training and germination trials. Research influence includes successful research collaborations, graduate student research capacity-building, and a continuation of the research in a new pilot by a research partner. The associated impacts on deforestation reductions via FTA's influence on policy, practice, and research on SFM in Mesoamerica will be addressed in the next phase of the integrative study.

**SFM in Southern Africa Cluster Results:** To influence sustainable management and conservation of miombo woodlands in Mozambique, FTA supported a project that investigated the damaging effects of fire and honey harvesting practices on important tree species in the Niassa National Reserve and developed recommendations for reserve managers and communities to more sustainably manage and conserve Reserve tree cover. While there is no evidence of policy influence to date, the project contributed to practice change and influenced research pathways. Reserve managers gained knowledge of and capacities to improve conservation practices within the Reserve, such as the monitoring of communities' logging and honey harvesting activities. Further promising practices changes have been observed, such as the revival and uptake of traditional honey harvesting methods by nine groups of honey hunters. Research capacities were also built in efforts to stimulate a critical mass of Mozambican researchers in sustainable forest management. The associated impacts on deforestation reductions via FTA's influence on practice and research on SFM in Southern African will be addressed in the next phase of the integrative study.

**SFM in Congo Basin Cluster Results:** To promote SFM in the Congo Basin, changes at the policy and market level are essential as well as the establishment of sustainable agroforestry options. CIFOR, ICRAF, and Bioversity International worked predominantly in DRC, Cameroon, and Gabon, with diverse focus points, ranging from capacity-building and training, research on value chains and the socio-cultural relevance of indigenous tree species and threats, as well as the establishment of multi-stakeholder fora, and support to boundary partners for tree-planting activities to reduce deforestation rates in the region. In terms of policy influence, FTA raised the awareness of the importance and relevance of the abovementioned topics; the Commission of Central African Forests (COMIFAC) endorsed recommendations for forest management co-produced by FTA projects to meet both the demands of local communities and timber concessionaires and reduce the potential for conflict and other

[3] This study uses a broad definition of policy, which is defined as a decision or commitment to a particular course of action (adapted from Pielke, 2007).

barriers. The actual implementation and enforcement of these recommendations require further evaluation work. In DRC, FTA supported research capacities (which have downstream influence on policy and practice) through the establishment of SFM and climate change-related topics in curricula for a masters' program at the University of Kisangani (UNIKIS). There are indications that many of the graduates of this program have gone on to work in relevant positions in the field of SFM. Furthermore, trainings have been offered to more than 1200 candidates from diverse institutional backgrounds. In addition, six research programs in forest management and biodiversity conservation in the context of climate change were initiated in partnership with Congolese and international institutions. FTA influence on practice includes indications of decreased pressures on forests of the Virunga National Park via the relocation of 2900 people (executed) and cattle (to be verified) to other areas. Eventually, it is anticipated that project partners' tree-planting activities supported by FTA's work will cover at least 7500 ha (to be verified).

**FLEGT Cluster Results:** FTA aims to promote the establishment of FLEGT compliance which will ultimately decrease illegal logging and, hence, uncontrolled deforestation. In the FLEGT/VPA cluster, the projects with a considerable relevance for the deforestation challenge are predominantly working in African countries[4]. FTA generated findings on the genetic sampling of tree species for developing DNA tools for timber tracing, inputs to the FLEGT mechanism, as well as the functioning local value chains and markets. FTA projects offered solutions to enhance the demand for legally-sourced timber in production countries, and supported local capacity-building for designing and assessing FLEGT/VPA-related activities. In terms of policy influence, FTA supported DEVCO to be more effective in documenting results about the compliance of exporters regarding legally-sourced timber. In Cameroon, FTA activities informed a new Forest Law through a policy brief, and a briefing paper was prepared for DEVCO. Later, a national public policy and conjoint decree was drafted by three ministries and forwarded to the prime minister (requires follow-up). Practice changes – expected to manifest in the private sector – are difficult to identify at this stage. Local research capacities of graduate students constitute the main research influence. The associated impacts on deforestation reductions via FTA's influence on FLEGT-related policy, practice, and research changes will be addressed in the next phase of the integrative study.

**Sustainable Forest Enterprises in Sub-Saharan Africa Cluster Results:** Awaiting access to final report for the DRYAD Project.

**Timber Markets in Sub-Saharan Africa Cluster Results:** To reduce illegal timber trade in Sub-Saharan African countries like Cote d'Ivoire, Cameroon, Gabon, DRC, and Zambia, FTA has conducted a series of projects investigating and taking stock of informal timber markets and cross-border trade. Some of the projects identified solutions for timber monitoring/tracing, enhanced value chains, and produced policy recommendations to improve the participation of smallholders and SMEs in formal markets. Evidence to date suggests FTA has had some policy influence in Cameroon and Zambia. In Cameroon, the Ministry of Forests and Wildlife established a task force for the purposes of monitoring urban timber flows and tracing corruption, though a key expected outcome of uptake of project methods to record timber flows by the task force was reported to not yet be realized. Indications of policy influence in Zambia include the forest department's reference to a project output and potential uptake and use of other findings that prompted a call for a national charcoal indaba and subsequent development of a draft policy on charcoal production and trade (though these require validation). There are also indications of practice influence, such as learning and increased capacities of timber associations in Cameroon as well as increased capacities of charcoal producers and traders to lobby governments and/or produce more sustainable charcoal (such indications also require validation). Indications of research influence include capacity-building of graduate students and research partners (to validate). The associated impacts on deforestation reductions via FTA's influence on timber market-related policy, practice, and research in Sub-Saharan Africa will be addressed in the next phase of the integrative study.

[4] FTA has been working on FLEGT/VPA in countries in other continents, most notably in Indonesia. Though, the evaluation team consider the projects operating in Indonesia to have a particular relevance for the Challenge 4 (Persistent rural poverty with increasing levels of vulnerability).

**REDD+ Cluster Results:** FTA's Global Comparative Study (GCS) on REDD+ over its lifetime (2009–2020) has produced extensive research and engagement efforts aimed at policy influence at the sub-national, national, and international levels. Globally, FTA has influenced the UNFCCC negotiations in suggesting a step-wise approach to setting reference levels, which was formally adopted in 2011. In addition, GCS research results have also clearly influenced the global UN-REDD Programme to include land tenure (in 2014), a major determinant of the equity of REDD+ schemes. At the national level, FTA's research and engagement has contributed to the Peruvian National Strategy on Forest and Climate Change and stimulated the initiation of a national cross-sectorial process for the legal recognition of peatlands. FTA's expertise on peatlands and deep engagement in Peru led to the initiation of a process for the legal recognition of peatlands in the country. FTA has also demonstrably increased the capacity and influenced the behaviour of national policy-makers and other actors, for example in Peru and Indonesia, to promote effective, efficient and equitable (3E) REDD+ approaches. In Asia, FTA research has been instrumental (and award-winning) in supporting the development of a national Payment for Forest Environmental Services (PFES) policy in Vietnam, which was approved by the government and is being adopted by all provinces in the country. CIFOR became part of a National Task Force to help develop Vietnam's Forestry Development Strategy (2020–2030) through 2045. In Indonesia, CIFOR was involved in the development of the Indonesian National REDD+ Strategy. Data produced by CIFOR informed Indonesia's forest moratorium and forest reference emission levels (FREL), and CIFOR directly supported the establishment of the Indonesia National Carbon Accounting System (INCAS) in 2015. Currently, CIFOR supports the improvement of Indonesia's FREL through refined greenhouse gas (GHG) accounting in wetlands. In Africa, FTA's research contributed to the Cameroon Readiness Preparation Proposal. FTA engagement with government technical staff in Guyana and Ethiopia resulted in both countries adopting CIFOR's stepwise approach to measurement, reporting and verification (MRV) of GHG mitigation measures, and continuously improving and adapting the forest and natural resource monitoring capacities. The associated impacts on deforestation reductions via FTA's influence on policy, practice, and research on REDD+ are yet to be clarified. Further assessment is needed, for instance on how effective the enforcement of Indonesia's forest Moratorium Policy has been (a full enforcement would potentially lead to the protection of 64.2 million ha of forest). Also, an effective enforcement of Vietnam's PFES policy could ultimately result in the protection of 3.5 million ha of national forest.

**Wetlands Cluster Results:** Through CIFOR, FTA is based on ground-breaking research on wetlands, including a pivotal 2011 discovery that they store three to five times more carbon than other tropical forests, most of it in the soil. Rooted in a strong evidence base, FTA has influenced national and international-level policy through the development of strategies and technical methods of sustainable wetland management policy in Indonesia and the UNFCCC. In addition to the notable policy influence through SWAMP project researchers' active engagement in key national and global policy events, this body of work has also had substantial research influence through a variety of highly cited and influential articles tailored for diverse audiences. These contributions, along with the development of new tools and methods, and an improved access to data and evidence on wetlands issues, have influenced the research agenda on wetlands. FTA has also contributed to practice changes at local community and private sector levels in the coastal zones where the projects operated in terms of climate adaptation and mitigation strategies for local community development and adapted private sector approaches for coastal infrastructure and development. The associated impacts on deforestation reductions via FTA's influence on policy, practice, and research on wetlands will be addressed in the next phase of the integrative study.

**Fire and Haze in Indonesia Cluster Results:** To reduce instances of forest fires causing deforestation in Indonesia, FTA has undertaken long-term research and engagement in Riau (since 2015) to investigate fire causes, social aspects of fire, hotspot locations, supported communities to implement community-based fire prevention and restoration models, and developed policy inputs for a national strategy on fire prevention. The research and engagements have achieved policy influence at the national level on fire prevention. The Grand Design of 2017-2019 to which the research contributed targets an area of 2.4 million hectares in Indonesia, where peatland burning is prohibited. The impact estimation rests on the assumption that no fires in the area arise from natural causes, and that the policy is effectively implemented and enforced to incentivize reductions in burning on peatlands. The

research and engagement have also succeeded in supporting communities to come together to institutionalize fire prevention, and take collective action to apply new practices including sago planting and canal blocking as preventative fire practices. It is reported that these efforts have resulted in communities applying fire prevention models to 11 ha of land in Bengkalis, Riau.

To reduce expansion of agricultural areas into natural forests for cash crop commodities, FTA has undertaken research and engagement aiming to be applied by stakeholders to reduce deforestation from expansion of the agricultural frontier for oil palm (in Indonesia), coffee, and cocoa (in Peru) plantations. FTA has undertaken research and engagement aiming to accelerate and improve the implementation of AFCs (in Peru), and to improve sustainable production of oil palm (in Indonesia) through influencing policy, practice, and research.

**Oil Palm in Indonesia Cluster Results:** In Indonesia, various FTA research and engagement efforts aimed to influence policy at subnational, national, and international levels, by either contributing directly to policy processes, or stakeholder engagement. Practice shows minimal evidence of influence, but was expected to be influenced through policy, or through market pressure as NGOs gained evidence to support their campaigns for sustainable oil palm production and used it to hold private sector accountable to zero deforestation commitments. Policy changes at the subnational levels have improved high conservation area preservation and spatial planning, policy at the international level supported better inclusion of women among RSPO member companies. Intended impacts on reduced deforestation were not reported for this body of work, but it is possible to project impact through policy review, making explicit assumptions, and using spatial tools such as the Borneo Atlas to quantify deforestation trends since the beginning of FTA's intervention in 2010.

**Agroforestry Concessions in Peru Cluster Results:** In Peru, FTA has provided research and engagement to support the implementation of agroforestry concessions. The interventions have supported identification of eligible areas, implementation challenges and opportunities (particularly for smallholders), and positioned the issue within the climate mitigation agenda by providing estimates of the potential climate mitigation impacts. The project contributed to the issuance of 14 concessions awarded to smallholders in San Martín, improving government understanding for future policy development, and succeeded in securing follow up funding with NGO and government partners. Increasing trees on farms within agroforestry concessions and the ecosystem services that follow are expected to yield sufficient livelihood benefits to reduce pressure on natural forests to be cleared for agricultural expansion. Potential impacts are projected in terms of 452 000 ha of forests, and 1 million ha land eligible for agroforestry concessions to be effectively regulated, which is projected to have an effect of a 20 percent carbon emissions reduction in Peru if agroforestry concessions are implemented to their full potential.

**Table 2.** Key results to date of outcome realization for policy, practice, and research impact pathways per cluster

| *Cluster* | *Realized Policy Influence* | *Realized Practice Influence* | *Realized Research Influence* | *Intended Impact (potential)* |
|---|---|---|---|---|
| Sustainable Forest Management in Mesoamerica | • Indication of uptake of findings by CONAP and ACOFOP in advocacy for renewal of community forest concessions in Guatemala [needs verification] | • Peten communities built capacities on germination via project training<br>• Indication of Peten community involving young people in community organizations for future leadership of community forestry<br>• Cruce a la Colorada community developed a planting scheme (with assistance of the research team) and replanted seeds from the germination trials to restore forest land [unexpected outcome] | • No access to bibliometric data<br>• Research collaboration established with Centro Universitario del Peten (6 students involved)<br>• 4 graduate students (3 masters, 1 doctoral) and 6 undergraduate students built research capacities<br>• Continuation of a research pilot in 3 other concessions following project-end | No target listed |
| Sustainable Forest Management in Southern Africa | No evidence to date | • Reserve managers learned about unsustainable honey harvesting practices and solutions using alternative traditional methods<br>• Uptake of traditional honey harvesting practices by 9 groups of honey hunters<br>• Community monitoring agents increase capacities to monitor logging and honey harvesting<br>• Wildlife Conservation Society requested access to research results to share with other organizations | • No access to bibliometric data<br>• 15 researchers built research capacities (including 4 local and 1 international graduate students)<br>• 9 local participants gained ethnobotanical and socio-economic training<br>• Uptake of findings on traditional sustainable honey harvesting practices in local educational materials | No target listed |
| Sustainable Forest Management in Congo Basin | • Indication that FTA research contributed to national management standards and legislative frameworks for SFM in Congo Basin<br>• COMIFAC endorsed and supported dissemination of FTA recommendations for forest management practices<br>• COMIFAC proposed second phase of AFDB Project | • MoU signed between the ICCN and Mashu community to relocate cows off Virunga National Park for grazing on vacant farmland<br>• Successful collaborative relocation of 2900 people from Virunga National Park to Walesse Vonkutu community<br>• Local associations and individuals support awareness-raising and/or take up agroforestry practices<br>• Multi-stakeholder workshops/ engagement opportunities for knowledge-sharing and participatory knowledge co-development established | • 25 publications, 8799 downloads, 93 citations<br>• Integration of SFM and climate change topics in curriculum of Master programme at UNIKIS<br>• DRC: More than 1200 participants from various institutions received training (e.g., MECNT, ICCN)<br>• >70 graduate students built research capacities<br>• 6 applied research programs in forest management and biodiversity conservation were initiated in partnership with Congolese and international | • FCCC Target 1: Virunga Foundation's tree planting (in agroforestry plantations) covers more than 4600 ha (potential: approximately 1.4 million tons of CO2 stocked) [verification needed]<br>• FCCC Target 2: Rehabilitate 5000 ha of natural forests in Virunga National Park (aim: 10% increase in carbon sequestration between 2013 and 2017) [verification needed] |

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| | | | institutions (South-South and South-North exchanges) | • FCCC Target 3: WWF plants 3 million trees within a 3000 ha agroforestry area<br>  • Achieved: 3153.14 ha of plantations completed, planting >5.5 million trees (potential for 900 000 tons of carbon capture) |
| FLEGT/VPA | • Cameroon: Submission of FTA policy brief to the government contributed to the development of the new Forest Law and a briefing paper for DEVCO<br>• Cameroon: A draft national public policy for the supply of legally-sourced sawn timber and a conjoint draft decree of MINFOF, MINTP, and MINMAP on the use of timber of legal origin in public procurement in Cameroon have been drawn up and submitted to the prime minister | No evidence to date | • 112 publications, 145,020 downloads, 1,474 citations<br>• Greater understanding in science of internal markets in tropical timber producer states (Cameroon, Gabon, Ecuador, Indonesia, DRC)<br>• Contribution to national research capacities through integration of students and doctoral candidates in diverse target countries (Ecuador, Indonesia, Cameroon, DRC, Gabon) | No target listed<br>• Broader contributions to foster the adoption of SFM, improve forest governance and livelihoods in producer countries, and avoid the creation of market inequalities between domestic and industrial timber sectors in West and Central Africa [to be verified] |
| Sustainable Forest Enterprises in Sub-Saharan Africa | Pending review of final report | Pending review of final report | Pending review of final report | Pending review of final report |
| Timber Markets in Sub-Saharan Africa | • Cameroon: Ministry of Forests and Wildlife established a task force to develop methods to record timber flows in urban markets<br>• Cameroon: [*outcome reported as not realized*] Government adopts project methods to record urban | • Indication of learning and capacity development by Cameroonian timber associations (e.g., ANCOVA) [needs verification]<br>• Indication that Cameroonian timber associations become government partners (e.g., ANCOVA, ANTAV) [needs verification]<br>• Indication that Zambian charcoal producers and traders are equipped to | • 5 publications, 570 downloads, 40 citations<br>• Indication that graduate students built research capacities [needs verification]<br>• Indication that research partners built research capacities [needs verification] | No target listed |

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| | timber flows to trace corruption and reduce informal payments<br>• Zambia: Forest department referred to an output on livelihood contribution of charcoal production and trade on disadvantaged women<br>• Zambia: Indication of uptake of findings by national government, prompting for a national charcoal indaba [needs verification]<br>• Zambia: Indication of draft policy on charcoal production and trade in progress | lobby government for better policy [needs verification]<br>• Indication of increased capacities to produce 'green charcoal' by Zambian producers [needs verification] | | |
| Global Comparative Study on REDD+ | • Global: FTA recommendations informed international climate negotiations for a global REDD+ agreement, which would support and increase the efficiency and effectiveness of national-level REDD+ policies (e.g., Indonesia, Vietnam, Tanzania, Peru, Brazil, Cameroon)<br>• Global: UN-REDD made tenure part of its strategy framework based on FTA research<br>• Global: FTA contributed to 6 chapters across the:<br>  • 2013 Wetlands Supplement to the 2006 IPCC Guidelines for National GHG Inventories<br>  • 2019 Refinement to the 2006 IPCC Guidelines | • Global: FTA expertise contributed to a UNFCCC decision in 2011 recommending a stepwise approach on setting, measuring and reporting reference levels<br>• Global: Support in the development of the Green Climate Fund's (GCF) sectoral guidance for ecosystems, land use and forestry and contributed to GCF's Learning-Oriented Real-Time Impact Assessment (LORTA) initiative<br>• Global: FTA provided support to the European Commission on Transparent Monitoring and REDD+ Finance<br>• Global: FTA supported improved monitoring, measurement, reporting, and verification (MMRV) systems in Indonesia, Vietnam, Guyana, Ethiopia, and Peru<br>• Peru: CIFOR's reflexive learning tool for multi-stakeholder fora is being adapted with the National Service of Natural Protected Areas (SERNANP) for use with its 75 co-management committees | • 1183 publications, 4,928,356 downloads, 37,849 citations<br>• Global: FTA played a role in facilitating learning platforms for REDD to achieve the 3Es (Effective, Efficient, Equitable)<br>• CIFOR is recognized as a REDD+ expert<br>• CIFOR's profile raised on topic of gender, tenure, and climate change and become trust source for training on the topic | • The 2011 Indonesian Forest Moratorium policy provides protection for a total area of 64.2 million ha of forest<br>• Vietnam's PFES policy and new REDD+ policy protect 35 million ha area of national forest from deforestation<br>• Peru's INDC aims to conserve 54 million ha of forest<br>• Colombia's INDC aims to conserve 59 million ha of forest |

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| | for National Greenhouse Gas Inventories<br>• 2019 Special Report on Climate Change and Land<br>• Indonesia: FTA input to development of 2011 Forest Moratorium (through Inpres No. 10/2011)<br>• Indonesia: FTA contributed to the development of the Indonesian National REDD+ Strategy<br>• Indonesia: FTA provided direct support to the establishment of the Indonesia National Carbon Accounting System (INCAS)<br>• Vietnam: FTA research informed development of a national PFES policy, which was approved by the government and is being adopted by all provinces in the country<br>• Vietnam: CIFOR became part of a National Task Force to help develop Vietnam's Forestry Development Strategy (2020–2030) through 2045<br>• Peru: FTA contributed to the Peruvian National Strategy on Forest and Climate Change and stimulated the initiation of a national cross-sectorial process for legal recognition of peatlands<br>• DRC: CIFOR invited by the national REDD+ coordinator to evaluate and support | • Indonesia: FTA supported improvements to the national FREL through refined GHG accounting in wetlands<br>• Ethiopia: Indications of uptake of FTA research on exclusion, benefit sharing, and gender in forestry by technical experts for development and implementation of Ethiopia's Climate Resilient Green Growth<br>• Guyana and Ethiopia: Indications of uptake of CIFOR's stepwise approach to MRV GHG mitigation<br>• Brazil: MoU between CIFOR and Government of Acre at the UNFCCC COP25 to continue to support social and environmental monitoring of SISA | | |

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| | DRC's REDD+ progress and national REDD+ policies<br>• Cameroon: Policy-makers promoted FTA research at the national and international levels, some of which has been incorporated in the REDD+ Readiness Preparation Proposal (RPP)<br>• Ethiopia: FTA contributed to development of the national REDD+ strategy and the benefit-sharing mechanism of the Oromia Forested Landscape Program<br>• Guyana: FTA supported the Forestry Commission's training on direct forest monitoring, forest area assessment, biomass estimation, and carbon measurement using new technologies and methods | | | |
| Role of Wetlands in Climate Change | • Donors have improved access to information on wetlands and enhanced understanding of technical wetland issues<br>• Global: FTA contributed to UNFCCC strategy for sustainable wetland management<br>• Global: FTA contributed to the Wetland Supplement to the 2006 IPCC Guidelines for National Greenhouse<br>• Indonesia: FTA contributed to strategy development and technical methods for sustainable wetland management policy<br>• Indonesia: Uptake of the Wetland Supplement in | • An International Tropical Peatland Centre (ITPC) was established (hosted on CIFOR Campus in Bogor and officiated by the Minister of Environment and Forestry of Indonesia)<br>• Indonesia: Uptake of FTA research to inform communities' climate change and mitigation strategies for community development<br>• Indonesia: Indication of integration of SWAMP-informed sustainable practices by private sector for coastal infrastructure and development<br>• Vietnam: SWAMP Toolbox and a series of trainings for media, journalists, and NGOs supported awareness-raising and journalists' capacities to communicate simple and | • 187 publications, 280,789 downloads, 7,984 citations<br>• Indication of growing number of studies on wetlands<br>• A SWAMP online Database has been developed to support further research efforts and inform policy (>100 datasets: maps, soil emissions, vegetation, etc.)<br>• SWAMP provided funding for 8 doctoral students to conduct studies on tropical peatland ecosystems<br>• Coalition-building improved partners' awareness of research related to wetlands and increased their use of research-based information in their global advocacy and campaigning | No target listed |

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| | national FREL reporting to the UNFCCC<br>• Indonesia: Uptake of FTA methods and tools by government to understand wetland issues, inform policies, and conduct carbon inventories (e.g., below ground biomass, BRG emissions estimation from drained/burned peatland)<br>• Vietnam: Uptake of FTA research on future PFES scheme for mangroves to analyze PFES pilot on carbon by the end of 2020 | accurate messaging on forest-cover change | | |
| Fire and Haze Indonesia | • FTA research used as input to Grand Design for Fire Prevention for 2017-2019<br>• Village government confirms allocation of funding for maintenance of peatland restoration | • MoU signed between CIFOR ICRAF and a large palm oil pulp and paper company to commit to fire prevention<br>• NGOs (Jikalahari, FORSIBU, WWF) facilitate implementation of fire prevention activities with communities (e.g., sago planting, canal blocking)<br>• 99% of 110 farmers surveyed in Dompas, Riau plan to not use fire<br>• Community based fire prevention and peatland restoration institutions formalized | • 30 publications, 19,633 downloads, 271 citations<br>• Journalists take interest in science on the topic<br>• CIFOR's profile raised on topic | • Indonesia's Grand Design for Fire Prevention for 2017-2019 aims to ensure that the peatland working area of the Peatland Restoration Agency (BRG) (~2.4 million ha) is not burned<br>• Community-based fire models applied on 11.4 ha of land in Riau |
| Oil Palm in Indonesia | • FTA findings contribute to revisions of RSPO principles and criteria on gender<br>• Subnational PERDA (provincial regulation) and PERGUB (implementing guidelines) reflect high conservation value areas<br>• Subnational governments use FTA spatial maps to verify licenses | • RSPO member companies comply with new regulations to be more inclusive (in order to uphold RSPO certification requirements)<br>• NGOs use FTA research to strengthen evidence bases of sustainability campaigns in oil palm and other commodities (e.g., Greenpeace used Borneo Atlas to hold RSPO companies accountable to zero deforestation commitments) | • 66 publications, 61,246 downloads, 688 citations<br>• CIFOR top contributor to gender in oil palm topic, academic discussion gaining traction<br>• 6 OPAL graduate students build research capacities<br>  • OPAL students invited as experts to support community and government processes | No target listed |

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| | • Indications of FTA engagements in RANKSB and ISPO processes<br>• FTA findings included in 2023 Spatial Plan of West Kotawaringin | | • 24 out of 26 CIFOR-USAID Fellowship (CUF) graduate students build research capacities<br>  • 11 continue to work in natural resource management | |
| Agroforestry Concessions in Peru | • Regional governments (San Martín and Ucayali) better understand AFC implementation options and compliance barriers to smallholders<br>• SERFOR understands the need to distinguish smallholders in policy (i.e., smallholder heterogeneity)<br>• Governments have capacity to identify areas eligible for AFCs using the meso-zoning approach detailed in the technical guidelines<br>  • San Martín regional government proceeds with a technical group working on zoning<br>• San Martín regional government develops 14 AFC registration pilots in late 2018<br>• AFC issue is on the agenda of national forestry and climate change strategies and governments demonstrate interest in agroforestry as a means to mitigate climate change | • 200 participating smallholders learned about AFCs (and opportunities), decision-making, registration, and their territory through discussions with the research team and the PGIS activities<br>• 14 smallholders in San Martín received AFCs as part of a pilot, adopting agroforestry practices and complying with requirements<br>• Enhanced interest on AFCs among NGOs; Some NGOs demonstrated an increased commitment to and action around AFCs<br>• New relationship & mutual interest recognized between ICRAF, GGGI, & SPDA to continue collaborative work<br>• NGOs confirmed adoption and application of micro-zoning (training provided by project) in their projects and AFC pilots in San Martín, which are run in cooperation with regional government authorities | • Research used to develop 2 new research proposals to pursue further gaps<br>• 5 publications, 3 citations<br>• Research capacities developed among research team, some of whom have continued careers in the Peruvian government in natural resource management/climate divisions | • 20 percent carbon emissions reduction (potential estimation of successful widespread implementation of AFCs)<br>• 23 000 AFC beneficiaries (estimation of the potential number of smallholder households)<br>• 1 million ha of land and 452 000 ha of forest eligible for AFC (potential eligibility estimation) |

The results in Table 2 demonstrate that FTA has the potential to have contributed to saving a significantly higher hectarage of forest from deforestation than its set contribution to the SRF, through various means of influence – policy change, practice change and capacity. However, these impact estimations are variably sensitive to a number of assumptions. More realistic figures that consider sensitivity to assumptions will be presented in the next version of the report.

Table 3 is an example of a future table the evaluation team aims to develop and saturate following the intended future data collection and impact estimation activities. The table will aim to present the proportion of intended impacts that have evidence of achievement and an assessment of the likelihood for future realization of the remaining impacts for each cluster. The table is intended to help answer the guiding research question for the impact estimation: What is the scope and scale of impacts to which FTA's research portfolio has contributed in each of the five challenges?

**Table 3.** Planned presentation of impact estimation assessment.

| Cluster | Intended Impact (potential) | Actual Impact (achieved) | Likelihood for future realization of remaining potential impact |
|---|---|---|---|

Table 4 presents a cluster-level appraisal of available evidence for Challenge 1 from which the assessments in Table 2 were derived. The table considers the reliability and confidence of evidence sources as well as highlights the gaps in evidence for outcomes (by pathway) and/or impacts for each cluster to inform where efforts for further data collection and evidencing could focus. In recognition of the limited time and resources available for this study and assessments of other challenges, key aspects of prioritization for additional evidence collection are presented for consideration. A more detailed project-level appraisal per cluster can be found in Appendix 3, which also offers initial suggestions for evaluative focus and methods to collect additional evidence of outcomes and impacts should the project and/or cluster be identified and selected for further data collection. This appraisal may be useful to inform planning for and design of FTA's outcome impact case reports for 2021. The current progress on documenting evidence of impact estimations for Challenge 1 can be found in Appendix 4.

The results indicate variable availability, reliability, and confidence of evidence to support outcome assessments and impact estimations. Clusters with low evidence availability, reliability, and confidence include those related to sustainable forest management (Mesoamerica, Southern Africa, Congo Basin), and illegal logging (FLEGT, SFE, and Timber Markets). Clusters working on REDD+, wetlands, and Fire and Haze contain a mid- to high-level of data availability, reliability and confidence to assess outcomes and estimate impacts. The Oil Palm in Indonesia and Agroforestry Concessions in Peru clusters contain a high availability of reliable and recent data for outcome assessments. Each have scope for projecting impact estimations.

**Table 4.** Summary Cluster-level Appraisal of Evidence for the Deforestation and Forest Degradation Challenge

| Cluster (number of projects associated with the cluster) | Total Number and Assessment[5] of Evidence Sources | Pathways with Strong Outcome Evidence | Pathways with Weak Outcome Evidence | Feasibility of Cluster Impact Estimation Assessment | Prioritization of Cluster for Additional Evidence Collection[6] |
|---|---|---|---|---|---|
| Sustainable Forest Management in Mesoamerica (1 project) | 2 sources (1 midterm report, 1 final report)<br>• *Reliability:* low<br>• *Confidence:* low | • Research pathway (need more detail)<br>• Community pathway (need more detail)<br>*evidence only for Guatemala component | • Government pathway (have indications of potential outcome realization)<br>• Forest cooperative/ partner pathway (need more detail) | No target(s) listed; possibility to make quantifications based on project contributions (though likely negligible) | *Prioritization:* medium<br>• Support regional representation<br>• Relatively small budget (<$1m)<br>• Feasible (1 project to assess)<br>• Preliminary outcome evidence is promising, but key gaps exist<br>• Likely negligible impact contribution |
| Sustainable Forest Management in Southern Africa (1 project) | 2 sources (1 midterm report, 1 final report)<br>• *Reliability:* low<br>• *Confidence:* low | • Research pathway (need more detail)<br>• Community pathway (need more detail) | • Forest reserve manager pathway (need more detail, account for turnover)<br>• National forest agency pathway (have indications of potential outcome realization) | No target(s) listed; possibility to make quantifications based on project contributions (though likely negligible) | *Prioritization:* medium<br>• Support regional representation<br>• Relatively small budget (<$1m)<br>• Feasible (1 project to assess)<br>• Preliminary outcome evidence is promising, but key gaps exist<br>• Likely negligible impact contribution |
| Sustainable Forest Management in Congo Basin (7 projects) | 7 sources (1 brief, 1 technical report, 1 quarterly report, 3 final reports, 1 external evaluation)<br>• *Reliability:* low (high for 1 external evaluation)<br>• *Confidence:* low (high for 1 external evaluation) | • Research pathway (promising preliminary evidence of UNIKIS collaboration; need more detail)<br>• Government pathway (preliminary evidence is promising)<br>• Donor/international organization pathway | • Timber company pathway (have indications of potential outcome realization)<br>• Community pathway (outcome not applicable to projects with stronger evidence bases, but preliminary indications from other projects could be promising) | 1 project had clear targets listed with indications of achievement (FCCC Project); possibility to make quantifications based on other project contributions (Yangambi Project) (though likely negligible) | *Prioritization:* medium<br>• Representative of FTA investment (collective cluster budget >$20m)<br>• Feasible if a strategic selection of projects is prioritized (e.g., FCCC Project, Beyond Timber Project) |

[5] The reliability of evidence sources was determined by an assessment of whether the source was internally produced (lower reliability) or conducted by an external evaluation (higher reliability). It was thought that external reports are providing an additional level of quality control of the evidence. The confidence of evidence sources was determined by an assessment of the quality of the evidence source (criteria included methodological approach (e.g., theory-based evaluation, quasi-experimental design), primary versus secondary/tertiary data collection, level of detail, indications versus clear realization, triangulation of evidence, etc.).

[6] A set of criteria were used to inform the prioritization assessment to enable strategic selection of clusters (and/or projects within a cluster) for additional evidence collection. These criteria include: potential overlap of cluster/project(s) for other challenges; geographic overlap and representation; pathway overlap; proportion of FTA investment of cluster/project (i.e., prioritizing clusters/projects with larger budgets); likelihood for availability of outcome evidence; and likelihood for availability and/or feasibility to assess and quantify the scale of impact.

| | | | | | |
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| | *2 projects have no evidence sources (1 is too young) | (preliminary evidence is promising) | | | • Regional overlap to prioritize: DRC, Cameroon<br>• Preliminary outcome evidence is promising, but key gaps exist<br>• Substantial impact contribution; impact estimation is possible |
| FLEGT/VPA (7 projects) | 8 sources (2 interim reports, 1 technical report, 4 final reports, 1 external evaluation report)<br>• *Reliability:* low<br>• *Confidence:* low | • Research pathway (only for PROFORMAL Project; other projects only identify expected outcomes)<br>• Policymaker pathway (only for PROFORMAL Project; other projects only identify expected outcomes) | • Timber company pathway (have indications of potential outcome realization)<br>• Smallholder/SME pathway (no preliminary evidence)<br>• NGO/CSO pathway (no preliminary evidence) | Some projections or targets are listed[7] | *Prioritization:* low<br>• Representative of FTA investment (collective cluster budget >$15m)<br>• More feasible if strategic selection of projects is prioritized (e.g., GLM, PROFORMAL Project)<br>• Regional overlap to prioritize: DRC, Cameroon<br>• Preliminary outcome evidence for 1 project is promising (e.g., PROFORMAL), but notable gaps exist for other projects<br>• Impact estimations are possible, but require supporting evidence of outcome realization and projects' contributions (assumptions must be explicit) |
| Sustainable Forest Enterprises in Sub-Saharan Africa (1 project) | Awaiting access to final report (report in progress) | – | – | – | *Prioritization:* Depends on review of final report |
| Timber Markets in Sub-Saharan Africa | 3 sources (2 midterm reports, 1 final report) | No outcome evidence | • Government pathway (indications of potential | No target(s) listed; does not seem possible | *Prioritization:* low |

[7] Most of the impact estimations for the FLEGT cluster are derived from project outputs (i.e., findings of status of country FLEGT and/or changes over time pre- and post-FLEGT implementation); these impact numbers are not impact contributions of the projects, but may be possible to use to represent the cluster *if* the logic and supporting evidence can be made to show either: i) how these outputs were used by stakeholders to incentivize country investment in FLEGT/VPA mechanisms and/or policy development/implementation to reduce deforestation/illegal logging; or ii) linked FTA contributions to the design and implementation of FLEGT/VPA mechanisms/tracking and/or policy development/ implementation to reduce deforestation/illegal logging.

| | | | | | |
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| (4 projects) | • *Reliability:* low<br>• *Confidence:* low<br>*1 project has no evidence sources (ongoing project) | | outcome realization discussed for 1 project)<br>• Partner pathway (no evidence)<br>• Research pathway (no evidence)<br>• Timber SME pathway (indications of potential outcome realization discussed for 1 project) | | • Relatively small budget (collective cluster budget ~$1.5m)<br>• No current evidence base for outcomes; would require intensive data collection<br>• Low possibility to derive impact estimations<br>*if pursued, suggest strategic selection of projects with regional overlap (DRC, Cameroon)<br>*may be valuable to hold off on data collection for this challenge as this cluster may also fall under another challenge (i.e., poverty alleviation) |
| Global Comparative Study on REDD+ (9 projects) | 25 sources (3 external evaluations, 1 masters thesis focused on evaluation, 2 annual reports, 5 case study reports, 3 flagship outcome stories, 4 midterm/final reports, 9 articles)<br>• *Reliability:* low for internal reports; high for external evaluations<br>• *Confidence:* medium for internal reports; high for external evaluations | • Research pathway (sufficient evidence for all GCS REDD+ project Phase 1, Phase 2, Phase 3 (half), and Benefit sharing mechanism project; other projects only identify expected outcomes. Update would strengthen)<br>• National government pathway (sufficient evidence for all GCS REDD+ project Phase 1, Phase 2, Phase 3 (half), and Benefit sharing mechanism project; other projects only identify expected outcomes. Update would strengthen)<br>• International government pathway (sufficient evidence for all GCS REDD+ project Phase 1, Phase 2, Phase | • Partner/ally pathway (have indications of potential outcome realization)<br>• Community pathway (have indications of potential outcome realization) | Some country-specific quantifications are listed and available; possibility to draw on policy targets | *Prioritization:* medium to high<br>• Representative of FTA investment (collective cluster budget >$50m)<br>• Preliminary outcome evidence is substantial and promising, but key gaps remain<br>• Substantial impact contributions; impact estimations are possible, but require supporting evidence of outcome realization and projects' contributions to achievement of policy targets (assumptions must be explicit) |

| | | | | | |
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| | | 3 (half), and Benefit sharing mechanism project; other projects only identify expected outcomes. Update would strengthen) | | | |
| Role of Wetlands in Climate Change<br>(5 projects) | 19 sources (2 external evaluation articles, 1 masters thesis focused on evaluation, 1 brief, 15 quarterly reports)<br>• Reliability: low for internal reports; high for external evaluations<br>• Confidence: low to medium for internal reports; high for external evaluations<br>*1 project has no evidence sources (too young) | • Research pathway (only for SWAMP; other projects only identify expected outcomes)<br>• National policy pathway (only for SWAMP; other projects only identify expected outcomes)<br>• International policy pathway (only for SWAMP; other projects only identify expected outcomes) | • Private sector pathway (only evidence from 1 project)<br>• Partner pathway (only evidence from 1 project) | Possibility to draw on policy targets; possibility to conduct an ex ante impact assessment? (e.g., Characterizing and Assessing Palm Swamp Degradation in the Peruvian Amazon Project) | *Prioritization:* low to medium<br>• Representative of FTA investment (collective cluster budget >$5m)<br>• Preliminary outcome evidence for 1 project is substantial (e.g., SWAMP), but key gaps remain<br>• Impact estimations are possible, but require supporting evidence of outcome realization and projects' contributions to achievement of policy targets (assumptions must be explicit) |
| Fire and Haze in Indonesia<br>(3 projects) | 5 sources (1 outcome story, 1 performance story, 1 final report, 1 annual report, 1 article based on external evaluation)<br>• *Reliability:* low for internal reports; high for external evaluation<br>• *Confidence:* low for internal reports; high for external evaluation | • Government pathway (sufficient evidence; update would strengthen)<br>• NGO/ally pathway (sufficient evidence; update would strengthen)<br>• Research pathway (sufficient evidence; update would strengthen) | • Public pathway (need more detail, update would strengthen)<br>• Smallholder/farmer pathway (no preliminary evidence) | Possibility to draw on policy targets | *Prioritization:* low to medium<br>• Relatively small budget (collective cluster budget <$1m)<br>• Preliminary outcome evidence for 1 project is substantial (Political Economy Study of Fire and Haze in Indonesia), but key gaps remain or require updated evidence<br>• Impact estimations are possible, but require supporting evidence of outcome realization and projects' contributions to achievement of policy targets (assumptions must be explicit) |

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| Oil Palm in Indonesia (4 projects) | 3 sources (2 external evaluations, 1 annual report)<br>• *Reliability:* high<br>• *Confidence:* high<br>*1 project has no evidence sources | • Government pathway (sufficient evidence)<br>• Partner pathway (sufficient evidence)<br>• Research pathway (sufficient evidence) | • Corporations pathway (insufficient evidence) | No target(s) listed; possibility to draw on policy targets or corporate commitments | *Prioritization:* low to medium<br>• Representative of FTA investment (collective cluster budget >$7m)<br>• Outcome evidence is substantial and recent, but key gaps remain<br>• Impact estimations are possible, but require supporting evidence of outcome realization and projects' contributions to achievement of policy targets and/or corporate commitments (assumptions must be explicit) |
| Agroforestry Concessions in Peru (3 projects) | 1 source (1 external evaluation)<br>• *Reliability:* high<br>• *Confidence:* high<br>*2 projects have no evidence sources (too young) | • Government pathway (sufficient evidence; update would strengthen)<br>• Partner pathway (sufficient evidence; update would strengthen) | • Research pathway (update would strengthen)<br>• Smallholder pathway (low preliminary evidence, update would strengthen) | 1 project produced potential impact estimations | *Prioritization:* low to medium<br>• Representative of FTA investment (collective cluster budget <$5m)<br>• Outcome evidence for 1 project is substantial (SUCCESS), but key gaps remain or require updated evidence<br>• Impact estimations are possible, but require supporting evidence of outcome realization and projects' contributions to implementation of a policy mechanism (assumptions must be explicit) |

Depending on the interest of pursuing either a breadth and/or depth of FTA contributions to Challenge 1, priorities to further evidence outcomes and estimate impacts are subject to further discussion. Preliminary prioritization based on the evidence appraisal indicates that clusters require different levels of data collection (and therefore time and resource investments) to make plausible impact estimations. For some clusters (i.e., those with many projects and no reliable evaluation data), data collection may be too time- and resource-intensive that the clusters may not be worth pursuing.

The team determined the following clusters to have strong levels of evidence that are likely sufficient for assessing outcomes and estimating impacts, with some minor gaps to fill:

- SFM in the Congo Basin
- Global Wetlands
- GCS REDD+
- Fire and Haze in Indonesia
- Oil Palm in Indonesia
- Agroforestry Concessions in Peru

The team determined the following clusters to be 'low-hanging fruit' with some evaluative work needed to substantiate both outcome and impact assessments:

- SFM in Mesoamerica
- SFM in Southern Africa

The team determined the following clusters to have many gaps and likely these clusters will be too time- and resource-intensive to pursue evaluative work to evidence outcomes and impacts:

- FLEGT/VPA
- Timber Markets in Sub-Saharan Africa

Given the size and complexity of the FTA program on the one side, and the time and resource constraints for this assessment on the other, it is required to make a decision whether a broad elaboration on all clusters shall be undertaken, or whether some clusters shall be assessed in more detail. Collecting evidence of the full set of identified clusters would not allow for delving into the details of the respective impact pathways, diminishing the rigor of the analysis and hence accuracy of claimed effects on outcome and impact level. Whereas focusing on selected clusters reduces the possibility to derive lessons learned also from the not considered clusters.

The research team proposes to apply a pragmatic approach (i.e., basing the decisions on prioritizing for further evidence collection on the level of data gaps, the number of projects within a cluster with data gaps, the budget allocated to the cluster, and the likelihood for outcomes and impacts to be reliably assessed within the time and resources available for this study). This is a key next step in the process and implies that only for a selection of clusters further evidence is collected. Yet, the research team awaits further input and suggestions from the ISC and partners before proceeding with planning the next steps on the upcoming data collection phase.

# Challenge 5: Rising Demand and Need for Nutritious Food

## Theory of Change

It is estimated that agricultural production will need to increase by 60-70 percent by 2050 in order to meet the demands of a larger, more urbanized population of the Global South. While population growth is one factor, rising income levels (albeit unequal), together with urbanization, has also coincided with changes in dietary habits (e.g., increased animal product consumption) and increased demand for energy, thereby intensifying non-food crop production, i.e. for animal feed and biofuels (Silva, 2018). Moreover, despite years of progress, the 'Prevalence of Undernourishment' (PoU) has been steadily increasing since 2014, standing at 690 million (8.9 percent of the world population) in 2019 and with the highest prevalence in Africa at 19.1 percent. The current COVID-19 pandemic is expected to significantly accelerate this concerning trend (FAO, 2020). A key global challenge of our times is therefore how to feed and nourish a growing population while minimizing the impact on the environment (Petersen et al., 2015), against a backdrop of persistent rural poverty and rising levels of (absolute) inequality.

The composite ToC (Figure 2) illustrates how the work carried out under the four research clusters interact to address the rising demand for nutritious food challenge. We have summarized FTA's core knowledge products and technologies associated with this challenge into six primary outputs, several of which are common to more than one research cluster. These range from focused research on identifying context specific "tree and crop portfolios" to enable the production of nutritious foods all year round on the one hand through to the development and promotion of improved farmer engagement and extension approaches, tree germplasm, and agroforestry technologies, such as fertilizer trees and tree fodder on the other. Researching the nutrition bolstering potential of understudied tree foods through the African Orphan Crops Consortium is another area of work, as is understanding and evidencing the contribution of forests to the diets of forest proximate communities.

These knowledge products and technologies were expected (implicitly) to have translated into improvements in policy and practice through targeted engagement with relevant stakeholders, involving both a) the co-production of evidence and fit-for-purpose farmer engagement approaches and agroforestry practices; and b) the direct provision of technical support and improved tree and fodder germplasm and the strengthening of delivery systems. The evidence generated through FTA-related research in particular was (and is) expected to galvanise more donor and government support on the role of trees and forests in promoting food security and nutrition, particularly for smallholder farmers and forest proximate communities.

This, in turn, was expected to have reinforced work undertaken with NGOs, local governments, research institutions, and the private sector to scale-up the production of food tree crops, tree fodder, and agroforestry technologies, such as fertilizer tree systems, on-farm, as well as reinforce forest conservation efforts while allowing continued and enhanced access for local communities. Small-scale producers were expected to have engaged in large numbers in these initiatives, taking up the contextually appropriate agroforestry practices and improved tree germplasm. Increases in the production of more diverse and nutritious foods are expected to follow suit, as well as sustainable improvements in total farm productivity (reinforced by the sustainable land use and restoration ToC) and enhanced smallholder income (reinforced by the persistent rural poverty ToC). Forest proximate communities are expected to maintain or (re)gain enhanced (and safer) access to forest resources, including to wild foods (reinforced for the deforestation/forest degradation ToC). Improved or sustained consumption and marketing of nutritious foods for both small-scale producers and forest proximate communities is finally expected to take place, benefiting both groups, as well as other consumers further down the value chain.

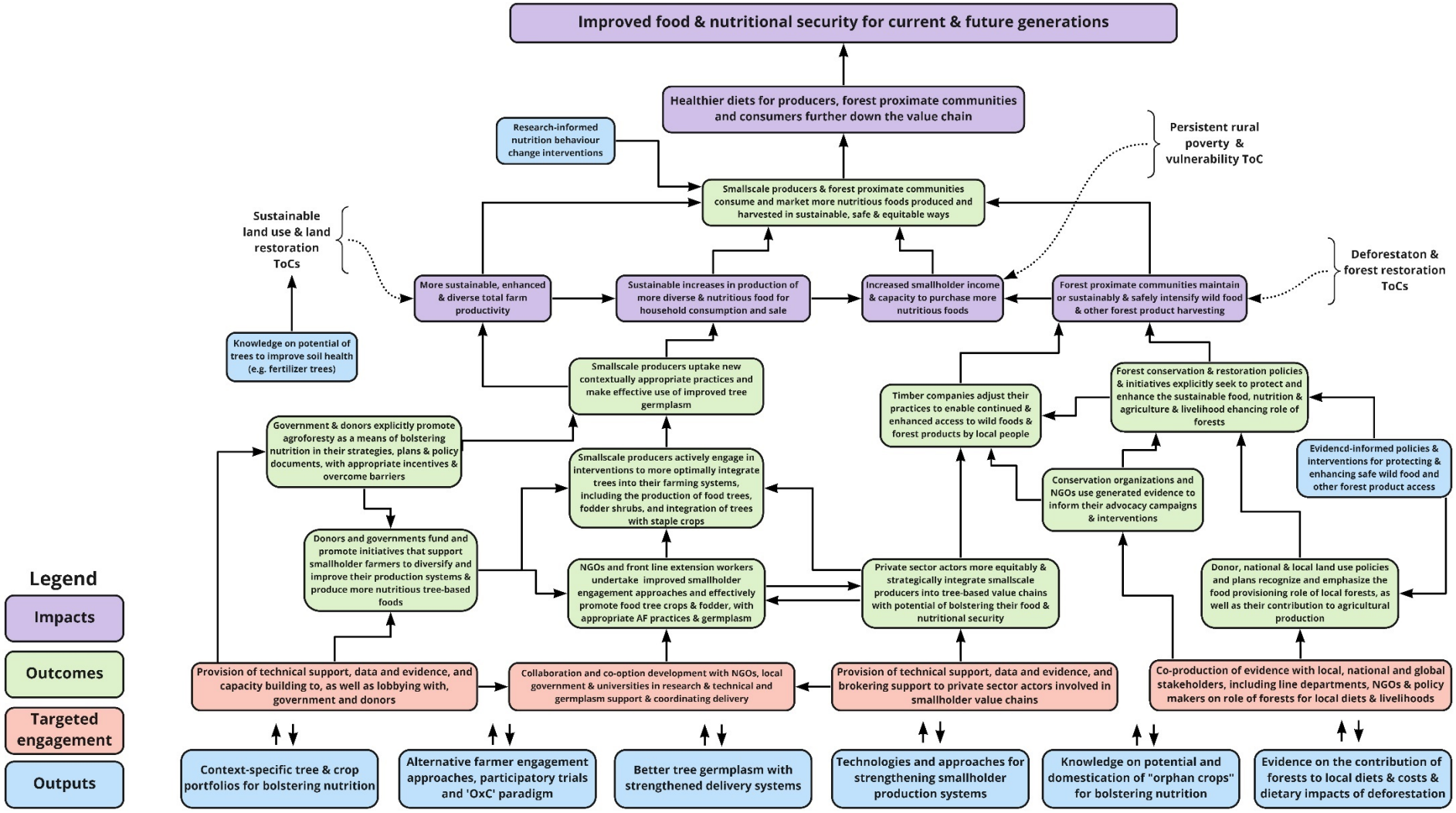


**Figure 2.** Overarching ToC outlining FTA contributions to Challenge 5 (Rising Demand and Need for Nutritious Food).

## Results

In this subsection and for each of the Challenge 5's research clusters mentioned above (see Appendix 2 for detailed cluster-level sub-ToCs), we start by summarizing the work associated with the cluster, followed by relevant FTA achievements and stakeholder engagement efforts. We then articulate the main impact pathways associated with the cluster, including their underlying assumptions. This is followed by a summary of currently available evidence on the extent to which expected outcomes and, in turn, their associated impacts have manifested. We conclude by presenting further evaluative work that FTA could undertake to better evidence key outcomes and impacts. Table 5 summarizes the information presented in this section.

**Table 5.** Rising demand & need for nutritious food for both current & future generations

| Key Achievements & Stakeholder Engagement Efforts | Primary Impact Pathway | Current Evidence on Realized Outcomes and Impacts | Further Prioritized Evaluative Work |
|---|---|---|---|
| ***Research Cluster: Scaling up the production of food-trees on-farm*** | | | |
| At least 63,000 farming households supported to scale up food tree production in 10 countries | Food tree growing leads directly to improve diets; enhanced income diversification indirectly improves diets; donors & implementing partners scale up food tree portfolios | Reliable evidence through survey data of adoption of food trees among at least 24,000 households; more focused food tree portfolio work in early stages, so uptake not yet to be expected | Food tree impact study, with primary data collection in Malawi and complementary modelling work applied in other key countries where the scaling work has taken place |
| ***Research Cluster: Integrating trees in cropping fields for sustainable staple food production*** | | | |
| At least 500,000 farming households supported to integrate trees into cropping fields in at least 10 countries | Trees enhance crop productivity through environmental regulatory services and total field productivity; direct partner engagement enhances their agroforestry scaling work and, in turn, impact | At least 31,000 households are estimated (via survey data) to have adopted Fertilizer Tree Systems (FTS) in Malawi, with evidence indicating average maize yield gains; a further 32,000 households have integrated trees into cropping fields more generally in 8 other countries, as determined via the analysis of other survey data | Use data from above Malawi food tree study to confirm FTS adoption rate; outcome evaluation of FTA's influence on the agroforestry scaling practices of implementing partners |
| ***Research Cluster: Improving smallholder dairy production through tree fodder*** | | | |
| Approximately 69,000 dairy farmers supported to uptake Fertilizer Tree Technology (FTT) in Kenya, Uganda, & Malawi with plans to support 110,000 more | FTT effectively promoted by implementing partners and established and utilized on farm leading to milk yield gains; improved extension approaches taken up by implementing partners, enhancing their effectiveness and, in turn, impact | Over 19,300 dairy farmers evidenced to have adopted FTT in Kenya and Uganda through survey data and impact studies, but the impact potential of such adoption has not been assessed | Undertake ex-ante impact modelling in the context of the S4C project; evaluate partner practice influencing by linking to about proposed outcome evaluation |
| ***Research Cluster: Forest resources and the nutrition of forest proximate communities*** | | | |
| Stakeholder engagement processes initiated in four countries, disseminating research finding and co-developing policy and intervention options; strategic inputs feed into three major global fora | National and local engagement leads to improved policies and interventions for promoting the safe and secure food provisioning role of forests; influencing global policy processes and donor priorities does the same but indirectly through influencing the former | Most countries have expressed anecdotal interest in taking on board research findings. However, Ethiopia has drawn on FTA research findings to in the design of the government's nutrition sensitive interventions | Assess how significant the influence has been and the corresponding impact potential; if both are high, consider undertaking an outcome evaluation |

**Cluster: Scaling up the production of food trees on-farm**

This cluster focuses on the contribution of food trees for improving food security and nutrition. This is directly by promoting the increased availability and consumption of nutrient-rich tree foods (i.e., fruits and nuts, seeds for protein and oils, and leaves as vegetables) themselves among both producers and downstream consumers. It is also indirectly via increasing and diversifying income generating opportunities for smallholder farmers and enhancing sustainable land management. The approach relies on the identification of ecologically suitable and socio-economically relevant food tree and crop portfolios through in-depth consultations with communities, combined with insights from the scientific literature. Projects make available quality planting material and provide technical training and institutional strengthening support to national partners and smallholder farmers, so that the latter integrate the co-generated portfolios into their farming systems. Greater dietary diversification and food security is thus expected by integrating trees that produce nutrient-dense foods. In addition to food and nutritional security, this approach aims to strengthen smallholder livelihoods and contribute to landscape restoration by harnessing ecologically suitable food tree and crop portfolios in ways that enhance livelihood and landscape resilience.

*Key achievements and stakeholder engagement efforts*

From what we have been able to compile from project documents and other reliable sources of information, over 63,000 smallholder farming households have been directly supported through at least eight FTA affiliated projects to scale up the production of food trees on their farms. Key countries where this work has taken place include: Ethiopia, Ghana, India, Kenya, Malawi, Mali, Niger, Rwanda, Senegal, and Uganda. In general, scaling up food trees on-farm has taken place primarily in the context of development focused projects. Here, FTA's role was to technically support implementing partners (NGOs and local government agencies) to source and produce appropriate planting material (e.g. through setting up 'mother blocks', seed orchards, or community nurseries) and provided training in key areas, such as nursery establishment, grafting, and budding.

A good example of FTA's work on addressing the food and nutritional security challenge is the Enabling Small Holders in Odisha to Produce and Consume More Nutritious Food through Agroforestry Systems project being implemented in Odisha, India. Here the state government has engaged ICRAF to scale up tree-based agriculture practices in this rice-based production landscape to enhance production and nutrition diversity of local communities. This included the setting up of 26 nutri-gardens, which are designed to provide year-round access to nutritious food, as well as the establishment of 38 nurseries for food and timber tree species. The project is being implemented in close collaboration with ICAR (the India Council of Agricultural Research) and state agricultural universities, as well as the process of production designing and planning. Suitable nutrition related on-farm and household interventions include building skills and capacity of all stakeholders, including the training of a total of 18,542 farmers and 1,618 trainers through over 300 workshops and strengthening extension services through supportive mobile application and local resources.

More recent FTA work on developing and evidencing 'tree crop portfolios' has a more explicit research focus. This is not just about scaling up the production of food trees on-farm to diversify food and income sources. Rather, work is undertaken with communities and implementing partners to identify food trees that can be produced together with other food crops in order to meet the food and nutritional needs of households throughout the year. This is particularly relevant in contexts that experience a 'hunger season' (especially in unimodal rainfed systems) and/or produce or have limited access to diverse sources of food. To date, a total of 16 tree-crop portfolios were developed for different landscapes across East Africa. Portfolio implementation requires significant investment, both private and public, in making the right type and quality germplasm available. In the context of one key project (Agrobiodiversity and Landscape Restoration for Food Security and Nutrition in East Africa), mother blocks and community nurseries were established or upgraded hosting ~200,000 fruit tree seedlings and ~100,000 non-fruit tree seedlings.

*Primary impact pathways and assumptions*

Given that much of the work associated with this cluster is developmental in nature, there are two primary impact pathways that are of interest. The first is the *food tree product consumption pathway*. Here, implementing partners effectively promote and develop the capacity of farming households to scale up the production of food trees on farm, with farming households actively engaging in such efforts and, in turn, integrating these trees into their farming systems. This is despite the fact that there may be trade offs vis-a-vis the production of annual crops. Once appropriately integrated and trees start producing edible food, a significant proportion is consumed, either by the producing household, other community members, and/or consumers further down the value chain, promoting dietary diversity and addressing key nutritional deficiencies. Key assumptions underpinning this pathway include:

- Households scale up the production of food trees in sufficient numbers and diversity (in terms of both nutritional offering and production cycle timing).
- Food trees that are actually grown at household level (as opposed to being promoted) meet idiosyncratic household and intra-household food security or nutritional needs.
- Household members (and/or others) consume a significant proportion of food tree produce (rather than prioritizing it for sale) and in the relevant quantity and frequency to significantly affect dietary intake and, in turn, food security and nutritional outcomes.

The second primary impact pathway is the *food tree product income diversification pathway*. This is particularly relevant for high value tree foods, such as the grafted mango and avocado promoted under the Malawi Agroforestry Food Security Program and other related projects. Here, the increased income earned through the marketing of high value fruits enables households to procure more and better-quality food. At the same time, livelihood resilience is promoted through the associated income diversification. While the relationship between household income and nutrition is not necessarily causal, there is a general association between rising income levels and better diets (Colen et al., 2018). Key assumptions particular to this pathway include:

- Households scale up food trees for which there will be adequate demand in the future when the associated produce matures.
- The food trees scaled up on-farm will be sufficiently profitable in the future, so as to make up for any associated losses in other agricultural activities.
- At least a portion of the additional income earned through the sale of the food tree products will be sufficiently large and be used to procure more and more diverse foods on a regular basis.

There is a third pathway that is perhaps more relevant to the tree crop portfolio work: *the food tree model horizontal scaling pathway.* This is where models and approaches for scaling up food tree production on-farm are taken up by other relevant actors and promoted and/or directly implemented, preferably using leveraged resources and at a larger geographic scale. While it is early on in the research cycle, this is inevitably what is expected to come out of the tree crop portfolio work, i.e. scalable models. However, this horizontal scaling pathway can also be applicable to the above more development focused work. A good example, again, is the Enabling Small Holders in Odisha to Produce and Consume More Nutritious Food through Agroforestry Systems project in Odisha, India. Here, ICRAF is practically demonstrating to the state government, the private sector, and other actors how fruit trees can be integrated into farming systems for enhanced income and resilience. Key assumptions associated with the food tree model horizontal scaling pathway include:

- "Scaling stakeholders" find the portfolio model attractive vis-a-vis other options for achieving their objectives.
- The model can be practically replicated in the absence of heavy-handed FTA technical support.
- All the above assumptions associated with the other two pathways.

*Current evidence on achieved outcomes and impacts*

To comprehensively evaluate the extent to which the first two impact pathways have materialized, adoption studies would first be needed to be undertaken in the areas where such food tree promotion work has been carried out in order to evidence the numbers of smallholder households that have successfully established the trees. Reliably evidencing what would have happened to these households (e.g., in terms of their food and nutritional security) had they never had established the trees would further be needed to evaluate impacts. Perhaps unsurprisingly (e.g., because trees typically take years to grow and produce food), there is limited evidence on both longer-term adoption and impact. One evaluation, however, of the above referenced AFSP project (Hughes et al., 2019) assessed the adoption of the improved fruit trees that were promoted as one subsidiary component of the overall evaluation. Out of the survey sample of 631 program participants, 19 percent reported that they had received fruit trees. Among those 117 households, 89 (76%) reported that they had at least 1 tree present on their farms, but only 24 (21%) reached the project target of 10 or more productive improved fruit trees. Extrapolating these percentages to the farming households that participated in the second phase of the project that was evaluated (28,414 households), it can be concluded that approximately 1,080 households managed to successfully establish at least ten improved food trees. The resulting impacts on food, nutrition, and income from improved fruit tree adoption were not estimated in this study.

In the eight Africa country Regreening Africa scaling project (2017 to 2022), the uptake of regreening practices is being periodically monitored through representative "uptake surveys", led by CIFOR-ICRAF's Impact Assessment and Acceleration team. These surveys have so far been undertaken in six countries and also monitor the uptake of specific agroforestry practices, including households that have established food trees. The following table shows the estimated numbers that have established food trees using the ascertained adoption rate for each project site (Table 6). Over 23,000 households have adopted food trees, with most households (74%) opting for exotic (generally higher value) varieties.

**Table 6.** Number of households (HH) taking up fruit trees and adoption rate via Regreening Africa scaling project (*Figures in parentheses are standard errors)

| Country | No. of HHs all fruit trees | No. of HHs exotic fruit trees | No. of HHs indigenous fruit trees |
|---|---|---|---|
| Kenya | 5156(891)* | 3811(810) | 2254(349) |
| Adoption rate | 0.37(0.03) | 0.27(0.03) | 0.16(0.02) |
| Rwanda | 9560(1162) | 9560(1162) | n/a |
| Adoption rate | 0.47(0.03) | 0.47(0.03) | n/a |
| Senegal | 1189(187) | 401(106) | 982(163) |
| Adoption rate | 0.56(0.02) | 0.19(0.02) | 0.46(0.03) |
| Ghana | 918(171) | 810(151) | 144(57) |
| Adoption rate | 0.48 | 0.42 | 0.07 |
| Mali | 3098(399) | 1612(214) | 2301(361) |
| Adoption rate | 0.67 | 0.36 | 0.50 |
| Niger | 3289(657) | 1049(345) | 2860(507) |
| Adoption rate | 0.70 | 0.22 | 0.60 |
| ***Totals*** | **23210** | **17243** | **8541** |

Finally, as part of the piloting of the tree crop portfolio approach, a baseline and endline study was carried out (N>600). Here, the portfolio adoption evidence appears mixed. In Ethiopia, the food tree species index increased from 3.7 to 4.9, while it decreased from 7 to 5 in Uganda. Moreover, while non-project related factors may be solely or partly responsible, reported food insecurity dropped considerably in Ethiopia (34% to 18%) but increased in the Ugandan sites (52% to 70%). Dietary diversity further did not seem to change significantly in the sites of either country between the two time periods.

*Further prioritized evaluative work*

As reported above, the main work carried out under the food tree cluster involved directly supporting farming households to scale up fruit tree production on their farms, including via the provision of improved planting

material. Efforts are already underway to estimate the plausible ranges of impacts associated with this work. This includes primary data collection and farm system modeling work in Malawi, the country where a significant number of households have been supported to do this (≈24,000), combined with more basic modeling work in the other countries. The impact assessment currently underway in Malawi is designed to answer the following questions:

- What difference does the establishment of an improved (high value) fruit orchard mean for both the actual and potential farm income of a typical smallholder maize farmer in Malawi, and how might this varies across farming family typologies?
- Does the establishment of an improved fruit orchard improve household food and nutritional outcomes for such households, and, if so, what is/are the primary mechanism(s) (e.g., via the consumption or income diversification pathway)?

A key methodological challenge in comparing households that established orchards with those that did not is overcoming both selection bias (systematic and relevant observable and unobservable differences between households that signed up for and/or were targeted to receive fruit trees and those otherwise) and "adoption success bias" (the fact successful households put more effort into caring for the fruit trees, indicating systematic differences in work ethic, interest in farming, etc.). The former type of bias is being addressed by ensuring that the sample of non-adopters comprises households provided with the requisite planting material. Moreover, efforts are being undertaken to mitigate the second type of bias by further reducing the sample of control households further to included on those that attempted to establish orchards but failed to do so due to factors beyond their control (e.g. an unforeseen dry spell, livestock damage, pest infestation, and theft). Such quasi-random factors are being treated as instrumental variables, as part of an effort to ensure that like is being compared with like. We will compare the two samples of households against their time invariant and recalled baseline characteristics, as part of an effort to evaluate the potential reliability of this approach, i.e. the extent both groups are statically balanced vis-a-vis these characteristics.

The farm system modeling work will be carried out in collaboration with FarmTreeServices. The primary focus is to model the full farm cash equivalent returns of the samples of households both with and without fruit orchards, using both household data (e.g. farm size, soil fertility management practices, crops types grown, number and variety of food and non-food trees) and common area data (e.g., farm gate prices for major crops, including improved and unimproved fruits). These returns will be modeled over at least a 10-year period, with the projections compared between the households with and without orchards. Similar common area and aggregate program participant data will be compiled for the other countries where similar food tree scaling work has taken place. This will enable plausible (albeit cruder) estimations of the likely farm income and nutrition enhancing effects of the promoted food trees to be estimated for these countries as well.

**Cluster: Integrating trees in cropping fields for sustainable staple food production**

This research cluster focuses on integrating trees into cropping fields to enhance the sustainable production of staple crops, such as maize and rice. This may be through enhancing soil fertility, for example via 'fertilizer trees' (nodal nitrogen fixation or the incorporation of nitrogen rich biomass into soils); reducing soil erosion caused by water runoff or wind; maintaining soil moisture; facilitating water infiltration and cycling; enhanced pollination; and cooling ground surface temperature. The integration of appropriate tree species at appropriate densities may further help to diversify farm production and income, generate additional products like fodder, firewood, and tree foods, and, in turn, bolster overall farm productivity. There is some overlap with the tree-crop and fodder tree research clusters, as this work also encourages smallholder farmers to adapt and target fertilizer, fruit, fodder and timber trees to appropriate niches where they can improve crop and livestock productivity.

*Key achievements and stakeholder engagement efforts*

Prior to FTA, significant "discovery", "proof of concept", and "piloting" work had been undertaken on the integration of trees into farming systems. A seminal synthesis of this work is a meta-analysis of maize yield response when it is intercropped with woody and herbaceous legumes (Sileshi et al., 2008). The general

conclusion from this research was that Fertilizer Tree Systems (FTS) offer considerable potential for improving long-term soil fertility and health, as well as bolstering yields and farmer income. Hence, this was followed by subsequent efforts in seven countries (Burkina Faso, Kenya, Niger, Malawi, Rwanda, Tanzania, and Zambia) to promote fertilizer tree systems among smallholder farmers.

Recently, however, FTA research (Coe et al., 2019) has called into question these early research findings, particularly as it applies to "real world" and highly heterogeneous farmer circumstances. This is linked to another significant body of FTA research, the Options-by-Context 'paradigm' (Sinclair & Coe, 2019), which postulates that the performance of agro-ecological innovations generally varies significantly across biophysical, socio-economic, and institutional settings. Using a 11-district dataset comprising farms with fields both with and without fertilizer trees, Coe et al. (2019) conclude that the performance of such trees, while generating an overall average maize yield gain, varies considerably, with many farmers experiencing maize yield losses. However, this conclusion was called in question by the scientific pioneers of this work Sileshi and Akinnifesi (2019), arguing that the nature of the dataset analyzed was not conducive for the type of analyses undertaken. Several additional exchanges between these researches via the *Experimental Agriculture* journal platform followed suit. Additional FTA-related research has emphasized the need for carrying out functional ecological and socio-economic assessments, prior to promoting particular tree-crop integration options among farmers (Chomba et al., 2020).

Despite conclusions about the need for further research embedded within the context of scaling-up initiatives (see Sinclair & Coe, 2019), the bulk of FTA's work under the integrating trees in cropping fields cluster is associated with promoting (or scaling) such integration. Key scaling projects include Evergreen Agriculture Partnership, the Malawi Agroforestry Food Security Program (AFSP), Trees for Food Security, the Drylands Development Programme (DryDev), and Regreening Africa. The former project has since evolved into a partnership platform, involving a large number of national and international organizations. The former two projects were heavily focused on promoting Evergreen Agriculture, i.e. the integration of trees in cropping systems, whereas for the others this is only one aspect. DryDev was a large "mega project" implemented in five countries (Burkina Faso, Ethiopia, Kenya, Mali, and Niger). It was originally designed to centre around the scaling out of evergreen agriculture, but various vested interests shaped it into a broader integrated rural development programme. Regreening Africa (Ethiopia, Kenya, Rwanda, Somalia, Ghana, Mali, Niger, and Senegal) is more focused on supporting the integration of trees into farming systems, but not limiting itself to cropping fields. All of the above projects were and are being implemented in collaboration with research and development partners (some of which are very large and influential, e.g., World Vision, Oxfam, CARE, and Catholic Relief Services), with the bulk of financial resources being directed to them to undertake the direct promotional work among farmers. It is also worth mentioning that at the regional level in Asia, together with the Food and Agricultural Organization (FAO), FTA developed and launched a practical manual on how to incorporate trees in rice production landscapes in Southeast Asia and initiated a systematic review of impacts of trees on rice yields. However, our discussions with a FAO contact stated that this manual has yet to be applied.

Looking across all these projects and based on project documentation and reports, we estimate that FTA-related work has directly supported over 500,000 farming households in Burkina Faso, Ethiopia, Ghana, Kenya, Malawi, Mali, Niger, Rwanda, Uganda, and Senegal to integrate trees into their staple cropping systems with the aim of bolstering total farm productivity and climate resilience.

*Primary impact pathways and underlying assumptions*

As is the case for food and nutrition cluster, the impact pathways for the work associated with the integration of trees in staple cropping systems cluster is biased towards the direct scaling efforts FTA has been involved in. However, this direct scaling work lends itself a practice influencing pathway.

The first pathway is the staple crop productivity enhancement pathway, where the integration of trees in the cropping field positively affects crop productivity. Work is undertaken with implementing partners to promote the integration of trees into cropping fields, most notably "fertilizer trees", coupled with enabling access to the requisite germplasm. Farmers integrate the right trees in the right ways into their cropping fields and follow

species specific management practices, for example, periodically cutting back leaf biomass and integrating into the soil. With more nitrogen and organic matter, soil fertility is improved, and, consequently, coupled with the other environmental regulatory services provided by the trees and shrubs, mentioned above, crop productivity is sustainably improved. More food is available for domestic consumption or sale, thereby both directly and indirectly improving household food security. Production expenses further decrease, given less need for chemical fertilizers. Key assumptions associated with this pathway included:

- Farmers have access to the requisite planting material or sufficient stumps and shoots exist on the field if such trees are being naturally regenerated.
- Farmers attempt to integrate appropriate tree species into their farming systems (i.e., take the initial adoption decision)
- Planted or naturally regenerating trees survive (e.g., are not eaten by goats)
- Farmers follow the requisite management practices, depending on the tree-crop system in question

The second pathway is the total field productivity pathway, integrating the trees into the cropping field may have a neutral or even negative effect on crop production. However, the benefits of doing so (e.g., from the additional income or products generated) outweigh the associated costs. Planting of timber species along the boundaries of the cropping field or along contour ridges would be a good example of an agroforestry practice relevant for this pathway. The integration of food trees into the cropping field could be another example, linking this path to the ones associated with the food tree cluster above. The assumptions associated with this pathway are similar to those of the first pathway.

The last impact pathway, the partner practice influence pathway, arises from FTA's direct engagement work with donors and implementing partners. At the most basic level, this would be through the provision of technical advice on what trees to integrate, where, and how vis-a-vis the farming systems being targeted (i.e. 'the right tree for the right place for the right purpose'). However, the engagement, including any associated 'co-learning' processes, may also alter the partners' entire approach, e.g. how the partner designs and/or implements its interventions. This would, in theory, lead to the better promotion of trees in cropping fields and, by extension, better and more appropriate farmer-level adoption and ensuing impacts. This pathway's key assumptions include:

- Conducive professional and social relationships are forged between FTA scientists and the partners in question.
- FTA scientists possess the requisite knowledge, insights, tools, and/or advice that are relevant and have potential to positively influence the partner's mindset or practice.
- Resource availability and/or intra-organizational power relations permit practice change.

*Current evidence on achieved outcomes and impacts*

While there were considerable efforts to test the efficacy of integrating trees in cropping fields in research station and farmer field trial settings that predate FTA, work to assess adoption and, to a greater extent, impact has been limited. The above referenced evaluation of the Malawi AFSPII project (Hughes et al., 2019) did seek to ascertain adoption rates and impacts. However, the quasi-experimental strategy to assess the later failed, given problems with project monitoring data. Nevertheless, substantive efforts to assess adoption levels were undertaken. Of the sample of 402 older program participants, 42 percent were found to have fertilizer trees in their cropping fields. However, the actual FTS adoption rate was ascertained to be much lower at 14 percent. In order to experience the expected effects of fertilizer trees, there needs to be sufficient numbers on-farm to generate the requisite leaf matter, and this leaf matter must be incorporated into the soil, e.g. prior to seed sowing. Assessing adoption in binary terms (i.e., simply having or not having one or more fertilizer trees) is not particularly insightful. Nevertheless, given that a total of 222,000 farmers participated in the 3 phases of AFSP and assuming that the ascertained 14% adoption rate is somewhat representative, it can be estimated that over 31,000 households have adopted potentially efficacious FTSs through FTA-related support.

To generate supplementary adoption evidence, endline datasets compiled for the following FTA projects were re-analyzed to provide specific estimates on the number of households that integrated trees into their farming systems: T4FS in Rwanda (2,569 among the 3,100 supported); DryDev in Burkina Faso, Ethiopia, Kenya, Mali, and Niger (17,000 among the 23,400 supported). We further analyzed the uptake survey data collected for Regreening Africa in Kenya, Rwanda, and Senegal. Here, over 15,000 households are estimated to have thus far scaled up the integration of trees into their cropping fields among the 20,000 that have thus far been supported.

One source of actual impact evidence comes from the Coe et al. (2019) paper cited above using data also collected in Malawi. The sample is not statistically representative but comprises households with fields both with and without fertilizer trees. They found that maize yield grains were slightly higher on average for fields where fertilizer trees had been established (0.32 to 1.04 t $ha^{-1}$ more maize), but with huge variation across households. Moreover, while positive, these average yield gains were also much lower than those established through the more tightly trials that predate FTA. However, a key shortfall of the data analyzed by Coe et al. (2019) is that it does not comprise variables indicating how much biomass was produced and incorporated into the fields with fertilizer trees. Hence, and extrapolating for the findings of the above AFSPII evaluation, it is likely that many of the fertilizer tree fields were only partially treated, hence watering down the estimating effects and possibly partially explaining why many of these fields experienced relative losses compared with the maize only comparator fields. It is also worth noting that, in the AFSPII evaluation, self-reported maize yields were compared between successful and unsuccessful FTS adopters, with the former reporting statistically significantly higher yields. However, this comparison is biased, given that the successful FTS adopters possessed greater asset wealth at baseline, and the statistical significance of the average yield difference disappears when this is controlled.

*Further prioritized evaluative work*

From the figures above, it is possible to provide reasonable estimations of FTA's contribution to the above CGIAR adoption target. The above-mentioned Malawi fruit tree impact study is also collecting data on fertilizer trees on-farm, which will be used to triangulate the above 14% rate. However, following insights from Chomba et al. (2020), that there is a need for more context specific research on tree-crop integration, and coupled with the 'adoption challenge' associated with agroforestry 'innovations' such as FTS, carrying out primary data collection to assess contributions to the other targets is not advised. Complementary research efforts such as those advocated by Sinclair and Coe (2019) are needed to identify improved ways of supporting farmers to overcome the adoption hurdle, particularly when it comes to integrating complex agroecological innovations in complex and heterogeneous smallholder farming systems.

However, given all the engagement work that has taken place with implementing partners under the banner of 'research-in-development', it is worth interrogating what difference this engagement made in the practices and cultures of these partner organizations. What are they doing differently as a result of this engagement, particularly in terms of how they are supporting smallholder farmers to uptake impactful agroforestry practices? As per the partner practice influence pathway articulated above, the expectation would be that this engagement would ultimately lead to the provision of more effective and relevant support to farmers and, in turn, better and more appropriate agroforestry adoption, leading to improvements in both socioeconomic and environmental conditions. Given the large investment FTA has made in developing and operationalizing the research-in-development concept, it is recommended that such assessment be undertaken, adapting the outcome evaluation methodology pioneered by SRE accordingly.

**Cluster: Improving smallholder dairy production through tree fodder**

As is the case with FTS, considerable research had taken place prior to FTA (largely concentrated in East Africa) on the potential of leguminous, high protein fodder trees and shrubs, also referred to as Fodder Tree Technology (FTT), in bolstering milk yields. This research has evidenced, for example, that two kilograms of dried *Calliandra calothyrsus* (equivalent to six kilograms fresh) is an effective protein supplement to basal feed comprising napier grass (*Pennisetum purpureum*) and crop residues. Under farmers' management, milk production was shown to increase by 0.6–0.75 kilograms per kilogram of dried *calliandra*. The profitability of FTT was further

demonstrated, with net benefits of $114 per cow per year when FTT is used as additional feed and $122 when substituted for commercial dairy meal entirely (Place et al., 2009). FTT is purported to be particularly relevant for smallholder dairy producers, given that they do not operate at the economies of scale to make the utilization of commercially available feed financially viable. There are also other potential benefits. For instance, they can be integrated into cropping fields to enhance soil fertility, similar to FTS as described above, as well as facilitate the control of soil erosion. Cow manure from FTT fed cows is typically higher in nitrogen and hence can be used to further improve soil fertility when applied on cropping fields (Katuromunda et al., 2012). Smallholder dairy farmers are often challenged with sourcing of quality feed during the dry season and the variability in such sourcing is being exacerbated by climate change. Fodder trees and shrubs are available all year-round if appropriately managed.

*Key achievements and stakeholder engagement efforts*

Again, similar FTS, much of FTA's focus on FTT has been in relation to its promotion among smallholder dairy farmers. One significant effort began in 2008 through the East Africa Dairy Development (EADD) Program. Funded by the Bill & Melinda Gates Foundation, this program targets 315,000 small-scale dairy households in Kenya, Tanzania, and Uganda. In its first phase, ICRAF led its feeds and feeding systems component, which included the promotion of FTT, with a strong emphasis on supporting the role out of rural advisory services. Under FTA's Value Chains Innovation Platforms for Food Security (VIP4FS) project, a further effort was made to 'nudge' farmers over the FTT 'adoption hurdle'. In particular, FTA scientists consulted the Busara Centre for Behavioural Economics in 2016, and this engagement led to the delivery of an innovative extension approach in Uganda where—in addition to basic training and scaling up FTT seedling production—similar dairy farmers with similar cows were paired together at the village level. One of the pairs in each village was supported to feed sufficient quantities of *calliandra* to their cow, while the other followed status quo feeding practice. Both were supported to keep records on feeding and milk yields, periodically feeding back results to their peers. Milk yields nearly doubled among the *calliandra*-fed cows (5 to 9.22 litres/day) but only increased by less than one litre in the status quo feeding group. Mean and median gains were 3.24 ($p$=0.008) and 3.0 ($p$=0.033) litres, respectively ($n$=28).

Experiences the VIP4FS Uganda effort were used to develop and access funding for the BMZ funded Shrubs for Change scaling project, which is ambitiously targeting 120,000 smallholder dairy farmers in Kenya and Malawi. Similar to the work in Uganda, this effort is explicitly operationalizing insights from behavioural science to facilitate farmers over the adoption hurdle, i.e. by ensuring that quality planting material is easy to access; educating farmers on the potential idiosyncratic benefits they can experience early on; relaying knowledge and information in small digestible seasonally sized chunks; decoupling collection and payment (so payments are made closer to the time when benefits are experienced); and targeting through groups and facilitating social recognition for good practice.

*Primary impact pathways and key assumptions*

There are arguably three impact pathways associated with the tree fodder cluster. The first is the *FTT uptake and utilization pathway*. This pathway is foundational, as it needs to be fully "ignited" in order for smallholder farmers to experience the potential milk yield gains. Implementing partners impart relevant information and knowledge to smallholder farmers and ensure access to the requite planting material. Smallholders plant FTT seedlings in sufficient numbers (400-500 per cow) on their farms and manage them well until they mature (about 18 months time). They then harvest 5-6 kgs of fresh leaf matter per cow on a daily basis, mixing with basil feed, for example, napier grass or crop residues. Evidence shows that, assuming requisite genetic potential, health, climatic conditions, and sub-option basil feeding, significant increases in milk yields should follow suit, as was the case under the citizen science intervention described above. While much of the milk is sold, some the excess is consumed domestically. There are obviously several key assumptions underlying this impact pathway:

- Implementing partners deliver quality training and ensure access to the requisite planting material
- Farmers find FTT an attractive option, despite the initial cost and labour investment

- Farmers collect and plant FTT seedlings in the requisite numbers at the correct time, e.g. at the start of the rainy season
- Weather conditions remain favourable
- The seedlings are properly managed, e.g. pruned, so that they produce adequate leaf, and this leaf matter is then appropriately utilized
- Households, particularly lactating mothers and under-five children increase their milk consumption.

FTT is not the only improved feed option available to smallholder farmers, so implementing partners have others they can promote. This is particularly relevant, given that encouraging farmers to plant 400-500 seedings per cow can appear daunting. However, FTT is arguably a very good feed option for smallholder dairy farmers for reasons explained above. Hence, it is desirable that partners working in the smallholder dairy sector promote it, even if alongside other feed options. The *FTT partner scaling impact pathway* is where partners become convinced of the appropriateness of FTT and appropriately promote it among the smallholder target groups in question. If this pathway was actualized in the context of the EADD project, for example, we would expect to see this project continuing to promote FTT, despite ICRAF no longer leading its improved feed component. Key assumptions include:

- Implementing partners are aware of the potential benefits of FTT and have the knowledge, skills, and capacity to effectively promote it.
- Implementing partners perceive the cost-benefit ratio associated with FTT on both the scaling side and farmer utilization side as being equivalent or even better vis-a-vis alternative options.

As explained above, the FTT scaling work is being undertaken in tandem with improved extension approaches. Through EADD, this was through volunteer farmer trainers, and through VIP4FS and S4C this was and is being done by integrating behavioral science insights into the scaling effort. Hence, a third pathway can be dubbed as the *improved extension scaling pathway*. Here, collaboration with implementing partners in co-developing, implementing, and adapting these alternative extension approaches leads changes in their extension and scaling practices in other contexts. In other words, they and the institutions they work with (e.g., local government departments) become more effective in supporting smallholder farmers to take up appropriate innovations and, thereby, become more effective in facilitating rural development and transformation. Again, this particular pathway relies on several key assumptions:

- Implementing partners are convinced that the alternative extension approach in question is more effective than the status quo, and that the perceived benefits of pursuing it outweigh the associated costs.
- Implementing partners have the motivation, materials and capacity to implement the improved extension approaches.

*Current evidence on achieved outcomes and impacts*

An end-line study (N=181) was carried out in the context of the EADD project mentioned above in Kenya. It found that 33% of the targeted farmers had adopted fodder shrubs, despite 67.5 percent being aware of them. The main reasons for the lower than desired uptake included: low accessibility of planting material, limited technical knowledge, and knowledge on utilization (Kiptot et al., 2015). Assuming that the majority of the FTT promotion work took place in Kenya, it can be estimated that 19,000 smallholder farmers had adopted FTT as through this scaling effort.

Under the VIP4FS project, a cluster randomized control trial (RCT) was used to evaluate the effectiveness of the 'citizen science' add-on intervention in 'nudging' FTT uptake. Results indicate that such uptake increased from 25% to 61% in the intervention clusters, against 26% to 42% in the control clusters, a relative difference of 20% ($p<0.001$; N=879). The increase in the latter is likely indicative of spill-over effects, possibly due to increases in local supply of *calliandra* and/or knowledge diffusion (Hughes et al., in-press). If we assume that such spill-overs took place, the uptake of FTT increased by 26 percent among the 1,300 dairy farmers that were being targeted, (i.e., 338 took up FTT practice).

While revealing, FTT, like FTS, is not a binary agroforestry innovation. A farming household requires at least 400 shrubs on-farm per cow to generate the requisite leaf matter. And this leaf matter must be fed at the appropriate frequency, in the appropriate quantity, and mixed appropriately with basil fed in order to positively affect milks yields.

*Further prioritized evaluative work*

As mentioned above, one shortfall of the above evaluative work that has taken place this far is that it has not examined actual FTT utilization among adopters in depth, nor assessed actual milk yield effects at scale. Given the timeframe that is left, this may be challenging to do in the context of the S4C project. However, ex ante impact modelling work is planned based on an FTT uptake survey that will take place in mid-2021. Hence, it will be possible to estimate ranges of plausible milk yield gains and potential dietary impacts.

The other useful piece evaluation work could be linked to the proposed outcome evaluation above, as it relates directly to improving partner extension practices in the context promoting complex agroforestry innovations.

**Cluster: Forest resources and the nutrition of forest proximate communities**

It has recently been estimated that 1.6 billion rural people live within five kilometers of a forest (Newton et al., 2020). By extension, the livelihoods of many of these people are linked in some form or other to these forests, with many relying on them for sources of nutritious foods. This research cluster is therefore focused on both understanding the extent forest proximate communities rely on local forests, including their contribution to meeting household food and nutritional requirements, both directly through food provisioning and indirectly through enhancing agricultural production. It is further devoted to raising awareness on this critical provisioning role and co-developing policy and intervention options to promote continued, enhanced, and safe access to desirable forest foods by proximate communities.

*Key achievements and stakeholder engagement efforts*

FTA researchers have undertaken primary research to evidence the contribution of forests to meeting the food and nutritional requirements of forest proximate communities at the global level (Rowland et al., 2017), as well as in Indonesia (Ickowitz et al., 2016; Purwestri et al., 2019), Cameroon, the DRC, Ethiopia (Baudron et al., 2017), and Zambia. This includes the administration of household surveys. Key findings have been disseminated and shared through multi-stakeholder platforms and focus group discussions, with the aim of raising awareness among policymakers and other relevant stakeholders on the contribution of forests to local diets. In Indonesia, for example, recommendations were co-developed with local communities, informed by evidenced food consumption patterns among traditional and oil palm households. In Ethiopia, Uganda, and Burkina Faso, a total of 1,750 stakeholders participated in such platforms, complemented with approximately 200 focus group discussions with communities where data were presented for participatory validation and further qualitative interrogation.

At the global level, FTA has sought to raise awareness of and provide policy options for enhancing the food and nutrition provisioning function of forests by providing inputs to (a) the International Union of Forest Research Organization's (IUFRO) Global Forest Expert Panel (GFEP) process; (b) the International Conference on Forests for Food Security and Nutrition; and (c) the high level of panel of the World Committee on Food Security (CFS).

*Primary impact pathways and assumptions*

From the above, there are two primary impact pathways that can be ascertained: the national and local policy and practice influencing pathway and the international policy influencing pathway. Both are related but distinct. In the former, awareness is raised in specific contexts on the food and nutrition provisioning role of forests and appropriate policy responses are co-developed with stakeholders. National and local policies and supporting interventions are then implemented to uphold the rights of local communities to safely and sustainably access wild foods from local forests. Key assumptions the underlie the national and local policy & practice influencing pathway include:

- Political will exists to integrate the generated evidence into decision-making, as well as to participate in joint policy formulation processes.
- Capacity to enforce and ensure sound implementation of relevant policy options is in place.
- Local communities are willing to fulfil their responsibilities in the sustainable management and protection of local forests.

The international policy influencing pathway is still intending to uphold (or enhance where relevant) the food and nutrition provisioning role of forests, albeit indirectly. Influencing such high-level policy processes is ultimately intended to influence national policies and interventions, as well as donor funding priorities, thereby helping to facilitate the national and local policy and practice influencing pathway. Key assumptions underpinning this work included:

- Global bodies and international organizations find FTA research in this area credible, relevant and actionable
- Influenced global level policy and funding priorities and decisions having the potential of meaningfully shaping those that the national and eventually local level

*Current evidence on achieved outcomes and impacts*

According to project reports and CIFOR's database, extensive FTA work on evidencing food and nutrition contribution on trees has generated significant interest and engagement from national and international policy makers, research institutions, and international NGOs. In Indonesia, national and sub-national governments have expressed interest in taking up the results and recommendations of FTA research on nutrition and food shifts in the course of rapid agrarian change. Moreover, in Zambia, ministries and national universities have expressed their interest in future collaborating on this topic. FTA work is also integrated into international development practice, such that 10 principles for a landscape approach are served as the implementation framework for a USAID USD 47 million project, LESTARI. In Ethiopia, the government formulated recommendations drawing on the findings from the above cited research for the inclusion of nutrition-sensitive interventions in their government's nutrition program.

*Further prioritized evaluative work*

As presented above, there has been significant engagement between FTA researchers and policy makers and other stakeholders at the global, national and local levels. However, to date, much of this appears to have only resulted in verbal expressions of interest in acting on research findings, rather than actually having done so, save for the case of Ethiopia. Further investigation is, therefore, warranted to assess how significant the influence has been and the corresponding impact potential. If both are considerable, the commissioning of an outcome evaluation should be explored, combined with ex ante impact estimation.

## Lessons and Challenges to Overcome

The assessment to date highlights opportunities for FTA to consider optimizing monitoring, evaluation, and learning to more strategically align the program to address complex challenges.

1. ***Inconsistencies in monitoring, evaluation, and impact reporting.*** Varying levels of project documentation and data presented a challenge for the evaluation team to categorize projects to one or more of the five challenges, as well as select projects with promising indications of outcomes and impacts, and assess available evidence. This made the categorization, selection, and assessment processes highly inefficient. Project selection was in part driven by the availability of project documentation, so it is possible that key FTA research efforts have been overlooked or omitted. These inconsistencies are further confounded by the differences between centres' systems and databases. For example, some centres have systematic and robust databases while others are less advanced and developed. In addition, the ways in which project reports and/or evaluations document evidence of outcomes and impacts are inconsistent. For example, few evaluation reports and/or project documents quantify or estimate impacts in terms of the five challenges or the SRF targets. Often reporting focuses on documenting project activities and outputs, rather than contributions to outcomes, impacts, or other changes in the wider system.
2. ***Inconsistencies in the use of monitoring, evaluation, and impact terms.*** There are inconsistent conceptualizations and uses of evaluation terminology across centres and projects. For example, the terms 'output', 'outcome', and 'impact' vary in reporting, which added to the inefficiency of the desk review. These keywords could not simply be searched and pulled from reports; the desk review involved much closer reading, review, and translation of content into the appropriate concept categories. Obtaining conceptual clarity within the evaluation team was also challenging. Fortunately, prior experience and distinct definitions have been shared and established amongst the team to ensure common understanding and consistent application of these components moving forward.
3. ***Diffusion of topics and geographies of research and engagement signals a lack of coherence in FTA's program strategy to address complex global challenges.*** Building on discussions from the 2020 FTA Science Conference, many of FTA's research projects in fact are Type I projects that aim to address Type III 'wicked' problems (i.e., the five challenges). Research efforts are diffuse across geographies and topics. Moreover, research efforts inconsistently build on one another, affecting FTA's capacities to meaningfully and strategically address complex problems in a given country and/or region. In part, this is a result of inconsistent and intermittent use of Theory of Change across centres and projects. Often the strengths that Theory of Change can provide for more strategic interventions are not leveraged, and in many cases some impact pathways are likely to hold up and demonstrate greater potential than others.

**Preliminary Recommendations**

1. ***Aim for consistent documentation of projects and influence across centres.*** To the extent possible, targeted intended outcomes and impacts for the specific challenges that FTA aims to address should be quantified and reported on at the project level (both in project design and final reporting), and FP-level targets should be derived from these documents. Specific outputs of interventions should clearly link to intended outcomes and impacts.
2. ***Strive for consistency in the application of monitoring and evaluation concepts.*** We suggest the following definitions for terminology be adopted by FTA and across centres:

   "Outputs: The products, goods, and services of the research and the research process (i.e., knowledge, fora, and processes generated by the activities).

   Outcomes: Changes in knowledge, attitudes, skills, and relationships manifested as changes in behaviour.

Impacts: Changes in flow (e.g., higher annual income, increased water discharge from a river) or state (e.g., socio-economic status, water quality in a reservoir), resulting wholly or in part from a chain of events to which the research has contributed." (Belcher, Davel, & Claus, 2020, p.9)

3. ***Use of nested ToCs can support challenge-centric program and strategy design.*** Researchers and program managers should fully utilize Theory of Change as a core element of strategic project planning and adaptive management. How FTA aims to contribute to complex social problems should guide program strategy, design, and implementation. A robust ToC for the challenges to which FTA aims to address would be a useful tool to guide strategic program management, and align centre and partner efforts in overlapping geographies and research topics to maximize intended contributions to outcomes, impacts and meeting SRF targets.

## Next Steps

The evaluation team has identified a series of tasks in order to plan for and proceed with the next stages of the study (Table 7). The table describes two parallel processes: first, the finalization of the study of Challenges 1 and 5; and second, the design and implementation of the study for remaining challenges.

**Table 7.** Planning for next stages of the study in 2021.

| Task | Description | Anticipated Timeline |
|---|---|---|
| *Finalization of the study of Challenges 1 and 5* | | |
| 1. Design study for collecting additional empirical evidence for Challenges 1 and 5 | Design workshop and detailed (costed) work plan developed | January 2021 |
| 2. Integrate feedback and map additional projects by partners (e.g., CIRAD, Tropenbos, CATIE, INBAR) into ToCs | Online consultations with partners to validate the ToCs and additional data collection on partners' research projects related to the challenges | January 2021 |
| 3. Collect empirical evidence for Challenges 1 and 5 | Proposal pending input and approval from ISC and partners | Once design approved February 2021 |
| 4. Analyze empirical evidence for Challenges 1 and 5 | TBD; dependent upon decisions from task 3 | March 2021 |
| 5. Final report of FTA contributions to Challenges 1 and 5 | Completed outcome assessments and impact estimations | May 2021 |
| *Study of Challenges 2, 3, 4 (parallel process)* | | |
| 1. Develop overarching and cluster-level sub-ToCs and narratives | Compiling inputs from interviews, desk review, modeling ToCs and developing accompanying explanatory narratives | February 2021 |
| 2. Integrate feedback and map additional projects by partners into ToCs (e.g., CIRAD, Tropenbos, CATIE, INBAR) | Online consultation with partners to validate the ToCs and additional data collection on partners' research projects related to the challenges | February-March 2021 |
| 3. Review existing body of evaluative work on clusters and conduct evidence appraisal | As described in report | March-April 2021 |
| 4. Plan, collect, and analyze additional evidence | TBD; dependent upon decisions from task 3 | May 2021 |
| 5. Additional impact estimation exercise | TBD; dependent upon decisions from task 3 | June-July 2021 |
| 6. Final report of FTA contributions to Challenges 2, 3, and 4 | Completed outcome assessments and impact estimations | September 2021 |

### Finalization of study of Challenges 1 and 5

In order for the evaluation team to prioritize which clusters (and/or projects to represent the clusters) across the two challenges can be prioritized for additional empirical data collection, key thinking needs to be done regarding

whether the assessment will cover a superficial breadth of all of FTA's work or present an in-depth assessment of select bodies of research and engagement activities to represent FTA's work.

The second task is already underway. The overarching ToCs and cluster-level sub-ToCs for both Challenge 1 and Challenge 5 are currently in the process of receiving validation and input from CGIAR partners (Tropenbos, CATIE, CIRAD, and INBAR) and lead scientists to ensure the ToCs reflect the breadth and depth of FTA's research and engagement. To date, four CIRAD projects have been identified and matched to clusters under Challenge 1. The evaluation team awaits responses from Tropenbos, CATIE, and INBAR before proceeding with the integration and assessment processes. The same procedure described in the methods section will be followed.

The third task will be determined by discussions and inputs to the proposed plan with ISC, partners, and the evaluation team. The research team proposes to apply a pragmatic approach, i.e. basing the decisions on prioritizing for further evidence collection on the level of data gaps, the number of projects within a cluster with data gaps, the budget allocated to the cluster, and the likelihood for outcomes and impacts to be reliably assessed within the time and resources available for this study. This is a key next step in the process and implies that only for a selection of clusters further evidence is collected.

The fourth and fifth tasks will require supplemental analyses (both ex post and ex ante) for impact estimations based on more robust outcome assessments where targeted evidence bases will be substantiated. Assumptions that underpin the impact figures to report on SRFs will be made explicit. A final report that builds on the structure here and considers input from partners and the ISC will be prepared.

***In parallel: Design and implementation of studies for the remaining challenges***

A similar process as presented in this interim report will begin to develop and test composite Challenge level ToCs for remaining challenges. It is expected that the iterative learning derived to date from designing and implementing the study for Challenges 1 and 5 will be applied to improve efficiency and moving the integrated study forward for the remainder of 2021.

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# Appendix 1. Cluster-level ToCs and Explanations: Challenge 1 (Deforestation and Forest Degradation)[8]

**Cluster: Sustainable Forest Management in Mesoamerica (Figure 3)**

*Purpose: Enhancing conservation of forest resources in Mesoamerica (Guatemala and Nicaragua)*

Sustainable forest management is one of the prominent foci of FTA's research. In Mesoamerica where pressures are needed from policy and the market to encourage community-based forest management, FTA's research facilitated participatory germination pilots with communities, investigated governance arrangements and socio-economic benefits of community forestry in different community contexts, and explored the socio-cultural realities, barriers, and opportunities of community forestry for communities. The research produced recommendations for policy development, policy implementation, and the management of community forests targeted to governments, local forestry cooperatives, NGOs, and communities. Based on these interactions, governments in Guatemala and Nicaragua were expected to develop and implement policy to support sustainable community forest management. Local cooperatives and NGOs were expected to support policy processes as well as communities' adoption of more sustainable forest-based practices and community forest management strategies. By influencing these actors, FTA aimed to contribute to the enhanced conservation of forest resources and communities' socio-economic well-being in Mesoamerica.

*Expected impact from the cluster:* Not available.

**Cluster: Sustainable Forest Management in Southern Africa (Figure 4)**

*Purpose: Sustainable forest management in Mozambique*

In Southern Africa, FTA's research on sustainable forest management aimed to support the needs for improved management and community development. Approximately 40,000 people who live in Mozambique's Niassa National Reserve (4,200,000 ha) depend on the trees and other natural resources (notably hunting and fishing), as well as agriculture, for their livelihoods. With a particular focus on forest conservation of the miombo woodlands in the reserve, the research engaged communities, reserve managers, and researchers in discussions around forest use, threatened species, conservation, and forest-based livelihoods. The research developed strategies for in-situ conservation management of priority tree species in the Reserve. Based on these interactions, reserve managers were expected to be better equipped to manage the forest resources in the Reserve, stimulate governmental support for the implementation of action plans by national forest agencies, and influence communities to adopt and comply with forest conservation practices. The research also aimed to advance research on forest conservation among local researchers to encourage a critical mass of research efforts in Mozambique. Together, these changes would lead to the sustainable management and conservation of miombo woodlands as well as enhanced and more sustainable livelihoods for surrounding communities.

*Expected impact from the cluster:* Not available.

[8] An interactive version of the cluster-level ToCs for Challenge 1 can be found here.

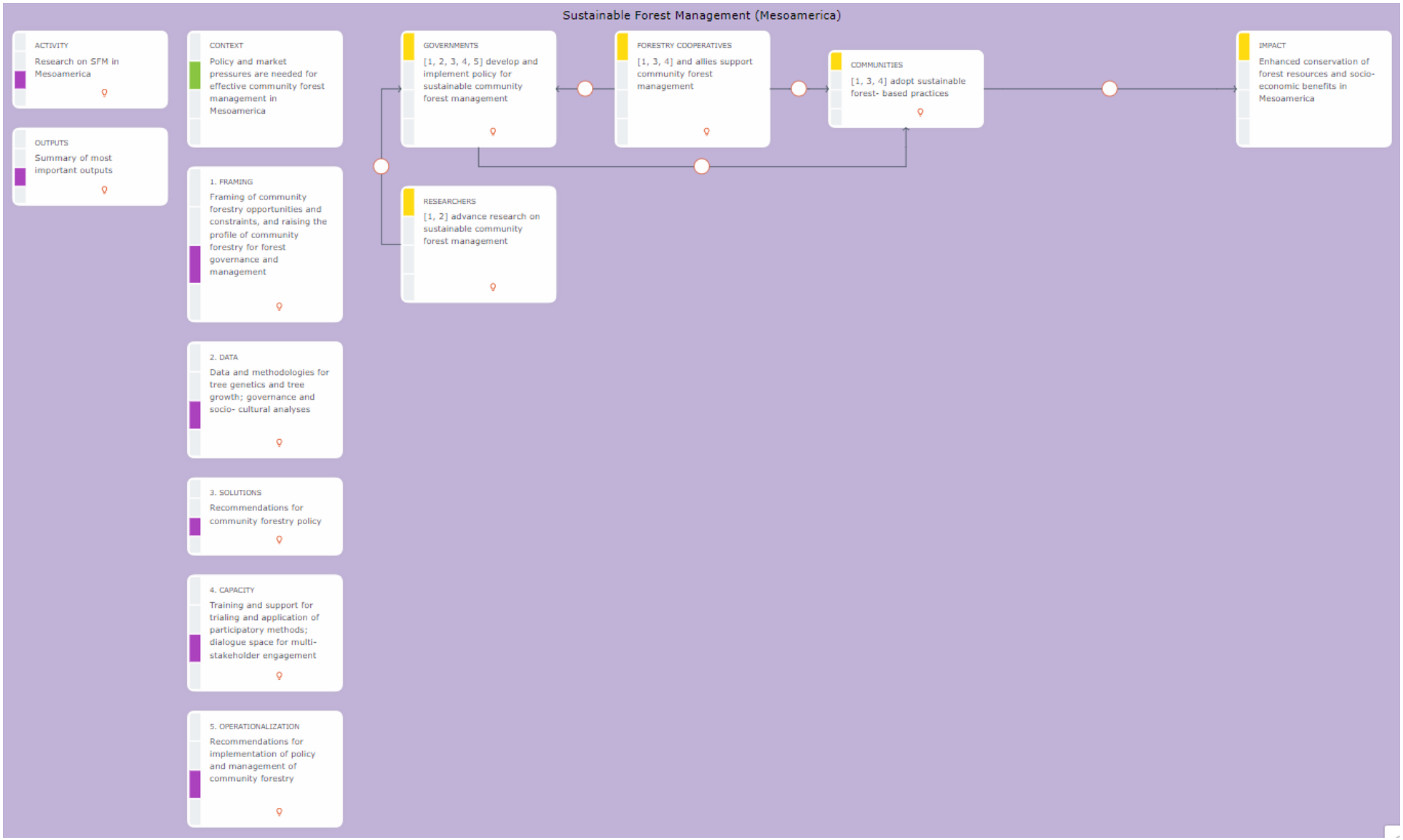


**Figure 3.** Cluster-level sub-ToC for FTA research on Sustainable Forest Management in Mesoamerica

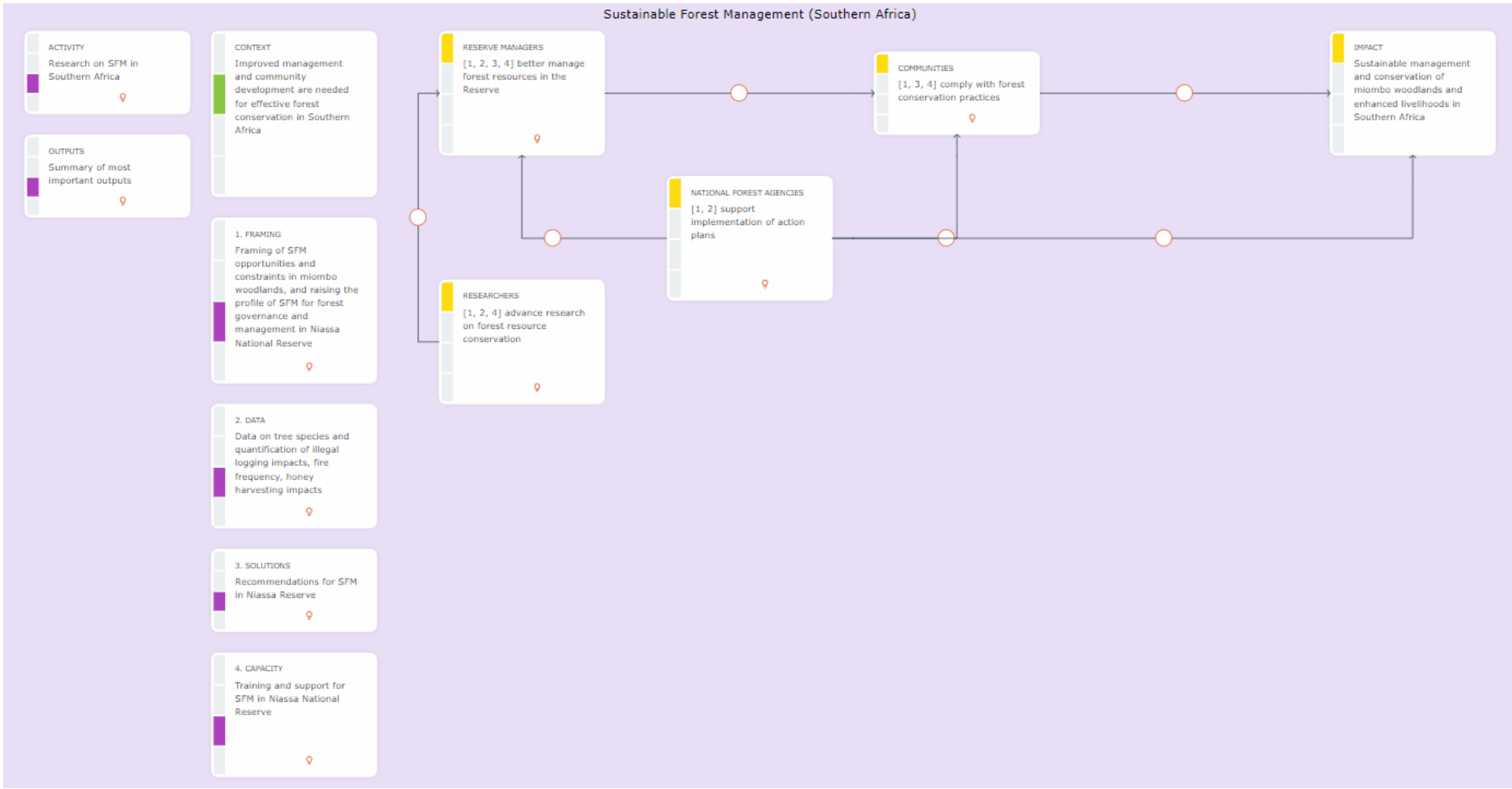


**Figure 4.** Cluster-level sub-ToC for FTA research on Sustainable Forest Management in Southern Africa

**Cluster: Sustainable Forest Management in the Congo Basin (Figure 5)**

*Purpose: Sustainable forest management in the Congo Basin*

For sustainable forest management in the Congo Basin, policy and market pressures as well as viable agroforestry options are needed to reduce deforestation across the region. Most of FTA's work on sustainable forest management has focused on the Congo Basin. This research has ranged from forest planting, capacity-building and training, the regeneration potential of tree species, the socio-cultural importance of indigenous species and current threats, value chains and market access, among others. The research produced knowledge on the effects of human pressures on forest resources such as logging and community use, the viability of intensified agroforestry systems, models, guidelines, and recommendations for mutually beneficial forest management practices for communities and the private sector. FTA also created opportunities for multi-stakeholder engagements and discussion on sustainable forest management in the Congo Basin. Based on these interactions and research activities, governments were expected to develop and implement policies to support sustainable forest management at the national, sub-national, and local levels, garner support from NGOs to lobby governments and companies to support sustainable forest management, stimulate timber companies to design and implement sustainable forest management plans, and influence community practices to alleviate agricultural pressures on forests. These changes were intended to reduce the deforestation and degradation of rural forests in the Congo Basin.

*Expected impact from the cluster:* 180 million ha of Congo Basin.

**Cluster: FLEGT Mechanism for Illegal Logging (Global) (Figure 6)**

*Purpose: Effective implementation of FLEGT to reduce instances of illegal logging (Global)*

Policy pressure and market transparency are needed to implement and incentivize FLEGT compliance to decrease instances of illegal logging. FTA's research ranged from botanical and genetic sampling of African tree species, policy analyses of the FLEGT mechanism and its communication strategy, assessments of value chain dynamics and regional priorities, and surveyed timber buyers, among other activities. FTA engaged diverse government stakeholders and experts within the forest sector and implemented territorial approaches to support inclusive local community decision-making processes. The research framed FLEGT/VPA opportunities and gaps, provided species origin and reference data, methods and DNA tools for species identification, information for companies using legal wood, and wood-fuel trade flow maps and value chain analyses. The research also proposed solutions to encourage consumer demand for legal timber as well as policy options for domestic timber markets and conservation strategies. The research established multi-stakeholder platforms to discuss issues or draft policy, offered training and technical capacity development, and supported graduate students. As a result of these contributions, it was expected that policymakers across Africa, Asia, and Latin American would create new or adapt existing policy on the legal procurement of timber and gain improved monitoring capacities. NGOs and CSO partners would support the implementation of and private sector compliance with these policies. Timber companies were expected to comply with FLEGT, and smallholders and SMEs were expected to have increased incentives and capacities to comply with legal requirements. Researchers were expected to build on the foundation to advance research on FLEGT and timber markets. These outcomes were expected to contribute to the broader impact of successful implementation of FLEGT, and therefore reductions in illegal logging and deforestation in West and Central Africa.

*Expected impact from the cluster:* To be determined.

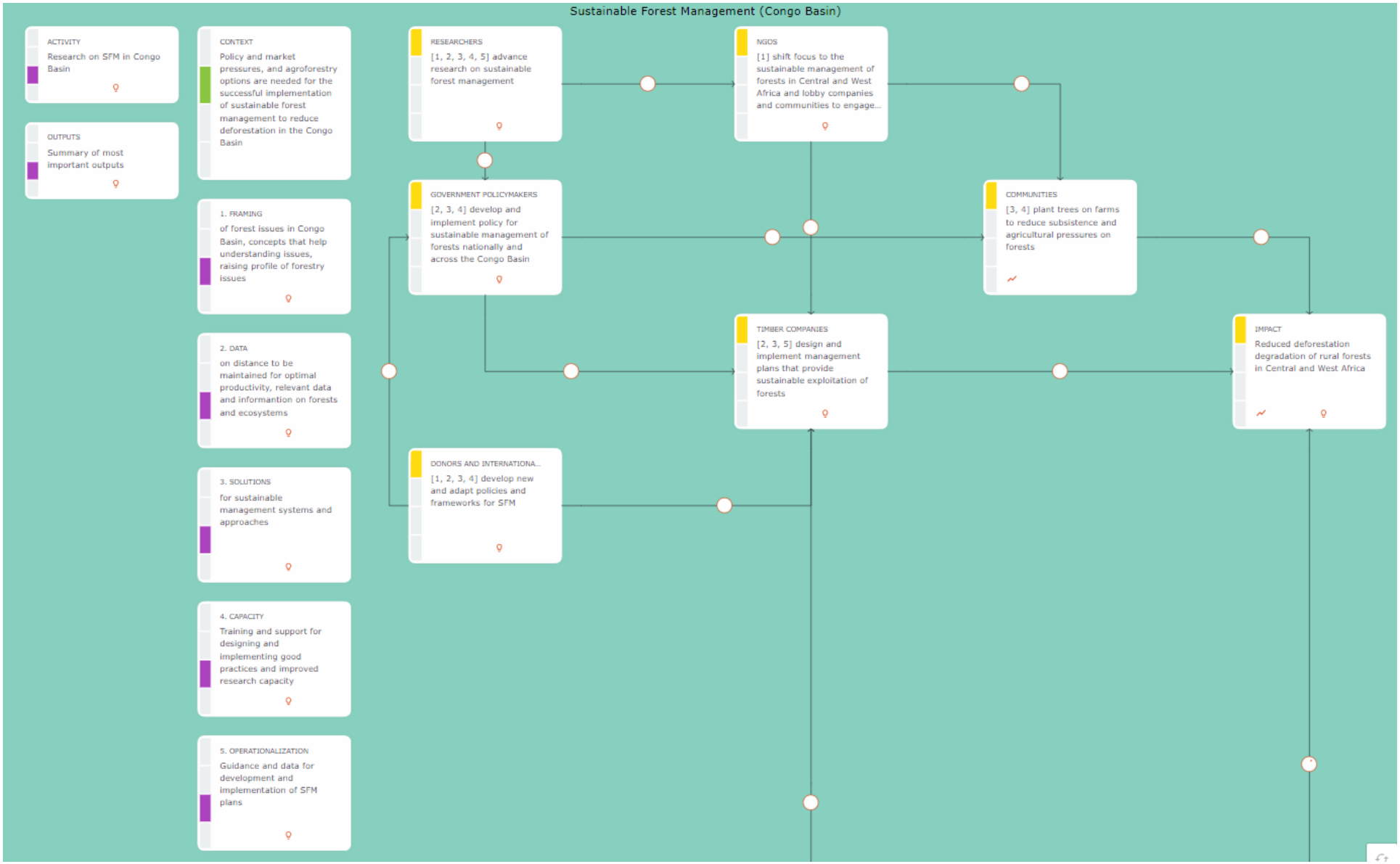


**Figure 5.** Cluster-level sub-ToC for FTA research on Sustainable Forest Management in the Congo Basin

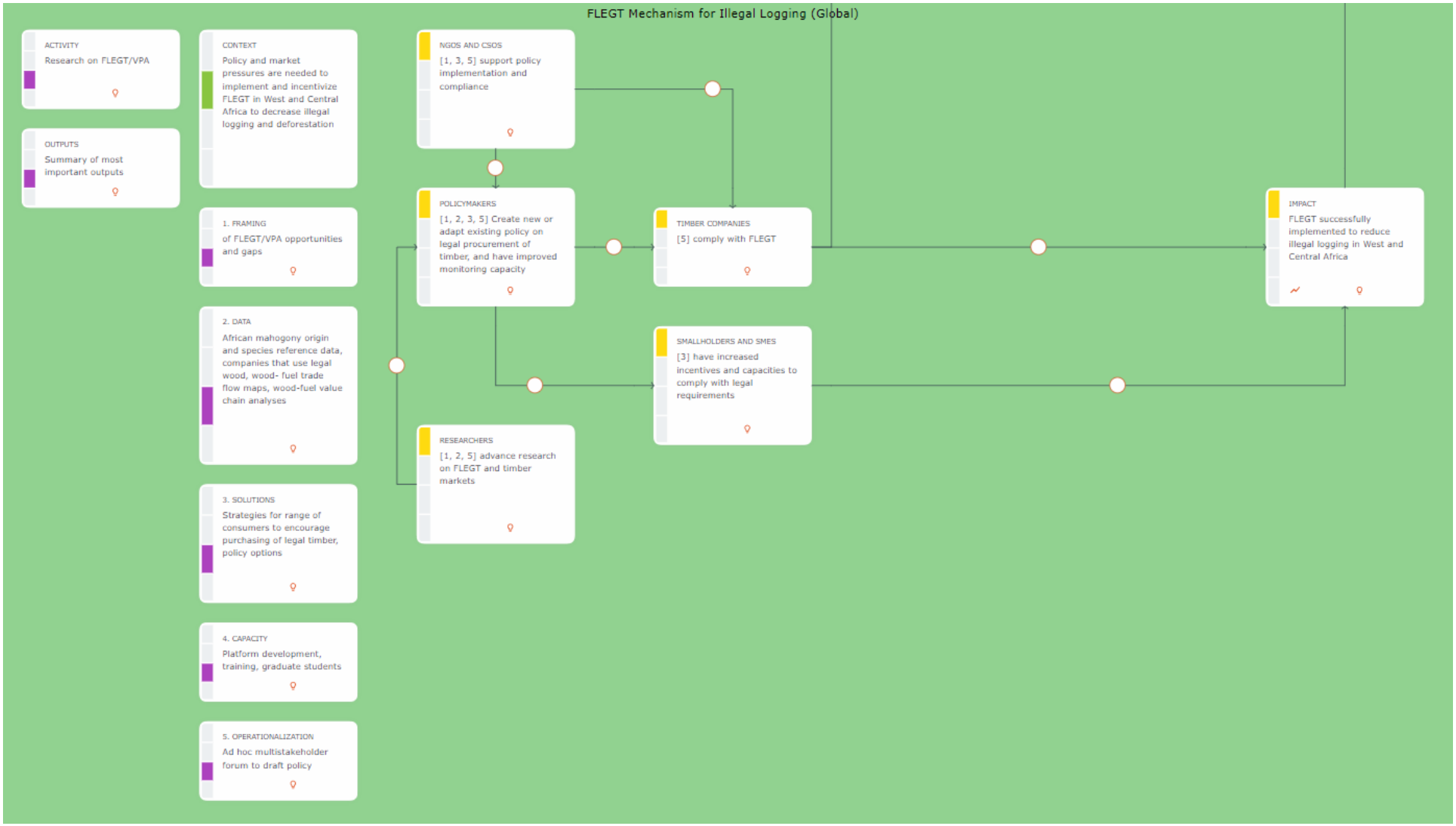


**Figure 6.** Cluster-level sub-ToC for FTA research on FLEGT

**Cluster: Sustainable Forest Enterprises in Sub-Saharan Africa (Figure 7)**

*Purpose: Enhance viable community forest enterprises (CFE) with sustainable livelihoods and environmental benefits through performance-based public finance and support mechanisms in Cameroon*

Improved monitoring capacities are needed for community forests in Cameroon to improve management. FTA's research activities ranged from delivering financing and monitoring systems for community enterprise performance against select environmental, social, and economic indicators, facilitating capacity-building and training on community forests to local entrepreneurs, and investigating the effectiveness and efficiency of the financial mechanism. FTA research facilitated the development of a field monitoring system to enable community forest enterprises (CFEs) to upload data to be viewed and analyzed in real time, and provided guidance on good practice, recommendations for scaling up co-investment, and performance-based public finance and support mechanisms. The research built capacity of CFEs to sustainably manage and maintain community forest land, and established a community of practice around forest enterprise that could be scaled up. It was expected that these contributions would provide a foundation on which forest enterprise research could be expanded. CFEs involved in the research were expected to improve their forest management practices, which would reduce the instances of illegal logging and encroachment, leading to an overall reduction in deforestation in Cameroon.

*Expected impact from the cluster:* Not available.

**Cluster: Timber Markets in Sub-Saharan Africa (Figure 8)**

*Purpose: Sustainable and legal development of timber markets and trade*

Better availability of monitoring data and understanding of timber markets, in combination with greater value addition in local supply chains, are needed to incentivize sustainability within timber markets across sub-Saharan Africa. FTA undertook research to take stock of community forestry and small-scale forest enterprises, worked in partnership to develop a methodology for collecting market and trading data, and conducted policy research on strategies for trade development. FTA research framed the contributions of community and small-scale logging to sustainable timber management, developed maps that detail the situation of cross-border trade, forest cover maps, market (demand data), as well as took stock of key issues and challenges that exist for SMEs. The research also produced policy recommendations, monitoring tools, and frameworks to solve key issues, provided training to communities on regulations, technical skills, finance, and commerce, and generated guidance for timber market policy implementation. As a result of these research efforts, it was expected that government policymakers would improve regulations to better enable the commercialization of community forest products and timber, and timber SMEs would become formalized and abide by regulations to improve ecological performance. As a result of changed demand, practice, and policy, there would be a reduction in illegal timber trade and logging activities, which would reduce associated deforestation.

*Expected impact from the cluster:* Not available.

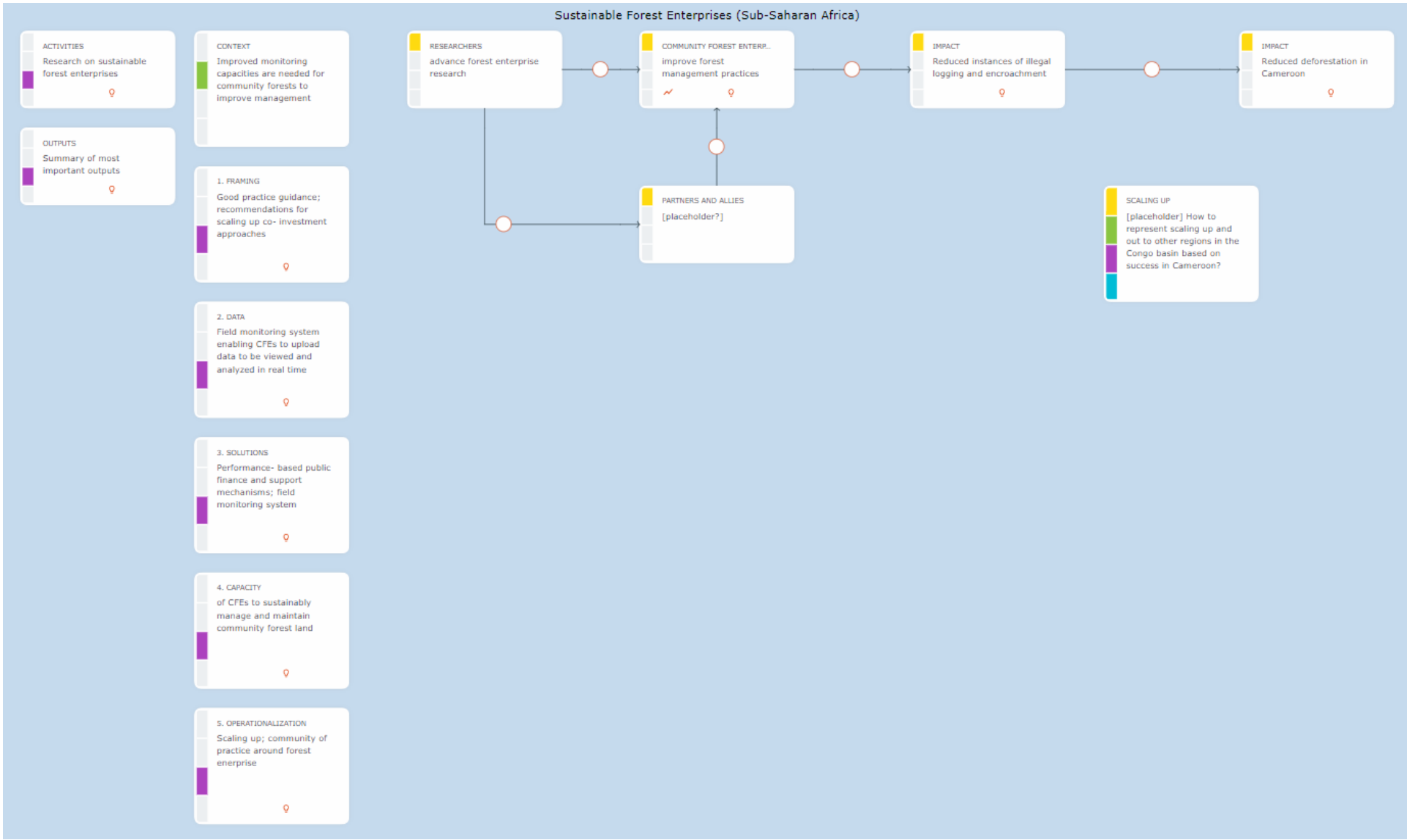


**Figure 7.** Cluster-level sub-ToC for FTA research on Sustainable Forest Enterprises in Sub-Saharan Africa

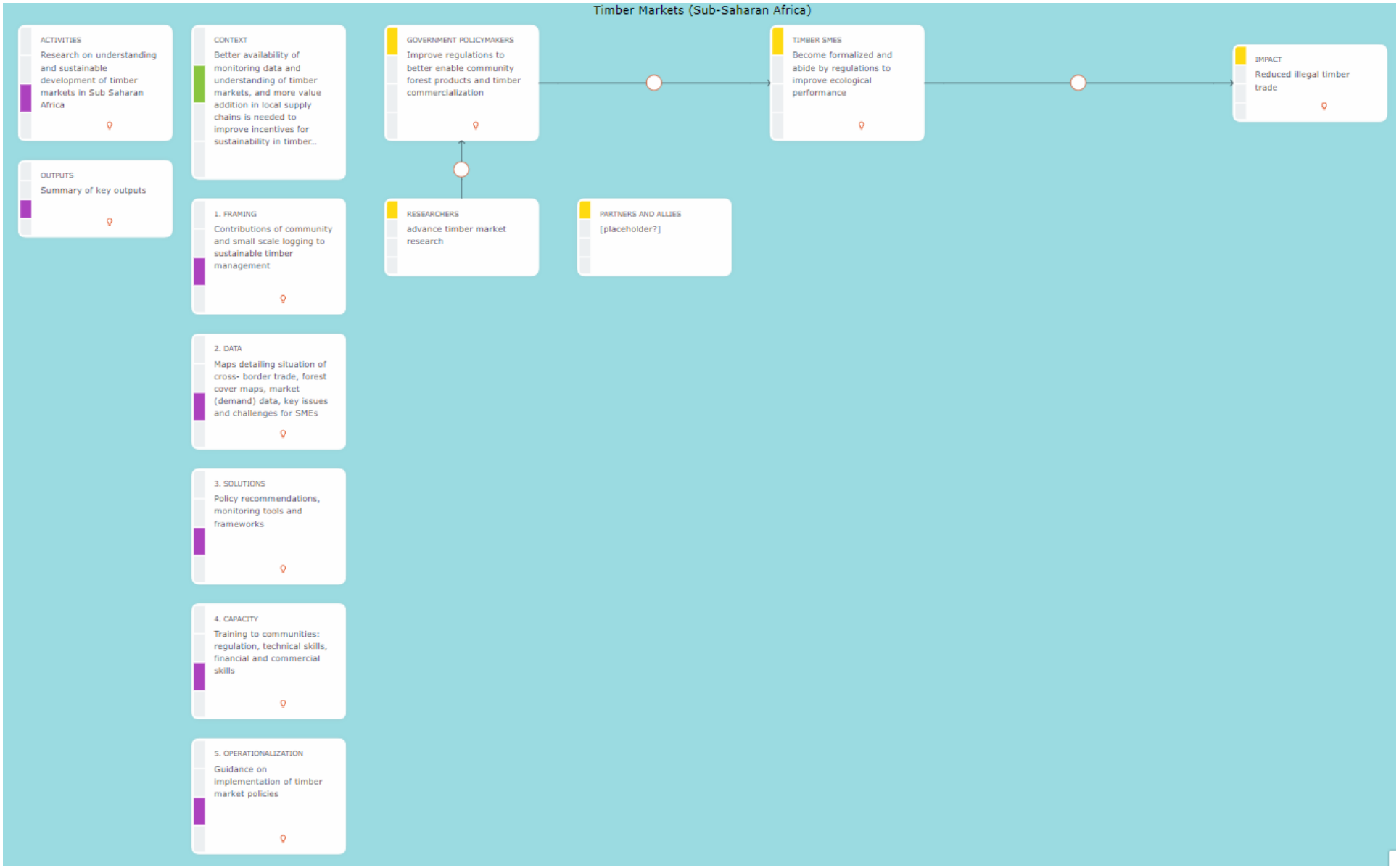


**Figure 8.** Cluster-level sub-ToC for FTA research on timber markets in Sub-Saharan Africa

**Cluster: REDD+ Policy Mechanism (Global) (Figure 9)**

*Purpose: Effective implementation of REDD+ to reduce deforestation-driven climate change*

In addition to international and national climate change policy mechanisms (REDD+), reliable data are needed to support effective policy mechanism implementation to address the negative effects of deforestation-driven climate change. FTA has undertaken a broad range of research projects on REDD+ culminating in global comparative studies. FTA played a role in facilitating learning platforms for REDD to achieve the 3Es (Effective, Efficient, Equitable), tested stepwise approaches to estimate reference emission levels, quantified emissions, and conducted multiple policy impact studies at the country level, assessing private corporate initiatives, exploring incentives and trade-offs for benefit sharing mechanisms, and developing improved monitoring, measurement, reporting, and verification (MMRV) systems. FTA research framed REDD+ policy opportunities and gaps, particularly for MMRV to raise the profile of REDD+ governance and carbon management, and generated data quantifying carbon emissions and forest and carbon reference levels. In addition, the research proposed recommendations for global and national REDD+ policies, measures, and commitments, developed training and supports for the REDD+ learning community, as well as provided guidance for the implementation and monitoring of REDD+ policies. As a result of these contributions, multi-level governments were expected to develop and implement more effective and informed REDD+ policies, partners and allies would support policy implementation at various levels and play an active role in the monitoring of government and private sector REDD+ commitments to hold these actors accountable to their commitments. As a result, the private sector was expected to respond to policy and civil society demand to adhere to REDD+ policies, and change their practices to reduce deforestation-related emissions. Researchers were also expected to build capacities and advance research on REDD+, which would continue to feed into REDD+ policy development and implementation. Ultimately, it was expected that REDD+ will better fill its mandate to reduce deforestation-related emissions through enhanced forest management at the national and international level.

*Expected impact from the cluster:* To be determined.

**Cluster: Wetlands (Global) (Figure 10)**

*Purpose: Effective management of wetlands and peatlands to reduce negative impacts of climate change*

Inadequate data to effectively monitor wetlands limits the recognition of their ecological value, and makes wetlands and peatlands vulnerable to deforestation as a result of aquaculture expansion and other development. FTA has primarily undertaken biophysical research to characterize and assess swamp degradation at the national level by estimating carbon emissions from vegetation changes, developed tools and models for ecosystem carbon dynamics suitable to tropical forest wetlands worldwide, and offered training opportunities to develop capacity with resource managers and policymakers. One aim of FTA research is to frame wetlands as a priority for climate action and raise the profile of wetland issues. FTA research has also supplied data to quantify the loss and degradation of wetlands and associated emissions, as well as build capacities of resource management, scientific, and policy communities to deal with wetland carbon issues. Moreover, FTA developed tools to support quantification activities, and provided guidance and data for the IPCC and national-level REDD+ management. As a result of these contributions, it was expected that national policymakers worldwide would have the information and tools necessary to develop and implement policies to sustain wetlands as part of their climate mitigation strategies and international policymakers would commit to the wetland agenda. Through multi-stakeholder opportunities facilitated by FTA, partners and allies would promote such policies, and researchers would continue to advance research on wetlands around the world. The private sector was expected to comply with new policy provisions and reduce stress on wetlands. Should these outcomes be realized, it is expected that wetlands and peatlands would become sustainably managed and preserved in the interest of addressing the causes and effects of climate change.

*Expected impact from the cluster:* To be determined.

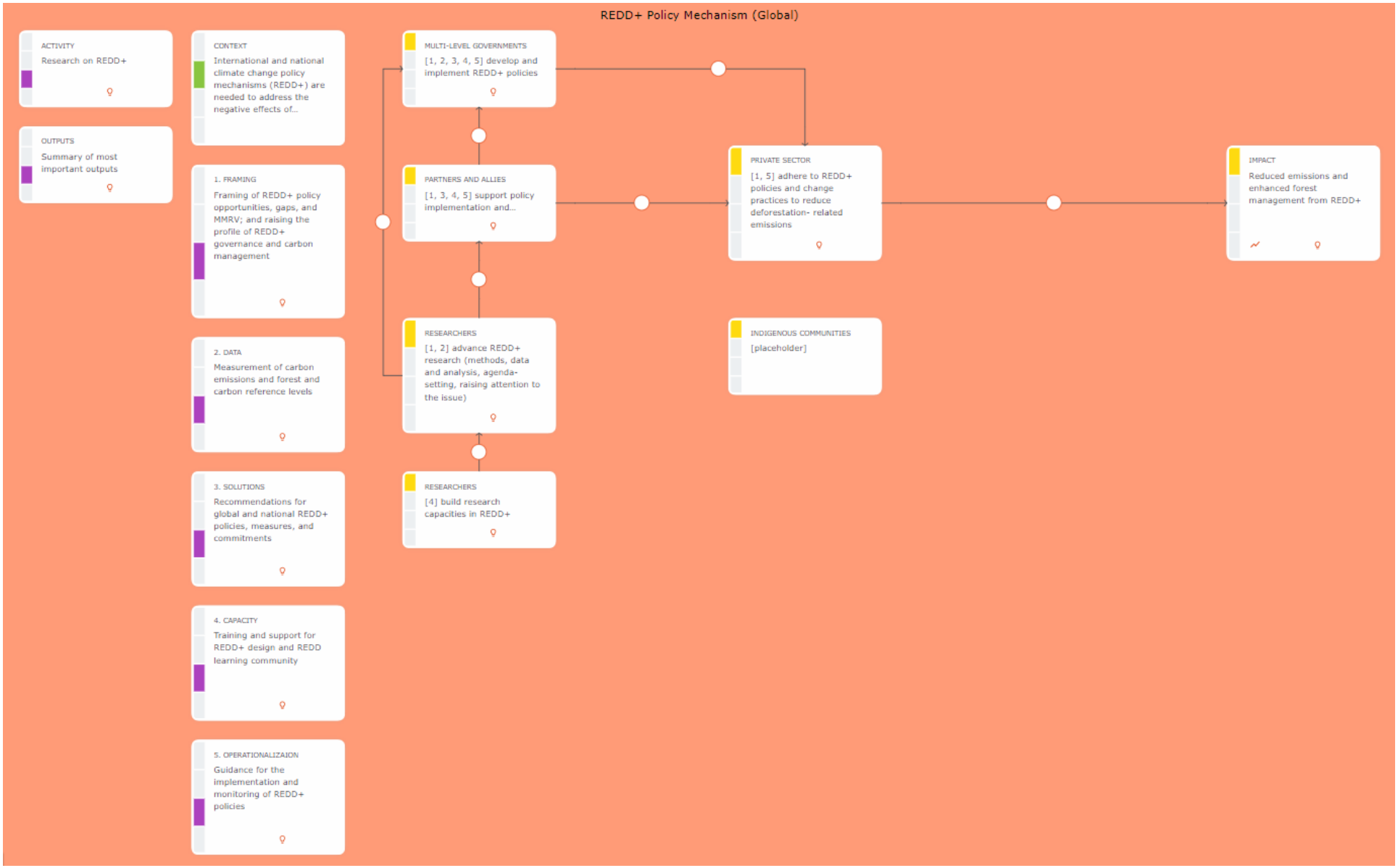


**Figure 9.** Cluster-level sub-ToC for FTA research on REDD+

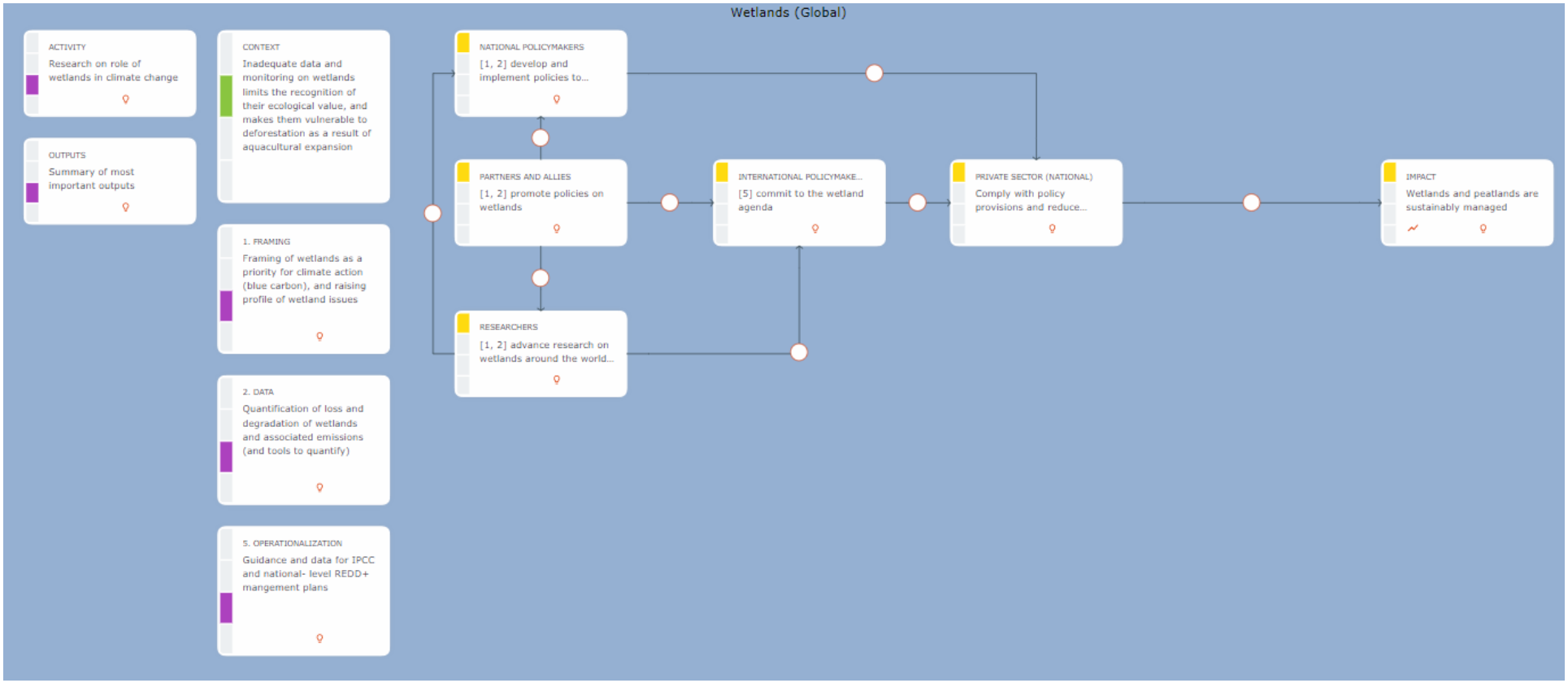


**Figure 10.** Cluster-level sub-ToC for FTA research on Wetlands

**Cluster: Fire and Haze in Indonesia (Figure 11)**

*Purpose: Reduced instances of fire in Indonesia and corresponding forest loss*

Advocacy, policy, and practice in support of fire prevention are needed to reduce forest loss from anthropogenic and natural forest fires. FTA research investigated the social, ecological, and economic dimensions of fires in Indonesia with the intent to inform policy and practice. FTA's research contributed by framing fire issues (there are political and economic incentives to burn), concepts to address issues (fire prevention), and raising the profile of fire-related issues. FTA generated data on the causes and locations of fires, as well as overlapping land claims. The research proposed solutions including recommendations for fire prevention policy and practice that consider context, as well as guidance and input to fire prevention policy development processes at the national and regional levels. FTA also established multi-stakeholder fora for fire prevention in Riau. As a result of these contributions, it was expected that the public would gain awareness of the importance of forest and land fire prevention and demand action. Public demand, in combination with FTA's contributions to policy, would help inform governments' development and implementation of regulations on fire prevention. NGO allies would advocate for fire prevention as a result of accurate and reliable data, and researchers would advance research on fire and haze. The resulting pressure from policy and the public would influence the private sector to commit to the fire prevention agenda and ultimately lead to farmers no longer using fire in agricultural practices, reducing instances of fire in Indonesia and corresponding forest loss.

*Expected impact from the cluster:* 2.4 million hectares saved from forest fires

**Cluster: Oil Palm in Indonesia (Figure 12)**

*Purpose: Sustainable and inclusive oil palm production in Indonesia*

Policy and market pressures are needed to change unsustainable oil palm production causing deforestation in Indonesia. FTA's research on oil palm in Indonesia ranges from analyses of the biophysical aspects of oil palm expansion, spatial analyses to quantify and qualify expansion and future scenarios, and policy-relevant analyses of private sector and government commitments to improve sustainability and inclusion in the sector. With new framing of oil palm issues, new data and analyses including maps and visualization tools, solutions and recommendations for improved policy and practice, researchers and governmental capacity development, and guidance for policy development and implementation, there would be a greater foundation of knowledge and national capacity on which to advance oil palm research and policy toward sustainability. Research partners and allies with similar sustainability objectives would have reliable resources to further advocate for and pursue pressing oil palm issues. For example, NGOs would have more evidence on which to build their campaigns. Increased market pressure from NGO campaigns and increased consumer awareness are expected to influence policy and practice. As a result of engagements throughout the research process and access to the research, the Indonesian government will be better equipped and incentivized to develop and implement sustainable oil palm policy, and likewise RSPO would revise their standards to better reflect sustainability and inclusion. These policy changes are expected to influence the practice of oil palm companies to adopt more sustainable and inclusive business models. As a result of better policy and improved practice across the private sector, smallholders are expected to adopt better agricultural practices and be better able to comply with sustainability standards. With improved practices by companies and smallholders, as well as better governance and management of forests, Indonesia's oil palm sector is expected to reduce oil palm expansion driven deforestation.

*Expected impact from the cluster:* To be determined.

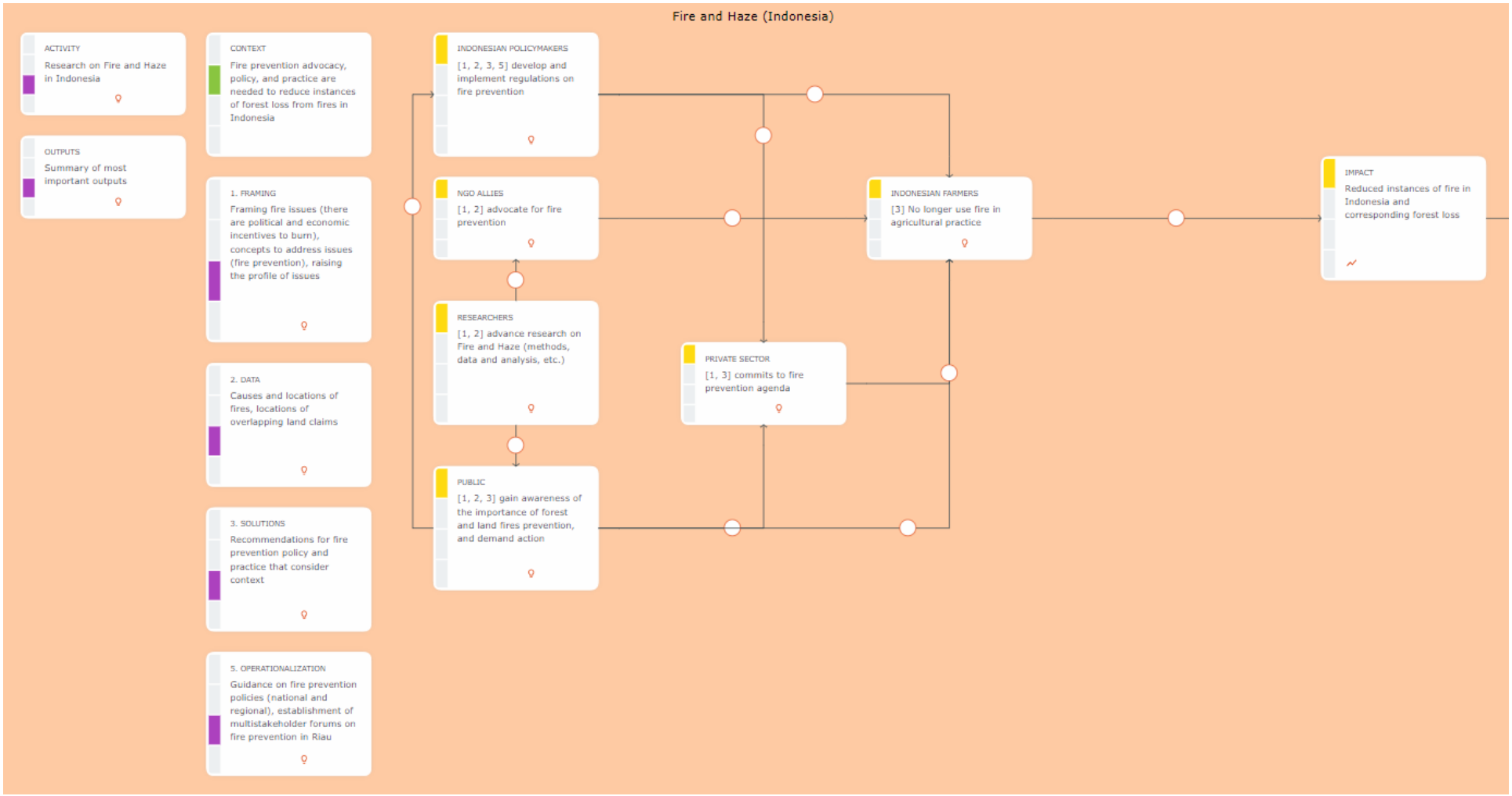


**Figure 11.** Cluster-level sub-ToC for FTA research on Fire and Haze in Indonesia

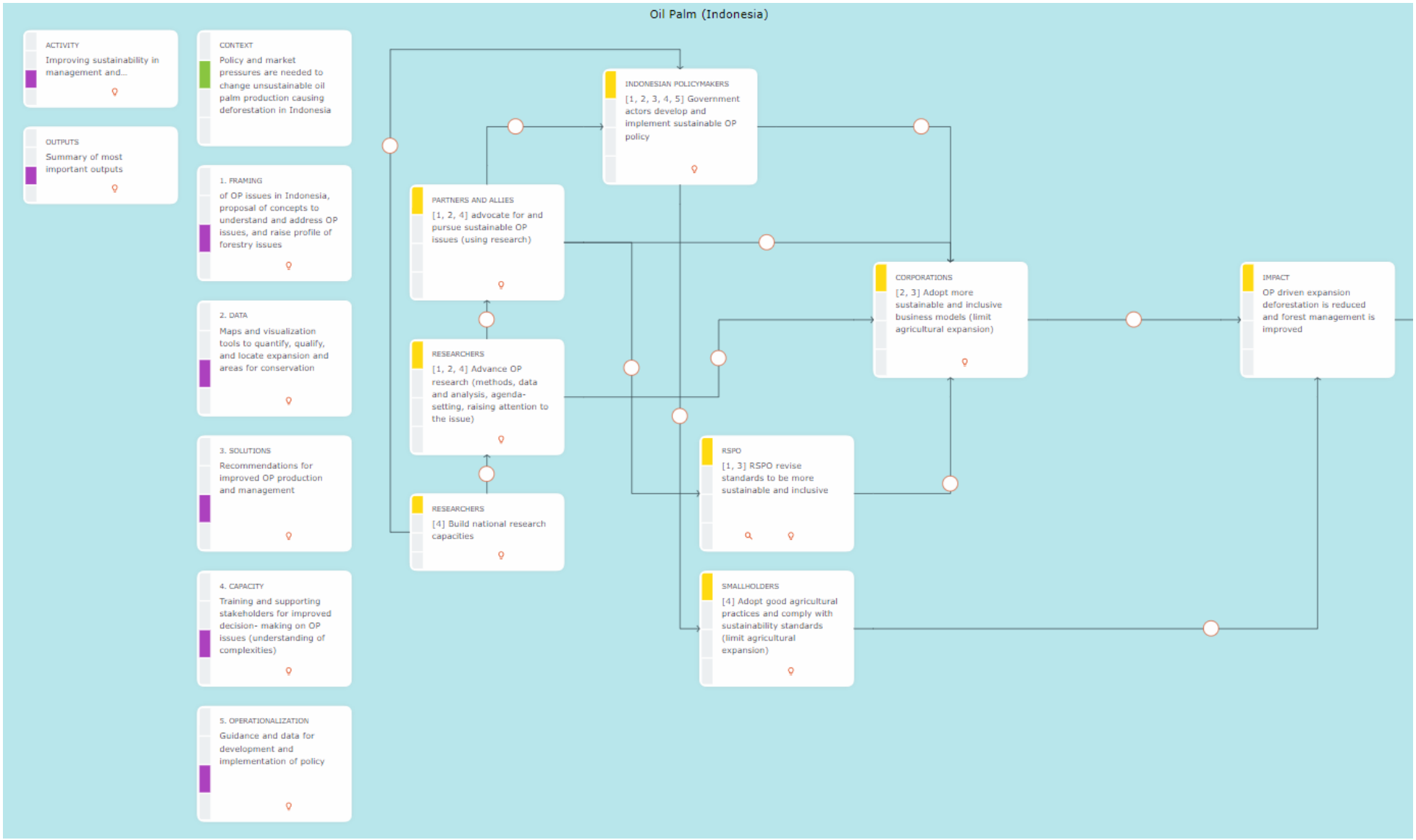


**Figure 12.** Cluster-level sub-ToC for FTA research on oil palm in Indonesia

**Cluster: Agroforestry Concessions in Peru (Figure 13)**

*Purpose: Sustainable multi-use management through agroforestry systems*

Informal farming communities' expansion of the agricultural frontier is a driver of deforestation in the Peruvian Amazon. FTA research aimed to support the implementation of agroforestry concessions for eligible smallholders in Peru that would lead to the reduction of deforestation. FTA works with and engages governments, NGOs, and local communities to frame challenges and opportunities for the agroforestry concession mechanism (e.g., compliance barriers for eligible smallholders), as well as expanded definitions of smallholders and concepts of smallholder heterogeneity. FTA's research also quantified the potential GHG reduction impact of successful implementation of the mechanism and mapped eligible zones and areas and proposed a new approach for zoning. Along with capacity and training for researchers and communities, FTA research co-produced guidance to implement and operationalize the agroforestry mechanism and its technical guidelines. As a result of these interventions, it is expected that the government at the national and sub-national levels would revise existing policy and effectively implement the mechanism, and NGOs support these processes to ensure smallholders can benefit from and comply with the mechanism's requirements. As a result, eligible smallholders would be incentivized to apply for and be awarded a concession, develop and maintain their capacities to comply with the provisions of the concession, and adopt agroforestry practices. It is expected that the culmination of these outcomes would reduce the amount of forest cut down to expand agricultural areas for cocoa and coffee and support some reforestation in the Peruvian Amazon.

*Expected impact from the cluster:* 1.5 million hectares of forest land in Peru

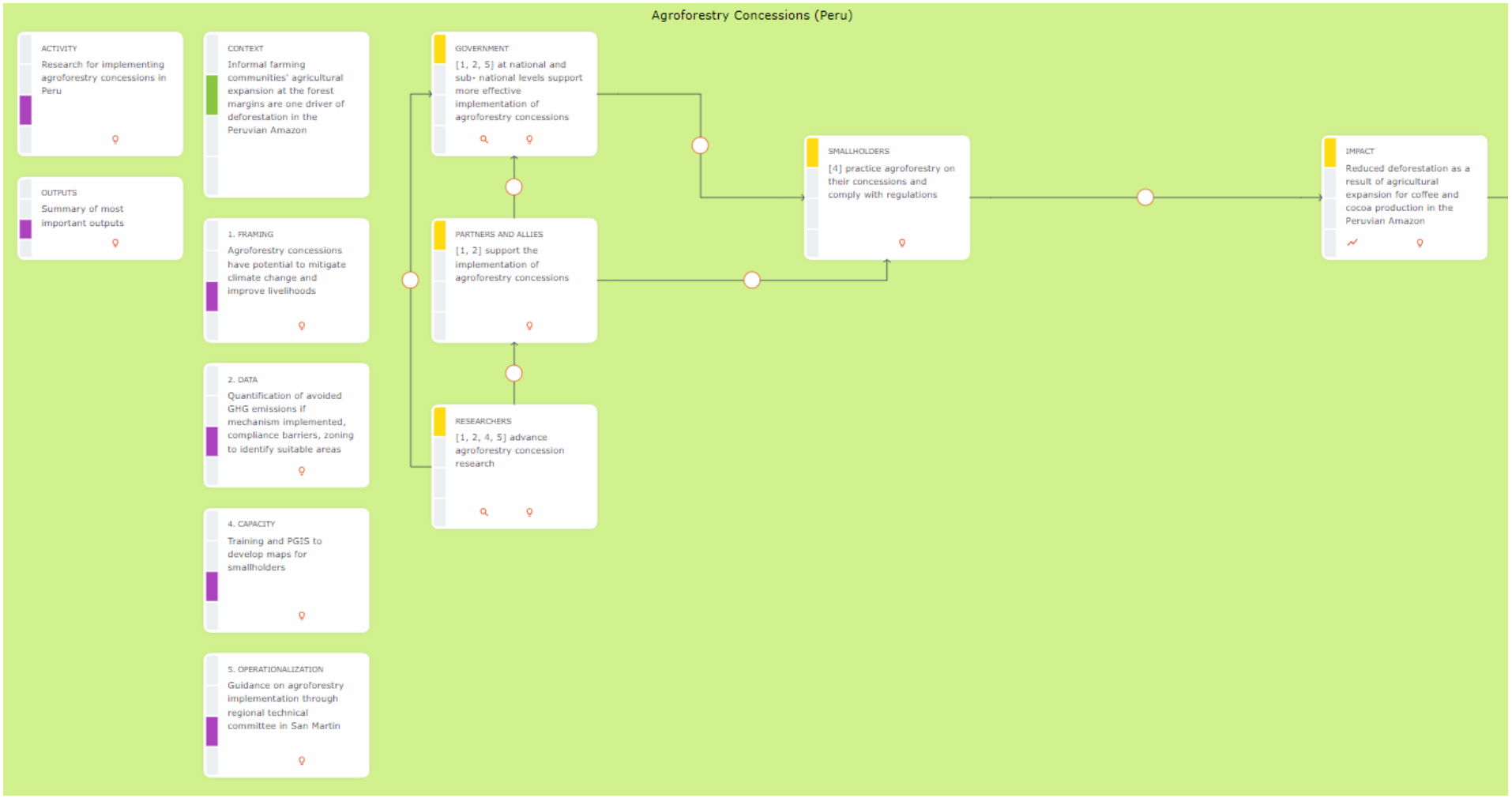


**Figure 13.** Cluster-level sub-ToC for FTA research on Agroforestry Concessions in Peru

# Appendix 2. Cluster-level ToCs and Explanations: Challenge 5 (Rising Demand and Need for Food)

**Overarching ToC: Tree Crops for Improved Nutrition Security (Figure 14)**

*Purpose:* This cluster of research projects focuses on the contribution of agroforestry and food trees for improving nutrition directly through increased availability and consumption of nutrient-rich foods. Indirectly, the work aims to achieve improved nutrition outcomes through diversification of livelihood opportunities for smallholder farmers in order to attain long-term benefits for families and communities. The approach relies on the identification of ecologically suitable and socio-economically relevant food tree and crop portfolios through in-debt consultation with communities combined with desktop analyses. Based on the co-created portfolios, projects make available the material, technical training and capacity to strengthen national partners' and smallholder farmers' engagement in integrating these portfolios into farming systems and restoring landscapes for increased food security and improved nutrition.

Diet diversification is thus achieved by implementing climate smart agroforestry approaches and integrating food trees that provide nutrient-dense foods (fruits and nuts, seeds for protein and oils, leaves as vegetables etc.) into the existing mixed crop farming systems.

In addition to nutrition security, this approach aims to contribute to landscape restoration by harnessing ecologically suitable food tree and crop portfolios in ways that enhance livelihood and landscape resilience while addressing food insecurity and improving nutrition.

*Expected impact from the cluster:* To be determined.

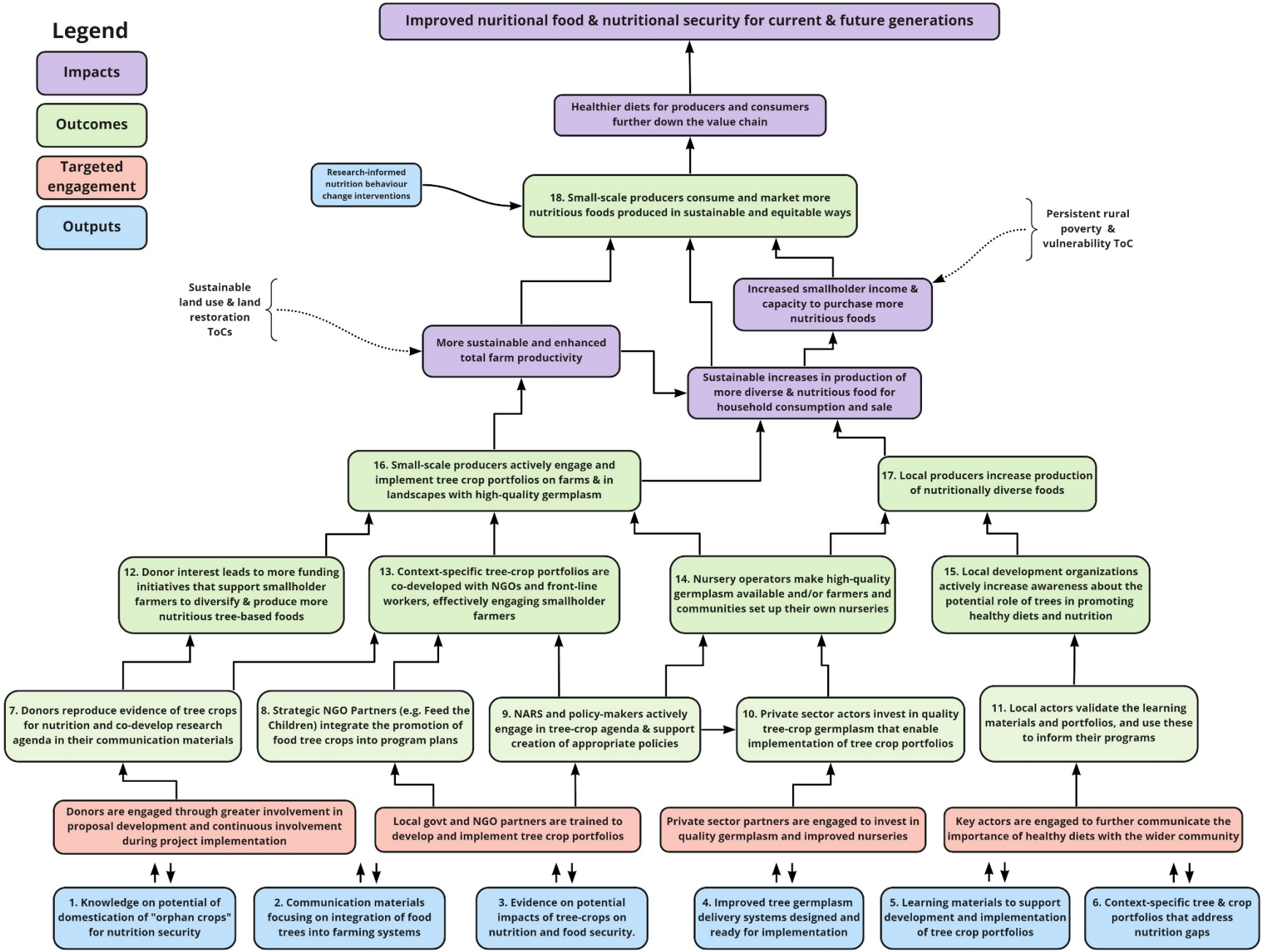
Legend
Impacts
Outcomes
Targeted engagement
Outputs
Improved nuritional food & nutritional security for current & future generations
Healthier diets for producers and consumers further down the value chain
Research-informed nutrition behaviour change interventions
18. Small-scale producers consume and market more nutritious foods produced in sustainable and equitable ways
Persistent rural poverty & vulnerability ToC
Sustainable land use & land restoration ToCs
Increased smallholder income & capacity to purchase more nutritious foods
More sustainable and enhanced total farm productivity
Sustainable increases in production of more diverse & nutritious food for household consumption and sale
16. Small-scale producers actively engage and implement tree crop portfolios on farms & in landscapes with high-quality germplasm
17. Local producers increase production of nutritionally diverse foods
12. Donor interest leads to more funding initiatives that support smallholder farmers to diversify & produce more nutritious tree-based foods
13. Context-specific tree-crop portfolios are co-developed with NGOs and front-line workers, effectively engaging smallholder farmers
14. Nursery operators make high-quality germplasm available and/or farmers and communities set up their own nurseries
15. Local development organizations actively increase awareness about the potential role of trees in promoting healthy diets and nutrition
7. Donors reproduce evidence of tree crops for nutrition and co-develop research agenda in their communication materials
8. Strategic NGO Partners (e.g. Feed the Children) integrate the promotion of food tree crops into program plans
9. NARS and policy-makers actively engage in tree-crop agenda & support creation of appropriate policies
10. Private sector actors invest in quality tree-crop germplasm that enable implementation of tree crop portfolios
11. Local actors validate the learning materials and portfolios, and use these to inform their programs
Donors are engaged through greater involvement in proposal development and continuous involvement during project implementation
Local govt and NGO partners are trained to develop and implement tree crop portfolios
Private sector partners are engaged to invest in quality germplasm and improved nurseries
Key actors are engaged to further communicate the importance of healthy diets with the wider community
1. Knowledge on potential of domestication of "orphan crops" for nutrition security
2. Communication materials focusing on integration of food trees into farming systems
3. Evidence on potential impacts of tree-crops on nutrition and food security.
4. Improved tree germplasm delivery systems designed and ready for implementation
5. Learning materials to support development and implementation of tree crop portfolios
6. Context-specific tree & crop portfolios that address nutrition gaps

**Figure 14.** Theory of Change for FTA Research on Tree Crops for Improved Nutrition

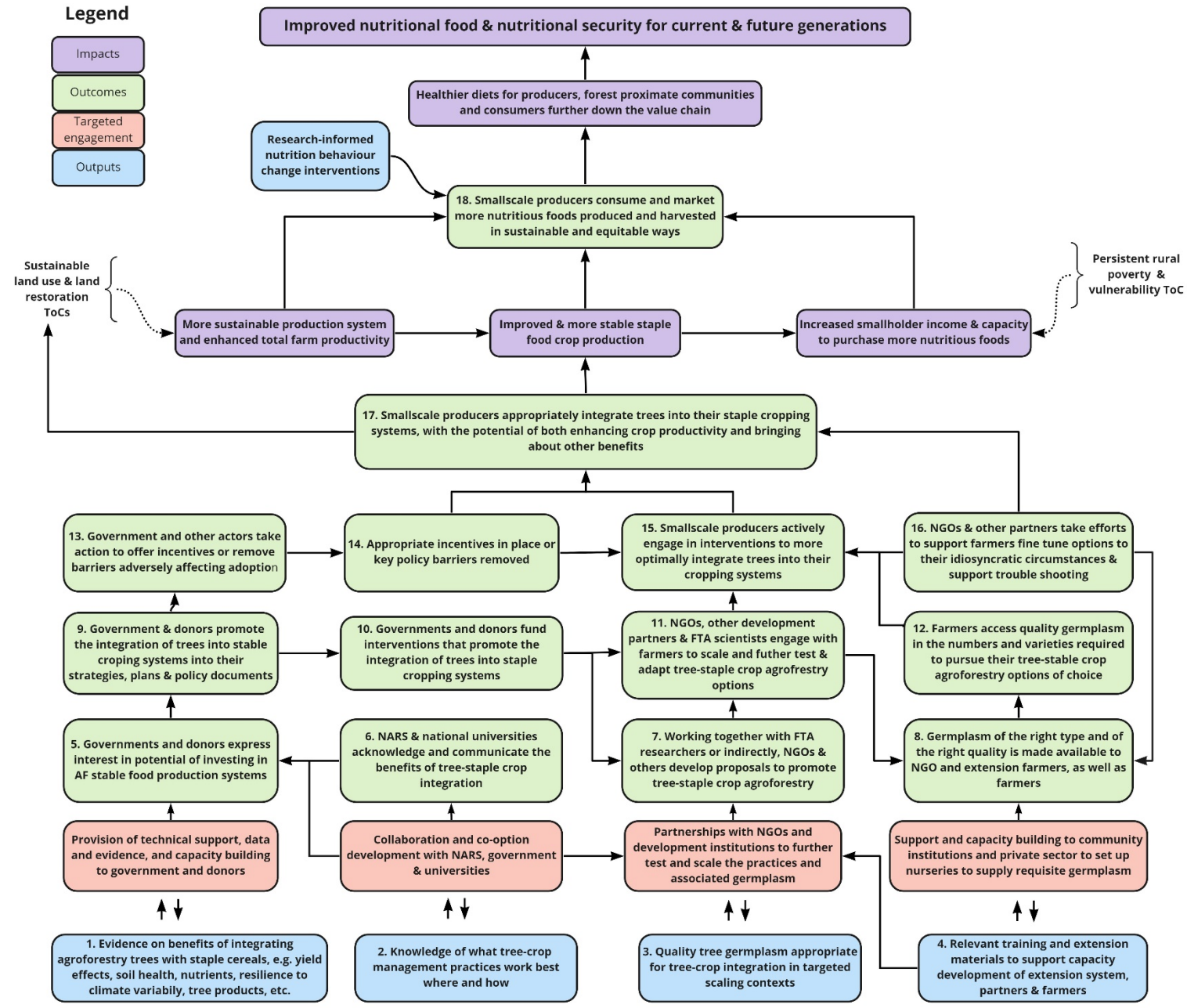

**Figure 15.** Theory of Change for FTA Research on Trees for Staple Crops

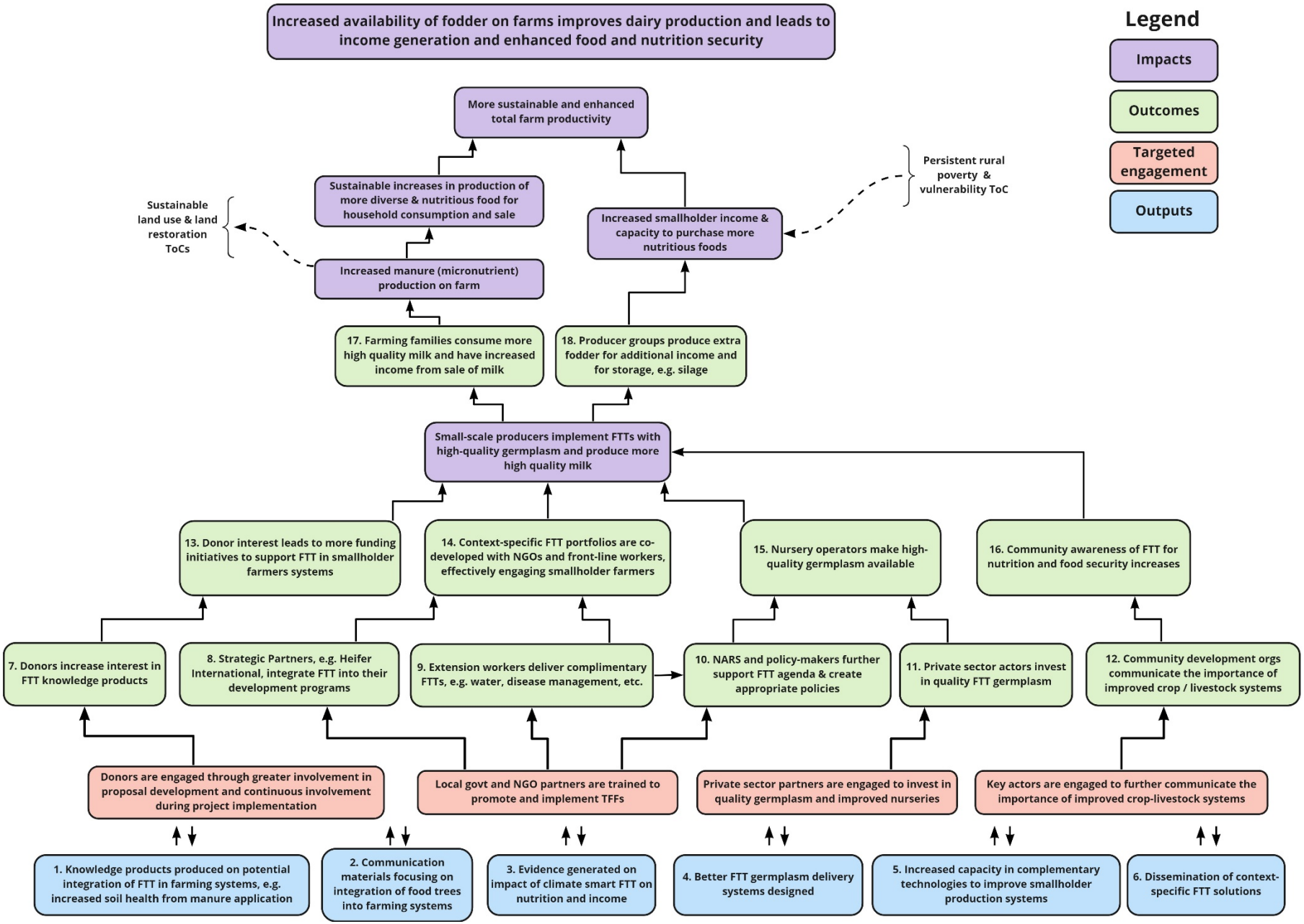
Increased availability of fodder on farms improves dairy production and leads to income generation and enhanced food and nutrition security
Legend
Impacts
Outcomes
Targeted engagement
Outputs
More sustainable and enhanced total farm productivity
Sustainable increases in production of more diverse & nutritious food for household consumption and sale
Increased smallholder income & capacity to purchase more nutritious foods
Persistent rural poverty & vulnerability ToC
Sustainable land use & land restoration ToCs
Increased manure (micronutrient) production on farm
17. Farming families consume more high quality milk and have increased income from sale of milk
18. Producer groups produce extra fodder for additional income and for storage, e.g. silage
Small-scale producers implement FTTs with high-quality germplasm and produce more high quality milk
13. Donor interest leads to more funding initiatives to support FTT in smallholder farmers systems
14. Context-specific FTT portfolios are co-developed with NGOs and front-line workers, effectively engaging smallholder farmers
15. Nursery operators make high-quality germplasm available
16. Community awareness of FTT for nutrition and food security increases
7. Donors increase interest in FTT knowledge products
8. Strategic Partners, e.g. Heifer International, integrate FTT into their development programs
9. Extension workers deliver complimentary FTTs, e.g. water, disease management, etc.
10. NARS and policy-makers further support FTT agenda & create appropriate policies
11. Private sector actors invest in quality FTT germplasm
12. Community development orgs communicate the importance of improved crop / livestock systems
Donors are engaged through greater involvement in proposal development and continuous involvement during project implementation
Local govt and NGO partners are trained to promote and implement TFFs
Private sector partners are engaged to invest in quality germplasm and improved nurseries
Key actors are engaged to further communicate the importance of improved crop-livestock systems
1. Knowledge products produced on potential integration of FTT in farming systems, e.g. increased soil health from manure application
2. Communication materials focusing on integration of food trees into farming systems
3. Evidence generated on impact of climate smart FTT on nutrition and income
4. Better FTT germplasm delivery systems designed
5. Increased capacity in complementary technologies to improve smallholder production systems
6. Dissemination of context-specific FTT solutions

**Figure 16.** Theory of Change for FTA Research on Fodder Tree Technology

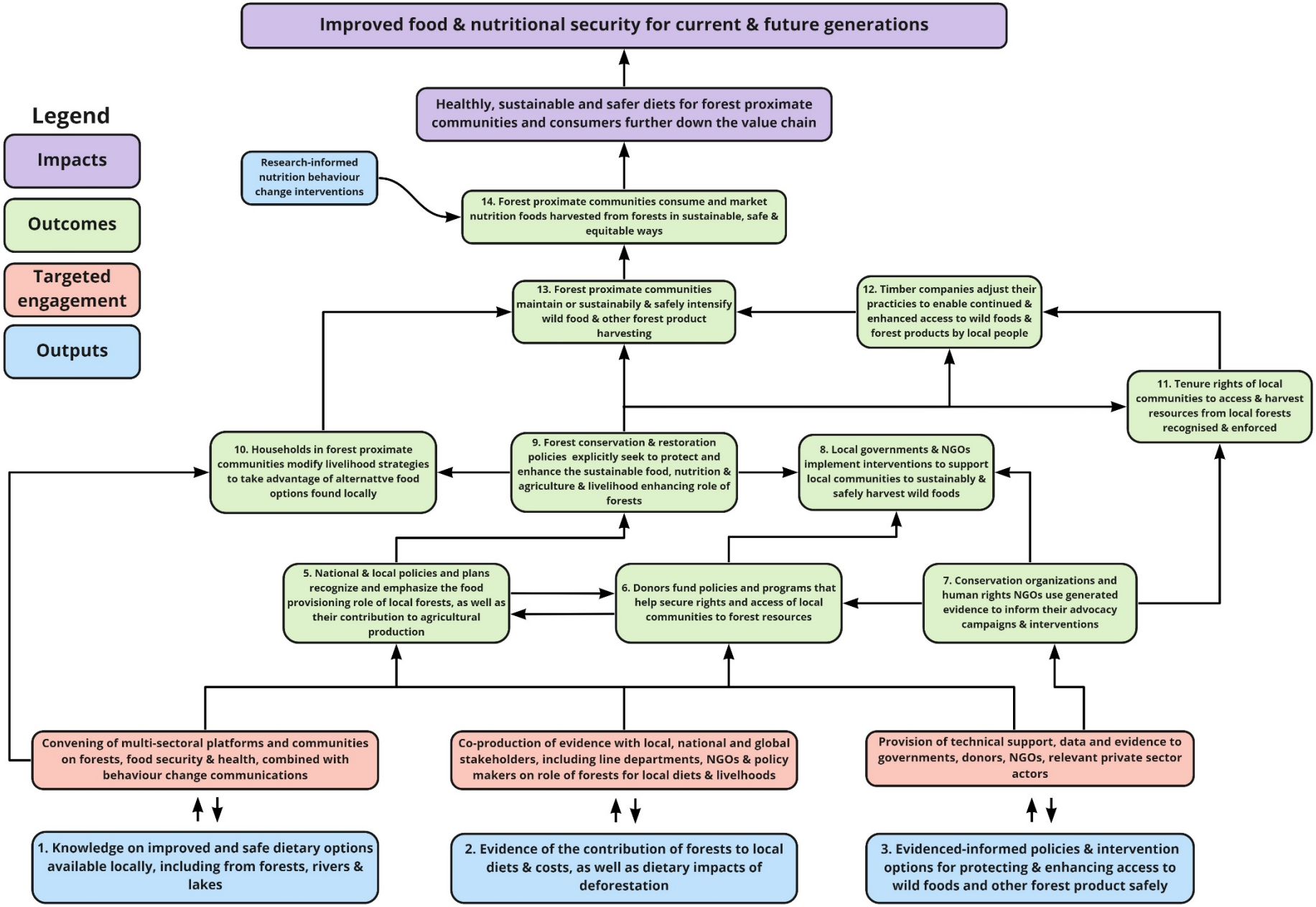
Improved food & nutritional security for current & future generations
Healthly, sustainable and safer diets for forest proximate communities and consumers further down the value chain
Research-informed nutrition behaviour change interventions
14. Forest proximate communities consume and market nutrition foods harvested from forests in sustainable, safe & equitable ways
13. Forest proximate communities maintain or sustainabily & safely intensify wild food & other forest product harvesting
12. Timber companies adjust their practicies to enable continued & enhanced access to wild foods & forest products by local people
11. Tenure rights of local communities to access & harvest resources from local forests recognised & enforced
10. Households in forest proximate communities modify livelihood strategies to take advantage of alternattve food options found locally
9. Forest conservation & restoration policies explicitly seek to protect and enhance the sustainable food, nutrition & agriculture & livelihood enhancing role of forests
8. Local governments & NGOs implement interventions to support local communities to sustainably & safely harvest wild foods
5. National & local policies and plans recognize and emphasize the food provisioning role of local forests, as well as their contribution to agricultural production
6. Donors fund policies and programs that help secure rights and access of local communities to forest resources
7. Conservation organizations and human rights NGOs use generated evidence to inform their advocacy campaigns & interventions
Convening of multi-sectoral platforms and communities on forests, food security & health, combined with behaviour change communications
Co-production of evidence with local, national and global stakeholders, including line departments, NGOs & policy makers on role of forests for local diets & livelihoods
Provision of technical support, data and evidence to governments, donors, NGOs, relevant private sector actors
1. Knowledge on improved and safe dietary options available locally, including from forests, rivers & lakes
2. Evidence of the contribution of forests to local diets & costs, as well as dietary impacts of deforestation
3. Evidenced-informed policies & intervention options for protecting & enhancing access to wild foods and other forest product safely
Legend
Impacts
Outcomes
Targeted engagement
Outputs

**Figure 17.** Theory of Change for FTA Research on Forests and Nutrition

# Appendix 3. Disaggregated Cluster Appraisal of Available Evaluation Evidence (by Project) for Challenge 1 (Deforestation and Forest Degradation)

***SFM in Mesoamerica Cluster***

| Project | Evidence Sources | Level of Outcome Evidence (L, M, H), Reliability Assessment, & Confidence | Impact Estimations (Y/N) & Reliability Assessment | What additional evidence is required? *Suggestions for additional data collection (for both outcomes and impact).* | Should this project be prioritized for additional evidence? |
|---|---|---|---|---|---|
| Forestry to enhance livelihoods and sustain forests in Mesoamerica: How institutional arrangements and value chains affect benefits and resources (*Bioversity International*)<br><br>• Guatemala<br>• Nicaragua | • 1 annual progress report (2016)<br>• 1 final report (2017) | *self-reported – lower reliability<br>*confidence: low<br>• Government outcomes (L): stated intentions only; Guatemala only<br>• Forest cooperatives/ partner outcomes (M): need more detail on qualification of partner (ACOFOP) learning and other intentions<br>• Research outcomes (H)<br>• Community outcomes (H): need more qualification of community learning and changed behaviours; Guatemala only<br>• Unexpected outcomes (H): community-related; Guatemala only | N | • Government outcomes: need evidence of gov't use/adoption of data/methods, gov't develop policy/renew community forestry concessions (Guatemala), gov't support for communities<br>• Forest cooperative/partner outcomes: need evidence of partner learning, skill-building, and use of findings for advocacy (Guatemala)<br>• Research outcomes: more detail on graduate student capacity-building and how applied post-project, evidence of research uptake/use<br>• Community outcomes: more detail on community learning, update on changes in community practice and governance (Guatemala)<br><br>*predominance of evidence for Guatemala – need evidence for Nicaragua component of the project<br><br>Impact estimations: is it possible quantify the community's replanting of successful germination trials? (possibly a negligible contribution)<br><br>• *Additional document review (project documents, trip reports, external media)*<br>• *Interviews/surveys with governments, forest cooperatives, partners, graduate students/research team*<br>• *Bibliometric analyses* | *Outcome level:* Preliminary evidence makes it a promising case (e.g., low-hanging fruit)<br><br>*Impact level:* Unsure of difficulty to collect/resources available |

| | | | | | |
|---|---|---|---|---|---|
| | | | | • *Quantification for impact estimation: remote sensing (baseline and update of forest cover)? Estimating area of replanted space?* | |

***SFM in Southern Africa Cluster***

| Project | Evidence Sources | Level of Outcome Evidence (L, M, H), Reliability Assessment, & Confidence | Impact Estimations (Y/N) & Reliability Assessment | What additional evidence is required? *Suggestions for additional data collection (for both outcomes and impact).* | Should this project be prioritized for additional evidence? |
|---|---|---|---|---|---|
| Sustaining Forest Resources for People and the Environment in the Niassa National Reserve in Mozambique (*Bioversity International*)<br><br>• Mozambique | • 1 midterm report (2012)<br>• 1 final report (2014) | *self-reported – lower reliability<br>*confidence: low-medium<br>• Forest reserve outcomes (M/H): need qualification of learning, capacities, and networks<br>• National forest agency outcomes (L): only indication of potential learning<br>• Research outcomes (H)<br>• Community outcomes (H)<br>• Unexpected outcomes (M/H): forest reserve manager-related | N | • Forest reserve outcomes: need evidence on project influence on new set of forest reserve managers (re: unexpected outcome), more details on learning and application of learning, evidence of reserve managers' use of project outputs, details on community monitoring agents' improved capacities to monitor<br>• National forest agency outcomes: need evidence on district gov't/national agency learning, need evidence on project influence on national forestry agency<br>• Research outcomes: more detail on graduate student capacity-building and how applied post-project, evidence of research uptake/use<br>• Community outcomes: update on extent of uptake of changed practices in community<br><br>Impact estimations: changes in forest/tree cover over time in reserve (possibly a negligible contribution)<br><br>• *Additional document review (project documents, trip reports, external media)*<br>• *Interviews/surveys with forest reserve managers, national forest agency, graduate students/research team*<br>• *Bibliometric analyses*<br>• *Quantification of impact estimation: remote sensing (baseline and update of reserve tree cover)?* | *Outcome level:* Preliminary evidence makes it a promising case (e.g., low-hanging fruit)<br><br>*Impact level:* Unsure of difficulty to collect/resources available |

***SFM in Congo Basin Cluster***

| Project | Evidence Sources | Level of Outcome Evidence (L, M, H), Reliability Assessment, & Confidence | Impact Estimations (Y/N) & Reliability Assessment | What additional evidence is required? *Suggestions for additional data collection (for both outcomes and impact).* | Should this project be prioritized for additional evidence? |
|---|---|---|---|---|---|
| Appui a la politique Nationale de conservation et gestion des forets et de la biodiversite en republique democratique du Congo (REFORCO) (*CIFOR*)<br><br>• DRC | • 1 final report (2016) | *self-reported – lower reliability<br>*confidence: low<br>• Government outcomes (L): indications of increased capacities, but lacks detail, no indications of policy change<br>• Research outcomes (H): *may be overlap with FCCC project<br>• Donor/international org outcomes (M/H): need more detail | N | • Government outcomes: need evidence of government learning, more detail on what capacities for forest management were strengthened and how, evidence of gov't application of learning/capacities<br>• Donor/international org outcomes: more detail on relationship development, need evidence of donor/int. org use of outputs<br><br>Impact estimations: No link between project and deforestation targets.<br><br>• *Additional document review (project documents, trip reports, external media)*<br>• *Interviews/surveys with graduate students, professors, government, research team* | *Outcome level:* No; this project was more focused on establishing university infrastructure and a program than deforestation.<br><br>*Impact level:* Not possible |
| Forests and Climate Change in Congo (FCCC) (*CIFOR, ICRAF*)<br><br>• DRC | • 1 final report (2016) | *self-reported – lower reliability<br>*confidence: low-medium<br>• Government outcomes (H): indications of learning, capacity, and action/policy change that need verification<br>• NGO outcomes (H) | Y (self-reported in appendix of report – both targets/indicators and achieved, detailed methodological backing/transparent limitations to quantify)<br><br>[potential – needs verification] | • Government outcomes: more detail on gov't learning and capacity-building from workshops/trainings, more detail on MECNT capacity strengthening (how), update on policy/gov't action (e.g., community relocation), evidence of governmental uptake and use of project outputs<br>• Research outcomes: uptake and use of project outputs<br>• Donor/int. org outcomes: more detail on implications of relationships/partnerships developed, more detail on donor/int. org learning and capacity-building via trainings | *Outcome level:* Possibly yes (e.g., low-hanging fruit)<br><br>*Impact level:* Possible. |

| | | | | | |
|---|---|---|---|---|---|
| | | • Research outcomes (H)<br>• Donor/int. org outcomes (M/H): indications of relationships and learning/capacity but needs more detail<br>• Timber company outcomes (L): indication of graduate students now working in private sector | Virunga Foundation's (partner) plants 4600 ha of trees in agroforestry plantations; estimating approx. 1.4m tonnes of $CO^2$ stocked<br><br>[potential – needs verification] Virunga National Park rehabilitates 5000 ha of natural forests; aim to increase $CO^2$ sequestered by 10% between 2013-2017<br><br>[achieved] WWF plants >5.5m trees in 3153.14 ha of an agroforestry area; estimated 900 000 tonnes of $CO^2$ stocked | • Timber company outcomes: more detail on graduate students working in private sector (e.g., how they are applying learning/skills gained from the project)<br><br>Impact estimations: Already have estimates – may require verification/follow up?<br><br>• *Additional document review (project documents, trip reports, external media)*<br>• *Interviews/surveys with government, graduate students (now working in gov't, NGOs, or private sector), donor/int. orgs*<br>• *Bibliometric analyses*<br>• *Quantification of impact estimation: borrow potential and actual estimates quantified by report; verification may require remote sensing (other?)* | |
| Yangambi, pole scientifique au service de l'homme et des forets (CIFOR)<br><br>• DRC | • 1 technical report (2019) | *self-reported – lower reliability<br>*confidence: low<br>• Government outcomes (L/M): indications of changes in governance arrangements but need more detail | N | • Government outcomes: need evidence of gov'tal learning and new awareness from project, update on strategy to develop Yangambi landscape (connected to PPP negotiations)<br>• Research outcomes: update on researcher training/coaching (what knowledge and skills gained), more detail on benefits of South-South exchange<br>• Donor/int. org outcomes: need evidence of donor learning | *Outcome level:* Possibly not, as technical report is recent (though evidence gaps to fill could be low-hanging fruit).<br><br>*Impact level:* Unsure of difficulty to |

| | | | | | |
|---|---|---|---|---|---|
| | | • Research outcomes (M)<br>• Donor/int. org outcomes (H)<br>• Timber company outcomes (L): indications for future outcomes (too early to manifest?)<br>• Community outcomes (L/M): indications of community awareness of project and engagement, but lack detailed evidence of resulting changes | | • Timber company outcomes: need evidence of timber company learning, evidence on use of project findings/outputs, update on PPP development and business incubator<br>• Community outcomes: more detail on community learning and how they have applied the learning, update on pilots, need evidence on changes to community practice, evidence of other community uptake<br><br>Impact estimations: is it possible quantify the community's farm pilots? (possibly a negligible contribution)<br><br>• *Additional document review (project documents, trip reports, external media)*<br>• *Interviews/surveys with government, researchers, donors, timber companies, communities*<br>• *Quantification of impact estimation: remote sensing?* | collect/resources available |
| SFM Congo Basin (*CIFOR*)<br><br>• DRC | • Delahais & Toulemonde article (2017)<br><br>*can we access the full evaluation they conducted? | *external evaluation commissioned – high reliability (though article version gives superficial indication of outcomes – need full report)<br>*confidence: medium-high<br>• Government outcomes (L): indications, but lack evidence of realization and actor-specificity<br>• NGO outcomes (L): indications, but lack | N | • Government outcomes: need more detail from full evaluation<br>• NGO outcomes: need more detail from full evaluation<br>• Research outcomes: need evidence of uptake and use of project outputs<br>• Donor/int. org outcomes: need more detail from full evaluation<br>• Timber company outcomes: need more detail from full evaluation<br><br>Impact estimations: ?<br><br>• *Additional document review (full evaluation report)*<br>• *Bibliometric analyses*<br>• *Quantification of impact estimation: ?* | *Outcome level:* Possibly not as the full evaluation should provide more detail to address current evidence gaps.<br><br>*Impact level:* Not possible? |

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| | | evidence of realization and actor-specificity<br>• Research outcomes (L): no evidence<br>• Donor/int. org outcomes (L): indications, but lack evidence of realization and actor-specificity<br>• Timber company outcomes (L): indications, but lack evidence of realization and actor-specificity | | | |
| Nouveaux Paysages du Congo (*CIFOR*)<br><br>• DRC | No evidence<br><br>*New project (too young to evaluate) | No evidence | N | • Government outcomes: preliminary evidence of govt'al engagement, gov'tal support for project, learning, relationships<br>• NGO outcomes: preliminary evidence of NGO engagement, NGO support for project, learning, relationships<br>• Research outcomes: preliminary evidence of relationships<br>• Donor/int. org outcomes: preliminary evidence of support for project, learning, relationships<br>• Timber company: preliminary evidence of company engagement, company learning<br><br>Impact estimations: ?<br><br>• *Additional document review (project documents, trip reports, external media)*<br>• *Interviews/surveys with government, NGOs, research team, donors, companies*<br>• *Quantification of impact estimation: ?* | *Outcome level:* Possibly? Need to consider the infancy of the project and value of preliminary evidence<br><br>*Impact level:* Not possible |

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| Aide à l'application des normes FSC sur la régénération et la diversité génétique des essences du bassin du Congo (COMIFAC) (*Bioversity International*)<br><br>• Cameroon | No evidence | No evidence | N | • Government outcomes: need evidence of governmental engagement, governmental support for project, learning, relationships<br>• NGO outcomes: need evidence of NGO engagement, NGO support for project, learning, relationships<br>• Research outcomes: need evidence of uptake and use of outputs<br>• Donor/int. org outcomes: need evidence of support for project, learning, relationships<br>• Timber company: need evidence of company engagement, company learning<br><br>Impact estimations: ?<br><br>• *Additional document review (project documents, trip reports, external media)*<br>• *Interviews/surveys with government, NGOs, research team, donors, companies*<br>• *Bibliometric analyses*<br>• *Quantification of impact estimation: ?* | *Outcome level:* TBD. Will require a lot of data collection to evidence.<br><br>*Impact level:* Not possible |
| Beyond Timber: Reconciling the Needs of Logging Industry with those of Forest-dependent People (AFDB) (*Bioversity International*)<br><br>• Cameroon<br>• DRC<br>• Gabon | • 1 quarterly report (2014)<br>• 1 final report (2014)<br>• 1 brief (2016) | *self-reported – lower reliability<br>*confidence: low<br>• Government outcomes (L/M): indications of governmental benefits, but need more detail and evidence<br>• Research outcomes (H): some gender-disaggregated evidence<br>• Donor/int. org outcomes (H) | N | • Government outcomes: more detail of governmental learning and capacity-building, need evidence of governmental uptake/use of project recommendations<br>• Research outcome: update on graduate student application of knowledge/skills development from project, uptake and use of outputs by external researchers<br>• Donor/int. org outcomes: more detail on collaborators' learning, update on COMIFAC progress and continued involvement in topic<br>• Timber company outcomes: evidence of company learning, more detail on capacity-building via training and how applied, evidence of uptake and use of project outputs | *Outcome level:* TBD. Preliminary evidence is promising, but key gaps exist.<br><br>*Impact level:* Not possible. |

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| | | • Timber company outcomes (M): indications of learning and training given – needs validation<br>• Community outcomes (L): indications of concessionaire learning, engagement, and relationships with research team | | • Community outcomes: more detail on concessionaire learning, engagement, and relationships, evidence of changed practices<br><br>Impact estimations: ?<br><br>• *Additional document review (project documents, trip reports, external media)*<br>• *Interviews/surveys with government, research team, graduate students, donors, timber companies, communities*<br>• *Bibliometric analyses*<br>• *Quantification of impact estimation: ?* | |

***FLEGT/VPA Cluster***

| Project | Evidence Sources | Level of Outcome Evidence (L, M, H), Reliability Assessment, & Confidence | Impact Estimations (Y/N) & Reliability Assessment | What additional evidence is required? *Suggestions for additional data collection (for both outcomes and impact).* | Should this project be prioritized for additional evidence? |
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| Appui technique au Ministère des Forêts et de la Faune pour l'opérationnalisation de la page web et la collecte de données dans le cadre de la mise en œuvre de l'Annexe VII de l'APV/FLEGT (*CIFOR*)<br><br>• Cameroon | • 1 report (State of timber sector in Cameroon) (2015) | *self-reported – lower reliability<br>*confidence: low<br><br>No evidence (reports emphasize outputs; main project contribution appears to be VPA website Annex VII, which is not available from a Google search) | Y (unsure if reliable or can be linked to project – maybe linked to other cluster contributions?)<br><br>[project quantified state of licensing in Cameroon] between 2012 and 2016, the number of council forests with valid licenses rose from 8 to 19, while total land area during that same time period rose from | • Policymaker outcomes: need evidence of learning, evidence of policy change, evidence of uptake and use of project findings, evidence of licensing implementation<br>• Timber company outcomes: update on uptake of licensing in Cameroon<br><br>Impact estimations: use project output/calculation for logic of potential cluster impact projection (for Cameroon – if other projects in cluster supported licensing policy/uptake/implementation) – requires evidencing of outcomes supporting this | *Outcome level:* Likely not, very limited initial evidence base and small project budget (<$50 000USD)<br><br>*Impact level:* Possible? Might be too distant/ unlinkable to project and cluster overall? |

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| | | | 188,000 ha to 587,000 ha | • *Additional document review (project documents, trip reports, external media)*<br>• *Interviews/surveys with policymakers, NGOs, CSOs, research team, timber companies, smallholders/SMEs*<br>• *Bibliometric analyses*<br>• *Quantification of impact estimation: projection of changes in licensing (and land covered) between 2016-2020?* | |
| Collecting evidence of FLEGT VPA-impacts for improved FLEGT communication (*CIFOR*)<br><br>• Ghana<br>• Cameroon<br>• Indonesia<br><br>Upcoming countries:<br>• DRC<br>• Cote d'Ivoire<br>• Honduras<br>• Guyana | • 1 report | *self-reported – lower reliability<br>*confidence: low<br>• Policymaker outcomes (L): only mentions expected outcomes | Y (unsure if reliable or can be linked to project – maybe linked to other cluster contributions?) (assumption: project outputs demonstrate positive impact of FLEGT to encourage investment in FLEGT/VPA and policies to reduce deforestation/illegal logging)<br><br>[project calculated for Cameroon] share of illegal timber in export market fell from 52% to 41% as a result of VPA, share of illegal timber in domestic market fell from 68% to 61%<br><br>[project calculated for Ghana] share of illegal timber in export market fell | • Policymaker outcomes: need evidence of learning, evidence of policy change, evidence of uptake and use of project findings<br>• Research outcomes: uptake and use of project findings<br>• Timber company outcomes: need evidence of learning, evidence of policy change, evidence of practice change<br>• Smallholder/SME outcomes: need evidence of learning, evidence of practice change<br><br>Impact estimations: use project output/calculation for logic of potential cluster impact projection (if findings supported further VPA uptake/ implementation) – requires evidencing of outcomes supporting this<br><br>Assess degree to which the project plausibly improved FLEGT/VPA; assess whether VPAs received more uptake after these improvements; estimate effective FLEGT/VPA implementation effect on deforestation<br><br>• *Additional document review (project documents, trip reports, external media)* | *Outcome level:* TBD. Likely requires intensive data collection.<br><br>*Impact level:* Possible |

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| | | | from 51% to 31% as a result of VPA, share of illegal timber in domestic market fell from 67% to 50%<br><br>[project calculated for Indonesia] share of illegal timber in export market fell from 44% to 29% as a result of VPA, share of illegal timber in domestic market fell from 50.5% to 40% | • *Interviews/surveys with policymakers, NGOs, CSOs, research team, timber companies, smallholders/SMEs*<br>• *Bibliometric analyses*<br>• *Quantification of impact estimation: ?* | |
| Réalisation d'une étude de caractérisation des différents types d'offres et de demandes en bois et produits dérivés dans les marchés publics en Côte d'Ivoire (*CIFOR*)<br>• Cote d'Ivoire | • 1 interim report<br>• 1 final report | *self-reported – lower reliability<br>*confidence: low<br>• Policymaker outcomes (L): only mentions expected outcomes | Y (expected policy) – though not reliable (assumption: enhanced regulated and sustainable timber production via new policy → decreased illegal logging and increased demand of legal sawn wood for public procurements) | • Policymaker outcomes: need evidence of learning, evidence of policy change, evidence of uptake and use of project findings<br>• Research outcomes: uptake and use of project findings<br><br>Impact estimations: Is it possible to derive from policy targets?<br><br>• *Additional document review (project documents, trip reports, external media, policy review)*<br>• *Interviews/surveys with policymakers, NGOs, CSOs, research team, timber companies, smallholders/SMEs*<br>• *Bibliometric analyses*<br>• *Quantification of impact estimation: policy review* | *Outcome level:* TBD. Likely requires intensive data collection.<br><br>*Impact level:* Possible |
| Essor des demandes publiques et privées camerounaises en | • 1 final report | *self-reported – lower reliability<br>*confidence: low | Y (expected policy change) – though not reliable (assumption: enhanced regulated | • Policymaker outcomes: need evidence of learning, evidence of policy change, evidence of uptake and use of project findings | *Outcome level:* TBD. Likely requires intensive data collection. |

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| sciages d'origine légale (*CIFOR*)<br><br>• Cameroon | | • Policymaker outcomes (L): only intended outcomes discussed | and sustainable timber production via new policy → decreased illegal logging and increased demand of legal sawn wood for public procurements) | • Research outcomes: uptake and use of project findings<br>• Timber company outcomes: need evidence of learning, evidence of policy change, evidence of practice change<br><br>Impact estimations: Is it possible to derive from policy targets?<br><br>• *Additional document review (project documents, trip reports, external media, review)*<br>• *Interviews/surveys with policymakers, NGOs, CSOs, research team, timber companies, smallholders/SMEs*<br>• *Bibliometric analyses*<br>• *Quantification of impact estimation: policy review* | *Impact level:* Possible |
| Policy and regulatory options to recognise and better integrate the domestic timber sector in tropical countries (PROFORMAL) (*CIFOR*)<br><br>• Cameroon<br>• Gabon<br>• DRC<br>• Ecuador<br>• Indonesia | • 1 evaluation report | *external evaluation commissioned – higher reliability<br>*confidence: low-medium<br>• Policymaker outcomes (M): contributed to forest law in Cameroon<br>• Research outcomes (M): evidence of graduate student capacity-building<br>• Timber company outcomes (L): does not report related outcomes | N | • Policymaker outcomes: need evidence of learning, evidence of governmental uptake and use of project findings<br>• Research outcomes: more qualitative detail of graduate student capacity-building, uptake and use of project findings<br>• Timber company outcomes: need evidence of learning, evidence of policy change, evidence of practice change<br>• Smallholder/SME outcomes: need evidence of learning, evidence of practice change<br><br>Impact estimations: Possibly project contributions can be connected to other projects' noted impact logics<br><br>• *Additional document review (project documents, trip reports, external media)* | *Outcome level:* Possibly, preliminary evidence is promising though key gaps exist<br><br>*Impact level:* Not possible? |

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| | | • Smallholder/SME outcomes (L): does not report related outcomes | | • *Interviews/surveys with policymakers, research team, timber companies*<br>• *Bibliometric analyses*<br>• *Quantification of impact estimation: ?* | |
| Governing multifunctional landscapes (GLM) in Sub Saharan Africa: Managing trade-offs between social and ecological impacts (*CIFOR, ICRAF*)<br><br>• Cameroon<br>• Ghana<br>• DRC<br>• Gabon<br>• Zambia<br>• Kenya | • 1 narrative report<br><br>*ongoing project (may be too young) | *self-reported – lower reliability<br>*confidence: low<br>• CSO outcomes (L): only expected outcomes discussed<br>• Smallholder/SME outcomes (L): only expected outcomes discussed<br>• Policymaker outcomes (L): only expected outcomes discussed<br>• Research outcomes (L): only expected outcomes discussed | Y? (expected but not documented/ quantified) – not reliable (assumption: minimize the impact of agri-business and timber business on deforestation, better understanding of impacts of FLEGT initiative; more sustainably and inclusively governing land and forests and access to resources, diversification and promotion of diets and nutrition. Combined with direct benefits to the FLEGT community, smallholders, forest dependent communities, SMEs, and vulnerable groups such as women and youth) | • Policymaker outcomes: need evidence of learning, evidence of policy change, evidence of uptake and use of project findings<br>• NGO/CSO outcomes: need evidence of learning, evidence of support for FLEGT<br>• Research outcomes: uptake and use of project findings<br>• Timber company outcomes: need evidence of learning, evidence of policy change, evidence of practice change<br>• Smallholder/SME outcomes: need evidence of learning, evidence of practice change<br><br>Impact estimations: ?<br><br>• *Additional document review (project documents, trip reports, external media)*<br>• *Interviews/surveys with policymakers, NGOs, CSOs, research team, timber companies, smallholders/SMEs*<br>• *Bibliometric analyses*<br>• *Quantification of impact estimation: ?* | *Outcome level:* TBD. Likely requires intensive data collection and should consider that the project is in progress (availability of preliminary evidence/outcome realization).<br><br>*Impact level:* Unsure if possible/feasible to collect |
| Developing DNA timber tracking tools and a conservation strategy for African mahogany (Khaya senegalensis) in West Africa | • 1 technical report | *self-reported – lower reliability<br>*confidence: low<br>No evidence | Y (projection) – though not reliable<br><br>[project output]<br>Project generated a large database of African mahogany covering 18 countries | • Policymaker outcomes: need evidence of learning, evidence of policy change, evidence of uptake and use of project findings<br>• Research outcomes: uptake and use of project findings | *Outcome level:* TBD. Likely requires intensive data collection.<br><br>*Impact level:* Possible? |

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| (*Bioversity International*)<br><br>• Benin<br>• Burkina Faso<br>• Ghana<br>• Togo | | | useful for timber legality verification; and have conservation strategies for two species ready to be implemented with practical uses also for restoration in 4 countries. | • Timber company outcomes: need evidence of learning, evidence of policy change, evidence of practice change<br><br>Impact estimations: Assess the claimed impacts on and effects of legality verification, conservation strategies, restoration efforts in project countries<br><br>• *Additional document review (project documents, trip reports, external media)*<br>• *Interviews/surveys with policymakers, NGOs, CSOs, research team, timber companies, smallholders/SMEs*<br>• *Bibliometric analyses*<br>• *Quantification of impact estimation: ?* | |

***Sustainable Forest Enterprises in Sub-Saharan Africa Cluster***

| Project | Evidence Sources | Level of Outcome Evidence (L, M, H), Reliability Assessment, & Confidence | Impact Estimations (Y/N) & Reliability Assessment | What additional evidence is required? *Suggestions for additional data collection (for both outcomes and impact).* | Should this project be prioritized for additional evidence? |
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| DRYAD (ICRAF)<br><br>• Cameroon | Awaiting access to final report. | | | | |

***Timber Markets in Sub-Saharan Africa Cluster***

| Project | Evidence Sources | Level of Outcome Evidence (L, M, H), Reliability Assessment, & Confidence | Impact Estimations (Y/N) & Reliability Assessment | What additional evidence is required? *Suggestions for additional data collection (for both outcomes and impact).* | Should this project be prioritized for additional evidence? |
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| To take stock of community forestry enterprises involved in commercialization of timber in Africa (*CIFOR*)<br><br>• Cameroon<br>• Gabon<br>• DRC | • 1 final report (2015) | *self-reported – lower reliability<br>*confidence: low<br><br>No outcome evidence (only reports on outputs) | N | • Government outcomes: need evidence of gov't learning and capacity-building, gov't use of project outputs, policy change<br>• Partner outcomes: need evidence of partner learning, involvement in timber issues, support for timber SMEs, partner use of project outputs<br>• Research outcomes: need evidence of uptake and use of project outputs<br>• Timber SME outcomes: need evidence of SME learning and capacity-building, changes in practice<br><br>Impact estimations: ?<br><br>• *Additional document review (project documents, trip reports, external media)*<br>• *Interviews/surveys with gov't, partners, research team, timber SMEs*<br>• *Bibliometric analyses*<br>• *Quantification for impact estimation: ?* | *Outcome level:* TBD. May be strategic to collect for geographic overlap of projects in cluster.<br><br>*Impact level:* Not possible. |
| Development of Intra-African Trade and Further Processing in Tropical Timber and Timber Products – Phase I (*CIFOR*)<br><br>• Cameroon<br>• Cote d'Ivoire<br>• DRC | • 1 project report (2016) | *self-reported – lower reliability<br>*confidence: low<br><br>No outcome evidence (only reports on outputs and intended outcomes) | N | • Government outcomes: need evidence of gov't learning and capacity-building, gov't use of project outputs, policy change<br>• Partner outcomes: need evidence of partner learning, involvement in timber issues, support for timber SMEs, partner use of project outputs<br>• Research outcomes: need evidence of uptake and use of project outputs<br>• Timber SME outcomes: need evidence of SME learning and capacity-building, changes in practice<br><br>Impact estimations: ?<br><br>• *Additional document review (project documents, trip reports, external media)*<br>• *Interviews/surveys with gov't, partners, research team, timber SMEs*<br>• *Bibliometric analyses*<br>• *Quantification for impact estimation: ?* | *Outcome level:* TBD. May be strategic to collect for geographic overlap of projects in cluster.<br><br>*Impact level:* Not possible. |

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| DFID KNOWFOR 2: SMEs and Informal Sectors (*CIFOR*)<br><br>• DRC<br>• Cameroon<br>• Zambia<br>• Indonesia | • 1 report (2017) | *self-reported – lower reliability<br>*confidence: low<br><br>No outcome evidence (only reports on outputs and some indications of gov't outcomes and SME outcomes – need to be verified) | N | • Government outcomes: need evidence of gov'tal learning and capacity-building, gov'tal use of project outputs/recommendations, evidence of policy change<br>• Partner outcomes: need evidence of partner learning, involvement in timber issues, support for timber SMEs, partner use of project outputs<br>• Research outcomes: need evidence of uptake and use of project outputs<br>• Timber SME outcomes: need evidence of SME learning and capacity-building, evidence of support from timber associations, changes in practice<br><br>Impact estimations: ?<br><br>• *Additional document review (project documents, trip reports, external media)*<br>• *Interviews/surveys with gov't, partners, research team, timber SMEs, timber associations*<br>• *Bibliometric analyses*<br>• *Quantification for impact estimation: ?* | *Outcome level:* TBD. May be strategic to collect for geographic overlap of projects in cluster.<br><br>*Impact level:* Not possible. |
| Promote and Formalise Artisanal Timber Production in Central Africa (PROFEAAC) (*CIFOR*)<br><br>• Cameroon<br>• DRC | No evidence<br><br>*New project (too young to evaluate) | No evidence | N | • Government outcomes: need evidence of gov'tal learning and capacity-building, gov'tal use of project outputs/recommendations, evidence of policy change<br>• Partner outcomes: need evidence of partner learning, involvement in timber issues, support for timber SMEs, partner use of project outputs<br>• Research outcomes: need evidence of uptake and use of project outputs<br>• Timber SME outcomes: need evidence of SME learning and capacity-building, changes in practice<br><br>Impact estimations: ?<br><br>• *Additional document review (project documents, trip reports, external media)* | *Outcome level:* Possibly? Need to consider the infancy of the project and value of preliminary evidence<br><br>*Impact level:* Not possible. |

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| | | | | • *Interviews/surveys with gov't, partners, research team, timber SMEs*<br>• *Bibliometric analyses*<br>• *Quantification for impact estimation: ?* | |

***GCS REDD+ Cluster***

| Project | Evidence Sources | Level of Outcome Evidence (L, M, H), Reliability Assessment, & Confidence | Impact Estimations (Y/N) & Reliability Assessment | What additional evidence is required? *Suggestions for additional data collection (for both outcomes and impact).* | Should this project be prioritized for additional evidence? |
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| Learning from REDD: A Global Comparative Analysis (Phase 1 of GCS REDD+ Program) (*CIFOR*)<br><br>• Indonesia<br>• Vietnam<br>• Nepal<br>• Brazil<br>• Peru<br>• Bolivia<br>• DRC<br>• Tanzania<br>• Cameroon | • 1 evaluation report (2015) | *external evaluation – higher reliability<br>*confidence: high<br>• Government outcomes (M/H): evidence of policy dev't, but needs more detail, geographic specificity? (only mentions one example from Guyana)<br>• Partner outcomes (H)<br>• Research outcomes (H): evidence of method uptake and use<br>• Private sector outcomes (L): no evidence<br>• Unexpected outcome: CIFOR's reputation | Y (noted in an Indonesian policy [forest moratorium?] – sensitive to assumptions)<br><br>[potential/target] 26% reductions in GHG emissions by 2020 | • Government outcomes: need more detail on capacities built, gov'tal use of project outputs (what is being used and how)<br>• Private sector outcomes: need evidence of private sector learning via project influence, evidence of uptake and use, evidence of practice changes (via policy or research)<br><br>Impact estimations: Could be derived from a policy review (e.g., Indonesia's forest moratorium, others?)<br><br>• *Additional document review (policy documents, project documents, trip reports, external media)*<br>• *Interviews/surveys with governments, private sector*<br>• *Quantification for impact estimation: borrow target estimates from gov't policy?*<br>  • [potential] Indonesia's forest moratorium (reduce reduce GHG emissions by 26% by 2020) | *Outcome level:* TBD. May already have sufficient evidence, but if evidence gaps are to be filled, it would be strategic to collect for geographic overlap of projects in cluster.<br><br>*Impact level:* Possible to collect and quantify. |
| Learning from REDD+: An enhanced global comparative analysis (Phase 2 of GCS REDD+ program) (*CIFOR*) | • 1 evaluation report (2015) | *external evaluation – higher reliability<br>*confidence: high<br>*same as above | *same as above | *same as above | *same as above |

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| • Cameroon<br>• Tanzania<br>• Indonesia<br>• Vietnam<br>• Brazil<br>• Peru<br>• (a subset of activities done in Burkina Faso, DRC, Mozambique, Papua New Guinea, Nepal, Bolivia, Guyana) | | | | | |
| Opportunities and Challenges to Developing REDD+ Benefit Sharing Mechanisms in Developing Countries (accompanying phase 2 of GCS REDD+ program) (*CIFOR*)<br><br>• Brazil<br>• Cameroon<br>• Indonesia<br>• Peru<br>• Tanzania<br>• Vietnam | • 1 evaluation report (2018) | *external evaluation – higher reliability<br>*confidence: high<br>• Government outcomes (M): needs more detail on type of learning<br>• Partner outcomes (M): needs more detail on practice change among actors/networks supporting cross-sector approaches for low emissions dev't<br>• Research outcomes (M): indications of uptake/use<br>• Private sector outcomes (M): | Y (not quantified – qualified in terms of improving target countries to achieve and assess carbon and non-carbon benefits) | • Government outcomes: need more detail on learning, gov't uptake/use of project outputs, changes in policy<br>• Partner outcomes: need evidence of partner learning, evidence of support/advocacy for practice change<br>• Research outcomes: uptake and use of project outputs<br>• Private sector outcomes: evidence of learning, evidence of practice changes<br><br>Impact estimations: ?<br><br>• *Additional document review (project documents, trip reports, external media)*<br>• *Interviews/surveys with gov't, partners, research team, private sector*<br>• *Bibliometric analyses*<br>• *Quantification for impact estimation: ?* | *Outcome level:* TBD. May already have sufficient evidence, but if evidence gaps are to be filled, it would be strategic to collect for geographic overlap of projects in cluster.<br><br>*Impact level:* Possible to collect and quantify? |

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| | | indications of MRV adherence/uptake? | | | |
| REDD: Research to Support Design and Implementation (accompanying phase 2 of GCS REDD+ program) (*CIFOR*)<br><br>• Indonesia<br>• Vietnam<br>• Papua New Guinea<br>• Nepal<br>• Tanzania<br>• Burkina Faso<br>• Mozambique<br>• Cameroon<br>• Peru<br>• Brazil<br>• Bolivia | • 1 evaluation report of benefit sharing project (2015)<br>• 1 Viet Nam outcome story report (n.d.)<br>• 1 flagship outcome story for Peru | *external evaluation, self-reported – varying reliability<br>*confidence: high<br>• Government (H): evidence for Brazil, Vietnam, Peru<br>• Partners (L/M): COP and UNFCC participation but unclear whether evidence used to help inform decisions<br>• Research (L): lacks specificity, need details of country-level partnerships with young academics<br>• Private sector (L): minimal evidence in Vietnam about pilot implementation | Y (impact estimations noted in outcome stories) – self-reported<br><br>[potential] Vietnam (PFES budget supports forest protection)<br><br>[potential] Peru (national strategy for climate change, national commitment to climate change) | • Government outcomes: need more detail on learning, gov't uptake/use of project outputs, changes in policy<br>• Partner outcomes: need evidence of partner learning, evidence of support/advocacy for practice change<br>• Research outcomes: uptake and use of project outputs<br>• Private sector outcomes: evidence of learning (e.g., via pilots), evidence of practice changes<br><br>Impact estimations: possible to use estimations and address reliability issue?<br><br>• *Additional document review (project documents, trip reports, external media)*<br>• *Interviews/surveys with gov't, partners, research team, private sector*<br>• *Bibliometric analyses*<br>• *Quantification for impact estimation: ?* | *Outcome level:* TBD. May already have sufficient evidence, but if evidence gaps are to be filled, it would be strategic to collect for geographic overlap of projects in cluster.<br><br>*Impact level:* Possible to collect and quantify? |
| A Global Comparative Study for achieving effective, efficient and equitable REDD+ results (Phase 3 of GCS REDD+ program) (*CIFOR*)<br><br>• Brazil<br>• Indonesia | • 1 midterm review/evaluation report (2019) | *external evaluation – higher reliability<br>*confidence: high<br>• Government outcomes (M): needs more detail on type of learning<br>• Partner outcomes (M): needs more detail on practice change among actors/networks supporting cross- | Y (not quantified – qualified in terms of improving target countries to achieve and assess carbon and non-carbon benefits) | • Government outcomes: need more detail on learning, gov't uptake/use of project outputs, changes in policy<br>• Partner outcomes: need evidence of partner learning, evidence of support/advocacy for practice change<br>• Research outcomes: uptake and use of project outputs<br>• Private sector outcomes: evidence of learning, evidence of practice changes<br><br>Impact estimations: ? | *Outcome level:* TBD. May already have sufficient evidence, but if evidence gaps are to be filled, it would be strategic to collect for geographic overlap of projects in cluster. |

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| • Peru<br>• Ethiopia<br>• Guyana<br>• Myanmar<br>• DRC<br>• Vietnam | | sector approaches for low emissions dev't<br>• Research outcomes (M): indications of uptake/use<br>• Private sector outcomes (M): indications of MRV adherence/uptake? | | • *Additional document review (project documents, trip reports, external media)*<br>• *Interviews/surveys with gov't, partners, research team, private sector*<br>• *Bibliometric analyses*<br>• *Quantification for impact estimation: ?* | *Impact level:* Possible to collect and quantify? |
| From Climate Research to Action under Multilevel Governance: Building Knowledge and Capacity at Landscape Scale (MLG) (*CIFOR*)<br><br>• Indonesia<br>• Mexico<br>• Peru<br>• Vietnam | • 1 final report (2019) | *self-reported – lower reliability<br>*confidence: medium<br>• Government outcomes (M): indication of project inputs to and uptake in countries' national REDD+ and climate change strategies and MRV system<br>• Partner outcomes (L)<br>• Research outcomes (L)<br>• Private sector outcomes (L): indication of learning via GLF, indication of PS commitment to addressing climate change | N | • Government outcomes: need evidence of gov't learning, evidence on capacity-building, need more detail on gov't uptake/use of project outputs, evidence of changes in policy and implementation of policy<br>• Partner outcomes: need evidence of partner learning and capacity-building, evidence of support/advocacy for policy and practice change<br>• Research outcomes: uptake and use of project outputs (e.g., methods, data) by researchers<br>• Private sector outcomes: evidence of learning, evidence of practice changes<br><br>Impact estimations: is it possible to use policy targets for the specific countries' National REDD+ and Climate Change Strategies where project influence can be traced?<br><br>• *Additional document review (policy review, project documents, trip reports, external media)*<br>• *Interviews/surveys with gov't, partners, research team, private sector*<br>• *Bibliometric analyses*<br>• *Quantification for impact estimation: policy analysis* | *Outcome level:* TBD. Existing evidence has some promising indications that require evidence.<br><br>*Impact level:* Possible to collect and quantify? |

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| Reducing emissions from deforestation and degradation through alternative land-uses in rainforests of the tropics (REDD-ALERT) (*CIFOR/ICRAF*)<br><br>• Cameroon<br>• Peru<br>• Vietnam | • 1 peer-reviewed article (discusses how project supported evaluation of REDD mechanisms) | *peer-reviewed – higher reliability<br>*confidence: medium<br>• Government outcomes (L): indication of learning<br><br>No evidence of outcomes – mostly focuses on outputs | N | • Government outcomes: need evidence of gov't learning, evidence on capacity-building, evidence of gov't uptake/use of project outputs, evidence of changes in policy and implementation of policy<br>• Partner outcomes: need evidence of partner learning, evidence of support/advocacy for policy and practice change<br>• Research outcomes: uptake and use of project outputs<br>• Private sector outcomes: evidence of learning, evidence of practice changes<br><br>Impact estimations: ?<br><br>• *Additional document review (policy review, project documents, trip reports, external media)*<br>• *Interviews/surveys with gov't, partners, research team, private sector*<br>• *Bibliometric analyses*<br>• *Quantification for impact estimation: ?* | *Outcome level:* Likely not – would require intensive data collection.<br><br>*Impact level:* Not possible |
| Impacts of Reducing Emissions from Deforestation and Forest Degradation and Enhancing Carbon Stocks (IREDD+) (*CIFOR/ICRAF*)<br><br>• China<br>• Indonesia<br>• Vietnam | • 1 final report (2014) | *self-reported – lower reliability<br>*confidence: low<br>• Government outcomes (L/M): indications of gov't and REDD+ negotiator learning and attitude change<br>• Partner outcomes (L/M): indicators of partner support, capacity-building of local-level REDD task force partners (Laos) | N | • Government outcomes: need more detail on gov't/REDD+ negotiator learning, need evidence on gov't support for REDD+ mechanisms, need evidence of gov't support for community involvement in REDD monitoring, need evidence of policy change/adoption of REDD+<br>• Partner outcomes: more detail on partner support for REDD, more detail on capacity gained by local-level REDD task for partners (Laos, other countries?)<br>• Research outcomes: more detail on local researcher learning and capacities, uptake and use of project outputs<br>• Community outcomes: need more detail on community learning/awareness about | *Outcome level:* TBD.<br><br>*Impact level:* Not possible. |

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| | | • Research outcomes (L): local researcher capacities, outputs discussed but not how used, uptake by media<br>• Community outcomes (L/M): indications of public awareness via media uptake and PLUP activities | | REDD+, need evidence on community support/advocacy for REDD, need evidence on involvement in REDD monitoring<br><br>Impact estimations: is it possible to derive from policy targets (if new REDD policies are adopted/implemented)?<br><br>• *Additional document review (project documents, trip reports, external media)*<br>• *Interviews/surveys with gov't, local REDD+ task force partners, research team, communities*<br>• *Bibliometric analyses*<br>• *Quantification for impact estimation: ?* | |
| SECURED Landscapes: Sustaining Ecosystem and Carbon benefits by Unlocking Reversal of Emissions Drivers in Landscapes (*ICRAF*)<br><br>• Cameroon<br>• DRC<br>• Indonesia<br>• Vietnam<br>• Peru | • 1 midterm report<br>• 1 final report | *self-reported – lower reliability<br>*confidence: medium<br>• Government outcomes (H): indications of learning/training, indication of Indonesian province-level and use of tools, evidence of NDC contributions, indications of gov't interest in LUWES tool (Peru, Cameroon, Vietnam)<br>• Partner outcomes (L): indication of TMP continued involvement<br>• Private sector outcomes (M): 24 | Y (projected) – questionable reliability<br><br>[target] total of 1,210,682 ha of landscapes covered by forests and total 660,234 ha of landscapes covered by sustainable land use plans in Cameroon, Peru, Indonesia, and DRC<br><br>[potential] estimated potential emissions reductions over 1 | • Government outcomes: need more detail on learning, more detail on capacities built, need evidence of gov'tal use of project outputs (what is being used and how) (e.g., LUWES tool, recommendations)<br>• Partner outcomes: need evidence of partner learning, partner support/advocacy for REDD policy dev't/implementation<br>• Private sector outcomes: need evidence of private sector learning via project influence, evidence of research uptake and use, more detail and evidence of practice changes (via policy or research)<br>• Research outcomes: uptake and use of project outputs<br><br>Impact estimations: Derive from policy review<br><br>• *Additional document review (policy analysis, project documents, trip reports, external media)* | *Outcome level:* TBD. Existing evidence has some promising indications that require evidence.<br><br>*Impact level:* Possible. |

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| | | Peruvian companies involved in carbon market (measure, management, offsetting emissions); Indonesian company (WKS) did calculations and defined a mitigation plan<br>• Research outcomes (L) | year (6,081,361 tonnes $CO^2$)<br><br>[potential] project reach: min. 2250 people engaged, potential for 98,980<br><br>[achieved?] 212 ha of forest regenerated in Vietnam (under implementation of community forest management regime) | • *Interviews/surveys with governments, private sector*<br>• *Bibliometric analyses*<br>• *Quantification for impact estimations: policy analysis, ground-truthing/remote sensing?* | |

***Role of Wetlands in Climate Change Cluster***

| Project | Evidence Sources | Level of Outcome Evidence (L, M, H), Reliability Assessment, & Confidence | Impact Estimations (Y/N) & Reliability Assessment | What additional evidence is required? *Suggestions for additional data collection (for both outcomes and impact).* | Should this project be prioritized for additional evidence? |
|---|---|---|---|---|---|
| Sustainable Wetlands Adaptation and Mitigation Programme (SWAMP) (*CIFOR*)<br><br>• Liberia<br>• Senegal<br>• Gabon<br>• Mozambique | • 2 theory-based outcome evaluation articles (1 focal, 1 part of a comparative paper)<br>• ISPC brief + corresponding | *external evaluations – higher reliability<br>*confidence: high<br>• International policy outcomes (M): IPCC accept wetland agenda via SWAMP contribution to global reference (Wetlands Supplement) to Paris Agreement | Y (noted in Flores, 2016) – though results indicate net negative impact<br><br>Flores (2016) assessment [potential]: "analysis shows that if the moratorium were to achieve full protection, Indonesia could avoid the release of 10-20 million tons | • National outcomes: update on NDC reporting (e.g., see UNFCCC 2020 report)<br>• Private sector outcomes: update on effects of changes already evidenced (e.g., climate mitigation strategy, sustainable practices to building coastal infrastructure – who exactly)<br><br>Impact estimations: is it possible trace changes in private sector practice and results from new strategies at community levels? Derive from policy targets? | *Outcome level:* Possibly, requires an update (e.g., low-hanging fruit)<br><br>*Impact level:* Possible to collect and quantify? (may be highly |

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| • Tanzania<br>• Mexico<br>• Peru<br>• Colombia<br>• Ecuador<br>• Indonesia<br>• India<br>• Cambodia<br>• Philippines<br>• Papua New Guinea | article (Flores, 2016) | • National policy outcomes (M/H): Used to calculate Indonesia's FREL, supported development of REDD+ National Strategy, using ground biomass calculations. Unclear exact policy changes that manifest (too early to say at time of evaluation)<br>• Partner outcomes (M/H): need more detail on GEF-funded project on blue forests<br>• Research (H)<br>• Private sector (M/H): Private sector approaches to building coastal infrastructure; developed climate adaptation and mitigation strategies for local community development (unexpected) | of carbon dioxide over the next 15 years, which corresponds to a mean social value of $402 – 805 million using a $40/ton social cost of carbon. With SWAMP's timely knowledge generation on tropical wetland carbon dynamics we estimate that $4.03 – 40.26 million of these social benefits can be attributed to CIFOR" (thesis abstract) | • *Additional document review (project documents, trip reports, external media, policy review)*<br>• *Quantification for impact estimation: ?* | sensitive to assumptions) |
| Characterizing and Assessing Palm Swamp Degradation in the Peruvian Amazon (*CIFOR*) | No evidence<br><br>*ongoing project (possibly too young) | *proposal notes projections – lower reliability | Y (projected) – not reliable<br><br>[potential] Target: Improve the protection and management of 350,000 ha area Palm Swamp ecosystem in | • International policy outcomes: need preliminary evidence of learning, evidence of policy change<br>• National policy outcomes: need preliminary evidence of learning, evidence of policy change | *Outcome level:* TBD; possibly too young.<br><br>*Impact level:* Ex ante assessment possible? |

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| • Peru | | | the Pastaza-Marañon Basin area that will lead to the enhancement of carbon storage amounts which are nationally and globally significant | • Partner outcomes: need preliminary evidence of learning and support<br>• Private sector outcomes: need preliminary evidence of learning, evidence of policy change, evidence of practice change<br><br>Impact estimations: Determine likelihood of outcome realization of the Pastaza-Marañon Basin area that would logically support the projected impact<br><br>• *Additional document review (project documents, trip reports, external media, policy review)*<br>• *Interviews/surveys with international and national gov't, partners, private sector*<br>• *Quantification for impact estimation: requires outcome assessment* | |
| Sustainable Wetlands Adaptation and Mitigation Program (SWAMP): Phase 2 (*CIFOR*)<br><br>• Kenya<br>• Cameroon<br>• India<br>• Indonesia<br>• Vietnam<br>• Brazil<br>• Colombia<br>• Ecuador<br>• Mexico<br>• Peru | • 8 quarterly reports (2017-2018) | *self-reported – lower reliability<br>*confidence: low-medium<br>No evidence of outcomes – reports mostly focus on outputs | N | • International policy outcomes: need evidence of learning, evidence of policy change<br>• National policy outcomes: need preliminary evidence of learning, evidence of policy change<br>• Partner outcomes: need evidence of learning and support<br>• Research: uptake and use of project outputs<br>• Private sector outcomes: need evidence of learning, evidence of policy change, evidence of practice change<br><br>Impact estimations: Noted in quarterly report 2018 Q3: Data can be used to track how deforestation impacts C stocks and GHG emissions over time.<br><br>• *Additional document review (project documents, trip reports, external media, policy review)* | *Outcome level:* Possibly not, limited initial evidence base.<br><br>*Impact level:* Not possible. |

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| | | | | • *Interviews/surveys with international and national gov't, partners, private sector*<br>• *Quantification for impact estimation: ?* | |
| Sustainable Wetlands Adaptation and Mitigation Program (SWAMP) 2019 (*CIFOR*)<br><br>• Tanzania<br>• Kenya<br>• Indonesia<br>• Vietnam<br>• Peru<br>• Mozambique<br>• Gabon<br>• Cameroon | • 4 quarterly reports (2019) | *self-reported – lower reliability<br>*confidence: low-medium<br>• National policy outcomes (L): expected outcomes discussed<br>• International policy outcomes (L): expected outcomes discussed | Y (expected but not quantified) –not reliable<br><br>[potential] Measurable change on the ground in how wetlands are managed (conserved and restored wetlands) | • International policy outcomes: need evidence of learning, evidence of policy change<br>• National policy outcomes: need preliminary evidence of learning, evidence of policy change<br>• Research outcomes: uptake and use of project outputs<br><br>Impact estimations: ?<br><br>• *Additional document review (project documents, trip reports, external media, policy review)*<br>• *Interviews/surveys with international and national gov't, partners, private sector*<br>• *Bibliometric analyses*<br>• *Quantification for impact estimation: ?* | *Outcome level:* Possibly not, limited initial evidence base.<br><br>*Impact level:* Possible? |
| Mainstreaming Wetlands into the Climate Agenda: A multi-level approach (SWAMP-II) (*CIFOR)*<br><br>• All? | • 3 quarterly reports<br><br>*ongoing project (too young?) | *self-reported – lower reliability<br>*confidence: low-medium<br>• National policy outcomes (L): expected outcomes discussed<br>• International policy outcomes (L): expected outcomes discussed | Y (intended noted, but not quantified) –not reliable (assumption: avoiding GHG emissions from wetland conservation globally) | • International policy outcomes: need evidence of learning, evidence of policy change<br>• National policy outcomes: need preliminary evidence of learning, evidence of policy change<br>• Research outcomes: uptake and use of project outputs<br>• Partner outcomes: need evidence of learning and support<br><br>Impact estimations: ?<br><br>• *Additional document review (project documents, trip reports, external media, policy review)*<br>• *Interviews/surveys with international and national gov't, partners, private sector*<br>• *Bibliometric analyses* | *Outcome level:* Possibly not, limited initial evidence base; consider infancy of project.<br><br>*Impact level:* Possible? |

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***Fire and Haze in Indonesia Cluster***

| Project | Evidence Sources | Level of Outcome Evidence (L, M, H), Reliability Assessment, & Confidence | Impact Estimations (Y/N) & Reliability Assessment | What additional evidence is required? *Suggestions for additional data collection (for both outcomes and impact).* | Should this project be prioritized for additional evidence? |
|---|---|---|---|---|---|
| Political Economy Study of Fire and Haze in Indonesia (*CIFOR*)<br><br>• Indonesia | • 1 outcome story<br>• 1 performance story (theory-based external outcome evaluation with primary data collection)<br>• 1 article (theory-based outcome evaluation)<br>• 1 annual report | *external evaluation and self-reported – varying reliability<br>*confidence: high<br>• Government outcomes (H)<br>• NGO / ally outcomes (H)<br>• Research outcomes (M): requires update of bibliometrics<br>• Private sector outcomes (M): evidence points to influence being low and outcomes partially achieved, but did lead to follow up MoU with palm oil pulp and paper company<br>• Public outcomes (M) | Y (from annual report – self-reported? Need to question the reliability) (assumption: perfect implementation of policy needed)<br><br>CIFOR helped develop the 'Grand Design for Fire Prevention for 2017-2019' as the standard for fire prevention in order to:<br>1. Ensure that the peatland working area of Peatland Restoration Agency (BRG) as large as 2.4 million hectares were not burned;<br>2. Ensure that the 731 villages identified by the Ministry of Environment and Forestry as prone to fire are not burned | • Research outcomes: need update on uptake and use of project outputs<br>• Private sector outcomes: update on outcome realization (those previously assessed to be partially achieved)<br>• Smallholder/farmer outcomes: need evidence learning, evidence of practice changes<br><br>Impact estimations: Derive from policy targets.<br><br>• *Additional document review (project documents, trip reports, external media, policy review)*<br>• *Interviews/surveys with gov't, research team, private sector*<br>• *Bibliometric analyses, Scopus review*<br>• *Quantification for impact estimation: Policy analysis* | *Outcome level:* TBD (update could be possible low-hanging fruit)<br><br>*Impact level:* Possible (We can get an impact estimate with low investment of resources, BUT this case is sensitive to underlying assumptions (policy implementation and scaled adoption of new practices) and many variables that are beyond control of project (naturally occurring fires) |
| DFID Know-for 2: Political economy of fire and haze (*CIFOR*)<br>• Indonesia | *same as above | *same as above | *same as above | *same as above | *same as above |

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| Disaster Preparedness Specific Discipline Integrated Programme in Riau, Indonesia (*CIFOR*)<br><br>• Indonesia | • 1 final report<br><br>*recently concluded | *self-reported – lower reliability<br>*confidence: medium<br>• Government outcomes (M): preliminary evidence of gov't support and policy change<br>• NGO outcomes (L): need to verify NGO/ally support, needs more detail<br>• Research outcomes (M)<br>• Private sector outcomes (L): PS engaged, but unclear what resulted<br>• Public outcomes (M): media uptake indicates influence on public awareness | Y<br><br>[potential] Project pilots community-based fire prevention and peatland restoration models on 11.1 ha | • Government outcomes: need update on gov't support, need evidence of gov't learning, evidence of policy change and onward effects<br>• NGO outcomes: need more detail on NGO support, need evidence of NGO learning<br>• Research outcomes: need update on uptake and use of project outputs<br>• Private sector outcomes: update on outcome realization (those previously assessed to be partially achieved)<br>• Smallholder/farmer outcomes: need evidence of learning, evidence of practice changes<br><br>Impact estimations: Derive from models? (possibly negligible?)<br><br>• *Additional document review (project documents, trip reports, external media)*<br>• *Interviews/surveys with gov't, NGOs, research team, private sector*<br>• *Bibliometric analyses*<br>• *Quantification for impact estimation: Derive from models and pair with community survey of intended practice change* | *Outcome level:* May be too early to assess (consider recent conclusion of project – though could be low-hanging fruit)<br><br>*Impact level:* Possible |

***Oil Palm in Indonesia Cluster***

| Project | Evidence Sources | Level of Outcome Evidence (L, M, H), Reliability Assessment, & Confidence | Impact Estimations (Y/N) & Reliability Assessment | What additional evidence is required? *Suggestions for additional data collection (for both outcomes and impact).* | Should this project be prioritized for additional evidence? |
|---|---|---|---|---|---|
| Supporting local regulations for sustainable oil palm in East Kalimantan (*CIFOR*)<br><br>• Indonesia | • 1 outcome evaluation (2020/in progress) | *external evaluation – higher reliability<br>*confidence: high<br>• Government outcomes (H): indications of future policy change<br>• Partner outcomes (H)<br>• Research outcomes (M/L)<br>• Corporations outcomes (L): no evidence to date | N | • Government outcomes: need update on related policy changes (e.g., EK pergub), resulting governance changes from policy implementation<br>• Partner outcomes: update on continuation and involvement of FKPB<br>• Research outcomes: update on involvement of UNMUL researchers in EK PERDA/pergub process<br>• Corporations outcomes: update on whether companies in EK accommodate the PERDA's policy changes (e.g., companies conserve/ manage HCV areas)<br><br>Impact estimations: is it possible quantify and/or extrapolate the potential of total HCV areas in EK that could be protected by the PERDA?<br><br>• *Interviews/surveys with gov't, FKPB, UNMUL, oil palm companies*<br>• *Quantification for impact estimation: calculate total HCV area in EK (use HCV maps developed by the project)* | *Outcome level:* Possibly not as there is already substantial recent evidence and additional evidence may take time to materialize (i.e., may not be available)<br><br>*Impact level:* Possible (e.g., low-hanging fruit) |
| Governing Oil Palm Landscapes for Sustainability (GOLS) (*CIFOR*)<br><br>• Indonesia | • 1 CUF evaluation report (2019)<br>• 1 outcome evaluation (2020/in progress)<br>• 1 CIFOR annual report (2017) | *external evaluations – higher reliability<br>*confidence: high<br>• Government outcomes (M): policy changes are too nascent<br>• Partner outcomes (H) | N | • Government outcomes: need evidence of additional uptake of GOLS outputs, update on related policy changes (ISPO, RANKSB)<br>• Corporations outcomes: evidence of company learning/attitude change, indications or evidence of company uptake/use of GOLS outputs, evidence of changes in company policy and/or practice<br><br>Impact estimations: do ISPO or RANKSB contain targets for forests or emissions? | *Outcome level:* Possibly not as there is already substantial recent evidence and additional evidence may take time to materialize (i.e., may not be available) |

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| | | • Research outcomes (H)<br>• Corporations outcomes (L): lack evidence of PS learning from project and changes to practice (no primary evidence from oil palm companies) | | • *Interviews/surveys with governments, oil palm companies*<br>• *Quantification for impact estimation: borrow target estimates from gov't policy?*<br>  • [potential] Indonesia's zero deforestation commitments for production forest areas (reduce deforestation by 25%, reduce GHG emissions by 13% from 64.2m ha)<br>  • [potential] Indonesia's Palm Oil Moratorium (PerPres No.8/2018) to protect 12.8m ha of conversion forest (reduce deforestation by 28%, reduce GHG emissions by 16%) | *Prioritize evidencing corporations outcomes (e.g., low-hanging fruit)<br><br>*Impact level:* Unsure if can link to project/ CIFOR's contributions |
| Oil Palm Adaptive Landscapes (OPAL) (*CIFOR*)<br><br>• Indonesia | • 1 outcome evaluation (2020/in progress)<br>• 1 CIFOR annual report (2017) | *external evaluation – higher reliability<br>*confidence: high<br>• Government outcomes (M/H): some policy changes are too nascent<br>• Partner outcomes (H)<br>• Research outcomes (H): project is still underway<br>• Smallholder outcomes (L/M): low primary evidence from smallholders/ farmers associations | N | • Government outcomes: need update on related policy changes (ISPO, RANKSB)<br>• Research outcomes: update on project progress (project end: 2021)<br>• Smallholder outcomes: need more detail on smallholder learning and changed practices<br><br>Impact estimations: do ISPO or RANKSB contain targets for forests or emissions?<br><br>• *Interviews/surveys with governments, research team, smallholders/farmer associations*<br>• *Quantification for impact estimation: borrow target estimates from gov't policy?*<br>  • [potential] Indonesia's zero deforestation commitments for production forest areas (reduce deforestation by 25%, reduce GHG emissions by 13% from 64.2m ha)<br>  • [potential] Indonesia's Palm Oil Moratorium (PerPres No.8/2018) to protect 12.8m ha of conversion forest (reduce deforestation by 28%, reduce GHG emissions by 16%) | *Outcome level:* Possibly not as there is already substantial recent evidence and additional evidence may take time to materialize (i.e., may not be available)<br><br>*Impact level:* Unsure if can link to project/ CIFOR's contributions |

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| DFID Know-for 2: Corporate Commitments to Sustainability (*CIFOR*)<br><br>• Indonesia | No evidence | No evidence | ? | • Government outcomes: need evidence of gov't learning, evidence in changes in relationships/ governance arrangements, evidence of gov'tal use of project outputs/findings<br>• Research outcomes: need evidence of graduate student learning and capacity-building, evidence of researcher uptake and use of project outputs<br>• RSPO outcomes: need evidence of RSPO learning<br>• Corporations outcomes: need evidence of corporation/oil palm company learning, evidence of changes in relationships, evidence of uptake of recommendations, evidence of new or revised corporate commitments (i.e., policy) to sustainability objectives and changed practices<br><br>Impact estimations: do any corporate/oil palm company commitments contain targets for forests or emissions?<br><br>• *Additional document review (project documents, trip reports, external media)*<br>• *Interviews/surveys with governments, research team, RSPO, oil palm companies*<br>• *Bibliometric analyses*<br>• *Quantification for impact estimation: borrow target estimates from oil palm company commitments?* | *Outcome level:* Possibly not – there is substantial evidence from other projects to represent this cluster<br><br>*could be low-hanging fruit to complete/round out cluster evidence<br><br>*Impact level:* Unsure if available |

***Agroforestry Concessions in Peru Cluster***

| Project | Evidence Sources | Level of Outcome Evidence (L, M, H), Reliability Assessment, & Confidence | Impact Estimations (Y/N) & Reliability Assessment | What additional evidence is required? *Suggestions for additional data collection (for both outcomes and impact).* | Should this project be prioritized for additional evidence? |
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| Support to the Development of Agroforestry Concessions in Peru (SUCCESS) (*ICRAF*)<br><br>• Peru | • 1 outcome evaluation report (2019) | *external evaluation – higher reliability<br>*confidence: high<br>• Government outcomes (H): policy changes too nascent<br>• Partner outcomes (H)<br>• Research outcomes (M/H): low evidence of external researcher uptake<br>• Smallholder outcomes (L): low primary evidence from smallholders/ farmers associations | Y (derived from project data – likely reliable as it was scientifically calculated)<br><br>[potential] 1 million ha of land and 452 000 ha of forest eligible for AFCs<br><br>[potential] 20% carbon emissions reduction (estimation of successful widespread implementation of AFCs) | • Government outcomes: update on gov'tal support for AFCs, update on AFC policy implementation, update on San Martín pilot<br>• Partner outcomes: update on partner involvement in AFC issues<br>• Research outcomes: update on external uptake of SUCCESS outputs<br>• Smallholder outcomes: need more detail on smallholder learning and changed practices, update on San Martín pilot<br><br>Impact estimations: Already have.<br><br>• *Interviews/surveys with governments, partners, research team, smallholders (e.g., those involved in San Martín pilot)*<br>• *Bibliometric analyses*<br>• *Quantification for impact estimation: borrow potential estimates quantified by project* | *Outcome level:* Possibly not as there is already substantial recent evidence and additional evidence may take time to materialize (i.e., may not be available)<br><br>*collecting 'update evidence' could be low-hanging fruit to complete/round out cluster evidence<br><br>*Impact level:* Already have/ |
| Peru's Agroforestry Concessions Scheme: Collaborative Action to secure Multi-level Readiness for Implementation of an | No evidence<br><br>*New project (too young to evaluate) | No evidence | ? | • Government outcomes: need evidence on governmental attitudes/support for AFCs, evidence of governmental capacity-building, evidence of changes in relationships<br>• Partner outcomes: need evidence on partner support for AFCs (e.g., GGGI, SPDA) and changes in relationships<br>• Research outcomes: need evidence on researcher capacity-building and changes in relationships | *Outcome level:* Possibly? Need to consider the infancy of the project and value of preliminary evidence<br><br>*collecting preliminary |

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| Innovative, Transformative Policy Project (*ICRAF)*<br><br>• Peru | | | | • Smallholder outcomes: need evidence on smallholder learning and capacity-building from pilots, evidence of changes in smallholder practices<br><br>Impact estimations: ?<br><br>• *Additional document review (project documents, trip reports, external media)*<br>• *Interviews/surveys with gov't's, partners, research team, smallholders (e.g., pilot participants)* | evidence could be low-hanging fruit to complete/round out cluster evidence<br><br>*Impact level:*<br>? |
| PARA: Piloting approaches to rural advisory services in support of scaling of the Agroforestry Concessions scheme in Peru (*ICRAF)*<br><br>• Peru | No evidence<br><br>*New project (too young to evaluate) | No evidence | Y (projection noted in project proposal)<br><br>[potential] 1.5 million ha of forest land in Peru eligible for AFCs (similar numbers to SUCCESS – may already be captured) | • Government outcomes: need evidence on governmental attitudes/support for AFCs and pilots, evidence of governmental capacity-building, evidence of changes in relationships<br>• Partner outcomes: need evidence on partner involvement in AFC issues and changes in relationships<br>• Research outcomes: need evidence on researcher capacity-building and changes in relationships<br>• Smallholder outcomes: need evidence on smallholder learning and capacity-building from pilots, evidence of changes in smallholder practices<br><br>Impact estimations: Already have.<br><br>• *Additional document review (project documents, trip reports, external media)*<br>• *Interviews/surveys with gov't's, partners, research team, smallholders (e.g., pilot participants)*<br>• *Quantification for impact estimation: borrow potential estimates quantified by project* [beware of double-counting] | *Outcome level:*<br>Possibly? Need to consider the infancy of the project and value of preliminary evidence<br><br>*collecting preliminary evidence could be low-hanging fruit to complete/round out cluster evidence<br><br>*Impact level:*<br>No, estimates of AFC potential are similar to SUCCESS numbers (possibility of double-counting) |

# Appendix 4. Evidence for Impact Estimations for Challenge 1 – In Progress

| Cluster | Project (Organization) | Total Estimated Impact | Underlying Assumptions |
|---|---|---|---|
| Sustainable Forest Management in Mesoamerica | Forestry to enhance livelihoods and sustain forests in Mesoamerica: How institutional arrangements and value chains affect benefits and resources (*Bioversity International*) | Not available | Possible to obtain quantification of community's replanting of successful germination trials? |
| | ***Cluster Total*** | Not available | |
| Sustainable Forest Management in Southern Africa | Sustaining Forest Resources for People and the Environment in the Niassa National Reserve in Mozambique (*Bioversity International*) | Not available | Possibility to quantify the results of the regeneration activity? (would be very small);<br>possibility to quantify reduction in tree felling/fires from use of traditional honey harvesting methods? |
| | ***Cluster Total*** | Not available | |
| Sustainable Forest Management in Congo Basin | Appui a la politique Nationale de conservation et gestion des forets et de la biodiversite en republique democratique du Congo (REFORCO) (*CIFOR*) | Not available | Unclear if any related deforestation estimates can be derived from the project |
| | Forests and Climate Change in Congo (FCCC) (*CIFOR, ICRAF*) | Partners' tree planting (in agroforestry plantations) covered more than 4600 ha [Virunga Foundation] (potential: approximately 1.4 million tonnes of CO2 stocked);<br><br>Aim to rehabilitate 5000 ha of natural forests [in Virunga National Park] (aim for carbon sequestered in the aboveground woody biomass within 5,000 ha of FN under PSG to be increased by 10% between 2013 and 2017)<br><br>Aim for 3 million trees within a 3000 ha agroforestry area [WWF] - achieved: 3153.14 ha of plantations completed, planting >5.5 million trees (potential for 900 000 tonnes of carbon capture) | |

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| | Yangambi, pole scientifique au service de l'homme et des forets (*CIFOR*) | Not available | |
| | SFM Congo Basin (*CIFOR*) | Not available | |
| | Nouveaux Paysages du Congo (*CIFOR*) | Project in progress – no evidence available | |
| | Aide à l'application des normes FSC sur la régénération et la diversité génétique des essences du bassin du Congo (COMIFAC) (*Bioversity International*) | No evaluation evidence | |
| | Beyond Timber: Reconciling the Needs of Logging Industry with those of Forest-dependent People (AFDB) (*Bioversity International*) | Not available | |
| | ***Cluster Total*** | **Achieved:**<br>3153.14 ha of degraded lands restored in DRC<br><br>>5.5 million trees planted in DRC<br><br>**Potential:** | Assumes DRC government's pledges are met (8 million ha) |
| FLEGT/VPA (Global) | Appui technique au Ministère des Forêts et de la Faune pour l'opérationnalisation de la page web et la collecte de données dans le cadre de la mise en œuvre de l'Annexe VII de l'APV/FLEGT (*CIFOR*) | Cameroon - between 2012 and 2016, the number of council forests with valid licenses rose from 8 to 19, while total land area during that same time period rose from 188, 000 ha to 587,000 ha | Assumes that transparency in data incentivizes licensing |
| | Collecting evidence of FLEGT VPA-impacts for improved FLEGT communication (*CIFOR*) | No evaluation evidence<br>Expected: Showing positive impact of FLEGT (in CIFOR's study) and that it makes sense to invest in FLEGT, then this would results into political processes tackling deforestation | |
| | Realisation d'une etude de caracterisation des differents types d'offres et de demandes en bois et produits derives dans les marches publics en Cote d'Ivoire (*CIFOR*) | ** to do | |

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| | Essor des demandes publiques et privees camerounaises en sciages d'origine legale (*CIFOR*) | 1. A draft national public policy for the supply of legally sourced sawn timber and a draft MINFOF / MINTP / MINMAP joint order on the use of timber of legal origin in public procurement in Cameroon were drawn up and submitted to the Commission. Prime Minister to establish the use of wood of legal origin in public procurement in Cameroon.<br>2. Large companies in the construction sector have been made aware of the value of sourcing legal sawnwood, but none have yet developed a consistent responsible wood purchasing policy.<br>3. Several advertising campaigns have increased the sensitivity of private buyers in Yaoundé to purchase sawnwood or legally-sourced wooden furniture.<br>4. The visibility of the project has been ensured.<br>Not available | |
| | Policy and regulatory options to recognise and better integrate the domestic timber sector in tropical countries (PROFORMAL) (*CIFOR*) | Not available | |
| | Governing multifunctional landscapes (GML) in Sub Saharan Africa: Managing trade-offs between social and ecological impacts (*CIFOR, ICRAF*) | Not avialable | |
| | Developing DNA timber tracking tools and a conservation strategy for African mahogany (Khaya senegalensis) in West Africa (*Bioversity International*) | No evaluation evidence | |
| | ***Cluster Total*** | | |
| Sustainable Forest Enterprises in Sub-Saharan Africa | DRYAD (*ICRAF*) | Pending receipt of final report | |
| | ***Cluster Total*** | | |
| Timber Markets in Sub-Saharan Africa | To take stock of community forestry enterprises involved in commercialization of timber in Africa (*CIFOR*) | Not available – only reports outputs | |

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| | Development of Intra-African Trade and Further Processing in Tropical Timber and Timber Products – Phase I (*CIFOR*) | Not available – only reports outputs and anticipated outcomes | |
| | DFID KNOWFOR 2: SMEs and Informal Sectors (*CIFOR*) | Not available – self-reported and based on anticipated outcomes | |
| | Promote and Formalise Artisanal Timber Production in Central Africa (PROFEAAC) (*CIFOR*) | Project in progress – no evidence available | |
| | ***Cluster Total*** | Not available | |
| GCS REDD+ (Global) | Learning from REDD: A Global Comparative Analysis (Phase 1 of GCS REDD+ Program) (*CIFOR*) | **Indonesia:** Total forest to be protected in under forest moratorium: 64.2 million hectares<br><br>**Contradictory evidence Indonesia:** Before moratorium policy, the average of annual deforestation from 2001-2011 is 473.000 ha/year, after the moratorium policy (2012-2019) was released the average of annual deforestation rate increased into 634.000 ha/year.<br><br>**Peru:**<br>**Brazil: Potential impacts:** Two REDD+ initiatives under CIFOR GCS-REDD at sub-national level:<br>1. The Green Municipalities Program helped reduce deforestation levels from 6000 km2 to 3000 km2 (difference is 300 000ha) in its first year in São Félix do Xingu. São Félix do Xingu (SFX) is one of the largest municipalities in the world and has historically been a major contributor to deforestation in the Brazilian Amazon.<br>2. Acre's State System of Incentives for Environmental Services (SISA) applies to the entire state of Acre, which is a relatively small and remote state in the western Brazilian Amazon. Acre encompasses an area of approximately 164,221 km2, which comprises 4.7% of the Brazilian Amazon | **Antecedent outcomes realized to support impact (Indonesia)**: CIFOR influenced LOI drafting and negotiations in significant way, supported national level policies and programs in many countries – step wise approach is used<br><br>**Key assumption (Indonesia):** The moratorium and REDD+ programs is effectively implemented and enforced to reach its objectives |
| | Learning from REDD+: An enhanced global comparative analysis (Phase 2 of GCS REDD+ program) (*CIFOR*) | | |
| | REDD: Research to Support Design and Implementation (accompanying phase 2 of GCS REDD+ program) (*CIFOR*) | | |
| | Opportunities and Challenges to Developing REDD+ Benefit Sharing Mechanisms in Developing | CIFOR's four-year project on benefit sharing – the fair division of benefits gained from conserving forests to lower carbon emissions (REDD+) – | |

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| | Countries (accompanying phase 2 of GCS REDD+ program) (*CIFOR*) | contributed directly to Peru's national REDD+ benefit sharing strategy, a monitoring and evaluation system for environmental compensation in Vietnam, and a high level policy dialogue in Indonesia. Results are summed up in an online tool, and research is continuing in Burkina Faso, Lao People's Democratic Republic (Lao PDR), and other countries<br><br>**Vietnam (Self reported):** Since its implementation in 2009, PFES has generated a total revenue of more than VND 3.44 trillion or approximately USD 162 million (VNFF 2014). FES budget supports for forest protection of 3-5 million ha/year out of the total 13.5 million ha; Reducing forest violation cases, destroyed areas<br>and forest fired areas. It also has impact on the social;<br>• Created jobs with participation of 348,715 households, 5,734 group of households & communities (2,241 owners and 3,493 contracted);<br>• Improved income/livelihood for people engaged in forestry (90 USD/household/ year);<br>• Created new revenue source for forest owners.<br><br>**Cameroon:** *Potential Impact:*<br>1. The GCS REDD+ initiative at sub national level work to protect The Mount Cameroon National Park covers a total of 212,686 ha in the southwest region of Cameroon. It encompasses the Mount Cameroon National Park, the remnant Bomboko Forest Reserve (that was not included in MCNP), and a leakage belt of 164 ha outside the national park boundaries. The total population in the villages of the initiatives is about 4300 individuals<br><br>2. The other GCS REDD+ initiative (Community Payments for Ecosystem Services) at sub national level also worked in two villages that are located in the south and east regions of Cameroon. First villages is in the Dja-and-Lobo Division, south region, and is | |

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| | | subdivided into three land types: community forests (1043 ha), the agroforestry zone and lands claimed by the community in the Kom Reserve (20,800 ha). The other village is in the Haut-Nyong Division, east region. It has a community forest (1759 ha) that covers the whole village (1910 ha), apart from minor claims in the nearby forest management unit.<br>The communities have earned Plan Vivo certification for carbon. The January 2010 Plan Vivo PDD (Plan Vivo 2010) indicates that the expected benefits in terms of carbon credits are 15,861 tC for SEC1 and 6884 tC for SEC2 for the 2012–2015 period, and 5418 tC for SEC1 and 53,119 tC for SEC2 for the 2016–2020 period, for a total of 81,282 tC over the 10-year period from 2010 to 2020. | |
| | A Global Comparative Study for achieving effective, efficient and equitable REDD+ results (Phase 3 of GCS REDD+ program) (*CIFOR*) | Not available | |
| | From Climate Research to Action under Multilevel Governance: Building Knowledge and Capacity at Landscape Scale (MLG) (*CIFOR*) | No evaluation evidence | |
| | Reducing emissions from deforestation and degradation through alternative land-uses in rainforests of the tropics (REDD-ALERT) (*CIFOR, ICRAF*) | No evaluation evidence | |
| | Impacts of Reducing Emissions from Deforestation and Forest Degradation and Enhancing Carbon Stocks (IREDD+) (*CIFOR, ICRAF*) | No evaluation evidence | |
| | SECURED Landscapes: Sustaining Ecosystem and Carbon benefits by Unlocking Reversal of Emissions Drivers in Landscapes (*ICRAF*) | No evaluation evidence | |
| | ***Cluster Total*** | **Potential**<br><br>**Achieved** | Assumes Indonesian moratorium targets are realized |

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| Role of Wetlands in Climate Change (Global) | Sustainable Wetlands Adaptation and Mitigation Programme (SWAMP) (*CIFOR*) | Not available | |
| | Characterizing and Assessing Palm Swamp Degradation in the Peruvian Amazon (*CIFOR*) | Not available | |
| | Sustainable Wetlands Adaptation and Mitigation Program (SWAMP): Phase 2 (*CIFOR*) | Not available | |
| | Sustainable Wetlands Adaptation and Mitigation Program (SWAMP) 2019 (*CIFOR*) | Not available | |
| | Mainstreaming Wetlands into the Climate Agenda: A multi-level approach (SWAMP-II) (*CIFOR*) | Not available | |
| | ***Cluster Total*** | Not available | |
| Fire and Haze in Indonesia | Political Economy Study of Fire and Haze in Indonesia (*CIFOR*) | At the national level, CIFOR helped develop the 'Grand Design for Fire Prevention for 2017-2019' as the standard for fire prevention in order to:<br>1. Ensure that the peatland working area of Peatland Restoration Agency (BRG) as large as 2.4 million hectares were not burned;<br>2. Ensure that the 731 villages identified by the Ministry of Environment and Forestry as prone to fire are not burned | Impact assessment of policy required. |
| | DFID Know-for 2: Political economy of fire and haze (*CIFOR*) | | |
| | Disaster Preparedness Specific Discipline Integrated Programme in Riau, Indonesia (CIFOR) | No evaluation evidence | |
| | ***Cluster Total*** | **2.4 million hectares in Indonesia (potential)** | Assumes policy effectively implemented and enforced to meet targets |
| Oil Palm (Indonesia) | Governing Oil Palm Landscapes for Sustainability (GOLS) (*CIFOR*) | Not available | Possible that ISPO or RANKSB contain estimates of deforestation or emissions reductions, or estimates of number of smallholders eligible (comes with assumption that the policies are perfectly applied/followed) |

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| | DFID Know-for 2: Corporate Commitments to Sustainability (*CIFOR*) | Not available | |
| | Oil Palm Adaptive Landscapes (OPAL) (*CIFOR*) | Not available | Possible that ISPO or RANKSB contain estimates of deforestation or emissions reductions, or estimates of number of smallholders eligible (comes with assumption that the policies are perfectly applied/followed) |
| | Supporting local regulations for sustainable oil palm in East Kalimantan (*CIFOR*) | Not available | Possible that estimates of total HCV areas for EK could be extrapolated/quantified from the maps (this would produce the potential of forests conserved/protected from deforestation with the assumption that the policy is perfectly applied/followed) |
| | ***Cluster Total*** | Not available | |
| Agroforestry Concessions in Peru | Support to the Development of Agroforestry Concessions in Peru (SUCCESS) (*ICRAF*) | 20 percent carbon emissions reduction (potential estimation of successful widespread implementation of AFCs)<br><br>23 000 AFC beneficiaries (potential estimation of # of smallholder households)<br><br>1 million ha of land and 452 000 ha of forest eligible for AFC (potential eligibility estimation) | |
| | Peru's Agroforestry Concessions Scheme: Collaborative Action to secure Multi-level Readiness for Implementation of an Innovative, Transformative Policy Project (*ICRAF*) | Not available | |
| | PARA: Piloting approaches to rural advisory services in support of scaling of the Agroforestry Concessions scheme in Peru (*ICRAF*) | **Projected in proposal:**<br>Direct Beneficiaries: 3,000 households, 27,000 ha<br>Indirect Beneficiaries: 7,000 households, 63,000 ha | |

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| | | Estimated that Agroforestry Concessions could benefit more than 120,000 families that are currently farming over 1.5 million hectares of forest land in Peru<br>[pulled from PARA logframe]<br>By 2022, at least 10,000 smallholder households will have adopted technologies developed by IARCs<br>By 2022, SLM practices designed by IARCs will be applied on approximately 90,000 ha including forest land<br>Baseline and endline survey data collected on representative of samples of AC HHs in 45 villages as part of the project's piloting work. The evidenced adoption rate (estimated to be about half of the 3,000 untitled farmers involved in the pilot) will then be extrapolated to areas the model will be scaled up to in 2022 | |
| ***Cluster Total*** | | | Assumes that agroforestry concession land reduces deforestation, and regulations are followed |
| ***Challenge Total*** | | | |