CGIAR

RESEARCH PROGRAM ON
Forests, Trees and Agroforestry

FTA HIGHLIGHTS OF A DECADE
2011-2021

Monitoring, Evaluation, Learning and Impact Assessment

Ten years of
forests, trees and agroforestry
research in partnership for
sustainable development

About the FTA Highlights series

This publication is part of a series that highlights the main findings, results and achievements of the CGIAR Research Program on Forests, Trees and Agroforestry (FTA), from 2011 to 2021 (see full list of chapters on the last page).

FTA, the world's largest research for development partnership on forests, trees and agroforestry, started in 2011. FTA gathers partners that work across a range of projects and initiatives, organized around a set of operational priorities. Such research was funded by multiple sources: CGIAR funders through program-level funding, and funders of bilateral projects attached to the programme, undertaken by one or several of its partners. Overall this represented an effort of about 850 million USD over a decade.

The ambition of this series is, on each topic, to show the actual contributions of FTA to research and development challenges and solutions over a decade. It features the work undertaken as part of the FTA program, by the strategic partners of FTA (CIFOR-ICRAF, The Alliance of Bioversity and CIAT, CATIE, CIRAD, Tropenbos and INBAR) and/or with other international and national partners. Such work is presented indifferently in the text as work "from FTA" and/or from the particular partner/organization that led it. Most of the references cited are from the FTA program.

This series was elaborated under the leadership of the FTA Director, overall guidance of an Editorial Committee constituted by the Management Team of FTA, support from the FTA Senior Technical Advisor, and oversight of the FTA Independent Steering Committee whose independent members acted as peer-reviewers of all the volumes in the series.

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FTA HIGHLIGHTS OF A DECADE
2011-2021

Monitoring, Evaluation, Learning and Impact Assessment

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The final content remains the sole responsibility of the authors.

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List of acronyms

CIRAD	Centre de coopération internationale en recherche agronomique pour le développement
CRP	CGIAR research program
FP	Flagship project
FSN	Food Security and Nutrition
FTA	CGIAR Research Program on Forests, Trees and Agroforestry
ISDC	Independent Science for Development Council
ISPC	Independent Science and Partnership Council
ISC	Independent Steering Committee
MELIA	Monitoring, Evaluation, Learning and Impact Assessment
ODI	Overseas Development Institute
QoR4D	Quality of research for development
R4D	Research for development
SDGs	Sustainable Development Goals
SPIA	Standing Panel on Impact Assessment
ToC	Theory of change

Executive summary

The CGIAR Research Programs (CRPs) embodied a fundamental shift in the approach to research for development. In addition to producing high-quality science, the CRPs explicitly assume shared responsibility for achieving economic and human development outcomes. This shift required new ways of working for positioning, prioritizing and planning of research, and better ways of monitoring and evaluating research. When the Forests, Trees and Agroforestry (FTA) program was established in 2011 it responded to the latter challenge by proposing to develop and use theory-based approaches for monitoring and evaluating outcomes and impacts. This concept was well received by reviewers at the time, and the approach has subsequently gained considerable traction in CGIAR as a whole. FTA's Monitoring, Evaluation, Learning and Impact Assessment (MELIA) Program has actively adapted, developed, tested and refined a comprehensive set of concepts and methods, including using detailed, participatory theories of change; developing and refining actor-specific theory-based outcome evaluation methods; conducting a series of outcome evaluations of FTA research projects; systematically reviewing, defining and assessing the quality of research that crosses disciplinary boundaries (i.e. research for development); and developing, testing and refining a transdisciplinary research quality assessment framework. This work has generated valuable lessons about research design, implementation, monitoring and evaluation within FTA and beyond. Designing research in a way that allows intended contributions to be made explicit and testable increases the likelihood and the magnitude of positive outcomes and

facilitates scaling. It also improves the ability to gather evidence, assess and communicate outcomes and impacts for enhanced accountability, and the capacity to learn from experience.

CIFOR researchers and Universidad Nacional Amazónica de Madre de Dios (UNAMAD) students work on a study examining the impact of selective logging on Brazil nut production in Peru.

Photo by Marco Simola/CIFOR

1. Introduction

The CGIAR Research Program on Forests, Trees and Agroforestry (FTA) was created in 2011 to help maintain and increase the value and contributions of forests and trees to the goals of sustainable development. FTA grew out of a substantive reform in 2009/2010 of the way CGIAR research was conducted. That reform recognized that contemporary environment and development problems are complex, with emergent properties and high levels of uncertainty, and that political and values barriers to progress are often as or more important than technical barriers. The CGIAR strategy to deal with complexity was to promote more, broader and deeper partnerships, not only with other research organizations, but with the full range of system actors.

A key objective was to integrate the work of the CGIAR centres and their partners, avoiding fragmentation and duplication of effort. This was achieved in part by shifting the approach to accountability. Since the beginning of CGIAR in 1971, centres and their programs, projects and scientists were primarily accountable for producing high-quality scientific outputs. The results-based management of the CRPs that emerged as a result of the 2009/2010 reform maintained the longstanding focus on high-quality science, but also explicitly adding shared responsibility for achieving development outcomes. That is, CGIAR programs and their scientists are co-responsible, with partners, for ensuring that their research is useful and helps realize positive change.

Near the Sindri village (Kongoussi area). Johanny Sawadogo, Head of Provincial Forestry Service, studying the evolution of wooded areas around the village of Sindri, Burkina Faso.

Photo by Ollivier Girard/CIFOR

To meet this responsibility, it was imperative to actively engage in the change process. FTA was built around three interrelated problems: the need to transform public and private governance and institutional arrangements; to improve utilization and management of forests, trees and forestry systems; and to understand and actively manage trade-offs between the production of commodities, ecosystem services and biodiversity. Clearly, this agenda required new ways of working and better ways of planning, monitoring and evaluating research.

When the Forests, Trees and Agroforestry (FTA) program was established in 2011 it responded to this agenda with a plan to develop and use theory-based approaches for monitoring and evaluating outcomes and impacts. This plan was well received and has subsequently gained considerable traction across CGIAR as a whole.

FTA recognized the importance of monitoring and evaluation, not only as an important management tool, but also as a field of research in its own right. From the beginning, FTA's Monitoring, Evaluation, Learning and Impact Assessment (MELIA) strategy included a core research component. FTA's impact orientation and MELIA work were strongly supported by FTA governance, in particular the Director and the Independent Steering Committee (ISC). The ISC convened a workshop with FTA science leaders and the MELIA Team in November 2019 to review and discuss FTA impacts, impact assessment and lessons learned. This workshop also helped catalyze and advance an integrated outcome evaluation of the entire FTA portfolio.

New and evolving research approaches of the kind being taken by FTA cross academic and disciplinary boundaries, integrate methodologies, and engage a broad range of research participants. This makes research more relevant and effective. FTA's overall portfolio of activities include a spectrum of concurrent research approaches that aim to contribute to reduced poverty, improved food security and nutrition, and improved natural resources and ecosystem services through technical, institutional and policy innovation. Research activities operate within an overarching program theory of change (ToC; see Box 1), but each activity has its own particular context, design and implementation, and specific ToC. This multi-level approach creates an excellent opportunity for learning how research contributes to transformative change within complex social and environmental systems.

Box 1. Theory of change

A theory of change (ToC) is a model of a change process. It provides a description and explanation of how and why an activity or a set of activities (such as a project or program) is expected to lead or contribute to a process of change. A ToC is not a single theory but a set of theories that describes and explains the multiple steps in a change process. The approach recognizes that socioecological systems are complex, and that causal processes are often non-linear, with multiple interactions and feedback loops. A ToC details the main actors involved in the process, identifies their actions as a sequence of steps or stages in the process, and specifies the theoretical reasons for the changes.

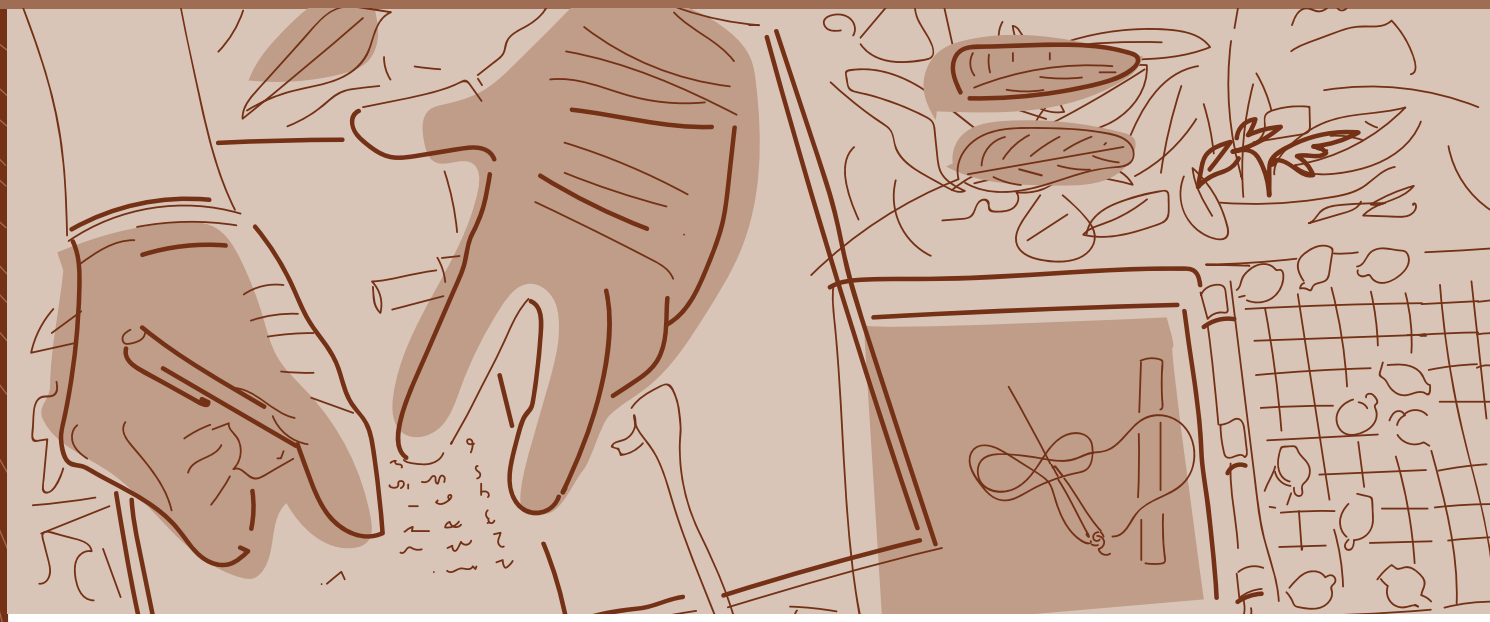
Source: Belcher and Claus (2020)

In its 10 years, the MELIA program has actively adapted, developed, tested and refined a comprehensive set of concepts and methods. These include promoting and using detailed and participatory theories of change (ToCs); developing systems for qualitative outcome monitoring; conducting a systematic review of literature pertaining to defining and measuring quality of research in interdisciplinary and transdisciplinary contexts;[1] developing a quality assessment framework suitable for research for development (R4D); developing and refining actor-specific, theory-based outcome evaluation methods; conducting a series of theory-based evaluations of individual FTA research projects; developing and testing an approach for theory-based evaluation of a portfolio of projects using a composite ToC; and conducting an ambitious integrated outcome evaluation of FTA's work. This work has generated valuable lessons about research design, implementation, monitoring and evaluation within FTA and beyond.

Camera trap installation in the Yangambi biosphere reserve, Yangambi, DRC.

Photo by Axel Fassio/CIFOR

[1] Interdisciplinary research (IDR) combines theories and methods to generate knowledge and insights from different disciplinary frames with a practical, problem-solving intent. Transdisciplinary research (TDR) crosses both disciplinary and institutional boundaries, in order to incorporate stakeholders in the research process and to foster more socially robust knowledge.



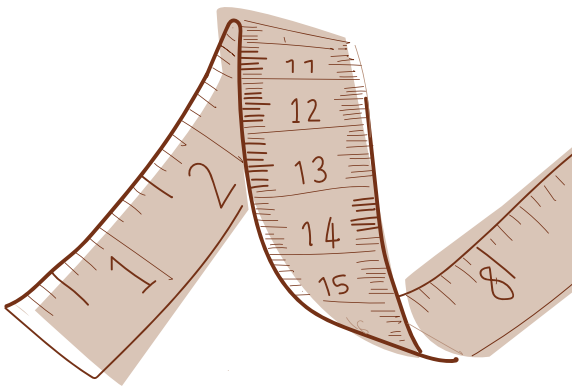
2. MELIA challenges for FTA and research for development

2.1 Impact expectations, interdisciplinary and transdisciplinary research approaches

The CGIAR research programs (CRPs) were developed with a strong focus on results-based management and an emphasis on impact. CGIAR has always aimed for impact, beginning with improving food security and evolving over time to include poverty alleviation and natural resources management. The increased attention to impact in the CRPs, and the idea of co-responsibility for outcomes, reflect a broader trend. Researchers and research organizations everywhere are under increasing pressure to demonstrate that their research contributes to positive change and helps to solve pressing societal challenges. Effective research evaluation tools are needed to satisfy expectations of accountability. Research funders need good research evaluation information to effectively allocate resources, and research organizations need credible evidence of past achievements to support proposals for new research. And, perhaps most importantly, researchers, research managers and research funders all need reliable assessments of what works and how to learn about and improve research design and implementation, especially as modes of research evolve beyond traditional disciplinary boundaries.

Recently, there has been a strong trend toward more engaged, transdisciplinary approaches to research that involve stakeholders and other system actors in order to deal with complexity and increase potential impact (Nowotny et al. 2001; Kasemir et al. 2003; Hirsch Hadorn et al. 2006; Carew and Wickson 2010; Pohl et al. 2010; Walter et al. 2007; Clark and Dickson 2003; Heinrichs et al. 2016; Kates 2017). These new research approaches begin with fundamentally different assumptions to those of traditional disciplinary approaches (Talwar et al. 2011). There is greater appreciation of contingency and uncertainty in science (Gibbons et al. 1994; Nowotny et al. 2001) and increased recognition that scientific knowledge alone is insufficient to solve sustainability problems; differing values and political considerations also need to be addressed (Funtowicz and Ravetz 1993; van Kerkhoff and Lebel 2006). There is also greater appreciation that the knowledge and values of all stakeholders are valid and important, and that research users have motivations and biases that influence how they engage with and use knowledge (Belcher et al. 2016; Kasemir et al. 2003).

FTA research has evolved in this way, aiming to generate knowledge that can be used to design tools, guidelines, models and policy recommendations. It also aims to build capacity among other researchers (e.g. national research partners, students) and research users (e.g. through training for journalists and support for national negotiators in international policy processes), and to support multi-stakeholder negotiations. FTA research crosses disciplines, and engagement and co-generation of knowledge with partners is a critical component of research to achieve impact. So, although some FTA research outputs were packaged as technological innovations, there were few discrete, stand-alone technologies such as an improved crop variety or post-harvest technique. Rather, FTA research operates in a systems context, interacting with and influencing multiple external actors and processes. Theoretically, such an approach appears to offer great potential to contribute to transformative change. However, because this approach is still new and because it is multidimensional, complex and often unique, it is important to know what works, how and why.



2.2 Funding model

The CGIAR research programs aim to bring an integrated strategic approach to CGIAR's work, with centralized funding for thematically focused flagship projects (FPs), which are organized within programs and work on high-priority issues. Since 2011 FTA's managing partners have invested considerable resources, including human power, in FTA, with close to USD 820 million of cumulative research contributions, about USD 170 m of which were CGIAR pooled resources (i.e. not specific project funding). A large proportion (about 80%) of FTA research funding was provided through bilateral projects, each with its own priorities, expectations, timelines, and reporting and evaluation requirements. These bilateral projects were organized within FPs, but inevitably resulted in some loss of coherence and integration.

2.3 Research evaluation in CGIAR

Research evaluation in CGIAR developed in a context that focused on technology. Much CGIAR research-based knowledge could be packaged and disseminated as improved crop varieties and other technologies. Impact could be assessed by measuring how widely a CGIAR-generated technology was being used, and by comparing productivity, efficiency, profitability and other parameters with what would have happened without the innovation. Consequently, there has been a strong emphasis in CGIAR on experimental and quasi-experimental impact assessment.

As the scope of CGIAR research has expanded to include more work on policy, institutions and complex natural resource management issues, and as the nature of the research has evolved to be more transdisciplinary, there has been a growing need for new approaches to evaluate this research. Experimental and quasi-experimental impact assessment is simply not appropriate for evaluating research contributions that target policy and institutional change and systems transformation (Deaton and Cartwright 2018; Belcher and Hughes 2020).

FTA research and other sustainability research operate in complex, emergent systems, at multiple spatial and temporal scales, and through multiple impact pathways. It would be unrealistic to try to evaluate individual pathways in isolation, and doing so would miss important contributions and synergies. A research project may simultaneously (co-)generate knowledge, enable and

support various stakeholders and other system actors, and influence policy discourse. The full range of influences is emergent and not fully known. Even if a similar approach is used in several different places, each case and context will be unique; that is, n=1. Experimental and quasi-experimental approaches require "large n" interventions (White 2010).

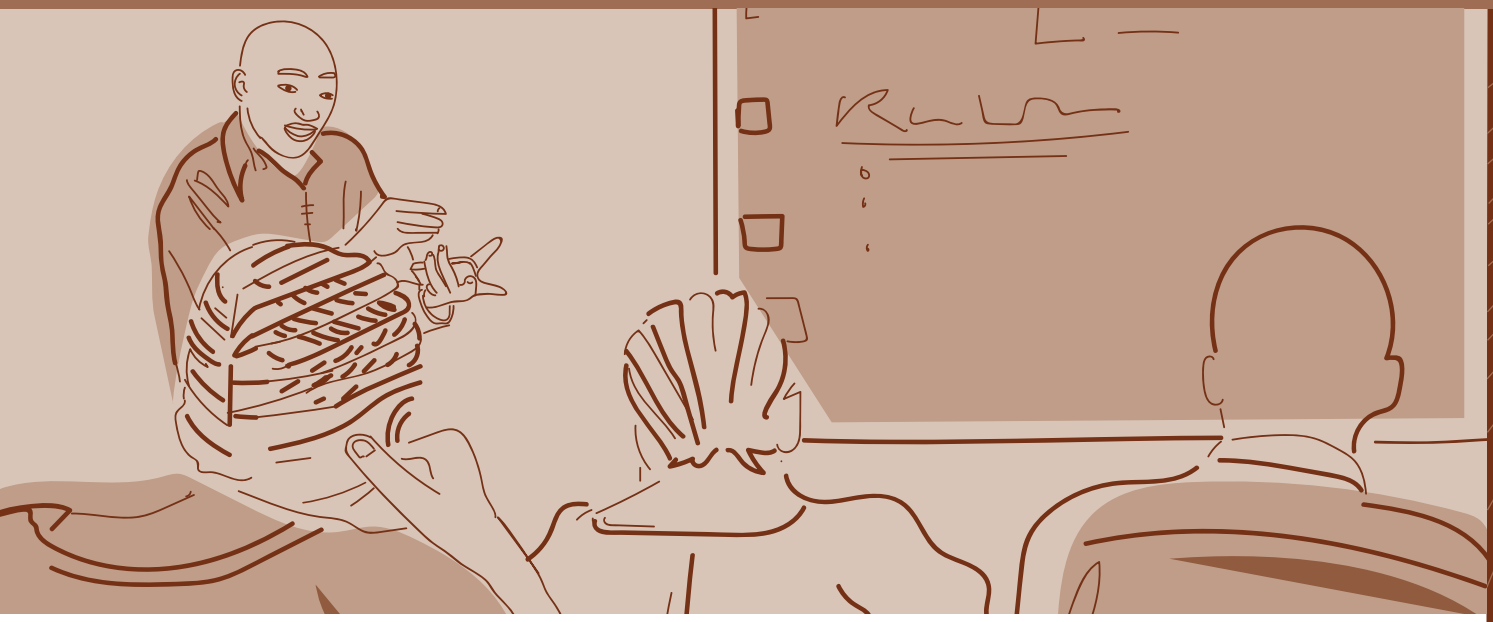
Impact assessment in CGIAR has been guided by the Standing Panel on Impact Assessment (SPIA), an external body of experts. SPIA has strongly supported rigourous, evidence-based approaches to research impact assessment. Panel members have focused primarily on the evaluation of technology-based innovations, with emphasis on the use of randomized controlled trials (Stevenson et al. 2018a). They recognize, however, that CGIAR research operates through multiple impact pathways and therefore calls for methodological pluralism:

> **"…impact evaluation and efficacy studies need to focus on causal relationships for which we have the greatest uncertainty and for which information would have the highest value. This suggests a greater focus on theory – away from searching for 'what works' in the abstract and toward finding out why certain things work and others do not in particular contexts […] It is less obvious how to make methodological breakthroughs on tracing policy influence or measuring the outcomes from capacity-building efforts, though the principle of independent theory-based evaluation should be prominent."**
>
> **(Stevenson et al. 2018b, 29)**

The same authors note that, in estimating the impacts of research for development: "[e]ven if one starts from the viewpoint that contributions to science and to capacity from the research process itself will be excluded, the challenges associated with estimating benefits from a research-based technology or other innovation are enormous" (Stevenson et al. 2018a, 3). They go on to point out that it is important to recognize these other kinds of contributions, but do not explore this important issue further. This acknowledges a substantial gap in CGIAR impact assessment methodologies.

Consolate Kaswera Kyamakya a PHD student examines a Four-Toed Elephant-Shrew (Petrodromus Tetradactylus) at the Yoko station laboratory, Yoko forest reserve, Democratic Republic of Congo

Photo by Ollivier Girard/CIFOR



3. FTA MELIA responses

3.1 Developing and testing theory-based evaluation

In the absence of a widely accepted and tested methodology for evaluating research for development, FTA set out to develop an approach. The process began with a series of workshops on Outcome Mapping (Earl et al. 2001) and Outcomes Theory (Duignan 2009), training scientists in the concepts and supporting the development of theories of change at the centre, program and project level. MELIA team members commissioned an evaluation of research by CIFOR and Centre de coopération internationale en recherche agronomique pour le développement (CIRAD) in the Congo Basin using Contribution Analysis. This was the first application of this method in CGIAR and one of few published examples of contribution analysis being used to evaluate research (Delahais and Toulemonde 2017). Team members also collaborated with the Overseas Development Institute (ODI) to develop, test and utilize a Rapid Outcome Assessment of REDD+ research (Belcher et al. 2020b). These activities helped build a base of experience and expertise in the MELIA team and among FTA research managers and scientists. The MELIA team built close links with the CGIAR Evaluation Community of Practice. FTA also developed a multi-year partnership with the Canada Research Chair Program in Research Effectiveness at Royal Roads University in 2013. FTA recognized this as a new and promising area of research with great potential to make major advances. These initiatives meant that the MELIA program had both research and evaluation functions.

3.2 Developing an outcome evaluation approach

FTA developed its theory-based outcome evaluation approach in a series of case studies (e.g. Belcher et al. 2019; Belcher et al. 2017; Claus et al. 2019; Halimanjaya et al. 2018; Ramirez and Belcher 2018, 2019). The approach drew on concepts and methods used in theory-based program evaluation, and on the more limited experience of theory-based research evaluation. The outcome evaluation approach conceptualizes research within a complex system, and explicitly recognizes the role of context, other actors and external processes. It uses a detailed, actor-centred theory of change (ToC) as its main analytical framework, and explicitly tests a set of hypotheses about the relationship between the research process/outputs and outcomes.

Outcome evaluations have five main steps:

1. document the project/program theory of change, including the key actors, intended outcomes and impacts, and the theoretical and context assumptions;
2. identify the data needed to measure or assess outcomes;
3. assemble available data from project monitoring, review of relevant documents, key informant interviews, focus group discussions and surveys to test whether intended outcomes have been realized and whether the intervention (research project) has made a contribution to those outcomes;
4. analyze and assess the project's theory of change against actual outcomes;
5. consider alternative theories/explanations for outcomes.

Evidence confirming that hypothesized outcomes have been realized supports the validity of the ToC. This evidence needs to be considered in conjunction with alternative explanations to assess whether the outcomes could have been realized in the absence of the project.

In addition to answering the question of "did it work," these assessments also investigate how and why outcomes and impacts occur or do not occur. Lack of evidence, or evidence of failure to achieve outcomes, triggers a deeper examination to determine the reasons. Intended outcomes may not be realized due to poor implementation, unforeseen circumstances/ changing context, or a faulty ToC. Outcome evaluations do not focus on accountability, because many outcomes and impacts have multiple contributing factors and may not be realized until many years after a research project has been completed. However, it is important to assess and document these achievements when they occur and improve understanding of how they occur.

FTA outcome evaluations are conducted as a collaboration between the MELIA team members and scientists working on the project in question. The scientists are actively involved in determining the assessment questions, methods and — depending on their interest and available time and resources —in data collection and analysis. This way, the evaluation can take advantage of the scientists' networks, understanding of context, and in-depth subject knowledge. It helps ensure that the evaluation asks the right questions of the right people. Moreover, this engagement helps achieve a stronger sense of ownership, understanding and learning for project scientists. A common criticism of participatory evaluation is that objectivity and rigour may be compromised. This risk is mitigated by having final analysis and reporting controlled by the MELIA team, and by the MELIA team reporting directly to the FTA Director.

A detailed explanation of the method, including a discussion of related approaches, is presented in Belcher et al. (2020a).

Lab work on the Afrormosia tree research, Yangambi, DRC.

Photo by Axel Fassio/CIFOR

ToC development during workshop

Photo by Rachel Claus

3.3 Outcome evaluations – case studies

The MELIA strategy emphasizes learning. Ex post outcome evaluations and impact assessments of the achievements of completed projects or sets of projects (grouped by theme, geographical region, time period, or portfolio) have four interrelated purposes:

- to develop and test assessment methods for policy and natural resource management research;
- to assess the effectiveness of FTA research in achieving intended outcomes, and eventual impacts, paying attention to both how and whether research contributes to change;
- to use the lessons learned from the assessments to design new and more effective research;
- to document FTA's achievements.

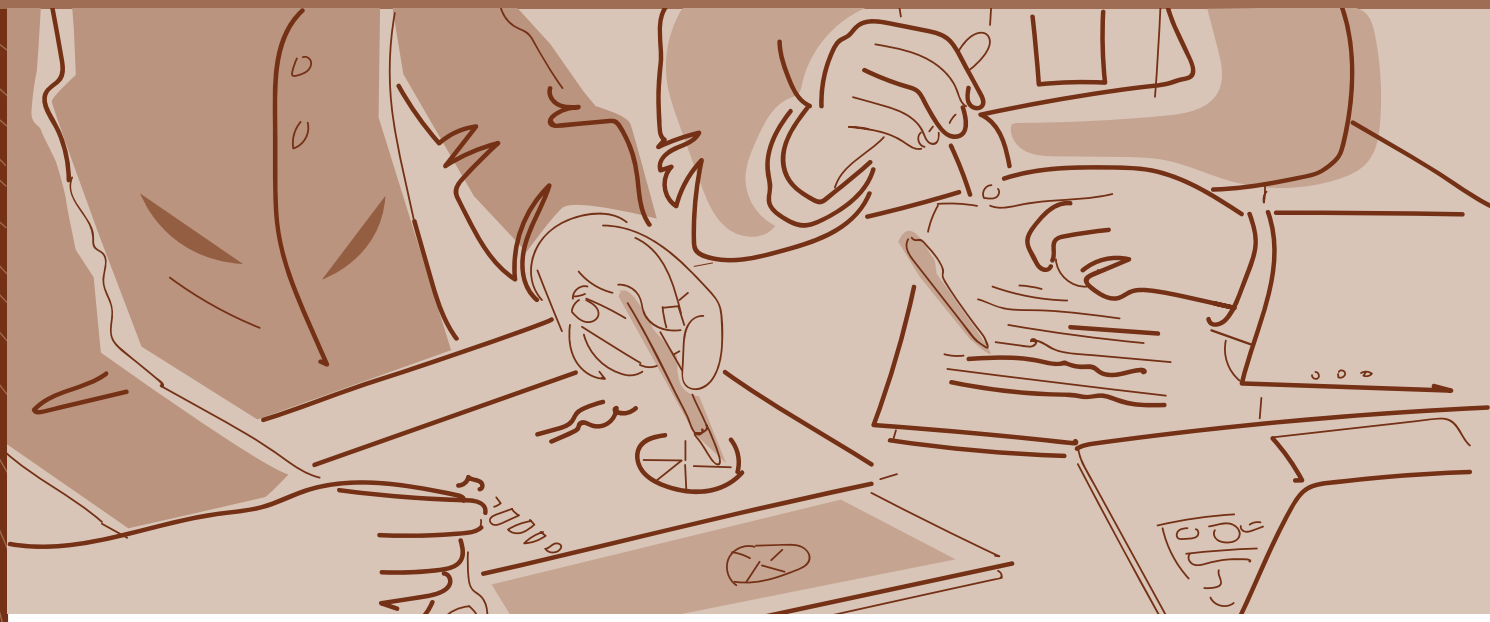
In addition to the REDD+ evaluation and the Congo Basin Contribution Analysis mentioned in 3.1, FTA conducted a series of ex post assessments using the outcome evaluation approach. Case studies included evaluations of the policy influence of research on trade-offs between timber harvesting and Brazil nut production in Peru (Ramirez and Belcher 2018, 2019); support to the Development of Agroforestry Concessions (SUCCESS) project in Peru (Claus et al. 2019); and Outcomes of the Sustainable Wetlands Adaptation and Mitigation Programme (Halimanjaya et al. 2018).

3.4 Outcome evaluation – composite ToC

Each of the outcome evaluations mentioned in 3.3 used a single-project ToC as its analytical framework. MELIA also pioneered an approach that uses a composite ToC to evaluate a portfolio of projects that are thematically related but separately managed. Such an approach is needed in contemporary sustainability research environments as goal-oriented initiatives gain ascendance. These initiatives include Grand Challenge programs in American universities (Popowitz and Dorgelo 2018), the Challenge Programs of the National Research Council of Canada (NRC 2021), and many decentralized research efforts designed to address aspects of the Sustainable Development Goals (SDGs). All of these efforts seek to address common goals without having shared management (Belcher and Hughes 2020; Bill and Melinda Gates Foundation n.d.; Popowitz and Dorgelo 2018).

FTA carried out a series of research projects on various aspects of oil palm production and management in Indonesia between 2015 and 2019. MELIA conducted an outcome evaluation on four of these projects (Davel et al. 2020) by developing a composite ToC based on the individual projects' ToCs. Team members expected that there would be overlap in some system actors across projects and that outputs and influences from projects would have some combined effect. The outcome evaluation followed the five steps outlined in 3.2, but it was substantially more demanding of time and resources than evaluations of single projects, with more, and more diffuse, impact pathways.

The evaluation found that the four projects being studied contributed to partially or fully realizing 18 of the 21 outcomes in the composite ToC. All intermediate outcomes were realized, except the intended influence on private-sector learning. Most end-of-project outcomes in each pathway were realized to some degree; targeted policy changes had begun at the provincial level (e.g., provincial regulation in East Kalimantan, Indonesia) and the international level (e.g. the Roundtable on Sustainable Palm Oil's consideration of gender in its criteria, indicators and guidance). The projects had also made some progress toward some higher-level outcomes, though most of these changes depended on factors and processes outside the portfolio's influence. Details of methods and results are published in Davel et al. 2020.



4. Assessing the FTA portfolio's integrated outcome evaluations

4.1 Integrated outcome evaluations

The composite ToC approach described in 3.4 was used to assess the overall FTA portfolio of work, considering a range of often inter-related research projects that address global and inter-connected challenges. Hundreds of projects have been implemented by FTA in diverse country contexts, geographies, policy environments and landscapes. MELIA focused its outcome evidencing and impact estimation work on five key global challenges identified in the CGIAR Strategic Results Framework (CGIAR 2016):

1. accelerating rates of deforestation and forest degradation;
2. high prevalence of degraded land and ecosystem services;
3. unsustainable land-use practices;
4. persistent rural poverty, with increasing levels of vulnerability;
5. rising demand for and need for nutritious food.

This integrated outcome evaluation aimed to generate a systematic overview and documentation of what FTA and its partner institutions have done, what they have produced, and what outcomes have been realized to address the challenges listed above. The evaluation also estimated the impact of FTA's work.

As a first step, MELIA team members mapped all completed and ongoing FTA-funded projects to one or more of the five global challenges. A comprehensive desk review and additional interviews with key scientists who were involved in these projects helped identify subsets of thematically and geographically related projects. These clusters of projects were modelled within each challenge's ToC.

The MELIA team developed cluster-level theories of change to articulate strategies and impact pathways related to a particular body of research. This established connections between research projects in the same cluster and between clusters. MELIA evidenced the main contributions to outcomes in terms of policy influence, practice influence, and research influence that were realized for each cluster. The strength of evidence for these contributions was systematically assessed, and knowledge gaps were identified.

Challenge-level ToCs were developed to illustrate how these various bodies of research and clusters contribute to a particular challenge. For Challenge 1, for instance, 11 clusters of projects were identified. The ToC for Challenge 1 (Figure 1) illustrates how FTA research and engagement efforts intend to generate new knowledge, attitudes, skills and relationships among key actors to address deforestation and forest degradation. These efforts do so through multiple pathways and multiple processes.

Lab work on the Afrormosia tree research, Yangambi, DRC

Photo by Axel Fassio/CIFOR

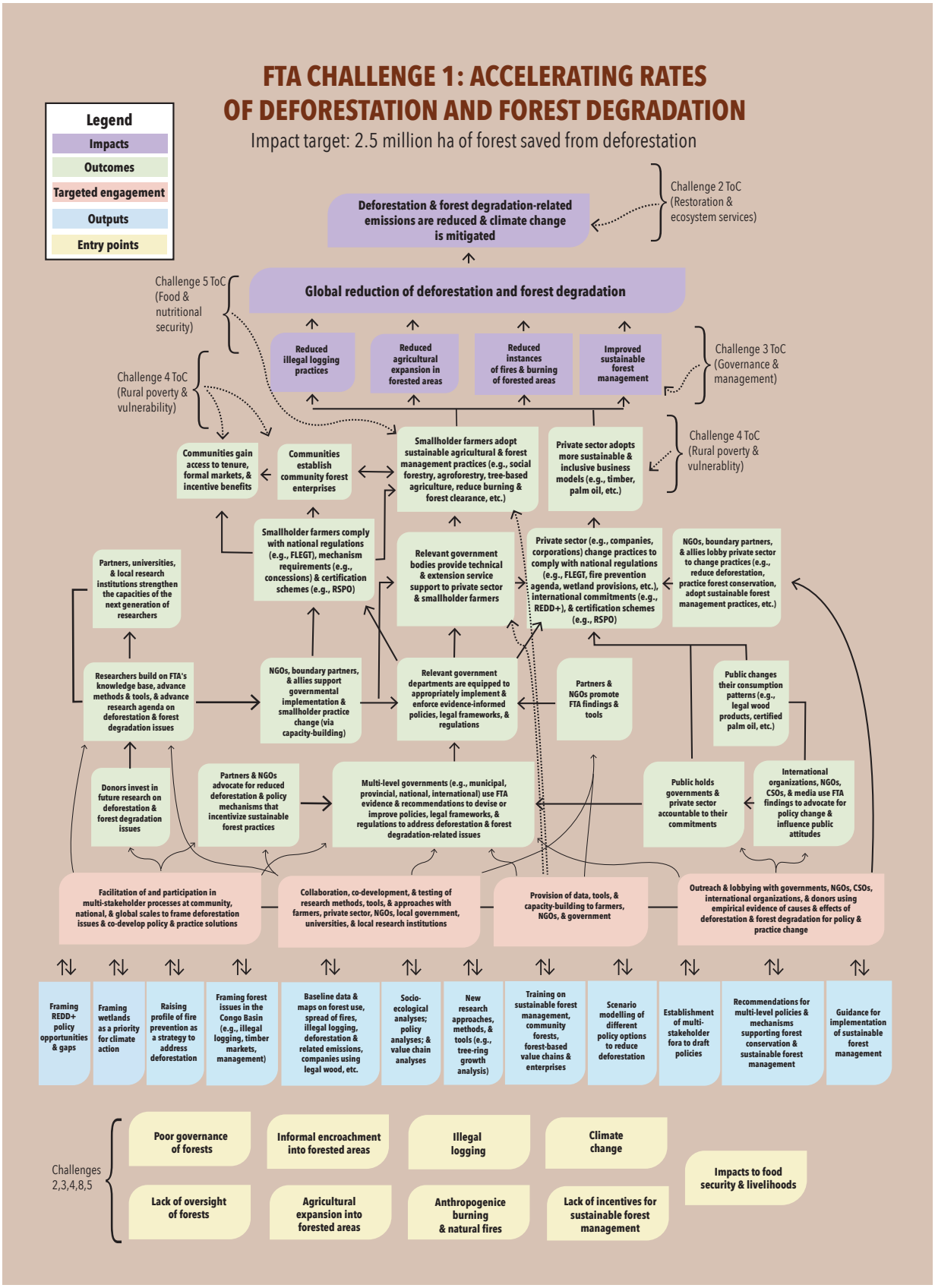


Figure 1. FTA Challenge 1

The MELIA team members used all available documentation to define and assess cluster-level and challenge-level ToCs. This helped identify where the evidence was strong and where additional evidence was needed to fill gaps. In parallel, a series of "deep dives" at the cluster level were designed to estimate the ranges of FTA impact at that level. These "deep dives" examined who changed and how, where an expected change happened, and how much change and impact FTA research has generated.[2]

Research on the Afrormosia tree, Yangambi, DRC.

Photo by Axel Fassio/CIFOR

[2] At the time of writing, the FTA Integrated Outcome Evaluation was still ongoing, and several "deep dives" were being implemented.

4.2 Preliminary results

The integrated outcome evaluation of the entire FTA portfolio documented the collective outcomes of sets of thematically related projects and in some cases estimated potential impacts. This created a systematic inventory of the entire body of FTA research and its multiple and diverse impact pathways, including international policy; national/subnational policy; private-sector policy/practice; individual practice; and the academic/research agenda. FTA has had substantial achievements in terms of realized outcomes along each pathway, as part of processes with realistic potential for impact at scale. See Figure 2.

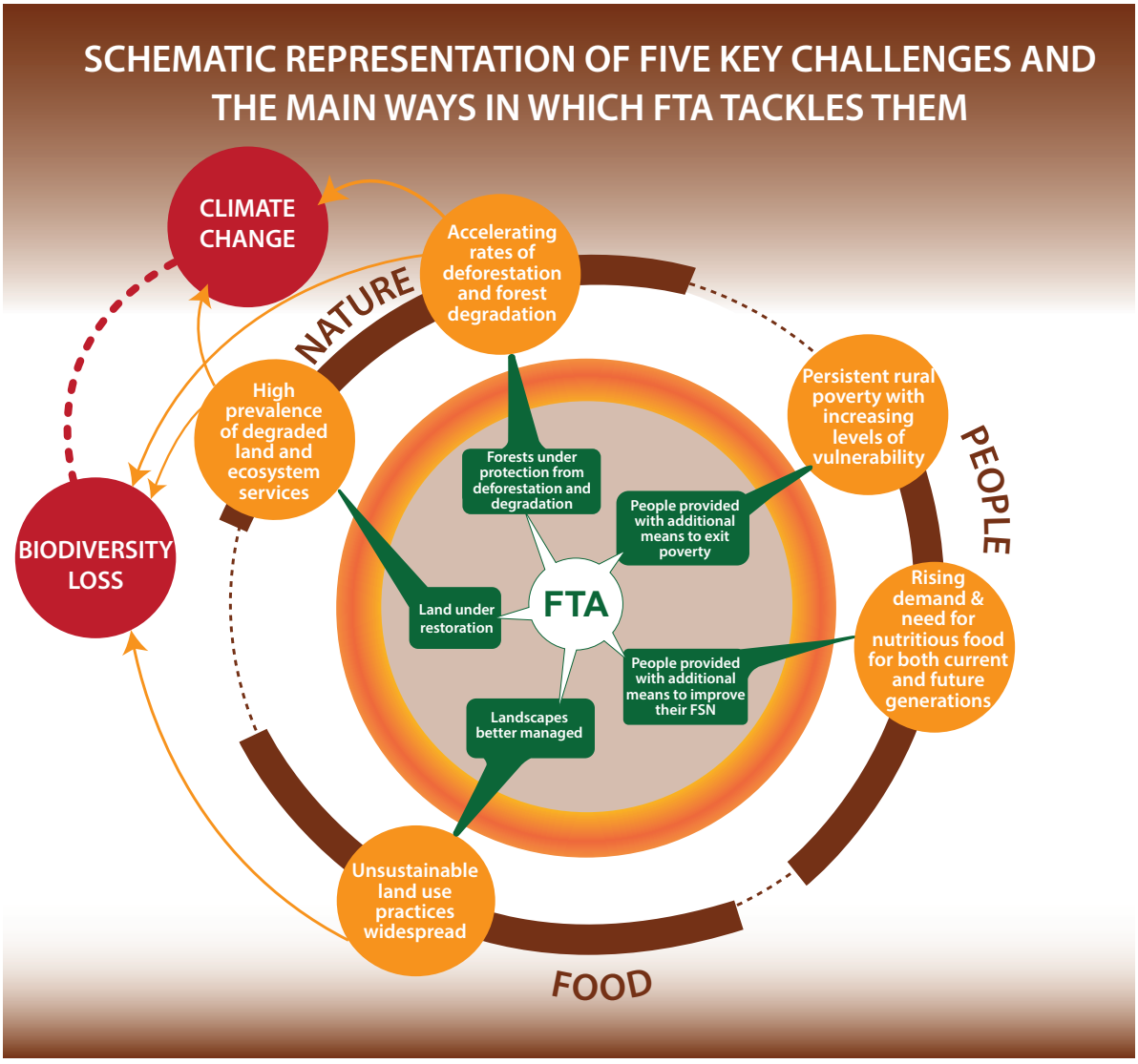


Figure 2. Schematic representation of five key challenges and the main ways in which FTA tackles them
Legend: Red = key challenges; FSN = financial safety net

In June 2021, the MELIA team members carried out a preliminary impact evidence exercise to estimate the range of possible impacts across the five challenges. This included an extensive review of existing evidence in project reports, internal and external evaluations, policy documents, research papers (more than 200 sources) for hundreds of projects, which was mapped to the challenges. Team members collected additional primary data through interviews with key scientists, government officials, donors, and other knowledgeable sources to fill gaps and validate early findings. The MELIA team estimated impacts for a subset of projects in a selection of countries where FTA had conducted research on and engaged with topics relevant to the challenges. Available figures for each project (i.e. number of hectares, number of people) were classified with both a lower (conservative) and upper (liberal) limit; sums of upper and lower limits per project resulted in the potential impact ranges. Key assumptions supporting these estimates were documented. This exercise yielded the preliminary findings outlined in 4.2.1; these will be further validated and confirmed in the upcoming FTA integrative study report.

4.2.1 Preliminary findings

As a result of the collective processes to which FTA research and engagement contributed in the countries assessed so far, the MELIA team evidenced the following preliminary findings for each challenge:

Challenge 1. *Accelerating rates of deforestation and forest degradation*

- between 25.7 million ha (lower limit) and 133.4 million ha (upper limit) of forests are under enhanced protection from deforestation and degradation;
- in these 133.4 million ha, estimated up to 125.4 gigatonnes (Gt) of CO_2 emissions may be avoided as a result of FTA's contribution to enhanced forest protection.

Challenge 2. *High prevalence of degraded land and ecosystem services*

- between 1.8 million ha (lower limit) and 34.4 million ha (upper limit) of land is currently under restoration;
- between 1.4 and 511.5 million metric tons of CO_2 emissions have potentially been sequestered as a result of collective restoration processes.

Challenge 3. *Unsustainable land use practices*

- between 59.5 million ha (lower limit) and 204 million ha (upper limit) of landscapes are better managed via improved policy mechanisms, monitoring systems, and adopted management practices on the ground.

Challenge 4. *Persistent rural poverty, with increasing levels of vulnerability*

- between 5.1 million people (lower limit) and 19 million people (upper limit) have directly or indirectly benefited, or have the potential to benefit from additional means to exit poverty or to reduce vulnerability of falling into poverty.

Challenge 5. *Rising demand and need for nutritious food*

- overall, between 1.12M (lower limit) and 3.43M (upper limit) people were provided with additional means to improve their food and nutritional security;
- 2.17 million disability-adjusted life years (DALYs) resulting from deficiencies in dietary iron and vitamin A could be saved per year through scaling up contextually suitable Food Tree Crops Portfolios (FTCPs) in the 12 African countries studied, with approximately 30,866 deaths per year among reproductive aged women (1,722) and children under five (29,144) potentially averted. The numbers DALYs saved range from 5,827 in Gambia to 800,056 in Nigeria.

5. Monitoring

Monitoring is a key element of FTA's adaptive, learning-oriented approach, from project level to program level. FTA has developed a set of monitoring tools for use at the project scale that are intended to be user-friendly and time-efficient. The tools help users collect a variety of information about the uptake, use, influence and outcomes of project work. These tools are designed to be used by research teams on an ongoing basis throughout the life of an activity. They facilitate systematic collection of data on engagement with stakeholders, knowledge generation and co-generation, uptake and use, and progress toward higher-level outcomes and impacts. Collectively, such data facilitate project reporting and provide a robust evidence base to test theories of change and demonstrate progress.

In addition, FTA has contributed to continuous collection and analysis of data against a set of standardized indicators developed by the CGIAR Monitoring and Evaluation Community of Practice. These indicators include the number of policies and innovations informed by FTA research as well as the program's contribution to a set of 10 aspirational system-level outcome targets.

While these indicators provide a framework in which CGIAR research programs (CRPs) could monitor their outputs and outcomes, the continuous changes in reporting requirements throughout the life of the CRPs and the strict requirements in terms of the evidence required to justify the inclusion of the results reported resulted in large transaction costs. With a decline in

the share of program-level CGIAR funding, researchers felt less motivated to invest the time needed to comply with these strict requirements, and although the FTA Management Support Unit provided extensive support during the reporting exercise, FTA's achievements were still under-reported in CGIAR's annual reports.

Scientists working on a study examining the impact of selective logging on Brazil nut productionau.

Photo by Marco Simola/CIFOR

6. Developing and testing quality of research for development (QoR4D)

In the context of research for development (R4D), it quickly becomes apparent that traditional academic definitions of research quality are insufficient. Effective evaluation of quality in research is critical for funding, management, ongoing development and advancement of research methods, projects and programs. Funders demand research excellence from the research organizations they support; research managers guide their programs in a way that will achieve excellence, and expect excellence from the programs, projects and individual scientists in their charge; scientists refer to their organizations' definitions and measures of research excellence in their own planning and research design strategies. But how to define and assess research quality is a continual challenge, particularly in a transdisciplinary context. Conventional research evaluation frameworks use criteria that are largely discipline specific (Tijssen 2003). Current approaches primarily evaluate individual researchers, programs and research units using publications, citations and peer assessment. Ongoing critiques of well-established evaluation criteria highlight the shortcomings and challenges of these conventional approaches. They tend to emphasize bibliometric and traditional discipline-specific peer-review criteria and undervalue the innovative advances and process contributions of transdisciplinary research (Nowotny et al. 2001; de Jong et al. 2011).

As part of an effort to build a broader definition of research quality, MELIA team members conducted a systematic review of literature that discusses the definitions of research quality and research excellence, and the principles and criteria for assessing the quality of applied, interdisciplinary, and transdisciplinary research. This was done as part of a broader set of FTA systematic reviews. The systematic review was organized around the question: What are appropriate criteria and indicators for defining and measuring the quality of transdisciplinary research in natural resource management? Team members recognized from the start that the question was broad for a systematic review, but asking the question brought rigour, objectivity and transparency.

CIFOR published the review protocol (Belcher et al. 2013), which provided a detailed explanation of the method, including search terms and inclusion/exclusion criteria. The review considered more than 19,000 titles, and ultimately included 38 papers for full review.

Few of the papers reviewed addressed the question in a comprehensive way; most touched on just one aspect and none provided a complete evaluation framework. The review protocol (Belcher et al. 2013) identified key themes and ideas and organized them as criteria within four main principles:

1. relevance (scientific and social);
2. credibility (mainly scientific, but including consideration of how disciplinary approaches were combined and of reflexivity);
3. legitimacy (mainly a social/political concept, achieved through transparency and engagement);
4. effectiveness (in terms of positioning the research for use).

Team members also developed a scoring rubric as part of a transdisciplinary research quality assessment framework (QAF). The review and framework were published in early 2016 (Belcher et al. 2016). The MELIA team subsequently applied and tested the framework in conjunction with a series of outcome evaluations of FTA projects (discussed above) and refined it on the basis of that experience.

The timing was good to contribute to a meeting organized by the CGIAR Independent Evaluation Arrangement on Science Quality in Rome in December 2016. MELIA team member Brian Belcher was then invited to join a working group of the Independent Science and Partnership Council (ISPC), which expanded the quality assessment framework to a Quality of Research for Development (QoR4D) framework. The resulting QoR4D

framework was therefore heavily influenced by FTA. The Director of FTA also participated in the working group, and as a representative of the CRP directors, worked to achieve the voluntary use of the framework across all programs. The QoR4D framework adopted the four principles used in Belcher et al. 2016 (ISPC 2017). The Independent Science for Development Council (ISDC) later developed QoR4D assessment criteria based on the QAF criteria (ISDC 2021). The QoR4D framework aims for coherence across the system by guiding and enhancing research quality at all levels, from strategies to specific research activities. It focuses attention on how research strategies and specific research questions are developed, defined and researched and how projects/teams are organized to perform all necessary functions. The QoR4D framework contributes to outcomes and impacts, puts learning systems in place for ongoing reflection and improvement, and assesses how and whether necessary support and facilitation functions are realized.

Members of Juaboso Community Resource Management Area (CREMA) in Western North region, Ghana participating in a theory of change workshop (2021)

Photo by George Wakesho/ CIFOR-ICRAF

7. Key lessons

7.1 Methodology

This substantial body of work and experience has generated valuable lessons about designing, implementing and evaluating research for development and about the contributions of FTA to development outcomes.

7.1.1 Theory of change

FTA began developing and using theory of change (ToC) for research planning, monitoring and evaluation from its inception. This included training and support for scientists through a series of workshops the life of the program. Hands-on, two- to three-day ToC workshops at the time of project inception have proven to be an effective way to encourage critical thinking, integration and collective visioning among team members and collaborators; facilitate co-ownership of the research process, and transparency of and accountability for results; identify and engage key actors at project/program boundaries; and understand the diverse roles in change processes. A ToC provides a framework and guide for project implementation, and for ex post evaluation.

The MELIA team developed several resources, including a ToC Toolkit,[3] Sample Facilitating Questions[4] and a set of templates, as well as the detailed description of the method in Belcher et al. (2020a).

[3] https://researcheffectiveness.ca/wp-content/uploads/sites/7/2019/08/Theory-of-Change-Toolkit.pdf .
[4] https://researcheffectiveness.ca/wp-content/uploads/sites/7/2019/02/Theory-of-Change-Facilitating-Questions.pdf.

Team members learned the value of having nested ToCs. An FTA-scale ToC, which is required as part of CRP proposals, is useful for developing and communicating overall program strategy. However, a ToC at the program scale needs to encompass multiple projects, so detail is necessarily limited. Therefore, more detailed ToCs are required at the sub-program scale (e.g. sets of closely-linked projects) and project scale. At the project scale, it is possible to precisely specify outcomes to guide planning and evaluation.

Developing a ToC is just a first step. Some projects, but certainly not all, used their ToCs to actively monitor progress and adapt accordingly. Those that did seemed to achieve better results (Belcher et al. 2019; Davel et al. 2020).

Nevertheless, some researchers still treat ToC development as a bureaucratic exercise. And, even if researchers appreciate the value of the ToC development process, they tend to lose sight of the ToC during project implementation, as other demands and looming deadlines take their attention. Relatively few projects have fully incorporated ToC into project management. More work will be needed to build capacity to use ToC to guide and support progress monitoring and adaptive management. This will need to be supported by research funding models that require a ToC and evidence of periodic reflection and adjustment as needed.

There is also potential to increase the strategic planning and analytical value of ToCs through improved contextual analysis. Many ToCs still start from a program-centric perspective, not paying adequate attention to the many other actors and processes (including other CGIAR programs!) that are currently operating and that may contribute to, or hinder, the change the program is working for. Recognizing and incorporating such relevant elements of the system into planning and implementation can lead to quicker and more pronounced results.

There is also large scope for improved use of social theory in research theories of change. Ultimately, the transformations that FTA and other R4D programs are trying to achieve must work through social systems. Progress in fields such as psychology, behavioural economics, sociology and other social sciences helps people understand, predict and influence human behaviour. Using relevant social theory, and making it explicit in theories of change, will help test the social theories and make learning about how research contributes to change more systematic and scientific.

7.1.2 Research quality appraisal

The Quality Assessment Framework (QAF) is intended to support the design, implementation and assessment of research by researchers, research managers, research evaluators and funders. There is great interest in the topic. The original paper that presented the transdisciplinary research (TDR) quality assessment framework (Belcher et al. 2016) has been cited more than 140 times and has influenced research assessment in CGIAR and in other research organizations. Within FTA, the framework has been used in conjunction with outcome evaluations to characterize project design and implementation (i.e. the degree to which the project reflected QAF principles and criteria), to allow participants to assess the relationship between project design and implementation and outcomes. As discussed in 3.3, in the case studies, projects that satisfied more of the QAF criteria had more and broader outcomes (Belcher et al. 2019). However, to date, the framework has not been used systematically to guide FTA research design.

Testing the framework in the FTA case studies identified scope for improvement in its criteria, definitions and scoring procedure. In the meantime, new literature has been published on research quality assessment and transdisciplinary theory (e.g. Norstrom et al. 2020; Nagy et al 2020). The next step in this work will be to review experience with the QAF and the new literature on research evaluation and social change theory, as a basis for revising and publishing an improved QAF, and to apply and test it in support of project design.

7.1.3 Outcome evaluation approach

The current outcome evaluation approach provides a logical and systematic way to assess the influence and outcomes of FTA work along multiple impact pathways. The ToC is treated as a set of hypotheses throughout the change process. These hypotheses are tested empirically using data from document reviews, surveys and interviews with key informants to assess actual outcomes against expected outcomes at each stage of the ToC.

The outcome evaluation approach helps to understand qualitative changes along multiple impact pathways, and so is well suited for research for development, or any problem-oriented research operating in complex systems. The approach considers and tests competing hypotheses for how a change may have happened in lieu of true counterfactual analysis. It involves project scientists and partners in the process of documenting and assessing the ToC,

which enhances co-learning while helping ensure accurate interpretation. Outcome evaluations provide evidence of the scope and scale of qualitative changes and change processes in the overall effort to address program challenges. They answer the question: who is doing what differently as a result of the research?

There are limitations to the approach, as discussed in Belcher et al. (2020a). One of the main challenges in the completed case studies was documenting the ToC after project completion. This challenge will be reduced as more projects develop explicit ToCs as part of their design, and use those ToCs in project management.

Research on the Afrormosia tree, Yangambi, DRC.

Photo by Axel Fassio/CIFOR

7.2 Change mechanisms

Research uses a wide range of mechanisms to contribute to outcomes and impacts. As a research organization, FTA's primary focus is on knowledge contributions. Projects provide theoretical and empirical analyses of problems and potential solutions, and evidence-based recommendations for improved policy and practice, as well as advancing theories and methods. Many projects also provide important contributions to social processes, building social and scientific capacity, encouraging and influencing discourse, and facilitating negotiated solutions. In addition to the research itself, projects support network development and, importantly, influence research agendas such that other researchers and research organizations pay attention to FTA priorities. In some projects, these social process contributions were as important or more important than the knowledge contributions.

Notably, projects with more transdisciplinary research elements (that is, projects that satisfied more QAF criteria) displayed a broader range of contributions to both knowledge and social processes. Engagement with the problem context, effective communication, and genuine and explicit inclusion of key actors are critical to success. By leveraging diverse contributions and mechanisms, projects have greater potential for influence across more impact pathways. Deliberate and systematic planning and management for outcomes using a theory of change approach can help facilitate learning to improve research practice.

7.3 Research design

In individual outcome evaluations, most FTA projects realized many of the end-of-project outcomes in their ToCs, and there were good indications of higher-level changes in progress. However, these end-of-project outcomes tend to be relatively limited in both magnitude and scope, with relatively few individuals/organizations influenced. There are several ways that research-for-development projects and programs can be designed and implemented to improve their effectiveness.

The idea that a research organization such as FTA is co-responsible for outcomes puts needed emphasis and attention on who will use the outputs of research and how these outputs will be used. Outcome evaluations of FTA research found that members of research teams can have very different understandings of the purpose and strategy of the program they are working on. Likewise, research users can have highly differentiated perceptions of

the value and the influence of research. Many different factors influence whether research has an influence on policy and/or practice. MELIA's work on research quality has helped show the importance of understanding context and of defining research problems and research questions appropriately. Effective research for development must address issues that are relevant to research users. The research process has to be perceived both as credible scientifically and as legitimate, in the sense that it represents the values and interests of those affected. Research needs to be delivered in a way that will inform, facilitate and support the change process. The process cannot end with delivering scientific outputs. In the change process, perceptions of the reputations of research organizations and researchers influence how research gets used. Designing research in a way that intended contributions are made explicit and testable increases the likelihood and the magnitude of positive outcomes. It also improves researchers' ability to gather evidence and assess and communicate outcomes and impacts for enhanced accountability, and improves their ability to learn from experience.

7.4 From Sentinel Landscapes to place-based research

The original FTA proposal of 2011[5] foresaw the creation of a network of Sentinel Landscapes, with an objective to generate data to support the testing of hypotheses on drivers and impacts of land-use change, as well as approaches to mitigate threats and maximize benefits, both for environmental resilience and for poor people. Sentinel Landscapes would also provide an instrument for integrating research and impact pathways, while building and benefitting from potential synergies across the entire program.

In 2014, an external independent evaluation of FTA (CGIAR-IEA 2014) acknowledged the importance of Sentinel Landscapes, but concluded that, due to extensive cuts to CGIAR's pooled funding, the level of funding dedicated to Sentinel Landscapes was insufficient to guarantee ongoing tracking of even a core set of indicators over many years. The evaluation noted that the eco-regional public goods produced by this type of research could materialize only if uninterrupted long-term data collection under the same protocol was guaranteed. The evaluation recommended that the Independent Steering Committee reassess the relevance and financial sustainability of the current set of Sentinel Landscapes and adapt the entire approach to them accordingly. In response to this recommendation, a science

[5] https://cgspace.cgiar.org/bitstream/handle/10947/3642/5.%20fc4_crp6_report.pdf?sequence=1&isAllowed=y.

workshop on place-based research[6] was organized in 2017, with the objective of understanding how to bring Sentinel Landscapes forward in Phase 2 of the FTA program. A series of case studies (Sonwa et al. 2021) were conducted to synthesize the work conducted in selected Sentinel Landscapes. A subsequent workshop, held in 2018, made a series of recommendations on options for the way forward in the context of severe funding constraints, and of diverse local contexts in the different Sentinel Landscapes. In particular, the workshop participants concluded that FTA should build a vision of placed-based, people-focused research; that this should rely on a framework to incentivize, facilitate and organize the integration of place-based research; and that the data collected in the Sentinel Landscapes could be used in building the framework, including a review of the potential of each Sentinel Landscape to remain an element of the framework.

7.5 Organizational structure

The FTA program benefited from the recognition by its governance and management that effectively implementing Monitoring, Evaluation, Learning and Impact Assessment requires significant time and financial resources. This recognition meant that the FTA MELIA function had two advantages. First, it had a dedicated budget, which was protected from the fluctuations and extensive cuts in CGIAR's pooled funding. This in turn meant that the MELIA team could conduct research and evaluations with a high degree of independence. In the last two years of the program this also made possible the planning and execution of large studies to estimate the impact of FTA, which could be planned according to a two-year workplan.

The second advantage was that the program reported directly to the FTA Director. In the first phase of the FTA program, the MELIA coordinator shared time between the lead centre and FTA and therefore had dual reporting lines (to the CRP Director and to the CIFOR Director General). Gradually, during the second phase, a dedicated position for the MELIA coordinator was established in the FTA Management Support Unit, reporting to the CRP Director.

The MELIA team members also benefited from extensive guidance and support from the Independent Steering Committee, which is responsible for the strategic programmatic oversight of the program. The committee closely followed the development of the integrated outcome evaluations and provided guidance during the entire process.

[6] Minutes of the workshop are available at https://www.foreststreesagroforestry.org/wp-content/uploads/pdf/workshop/docs/science/FTA%20science%20workshop2017-draft%20proceedings-sent%20participantsFinalclean.pdf.

7.6 Future directions

Although the Forests, Trees and Agroforestry program is coming to an end in 2021, new, innovative, large-scale, and long-term research and engagement initiatives are being conceptualized and designed at CIFOR-ICRAF, with partners. Lessons learned from the monitoring and evaluation of FTA are very relevant to such initiatives, which share several similar characteristics with FTA. For example, Transformative Partnership Platforms (TPPs) are alliances that focus on one critical issue and can deliver substantive results (CIFOR-ICRAF 2021). They operate at multiple sites and are supported by both implementation partners and funding partners. The potential of several TPPs — on issues ranging from agroecology and transformative landscape restoration to REDD+ — is still being assessed. In parallel, an Engagement Landscape is another concept that shares similar characteristics with TPPs but is much more context-specific; carrying out concentrated and long-term, place-based work in specific geographies. Engagement Landscapes on cocoa in Ivory Coast and drylands in East Africa (CIFOR-ICRAF 2021) are examples being explored. Some FTA Sentinel Landscapes could lead the way to being successful Engagement Landscapes. Other partners of FTA have similar set-ups, such as CIRAD's "platforms in partnership" (CIRAD 2021), which are also issue-based and place-based. To be successful and generate evidence of transformative results and impact, it is critical that both TPPs and ELs work with specific theories of change nested in the composite CIFOR-ICRAF ToC. As partners look to the next steps for the FTA partnership post-2021, it is critical to set up a MELIA system early on and allocate sufficient resources to its implementation. This will allow CIFOR-ICRAF and partners to capture, track and communicate performance against their respective ToCs, allowing the initiatives to expand and develop.

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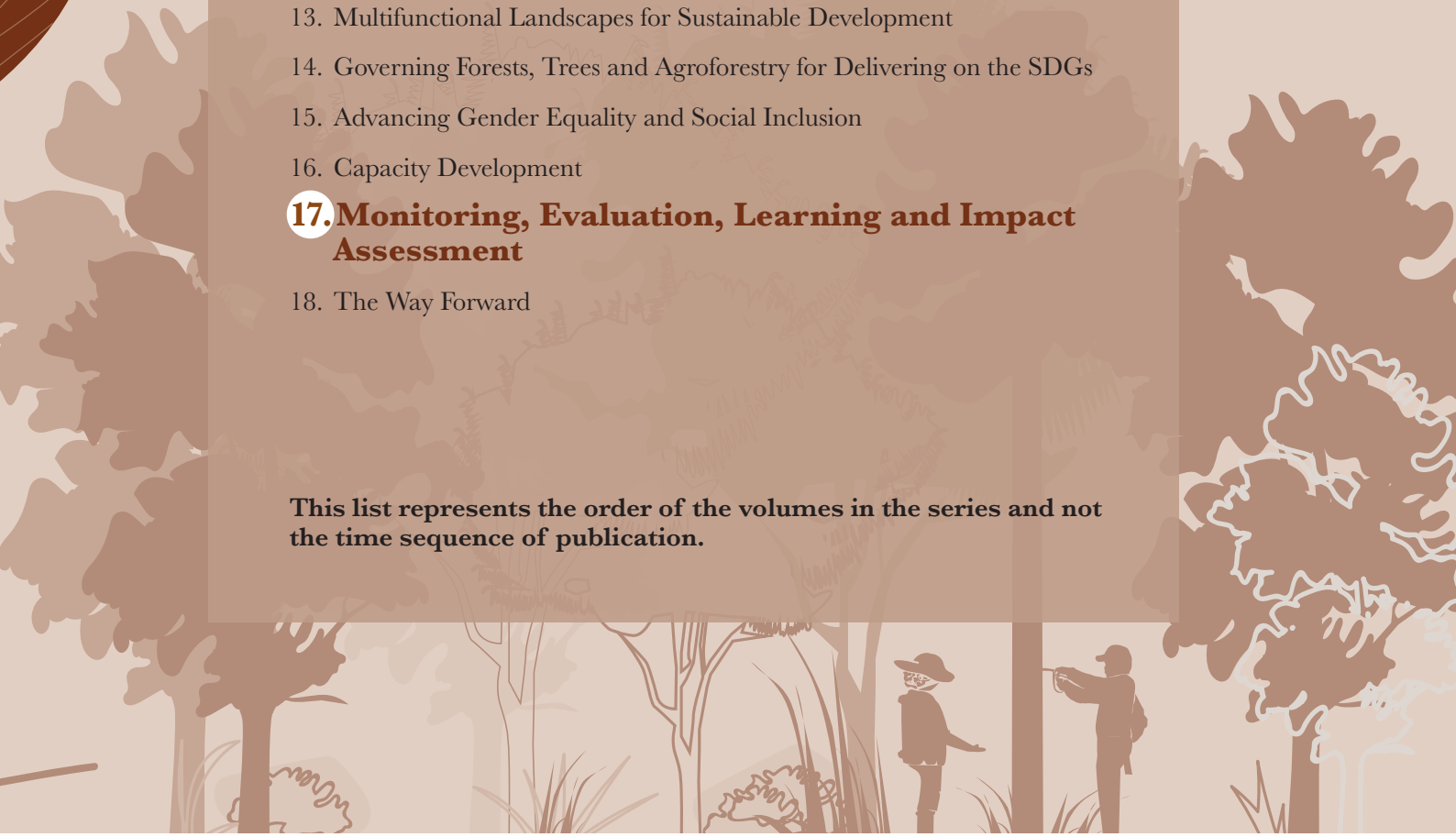

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2011-2021

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