CGIAR Research Program

Forests, Trees and Agroforestry
Livelihoods, Landscapes and Governance

Executive Summary

The challenge

Forests are cut, temperatures rise and biodiversity is lost. The poor become poorer and indigenous cultures disappear. With the rise in temperatures, fires increase, droughts lengthen, floods spread, and pests and diseases affecting livestock and plants adapt and multiply. What many are calling a "perfect storm" gathers strength and the impact rolls across the developing world from the forests to the farms to the atmosphere. The first and hardest hit are the poorest people who eke out a living on formerly forested lands, or farm dry cereals on degraded and rain-fed lands where the margins for error are slim to none. Next hit are the irrigated areas where floods and drought combine to silt or empty reservoirs; and farmers who plant highly targeted crop varieties struggle to adapt. The incomes and livelihoods of the world's poorest people spiral downward.

Vision

To reduce poverty and hunger, improve human health and nutrition, and enhance ecosystem resilience through high-quality international agricultural research, partnership and leadership.

Strategic Objectives

Food for People: Create and accelerate sustainable increases in the productivity and production of healthy food by and for the poor.

Environment for People: Conserve, enhance and sustainably use natural resources and biodiversity to improve the livelihoods of the poor in response to climate change and other factors.

Policies for People: Promote policy and institutional change that will stimulate agricultural growth and equity to benefit the poor, especially rural women and other disadvantaged groups.

Source: CGIAR. 2010. A strategy and results framework for the CGIAR. Available at www.cgiar.org/changemanagement /pdf/cgiar_srf_june7_2010.pdf .

This scenario stems in large measure from the poor management of our forests, trees and wild genetic resources. Despite decades of research and development efforts to reverse deforestation, forest degradation and biodiversity loss, these trends continue at an alarming rate. During the time it takes to read this case for investment, as much as 3000 hectares of natural forests and tree cover will disappear, along with the biodiversity they embrace, a loss of almost 13 million hectares annually. Deforestation and land use change contribute 12–18% of the world's total annual carbon emissions accelerating global warming.

Natural forests form a dwindling part of a finite land area where conversion to agriculture poses the greatest threat in the developing tropics. Adjacent or newly cultivated cropland may retain remnant trees or accommodate natural tree regeneration. However, these are insufficient to provide the environmental goods and services formerly coming from intact forests. And while conversion of forest to agriculture can in some cases improve rural incomes, all too often deforestation leads to impoverishment of both ecosystems and communities.

Such outcomes are overwhelmingly the result of governance failures at landscape, national and global scales. Such governance failures are typically manifested through such factors as unclear land tenure or insecure access rights to resources; poorly regulated extraction, trade and investment regimes; nonexistent or inchoate land use planning; a growing propensity for land grabbing; perverse incentives; exclusion of poor, often indigenous, people from decision-making processes; and

weak law enforcement. Individually or collectively, these factors contribute to the loss of forest and tree cover, the progressive depletion of tree genetic resources and biodiversity, and the unequal distribution of economic and social benefits from forests, trees and agroforestry systems.

Deforestation and degradation cause the loss of more than just the biodiversity, products and environmental services that forests and trees provide—carbon sequestration, stabilization of soils, adaptation to the destructive effects of rising temperatures or a simple, peaceful retreat. Failure to optimize land use means we are squandering an opportunity to improve the livelihoods of more than a billion of the world's poorest people, as well as the national balance sheets of developing countries. More than US$3 billion a year is lost in illegal logging in Indonesia alone. Forests and trees conservatively provide US$250 billion in the various types of income—timber, fuelwood, food, medicines and non-forest tree products—from these resources. However, this amount could be much higher and could also be sustainable for generations to come.

Studies show that people living in or near forests earn on average about 25% of their income from forest resources; this amount could be much higher with multiple-use management approaches that target all the potential sources of income from forests, trees and environmental services, instead of the prevailing narrow focus on the extraction of a few valuable tree species. The potential of payments for environmental services (PES)—and specifically reducing emissions from deforestation and degradation (REDD+)—as sources of revenue for rural forest stewards remains barely tapped. Trees on farms offer tremendous potential to increase rural incomes. Roughly

10% of the world's tree cover is found on farms—and the rate is increasing—making an important contribution to climate mitigation and adaptation. In developing countries, agroforestry systems provide essential fodder and non-timber forest products, and contribute significantly to the revenues of women-led households. Wild tree species have the potential to play a critical role in improving livelihoods on small farms. Nevertheless, most extension agents do not receive training in agroforestry techniques and most wild tree species are not yet adequately conserved. If extension agents were so trained, if wild tree species were classified and cultivated to preserve and improve their sustainable productivity, and if access to markets for tree products were enhanced, then income from trees on farms could be vastly increased.

The world requires a well-planned, well-resourced and long-term effort to improve the management and governance of our remaining forests, to reduce conflicts over disputed lands, to increase the input of women and marginalized communities and to derive more value from trees deliberately cultivated in agricultural and forest-adjacent lands. In the absence of that effort, those people who depend on forests and trees for their livelihoods will be left to become even further impoverished, and climate change will continue to warm the world.

What is needed now to answer this challenge is a new approach to research—more strategic, more targeted and more collaborative. It must be ambitious and far reaching. It must be driven by innovation, by new methods, by new partnerships and by more capacity. The time it takes to move from science to impact must be slashed. Time is not a friend of forests and trees.

A new research approach

In response to the urgency of the challenge described above, four centers within the Consultative Group on International Agricultural Research propose the *CGIAR Research Program No. 6: Forests, Trees and Agroforestry: Livelihoods, Landscapes and Governance* (CRP6). This initiative brings together four of the world's leading research centers in their respective subjects—the World Agroforestry Centre, CIFOR, CIAT and Bioversity—together with their partners, data, resources and experience and channels them toward a clear objective: enhancing the management and use of forests,

agroforestry and tree genetic resources across the landscape from forests to farms.

CRP6 is designed to make a significant contribution toward the vision and strategic objectives articulated in the CGIAR's Strategic Results Framework (see the box below) by:

1. enhancing the contribution of forests, agroforestry and trees to production and incomes of forest-dependent communities and smallholders;
2. conserving biodiversity, including tree genetic diversity, through sustainable management and conservation of forests and trees;
3. maintaining or enhancing environmental services from forests, agroforestry and trees in multifunctional and dynamic landscapes;
4. reducing emissions of greenhouse gases and augmenting carbon stocks through better management of forest- and tree-based sources while increasing local and societal resilience through forest-, agroforestry- and tree-based adaptation measures; and
5. promoting the positive impacts and reducing the negative impacts of global trade and investment as drivers of landscape change affecting forestlands, agroforestry areas, trees and the well-being of local people.

Innovation is central to CRP6, from design to execution, from the way we choose our partners to the way we communicate. CRP6 represents cutting-edge approaches that incorporate global comparative research with an extended time horizon (both backward and forward to better understand trends), across scales, ecological systems, landscapes, institutions, sectors of society and disciplines. We will develop sophisticated tools, approaches and frameworks to support our research, to test interventions and to assess and define policy options and scenarios. We will further share our knowledge and data to achieve high impact. Implementation of CRP6's innovative approaches to impacts will move the collaborating CGIAR centers and their key partners beyond "business as usual", opening up new opportunities for integration and synergy among themselves and with other partners, within the larger geographic, environmental and social domain relevant to forests and trees.

The framework

Forests occur under varying geographic, edaphic and climate regimes ranging from the boreal regions to the tropics; estimates suggest almost 560 (68%) of the terrestrial ecoregions around the world can be identified as forests and woodlands. Trees, however, are not limited to such habitats; they are an important element in many other systems including agricultural landscapes, grasslands, steppes and deserts. This ecological diversity, along with the considerable cultural and socioeconomic variation in the people that live in and around forests and otherwise depend on forests and agroforestry, makes their management and use complex, requiring a broad diversity of research strategies.

At the same time, we know that historically, forested countries have experienced phases of decreasing and then increasing forest area, with changes in both type and amount of tree cover in landscapes, as illustrated in the below. The progress of a country or region along this **forest and land use transition curve** has tended to track demographic change and economic development.

However, this curve is also useful for describing spatial variation across contemporary landscapes. As illustrated in the figure below, the research components of CRP6 together address land use management challenges across the range of variation. CRP6 is thus framed to carry out research along the continuum from relatively undisturbed forest to intensively farmed agricultural land. The continuum provides a useful integrative and analytical concept given that strategies and approaches may vary in a consistent way across the landscape.

CRP6 research will focus on areas where local people depend on resources from forests and agroforestry for their livelihoods, where forests that are important for carbon sequestration or other environmental services are under severe pressure from timber extraction or conversion to other land uses and/or where forests are projected to be severely affected by climate change.

A range of drivers impact the pace of change along the curve, and the extent to which these affect environmental services and livelihood benefits or deficits depends primarily on how they are governed.
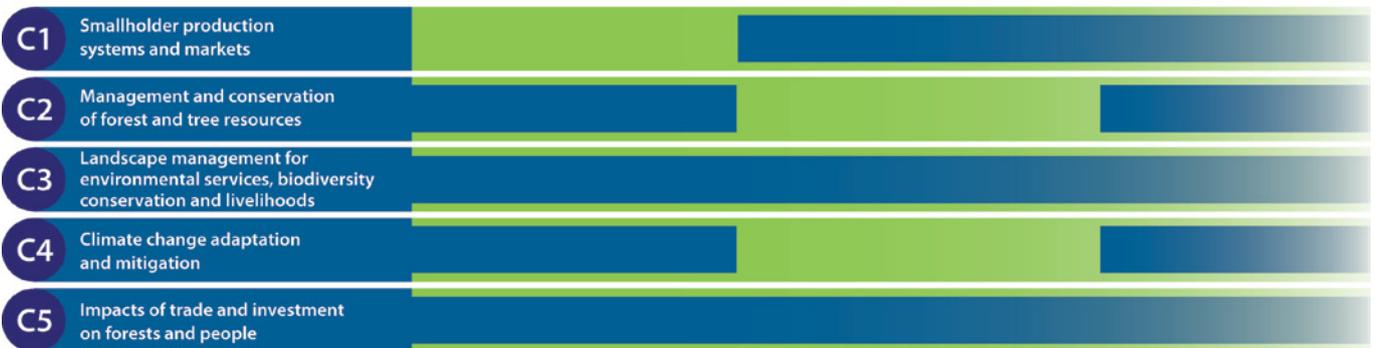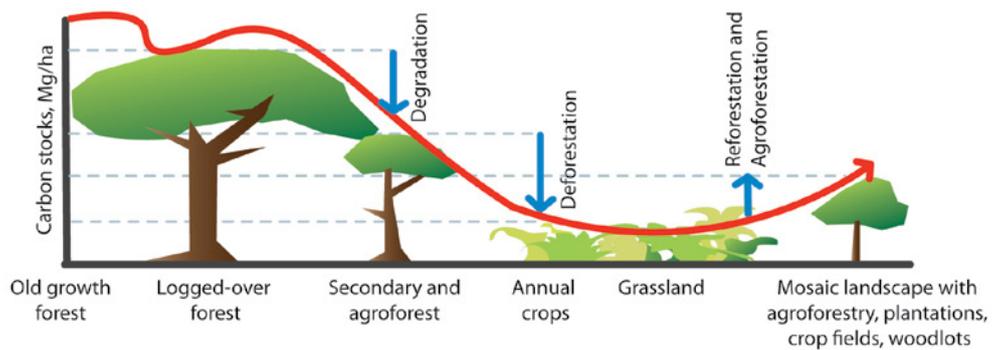
CRP6 components within the forest and land use transition curve

Another innovation will be the focus of much CRP6 research on "sentinel landscapes". Such research will support the collection of the long-term data sets necessary to understand the drivers and impacts of land use change. Sentinel landscapes will also provide excellent locations to foster dialogue among various stakeholders and to test models, thus facilitating consensus on contentious issues such as the sustainable exploitation of a disputed natural resource. They will also offer opportunities to implement experimental design to measure the uptake of research results and for overall impact assessment. Finally, sentinel landscapes will provide global focal points for multidisciplinary research; they will also provide spaces for engagement with the broader suite of researchers, development efforts and stakeholders working in rural areas, including other long-term site-specific research efforts being undertaken within the broader CGIAR network.

The research portfolio

After extensive consultation with partners and stakeholders, we have identified **five components** that will form the core of the CRP6 research and impact strategies. The five CRP6 components are designed to deliver distinct but interlinked outcomes across the forest and land use transition curve, which together will generate a common set of impacts. Through carefully articulated impact pathways, our research will be oriented to produce measurable and significant outcomes and impacts—globally, regionally and locally. A summary of each component is presented below.

1. Smallholder production systems and markets. Key research themes:
   - Enhancing productivity and sustainability of smallholder forestry and agroforestry practices, including food security and nutritional benefits, through better management of production systems
   - Increasing income generation and market integration for smallholders through utilization of forest and agroforestry options
   - Improving policies and institutions to enhance social assets and to secure rights to forests, trees and land

2. Management and conservation of forest and tree resources. Key research themes:
   - Understanding the threats to populations of important tree species and formulating effective, efficient and equitable genetic conservation strategies

   - Conserving and characterizing high-quality germplasm of high-value tree species along the forest-to-farm gradient
   - Developing improved silvicultural and monitoring practices for the multiple-use management of forest ecosystems
   - Developing tools and methods to resolve conflicts about distribution of benefits and resource rights in the use of forests and tree resources

3. Landscape management for environmental services, biodiversity conservation and livelihoods. Key research themes:
   - Understanding drivers of forest transition as a prerequisite for their management
   - Understanding the consequences of the forest transition for environmental goods and services and livelihoods
   - Enhancing response and policy options to sustain and maximize environmental and social benefits from multifunctional landscapes

4. Climate change adaptation and mitigation. Key research themes:
   - Harnessing forests, trees and agroforestry for climate change mitigation
   - Enhancing climate change adaptation through forests, trees and agroforestry
   - Understanding the role of forests, trees and agroforestry in achieving synergies between climate change mitigation and adaptation

5. Impacts of trade and investment on forests and people. Key research themes:
   - Understanding the processes and impacts of forest-related trade and investment
   - Enhancing responses and policy options to mitigate negative impacts and enhance positive impacts of trade and investment

Pathways to impact

CRP6 will embed its core research activities in specific **impact pathways** for each component, explaining how research outputs will lead to outcomes and ultimate impacts. Research will result in increased awareness and understanding among key stakeholders, practitioners and policymakers of the problems and opportunities for improving technical practices and developing more appropriate and effective policies and governance mechanisms that deliver real-world impacts.

Themes

Component 1

- Enhancing productivity and sustainability of smallholder forestry and agroforestry practices, including food security and nutritional benefits, through better management of production systems
- Increasing income generation and market integration for smallholders utilization of forestry and agroforestry options
- Improving policies and institutions to enhance social assets and secure rights to forests, trees and land

Component 2

- Understanding the threats to populations of important tree species and formulating effective, efficient and equitable generic conservation strategies
- Conserving and characterizing high quality germplasm of high value tree species in the forest to farm gradient
- Developing improved silvicultural and monitoring practices, for multiple-use management of forest ecosystems
- Developing tools and methods to resolve conflicts about distribution of benefits and resource rights in the use of forest and tree resources

Component 3

- Understanding drivers of forest transition as a prerequisite for their management
- Understanding consequences of the forest transition for environmental goods and services and livelihoods
- Enhancing responses and policy options to sustain and maximize environmental and social benefits from multifunctional landscapes

Component 4

- Harnessing forests, trees and agroforestry for climate change mitigation
- Enhancing climate change adaptation through forests, trees and agroforestry
- Understanding the role of forests, trees and agroforestry in achieving synergies between climate change mitigation and adaptation

Component 5

- Understanding the processes and impacts of forest related trade and investment
- Enhancing responses and policy options to mitigate negative impacts and enhance positive impacts of trade and investment

Impact Strategies

Joint construction of impact strategies with partners

Research approaches that engage policy and practitioner communities at the outset

Research methods that build in impact assessment and gender dimensions

Strategic investment in capacity assessment and strengthening

Utilization of both traditional and new media options for communications and knowledge-sharing

Outcomes

- Smallholders and vulnerable groups have improved access and management rights to forest, agroforest and tree resources
- Knowledge on tree management and access to productive tree germplasm available to rural communities
- Access to forest and tree product markets enhanced through improved value chains

- Increased awareness at local, regional and international level of the status and threats to priority tree species
- Effective and equitable conservation strategies are implemented in an increased number of countries
- Improved tree genetic material is conserved for use by forest managers and farmers
- Forests are better managed

- More realistic land use and developmnet planning and institutional reform of land use regulation
- Clarified rights, defined multistakeholder tergets, multistakeholder negotiations, restoration investment
- Empowerment of realistic, conditional and voluntary actions in a continuous learning perspective

- REDD+ and EBA concerns are appropriately integrated into global agreements
- Effective, efficient and equitable M&A policies and initiatives are designed and implemented
- Financial mechanisms linked to climate change increase support to forest and tree based initiatives

- Global T&I flows are better regulated to be socially and ecologically responsible and to promote sustainable forest management
- Forest stewards are empowered to, and global consumers make, responsible decisions on forest use
- Global businesses adopt guidelines that aim to reduce ecologically and socially harmful investments

Impact

CRP Impact

- Reduced deforestation and degradation
- Increased net carbon storage
- Conservation and increased use of forest and tree genetic resources
- Increased social and economic benefits from forest and agroforestry goods and services
- Reduced risk for rural livelihoods
- Enhanced access of women and other disadvantaged groups to benefits at all level

SRF Vision

- Create and accelerate sustainable increases in the productivity and production of healthy food by and for the poor;
- Conserve, enhance and sustainably use natural resources and biodiversity to improve the livelihoods of the poor in response to climate change and other factors; and
- Promote policy and institutional change that will stimulate agricultural growth and equity to benefit the poor, especially rural women and other disadvantaged groups

Overall impact pathways

The five components are tightly interwoven and interlinked, and will synergistically work together to deliver impacts, as detailed in the following figure.

Cross-cutting commitments

The design of CRP6 also includes a number of commitments to undertake research for development in ways that will produce more effective and equitable results.

Gender sensitivity

For decades, gender analysis has been given lip service in agricultural and forestry research. Moreover, foresters and extension agents, project managers, policymakers and scientists have routinely overlooked gender in their work. This occurs despite repeated studies showing that increasing the involvement of women results in improvements in the management of resources, whether at the community, household or farm level, as well as enhancements to livelihoods. Gender is integrated into all CRP6 components and activities. Gender analysis methods will generate understanding of key institutional, cultural and attitudinal contexts that entrench inequity and squander opportunities to improve women's lives. Our approach will include collection of sex-disaggregated data, development of gender-focused partnerships and alliances, knowledge sharing and adaptive learning. CRP6 research will also identify policies, technologies and practices that will enhance gender equity in the access, use and management of forests and trees and the distribution of associated benefits.

While we highlight gender, CRP6 will also prioritize other disadvantaged groups such as indigenous peoples, the youth and the elderly.

Capacity strengthening

Most of the developing countries in which CRP6 will operate have major capacity gaps. There are too few trained foresters and agroforestry specialists, and even less multidisciplinary expertise spanning the biophysical, social, economic and political sciences. Moreover, the problem is worsening, with a marked reduction in training and education in forestry. Enrolments are declining and there is a worrying pattern of universities closing forestry colleges.

Capacity strengthening is not optional for CRP6; rather, it is a crucial ingredient of the project's impact orientation. Research will document and increase understanding of the global capacity needs required for the management and conservation of forests, agroforestry and tree genetic resources. Increasing current awareness of the global importance of forest issues presents a rare opportunity to develop a new generation of professionals able to address the breadth of challenges and opportunities that forests, trees and agroforestry provide. We recognize the need for more sophisticated multi- and trans-disciplinary expertise, increased numbers of trained people within disciplines and more capable institutions. Although capacity building on the scale needed goes beyond the scope of CRP6, we will strengthen and mobilize capacity through joint learning and implementation with new and existing partners.

Partnerships

A third commitment, alongside our approaches to gender and capacity building, is the way we approach partnerships—as *the* most important path to impact. We will convene as research partners the world's leading expertise through new and existing partnerships with advanced and national research institutes, and other specialized research organizations necessary to complement the core competencies of the CGIAR. We will also engage "policy and practitioner partners" as the immediate clients for our research results. Policy and practitioner partners will span the range from global negotiating forums to local community organizations. Further, we will establish working relationships with "knowledge-sharing partners" to serve as intermediaries in reaching the media, students and the general public. Consistent with our approach to impact pathways, we will work closely with national- and local-level partners to assess and build capacity—both to undertake and to act on research—to ensure that measurable and significant outcomes and impacts result, globally, regionally and locally.

Knowledge sharing

At least part of the reason forestry and agroforestry science has not translated more broadly and rapidly into changes in policy and practice has been a failure of communication. The knowledge-sharing model introduced in this CRP combines traditional

research outputs and media outreach with a viral and multidirectional delivery and feedback communications system. It will leverage available and emerging social media tools, "member communities", new concepts, trends and monitoring techniques. It is designed to ensure that all research outputs, including research data, are delivered to the people who need them—scientists, practitioners, donors, development agencies, policymakers, media and NGOs—today rather than five years from now. CRP6 will lead the way in developing knowledge sharing as an integral part of agricultural research.

Management

CIFOR, the World Agroforestry Centre, CIAT and Bioversity will lead the implementation of CRP6. The management structures, intended to be light, will include a Lead Center charged with the fiduciary and legal responsibility for CRP6. A Steering Committee comprised of the core participating CGIAR centers, plus additional CGIAR and external partner institutions as appropriate for the effective implementation of this ambitious program, will provide direction and oversight. A Scientific and Stakeholder Advisory Committee will provide guidance to ensure relevance, and a Management Support Unit based at the Lead Center will provide day-to-day management and coordination. Component Implementation Teams with scientists based across participating centers and partner organizations will be charged with undertaking the research and other activities necessary to deliver CRP6's outputs and outcomes, leading ultimately to impacts.

CRP6 will put in place mechanisms to ensure the quality, relevance and impact of our research, and will develop procedures for monitoring and evaluation of activities, projects and processes. CRP6's management will focus on promoting scientific excellence and adaptive management characterized by transparency, fairness and inclusiveness.

Resources required

To achieve these ambitious objectives through this program, CRP6 will require an initial start up budget of US$232.9 million over the next three years for what will be a minimum 10-year program. In the first year a budget of US$67.8 million is envisaged; of which US$ 23 million is expected from unrestricted funding, US$ 33.5 million from confirmed restricted grant projects and the remaining US$ 11.3 million from unconfirmed proposals. Restricted grants include current ongoing grant activity. This represents only a modest increase on "business as usual" as participating centers align their research programs with CRP6 and build Consortium-level management and communications capacity. In the second and third years, we project increased levels of funding, to enable us to implement the more innovative aspects of the proposal, such as a network of sentinel landscapes. We anticipate that this level of funding will leverage substantial additional investment in research by the CRP6 partners as well as by external partners over the coming years. In addition, substantial complementary funding will be needed for forest-related capacity-building and implementation agendas, beyond the scope of this research-for-development initiative; these agendas will be required for impact pathways to deliver results on the scale envisaged.