

TreesAdapt

Adaptation with forests, trees and agroforestry for agriculture, landscapes and people

The overall objective of *TreesAdapt* is to support actors in the development and implementation of climate change adaptation solutions for and through tree-based systems (forests, trees and agroforestry).

TreesAdapt is CIFOR-ICRAF's response to the huge and urgent challenge of climate change adaptation. It aims to answer the demand for adaptation, to enhance forests, trees and agroforestry contribution, to support countries and actors with appropriate knowledge and tested solutions in a range of contexts.

Why *TreesAdapt* ?

- First, forests and tree-based systems, and the way they are managed, need to be adapted to the drastically changing climate. Otherwise, they will die back, their carbon and much more will be gone.
- Second, tree-based systems (such as coffee, cocoa, rubber, etc.) are key to livelihoods and food security of millions of smallholders. The issue is to build the resilience of tree-based value chains to changing production conditions, price fluctuations, given that climate change will amplify a range of existing shocks and bring new ones.
- Third, trees can make the whole of agriculture, farming, and food systems more resilient. They help mitigate the impact of heat waves, create better microclimate for farming, help better manage water from plot to landscape, limit impact of floodings, erosion etc. This will request investments from seed systems, to markets, trees and agroforestry systems development.
- Finally, forests and trees are key to the resilience of many other sectors: cities, water, energy... For instance to be livable in the future, cities will need a lot more trees. There is overall a huge potential for nature based solutions with trees.

Adaptation of forests and trees, adaptation with forests and trees, and mitigation with forests and trees are intrinsically linked. Focusing on adaptation facilitates engagement of actors. It is because of the recognized and increased benefits provided by forests and trees that local communities have an interest to facilitate and support their adaptation, conservation and sustainable management which in turn are indispensable for their long term contribution to mitigation.

Adopting a concrete entry point, forests and trees, *TreesAdapt* is a **transformative partnership platform** that targets effective and efficient implementation of adaptation of forests and trees, and with forests and trees. To this aim, countries and actors need appropriate knowledge, solutions, enabling conditions and implementation support in a range of contexts: *TreesAdapt*, launched at the Global Landscapes Forum (GLF) at Sharm El Sheik on 12 November 2022, is there for this.

This document explains the background, purpose and thematic areas of work of *TreesAdapt*

1. Background.

Forests are already experiencing increased risks because of climate change. Firefighters fighting fire at night. Outside Palangka Raya, Central Kalimantan.

Photo by Aulia Erlangga/CIFOR

The latest IPCC report has stressed the breadth and intensity of present and expected impacts of climate change (CC). This has been further shown by heatwaves, droughts, floods and other extreme events during 2022.

Forests, tree commodities and agroforestry systems -as well as their value chains- are already impacted by climate change and will be even more strongly affected in the future. Given their permanence, trees are often good markers to follow climate impacts on ecosystems. At the same time, forests and trees are key to buffer impacts of climate change on agriculture and other sectors, including water, infrastructures, cities and on the most vulnerable populations, starting with forest-dependent communities, but playing a role for the adaptation of farmers and urban populations as well, given the effects of forests and trees on local climate and their roles on the water cycle as well as provision of other ecosystem services.

Trees reduce extreme temperatures in all seasons and times of day, reducing the impacts of heatwaves on human health, plant yield and animal productivity. Forests and trees contribute to water conservation and circulation, by facilitating water infiltration in the soil, reducing the intensity of floods, pumping moisture back from the soil during drier seasons and restoring it through evapotranspiration that can benefit plants locally and regionally. Trees reduce wind and water soil erosion and their consequences on soil fertility, dams and river-beds. Tree based systems and activities also contribute to food security and nutrition through provision of food, feed and livelihood opportunities, particularly in times of crisis. All these contributions are of particular significance for the most vulnerable populations particularly exposed to the impacts of climate change in both rural and urban areas.



Trees provide shade and cooling microclimates for plants, animals and humans. Livestock and farming near Chiana, Kassena Nankana District - Ghana.
Photo by Axel Fassio/CIFOR

Because of these multiple contributions, and because they are an ecological infrastructure with characteristic lifespan from decades to centuries, forests and trees can play a key role in transformative approaches to adaptation.

Actions mobilising the potential of forests and trees for adaptation have thus multiple benefits, mitigating climate change, contributing to biodiversity and land restoration agendas and to the achievement of the SDGs.

This importance of forests and trees is now widely acknowledged by countries, that increasingly integrate adaptation of and with forests and trees in their National Determined Contributions (NDCs) and National Adaptation Plans (NAPs). There is also an increasing demand for cross cutting, systemic adaptation for which forests and trees are a very good entry point.



Trees provide food and feed in semi-arid areas and during the dry season. Livestock-based livelihood system (dependent on fodder tree, Khejri) at Churu District, Rajasthan.
Photo by V.P. Singh/World Agroforestry Centre

Answering these demands for increased contributions of forests and trees to adaptation requires to synthesize and organize knowledge, issues and options inside forests and tree-based sectors, as well as to relate to other sectors (e.g agriculture, water, cities) and to broad challenges at national level. This is particularly important for **transformative adaptation**, that aims to change the fundamental attributes of a system, to modify it so that it deeply integrates response mechanisms to climate change and its effects, in other words, building resilience and adaptive capacity deep within the systems, including through addressing the root causes of vulnerability. There is also an increasing demand to “climate proof” all development projects, creating new avenues for forests and trees.



Restoration of mangroves is a cost-efficient way to protect crops and infrastructures against sea level rise. Restored mangrove area in Ciénaga del Progreso. Yucatan, Mexico.
Photo by Yoly Gutierrez/CIFOR

All of this creates a clear **demand for evidence** to ground the design and selection of options for concrete adaptation measures mobilizing forests and trees, including on synergies with mitigation and other co-benefits, as well as of the necessary enabling environment. Both UNFCCC documents and the Green Climate Fund recognize and highlight that adaptation needs to be evidence-based, including to reduce risks of maladaptation. There is already a wealth of adaptation information for, and with, forests and trees that has been generated; it needs to be organized and oriented towards action and demands and made as easily available as it is for mitigation, so that it can be better connected to the development of adaptation plans, to the development of technical options, and their implementation on the ground.



Agroforestry systems enable better management of natural resources and buffer impacts of climate change. A Paddy- based agroforestry system, Sri Lanka.

Photo by: DKNK Pushpakumara/
World Agroforestry Centre

Moreover, such a knowledge and the corresponding options need to be permanently updated, to integrate evolving climate impacts as well as learning from the effectiveness of adaptation measures. Given the fundamental nature of adaptation, being place-based, people-centred, and combining ecological and social systems, an appropriate knowledge/innovation/implementation system for adaptation requires to mobilize various sources of knowledge, including scientific, traditional and indigenous knowledge, technical knowledge about options, innovations and their operationalization, the conditions for scaling up, as well as information on effectiveness from economic actors and local populations facing climate impacts on the ground. Such knowledge and evidence should underpin technical support for the design and implementation of adaptation measures of/with forests and trees, as well as the design and development of the appropriate enabling environment. And there is an emerging demand from the private sector for evidence to support their own vulnerability and risk assessments and adaptation activities, including to respond to concerns from the finance community.

At the global level there is a need to raise awareness on how forests, trees and agroforestry can contribute to the Global Goal on Adaptation (GGA), and also on what capacities are needed at the national level to enhance this role. Finally, there is a rising demand on metrics for adaptation, monitoring and evaluation systems to measure, assess and report on adaptation.



2. Role and purpose of *TreesAdapt*.

Appropriate adaptation requires place-based, people-centred, participatory approaches, engaging with actors and mobilizing various sources of knowledge, including scientific, traditional and indigenous knowledge. Mapping workshop in Nakhon, Kassena Nankana District - Ghana.

Photo by Axel Fassio/CIFOR

It is to answer these demands and needs that CIFOR-ICRAF has decided to organize a coordinated answer: *TreesAdapt*. *TreesAdapt* builds upon a strong and diversified body of knowledge and track record. - inter alia from a decade of collaborative work with a range of partners under the FTA program.¹ This track record extends over key geographies worldwide, working from local to global scales, and covering ecological, economic and social systems, from forests and tree-based systems to trees on farms and in landscapes.

There are various networks or programs focusing on adaptation including the Global Center on Adaptation², the Global NAP network³ and the World Adaptation Science Programme (WASP). They have generally a very broad scope, covering adaptation in general and are in need of more technical support on forests, trees and agroforestry, for which CIFOR-ICRAF is recognized as a main resource.

The purpose of *TreesAdapt* is to go one step further towards implementation by focusing on a concrete pathway, which is to help forests and trees adapt so that in turn they can sustainably contribute to the adaptation of ecosystems, societies and people, with a particular attention to women and vulnerable people.

¹ <https://www.foreststreesagroforestry.org>

² <https://gca.org/>

³ <https://napglobalnetwork.org/>



Forests and trees provide food, feed and means of income that are particularly important. Women harvest lemongrass in the Chisapani Community Forest, which will be distilled down into an essential oil.

Photo by Chandra Shekhar Karki/CIFOR

This "forests and trees" pathway covers **four tracks**:

1. Adapting managed forests;
2. Adapting tree-based systems, tree commodities and their value chains;
3. Supporting the role of agroforestry, silvo-pastoralism and trees on farm to contribute to adaptation of crop and livestock systems (including water and heat management); and
4. Developing the role of forests and trees at landscape scale, to regulate water, local and regional climate, and to reduce impacts of heat waves particularly in cities.

Planting a tree, protecting a forest are promoted as adaptation measures, because of their ecosystem services that contribute to adaptation now and -given the lifespan of trees and forests- in the future. To avoid maladaptation and maximize benefits it must be the right tree, in the right place and for the right purpose. And it has to be done well. **The four tracks described above are all knowledge intensive**, and, to ensure their relevance, credibility, legitimacy and effectiveness, they need to be co-developed with stakeholders, including using right based approaches which focus on the empowerment of vulnerable people affected by climate change, including Indigenous Peoples, women and marginalized groups, and by focussing on the engagement with youth.

Adopting a concrete entry point, forests and trees, **TreesAdapt is a transformative partnership platform** that targets implementation of adaptation of forests and trees, and with forests and trees, on the ground, evidence-based, establishing learning loops, including to identify enabling conditions.

TreesAdapt's ambition is transformative because, as explained above, it aims at mobilizing forests and trees to building long-lasting resilience, deep within the systems. It is also a partnership: CIFOR-ICRAF is building the platform to team-up and work with a range of partners (from local to national and international) with complementary roles or operating in complementary geographies, in delivering on common objectives and functions (see below).

It aims to constitute forests and trees as a binding object that can trigger intersectoral dialogues, facilitate the elaboration of a shared understanding of issues and the collective construction of solutions adapted to local conditions. **TreesAdapt**, because of its cross-cutting nature, is also a great vehicle for introducing system thinking in broad adaptation planning.

This includes (i) assessment of impacts of climate change on such systems: forests, trees, and the sectors and people that depend on them, as well as (ii) understanding the role of forests and trees as providers of ecosystem services, in farming, in landscapes, in cities; and (iii) how these roles might be impacted by climate change and (iv) how they can contribute -as one key nature-based solution- to build resilience of landscapes and people to climate change.

***TreesAdapt* beneficiaries are:**

- Countries, that **TreesAdapt** will support in the integration of forests and trees in their adaptation strategies, plans and measures, from vulnerability assessments to design and implementation of adaptation.
- Farmers and businesses, to be supported along tree commodity value chains to assess vulnerabilities to climate change, identify adaptation options and implement them.
- National governments, international organizations and other actors to be supported in the design and implementation of an enabling environment for adaptation of/with forests and trees.

***TreesAdapt* supports countries and actors all along the adaptation process** (see Figure 1) for:

1. Identification of climate change impacts on forests, trees and tree value chains and systems
2. Vulnerability assessments,
3. Identification of adaptation options, including those benefitting other sectors (cross-sectoral adaptation),
4. Selection and prioritisation of options (including cost/benefit analysis) with particular attention to mitigation and other co-benefits to construct “business cases” that can attract a diversity of public and private investments,
5. Implementation of measures, including building an enabling environment (such as improved governance and finance for adaptation with forests and trees),
6. Monitoring and assessment of implementation and adaptation effectiveness.



Collection of forest products as part of community forest use gives the incentive and possibility for sustainable forest management, including monitoring of impacts of climate change and adaptive management.

Zuhaidi, and Dedi Aprianto collecting resin from a damar tree (*Shorea Javanica*) in Pahmongan village, Pesisir Barat regency, Lampung province, Indonesia. (GCS-Tenure Project in Lampung).

Photo by Ulet Ifansasti/CIFOR

TreesAdapt will conduct a range of **functions and activities** (see also Figure 1) that are binding together knowledge and decision in support to the adaptation process with forests and trees, with in-bedded learning and means to assess effectiveness. The activities span all along the adaptation cycle (see above) and can be grouped under four major clusters.

1. Knowledge

- Facilitating knowledge generation and co-generation (bridging scientific knowledge and indigenous and local knowledge);
- Synthesizing existing knowledge, including across projects and initiatives;
- Making knowledge useful and usable for action;
- Knowledge sharing – making available and accessible relevant knowledge from a wide range of projects; and
- Identifying with stakeholders knowledge gaps and conducting relevant research.

2. Methods and tools

- Developing methods and tools for different steps of the adaptation cycle, including to assess impacts of climate change, to understand vulnerabilities as well as resilience options with trees⁴ that can ground adaptation, to facilitate identification and prioritization of options including cost benefit analysis, and assessment/monitoring of effectiveness; and
- Constructing business cases (including mitigation and other co-benefits)

⁴ This inter alia can mobilize techniques such as dendrochronology to analyse and understand the impact of climate on trees.

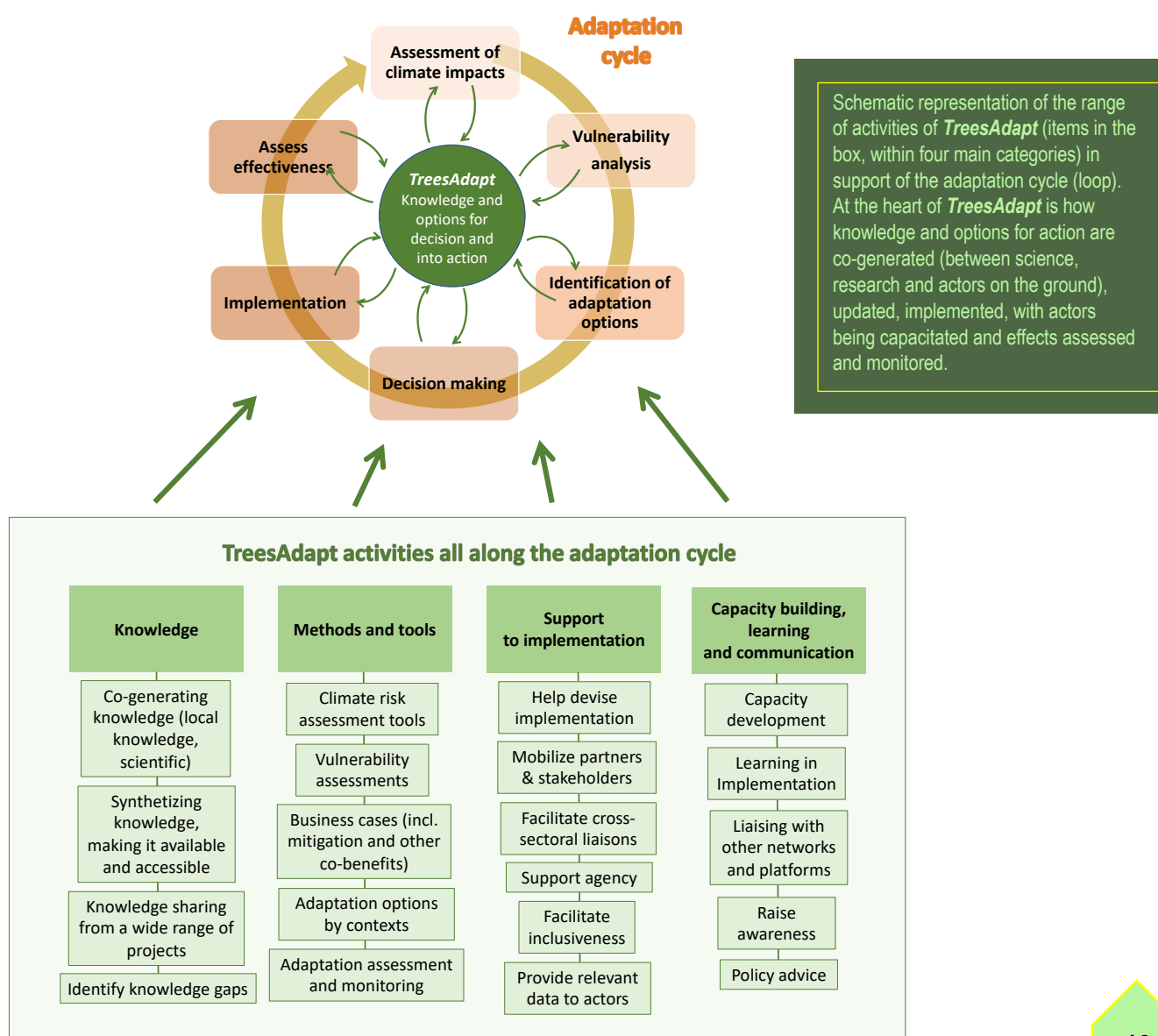
3. Engagement in implementation

- Mobilizing partners and stakeholders in knowledge generation and in implementation;
- Facilitating cross-sectoral interactions;
- Supporting agency of stakeholders, including of women, Indigenous populations, youth and vulnerable groups; and
- Working on the enabling environment.

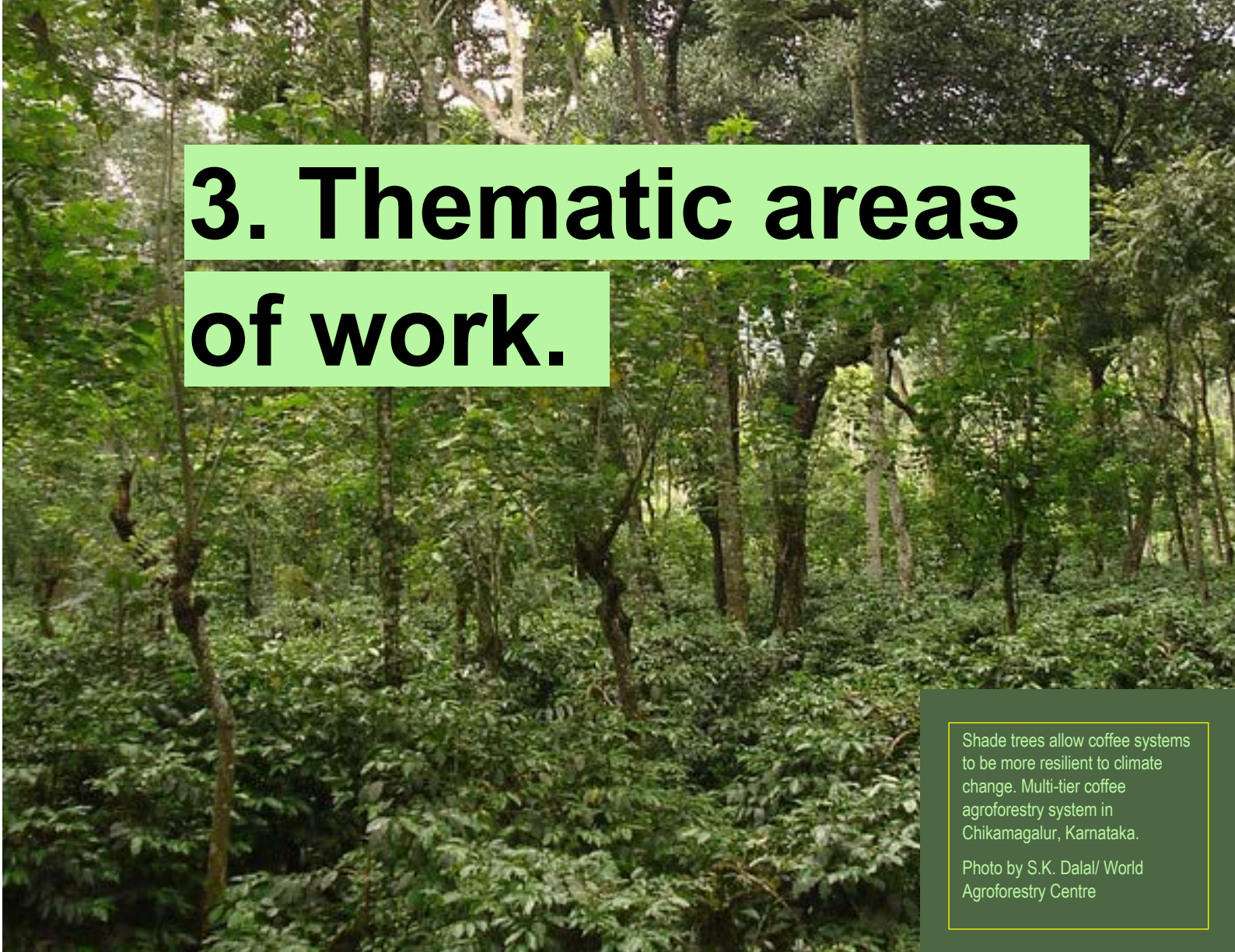
4. Capacity development, learning and communication

- Capacity development of public and private actors (including liaising with capacity building actors and institutions);
- Learning from implementation and updating the knowledge base; and
- Liaising with other networks and platforms, raising awareness locally to globally including as part of national and international processes such as the GGA.

Figure 1. *TreesAdapt* supports actors all along the adaptation cycle, with knowledge for assessment, decision and implementation



3. Thematic areas of work.



Shade trees allow coffee systems to be more resilient to climate change. Multi-tier coffee agroforestry system in Chikamagalur, Karnataka.

Photo by S.K. Dalal/ World Agroforestry Centre

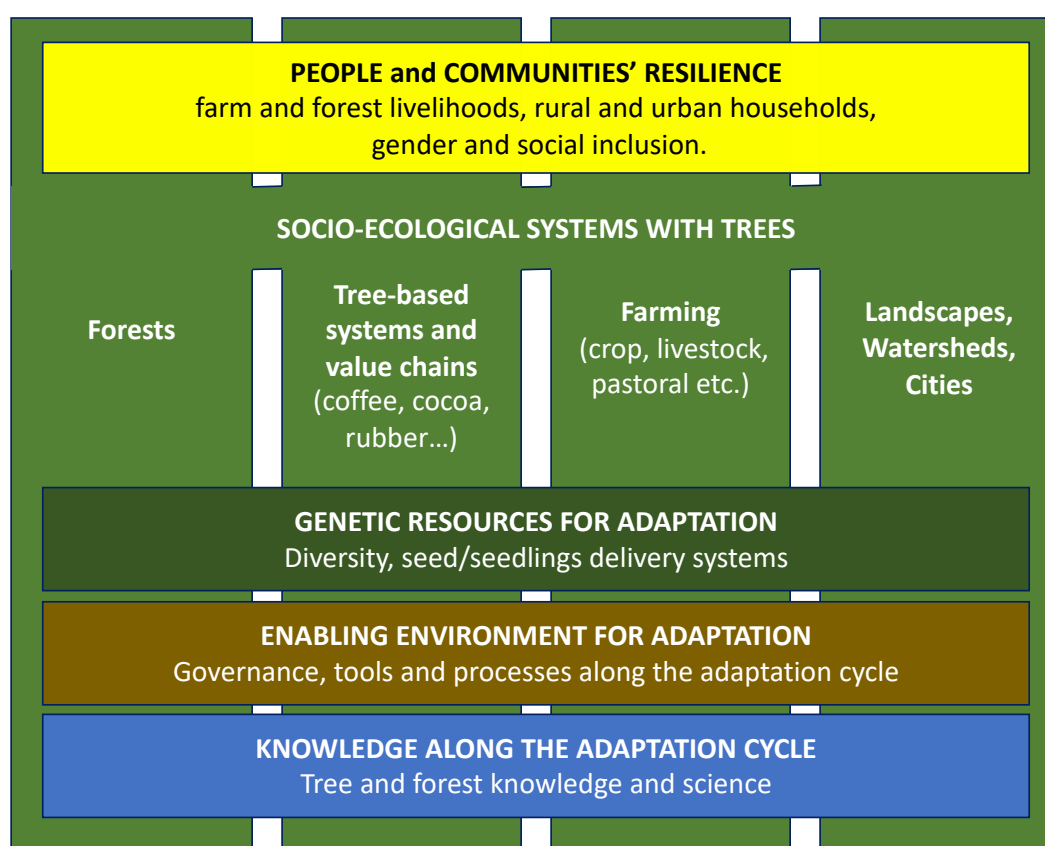
TreesAdapt is focused on adaptation of forests, trees and agroforestry as well as on their contribution to adaptation of agriculture, landscapes and people, and the enabling conditions for this to happen.

The key areas of work of *TreesAdapt* are therefore linked to the four tracks described above: Forests, Tree-based systems, Farming, Landscape/watersheds/cities. Cross-cutting to these are the four areas of: people and communities (as a fundamental objective of adaptation, and where priorities are framed), tree genetic resources (both to ensure availability, accessibility and diversity, and underlying systems), the enabling environment (which includes governance, adaptation processes and tools in support), and finally knowledge management all along the adaptation cycle and also across projects and initiatives.

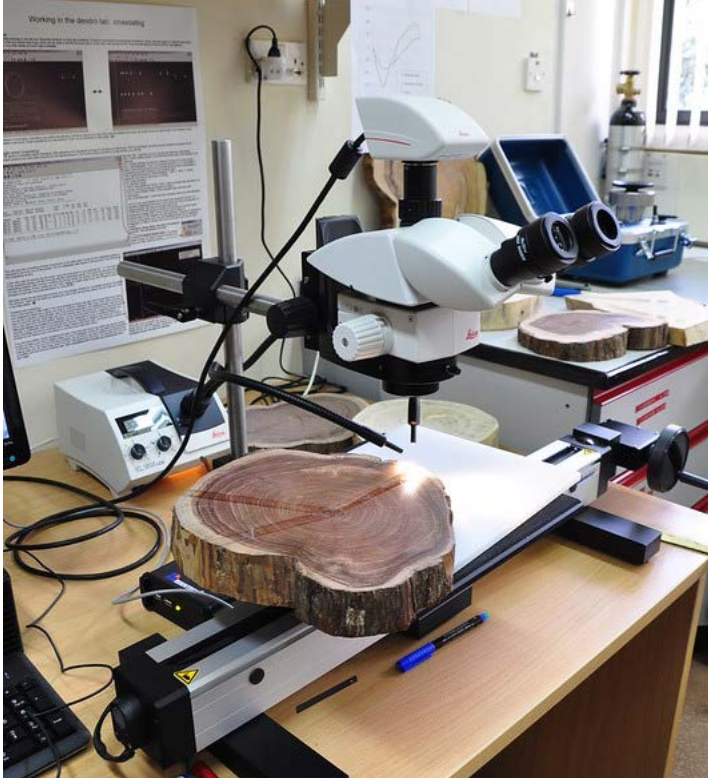
Through these tracks and their interrelations, *TreesAdapt* encompasses research, capacity development, and outreach and engagement both on trees, on ecosystems (e.g., the impacts of climate change on forests and trees), on production systems (e.g agroforestry, agroecological approaches, etc.) and tree-based value chains, as well as on social systems (e.g., the vulnerability of local communities to climate change and political or economic changes needed).

A key emphasis is placed on the interactions between ecological, economic and social systems, in order to understand how changes in ecosystems (e.g., due to climate change, land use change or degradation) may affect people's vulnerability and how the consequences of climate change on people may in turn affect ecosystems (e.g., through unsustainable use of forest products for coping with climate-related stress). Analyzing the dynamics of socio-ecological systems is crucial to the development of adequate adaptation strategies that increase the resilience of both ecosystems and social systems, including through ecosystem-based adaptation (EbA). It is also important that tools and methods for impact assessment, for devising options and for decision, include an appraisal of adaptation costs and benefits (including mitigation co-benefits as well as economic and social co-benefits).

Figure 2. Key thematic areas of work of *TreesAdapt*, along four tracks



TreesAdapt deals with the four tracks of adaptation (left to right, in green) linked to the role of trees and forests in the functioning of the related socio-ecological systems: adaptation of forests, adaptation of tree-based systems, role of trees in adaptation of farming, and role of trees and forests in adaptation of landscapes, watershed and cities. Within these tracks, *TreesAdapt* considers people and communities' resilience at the heart of the adaptation objectives (yellow), and is working on the enabling conditions for adaptation in terms of genetic resources (dark green), the enabling environment (brown), and knowledge (blue).



This Lintab (TM) is used to measure tree rings with high precision. Such methods can ground modelling of effects of climate change on trees.

Photo by K. Foster/World Agroforestry Centre

Modern investigative technologies, including dendrochronology, allow to analyze retrospectively impacts of climate events on trees and thus to predict effects of climate change on species.

TreesAdapt also includes work on genetic resources (that is often a critical bottleneck to enable scaling up of adapted solutions with trees) and how they can be made available to small holders, on institutions and governance as well as on gender, youth and vulnerable populations.

Liaising with CIFOR-ICRAF's platform on *Transforming the Quality of Tree Planting*, particular attention is given to the need for appropriate seed systems, facilitating small holders' access to seeds and seedlings, of appropriate trees, nursery development, as well as for capacity building.

Provision of adequate quality genetic material is essential to adaptation activities.

Finally, **TreesAdapt** contributes to governance including, how to ensure the best integration of forest and trees in cross sectoral adaptation, how to devise national and sub-national policies.

In addition to help deliver better adaptation on the ground, **TreesAdapt's** findings will contribute to strengthen global narratives on climate action including joint mitigation and adaptation approaches and nature-based solutions, as well as to better link forests, agriculture and land-use in climate action.



Potting of a seed (Water towers project in Mau Forest).

Photo by Patrick Shepherd/CIFOR

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How to cite

CIFOR-ICRAF. 2022. *Adaptation with forests, trees and agroforestry for agriculture, landscapes and people. TreesAdapt*. Bogor, Indonesia: Center for International Forestry Research (CIFOR) and Nairobi, Kenya: World Agroforestry (ICRAF). 14 pp.
DOI: 10.17528/CIFOR-ICRAF/008725

This document was prepared by Vincent Gitz, Alexandre Meybeck, Houria Djoudi, Peter Minang, Thuy Pham, Aster Gebrekirstos, Christine Lamanna. CIFOR-ICRAF.

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