World Agroforestry Centre

Strategy 2013-2022

Transforming lives and landscapes with trees

The World Agroforestry Centre (ICRAF) is one of the 15 Centres of the CGIAR Consortium. ICRAF's headquarters are in Nairobi, Kenya, with eight regional and subregional offices located in China, India, Indonesia, Kenya, Malawi, Mali, Peru and Cameroon. We conduct research in 28 other countries in Africa, Asia and Latin America.

Our vision is a rural transformation in the developing world as smallholder households increase their use of trees in agricultural landscapes to improve food security, nutrition, income, health, shelter, social cohesion, energy resources and environmental sustainability.

The Centre's mission is to generate science-based knowledge about the diverse roles that trees play in agricultural landscapes, and to use its research to advance policies and practices, and their implementation that benefit the poor and the environment.

The World Agroforestry Centre is guided by the broad development challenges pursued by the CGIAR. These include poverty alleviation that entails enhanced food security and health, improved productivity with lower environmental and social costs, and resilience in the face of climate change and other external shocks.

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Contents

List of abbreviations & acronyms

AF	Agroforestry
APAARI	Asia-Pacific Association of Agricultural Research Institutions
API	Agroforestry Policy Initiative
ASARECA	The Association for Strengthening Agricultural Research in Eastern and Central Africa
AWARD	African Women in Agricultural Research and Development
CIFOR	Center for International Forestry Research
CIRAD	Centre de coopération internationale en recherche agronomique pour le développement
CRP	CGIAR Research Programme
FAO	The Food and Agriculture Organization of the United Nations
GRU	Genetic Resource Unit
GSL	GeoScience Lab
HQ	Headquarters
IARAS	Impact Assessment and Rural Advisory Services
ICRAF	World Agroforestry Centre
ICT	Information and Communication Technology
IDO	Intermediate Development Outcomes
ILRI	International Livestock Research Institute
IPG	International Public Goods
K2A	Knowledge to Action
M&E	Monitoring and Evaluation
NARS	National Agricultural Research Systems
NGO	Non-Governmental Organization
OCS	One Corporate System
OG	Operational Goal
R4D	Research for Development
RMG	Research Methods Group
SD	Science Domain
SE	Southeast
SLO	System Level Outcome
SRF	Strategic Results Framework
UN	United Nations



1. The global context: trends and challenges in development

1.1 Background

Poverty is a poor term for such a debilitating condition suffered by billions. It does little to describe the suffering, the deprivation, the precariousness and the lack of hope facing those people low down on the world's development ladder. It is morally, logically and socially unacceptable. Poverty of ideas in addressing such inequality and inhumanity is equally worrying. That poverty abounds greatest in the most fragile areas and degraded environments is no mere coincidence. These persistent and perennial problems need new thinking as well as sustainable or perennial solutions. Quick fixes alone won't work.

In 1972, the Brundtland Commission defined as "*sustainable*" any development that meets the needs of the present generation, without compromising the ability of future generations to meet their own needs. Since then the human population has increased by 3.5 billion people. Sadly this increased population is placing additional burdens on the limited natural resource base, and what is equally worrying is that 925 million of the world's poorest people still languish in hunger. Most progress towards development has come at a great cost to our environment – simply put, we have exceeded our planetary boundaries. Clearly, sustainable development is as supreme, and even more urgent, a challenge now as it was 40 years ago.

Fortunately though, it is not all bad news.

Advances in science and technology offer opportunities for more rewarding and efficient use of resources, including the three most important ones: the sun's energy, water and chlorophyll in plants. Equally, advances in our understanding of the way economies and societies work suggest that addressing equity,

including among genders, generations and social groups, is a way of better addressing population growth and poverty, and hence more sustainable consumption. There are opportunities to change, but the issue is how quickly humankind can grasp them.

Piecing together our fragmented understanding of the world and how it works, while we draw on human capabilities for innovation, appears the only viable approach for sustainability. To this fundamental approach ICRAF adds three important elements: (1) new income and food chains derived from largely under-cultivated trees; (2) focus on trees as the best organisms to sustainably harness the energy of the sun; (3) the concept of 'landscapes' as the venues for integrating multiple spatial and temporal scales to better manage the bewildering complexity of the world we live in. Landscapes deliver robust, widely applicable options for food security, sustainable development and ecosystem functioning.

Agroforestry can greatly help to transform landscapes where trees are a keystone of productivity and thus deliver multiple benefits for humans and ecosystems. It can contribute substantially to both environmental and human resilience. The mission of the World Agroforestry Centre (ICRAF) is to harness the best science, people and partnerships within a framework of research for (and in) development to fully exploit and extend the positive effects of trees and agroforestry across the developing world. Here we lay out that vision and mission for transformed lives and landscapes with trees.

1.2 Foresight studies

In 40 years, the world will be a dramatically different place. We have explored important insights from a number of leading foresight studies to inform ourselves about the nature of this world and what science might be needed to support sustainable options in the coming decades.

- **Increased global population**. The projected increase in the global population to around 8 billion by 2030 and over 9 billion by 2050 will mostly occur in the low- and middle-income countries. For example, Africa's population is projected to double to 2 billion people by 2050. Urbanization won't change people's need for rurally-derived food, fibre, shelter, water and energy. Demographics are also working against rural areas with younger people showing less interest in agriculture.

- **Future governance of the food system at both national and international levels.** The globalization of markets has been a major factor shaping the food system over recent decades and this also has a substantial effect on food security. The emergence and continued growth of new food superpowers, notably Brazil, China and India has increased total food production, but price volatility remains high. Production subsidies, trade restrictions and other market interventions continue to have a major effect on the global food system. Smallholders can only compete with economies of scale if they use better and more relevant technologies, aggregate their produce and work collectively.

- **Forest financing.** There is a pronounced gap in financial support for sustainable forest/agroforest activities. In 2012, this need was estimated to be between US$70 and US$160 billion per year globally with the greatest need for the 2.1 billion hectares of tropical forest. The carbon market alone at less than US$5 billion annually won't solve this problem, nor will relying on the short-term, opportunity cost of deforestation as deforestation will routinely be chosen unless environmental and social externalities are factored in.

- **Climate change.** Growing demand for food must be viewed against a backdrop of rising global temperatures and changing patterns of precipitation, affecting: tree and crop growth as well as livestock performance, the availability of water and the functioning of ecosystem services in all regions. Extreme weather events will very likely become both more severe and more frequent, thereby increasing volatility in production and prices. Plant production will also be indirectly affected by changes in sea level and river flows, although new land at high latitudes may become more suitable for cultivation and some degree of increased CO_2 fertilization is likely to take place.

- **Competition for key resources.** Land under agriculture (crop, pasture and rangeland) currently stands at 4.9 billion hectares whereas land under forest is 4.1 billion hectares (80 per cent publically owned). A proportion of both these will be lost to desertification, salinization and sea level rise. At the same time, global energy demand is projected to double between now and 2050; fuelwood or charcoal providing up to 90 per cent of this total in developing countries. In addition, agriculture currently consumes 70 per cent of the total global 'blue water' withdrawals from rivers and aquifers available to humankind. The demand for water for agriculture could rise by over 30 per cent by 2030 and could double by 2050.

1.3 Strategic Results Framework of the CGIAR

The Consortium of the 15 independent agricultural research centres of CGIAR, of which the World Agroforestry Centre is a member, is responding to the unprecedented challenges faced by agriculture and natural resource management in developing countries. ICRAF was a founder member of the Consortium in 2010 and actively participates in its evolution and operations. The CGIAR has set out a Strategic Results Framework (SRF) that guides the Consortium in defining what needs to be achieved, how the members and partners can be organized to deliver these results, and monitor, evaluate and assess whether the results are actually being achieved. In essence, managing research for results. Within the SRF are 15 integrated research efforts known as the CGIAR Research Programmes (CRPs). The SRF and seven of these CRPs set the context within which the World Agroforestry Centre's strategy unfolds. The majority of our research is described and organized under CRP6 Forestry, Trees and Agroforestry where CIFOR is our strongest partner.

At the highest level, the SRF lays out four System Level Outcomes (SLOs) that represent a set of international development impacts which can be enhanced through improvements in agriculture, agroforestry and forestry. These constitute the targets of CGIAR research at the system level, and include:

- *Reduced rural poverty*. It has long been known that growth in agriculture, achieved through improved productivity and better developed markets, reduces poverty, especially in the initial stages of development. [25 per cent of our effort]
- *Improved food security*. Millions of poor people in both urban and rural communities struggle to afford food, especially during global price spikes. Solving this problem requires an increase in global, regional and local supplies of key staples and safety net alternatives (fruits, nuts, etc) that will buffer price rises and volatility. [30 per cent of our effort]
- *Improved nutrition and health*. Poor people, particularly women and children, often suffer from a lack of micronutrients in their diets. The resulting malnutrition affects their health and development. This can be tackled by diversifying production systems and developing improved tree and crop varieties, especially fruit. [10 per cent of our effort]
- *Sustainably managed natural resources*. This outcome is essential for both food production and the provision of ecosystem goods and services to the poor, particularly in light of climate change. [35 per cent of our effort]

Underpinning the four SLOs in the CGIAR theory of change are a prioritized list of Intermediate Development Outcomes (IDOs). The research outputs and outcomes of the seven CRPs in which we participate link to and aggregate under the higher level IDOs. These IDOs evolve as results emerge and are scrutinized, and the complexity of multiple impact pathways becomes better understood.

1.4 Development challenges related to agroforestry

Based on the foregoing as well as 35 years of diagnosis and design at ICRAF, along with inputs from key partners, we identify 10 development challenges that will be closely related to agroforestry over the coming decades. In order to effectively address the challenges and transform lives and landscapes with trees they will need to be tackled in an integrated manner. The top 10 challenges that agroforestry seeks to address are:

Livelihood oriented:

1. Poverty
2. Hunger
3. Inequity (rights, gender, negotiation, recognition, access, voice)
4. Malnutrition and human health
5. Energy scarcity

Landscape (environment) oriented:

6. Land degradation
7. Climate change
8. Deforestation and habitat loss
9. Water scarcity
10. Biodiversity loss



2. What is agroforestry?

2.1 Definitions

Agroforestry is a recently coined term derived from *agriculture* and *forestry*. It describes practices developed and employed by farmers over many centuries to cultivate trees on farmland in different combinations with crops and livestock. From the pure agricultural perspective, agroforestry is about recognizing and promoting trees on farm; from the strict forestry perspective, it is about recognition and rights for the tree-based systems and livelihoods that farmers/agroforesters have created and can expand with appropriate support. Whilst agroforestry is an amalgam of *agriculture* and *forestry*, rather than treating these as separate land uses, institutions, policy domains and fields of science we integrate them in a landscape approach. Most importantly though, apart from bio-geophysical perspectives, agroforestry is often an entry point to progress social, economic, farmer welfare, market, environmental stewardship and political goals.

Agroforestry can be basically defined as:

> ***The inclusion of trees in farming systems and their management in rural landscapes to enhance productivity, profitability, diversity and ecosystem sustainability.***

A broader interpretation of the practice is:

> ***A dynamic, ecologically based, natural resource management system that, through integration of trees on farms and in the agricultural landscape, diversifies and sustains production and builds social institutions.***

Agroforestation is the increasing use of trees on farm and recognition of farmers in the forest and as shapers of landscapes.

2.2 The value of agroforestry

Trees contribute in a significant way to livelihoods by providing both ***tree products*** and ***tree services***.

The following ***tree products*** are either for home use or for sale to earn income:

- Food: fruits, nuts, edible leaves and roots, and honey which are vital nutritional products
- Tree commodities: confectionery, beverages, oils, industrial products
- Energy: liquid biofuels, fuelwood and charcoal
- Timber: sawnwood, veneer, plywood and poles for construction and furniture
- Medicines: herbal products that can prevent and cure diseases
- Fodder: animal nutrition supplements that can especially meet dry season feed shortages.

In addition to reinforcing livelihoods, these products generate income for farmers and pastoralists, enabling them to meet their food, shelter, education and health needs. Thus, development of tree-based commodities and better aggregation of production are crucial aspects of agroforestry intensification. Under some conditions, generating these resources on farms removes the pressure to extract them from forests.

Agroforestry also provides ***tree services*** to agriculture and to the environment by contributing to:

- Ground cover and ecosystem integrity: trees allow the growing season to be extended beyond the period needed for short rotation crops thus keeping the landscape covered with vegetation for more of the year.
- Water management: with appropriate selection of tree species and tree locations, rainwater can be better managed, infiltration improved and the flow regulated.
- Biodiversity conservation: landscapes with agroforestry cover provide shade, migration corridors and habitats for mammals, birds, insects and other life forms. They support greater below-ground biodiversity and soil functioning.
- Soil regeneration: degraded land can be regenerated and brought into production through regenerative agroforestry practices, with similar practices preventing degradation and erosion.
- Carbon sequestration: agroforestation sequesters carbon to mitigate climate change and provides goods (e.g. soil organic carbon) that enable adaptation to climate change effects.

- Micro-climate modification: that provides protection for crops and livestock from direct sunlight, reduces wind speed and associated erosion, reduces temperature and increases humidity.
- Nutrient cycling: nitrogen-fixing trees increase soil fertility (and can provide a grain legume) and by incorporating more biomass into soils, enables more efficient use of inorganic fertilizers. Fertility can also be improved through nutrient cycling where trees extract nutrients from the lower levels of the soil profile and return them to the surface through leaf litter.
- Spiritual and ritual values: as the life cycle of trees matches that of humans, trees have symbolic and spiritual/ritual value and local trees are part of the identity and value systems, including religious and judiciary traditions.

Apart from the tree products and services, agroforestry is often used as an entry point to progress social and community development. Advancing the biophysical benefits of trees provide a setting for wider discussions and improvements in rights, gender balance, negotiation skills, recognition, empowerment, conflict resolution, and resource access. Property rights on trees may be distinct from those on land, and allow use of trees as collateral in obtaining credit.

In a geospatial analysis of tree cover on agricultural land, Zomer et al. (2009)[1] estimated that 46 per cent of agricultural land has at least 10 per cent tree cover (Figure 1). Current research shows that better policies, human and institutional capacity and technological innovations are imperatives for enabling further agroforestry developments and even greater tree cover for wider benefits.

In terms of rural development with respect to smallholder agriculture, agroforestry seeks and helps to progress farms and communities through a five-stage framework (see Figure 2) defined as: (1) subsistence agriculture; (2) subsistence agriculture plus safety nets (biophysical, social, financial); (3) pre-commercial agriculture; (4) profitable smallholder agriculture; and (5) sustainable smallholder agriculture. With farm size diminishing against rural population increases (total number not percentage or growth rate per se) the importance of social safety nets, farmer institutions and market associations within this framework becomes evident. The main aim of our work is to help smallholders to move down through the sequence with agroforestry interventions, but we also seek to use agroforestry to stop smallholders falling backwards where ultimately they may end up in urban slums.

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[1]Zomer RJ, Trabucco A, Coe R, Place F. 2009. Trees on Farm: Analysis of Global Extent and Geographical Patterns of Agroforestry. ICRAF Working Paper no. 89. Nairobi, Kenya: World Agroforestry Centre

Figure 1. Global tree cover on agricultural land (numbers in legend show percentage tree cover).

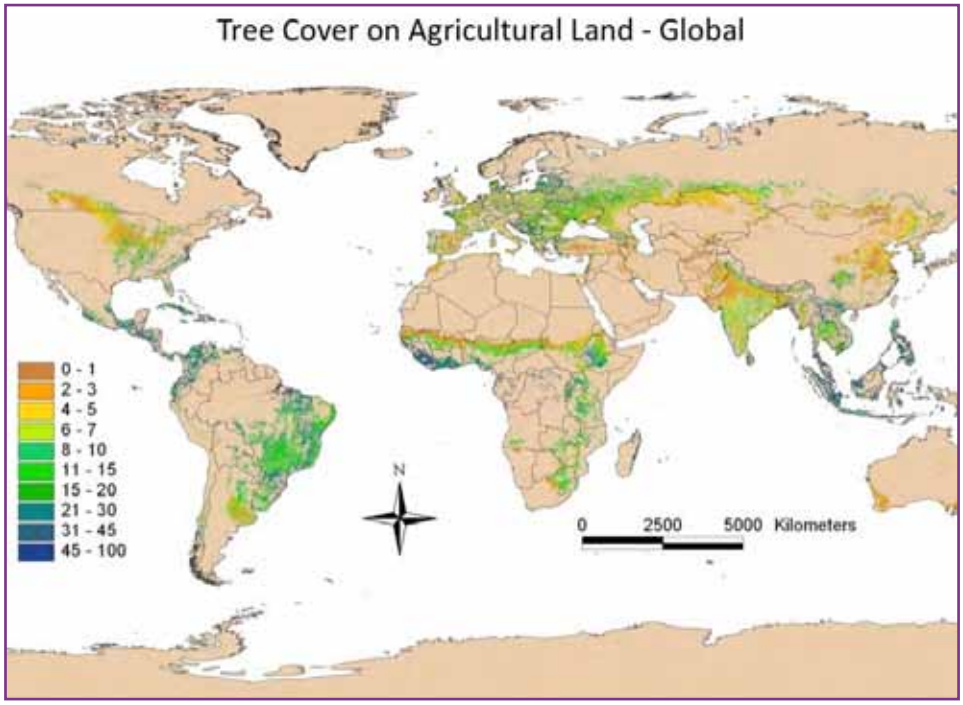
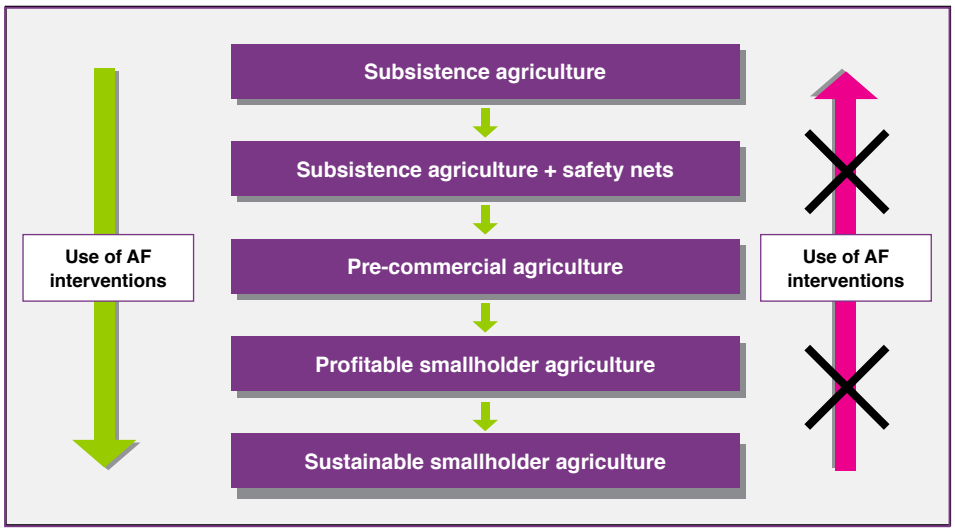


Figure 2. Five-stage smallholder agriculture framework for agroforestry



2.3 Emerging research needs and opportunities

Over the last 40 years, agroforestry research has moved from a phase of description and inventory, to one of participatory priority setting and support for on-farm technology development, supported by hypothesis testing, system model building, value chain and policy analysis. Agroforestry science as a multi- and inter-disciplinary endeavour has integrated ecological/biophysical and social/economic/policy aspects of topics such as domestication of indigenous tree species to meet farmers' needs, tree-soil-crop-livestock interactions linked to farmers' ecological knowledge, production ecology, profitability, land health analysis, climate change impact, forest tenure reform and rewards for environmental service provisioning.

Globally, the number of agroforestry researchers is growing rapidly as more work is being done to understand complex landscapes and the social, economic and environmental outcomes of various tree-based options. In Europe, North America, Australia, Japan and other temperate, developed regions, agroforestry has (re)emerged as a solution to current needs of society, often after phases of purposeful tree removal from agricultural landscapes. The number of agroforestry stakeholders has also surged to include agricultural research institutes, forestry agencies, universities, governments, private sector development organizations and funding institutions. Robust partnerships are emerging to support ***agroforestation***. The demand for good science, evidence, better policies and innovative technologies has never been higher. The following research and development opportunities are incipient.

Figure 3. Research and development opportunities

Generating multifunctional landscapes through agroforestation	Agroforestry brings together knowledge from agriculture, forestry, hydrology, energy, natural resources and environment. Successful agroforestry is boundary spanning and may involve reform of forestry and agrarian policies. Studies on landscape mosaics and their functionality are essential to provide guidance on overall landscape development alongside rights, recognition and conflict resolution through negotiation and policy reform
Reversing loss of natural forest and land degradation	Bringing degraded lands back into production will mitigate forest loss and add to fibre and bioenergy supplies that currently add pressure on forests
Meeting the growing bioenergy demand	Dwindling fossil fuel resources are driving the search for biofuels, solid and liquid for use in static and mobile applications; various trees and tree-based land use systems offer opportunities
Developing new tree crops for different ecosystems and socio-economic conditions	Global business opportunities are huge for nutritious fruits, nuts and edible foliage for the rapidly growing human population. Increased use of trees will also diversify income sources for farmers, but involves considerable time lags, beyond the attention-span of many funding agencies
Creating policy, institutions and capacity	There is a wide scale appreciation of agroforestry, but there are very few policies that integrate agriculture and forestry perspectives, while institutional capacity to implement agroforestry is limited. New coalitions of practitioners and supporters are emerging
Understanding how marketing and value addition of AF products can improve livelihoods of the poor, women and other marginalized groups	Underutilized agroforestry products have great market potential

3. The World Agroforestry Centre

The International Centre for Research on Agroforestry (ICRAF) was founded in 1978 with its global headquarters based in Kenya. It now operates in 36 countries. In 2002, it was rebranded as the World Agroforestry Centre although retaining ICRAF as its legal name and acronym.

3.1 Vision

Our vision is a rural transformation in the developing world as smallholder households increase their use of trees in agricultural landscapes to improve food security, nutrition, income, health, shelter, social cohesion, energy resources and environmental sustainability.

3.2 Mission

The Centre's mission is to generate science-based knowledge about the diverse roles that trees play in agricultural landscapes, and to use its research to advance policies and practices, and their implementation that benefit the poor and the environment.

3.3 Values

We strongly adhere to four shared core values that guide our work and relationships with colleagues, investors and partners:

- **Professionalism**. We aspire to achieve the highest standards of professionalism in our research, communications, fiduciary management and operations; high levels of personal, managerial and governance integrity; transparency in our methods and approaches; and fairness in sharing credit.

- **Mutual respect.** We genuinely respect all those with whom we work, irrespective of nationality, gender, religion, age, profession or workplace seniority. We celebrate the achievements of our colleagues and partners. We support a work environment that fosters trust, teamwork and diversity. We commit ourselves to an environment of mutual respect and collaboration with partners, donors and colleagues.
- **Creativity.** We promote a culture of innovation, continuous learning, problem solving and independent thinking. We believe that success in living and fostering these values is fundamental to maintaining a vibrant organization, contributing to science and achieving impact.
- **Inclusiveness.** We strive to be highly inclusive as a value and an organizational practice, providing an open environment for full participation, a sense of belonging, mutual commitment and supportive engagement for all.

3.4 ICRAF's roles in research in development

The World Agroforestry Centre is dedicated to generating and applying the best available knowledge to stimulate agricultural and forest growth, raise farmers' incomes and protect the environment. ICRAF has a comparative advantage in agroforestry research for development by combining six key roles which contribute to our research, research in development and development agendas (see Figure 4).

1. **Generation and validation of knowledge as International Public Goods (IPGs).**
   Involves the development and production of paradigms, models, tools, technologies, methods and materials that are available without restriction.
2. **Building robust evidence for higher level decisions on policies and investments.**
   Provision of information, analyses, scenarios and assessments to decision makers to permit better investment and policy decisions.
3. **Working with partners at multiple scales to translate IPGs into actionable knowledge.**
   Collaborative engagement with NARS and others at various levels to demonstrate and adapt more generic technologies, approaches and materials.
4. **Demonstrating proof of application of knowledge to accelerate impact and advance the science of scaling up.**
   Applying scientific methods and frameworks to scale up good policies and practices. Demonstrating, for replication, multiple approaches with controls and strong M&E foundation.

5. **Developing and mobilizing capacity at institutional and individual levels.**
   Identifying and filling capacity gaps for institutional, national and scientist benefit. In addition, assisting in raising awareness of and mobilizing efforts of existing under-utilized capacities.

6. **Convening, advocacy and interfacing amongst a wide range of partners to be co-responsible for development outcomes and better engaged with realities faced by development agencies.**
   Playing a critical boundary spanning role between actors and partners when requested or required to be able to promote and demonstrate greater and earlier impacts.

Figure 4: Allocation of roles across research, research in development and development agendas

Roles	Overall % of our effort	Research (50%)	Research in Development (30%)	Development (20%)
1. Generation and validation of knowledge as IPGs	**30%**	*50%*	*10%*	*5%*
2. Robust evidence for decisions on policies and investments	**15%**	*25%*	*10%*	-
3. Translating IPGs into actionable knowledge at national and local levels	**20%**	*15%*	*25%*	*30%*
4. Proof of application and the science of scaling up	**20%**	*5%*	*30%*	*40%*
5. Capacity development and mobilization (individuals & institutions)	**10%**	*5%*	*15%*	*15%*
6. Convening, advocacy and interfacing roles	**5%**	-	*10%*	*10%*
TOTAL	**100%**	***100%***	***100%***	***100%***

3.5 Strategic goals

Considering the trends and challenges in the global environment, the emerging research needs and opportunities, as well as ICRAF's comparative advantages and roles, the Centre has developed three integrating strategic goals upon which its programme of research for development impact is based. These goals also help us channel our efforts into the four SLOs of the CGIAR Strategic Results Framework (SRF). Recognizing the complexity of impact pathways and multiple ways and feedback loops there is no single mapping or linear hierarchy of our strategic goals to the SLOs.

Strategic Goal 1: Build livelihoods by generating knowledge, choice and opportunities

Strategic Goal 2: Improve landscapes and their sustainability by better managing their complexity

Strategic Goal 3: Transform agroforestry impacts to large-scale through policy, innovation and partnerships

Strategic Goal 1: Build livelihoods by generating knowledge, choice and opportunities

- Generate knowledge and viable agroforestry technologies to support livelihoods with trees, particularly for the poor and women
- Provide information relevant for all land users, managers and planners
- Explore different ways and implementation mechanisms of how to turn knowledge and materials into livelihood benefits
- Identify livelihood options and choices (with comparisons on returns)
- Generate options for enhancing greater self-determination and voice
- Enhance the contribution of trees to human diets and income
- Enable tomorrow's smallholders to adapt and prosper through tree-based options
- Provide smallholders with locally relevant options to increase the productivity and profitability of farming systems through sustainable intensification with trees
- Strengthen AF tree product value chains, thus enabling the poor and women to have greater access to lucrative markets.

Strategic Goal 2: Improve landscapes and their sustainability by better managing their complexity

- Integrate trees into landscapes for sustainable intensification of agriculture
- Reduce deforestation and forest degradation in mixed agriculture-forest landscapes
- Increase the multi-functionality of agricultural landscapes, and understanding of trade-offs and synergies
- Prevent and reverse landscape degradation with better soil structure and water holding capacity
- Enhance or maintain biodiversity in agricultural and associated landscapes
- Avoid eutrophication of water bodies, siltation of reservoirs and disruption of hydrological cycles
- Develop natural asset accounting and valuation/pricing of externalities
- Model and monitor the land use and land cover changes in tree-based landscapes
- Raise awareness on ecosystem services and map, monitor and value these and devise policies that create the incentives to preserve this natural capital.

Strategic Goal 3: Transform agroforestry impacts to large-scale through policies, innovation and partnerships

- Highlight and mainstream agroforestry into international, regional, national and local policies
- Participate in, convene and communicate about pilot development initiatives that use agroforestry innovations to go beyond proof of concept to proof of application
- Support development initiatives concerning agroforestry with tools and information
- Make information and evidence context-specific
- Conceive and test innovative extension approaches
- Develop frameworks for and build knowledge on the science of scaling up
- Better target resources and technologies for specified agroforestry systems and technologies
- Help catalyse provision of inputs and materials (e.g. germplasm) for successful testing and adoption of agroforestry practices at scale
- Determine how to scale up the benefits of value chain development interventions so as to benefit large numbers of smallholders and other poor value chain actors
- Take responsibility for delivery of information in ways that diverse audiences can assess, understand and use

3.6 Operational goals

In addition to the three strategic goals, the Centre has five operational goals (OGs) to underpin the strategy. These are:

Operational Goal 1: Enhancing science quality

Operational Goal 2: Increasing operational efficiency

Operational Goal 3: Building and maintaining strong partnerships, and

Operational Goal 4: Accelerating the use and impact of our research

Operational Goal 5: Greater cohesion, interdependence and alignment

Operational Goal 1: Enhancing science quality

- Maintain high relevance of the research being undertaken with regular priority setting
- Develop and advance new paradigms and models
- Publish work in peer-reviewed journals
- Attract and retain world-class scientists
- Invest regularly and proactively in cutting edge scientific equipment
- Promote on-the-job scientific training
- Manage and archive all research data and outputs
- Foster greater co-located research activities
- Routinely query methodological rigour
- Avoid, monitor and eliminate any scientific fraud
- Ensure reproducibility of results and maintain high validation thresholds
- Avoid confirmation bias in our research
- Build in strong M&E frameworks into the research

Operational Goal 2: Increasing operational efficiency

- Regular review of policies, systems and procedures
- Share and seek out best practices in organizational operations
- Maintain and routinely update an institutional risk register, and exceptions register
- Focus on and pay particular attention to financial fraud prevention
- Continue with strong and independent internal audit review and oversight
- Align our business practices and requirements optimally with collective CGIAR Consortium efforts (e.g. One Corporate System)
- Set and foster good staff diversity and gender-balanced goals
- Put in place staff evolution and continuity plans

- Develop and manage staff with appropriate performance management tools and incentives
- Maintain a vibrant and modern working environment
- Enhance and use contemporary ICT resources and platforms
- Create strong and sustainable financial reserves and funding pipelines to avoid discontinuities

Operational Goal 3: Building and maintaining strong partnerships

- Rigorous partner identification, selection and evaluation
- Undertake joint planning and implementation with partners
- Maintain particularly strong collaboration with our sister centres CIFOR and ILRI
- Build stronger partnerships with other CGIAR centres through CRPs
- Ensure clearly defined roles and well documented agreements
- Inclusion of sufficient intermediary partners to take research to impact
- Fair recognition and attribution of contributions and successes
- Leverage resources and skills of required set of partners
- Maintain a significant element of centre-funded work with partners (20-25 per cent)
- Seek efficiencies and fairness in shared resources
- Undertake convening/interfacing roles as required
- Pay particular attention to under-represented partners (e.g. private sector and youth organizations)

Operational Goal 4: Accelerating the use and impact of our research

- Review, support and influence policy reform in areas associated with agroforestry
- Understand and advance incentives for agroforestry
- Carry out impact assessments (ex ante and ex post)
- Use a Knowledge to Action (K2A) framework to better conduct and communicate our research
- Engage only where we are most credible/legitimate to take specific roles
- Assist in building stronger rural and farmer institutions, and support negotiation processes
- Communicate more effectively in timely and appropriate formats across policymakers, opinion leaders, researchers, educators, development agencies, private sector and investors
- Improve the accessibility of our science and knowledge management
- Participate in key international events and fora

- Develop and mobilize national capacities
- Contribute fully to wider CGIAR Consortium initiatives
- Advance the science of scaling up

Operational Goal 5: Greater cohesion, interdependence and alignment

- Instill a common sense of purpose amongst our staff across all cadres and locations
- Devolve decision-making as best required and avoid unnecessary hierarchy
- Empower staff with voice and choice to nurture a more coherent organization
- Develop a culture of being a more value-based organization rather than a rules-based organization
- Promote better research and administrative cooperation
- Seek synergies and optimal interaction across scientific disciplines and units
- Revisit our goals, objectives and research portfolio annually to maintain focus



4. Operationalizing the strategy

4.1 Science Domains

Research for Development (R4D) efforts at the World Agroforestry Centre are organized around six Science Domains (SDs) which when taken together respond well to the complexity and interactions of the key development challenges related to agroforestry. Our research aims to provide gender and socially differentiated answers to complex problems across different agro-ecologies, sectors and political spheres. The generation, validation and uptake of knowledge require strong organizational platforms and communication which function the SDs seek to fulfill. Collectively, the SDs form a coherent research agenda to champion the role of trees in transforming lives and landscapes. The ensuing developmental change from our SDs is derived from the robustness and innovativeness of the science as well as how well informed and engaged our development practitioners are. Our six domains encompass:

SD1 – Agroforestry Systems

SD2 – Tree Products and Markets

SD3 – Tree Diversity, Domestication and Delivery

SD4 – Land Health

SD5 – Environmental Services

SD6 – Climate Change

Each Science Domain is led by a world-class researcher who conceptualizes, develops and oversees that domain and its sub-themes as well as seeking synergies and integration with CGIAR Research Programmes (CRPs), other Science Domains and our cross-regional and regional teams. The SDs are the means to seek thematic coherence in our institutional agenda and the SD office teams are primarily focused on the first two of ICRAF's roles, namely: (i) production of global public goods, and (ii) building robust evidence for

better investments and policies. They also support our regional teams with roles concerning (iii) actionable knowledge, and (v) capacity development. The SD offices are less involved in the other two institutional roles of (iv) proof of application to investigate the science of scaling up; and (vi) convening-interfacing groups of partners as these are primarily led by our regional teams and the Impact-Extension Office. Each SD further instills a focus on innovation, gender advancement and wider public awareness and appreciation within the agroforestry arena.

SD1 - Agroforestry Systems

This domain seeks to understand how agroforestry systems can function better, be more productive, more attractive for investments and be more ecologically sustainable in the long term. The research is carried out across various tropical agro-ecologies, from humid over sub-humid to moist savannah and dry savannah (semi-arid). Optimal agroforestry systems are quite different for each agro-ecology. It includes investigations into nutrient cycling among trees, livestock and crops; using local ecological knowledge to develop improved agroforestry management; expanding tree species and cultivated diversity; enhancing water use efficiency by trees and agroforestry systems; and considering tree-crop-livestock-soil interactions to match species to sites and systems. Research into the appropriate agroforestry-management options and their economic and ecological impacts on farming systems and household welfare is led by this SD. It includes work on how multi-strata agroforestry systems can best be managed for diversity, productivity, profitability and stability. It also examines the distribution of costs and benefits of tree systems among household members and social groups. Policy-related work in this domain includes analyzing the effects of tenure security to inform debates on access, use and rights to land, water and tree resources.

SD2 - Tree Products and Markets

This domain encompasses the science behind understanding and developing value chains for agroforestry tree products as well as the institutions that support and participate in tree product markets. Market access, policy regulations, opportunities to aggregate and bargaining power greatly affect smallholders' ability to exploit agroforestry tree product commercialization. This domain identifies the "best-fit" practices for improved market access for the poor and the vulnerable, develops tools for improved value chain analysis and development, and improves stakeholder capacity to analyse and take advantage of market opportunities. In addition, the knowledge and skills, as well as gender and social standing, required to participate in markets are elucidated. Mechanisms and approaches to better engage local and multi-national private sector actors are explored in this domain. Improving women's access to markets and rural advisory services are key priorities, as are understanding how to build entrepreneurial capacity, strengthen rural enterprises (including cooperatives), engage local and multinational private sector actors and assessing how standards and certification can benefit smallholders.

SD3 -Tree Diversity, Domestication and Delivery

This research theme involves identifying, delivering and conserving quality tree germplasm as well as supporting the optimal use of the right tree in the right place for the right purpose. Research seeks to promote improved germplasm of exotic and indigenous tree species while avoiding problems associated with invasive species. In particular, work includes research on tree domestication approaches and on innovations in input supply chains leading to sustainable production and distribution of quality seeds and seedlings. Priority is given to high-value tree species (e.g. fruit, sawn wood, medicine, fodder and other commercial tree commodities) with attention also paid to trees for fertilizer, energy and other uses. Tree improvement traits considered include yield, product quality and seasonality, nutritional value, pest and disease resistance, and adaptation to current and future climates. Databases and decision support tools for the selection of species, varieties and seed sources are developed. The theme incorporates ICRAF's global Genetic Resource Unit (GRU), which focuses on the conservation and sustainable use of diverse tree genetic resources. Policy development work is undertaken with the International Treaty for Plant Genetic Resources and the relevant UN Conventions, along with national policy frameworks.

SD4 - Land Health

This domain is concerned with understanding land degradation and how it can be prevented, reversed and its significance better communicated and recognized. This is within a wider landscape characterization and management approach that deals with nested and interacting biophysical and social scales. It aims to develop and promote scientifically rigorous methods for measuring and monitoring land health, assessing land health risks, and targeting and evaluating agroforestry and other sustainable land management interventions to improve soil fertility, ecosystem health and human wellbeing. The work involves field, laboratory and modelling approaches to build robust evidence for policies, investments and practices. The Land Health SD incorporates the world-renown HQ and satellite country plant and soil labs. This SD engages most significantly with the ICRAF GeoScience Lab using its research outputs on baselines, time-series analyses and land health metrics to relate geo-referenced field data to grid-based remote sensing approaches. It is also contributing to conceptualization of our Decision Hub and applied information economics thinking.

SD5 - Environmental Services

This domain is focused on understanding and promoting the benefits and sustenance of key environmental services associated with tree-based landscapes including water, soil stabilization, carbon and biodiversity. The management of these multifunctional landscapes requires mechanisms to balance: (a) goods and services; (b) short- medium- and long-term objectives; and (c) efficiency and equity in the pursuit of sustainable development. It includes work on the biophysical, social and economic trade-offs and synergies in natural resource management. This includes research on hydrological functioning of tree-based landscapes and global processes. It also promotes approaches and mechanisms for efficient and fair management of ecosystem services by various stakeholder groups, whilst reviewing existing and formulating more favourable new policies. This SD coordinates and incorporates ICRAF's contributions to the ASB Partnerships for the Tropical Forest Margins (ASB). ASB explores options for shaping land use at forest-agriculture interfaces in the humid tropics with the goal of raising the productivity and income of rural households without worsening deforestation or undermining essential environmental services.

SD6 - Climate Change

This domain is concerned with the vulnerability of smallholders and developing countries to the negative effects of climate change. It attempts to examine how poor farmers and national/sub-national agencies can better adapt to changing conditions as well as benefit from mitigation opportunities. Trees themselves are affected by climate change and climate variability, and hence this SD seeks to understand and monitor how trees, agroforestry systems are responding to current climate variability. It also strives to reconstruct past climates with dendro-chronological techniques. Carbon markets and ways developing countries and their farmers can benefit from them is a priority research topic. Another growing research topic is how biofuels can assist with human-mediated climate change. The SD investigates ways in which trees in landscapes can assist actors to intensify, diversify and buffer farm systems. Substantial work on upscaling and downscaling of modelling efforts is undertaken. The generation and validation of standardized assessment methods and protocols for greenhouse gas and benefits measurement are key IPG elements of this SD. Policy work at national and international level includes inclusion of practices and dimensions that preferentially assist developing nations and smallholder farming communities to cope with climate change.

4.2 Regional implementation

The research and development work of the World Agroforestry Centre spans global, regional, national, sub-national and local scales. Whilst our research is conceived globally around six Science Domains it is largely implemented through regional/national teams of ICRAF staff and partners.

Regional networks

For more than 25 years, ICRAF has operated regional networks throughout the tropics. These are recognized and interact with the relevant subregional organizations in agriculture (e.g. APAARI, ASARECA), forestry (e.g. Africa Forest Forum), environmental (e.g. DIVERSITAS) and intergovernmental (e.g. African Union) spheres. These regional network offices allow ICRAF to dialogue and liaise with regional and subregional processes, as well as provide efficiency and oversight to effectively manage the national country teams, and provided shared managerial services to CGIAR as well as other co-located partners (e.g. CIRAD, AWARD). The regional offices consolidate multiple national country office plans, budgets and expenditure reports, as well as mobilize appropriate levels of financial and human resources at regional and national levels. The regional network offices have a full complement of managerial and administrative staff as well as centralized business processes for the region. ICRAF does not maintain its own independent regional research facilities (labs and field sites) and bases itself within national partner and community locations.

ICRAF operates five regional programmes through a regional network office as follows:

- East and Southern Africa Region (with two subregions in East Africa and Southern Africa)
- West and Central Africa Region (with two subregions in Humid and Semi-Arid areas)
- Southeast and East Asia Region (with two subregions in Southeast Asia and East Asia-China)
- South Asia Region
- Latin America Region

Country teams

Each of the regional network offices manages a group of geographically associated country offices. These country offices house locally-based country teams as well as host visiting global and regional scientists (ICRAF and seconded staff). They are the principal mode for undertaking our regionally-based research. By basing much of our implementation through country teams this provides a better local contextualization for research and ensures that the research is responding well to key needs and challenges as they evolve. It also feeds ideas into the more globally-oriented Science Domain offices to spark innovation and methods/tools development. The country team approach also permits ways to better co-locate research with other research and development partners, often through long-term sentinel sites. The network of country sites further provides options to examine how contrasting biophysical, market and social conditions affect research outputs and outcomes. In addition, the deployment of common designs and methods across country sites allows meta-analyses and syntheses that would otherwise not be possible. The country offices range in size from near-complete complement of research, management and administrative staff to a handful of seconded staff on ICRAF contracts.

Figure 5: Where ICRAF works

East and Southern Africa Region	West and Central Africa Region	SE and East Asia Region	South Asia Region	Latin America Region
Regional Network Office: Nairobi, Kenya	***Regional Network Office:*** Yaounde, Cameroon	***Regional Network Office:*** Bogor, Indonesia	***Regional Network Office:*** Delhi, India	***Regional Network Office:*** Lima, Peru
Ethiopia Kenya Malawi Mozambique Rwanda Tanzania Uganda Zambia Zimbabwe	Burkina Faso Cameroon Côte d'Ivoire Democratic Republic of Congo Ghana Mali Niger Nigeria Sierra Leone	China Indonesia Philippines Thailand Vietnam	Bangladesh Bhutan India Nepal Sri Lanka	Brasil Costa Rica Peru

4.3 Research support and advice units

The Science Domains as well as regional teams all share some cross-cutting and common elements, management and methodological needs. Consequently, a number of units exist to support the Science Domains and regional programmes. The costs for these units are charged as a proportion of scientific time to ensure research benefits from strong support, up-to-date methods and common approaches.

These units and functions include:

Research Methods Group (RMG) - responsible for providing appropriate research methods and analytical approaches. The RMG also leads the centre's efforts in ensuring our research data is well documented, accessible and archived.

Impact Assessment and Rural Advisory Services (IARAS) - leads the impact studies and monitoring and evaluation work of the centre. In addition, the extension approaches, rural advisory services and science of scaling up leadership falls under this unit.

GeoScience Lab (GSL) - brings together new methods and models for geo-spatial analyses at different scales and for a variety of purposes. Setting relevant baselines and researching trends in land, vegetation, demographic, climatic and other variables is a key part of the unit.

Knowledge Management - seeks to make the outputs of the centre more widely known and accessible. It brings new accessibility, tagging and cross-referencing approaches to the knowledge base of the centre and focuses on connecting people to people, people to content and content to content.

Communications - provides oversight of all corporate communications, public awareness, scientific publications, media relations, website management and special event reporting with blogs and articles. The centre seeks to spend at least 5 per cent of its total budget on communications and much of this is done through regional offices and project teams.

Capacity Development - aims at improving skills, knowledge, working styles, attitudes, and understanding of its research and development partners about agroforestry in areas where ICRAF has comparative advantage. The nature of capacity strengthening activities may range from teaching and supervision of graduate and postgraduate research students and other types of young scholars through mentoring and on-the-job training, seminars, workshops and conferences.

Agroforestry Policy Initiative (API) - comprises a team of senior advisors and partners such as FAO who work at informing decision makers, key policy advisors, NGOs and governmental institutions. They seek to show how agroforestry can be integrated into national strategies and how policies can be adjusted to specific conditions. Policy guides provide examples of best practices and success stories, as well as lessons learned from challenges and failures.

4.4 Resource requirements

ICRAF operates, has influence and achieves its goals through a combination of resources (human, capital and financial) that it generates: (a) for itself; (b) for partners; (c) as partner co-funding; and (d) from larger resource pools that it leverages. In terms of financial and human resource reporting only sources (a) and (b) are considered even though sources (c) and (d) are even more substantial.

Financial resources

Figure 6 summarizes the financial revenues and needs over the 10-year period 2013 to 2022. It projects a realistic annual growth of between 5 and 7 per cent. Currently, approximately two-thirds of funding comes from bilateral grants and one-third through the CGIAR Fund, although we expect this to swing to parity within 2-5 years and by 2022 to be reversed to a two-thirds to one-thirds ratio.

Figure 6: Projected income and expenditure – 2013-2022 (in US$ millions)

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Income										
Unrestricted	0.941	-	-	-	-	-	-	-	-	-
Bilateral grants	41.807	48.740	47.470	48.603	46.535	44.919	42.254	38.427	37.344	36.138
CRP funds	17.622	20.544	26.702	31.074	38.074	44.919	51.644	60.104	66.390	73.372
Other income	0.989	1.765	2.059	2.084	2.198	2.228	2.522	2.733	2.863	2.908
Total	**61.359**	**71.049**	**76.231**	**81.761**	**86.807**	**92.066**	**96.420**	**101.264**	**106.597**	**112.418**
Expenditure										
Research expenses	56.754	60.895	65.342	70.287	74.700	79.363	83.212	87.644	92.352	97.555
Management expenses	8.286	8.830	9.344	9.910	10.458	11.031	11.317	11.569	12.098	12.682
Total	**65.040**	**69.725**	**74.686**	**80.197**	**85.158**	**90.394**	**94.529**	**99.213**	**104.450**	**110.237**
Surplus/(Deficit)	(3.681)	1.324	1.545	1.564	1.649	1.672	1.891	2.051	2.147	2.181

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World Agroforestry Centre

Strategy 2013-2022

Transforming lives and landscapes with trees

The Strategic Goals of the World Agroforestry Centre

Strategic Goal 1: Build livelihoods by generating knowledge, choice and opportunities

Strategic Goal 2: Improve landscapes and their sustainability by better managing their complexity

Strategic Goal 3: Transform agroforestry impacts to large-scale through policy, innovation and partnerships

CGIAR

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