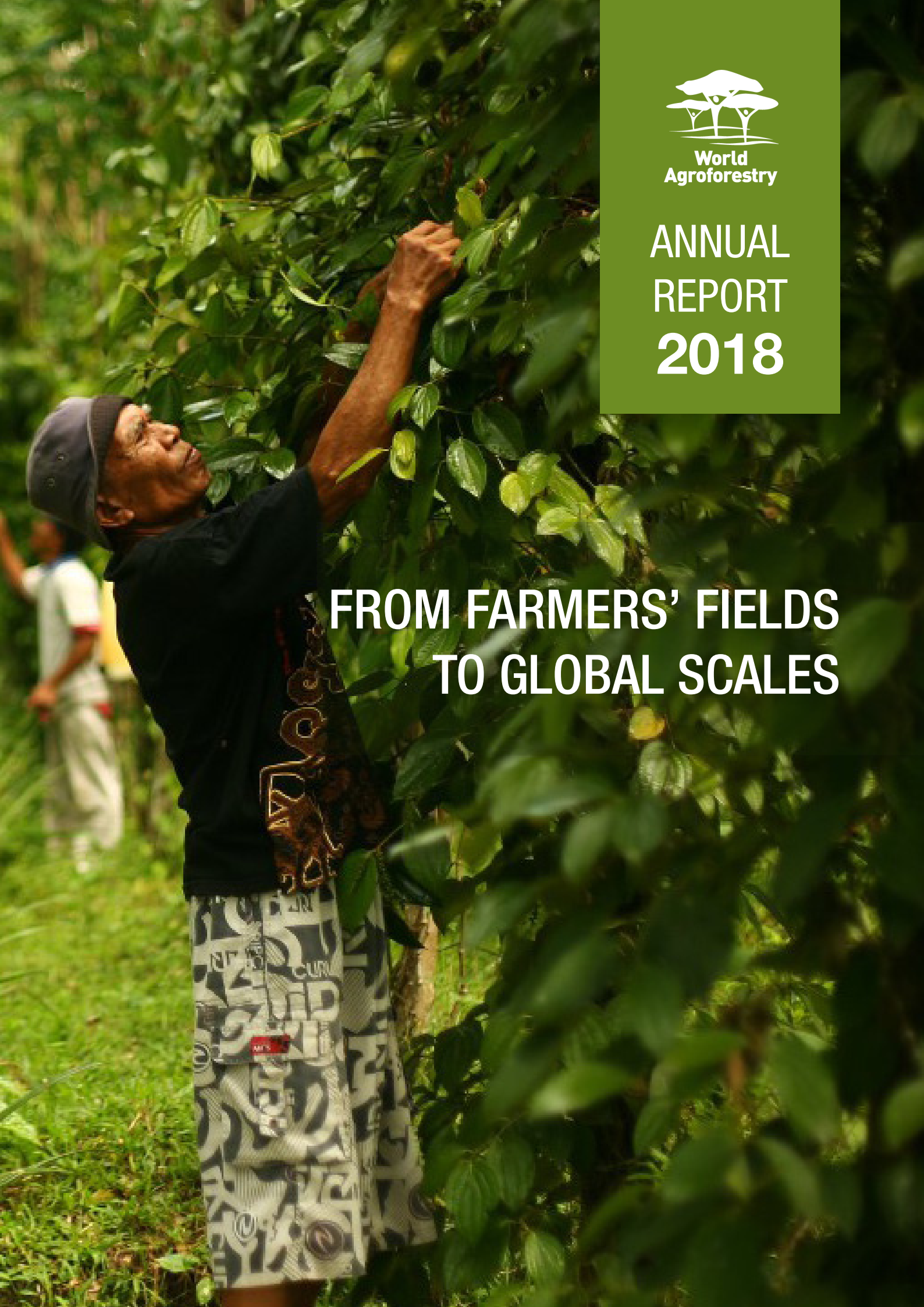




World  
Agroforestry

# ANNUAL REPORT 2018

## FROM FARMERS' FIELDS TO GLOBAL SCALES





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From a portfolio of 9,335 tCO<sub>2</sub>e  
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**World Agroforestry (ICRAF)** is a centre of science and development excellence that harnesses the benefits of trees for people and the environment. Leveraging the world's largest repository of agroforestry science and information, we develop knowledge practices, from farmers' fields to the global sphere, to ensure food security and environmental sustainability.

**Our vision:** An equitable world where all people have viable livelihoods supported by healthy and productive landscapes.

**Our mission:** To harness the multiple benefits trees provide for agriculture, livelihoods, resilience and the future of our planet, from farmers' fields through to continental scales.

**Our value offer:** We are the place to engage for:

- Providing robust evidence and analyses
- Making available social and technical solutions
- Assisting with design, decision and delivery options



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## MESSAGE FROM THE CHAIR OF THE BOARD OF TRUSTEES AND THE DIRECTOR-GENERAL

In 2018, World Agroforestry began its fifth decade of innovative research for development: a milestone year.

Since our establishment, the very concept of agroforestry—agriculture with trees—has been inextricably linked to ICRAF. The year 1978 was a time of disconnect between people and the world's natural resources; one of little recognition, understanding or appreciation of the vital role trees play in rural habitats. While the interdependence of people and the environment is now widely recognized, the challenges remain, and have evolved into the hot-button issues facing the global community in the 21st century.

The need to better address these challenges motivated the landmark decision with which World Agroforestry closed the year: an agreement to merge with the Center for International Forestry Research (CIFOR), our sister CGIAR centre and the leading institution devoted to international forestry research. The merger became effective 1 January 2019, with the appointment of a Common Board of Trustees mandated to prepare the two centres for a full legal merger within three years. In the intervening period, ICRAF and CIFOR will be governed in compliance with their respective charters; they will preserve their autonomy and separate legal status as international organizations while operating under a common management team. Both entities will also remain active members of the CGIAR.

The benefits of this merger will be evident in the synergies created by leveraging the policy research, knowledge products and knowledge services of both organizations, using the Global Landscapes Forum as a repository and disseminator of information and as a convenor of key players in landscape management, land-use policy, forestry and agroforestry. Together, CIFOR and ICRAF

will provide the research, policy development and tailored solutions to help forward-thinking countries, communities and companies improve land management, livelihoods, sustainability and resilience.

Our partners and clients have warmly welcomed the merger. The need for improved land management, and the role of cutting-edge agroforestry and forestry practice in making it possible, are widely acknowledged. So, too, is the urgency to support governments, cities, multinational corporations and communities in developing and implementing solutions that are coherent and sensitive to social goals and the maintenance and enhancement of the water, carbon, phosphate and nitrogen cycles.

With growing anxiety about climate change and increased politicization of the topic, natural-resource accounting will drive the need for advisory and other services. CIFOR and ICRAF are uniquely qualified—technically, financially, institutionally and by their missions—to respond to these demands.

### Our work in 2018

World Agroforestry works across four interrelated research themes in six regions of the world. The diversity of our work, which in 2018 has been documented in over 300 publications, mirrors the multifaceted nature of agroforestry itself, spanning diverse topics but at the same time connecting them; because complex problems require solutions from multiple disciplines. In our 2018 Annual Report, we use the multiscale nature of agroforestry as a framework for illustrating how we are tackling the climate crisis, poverty, biodiversity loss and land degradation.

In this report, we show how our field activities responded to farmers' needs while building evidence to improve development practice. We highlight landscape-level work on land restoration

and our contributions to national-scale policy development. And we describe our work at global and continental scales: work that further cements ICRAF's reputation for high-level science and advice grounded in local realities and field-based research.

### Our finances in 2018

Our activities in 2018, as always, were made possible through the support of numerous public and private investors who share World Agroforestry's vision. We are grateful to all our funding partners for their support and trust. We are pleased to report that at USD 55.3 million, our grant income for 2018 registered an increase of almost 5% over 2017, thus reversing the contraction witnessed between 2016 and 2017. The year saw an even more encouraging increase of 13% in bilateral grant support.

Against this, there was an increase in general and administrative expenses (USD 10.0 million versus USD 7.7 million in 2017). However, ICRAF's short-term solvency stood at 148 days (well above the CGIAR benchmark of 90–120 days), while adequacy of reserves stood at 108 days (versus the recommended minimum benchmark of 70–90 days). Further details on our expenditures and costs can be found on pages 28–31; our detailed 2018 Financial Statement is available [online](#).

Thanks in part to our work, the central role of trees in the interdependence of people and the environment has never been more widely appreciated. We trust that this Annual Report demonstrates not only that Planet Earth needs agroforestry, but that World Agroforestry is delivering on the promise set out in our vision and mission. Please visit our [newly relaunched website](#) to see how we continue to strive to realize our vision: an equitable world where all people have viable livelihoods supported by healthy and productive landscapes.



A handwritten signature in blue ink, reading "Marie Claire O'Connor".

**Marie Claire O'Connor**  
Chair, Board of Trustees



A handwritten signature in blue ink, reading "Anthony Simons".

**Anthony Simons**  
Director-General

## A MESSAGE FROM WORLD AGROFORESTRY'S STAFF



It gives me great pleasure to convey warm greetings on behalf of all World Agroforestry staff to our partners and all readers of our 2018 Annual Report. From Bogor to Yaoundé, Brasilia to Nairobi, we take great pride in sharing our achievements and impact based on our shared values of professionalism, mutual respect, creativity and inclusiveness.

**Catherine Muthuri,**  
Chair, ICRAF Staff Association

## WORLD AGROFORESTRY'S SCIENCE IN 2018: FROM FARMERS' FIELDS TO GLOBAL SCALES



2018 has seen a shift in discourse. The media, general public and policy makers now refer not simply to global change but to global crises: in climate, in biodiversity, in land degradation and, still, in poverty and hunger.

World Agroforestry recognizes the urgent need for solutions.

In Bankassa Commune, Mali, a mother of seven begins working with a newly established rural resource centre and starts to accumulate savings.

In Laikipia County, Kenya, local authorities and others come together to work out how to recover the ecosystem services of their landscape.

In Nepal, agroforestry science informs the design of a national agroforestry policy to strengthen the country's response to the climate crisis.

In multiple countries in Africa, Asia and the Americas, producers, policy makers and scientists collaborate on how to use trees on farms to meet global biodiversity commitments, all supported by World Agroforestry and its partners.

Our work in generating knowledge and offering knowledge services at multiple scales supports a virtuous cycle of change: field-level innovation builds to impacts at landscape, regional and global scales while being further enabled by policy, social and technological developments.

2018, as well as being a landmark year in our Centre's history, has been one of notable achievements and impacts. This section of our 2018 Annual Report describes some of them: harnessing the power of trees from farmers' fields to continental and global scales.

### **Ravi Prabhu**

Deputy Director-General for Research



## FARMERS AND THEIR FIELDS



**World Agroforestry** is a centre of scientific excellence that likes to get its boots muddy. We ground our work in farmers' realities and build them into development projects. This research-in-development approach makes development more effective and ensures our research meets the gold standards of salience, relevance and legitimacy.

The '**Options by Context**' approach is a cornerstone: one size does not fit all; development options have to fit local contexts. Our research at all scales seeks to clarify what works where, and why; nowhere is this better seen than at the scale of farmers and their fields.

### Magnifying impact by embedding research in development

In 2014, ICRAF scientists Ric Coe, Fergus Sinclair and Edmundo Barrios **proposed a new direction in agroforestry research**. They argued that nesting research in development would greatly increase the impact of both. This new research paradigm is now in action.

'Thousands of farmers are in the process of comparing options for soil and water conservation, tree establishment, post-harvest pest and disease control, livestock governance and farmer-managed natural regeneration,' commented **Fergus Sinclair**.

## Options and contexts

Farmers need locally adapted options to help them respond to the many challenges they face: the climate crisis, land degradation, pests and diseases, extreme poverty.

ICRAF, with its partners, is testing a range of practices that transcend narrower concepts of agroforestry. They include different approaches to boundary planting, to woodlots, fruit orchards, fodder banks, soil and water conservation, riverbank stabilization, pasture management, pest control, water management, farmer-managed natural regeneration, and fertilizer micro-doses.

‘Farmers expect options and solutions to problems that will bring lasting benefits. Involving them in research is the best way to both ensure that options fit local contexts, and to facilitate subsequent scaling up,’ said **Patrice Savadogo**, leader of the IFAD/EU-funded [Restoration of Degraded Land for Food Security and Poverty Reduction in East Africa and the Sahel](#) project in Mali. ‘Time and time again, we find that one size does not fit all.’

### Context matters

Studies by ICRAF’s [James Roshetko](#), [Meine Van Noordwijk](#) and colleagues in Southeast Sulawesi Province, Indonesia, found that farmers’ local knowledge about cacao cultivation sometimes conflicted with findings from scientific studies. This is in part because the former reflected specific local contexts—underlining the importance of harnessing local knowledge in the design and evaluation of options.

In Nepal, ICRAF’s [Rachmat Mulia](#) and [Betha Lusiana](#), with colleagues from Forest Action Nepal, University of Adelaide and University of New South Wales found that [farmers’ preferences for tree species—but not crop species—were strongly influenced by ethnicity and household economies](#).

‘What works in one place doesn’t always work elsewhere,’ commented cacao and coffee specialist, Philippe Vaast. ‘For example, shade trees are often promoted as a climate change adaptation strategy. However, under extreme drought in Ghana [we found that the two species examined made things worse](#); their shading effect was outweighed by their strong competition for water.’

In Brazil, ICRAF and partners developed [AnaliSAFS](#), an Android application that includes a component for comprehensive participatory diagnosis of the local context of individual farms. Country Coordinator, Andrew Miccolis, revealed that, ‘By shedding light on their objectives, vulnerabilities and resources, the tool enables farmers and technicians to tailor systems to their specific context.’





East Nusa Tenggara Huge bamboo canes near the village.  
© Aulia Erlangga/CIFOR

The projects are united by common elements: they identify or build on options suitable for local contexts, build or strengthen tree-product value chains, include measures to secure large-scale adoption and initiate concrete measures to ensure that gender is taken into account, so that solutions benefit both women and men.

Farmer research-collaborators find ways to make the technologies work for them. Marie Jose of Rwanda has participated in trials on biomass incorporation ([Trees for Food Security 2, an ACIAR-funded project](#)). She understood how useful alder is for stakes, firewood and poles but discovered more: 'I never knew it was a powerful source of green manure ... now we have another important type of fertilizer.'

The varying experiences of hundreds of thousands of farmers like Marie Jose are generating the data

that our scientists need in order to understand which options work best in which contexts.

### Value chains and agribusiness: making them work for the most vulnerable

Not all tested options are directly related to market-oriented production. For example, participants in the [DRYDEV](#) project have been constructing farm ponds, which are now emerging as 'hubs' for other technologies.

Mary wa Kimali, a farmer in Kenya's Kitui county, explained how the pond that her farmers' group established has provided the water needed for a tree nursery: 'We have established tree nursery enterprises comprising local indigenous species, particularly those that help protect against pests and diseases.' One innovation enables another.

In other cases, development of options necessarily includes work on value chains and agribusiness, which are central to projects such as the ACIAR-funded [Kanoppi](#)<sup>1</sup> in Indonesia and the [Coady Foundation-financed Triple A](#) project<sup>2</sup> in Western Kenya.

The research in Indonesia, carried out by the Australian National University's Marcellinus Utomus under the [Kanoppi](#) project, is being applied by ICRAF to support the Indonesian Government's 10-year Seribu Desa Bambu (Thousand Bamboo Villages) program. It has identified options for more equitable participation of growers in value chains, particularly the lucrative handicraft value chain. ICRAF has established village learning centres to help communities connect better and more equitably with the private sector.

'That is key to improving incomes and livelihoods,' said ICRAF's project coordinator, Aulia Perdana.

The Triple A project has encouraged smallholders to look at their farms as businesses. The innovative 'Leaky Bucket' methodology, documented in a [manual](#) by ICRAF project leader, Lisa Fuchs, and colleagues, targets one precondition for this shift: helping farmers appreciate and quantify their income and costs.

1 <sup>1</sup>Developing and promoting market-based agroforestry options and integrated landscape management for smallholder forestry in Indonesia

2 <sup>2</sup>Accelerating adoption of agroforestry in Western Kenya

Value chains will not work automatically for the most vulnerable; institutions, incentives and culture all shape outcomes. For this reason, major development agencies have produced guides for integrating gender considerations in value chain development. In 2018, ICRAF Latin America scientists Jason Donovan and Trent Blare, together with colleagues from Bioversity International, reported on their [evaluation of seven widely-used guides for incorporating gender perspectives into the design and implementation of value chain development](#).

Their analysis, based on a purpose-designed assessment framework, not only identified several positive attributes, but also highlighted a need for stronger emphasis on several aspects.

These include intra-household dynamics, the role of men, and how collective enterprises address discriminatory gender norms and promote women's participation. More widely, the scientists noted that the guides are insufficiently linked to tools addressing other aspects of value chains.

'Quite often, practitioners use just one tool, which is usually limited in its conceptual and methodological coverage,' noted Donovan. 'This suggests the need for innovation in the design of practitioner-oriented guides; for example, fewer checklists and more incorporation of field-level insights on application. It also implies the need for innovation in guide application, including the use of specialized guides to address specific issues that emerge in the implementation process. Some of these comprise baseline formulation, gender strategies and design of business models.'

## Large-scale adoption

ICRAF scientists from Viet Nam, Trong Hoan Do and Rachmat Mulia observed that lack of knowledge on how to establish and maintain trees could constrain adoption of agroforestry practices, particularly by vulnerable groups. This is one reason why research in development must be coupled with effective extension and other advisory services. ICRAF has pioneered farmer-to-farmer extension through which adoption rates can be multiplied far beyond direct project beneficiaries.

In the Finland-funded [FoodAfrica 2 Project](#) (2016–2018), the Volunteer Farmer Trainer (VFT) approach, a form of farmer-to-farmer training developed by ICRAF, proved very effective. A volunteer trains over 50 other farmers, on average. By early 2018, 87 collaborating organizations across Kenya, Uganda, Tanzania and Rwanda had adopted the VFT approach; between them they deploy more than 19 000 VFTs, serving about 383 000 farmers.

Organizations using VFTs often achieve a higher proportion of women trainers compared to the conventional extension approaches. One of them, Sara Kawere from Mukono in Uganda, trained more than 30 farmers over a period of two months. Her words illustrate her commitment:

'I meet many people as they pass by my fodder demonstration garden, in church, in women's groups and village meetings. Normally, I train these groups informally. My joy comes when I see them appreciate and take on the new fodder technologies to improve their milk production and income. Since I don't pay for the knowledge I receive as a farmer trainer then I must pass it on as a gift for free.'

ICRAF's Steve Franzel, leader of the Extension component of the project, commented: 'Sara's exemplary training techniques demonstrate that the use of farmer-trainers is an effective, relatively fast and cost-effective approach. Farmers learn more from fellow farmers whom they easily identify with and whom they believe share similar problems and challenges.'

The VFT approach is effective. Nevertheless, sustainability is a concern: many donor-funded farmer-to-farmer extension programs collapse when projects end. Institutionalization—mainstreaming into institutions' day-to-day operations—is one response to this challenge. [In a 2018 article](#), ICRAF scientists Evelyne Kiptot and Steve Franzel highlighted the conditions that need to be in place for this to happen, based on research on dairy producers' organizations in Kenya. They found that the stakeholders' support and 'ownership' of the institutionalization process was key, together with shared understanding and effective building of institutional structures.





A VFT showing a farmer how to plant gliricidia. © World Agroforestry

## Regreening Africa: business unusual

In 2017–2018, ICRAF and partners began implementing the EU-financed Regreening Africa project.

[Regreening Africa](#) is no ordinary project.

ICRAF's **Susan Chomba**, the project manager, noted, 'Everything we do reflects a "business unusual approach"; we are trying to avoid the all-too-familiar pattern of not failing but not scaling.'

With the help of seasoned partners like World Vision, CARE International, Catholic Relief Services, Oxfam International and Sahel Eco, the project will support national and local governments and CBOs in directly re-greening 1 000 000 ha of degraded land and reaching 500 000 families.

'But our ambition is far greater,' added Chomba. 'We're aiming at catalysing the restoration of tens

of millions of hectares of degraded land across the continent.'

Regreening Africa is already engaging with decision makers, development partners and others at multiple levels and in multiple sectors in each of the eight countries. The aim is to realize this wider objective in specific 'leverage sites', where other actors in the landscape will adopt or accelerate land restoration via policy or practice.

## Gender: 'Men thought they were doing that ...'

ICRAF scientist Emilie Smith Dumont neatly summed up a guiding principle of World Agroforestry's interventions worldwide: 'Tackling harmful gender stereotypes and gaps cannot be considered an accessory to technical interventions; it is a critical requirement to achieving sustainable outcomes.'

In parts of sub-Saharan Africa and other regions, wider changes—such as male emigration, increased education, legal reform and higher awareness of women's rights and domestic violence—are already leading to changes in gender relations. Such change brings new opportunities.

However, ICRAF staff working on the [EU/IFAD-funded project on taking land restoration successes to scale<sup>1</sup>](#) discovered that to reap maximum benefits, [careful exploration of the gender implications of restoration interventions is needed](#).

'Unless gender is considered systematically there is a risk of perpetuating or even reinforcing existing inequalities rather than advancing equality,' observed ICRAF gender specialist **Ana María Paez-Valencia**.

For example, the planting basins that the project has been testing lead to higher yields and provide women farmers with greater independence from predominantly male-controlled resources such as oxen and ploughs. On the other hand, almost 40 percent of basin-digging was done by women working alone compared to 27 percent for usual farming activities. The women reported that this additional work limited their ability to collect firewood and water.

'Such data are basic in developing options that work for both women and men,' added Paez-Valencia.

In the CIFOR-led [West Africa Forest-Farm Interface project](#), ICRAF and partners examined labour and gender gaps in control over resources and decision-making. The findings indicated that women contributed significantly to the households but that there were large differences in access to resources and strong imbalances in intra-household decision-making.

These results were later discussed with communities through structured dialogues. Participants were encouraged to reflect on the results and their implications. They made some telling remarks.

'Even if you don't tell the truth, you have the power,' said Bibata Ouedraogo, reflecting on a role-playing game in which she played the part of a male household head.



Workshop participant, Bibata Ouedraogo, shares a humorous moment with ICRAF's Emilie Smith Dumont. © World Agroforestry

Another participant, Stephen Adayira, said he was surprised to see the amount of income that women contributed to the household. 'Men thought they were doing that,' he said.

In 2019, data from the research in development approach—reflecting our gender-sensitive development of options for specific contexts—will continue to accumulate and further inform development decisions, not only at the farm level, but also at landscape and policy levels.



## LANDSCAPES AND THEIR COMMUNITIES



A tropical savannah landscape on Indonesia's Sumba Island. © World Agroforestry/Robert Finlayson

No farmer, no farm, is an island: all play roles in the wider context of a landscape. The economic, ecological and social dynamics of landscapes affect farmers' options while farmers' decisions and those of others affect landscape health. That is, the capacity to supply the ecosystem goods and services on which humans and all life depend.

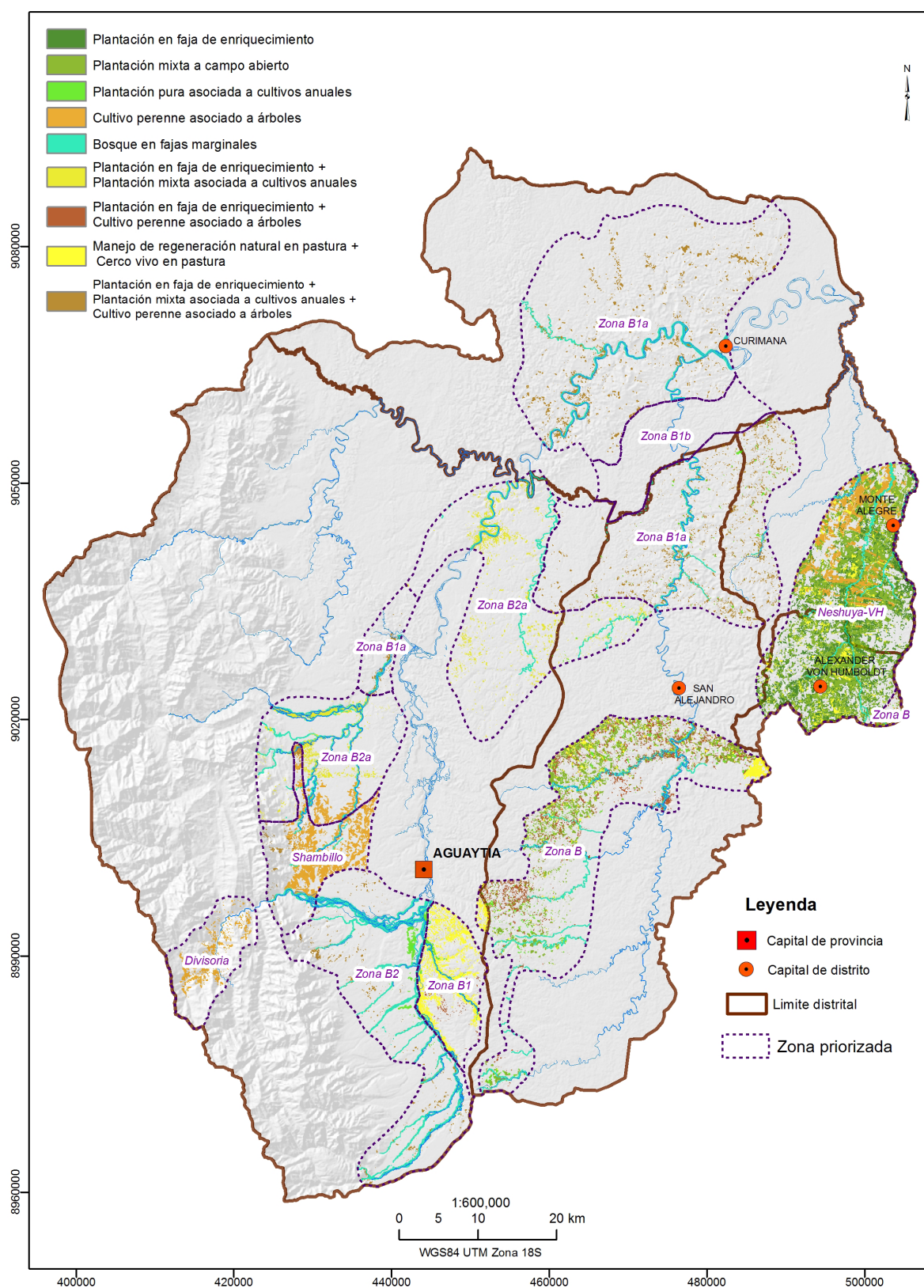
Here we focus on some examples of how World Agroforestry's activities in 2018 demonstrated how the landscape approach can be implemented.

### Land restoration in practice

Land degradation affects vast areas of the 40 percent of our planet's surface that is used to produce food. Unsustainable practices have reduced the capacity of these lands to produce the goods and services that people and the planet depend on, such as food, water, carbon sequestration and habitat.

Land degradation is both symptom and cause of the climate and biodiversity crises; it cuts across the great challenges that humanity faces.

'To restore land effectively, we need indicators that are objective, measurable, take into account the complex processes that operate at different scales, and that are cost-effective,' said Tor-Gunnar Vågen, Head of World Agroforestry's Geo-Science Lab.



Restoration Options map for the 1 000 000 ha Padre Abad Province in the Peruvian Amazon. A map tells a thousand stories: not just of biophysical reality and the results of cutting-edge science, but also of the experience, knowledge and priorities of local people.



A tall order, but ICRAF's Land Degradation Surveillance Framework ticks those boxes (and others). [A 2018 article by ICRAF scientist Leigh Winowiecki and her colleagues](#) reveals how the Framework can transform approaches to assessing degradation and identifying restoration options. It employs a combination of 'smart' field sampling and cost-effective soil analysis using spectroscopy instead of conventional 'wet' techniques. It also utilizes sophisticated statistical inference to produce accurate predictive maps.

In their Laikipia County (Kenya) case study, the scientists mapped soil organic carbon, sand content, pH and vegetation cover over 200 km<sup>2</sup> at a cost of approximately USD 1 per hectare. The Framework has now been applied in other East African countries, the Sahel, the Peruvian Amazon and India.

World Agroforestry recognizes that information alone is not enough: it must be relevant to users and available in a friendly form. ICRAF's Land Degradation Surveillance Framework team have met this goal by drawing on another innovation from the organization: the [Stakeholder Approach to Risk Informed and Evidence-based Decision-making](#) (SHARED).

SHARED and the Framework have come together to help users co-design their own [Decision Dashboards](#): regularly updated, highly visual displays of information and data that inform decision-making by allowing users to access trends and links between types of data that are often not available in the same location.

### In restoration too, local context matters

Leigh Winowiecki and other ICRAF scientists also collaborated with Bangor University scientist Mary Crossland in a study on local perceptions of land degradation. Through participatory mapping, farmer interviews and biophysical field surveys they found while farmers across the study area agreed that human actions and unsustainable land management practices have led to severe degradation in the form of soil erosion, men and

women within the same community often did not have the same priorities or perceptions about where, when and how to address degradation. This suggests that perceptions vary with respect to gender roles; consistent with men and women being most likely to observe degradation at the spatial locations they spend most time and effort. Nevertheless, such issues can be overcome with the use of the right approaches.

**Leigh Winowiecki** comments: 'Based on the study, we were able to formulate three guiding strategies. Priorities need to be negotiated and accompanied by clear incentives for action. Second, these priorities and options must be matched to local contexts. Finally, co-production of knowledge and indicators is central to ensuring that the restoration activities stay on track.'

### Multi-stakeholder platforms: beyond 'muddling through'

Not only is restoration challenging, but lasting success and land degradation neutrality require that restored land stays that way. Integrated landscape management can help achieve that. However, putting it into practice is easier said than done.

In 2018, ICRAF's Landscapes Theme leader, Peter Minang, and colleagues provided essential guidance in a [detailed analysis on the needs of a common central component of integrated landscapes initiatives: the multi-stakeholder platform](#). The authors argue that, 'challenges in landscapes are often urgent and wicked, and just getting stakeholders around a table will not automatically result in changes on the ground.'

Rather, they suggest a participatory method to aid planning, monitoring and evaluation of such platforms, based on a three-fold approach of 'looking forward, looking inward, and looking back'. They also highlight successful pilots of the methodology in Ghana and Indonesia, which yielded valuable inputs for adjustments of the approach.

## In Peru, ICRAF demonstrated how restoration planning could achieve synergy with mitigation and adaptation

Peru has committed to restoring 3.2 million ha of degraded land. In supporting this process, World Agroforestry scientists have stressed the importance of the complementarity between restoration and other elements in the national and subnational environmental and development agenda.

This was reflected in a collaboration with Serfor (the National Forest Service and Forest Authority), subnational authorities, and IUCN to implement an augmented ROAM<sup>3</sup> process that explicitly aimed at integration and synergy with local climate change and territorial planning initiatives. The process included implementation of the [Low-Emissions Development Strategy](#) (LUWES) planning methodology developed by ICRAF Southeast Asia, in this case oriented towards restoration activities.

The work was carried out in Padre Abad, an Amazonian province of almost 1 000 000 ha, and built on earlier applications of the methodology. Through a participatory, multi-actor process including 16 technical, analytical and consultative workshops, ICRAF's researchers facilitated the identification of specific ecosystem services of interest, local indicators of degradation, restoration objectives, and eight generic restoration alternatives.



## In Indonesia, communities work to make Sumba 'Sandalwood Island' again

Sumba Island was once known as Sandalwood Island. However, after almost 300 years of exploitation, forests remain only in steep gullies and on inaccessible hilltops. The Ministry of Forestry estimates that 80 percent of East Sumba is critically degraded. Unlike much of Indonesia, the area experiences harsh and long dry seasons. Grass fires and livestock destroy crops and seedlings. In addition, when the rains arrive, they can be extreme, resulting in floods and destruction of crops.



Hendrik Mbolu Manggal, proud owner of 'The Sandalwood Farm'  
© World Agroforestry/Robert Finlayson

Yet, despite these adverse conditions, the farmers of East Sumba District are committed to restoring their land. In recent years, the Wahana Visi Indonesia-led [Rural Economic Development](#) project has supported them. The initiative, which was completed in mid-2018, has left a legacy of highly motivated communities and farmer extensionists like 19-year-old Regina Rensi D. Deru from Mbatapuhu.

'I gained a lot of new knowledge and became more confident,' she said. 'Usually in every session I led, I had five to ten people who attended and, although most of them were older than me, they listened to me seriously.'

Farmer Hendrik Mbolu Manggal was trained by ICRAF in sandalwood cultivation. He now has 600 trees. At maturity in 10-20 years, they will each sell for upwards of USD 2,500. He is happy to share his success. Other farmers often stop by his farm, which is becoming known as 'the sandalwood farm'.

'Sumba used to be called Sandalwood Island,' he said. 'Sandalwood is important for all Sumbanese. Yes, our environment today is harsh, but it shouldn't make us harsh. Our hearts must be strong. We must plant trees. If 1000 people plant one tree each day, in 10 years there will be many, many trees.'



## POLICIES AND COUNTRIES



All over the world, results such as those documented in the preceding pages have proven that agroforestry can help governments resolve domestic poverty alleviation and environmental objectives, while also meeting international commitments.

World Agroforestry scientists—both the 63 percent based ‘in country’ and those at our headquarters in Nairobi—have been a key resource informing policy development: policy that can further magnify the positive impact of agroforestry on livelihoods and landscapes.

### National agroforestry policies

In 2014, India became the first country to adopt a National Agroforestry Policy. The policy has successfully brought together groups in the agricultural, environmental and rural development sectors: a precondition for resolving historical policy bottlenecks, removing institutional barriers and overlaps and for achieving a more integrated approach to land-use planning. It has also speeded much-needed reform of regulations that affect value chains of farm-grown tree products.

Success is contagious. In 2018, World Agroforestry continued its support to neighbouring Nepal in developing its own national agroforestry policy, a process supported by the [Climate Technology Centre and Network](#). Nepal’s policy will promote



An agroforestry landscape in Nepal

climate- and pest-resilient farming systems, integration of tree, crop and livestock production, maintain and increase forest and tree cover, reduce pressure on natural forests by ensuring availability of agroforestry products, build links between agroforestry farmers and markets, industries, banks and insurance providers, and facilitate investment and funding for agroforestry.

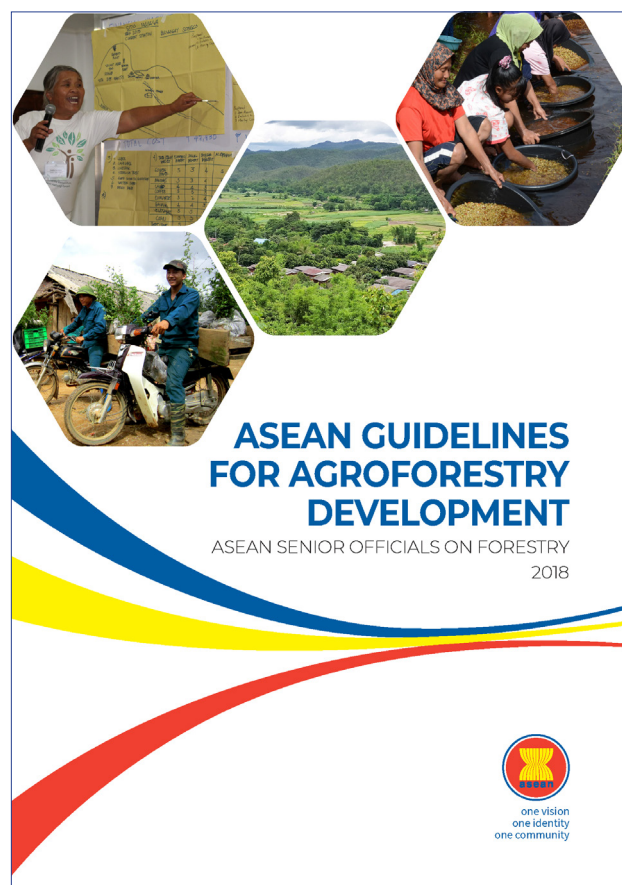
The impetus for development of national agroforestry policies has now spread beyond South Asia. In Central America, the Government of Belize has also requested support from the Climate Technology Centre and Network to develop a national policy.

In the Philippines, representatives of government forestry and agriculture agencies, the private sector, universities, farmers' organizations and NGOs, meeting in a forum co-organized by ICRAF and the University of the Philippines, [called for a national agroforestry policy to meet climate challenges](#).

Meanwhile, ICRAF is responding to a request to assist in the development of a national agroforestry strategy for Rwanda, funded by FAO.

Calls for an agroforestry policy for the Philippines have a wider context: the 2018-published [ASEAN Guidelines for Agroforestry Development](#), endorsed by ASEAN ministers of agriculture and forestry in October.

The publication, co-authored by ICRAF Viet Nam coordinator Delia Catacutan and other scientists from ICRAF and partners, sets out 74 guidelines within 14 principles.





## Contributing to successful policy on multiple fronts

World Agroforestry's policy work also encompasses research aimed at informing specific policies or their implementation.

### Success in Peru

The Agroforestry Concessions scheme is an innovative legal provision under the 2012 Peruvian Forest Law. It seeks to reduce deforestation and promote restoration of previously cleared land by 40-year usufruct concessions to smallholders, conditional on their committing to agroforestry and other sustainable practices.

To date, the scheme has been little-used—but effective implementation would benefit more than 120 000 smallholder families living on over 1 000 000 ha of land, including almost 500 000 ha of carbon-rich forest that might otherwise be lost.

The research conducted by World Agroforestry's BMZ<sup>4</sup>-financed project, Support to the Development of Agroforestry Concessions (SUCCESS), led by ICRAF scientist Valentina Robiglio, aimed at enabling evidence-based implementation of agroforestry concessions.

SUCCESS was based explicitly on the research-in-development paradigm and its emphasis on the need for appropriate options for differing socioecological contexts.

An independent evaluation of the project commissioned by the CGIAR Research Program on Forests, Trees and Agroforestry (FTA) found that SUCCESS was indeed successful, contributing to the policy process by informing smallholders, building government capacity to implement better the Agroforestry Concessions scheme, helping to build coalitions to sustain progress, and establishing the project team's credentials for supporting government agencies responsible for the legal framework.

**Valentina Robiglio** comments, 'We were able to demonstrate that investing in agroforestry can stabilize precarious smallholder farmers and is strategic in meeting national and climate change in biodiversity targets.'

In 2018, BMZ approved a larger, follow-up project that will enable World Agroforestry and partners to build on these achievements, while testing the usefulness of alternative types of rural advisory services.



4 German Federal Ministry for Economic Cooperation and Development



## Informing Uganda's food policy

Although the focus of the Sustainable Development Goal 2 to 'End hunger, achieve food security and improved nutrition, and promote sustainable agriculture' may be universally shared, the formulation of policy to achieve it is not straightforward, not least because no country has perfect knowledge and each has to deal with a unique set of uncertain factors.

ICRAF scientist Eike Luedeling and partners at the University of Bonn, supported by the UK Government, responded to this challenge by pioneering the use of Stochastic Impact Evaluation, which allows holistic models to be built by using both 'hard' data and qualitative information, including subjective opinions. The approach can also be used to estimate the value of filling specific knowledge gaps, allowing users to better prioritize research and data collection.

In Uganda, the researchers worked with a group of experts to examine the decision to implement agricultural industrialization as part of the [Uganda Vision 2040](#). Perhaps the most useful results of this sort of activity are those that may be counterintuitive. In this case, [the results indicated that industrialization could increase the prevalence of micronutrient deficiencies](#), suggesting grounds for re-examining existing policy.

Eike Luedeling and colleagues also developed a [Decision Analysis Methods Guide](#) that outlines participatory procedures for experts, analysts and others to apply these approaches.

## GLOBAL AND CONTINENTAL SCALES



Agroforestry landscape near Wote, Kalawa, Kenya. © World Agroforestry

### Responding to the climate crisis

#### Quantifying and maximizing the contribution of agroforestry to sequestration of greenhouse gases

‘Agroforestry is already offsetting about a third of total agricultural emissions,’ noted Dennis Garrity, the United Nations Drylands Ambassador and former ICRAF Director-General during [a June 2018 agroforestry conference held in Da Nang, Viet Nam](#).

Agroforestry’s unique role is increasingly recognized. For example, the 2017 best-selling book, [Drawdown](#), listed 100 top approaches to greenhouse gas sequestration, at least 15 of which are (agro)forestry-related.

ICRAF is working at farm, landscape and national levels to further enhance this contribution. Here, we highlight important advances in 2018 by ICRAF scientists and collaborators at global and continental scales.

ICRAF Southeast Asia scientists, Ni’matul Khasanah, Meine van Noordwijk and colleagues led [pioneering work on peatlands in Indonesia](#). They compared remnant logged-over forest and four dominant land-use types, generating much-needed estimates of the carbon emitted when peatland—of which Indonesia has 20.6 million ha—is converted from forest and drained for agricultural purposes.

The scientists found that recently established oil-palm plantations on smallholdings had the highest emissions: 121 tonnes of CO<sub>2</sub> per year. This was lower than industrial oil-palm but higher than agroforestry practices—such as coffee gardens, rubber agroforest and mixed betel nut gardens—and more than twice the default values suggested by the Intergovernmental Panel on Climate Change.

They argued that effective solutions to the problem of peatland conversion will require more detailed work with smallholders and the government agencies associated with peat management.

It is not only the 'visible' part of agroforestry that contributes to climate change mitigation. In 2018, [work by ICRAF East and Central Asia scientist Lingling Shi and colleagues](#) shed light on the global potential of agroforestry for sequestering belowground carbon. They found that homegardens sequestered more carbon than the other practices they examined. Analysing more than 400 paired comparisons, they observed that mean soil carbon stocks under agroforestry were 19 percent greater than for cropland or pasture. They also calculated that, globally, agroforestry could store an additional 5.3 billion metric tons of carbon.

ICRAF Latin America carbon scientist Marta Suber and her colleagues from CIAT, the [Tropical Agricultural Research and Higher Education Center](#) (CATIE), CIFOR and national institutions focused on the potential contribution to greenhouse gas sequestration by Latin American silvopastoral systems.

In a November 2018 workshop at CIAT HQ in Colombia, a group convened by the [CGIAR Research Program on Climate Change, Agriculture and Food Security's Livestock Plus project](#) established a network for monitoring, reporting and verification. A major publication will be produced in 2019, focusing on countries' readiness to integrate silvopastoral systems within national monitoring schemes. This is a long overdue development: although the potential of silvopastoral systems for carbon sequestration has long been recognized in principle, it has been much neglected in practice.

No doubt exists regarding the effectiveness of agroforestry as a climate-crisis mitigation strategy. However, not all agroforestry options are equal. In 2018, [CIRAD and ICRAF scientist Philippe Vaast and colleagues](#), working in the Western Ghats of India, found that agroforestry with native species maintained higher carbon stock (and higher biodiversity) than agroforestry with the increasingly used exotic *Grevillea robusta*.

Beyond choice of practices and species, [a global study by ICRAF Southeast Asia's James Roshetko and colleagues](#) explained that the use of appropriate seed sources is as important in maximizing carbon sequestration as it is in maximizing productivity and profitability.

'Best-practice germplasm sourcing approaches have a lot of potential for improving the effectiveness of carbon sequestration,' said [Roshetko](#). 'The scale of the impact would vary, but even basic measures to avoid the use of poorly-adapted seed sources could increase carbon sequestration by 30 to 40%.'

## The Climate-Smart Papers

ICRAF environmental scientist Todd Rosenstock and his collaborators suspected that valuable research on climate-smart agriculture remained unpublished and inaccessible to practitioners in the field. Their instincts were correct: in response to an open call, 65 teams of researchers from over 45 institutions (universities, research organizations, development partners, government and private sector) pitched proposals for creative and innovative papers that provide evidence on key topics that could help bring climate-smart agriculture to scale.

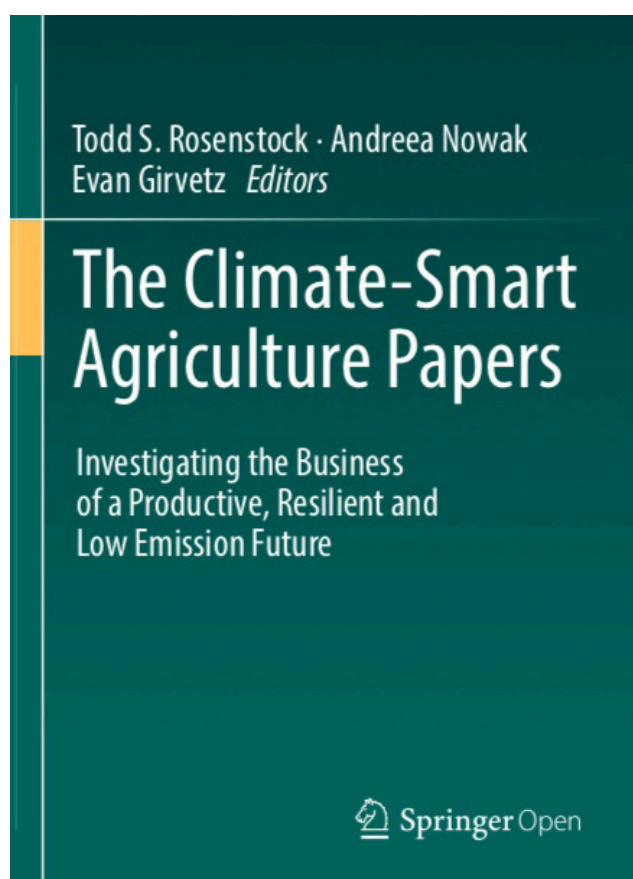
In 2018, a selection of these were published in the open-access book, [The Climate-Smart Agriculture Papers: Investigating the Business of a Productive, Resilient and Low Emission Future](#) and in the accompanying visual booklet, [Data Leaks to Help Create a Climate-Smart Future. Graphical Notes to the CSA Papers](#). The book and graphical notes reveal insights and considerations on the role of agricultural transformation under increasing climate risks.



## How to adapt

ICRAF scientists on the ground have been highly active in researching and providing guidance on approaches to adaptation and other aspects of climate-smart agriculture.

For example, the [CSA-Diagnostic Tool](#), authored by Todd Rosenstock and others, guides users in assessing the 'climate-smartness' of agricultural technologies in the field.



Other ICRAF scientists have been looking at priorities and gaps as seen from a global perspective. ICRAF's Leigh Winowiecki and colleagues, led by the University of Alberta's Minjie Chen, analysed a large dataset generated by the [CGIAR Research Program on Climate Change, Agriculture and Food Security](#). They found that access to weather information and human capital endowment have tended to be important determinants of adaptation through intensification. The results supported approaches and findings of projects that ICRAF has been involved with in [Viet Nam](#) and the [East African Highlands](#).

By contrast, in the case of adaptation through diversification, the paper by Chen and others found that significant determinants of adaptation were more common at individual-site level, suggesting that the promotion of diversification of response may require localized and targeted interventions—precisely what ICRAF's research in development paradigm seeks to facilitate.

## Mountain Futures: a key initiative in response to the climate crisis

In June 2018, researchers and representatives from governments, mountain communities and the private sector from across the globe met during a four-day Mountain Futures Conference, co-organized by ICRAF and Kunming Institute of Botany.

During the event, a major new publication was launched: [Mountain Futures—Inspiration and Innovation from the World's Highlands](#). More than 50 authors contributed to the book's 37 chapters, which cover a diversity of sociocultural and biophysical themes of relevance to sustainable land use and livelihoods in the planet's mountain regions.

'Mountain regions can serve as pathways to a better future,' said **Xu Jianchu**, ICRAF regional coordinator for East and Central Asia and editor-in-chief of the book. 'The ingenuity and diversity of mountain landscapes and peoples can be harnessed to generate bold new solutions to global challenges such as climate change. Through the mountain futures initiative, we are helping to catalyse such innovation.'



## Responding to the biodiversity crisis

The ongoing and potentially catastrophic decline of many animal and plant species directly threatens human livelihoods and planetary health. Unsustainable agricultural practices are one of the causes.

Agroforestry, as a cornerstone of sustainable agriculture, is a fundamental part of the response. In 2018, ICRAF scientists were highly active in research aimed at maximizing agroforestry's contribution to meeting the biodiversity crisis, engaging in topics ranging from biodiversity on agricultural land, through development of assessment and measurement tools, to ground-breaking work on conservation and characterization of agrobiodiversity.

## Supporting the Aichi Biodiversity Targets

[Aichi Biodiversity Target 7](#) aims to promote biodiversity conservation by ensuring that 'areas under agriculture, aquaculture and forestry are managed sustainably.'

A [2018 analysis](#) by World Agroforestry's Edmundo Barrios and colleagues indicated that agroforestry is central to this goal. They looked at the contribution of agroforestry to above- and belowground biodiversity in six agricultural landscapes in Africa, Asia and Latin America with differing degrees of tree cover.

The analysis revealed positive effects of agroforestry and trees on both the conservation value of agricultural land—for example, by maintaining pollinator populations—and on soil macrofauna.



However, once more, a key lesson was the importance of taking into consideration the local context.

As Barrios and coauthors explained, ‘The effects of agroforestry practices are not always positive and their effects on biodiversity and ecosystem services can be highly context-dependent. This suggests a need for more research into how agroforestry can best be harnessed to meet global and national biodiversity objectives.’ ICRAF and partners are already responding to this need.

In 2018, work began on a BMU IKI<sup>5</sup> project aimed directly at Aichi Target 7. The project’s title encapsulates its approach: [Harnessing the Potential of Trees on Farms for Meeting National and Global Biodiversity Targets](#). Its geographical scope—operating in Honduras, Indonesia, Peru, Rwanda and Uganda—will allow it to generate information and tools of global relevance to biodiversity and landscape restoration.

The development of a [tool for assessing and monitoring biodiversity in agricultural landscapes](#) was also a focus of activity. The tool, developed with 30 biodiversity experts from participating countries, consists of a core protocol focusing on trees and birds, supplemented by optional components on pollinators, natural enemies, soil biota, rangeland health and terrestrial vertebrates.

ICRAF ecologist Rhett Harrison, who is leading the development of the tool, explained that, ‘In terms of biodiversity conservation, the sustainable agriculture required by Aichi is something of a blunt instrument. You could say it needs sharpening. Our tool will do that by helping to maximize the effect of sustainable practices on key elements of biodiversity.’

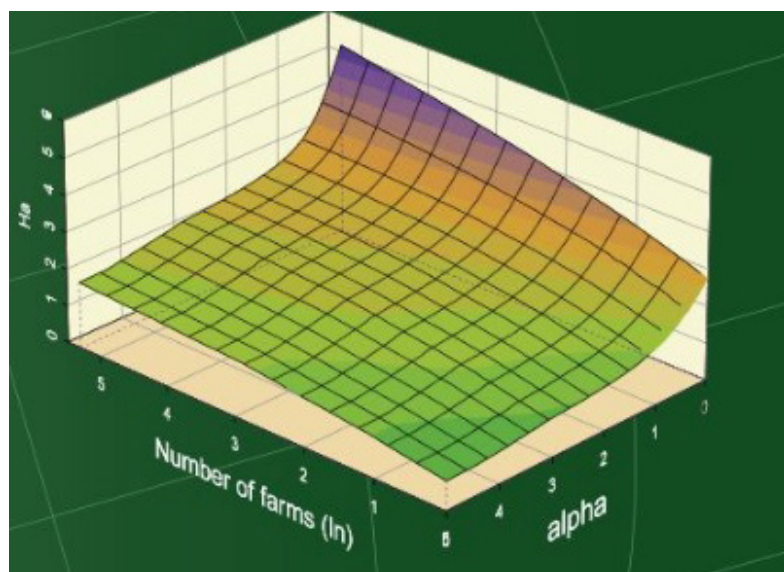
The On-Farm Biodiversity Assessment tool will add to World Agroforestry’s impressive battery of tools for biodiversity analysis. These include the highly successful BiodiversityR package, which achieved an important landmark in 2018.

The package offers a user-friendly graphical interface designed specifically for users not familiar with R-programming. [Recently, it was expanded with species’ distribution modelling functions](#), used

for example, in the recently published [Climate Change Atlas for 54 Central American Tree Species](#).

## 100,000 downloads of BiodiversityR ... and counting

In October 2018, [BiodiversityR](#), an open-access biodiversity assessment and analysis software package authored by World Agroforestry’s Roeland Kindt, achieved the landmark number of 100 000 downloads since 2012.



## Safeguarding agroforestry genetic resources for future generations

Sustainable use and conservation of genetic resources has long been a central element in World Agroforestry’s agenda. With the support of the [CGIAR Genebank Platform](#) and the [Crop Trust](#), we maintain the world’s largest collection of agroforestry genetic resources, with over 13 000 accessions of species of global and regional agricultural importance. Many are maintained in 42 field genebanks located in 16 countries, which serve as sources of high-quality, diverse germplasm to some of ICRAF’s flagship projects.

In 2018, ICRAF joined the 10<sup>th</sup> anniversary celebrations of the Svalbard Global Seed Vault in Norway’s Arctic, adding 318 seed accessions to the 1094 accessions of 180 tree species previously deposited.



'ICRAF's presence at this important anniversary celebration signalled our passionate support of the Vault's objective of ensuring that vital plant genetic resources are available to future generations,' remarked ICRAF Theme Leader **Ramni Jamnadass**.



Alice Muchugi and Ramni Jamnadass (respectively, right and left) unload treasures from ICRAF's genebank for deposit in the Svalbard Vault. © World Agroforestry

The celebration to mark the anniversary was hosted by the Crop Trust and the Nordic Genetic Resource Centre at Svalbard, in the presence of guest-of-honour Jon Georg Dale, Norway's minister of agriculture.

### The African Orphan Crops Consortium forges ahead

The year 2018 was also highly significant for the ICRAF-managed [African Orphan Crops Consortium](#) (AOCC).

The most comprehensive and integrated crop improvement venture on the continent, AOCC works with 50 woody species and 51 other crops. All have the potential to address the micronutrient deficiencies prevalent in Africa, but remain largely outside the mainstream research agenda. They

include baobab, shea, bush mango and more widely known species such as papaya, mango and avocado.

AOCC is developing genetic markers and other genomic resources and imparting training to African plant breeders to make African trees and crops more nutritious, productive and resistant to diseases, pests and the changing climate.

Concurrently, AOCC's African Plant Breeding Academy, run by the University of California, Davis, trains African scientists to enable best use of the genetic information produced.

**Ermias Abate Desta**, an Academy graduate, commented, 'This initiative is creating a network of new breed African plant breeders with a shared vision of a continent with no hunger, malnutrition and poverty. I am honoured to be part of this great movement.'

In October 2018, AOCC was officially recognized by FAO's Committee on Agriculture. An agreement was reached with FAO that endorsed AOCC's approach to addressing food insecurity by improving the nutritional content of key crop species in Africa.

AOCC has received generous support from Mars Incorporated, the Alliance for a Green Revolution in Africa, Thermo Fischer Inc, Illumina, BGI and ICRAF itself.

### Responding to the water crisis

The world is facing a growing water crisis: today, 40 percent of the world's population is affected by water scarcity. The climate crisis is already increasing the frequency of floods and droughts in vulnerable areas around the world.

Water is a recurring theme at all levels at which ICRAF operates: both drought and floods are key themes in climate change adaptation; recovery of watershed functions is a major concern in landscape restoration; and ensuring adequate quality and quantity of water are central national policy concerns.

Many of the activities described in the preceding pages directly address water issues. Nowhere is



African plum for sale in a village market in Cameroon. © Charlie Pye-Smith.

one of ICRAF's core maxims—the right tree in the right place—more important than when discussing water issues.

### A major new report on forests and water

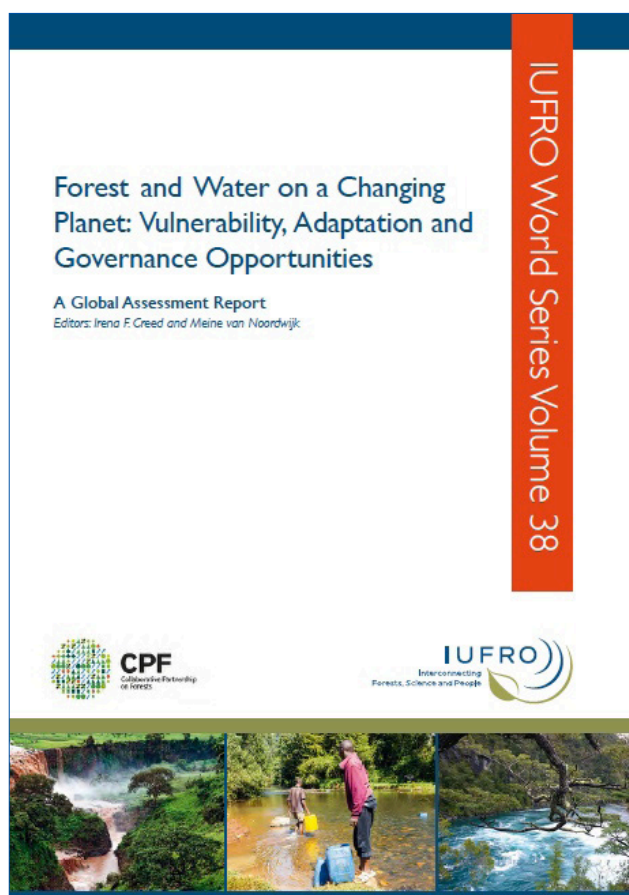
In 2018, ICRAF scientist Meine van Noordwijk coedited and coauthored a major IUFRO-coordinated GFEP<sup>6</sup> report titled: [Forests and Water in a Changing Planet](#). He observed that, 'the shift that we have seen in agroforestry concepts—from field- and farm-level to landscape-and governance-level—has helped us understand that all water-related aspects are interlinked, that they are urgent in the current sustainable development discussion, and are open to a wide range of tree and agroforestry-based interventions.'

ICRAF East and Central Asia Coordinator Xu Jianchu, coauthor of several chapters, noted that 'while public attention has tended to focus on the potential of forests as carbon sinks, from a local perspective, water is often seen as a greater priority.'

The report advocates a more coherent, nature-based approach to water flows (availability, quality, avoiding disasters) and storage. This includes both the concept of an intermediate tree-cover optimum at landscape scale, for which agroforestry is one vehicle, and due attention to the increasingly recognized 'rainbow water' component: water released into the atmosphere by trees.

6 Global Forest Expert Panels of the Collaborative Partnership on Forests





‘This is an important but understudied aspect of the world’s water cycle,’ said van Noordwijk. ‘The invisible moisture comes back as rainfall, both nearby and at vast distances, depending on the global location of the source.’

The report presents [10 conclusions](#) with implications for decision-makers at different scales. These include the centrality of water to all 17 Sustainable Development Goals and a clear call for a ‘systems approach’ to climate–forest–water–people relations, as well as for greater investment in collection of data necessary for evidence-based, locally-appropriate landscape management.

[World Agroforestry’s ongoing merger with our sister organization CIFOR](#) will allow the two organizations to tackle water issues using the integrated, multi-scale approach that is required: as it will for the many other issues that require solutions that transcend the traditional divisions between agriculture and forestry.

## OUR PUBLICATIONS

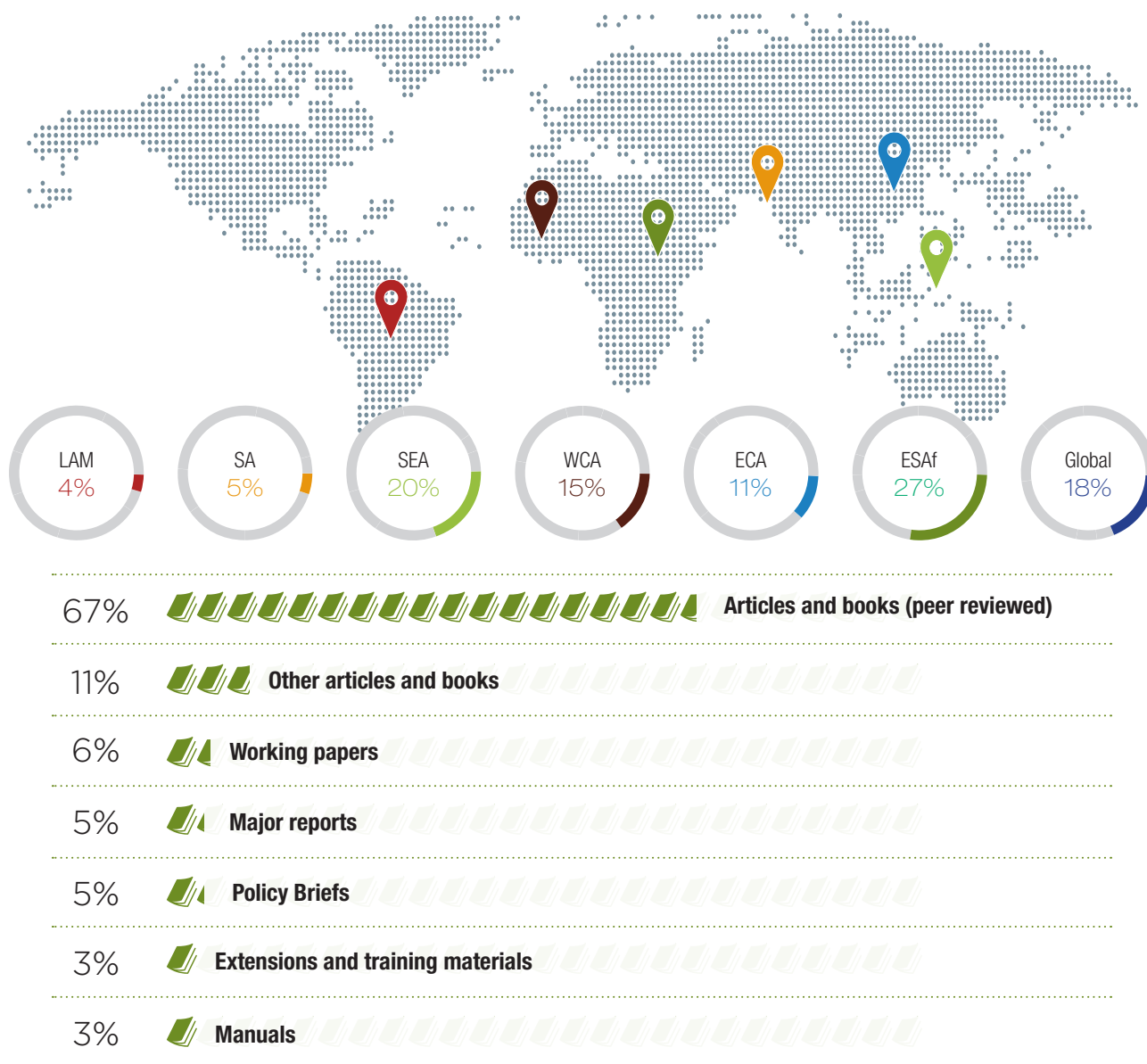
The work described in the preceding sections is documented in our 2018 publications, as are the many other outputs and findings that World Agroforestry scientists produced during the year.

These 331 scientific and technical publications include peer-reviewed articles, book chapters or books, manuals and policy briefs.

**Sixty-three percent** of them are available through online open access.

**Seventy-eight percent** of our publications addressed specific challenges or opportunities in one or more of our six global regions. The remaining 18% were of pantropical or global application.

### ICRAF 2018 Publications: Geographical Focus

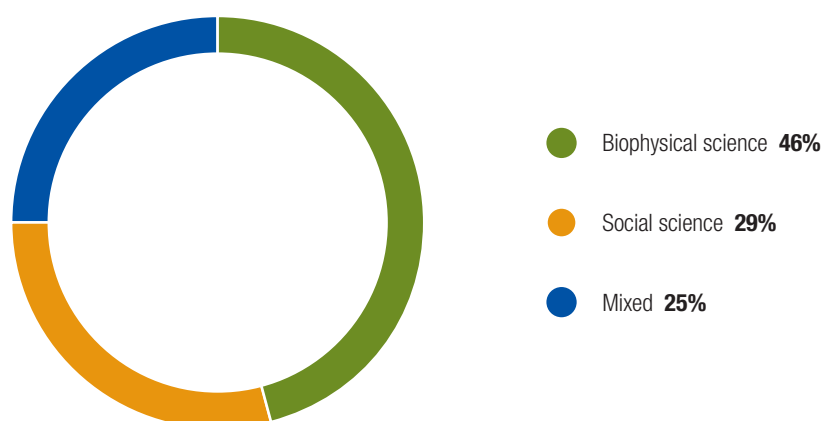


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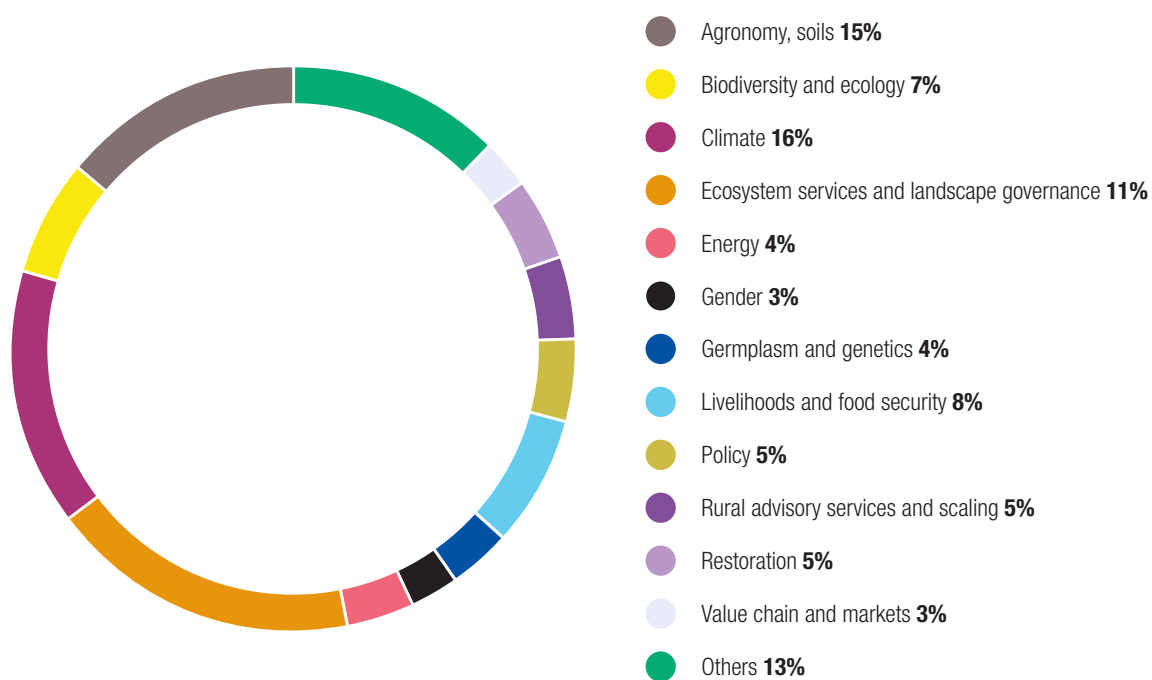
LAM: Latin America Region; SA: South Asia Region; SEA: Southeast Asia Region; WCA: West and Central Africa Region; ECA: East and Central Asia Region; ESAf: East and Southern Africa Region



### ICRAF Publications 2018: Publication Type



In 2018, our publications continued to reflect ICRAF's longstanding strength in biophysical science. However, more than half were the products of social science research or involved both biophysical and social science research.



Our publications address a variety of challenges and opportunities directly linked to the 'hot-button' issues of climate change, sustainable landscape management, biodiversity and poverty.

## OUR IMPLEMENTATION PARTNERS

World Agroforestry achieves its impact through and with its implementation partners, from farmers' associations through to national governments, the private sector and international organizations. 2018 has been no exception. Here we take pleasure and pride in recognizing each of these mutually beneficial relationships and in thanking each partner for the trust they have placed in us.

Abeokuta Federal University of Agriculture, Nigeria	Center for People and Forests, Thailand	Department of Environment and Natural Resources, The Philippines
ABT Associates, USA	Center for Research and Teaching in Tropical Agronomy, Costa Rica	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH, Germany
Action Contre la Faim, France	Centre D'Appui aux Femmes et aux Ruraux, Cameroon	Dien Bien Extension Center, Viet Nam
Adventist Development and Relief Agency, Kenya	Centre de Coopération Internationale en Recherche Agronomique pour le Développement, France	Eberswalde University for Sustainable Development, Germany
African Forum for Agricultural Advisory Services	Centre Suisse de Recherches Scientifiques en Côte d'Ivoire	Emory University, USA
African Network for Agriculture, Agroforestry and Natural Resources Education	Centro Bartolome De Las Casas, Peru	Empresa Brasileira de Pesquisa Agropecuária, Brazil
Aga Khan Foundation	Chiang Mai University, Thailand	Environment and Rural Development Foundation, Cameroon
Agropolis Fondation, France	Chinese Academy of Agricultural Sciences	Ethiopian Environment and Forest Research Institute
Amani Nature Reserve, Tanzania	CNRA, Côte d'Ivoire	Ethiopian Institute of Agricultural Research
ANADER, Côte d'Ivoire	COBABA, Cameroon	Farm Concern International, Kenya
Asia Network for Sustainable Agriculture and Bioresources, Nepal	CODEL, Cameroon	Georg-August-Universität Göttingen, Germany
Asian Pulp and Paper Group, Indonesia	CODEM, Cameroon	Global Shea Alliance, Ghana
Association Tous Egaux de Doumzok, Cameroon	Commonwealth Scientific and Industrial Research Organization, Australia	Government of Kenya
Bagong Silang Binhi Farmers Association, The Philippines	Community Association for Development of Ngoume, Cameroon	Government of Zambia
Bakingili Community Forest, Cameroon	Cooperativa Agrícola Mista de Tomé-Açu, Brazil	Groupe d'Initiative Commune Agroforestier de la Communaute Mgbasseng de Ngoume, Cameroon
Beijing Municipal Bureau of Forestry and Parks, China	Coopérative Agroforestière de La Trinationale, Cameroon	Groupe d'Initiative Commune Chilly Revolution Verte du Cameroun, Cameroon
Better Globe Forestry Limited, Kenya	COPEME, Peru	Groupe d'Initiative Commune des Communautés de Famille Banane, Bagbam, Banteba, Bakeh et Baka de Medjoh, Cameroon
Bioversity International	Copperbelt University, Zambia	Groupe d'Initiative Commune Econome de Mindourou, Cameroon
Borlaug Institute for South Asia, India	Côte d'Ivoire Landscape and Planning	
Cameroun Ecologie, Cameroon	Crops for the Future Research Centre	
CARE Denmark	Danish Centre for Forest	
CARE International Niger	Department of Agricultural Research Services, Malawi	
Catholic Relief Services		
Center for International Forestry Research		

- Groupe d'Initiative Commune  
Forêt Communautaire Nguimbock  
Logbassanguen, Cameroon
- Groupe d'Initiative Commune Forêt  
Communautaire Solidarité Nyogn et  
Kelle, Cameroon
- Groupe d'Initiative Commune Forêt  
Communautaire Boomabong/Pouth  
Ndjock, Cameroon
- Groupe d'Initiative Commune La  
Dymanique, Cameroon
- Groupe d'Initiative Commune MBACOF,  
Cameroon
- Groupe d'Initiative Commune PNNT,  
Cameroon
- Groupe d'Initiative Commune Pour  
le Developpement de la Foresterie  
Communautaire a Nlomoto, Cameroon
- Groupe d'Initiative Commune  
PRODEVINDO, Cameroon - Groupe  
d'Initiative Commune Sodenkang,  
Cameroon
- Groupe d'Initiative Commune Union  
Coeurs des Forets D'assok 1, Cameroon
- Guamán Poma, Peru
- HELVETAS Swiss Intercooperation
- Higher National School of Statistics  
and Applied Economy of Abidjan, Côte  
d'Ivoire
- HM Clause Inc, USA
- Hunan Yunjin Group Company Limited,  
China
- Imaging Solutions Limited, Kenya
- IMBARAGA Farmers Association,  
Rwanda
- Indian School of Business
- Institut de l'Environnement et de  
Recherches Agricoles, Burkina Faso
- Institut des Sciences Agronomiques du  
Burundi
- Institut National de la Recherche  
Agronomique, France
- Institut Senegalais de Recherche,  
Senegal
- Institute for Agricultural Research for  
Development, Cameroon
- Instituto de Investigaciones de la  
Amazonia Peruana, Peru
- Instituto Iniciativa Amazônica, Brazil
- Instituto Nacional de Innovación Agraria,  
Peru
- Instituto Nacional de Investigación y  
Tecnología Agraria y Alimentaria, Spain
- Instituto Salvia Soluções  
SocioAmbientais, Brazil
- International Center for Agricultural  
Research in the Dry Areas
- International Crops Research Institute  
for the Semi-Arid Tropics
- International Humana People to People  
Movement, Zimbabwe
- International Institute of Tropical  
Agriculture
- International Livestock Research  
Institute
- International Network for Bamboo and  
Rattan
- International Union for Conservation of  
Nature
- International Water Management  
Institute
- Internews, USA
- Irish Aid
- Islamic Organization for Food Security of  
the Organization of Islamic Cooperation,  
Kazakhstan
- Jomo Kenyatta University of Agriculture  
and Technology, Kenya
- Kapchorwa District Landcare Chapter,  
Uganda
- Kasungu District Council, Malawi
- Kazakh National Agrarian University
- KEFI Minerals Ethiopia Limited
- Kenya Agricultural and Livestock  
Research Organization
- Kenya Forest Service
- Kenya Forestry Research institute
- Kisii University, Kenya
- KKO International, France
- Kunming Institute of Botany, China
- Kyrgyz National Agrarian University
- Lake Basin Development Authority,  
Kenya
- ICCO Cooperation, The Netherlands
- Leibniz Universität Hannover, Germany
- Lilongwe University of Agriculture and  
Natural Resources, Malawi
- M'mbelwa District Council, Malawi
- Makerere University, Uganda
- Mali Bicarburant S.A, Mali
- Malindi Maximum Prison, Kenya
- Mbale Coalition against Poverty, Uganda
- Mekelle University, Ethiopia
- Ministry of Foreign Trade and  
Development Cooperation, Netherlands
- Ministry of Agriculture and Rural  
Development, Viet Nam
- Ministry of Environment and Forestry,  
Viet Nam
- Ministry of Environment, Peru
- Mount Elgon Tree Growing Enterprise,  
Uganda
- Murdoch University, Australia
- National Academy of Sciences of  
Kyrgyzstan
- National Agricultural Research and  
Innovation Centre of Hungary
- National Centre for Genetic Resources  
and Biotechnology, Nigeria
- National Forestry Resources Research  
Institute, Uganda
- National Institute of Forest Science,  
Korea
- Nelson Mandela African Institution of  
Science and Technology, Tanzania
- New Mexico State University, USA
- Northern Mountainous Agriculture and  
Forestry Science Institute, Viet Nam
- Norwegian Refugee Council
- Oregon State University, USA
- Oromia Agricultural Research Institute,  
Ethiopia
- Oxfam UK
- Princeton University, USA
- PT Riset Perkebunan Nusantara,  
Indonesia
- PT Tridaya Alam Lestari, Indonesia
- PUR Projet, France



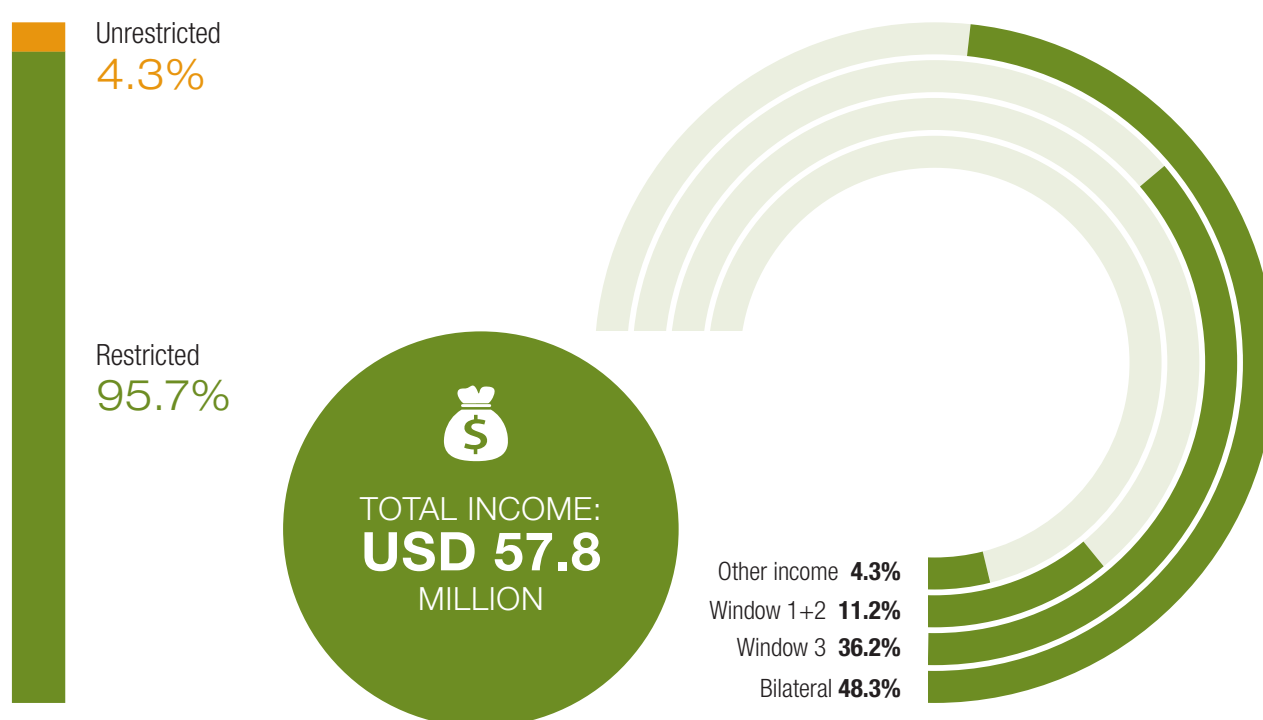
Regional Universities Forum for Capacity Building in Agriculture, Uganda	TCCF CIG, Cameroon	University of Leeds, UK
Republican Scientific Production Centre for Decorative Gardening and Forestry, Uzbekistan	The Munden Project, UK	University of Leuven, Belgium
Research into Results Ltd, UK	The Nature Conservancy, USA	University of Natural Resources and Life Sciences, Austria
Research Triangle Institute International, USA	Threads of Life, Indonesia	University of Rwanda
Réseau MARP, Burkina Faso	Tree Aid, UK	University of the Philippines at Los Baños
Rongo University College, Kenya	Tumbi Agricultural Research Institute, Tanzania	University of Witwatersrand, South Africa
Rwanda Agriculture Board	Unique Forestry and Land Use, Germany	University of Zambia
Sahel Eco, Mali	United Nations Environment Programme	Vi Agroforestry, Sweden
Savanna Agricultural Research Institute, Ghana	United Nations Industrial Development Organization	Viet Nam Academy of Forest Sciences
Servicio Nacional Forestal y de Fauna Silvestre, Peru	Universitas Brawijaya, Indonesia	Wageningen University, The Netherlands
SGS Kenya Ltd	Universitas Mataram, Indonesia	WaterAid, UK
SNV Netherlands Development Organization	Université de Bouaké, Côte d'Ivoire	World Cocoa Foundation
Société d'Exploitation et de Développement Aéroportuaire, Aéronautique et Météorologique, Côte d'Ivoire	Université Nangui Abrogoua, Côte d'Ivoire	World Vegetable Centre
Soil and Fertilizers Research Institute, Viet Nam	Université Peleforo Gon Coulibaly de Korhogo, Côte d'Ivoire	World Vision Australia
Sokoine University of Agriculture, Tanzania	University College Cork, National University of Ireland	World Vision Ethiopia
Son La Extension Center, Viet Nam	University of Adelaide, Australia	World Vision International
South Eastern Kenya University	University of Arizona, USA	World Vision Mali
Southern Cross University, Australia	University of Bonn, Germany	World Vision Rwanda
	University of British Columbia, Canada	World Vision Uganda
	University of California (Davis), USA	World Wide Fund for Nature
	University of Cape Town, South Africa	Yale University, USA
	University of Central Asia, Tajikistan	Yen Bai Department of Agriculture, Viet Nam
	University of Dodoma, Tanzania	
	University of Helsinki, Finland	Zambia Agriculture Research Institute

## OUR FINANCES AND INVESTORS

The work described in the previous sections is made possible through the support of several public and private investors who share and support World Agroforestry's strategic objectives. Here we summarize our income and expenditure in 2018 and gratefully acknowledge the support of our funding partners. Our full financial statement can be accessed [here](#).

### Our income

World Agroforestry's funds come from public and private investors, either directly or through the CGIAR Trust Fund. In 2018, as in most recent years, the great majority (about 84.5 percent) of our income was tied to specific investor-funded projects (Window 3 and bilateral)\*. Consistent with this, only a small proportion (4.3 percent) of our 2018 income consisted of flexible or 'unrestricted' funding. Grant income was 5 percent higher than in 2017, reversing the contraction of 13 percent seen between 2016 and 2017. Bilateral grant income increased by 13 percent.



\*Cost Sharing Percentage channelled to the CGIAR System organization;

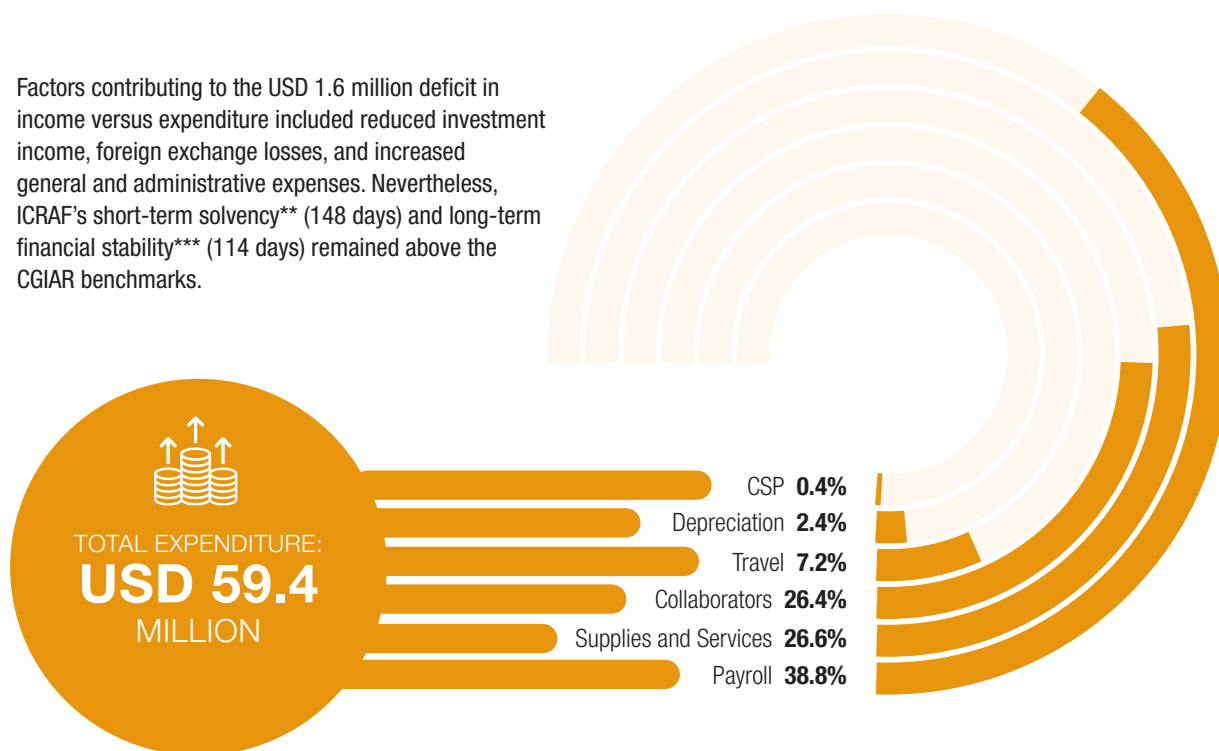
\*\*Number of days that working capital could fund expenditure;

\*\*\*Number of days of unrestricted net assets

## Our expenditure

In 2018, as is usual, ICRAF spent more than 97 percent of its income on implementing research for development and ensuring that our administration, facilities and infrastructure are up to the task to support operations. Almost one-quarter of the total was allocated as sub-grants to implementation partners.

Factors contributing to the USD 1.6 million deficit in income versus expenditure included reduced investment income, foreign exchange losses, and increased general and administrative expenses. Nevertheless, ICRAF's short-term solvency\*\* (148 days) and long-term financial stability\*\*\* (114 days) remained above the CGIAR benchmarks.



\*Funding to World Agroforestry comes from two main sources: funds contributed by investors to the CGIAR Trust Fund and "Bilateral" direct funding from private and public sources. CGIAR Trust Fund resources are channelled to World Agroforestry through three 'Windows'. W1 consists of funding allocated to the entire CGIAR portfolio of approved system-wide investments prioritized and allocated by Funders collectively through the System Council. W2 consists of funding allocated by investors individually to components of the system-wide portfolio. W3 consists of funding allocated by investors individually to projects that they and their partners define, and that World Agroforestry and partners will implement. 'Bilateral funds' include those from multilateral institutions.



## Our investors

In 2018, ICRAF received funds from more than 100 investors. We gratefully acknowledge and thank each one,—above all, on behalf of the millions of beneficiaries,—for their generous support to ICRAF.

Acacia Forest Industries, Malaysia	Deutsche Gesellschaft für Technische Zusammenarbeit	Hankyong National University, Korea
Adam Smith International Limited	EcoAgriculture Partners, USA	Heifer International, USA
Agropolis Foundation, France	European Space Agency	Helvetas Swiss Intercooperation
Asia Pulp and Paper, Indonesia	European Union	IDH Sustainable Trade Initiative, The Netherlands
Australian Centre for International Agricultural Research	Federal Research and Training Centre for Forests, Natural Hazards and Landscape, Austria	Institute for Global Environmental Strategies, Japan
Azim Premji Philanthropic Initiatives Private Limited, India	Flemish Office for Development Cooperation and Technical Assistance	International Centre for Environmental Management, Viet Nam
Bangor University, United Kingdom	Fondation pour le Tri	International Centre for Tropical Agriculture (CIAT)
Bill and Melinda Gates Foundation, USA	Fonds Interprofessionnel pour la Recherche et le Conseil Agricoles	International Crop Research Institute for the Semi-arid Tropics
Bioversity International	Food and Agriculture Organization of the United Nations	International Food Policy Research Institute
BirdLife Indonesia Association	Forum for Agricultural Research in Africa	International Fund for Agricultural Development
BNP Paribas	German Academic Exchange Service	International Institute for Applied Systems Analysis
Brazilian Agricultural Research Corporation (EMBRAPA)	German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety	International Institute of Tropical Agriculture
CARE	GFA Consulting Group, Germany	International Livestock Research Institute
Cargill Ghana and Cargill West Africa Ltd	Global Crop Diversity Trust	International Maize and Wheat Improvement Center
Cémoi Group, France	GlobalGiving, USA	International Potato Center
Centre for International Forestry Research	Gothenburg University, Sweden	International Water Management Institute
CGIAR System Organization	Government of Chad	Kansas State University, USA
CIRAD, France	Government of China	London School of Hygiene & Tropical Medicine, United Kingdom
Columbia Global Center Africa	Government of Finland	Lund University, Sweden
Columbia Global Center in Eastern and Southern Africa	Government of India	Mars Inc, USA
Concern Worldwide, Ireland	Government of Ireland	McKnight Foundation, USA
CORAF/WE CARD	Government of Japan	Mercy Corps, USA
COWI	Government of Kenya	Ministry of Agriculture and Food Security, Lesotho
DAI Europe Ltd	Government of Odisha, India	
Danish International Development Agency	Government of Peru	
David and Lucile Packard Foundation, USA	Government of The Netherlands	
Department of Environment and Natural Resources, The Philippines	Governors of St. Francis Xavier University/Coady International Institute, Canada	

Ministry of Environment, Climate  
Change and Natural Resources, The  
Gambia

Mvule Trust, Uganda

National Academy of Science, USA

National de la Sangha, Cameroon

National Institute of Agricultural  
Botany, UK

Natura Innovation and Technology  
Products Ltd., Brazil

Norwegian Agency for Development  
Cooperation

Norwegian Refugee Council

PT Tirta Investama, Indonesia

Republic of South Africa

Rwanda Natural Resources Authority

S&D Nedcoffee De Ruijterkade, The  
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SNV Netherlands Development  
Organization

Stichting Rainforest Alliance

Stockholm Environment Institute,  
Sweden

Swaziland Water Agricultural  
Development Enterprise

Swiss Development Corporation

The Nature Conservancy, USA

The Pacific Community

UK Department for International  
Development

UN Habitat

United Nations Development  
Programme

United Nations Environment  
Programme

United Nations University

United States Agency for  
International Development

United States Department of  
Agriculture

University of California (Davis), USA

University of Edinburgh, United  
Kingdom

University of Ghana

University of New Hampshire, USA

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<sup>1</sup>to April 2018.

<sup>2</sup>from November 2018.



## Our staff in 2018

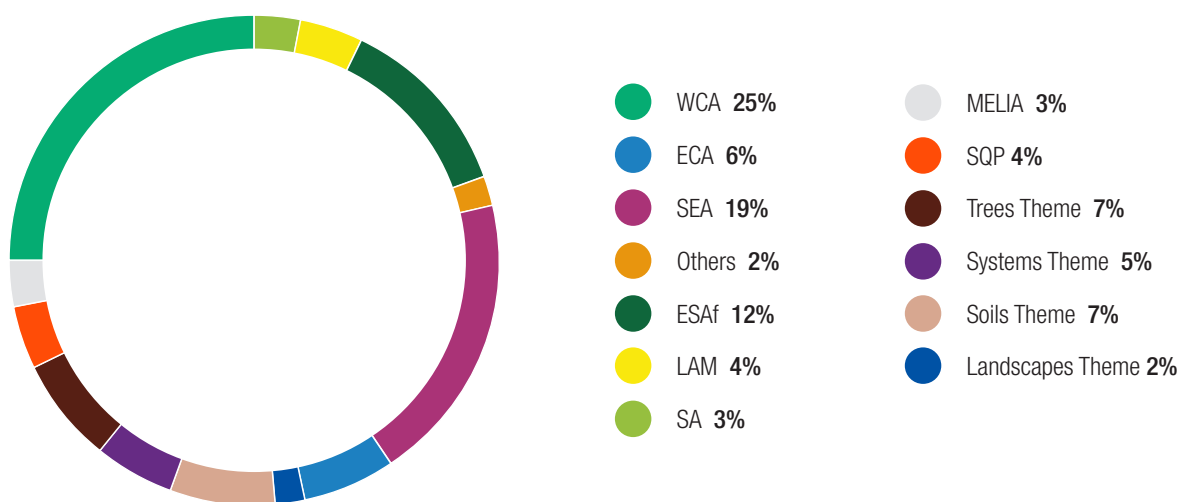
World Agroforestry's almost 500 staff are mostly based outside our headquarters in Nairobi.

Globally, staff fall into two broad groups: science-implementing staff (scientists, research assistants, research managers) (54 percent) and enabling staff (a diverse group, ranging from IT and communications specialists to finance and administrative staff) (46 percent).

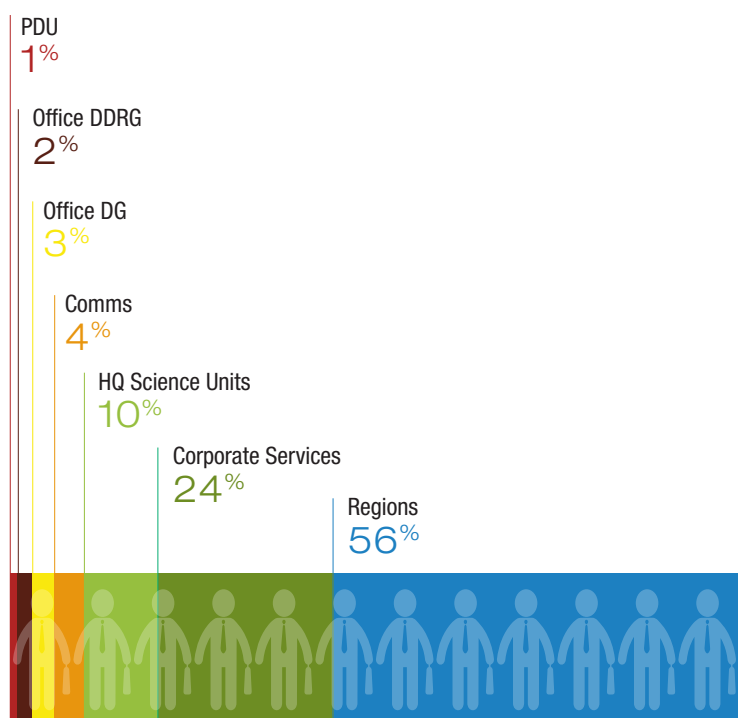
The dedication and high quality of both groups are vital to achieving our mission.

Our gender ratio remains male-biased, particularly among staff in four of our six regions (overall regional F:M ratio 34:66). At headquarters, the gender ratio is slightly female-biased (53:47). Globally, the gender ratio among our science-implementing staff is male-biased.

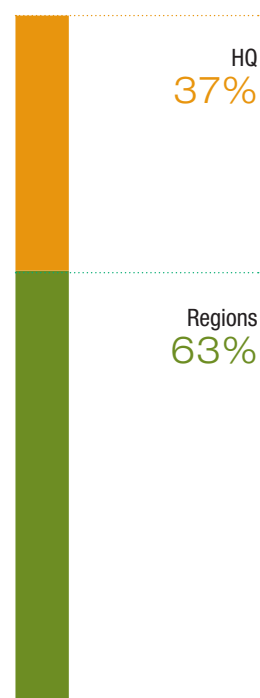
### Distribution of science-implementing staff by Unit, December 2018



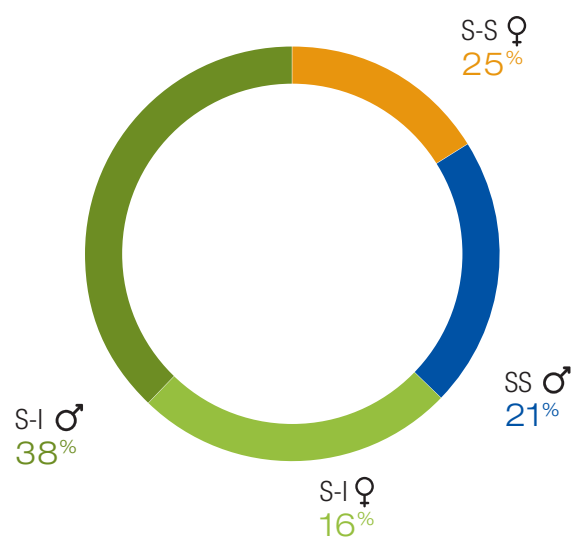
### Distribution of science-supporting staff at HQ and in regions, December 2018



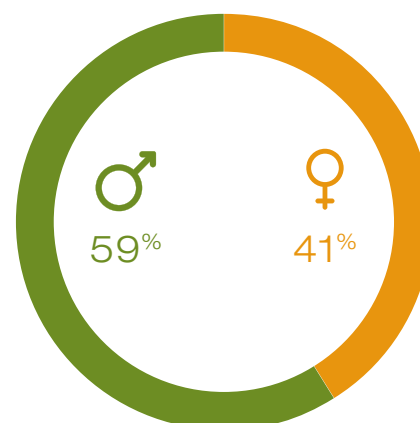
### Distribution of staff between HQ and regions, December 2018



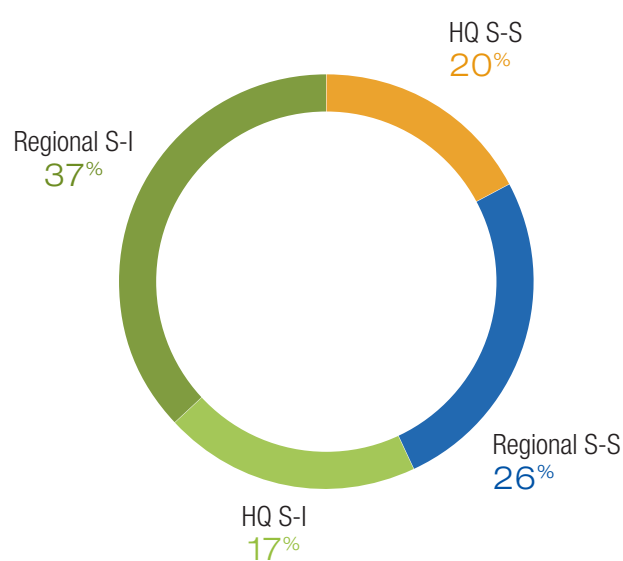
**Distribution of science-implementing and science-supporting staff by gender, December 2018**



**Distribution of science-implementing and science-supporting staff by gender, December 2018**



**Distribution of science-implementing and science-supporting staff by gender, December 2018**



**Note:**

ECA: East and Central Asia Region; ESAf: East and Southern Africa Region; HQ Science Units: MELIA, SQP, Themes; LAM: Latin America Region; MELIA: Monitoring, Evaluation and Impact Assessment; PDU: Programme Development Unit; DDGR: Deputy DG Research; SA: South Asia Region; SEA: Southeast Asia Region; SQP: Science Quality Platform; WCA: West and Central Africa Region

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Robin Chacha, Samuel Gaturu, Dominic Atandi Gisiara, Eugene Mugeni Innocent, Mary Ng'endo Kanoi, Valentine Karari, Bella Kauma, Betty Ndubi, Jonathan Kilonzi Kimanzi, Stanley Mulwa Kitiki, Christine Lamana, Eike Luedeling, Sylvester Munyao Mutati, Caroline Muchiri, Josphine Nthambi S Muteti, Jane Wanjiru Mwangi, Beatrice Gathoni Mwangi, Grace Ndege, Hezekiah Nyandika, Arthur Okello, Isaac Ochieng, Beatrice Oware, Gard Okello, Bruce Scott, Andrew M. Sila, Erick Towett, Anne Wavinya, Elvis Weullow - Landscapes Theme: Peter Minang (Leader), Pius Borona, Jeanne Coulibaly, Lalisa Duguma, Elizabeth Kahurani, Joyce Kasyoki, Catherine Kimengu, Judith Nzyoka, Joseph Tanui

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