

Congress Highlights



World Congress of
Agroforestry 2009
Nairobi Kenya 23-28 August



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Contents

Congress Declaration	01
Background	02
Speakers	03
Panel discussion	18
Agroforestry and policy	19
Closing session	20
Donor statements	21
Symposia	22
Technical sessions and posters	31
Getting the message across	32
The organizers	33





Congress Declaration

We, the 1200 participants from 96 countries who gathered in Nairobi, Kenya for the 2nd World Congress of Agroforestry from 24 to 27 August 2009, recognize the significant progress made in the development of agroforestry as a science-based land-use discipline during the past three decades. The demonstrable role of agroforestry in sustaining crop yields, diversifying farm production, realizing ecosystem services and ensuring environmental integrity is leading to improved livelihoods for smallholder farmers. There is a global consensus that integration of trees into farms, grazing lands, and other production landscapes helps to promote social, economic, cultural, ecological and environmental benefits. With these developments in agroforestry we are now better positioned than ever before to capture the promise of multi-functional agriculture to make a difference in the lives of millions of people.

Recent studies have shown that more than 1 billion hectares of agricultural land have more than 10 percent tree cover. Of this, 160 million hectares have more than 50 percent tree cover. Agricultural ecosystems can be further improved through agroforestry to ensure environmental restoration, greater farm productivity, and realization of ecological services, including climate change mitigation and adaptation for improved rural livelihoods.

The participants of this Congress believe that widespread scaling-up of agroforestry innovations during the next decade will greatly facilitate the success of global commitments and conventions, such as the UN Millennium Development Goals, Convention on Biological Diversity, Framework Convention on Climate Change, and the Convention to Combat Desertification. Agroforestry will achieve progress by building on past accomplishments and by engaging more stakeholders, including foresters, farmers, policy makers, local communities, indigenous peoples, civil society institutions, the media, the private sector, scientists and the public.

We, the participants of the 2nd World Congress of Agroforestry:

RECOGNIZE that agroforestry, as a delivery mechanism for multifunctional agriculture, has evolved in ways that can effectively target and help to alleviate the persistent development challenges of inter-alia: poverty, ill health, malnutrition and hunger, energy insecurity, land degradation, climate change and loss of biodiversity

ACKNOWLEDGE the contributions made by time-tested agroforestry systems, knowledge and culture of local communities

Are **AWARE** of the wide-ranging agroforestry innovations being tested and validated with farmers in many parts of the world

Are **CONSCIOUS** of the need for accelerated adoption of agroforestry innovations for positive and equitable impacts on the livelihoods of smallholder farmers

Are **ENCOURAGED** by the inclusion of agroforestry in education curricula around the world and the relevant development of human and institutional capacity

Are **INSPIRED** by recent policy developments at global and national scales that recognize agroforestry and the need to ensure farmers' and local communities rights to knowledge, tree tenure and land

APPEAL to the international funding community and governments, and environmental financing mechanisms to recognize the national, regional and global importance of agroforestry.

We therefore unanimously propose:

1. Vigorous further development of cross-sectoral policy and institutional frameworks at global, regional and national levels in the context of development strategies and multi-lateral environmental agreements
2. Enhanced public and private investment in agroforestry initiatives, including research, education and development
3. Accelerated development of methodologies for measuring, valuing and monitoring ecosystem services provided by agroforestry
4. Enhanced research and development on tree domestication, genetic improvement, use of biotic resources and value adding to agroforestry products at all levels
5. Expansion of choices available for women and vulnerable people to further increase their access to land and tree-based products and services
6. Concerted efforts to popularize the deployment of agroforestry through an integrated, interdisciplinary, multi-institutional and multi-stakeholders approach
7. Improved communication about the benefits of agroforestry for social, economic, cultural, ecological and environmental sustainability
8. Increased recognition of agroforestry as an important area of investment for land rehabilitation, biodiversity conservation, climate change mitigation and adaptation and improved food and nutritional security.

**Nairobi, Kenya
27 August 2009**



Background to the 2nd World Congress of Agroforestry, 2009

2

Agroforestry first captured the attention of the scientific community in the late 1970s. Today, agroforestry has truly come of age – poised as a sustainable land use option the world over. Its potential for helping to achieve the goals of the key global environmental conventions on climate change, biodiversity and desertification, as well as the Millennium Development Goals, has drawn the interest of scientists and policy makers alike.

Over the last 30 years agroforestry has been transformed from a vaguely defined concept to a robust, science-based discipline and a land use that can address many of the world's most pressing problems. Agroforestry offers effective and inexpensive options for mitigating and adapting to the effects of climate change. Institutions engaged in agroforestry and biological conservation are working in partnership to tackle the challenges of protecting biodiversity. Agroforestry also has a key role to play in addressing food security and poverty, and improving livelihoods, while conserving the natural

resource base on which agriculture depends. Indeed, the role agroforestry plays in tackling global environmental problems and poverty has never been more widely appreciated.

Against the backdrop of exciting developments in the climate change and conservation agendas, the 2nd World Congress of Agroforestry was held in Nairobi, Kenya from 23–28 August, 2009. Under the overall theme of *Agroforestry – the Future of Global Land Use*, plenary sessions, symposia and technical sessions explored three sub-themes of Food Security and Livelihoods, Conservation and Rehabilitation of Natural Resources, and Policy Issues.

Close to 1200 researchers, educators, practitioners and policy makers from around the world shared ideas and experiences, established new partnerships and strengthened existing relations. The Congress also provided an excellent opportunity to bring together scientists and policy makers, to make research relevant to policy and ensure policy decisions are informed by science.



Achim Steiner

UN Under-Secretary General and Executive Director,
United Nations Environment Programme (UNEP)

“

The future of global land use is no longer just about land – it is about the future of the atmosphere, of biodiversity and of water, fuel and food.

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“How do we, in a world of more than six billion people ... feed everyone, while simultaneously securing the ecosystem services such as forests and wetlands that underpin agriculture, and indeed life itself?” Steiner began.

“Humanity all too often thinks in boxes but there is no simple answer,” he continued. Complexity is part of the solution and we need to take the best of indigenous, traditional and farmers’ knowledge and temper it with empirical scientific evaluation. Agroforestry is a shining example of this approach, merging centuries-old knowledge with modern science.

In the new landscape of rewarding countries for their nature-based services, and especially for their carbon management, agroforestry has many roles to play. It offers potential for maximising sustainable food production, while boosting biodiversity and ‘natural infrastructure’. It offers an opportunity for timber production, contributing to alternative livelihoods and

meeting a potential emerging timber supply gap. Agroforestry may also secure carbon finance flows in its own right, perhaps through existing arrangements under the Kyoto Protocol for afforestation projects, or new carbon farming agreements.

The role of perennial crops in sustainable agriculture is an area in need of increased research and development. Experts suggest that ‘moving back to the future’ to these kinds of multi-year crops with deep roots can not only boost soil fertility and stability 50-fold, but also assist in adaptation to climate change. In terms of mitigation, perennial crops are also 50 percent better at carbon capture and storage than their annual cousins, according to some estimates.

Agroforestry, with its multiple benefits, is very much part of the transition to a low carbon, resource-efficient economic future. The future of global land use is no longer just about land – it is about the future of the atmosphere, of biodiversity and of water, fuel and food.



Dennis Garrity

Director General, World Agroforestry Centre

“

Agroforestry has come of age as an integrative science and practice. It is at the heart of the solution to so many of the challenges we face.

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The world faces a serious food crisis, and nowhere more acutely than in Africa. Agroforestry has a critical role to play in the creation of multifunctional agriculture that not only underpins food security, but also provides better watershed services and enhances conservation of biological diversity.

Take, for example, *Faidherbia albida*, grown by millions of farmers across Africa. The trees produce leaves in the dry season, providing a crucial source of fodder when others dry up. At the onset of the rains the trees drop their leaves, fertilizing the crops below.

“Why aren’t we deploying it more aggressively?” asked Garrity. “Why don’t we use the most advanced genomics technologies to identify the genes responsible for this unique trait and transfer them to a range of other species that could also be compatible with intensive cropping systems?” Agroforestry scientists need to rise to the challenge of developing traditional

and novel agroforestry systems and making them available to farmers.

Policy changes are also needed that provide incentives for farmers to grow trees. A simple policy change in Niger in the 1990s, for example, permitted farmers to cut down trees on their own lands. Farmers responded by planting trees on millions of hectares of farmland, greening the Sahel in the teeth of catastrophic desertification. A simple policy change opened the door to a huge opportunity to improve food security, and conserve and rehabilitate natural resources. The tool: agroforestry!

“A crisis is a terrible thing to waste,” Dr Garrity finished by saying. The current food crisis and climate change debate offer an opportunity for agroforestry to take its place as the future of global land use. “Agroforestry has come of age as an integrative science and practice. It is at the heart of the solution to so many of the challenges we face.”



Wangari Maathai

Nobel Prize Laureate, Green Belt Movement

“

Trees have an important role to play, not only in climate change mitigation, but also in reducing vulnerability to climate-related risks.

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For the last three decades the Green Belt Movement has urged smallholders to plant appropriate trees on their farms. “The value, role and contributions of agroforestry and protection of endemic habitats, in the light of current global environmental challenges, cannot be over-emphasized,” said Maathai.

It is now critical that we expand existing proven, integrated, tree-based practices – for instance by combining conservation agriculture and agroforestry – to create ‘evergreen agriculture’. The agricultural systems most vulnerable to climate change are those already affected by unsustainable management, and land and resource degradation. Trees have an important role to play, not only in climate change mitigation, but also in reducing vulnerability to climate-related risks.

In Kenya and Malawi, farmers and policy makers are beginning to view agroforestry as an environmentally sustainable way

to boost income and production on small farms. The return on investment from trees in agroforestry systems can be substantial, but can also take several years to recoup. Subsistence farmers might be more willing to invest in trees if it generated short-term revenue through carbon credits. Africa has long been sidelined in the carbon market, but initiatives such as the Carbon Benefits Project, funded by the Global Environment Facility (GEF) and implemented by UNEP and the World Agroforestry Centre with other partners, bring hope.

Agroforestry is important for increasing food security and reducing vulnerability, and it must be included in climate change negotiations. African negotiators must form a unified position and show how important agriculture is for climate adaptation and mitigation. A common voice and a common stand are critical; Africa must come together in its position on a post-Kyoto climate regime.



Kalonzo Musyoka

Vice President, Republic of Kenya,
on behalf of the President H.E. Hon. Mwai Kibaki

“

Agroforestry offers an important opportunity in both adaptation to, and mitigation of, climate change.

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The Honourable Kalonzo Musyoka began by welcoming Congress participants to Kenya and thanking the organizers for selecting Nairobi as the venue. Kenya is proud of its decision 30 years ago to host the World Agroforestry Centre and remains committed to continuing its support.

The most serious global challenges are poverty and food insecurity, particularly in Africa. We need to be able to buffer the negative effects that are brought about by the planet becoming warmer, and stabilize carbon emissions globally. Agroforestry offers an important opportunity in both adaptation to, and mitigation of, climate change.

“Climate change is now a reality, demonstrated by more frequent floods and droughts,” he said. “Kenya is already experiencing the vagaries of climate change. We have received less than adequate rains during the last three years resulting in severe famine.” Millions of people in the country now depend on food relief and their livestock face starvation. Kenya is

therefore placing emphasis on irrigated food production and increased fertilizer use in its medium- and long-term plans. Agroforestry systems that are appropriate for irrigated agriculture, that safeguard watersheds and supply organic fertilizer have a critical role to play in these interventions.

It is imperative that we work together to develop both national and regional markets for the various types of tree products, to create income opportunities for the rural population. In Kenya, demand for tree products is growing rapidly and farmers are responding positively to the demand. Timber has become an important smallholder commercial crop, with farmers planting both indigenous and improved species on their farms.

The Vice President urged the Congress to sustain partnerships and collaboration in agroforestry with a view to addressing the challenges of climate change, including food scarcity and poverty, with continued leadership from the World Agroforestry Centre.





MS Swaminathan

Founder, MS Swaminathan Research Foundation

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Successful examples of evergreen agriculture from Africa urgently need further research and scaling up to create a real evergreen revolution.

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There are two key challenges facing African agriculture. First, farmers need irrigation and higher productivity to provide them with a marketable surplus and cash income. In Africa, 80 percent of food production is from smallholder farmers, for whom agriculture is the backbone of their livelihoods and security. Higher productivity must be achieved without harming the ecological foundations essential for sustainable agriculture. Second, climate change threatens agriculture in many parts of the world, especially Africa.

“Risks rise rapidly with temperature,” Swaminathan said. “Once the temperature increases by about two degrees, up to four billion people could be experiencing growing water shortages. Agriculture could cease to be viable in some parts of the world, particularly in the tropics, and millions more people will be at risk of hunger.”

To respond to the challenges of climate change, food security and ecosystem degradation, Africa needs an ‘evergreen

revolution’ that increases productivity in perpetuity without causing ecological damage. Agroforestry clearly has a key role to play in this evergreen revolution. Novel solutions and technological advances must be married with ecological thinking to drive a truly sustainable agricultural revolution. Swaminathan highlighted the example of halophytes, trees that tolerate saline conditions, such as mangroves, *Salicornia* and *Atriplex*. They can form the basis of integrated sea-water farming with the addition of bamboo and casuarina for wood production, and shrimp, prawns and crabs in canals between the trees. But more than this, mangroves offer a wonderful repository of genes for salinity tolerance.

Building a successful evergreen revolution requires four components: technology, services, favourable public policies, and farmer enthusiasm. Successful examples of evergreen agriculture from Africa urgently need further research and scaling up to create a real evergreen revolution.



Richard Leakey

Chairman, Wildlife Direct

“

We need to control our species to do less harm, rather than trying to control nature.

”

Water is at the heart of the crisis facing Africa today and agroforestry provides some of the tools for restoring tropical aquifers that have been destroyed by years of deforestation and poor land management. Leakey, a lifelong conservationist and activist, pointed to the limitations of technologies for restoring ecosystems, and suggested that we must control destructive human activities before trying to control nature.

Climate change scientists have long focused on rising temperatures, but the effects of temperature on precipitation in the tropics will be the real problem in Africa. Giving examples from Kenya, Leakey pointed to human activities that have long degraded aquifers and are therefore undermining any attempts to adapt to climate change impacts, or build a sustainable way of life. Despite high seasonal rainfall and flash flooding, natural water capture in Kenya has been minimal.

This is exacerbated by uncontrolled hydroelectric schemes and extraction of water through boreholes. Water banks, towers and catchments, which require healthy forests to function, are also not sufficiently valued.

When restoration does become a priority, human technologies for reafforestation cannot truly mimic nature's complex restoration process. In Kenya's Aberdare mountains, what is now a forested national park used to be farmland. After the area became protected it eventually naturally reverted to a healthy forest ecosystem. "This is an example of nature doing its job remarkably quickly and effectively," said Leakey. Technological interventions are not enough to bring a forest or an ecosystem back to life. Leakey warned against "becoming so expert that you kill off nature's ability to heal itself. We need to control our species to do less harm, rather than trying to control nature."



Namanga Ngongi

President, Alliance for a Green Revolution in Africa (AGRA)

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Africa needs a uniquely African Green Revolution. A carbon copy of the Asian Green Revolution will not work.

”

“Africa needs a uniquely African Green Revolution. A carbon copy of the Asian Green Revolution will not work. We need to ensure that farming is a profitable activity in Africa, not just a way of life.”

Sub-Saharan Africa faces some very particular challenges. Cereal yields in the region are considerably lower than in China and South Asia, and have remained stagnant while per hectare yields in other continents have risen substantially over the past four decades. Fertilizer use per hectare is the lowest in the world; many African countries including Uganda, Ghana, Guinea, Mozambique, Nigeria, Burkina Faso and Mali do not even register on a scale of fertilizer use, in comparison to the Netherlands where nearly 600kg/ha are applied on average.

Adoption of novel technologies and improved crop varieties is very low in sub-Saharan Africa, hampered by the limited extent and weak capacity of extension

services, and lack of access to necessary inputs such as fertilizers and improved seeds. African agriculture needs to address a range of other challenges in the short and medium term. Ecological diversity, diverse soils, the use of many crop species, and the segmented political landscape make it more difficult to respond comprehensively to the continent’s problem of low productivity.

Highlighting the need to focus food production on systems that support smallholder farmers, many of whom are women, Ngongi warned that we must avoid the “monopolistic attitudes” that one institution or ideology can solve Africa’s food security woes.

Conservation agriculture and agroforestry need to be upscaled, he said. “India and Asia have shown that a green revolution is possible. Now we need to build partnerships. We all have to work together to bring about food security in Africa.”



RK Pachauri

Nobel Laureate and Chair, Intergovernmental Panel on Climate Change

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If we work together, collectively, there is no reason to believe that agroforestry cannot bring about mitigation of greenhouse gases, but also produce a substantial set of co-benefits.

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The worst victims of climate change will be the poorest communities in the world, especially the vulnerable in Africa, where 75 to 250 million people are projected to live in water stressed conditions by 2020. “The evidence is unequivocal and the impacts that are being felt throughout the world point to a frightening, if not clearly disastrous, future,” Pachauri said.

Agroforestry should be a key component in climate change mitigation measures. Previously underrated, large scale agroforestry offers a mechanism for reversing the effects of deforestation and forest degradation; a natural bounty through which carbon dioxide can be fixed. Pachauri stressed the huge co-benefits that would come with large-scale agroforestry. Mitigation in general brings co-benefits to the world, including lower pollution levels, greater global energy security and expanded employment. Such co-benefits also apply to agroforestry, in relation to improvements to the local environment,

health benefits locally, energy security through second generation biofuels, more productive agriculture, conservation of agro-biodiversity, and employment.

Pachauri urged Congress participants to look beyond the direct benefits of agroforestry for climate change mitigation, and identify some of the co-benefits that are not always apparent. If agroforestry provides substantial net benefits, then we need to clearly identify, evaluate and estimate them so that decisions can be made on a more enlightened basis. Such analysis would also form a basis for informing the public, which will be vital if public support is to be garnered for agroforestry in the name of climate change mitigation.

“The challenge is exciting, the task is clear,” he concluded. “If we work together, collectively, there is no reason to believe that agroforestry cannot bring about mitigation of greenhouse gases, but also produce a substantial set of co-benefits.”



Angela Cropper

Deputy Executive Director,
United Nations Environment Programme (UNEP)

“

Agroforesters should contribute to discussions on Reducing Emissions from Deforestation and forest Degradation (REDD) to ensure inclusion of agriculture, agroforestry and biodiversity

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We are all familiar with the confluence of disturbing situations we face: food insecurity, climate change, poverty, loss of species, degradation of ecosystem services, the need to sustain livelihoods and jobs. We need to produce more food on less land with less water and fewer external nutrients. This is the central challenge. Addressing this will require an integrated, multi-sectoral approach that focuses on properly functioning ecosystems that are resilient to such global changes. Food production systems must be developed in concert with water specialists, forest specialists, biodiversity specialists and economists. This integrated multi-sectoral approach is not yet the norm.

Cropper highlighted some of the many ongoing global processes that offer opportunities for policy engagement. The International Year for Biodiversity in 2010 could be used to highlight the interdependence of biological diversity and sustainable agricultural production. Agroforesters should contribute to

discussions on Reducing Emissions from Deforestation and forest Degradation (REDD) to ensure inclusion of agriculture, agroforestry and biodiversity. Both the design and implementation of REDD are still under negotiation, providing an opportunity for agroforesters to engage with policy.

Other activities, such as the billion tree campaign, launched in 2006 by UNEP, the Green Belt Movement and the World Agroforestry Centre, can help motivate individuals, communities and countries to plant trees to mitigate greenhouse gas emissions. The key to ensuring widespread uptake is planting “the right tree, in the right place, for the right use”.

Influencing public policy is not easy, Cropper concluded, and specialists cannot do all these things on their own. But specialists need to work more smartly, more strategically, and with more linkages to other specialist and professional groups, to move from systems thinking to systems doing, and to do so with urgency.

Key policy issues



Sarah Scherr

President, Ecoagriculture Partners

Agricultural policy in the 21st century is at a crisis point: food and fibre are needed for ten billion people and demands are likely to increase by 50 to 100 percent by 2030. Questions surround our ability to reduce rural food insecurity, develop sustainable biofuels, adapt to climate change, and restore degraded resources and critical ecosystem services. With so many issues to focus their minds, policy makers are paying attention, says Scherr. "Now is the moment!"

The term 'ecoagriculture' aims to convey a vision of rural communities managing their resources to jointly achieve three broad goals at a landscape level: to enhance rural livelihoods, conserve biodiversity and ecosystem services, and develop more sustainable and productive agricultural systems. It is both a conservation and a rural development strategy.

Ecoagriculture clearly overlaps with agroforestry and both aim to use production systems that supply ecosystem benefits. Important steps to producing such ecosystem benefits include: selecting the right crop varieties; diversifying agriculture with perennials or wild crops, livestock feeds and biofuels; using agroecological practices and reducing input pollution; and supporting

farmer innovation systems. Overall we need to embrace diversity in all its forms.

Research has a key role to play in integrating agriculture and ecosystem management. Getting the data is essential; monitoring of agriculture, environment and human well-being needs to be integrated. Perhaps more importantly, researchers need to communicate the costs and benefits of agroforestry to policy makers. And here, language and message are key. Few policy makers care to hear about tons of soil lost, tree growth rates or biodiversity indexes. But policy makers do care about increased and stable food supplies, food security, increased incomes, clean and reliable water supplies, wildlife to support tourism, and human health.

Policy action is needed at a scale that will make a difference. Research must be designed to answer policy makers' questions, and to convey information in a way that engages and mobilizes them. Researchers should craft simple messages about how agroforestry achieves policy goals, while having the information available to quickly provide guidance for implementation. "We must have the 'details in our pocket' to take these initiatives forward," Scherr concluded.

Public-private partnerships



Navin Sharma

**Chief Scientist, ITC R&D Centre,
Bangalore, India**

There is a paradox at the heart of Indian agriculture. The country boasts excellent research and extension capacity, its farmers can produce almost any crop, and agriculture employs a huge workforce – yet despite all this, farm productivity is stagnant, consumers have little choice, insignificant volumes of agricultural products are processed, and workers' per capita income is poor.

Converging demands on land mean that a food crop does not only compete with other food crops, but also with feed, fibre and fuel: the convergence of the 4Fs, Sharma calls it. This leaves Indian agriculture at something of a crossroads, with potentially conflicting demands: to be globally competitive but also locally inclusive, address food safety and food security at the same time, and increase production while also conserving nature.

In answer to conflicting demands and drivers, public-private partnership is not a choice, but an imperative for Indian agriculture. On the one hand, the private sector is best placed to align production with consumer preferences; improve farm production and processing practices; and

create efficient linkages along the value chain. On the other hand, the government needs to support this process by reforming regulations to balance the interests of poor consumers, small farmers and a fragile ecology. The government also needs to invest in infrastructure and share research knowledge and weather information.

ITC, one of the largest private companies in India, has championed the theme of public-private partnerships in agriculture and forestry. Using the company's background in agribusiness and information technology, ITC has established a network of *eChoupals* – kiosks with internet access within walking distance of target farmers, as well as in warehousing hubs and stores. A collaborative network of companies orchestrated by ITC provides a pan-Indian presence that provides agricultural communities with ready access to information in their local language on the weather and market prices, as well as good farm management practices and risk management. They also facilitate the purchase of farm inputs, and sales of produce from the farmers' doorsteps.

Generating income for smallholders



Howard Shapiro

Chief Agronomist, Mars Incorporated

Cacao tree crops in the tropics are crucial to the livelihoods of the smallholder farmers who grow them. They are also crucial to Mars, Inc., one of the largest commercial chocolate producers in the world. "Mars is betting a 'small fortune' on the benefits that can be generated by improving cacao farming at every stage of the process," said Shapiro, "from the seed, to the farmers' access to markets, and beyond."

Tree crops can help farmers remain agile in responding to new challenges brought on by climate change, ecosystem degradation and food shortages. Nonetheless, productivity of cacao tree crops in West and Central Africa has been diminishing due to plant disease, decreasing commodity prices and more profitable alternatives such as logging. Returns to farmers in Africa are very low, particularly when compared to prices paid to cacao farmers in Indonesia. For example, it takes 800kg of cacao to buy a motorcycle in Indonesia, compared to 2900kg in Ghana and 5500kg in Côte d'Ivoire.

Although it is clear that farmers need to increase production, the existing system is

unsustainable and could collapse if pushed too far. By investing in improved cacao germplasm, better growing conditions and improved market access for smallholders, Mars hopes to increase yields by 500 percent. By focusing research and investment on restoring the building blocks of a healthy, functioning and productive cacao system, the company hopes to completely revitalize the fundamental resource on which it relies for its business. These building blocks include biological resources such as a robust and diversified seed supply, and natural capital such as fertile soil, clean water and functioning forests. They also include sustainable livelihoods, good nutrition, healthcare and community participation in the decisions that affect growers' lives. The private sector must be encouraged to take responsibility for the resources that drive its business.

"Tree crops are a security bank for people. A tree is not just food, medicine and basic nutrition; a tree also pays for school fees. That is agroforestry in a nutshell."

The extent of trees in agricultural landscapes



Richard Coe

Principal Scientist, World Agroforestry Centre

Although agriculture is often associated with massive deforestation, particularly in developing countries, new research presented by Richard Coe of the World Agroforestry Centre, demonstrated that almost half of all farmed landscapes worldwide actually include significant tree cover.

Previous global estimates of agroforestry on farmland have ranged from 50,000 hectares up to 307 million hectares. Part of the problem previously has been in viewing agroforestry as a series of technologies – arrangements of trees and crops in space and time. This quickly becomes bogged down in definitions. By defining agroforestry as ‘trees in agricultural landscapes’ the researchers were able to estimate the global extent of such landscapes.

This analysis, based on detailed satellite imagery, reveals that tree cover exceeds 10 percent on more than ten million square kilometres – almost half of the world’s farmland and home to more than half a billion people. This is based on measurements of tree cover on each square kilometre of the world’s 22.2 million square kilometres of farmland.

Trees are an integral part of the agricultural landscape in all regions except North Africa and West Asia. Most notably, the researchers found that globally there is no consistent trade-off between people and trees. There are areas with low population and little tree cover, and areas with lots of people and lots of trees. Nor could the amount of tree cover – low or high – be explained solely by climatic conditions.

Although the headline here is that 1 billion hectares have more than 10 percent of tree cover, Coe emphasized that there is, of course, continuous variation in cover. Twenty seven percent (or six million square kilometres) of global agricultural land has over 20 percent tree cover. He cautioned that this may underestimate the global extent of tree cover on farmlands because land not classified as ‘agricultural’, such as tree crops and agroforests, may be excluded from the analysis. The exact figure may still elude us, but the key message is that tree cover is a common feature on agricultural land and this must be recognized by all those involved in agricultural production, planning and policy development.

Agroforestry and biodiversity conservation



Mohamed Bakarr

**Senior Environmental Specialist,
Global Environment Facility**

Although much has been achieved in the way of biodiversity conservation in recent years, much remains to be done. An extensive network of protected areas has been created, and yet many species are threatened with extinction, resources continue to be used unsustainably, and access to the benefits of natural resources is still inequitable.

We need a paradigm shift in biodiversity conservation, brought about through: collective action between scientists, policy makers, land users and business people; partnerships and alliances across sectors; and an enabling environment at the national level. And there are heartening signs that such a shift is underway. There has been a move away from protecting species and individual ecosystem services towards ensuring ecosystem health, a shift from seeing humans as the threat towards viewing human livelihoods as the priority, and away from protecting sites and corridors towards integrated conservation. This landscape approach to conservation incorporates multi-scale management, cross-boundary co-operation, adaptive and integrated management.

The importance of conserving biodiversity in agricultural landscapes is widely recognized,

and this is where agroforestry comes into play. Agroforestry reduces pressure on natural forests, provides habitat for native plant and animal species and serves as a benign matrix land use in fragmented landscapes.

So what is needed to make agroforestry truly the future of global land use? First, the science and practice of agroforestry need to be mainstreamed, both nationally and cross-border, across sectors and across scales from farm level to entire agro-ecosystems. We need innovative tools for monitoring and assessment, so that we can measure the impacts of different agroforestry options on biodiversity and livelihoods, and assess the trade-offs between them. We also need increased focus on quantifying the global environmental benefits of agroforestry – measuring its contribution to carbon sequestration, agro-ecosystem resilience and habitat connectivity. And finally, more country-level investment in sustainable land management is needed, with agroforestry as a national development priority, contributing to delivery on commitments to global conventions.

Taken together these steps will help agroforestry deliver on its potential as the future of global land use, and fulfil its role in biodiversity conservation within production landscapes.

Multifunctional agriculture and agroforestry



Roger Leakey

James Cook University, Australia

The International Assessment of Agriculture Knowledge, Science and Technology for Development (IAASTD) was carried out over three years, from 2005 to 2008. It provided an in-depth evaluation of the impacts of agricultural knowledge, science and technology on environmentally, socially and economically sustainable rural development worldwide. In April 2008, 62 governments signed up to a new paradigm of agriculture based on the concept of multifunctional agriculture. "This recognizes agriculture as a multi-output activity, producing commodities and non-commodity externalities and public goods, such as environmental services, landscape amenities and cultural heritages," explained Leakey.

In many ways the goals of multifunctional agriculture coincide with those of agroforestry. Multifunctional agriculture includes a number of low-input, resource conserving, socially relevant and pro-poor technologies. These low-input systems address the key challenges in smallholder agriculture: soil fertility management, rehabilitation of degraded land, loss of biodiversity, carbon sequestration, and soil and watershed protection. Agroforestry is one such technology, and additionally provides useful and marketable tree products, complex

agro-ecosystems akin to natural woodlands, and linkages to traditional foods and cultural practices. Agroforestry is a means of putting multifunctional agriculture into practice.

So, where does this lead? Multifunctional agriculture has been accepted internationally as the new paradigm in agriculture. Agroforestry is a key delivery mechanism for multifunctional agriculture. Using the platform of multifunctional agriculture will allow us to improve public knowledge and understanding of agroforestry – a welcome move. The IAASTD process, which involved hundreds of reviewers, highlighted the poor image of agroforestry: rather aloof and poorly integrated with agriculturalists, they said. For multifunctional agriculture, agroforestry represents a 'low-hanging fruit', ready to be plucked and put to use straight away.

"The challenge," Leakey concluded, "is not how to improve the lot of subsistence farmer households at the village level – it is how to scale the process up to tens of millions of people each year to meet sustainable development goals. Our ability to achieve this will be enhanced if agroforestry can be seen as the delivery mechanism for multifunctional agriculture."

Panel discussion

How can agroforestry rise to the challenges?

The six-strong panel included representatives of a wide range of different organizations and interests: Abdon Nababan of Indonesia's National Indigenous People's Organization (AMAN); Ambika Upadhyay, from ITC, India; Coosje Hoogendoorn of the International Network for Bamboo and Rattan; Jan Heino from the UN Food and Agriculture Organization (FAO); Nyaga Mwai, of the Dairy Goat Association of Kenya; and Assetou Yaya, of the African Network for Agriculture, Agroforestry and Natural Resources Education (ANAFE).

"What are the challenges facing agroforestry?" the panel was asked by moderator, Ravi Prabhu of UN-REDD, before inviting contributions from Congress delegates.

"More needs to be done to raise awareness about the importance of agroforestry and its benefits. And we need better data to provide to politicians." Jan Heino, FAO

"Politicians and decision makers have failed to recognize the importance of indigenous agroforestry systems. We have the systems, the knowledge and the institutions, but the challenge lies in getting decision makers to recognize the importance of agroforestry." Abdon Nababan, AMAN

"Technical knowledge alone is not enough. We need soft skills too,

which involves building the capacity of women, scientists, extension people and others." Assetou Yaya, ANAFE

"In public-private partnerships, the company has to make a profit, but there needs to be a win-win situation for the company and the farmers." Ambika Upadhyay, ITC

"Researchers fail to communicate and share their results with farmers." Nyaga Mwai, Kenya Dairy Goat Association

"Agroforesters need to convince not only policy makers, but also agribusiness, that agroforestry is more than just a low grade science. And, we are considered to be boring! We need to spend more time linking with professional communicators." Roger Leakey, James Cook University, Australia, contribution from the floor.

Communication emerged as a key challenge, identified by panel members, speakers from the floor and summed up by Prabhu: to a considerable extent, agroforesters are still talking to themselves. They're not getting their message across to policy makers and others who really matter. The pressing need now – and a key challenge – is how to communicate the virtues of agroforestry to a wider audience.



Jan Heino



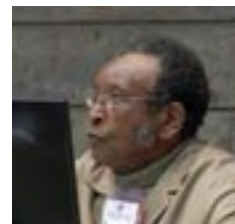
Abdon Nababan



Assetou Yaya



Ambika Upadhyay



Nyaga Mwai



Coosje Hoogendoorn

Agroforestry and policy

“What would I do if I were designing agroforestry legislation in Latin America?” asked Peruvian agronomist and forestry expert, Marc Dourojeanni. Simple, but serious economic feasibility studies are necessary to identify when agroforestry would be appropriate. The legislation would need to be precise, clear and enforceable. Although much promotion of agroforestry is expected to be ‘pro-poor’, Dourojeanni pointed out that in Latin America, the best agroforestry is often done by rich farming families. How should this contradiction be accommodated? A fundamental principle of any agroforestry legislation must be that it does not promote further deforestation or forest degradation, as has happened in Brazil.

A number of key issues emerged during the question and answer session of this policy discussion, including the need to integrate complex community mechanisms governing land use into national-level policies; Steve Carr pointed out that policy makers must understand how customary tenure works, before trying to reform it. Ed Barrow noted that, although some countries have weak institutions and mechanisms for law enforcement, they can still provide success stories from which we can learn.

Frank Place from the World Agroforestry Centre introduced the Agroforestry Policy Initiative, which was launched at the Congress. Currently at the conceptual stage, the initiative aims to draw on the successes of agroforestry, emerging opportunities (such as those presented by the climate change debate) and global interest in agroforestry.

Agroforestry is a complex and multifaceted activity, Place said. It functions across a range of scales from farm to landscape, and spans several sectors including agriculture, forestry and environment. This complexity increases the importance of reviewing and distilling examples of good practice from around the world.

The long-term objective of the initiative is to support policy reform across relevant sectors in order to reduce the barriers to, and improve the incentives for, private investment and more effective public sector support for agroforestry. In the short-term, the objective is to document and disseminate examples of the challenges, principles and good practices that would support this long-term aim. The main output will be a set of agroforestry policy guidelines that will be updated periodically to reflect the findings of the ongoing, ‘living’ initiative.



Marc Dourojeanni



Frank Place

Closing session

The way forward – energizing the next wave of agroforestry science

PK Nair, Meine van Noordwijk, Frank Place and Dennis Garrity reflected on the key messages of the Congress and the steps needed to promote agroforestry. The Congress has provided ample proof that agroforestry has been transformed over the last 30 years, from a vaguely defined concept to a robust, science-based land-use discipline.

PK Nair, who chaired the session, said: “We are well positioned to capture the promise of agroforestry to improve the lives of millions of people. However, agroforesters must make greater efforts to transfer knowledge to practitioners, update ‘the stockpile of our technical knowledge’, and continue to do rigorous research.”

Meine van Noordwijk offered a personal perspective on some of the Congress highlights. Some posters had caught his attention vividly, not only for the excellent scientific work they described, but for the links between science and policy. There was plenty of exciting work on display, he concluded.

Frank Place provided a brief synthesis of the key Congress messages. Agroforestry has an important role to play in tackling many major policy and development challenges. It is poised to achieve much more in the near future, but there needs to be greater collaboration between different sectors. We need to quantify the benefits of agroforestry, and provide the results to policy makers and the public in a way that is easily understood. And finally, much more work needs to be done on scaling up agroforestry programmes.

Dennis Garrity highlighted three main areas: publications, communications and scientific impact. “This Congress was even better than the last,” he said, “and it will inspire a raft of publications.” The Congress had made a real breakthrough in communications, getting widespread media attention in Kenya and internationally. He concluded by stressing the need to continue doing high-quality scientific research in agroforestry.



PK Nair



Meine van Noordwijk



Frank Place



Dennis Garrity

Donor statements

During the final session of the Congress, **Lynne Haight**, Chair of the World Agroforestry Centre invited investors in agroforestry to offer their brief reflections on the Congress.

AK Singh of the Indian Council of Agricultural Research noted that three things must come together for a meeting such as this to be a success: the technical, the logistics and the funding. Luckily in this case, they all did.

Shantanu Mathur of the International Fund for Agricultural Development said that, for him, among the take-home terms are 'sustainability' and 'evergreen agriculture'. But no-one has spoken about the importance of the governance of research and embedding local people and indigenous knowledge.

Hansjorg Neun from the Technical Centre for Agricultural and Rural Cooperation asked whether we should accept the current exponential level of population growth. No-one has mentioned that there is a deep human crisis and we need to reflect

on just what it will take to achieve sustainable development.

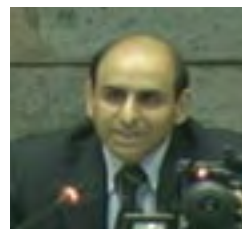
Daizaburo Kuroda of the Ministry of Environment, Japan, noted that the Satoyama approach in Japan, which was presented at the Congress, follows the principle of co-existence and fits with the objectives of the Convention on Biological Diversity.

Mike McGahuey of the United States Agency for International Development suggested that we need to work harder to mainstream agroforestry into agricultural development. "Does the world really believe we can achieve food security if we leave agroforestry on the sidelines?" he asked.

The representative from Norway's International Climate and Forest Initiative pointed out that multilateral climate change programmes have much to gain from agroforestry. Norway's support for initiatives for Reducing Emissions from Deforestation and forest Degradation (REDD) aims to reduce emissions to pre-industrial levels.



AK Singh



Shantanu Mathur



Hansjorg Neun



Daizaburo Kuroda



Mike McGahuey



Symposium

Theme 1: Food security and livelihoods

Symposium 1: Agroforestry tree crop value chains

Organized by Dagmar Mithoefer of the World Agroforestry Centre, this symposium took a commodity approach to tree crop value chains in a development context. The three presentations focused on the contrasting value chains for biofuels, medicinal plants and fruit trees.

Simla Tokgoz from the International Food Policy Research Institute talked about **Biofuel value chains: drawing lessons from the US for newcomers**. She described the established biofuel value chains in the United States where ethanol is produced mainly from maize. Biofuel production is not simply about biofuel, she emphasized: it is linked to established markets for the by-products, such as livestock feed. Maize producers, biofuel and livestock sectors are closely interlinked in the biofuel value chain. She contrasted this with the value chain for *Jatropha* in Asia and Africa, where there is less competition with other land uses, and little use of the by-products. This generated a discussion of *Jatropha*'s by-products, which can be used for fertilizer, fuel, iodine and soap.

In South Africa, medicinal plants, including fruits, bulbs, roots, bark products and grasses, are brought to urban areas, given basic processing and traded in informal markets.

Miles Manders from EcoFutures described these substantial, informal markets in **Trade chains in Ethiopian and South African traditional medicinal plants**. Most of the plant products used in traditional medicines are harvested from wild populations, which are threatened by widespread land clearance and harvesting itself. Traditional medicines play a key role in households and the economy that cannot be replaced by pharmaceutical medicines. The industry and its associated household welfare are vulnerable, Manders concluded, and opportunities for improving supply and adding value warrant further investigation.

Steven Mbithi of the Horticulture Council of Africa talked about **Agroforestry through fruit trees**. About four and a half million people in Kenya depend on horticulture for their livelihoods, for domestic consumption and export. He described efforts by the Horticultural Council of Africa to promote fruit trees in Kenya as alternatives to seasonal crops, as they are often better suited to semi-arid areas. Fruit trees make a considerable contribution to nutrition, and they are already widespread in farming systems, in particular as hedge crops.



Symposium

Theme 1: Food security and livelihoods

Symposium 2: Domestication of agroforestry tree crops

Tree domestication can significantly increase the incomes of smallholder farmers and rural dwellers, and can provide considerable environmental benefits. This was a key message from this symposium, organized by Roger Leakey of James Cook University in Australia. Three presentations described tree domestication in West and Central Africa, Latin America and Southern Africa.

Farmers in West and Central Africa value indigenous fruit trees such as African plum and bush mango very highly. These species, among others, have been the subject of a programme of participatory domestication. Zac Tchoundjeu of the World Agroforestry Centre talked about the **Impact of participatory tree domestication on farmer livelihoods in West and Central Africa**. The majority of farmers who adopted tree domestication practices found that it can bring quick results, either through sales of nursery plants or through early fruiting. In some areas, the income from tree domestication was quite low, but in others, domestication has allowed farmers to send their children to secondary school and improve their housing.

In theory, smallholder production of germplasm – seeds and plants – for agroforestry can be a win-win situation: smallholder germplasm producers support their livelihoods, while at

the same time facilitating tree planting by other smallholders. However this is not always the case, as Jonathan Cornelius of James Cook University in Australia explained in **Smallholder production of agroforestry germplasm: experiences and lessons from Brazil, Costa Rica, Mexico and Peru**. Germplasm producers need to sell material in sufficient quantities and at high enough prices to make it viable. This affects the species they are keen to supply, for example with a bias towards large-seeded species, those that are in high demand but low supply, and the production of plants rather than seeds.

Cyril Lombard of Phytotrade Africa talked about the organization's experiences in Southern Africa in **Protecting the rights of farmers and communities while securing long term access for producers of non-timber forest products**. Promoting the sustainable use and commercialization of natural products from indigenous plants, this trade association works with indigenous communities and local companies to help them secure long-term access to markets through the protection of their intellectual property rights. Overall Phytotrade Africa aims to promote both the sustainable use of indigenous resources and to reduce poverty by generating secondary income and other livelihood benefits.



Symposium

Theme 1: Food security and livelihoods

Symposium 3: Adaptation to climate change

“When it comes to the kinds of emission reduction strategies being discussed in the UNFCCC negotiations, it’s clear that we’re still just nibbling at the edges,” said Lou Verchot of the Center for International Forestry Research (CIFOR) during this packed, standing-room only symposium. The three presentations, co-organized by PK Nair of the University of Florida, and Lou Verchot, suggest there is considerable potential for broadening carbon sequestration strategies to include agroforestry systems.

Risto Seppala of the International Union of Forest Research Organizations described a recent global assessment of the **Adaptation of forests and people to climate change**. It looked at a number of potential climate scenarios and emphasized the vulnerability of forests to even minor changes in temperature. He highlighted the fact that “successful mitigation requires that forests retain their capacity to adapt to climate change,” and contrasted this with the alternative, potentially catastrophic “feedback loop” scenario, where increasingly degraded and destroyed forests lose their ability to sequester carbon.

PK Nair from the University of Florida described the results of a recent study carried out in Brazil, India, Mali, Spain and the US, which

underscores the importance of agroforestry in climate change mitigation through soil carbon sequestration. In **Climate change mitigation through agroforestry: science in support of the concept**, Nair suggested that much of the science behind previous studies of carbon sequestration by soils has been weak and based on unsubstantiated assumptions. Soil carbon stock in tree-based systems is consistently higher than that in treeless systems, he concluded. In fact, soils in some long-term agroforestry systems, and even home gardens, can sequester comparable amounts of carbon to soils in natural forests.

Lou Verchot of CIFOR suggested that providing start-up finance to smallholder farmers is the key to making agroforestry systems viable for inclusion in carbon markets. In his discussion of **Agroforestry options for climate change mitigation and adaptation: implications for carbon markets**, he described the “often crippling” start-up costs of establishing a plantation as possibly the most significant obstacle for smallholder farmers. However, as little as USD 1.80 per tonne of carbon may be needed to provide sufficient incentive for smallholders to incorporate agroforestry practices.



Symposium

Theme 1: Food security and livelihoods

Symposium 4: Agroforestry Systems in Africa

This symposium, organized by Steve Franzel of the World Agroforestry Centre, Kenya, focused on the benefits of agroforestry systems in Southern Africa. Presenters and participants discussed the economic benefits derived from various agroforestry practices, and their distribution between men and women.

In Southern Africa, the 'fertilizer tree system' helps resource-poor farmers replenish their soils by adding a substantial amount of nitrogen in the form of leaves. This can reduce farmers' requirement for mineral nitrogen fertilizer by up to 75 percent. With good management, fertilizer trees can double, or even triple maize yields compared with local farmers' maize cultivation practices without fertilizer. In **Harnessing the potential of fertilizer trees for sustainable food security in Southern Africa**, Festus Akinnifesi of the World Agroforestry Centre described how the increase in yield due to fertilizer trees is equivalent to between 54 and 114 additional person-days of maize consumption, capable of reducing the hunger period by 2–3 months per household.

Agroforestry has significant potential advantages for women, as it often involves few costs and provides a range of products and services. However, according to Evelyn Kiptot of the Kenya Forestry Research Institute and

Steve Franzel's discussion of **Gender and agroforestry adoption: are rural women benefiting?**, these advantages are not always realized. Women's ability to adopt agroforestry is limited by their inadequate control over production resources, inadequate access to extension education, cultural norms and taboos, and a lack of control over the benefits arising from their work.

A study of milk production in East Africa demonstrated similar gender distortion. Most milk in East Africa is produced by smallholder farmers and a major constraint to milk production is the cost and availability of high quality feed. In a discussion of **The impact of fodder shrubs on livelihoods in East Africa**, RL Roothaert of Farm Africa described how planting 500 *Calliandra* shrubs for fodder could increase a farmer's net income by USD 101 to 122 per year. Although most households surveyed did not generate direct income from the sale of fodder, there were savings which would otherwise be spent on fodder and dairy meal. For most women, there is a discrepancy between work done and income derived from farming, because bank accounts are normally controlled by men. However, increasing female participation in community groups has led to better access to resources for some women.



Symposium

Theme 2: Conservation and rehabilitation of natural resources

Symposium 1: Segregate or integrate for multifunctionality and sustainability

Agroforestry – the interface of the agricultural and forestry spheres – has its roots in an ‘integrated’ approach to multifunctionality, explained the symposium organizer Meine van Noordwijk of the World Agroforestry Centre. The ‘segregate’ approach achieves multiple goals by using some parts of the landscape for intensive agriculture (or tree production) while maintaining separate areas for conservation. It minimizes the interface between agriculture and natural forests. By contrast, the ‘integrate’ approach combines production and conservation functions within a unified management area. The ‘segregate or integrate’ choice plays out at various spatial scales, from farm level to landscape, but also over time. The concept of ‘sustainability’ focuses on keeping options open to respond to future change and ensuring the reversibility of choices and opportunities.

Examining the tradeoff between profitability and biodiversity, Hesti Tata of the Forestry Research and Development Agency in Indonesia introduced a **Case study of change in the integrated rubber agroforest landscape of Jambi (Sumatra)**. These complex rubber agroforests support high levels of biodiversity, while profitability is comparable with local wage rates. Rubber agroforests also retain trees used by farmers for fruit, food, fodder, medicine, dye and timber. However, the current trend is for the replacement of complex rubber agroforests with monoculture plantations of rubber or oil palm. Payments for ecosystem services

are being explored as a means of increasing the profitability and securing the sustainability of rubber agroforest landscapes.

In China, the diverse landscapes of the greater Mekong are similarly threatened by rubber monocultures. The traditional swidden farming system is time-consuming and farmers, supported by national policy and institutions, readily replace it with rubber monocultures. In **Maintaining ecological connectivity in the Greater Mekong subregion through agroforestry**, Jianchu Xu of the World Agroforestry Centre, China, described a project that aims to develop the carbon and biodiversity assets of the Upper Mekong for multifunctional landscapes.

In Central America, a comparison of biodiversity across forest, pasture and silvopastoral systems in four highly fragmented landscapes showed that factors such as floristic composition and structural complexity, management, tree density, and location of the plot within the broader landscape all influence patterns of biodiversity within silvopastoral systems. **Discussing Biodiversity conservation in landscape mosaics of Central America: segregate or integrate?**, Celia Harvey of Conservation International noted that the rate of species accumulation within agroforestry landscapes may be similar to that of intact forest landscapes but the species composition can be quite distinct.



Symposium

Theme 2: Conservation and rehabilitation of natural resources

Symposium 2: Land health surveillance: an evidence-based approach to land management

The symposium, organized by Keith Shepherd and Tor-Gunnar Vagen of the World Agroforestry Centre, focused on land surveillance, which encompasses statistical sampling, development of standardized measurement protocols and rapid screening tests for measuring land health indicators. Participants noted that while agroforestry systems can be used to restore land health, farmers must perceive real benefits when making significant changes in their land management practices.

Markus Walsh of the Earth Institute, Columbia University pointed out that Africa's ecological footprint is about half the global average and most of this accrues from the agricultural sector. In comparison, in the industrialized West, the footprint is largely caused by waste management. In **Managing ecosystem services in agricultural systems; the African challenges**, Walsh pointed to the need for greater scientific understanding of the trade offs between agricultural provisioning and other economic services.

Wajibu MS is a Kenyan environmental NGO working with **Land health monitoring in Kenya's 'forgotten' rangelands** on private ranches. In a practical application of land health surveillance described by Finn Davey, a partner at the NGO, standardized indicators are used in partnership with local pastoralists to guide

improved pasture management and engage with carbon trading. These indicators include measurements of above-ground vegetation, water infiltration rates and soil carbon.

Sara Scherr of Ecoagriculture Partners described some of the key challenges to reducing risks from land degradation: these include research on least-cost solutions, the promotion of institutional innovation for farmer learning and financial collaboration. Discussing the options for **Reducing and reversing risks to land and ecosystem health through ecoagriculture landscape strategies**, Scherr highlighted the potential of ecoagriculture to restore degraded landscapes and pastures, integrate perennial vegetation and protect natural forests.

In Morocco, hillside areas experience high levels of poverty and farmers' solutions to land degradation are sporadic, small scale and time-consuming. Talking about **Smallholder land use transformation, household economics and the potential role of carbon offset markets: a household financial analysis from Morocco**, Brent Simpson from Michigan State University described an ongoing project with components of tree crops, artisanal fisheries and assistance that targets such hillside areas and aims to shift farming from an annual subsistence to a high value cropping system.



Symposium

Theme 2: Conservation and rehabilitation of natural resources

Symposium 3: Temperate agroforestry systems

Agroforestry offers multiple benefits in temperate, as much as tropical, regions. A key challenge articulated in this symposium lies in assessing and clearly presenting the value of the benefits provided by agroforestry systems. Organized by M-R Mosquera-Losada and A Rigueiro-Rodríguez of the University of Santiago de Compostela, and Dirk Freese and SAFE Project staff at the Technical University of Cottbus, the symposium drew together agroforestry experiences from Europe, Canada and the United States of America.

In Europe's intensively managed landscape, population increase, rising demand for energy and other resources, and inappropriate biofuel production will place more and more pressure on land. Agroforestry systems are particularly relevant to marginal regions and degraded lands, where they offer an alternative to land abandonment and afforestation. Dirk Freese from Brandenburg University of Technology described an **Assessment of ecosystem services provided by agroforestry systems in Europe**, which highlighted the need for 'best bet estimates' of carbon sequestration potential and other benefits of multifunctional land use. This would help to determine if and when agroforestry systems are a valid alternative to traditional land management methods.

Agroforestry can entail an uneven distribution of costs and benefits between public and private

sectors. Bruce Neill of Agriculture and Agri-Food Canada, described the need for socio-economic and biophysical research that aims to understand the balance of private and public benefits from agroforestry practices. In **Temperate agroforestry: a Canadian perspective**, Neill noted that some agroforestry practices, such as the protection of woody riparian buffers, provide important environmental benefits to society, but the benefits to landowners may be relatively small. Targeted and substantial public support would be likely to increase landowner adoption of riparian buffers. This public-private balance in costs and benefits needs to be taken into account as agroforestry policies are developed.

In industrialized nations, said Gene Garrett of the University of Missouri, one goal for agroforestry is to minimize the amount of land converted from agricultural production and to maximize the ecosystem benefits. 'Green accounting' should accurately reflect the benefits of agroforestry practices. In **Ecosystem services from agroforestry practices in the USA**, Garrett pointed out that many landowners do not know or understand the ecosystem benefits of agroforestry. In a culture where management decisions are based on cash flow, net present value and net income, non-market benefits often get overlooked or underemphasized in the decision process.



Symposium

Theme 2: Conservation and rehabilitation of natural resources

Symposium 4: High carbon stocks development pathways

Land use change and deforestation are critical drivers of climate change, responsible for 20–25 percent of greenhouse gas emissions. This symposium, organized by Peter Minang, Global Coordinator for the Alternatives to Slash and Burn (ASB) Partnership at the World Agroforestry Centre, examined ways in which smallholder farmers in tropical forest margins could benefit from global carbon markets and contribute to fighting climate change.

Mario Boccucci from the UN Environment Programme described the **UN Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries** (UN-REDD). This aims to create a financial value for the carbon stored in forests, offering incentives for developing countries to reduce emissions from forested lands.

Niken Sakuntaladewi of the World Agroforestry Centre, Southeast Asia, focused on the **Challenges for swidden cultivation in relation to REDD schemes in Indonesia**. With increasing population and associated reductions in fallow length, swidden cultivation is viewed by the Indonesian Government as a threat to forests and a barrier to economic growth. However, swidden cultivation is a dynamic system that fulfils rural family needs while being environmentally sound and culturally acceptable. The barriers to inclusion of swidden systems under a REDD scheme relate to the poor

perception and understanding of swiddens in relation to deforestation.

Roberto Porro of the World Agroforestry Centre, Latin America, described a project in Anapu, Brazil, which integrates smallholder cocoa-based agroforestry, payments for environmental services, and sustainable forest management to address emissions from deforestation and biodiversity deterioration, while also improving livelihoods. In **Environmental services provision in the Transamazon through cocoa-based agroforestry and certified community-company forest management** Porro estimated that the program could result in 24,000 hectares of avoided deforestation. Land tenure insecurity is an ongoing challenge: “How can you reward farmers for not chopping down a tree that doesn’t belong to them?” asked Porro.

The belt of cocoa plantations that stretches across West and Central Africa is often cited as a cause of tropical deforestation. In **Cocoa forests in West and Central Africa**, Jim Gockowski from the International Institute for Tropical Agriculture in Ghana described research in the cocoa agroforests of southern Cameroon, which could be a high carbon pathway for rural development. Cocoa agroforests store about 40–60 percent as much carbon as secondary forests. However, the associated benefits for poverty reduction may justify this tradeoff, as secondary forests rarely generate significant economic returns.



Symposium

Theme 2: Conservation and rehabilitation of natural resources

Symposium 5: Satoyama – a socio-ecological production landscape approach

Satoyama is a Japanese term for rural landscapes that comprise several types of ecosystems including secondary forests, agricultural lands, irrigation ponds and grasslands, along with human settlements. *Satoyama*, which makes up more than 40 per cent of Japan's total landmass, connotes a way of life based on the symbiotic interaction between people and the environment. Central to *Satoyama* management is the sustainable supply of ecosystem services essential for human well-being. The symposium, organized by Maiko Nishi of the United Nations University in Japan, and Anantha Duraiappah of the United Nations Environment Programme in Kenya, brought together a number of perspectives on *Satoyama*, both within Japan and elsewhere.

There has been a resurgence of interest recently in traditional land use systems such as *Satoyama*. Comparing **Agroforestry in the Western Ghats of peninsular India and the *Satoyama* landscapes of Japan**, Mohan Kumar of Kerala Agricultural University pointed out that, despite some similarities, the two systems differ in nature, complexity and objectives, posing challenges for the transfer and application of knowledge gained in one system to the other.


Satoyama used to be a typical, traditional rural landscape in Japan, and was often also found in other countries of Monsoon Asia where rice cultivation is a longstanding part of the culture.

However, the system has been degraded and diminished in area over recent years. Masataka Watanabe of Keio University described a study of the **Ecosystem services management of *Satoyama* for a sustainable society** in Japan with an emphasis on land use, ecological conservation, biomass and resource recycling.

Takakazu Yumoto of the National Institute for Humanities in Japan, delved deeper into the **Cultural services provided by the *Satoyama* landscape and its role in the conservation of biodiversity**. A large area of *Satoyama* has been managed as a common resource by local communities, with strict rules governing limited membership, obligations and punishment. Overexploitation of *Satoyama* is avoided through strong community governance and the spiritual status of sacred forests.

Yoshihiro Natori of the United Nations University Institute of Advanced Studies described the **International *Satoyama* Initiative**.

Satoyama-like landscapes can contribute to the improvement of people's livelihoods, especially in developing countries, and can address global issues such as food security, poverty and climate change. The Government of Japan proposes the International *Satoyama* Initiative as a means of disseminating the concept of living in harmony with nature.



Technical sessions and posters

The response to the Call for Papers for the Congress was overwhelming. More than 1000 submissions were received from over 100 countries for oral or poster presentations. Thirty one concurrent technical sessions were held over the four days of the Congress. These covered a diverse range of themes: some were general in scope, such as the session on Policy Formulation and Stakeholder Engagement in Natural Resource Management; others covered quite specific topics, for instance, the session on Cabruca Agroforestry Systems of Bahia, Brazil. Over 300 posters were also displayed during the Congress.

The Congress brought together a wealth of agroforestry knowledge, offering participants the opportunity to share and exchange information and ideas in a range of formats, from informal conversations to posters; oral presentations to

formal symposia. Overall the Congress provided a comprehensive snapshot of the current state of knowledge about agroforestry worldwide, and an overview of the expected future trends in agroforestry to deal with some of the most pressing global issues.

The Book of Abstracts brought together edited abstracts of invited symposium presentations, voluntarily submitted papers selected for oral presentation at the technical sessions, and poster abstracts, creating a valuable record of the Congress and a resource for continued research and networking among participants.

Reports and presentations from the Congress together with the Book of Abstracts are available from the Congress website, www.worldagroforestry.org/wca2009.



Getting the message across

Agroforesters may stand accused of being poor communicators but that was emphatically not the message that emerged from the world's media coverage of the Congress. Over 100 journalists attended a press briefing at the start, setting the scene for widespread, quality coverage of the Congress and the key stories it generated.

Agroforestry stories featured in the media during the week, with coverage from China to Canada, India to Ireland. Traditional print media coverage included newspaper and magazine stories in the *Daily Telegraph*, *Le Monde*, the *Shanghai Daily*, the *Jakarta Post*, and the *Hindustan Times*. Stories related to the Congress featured on over 50 online sites, including those of *El Pais* and *New Scientist*.

Time magazine ran a story based on the World Agroforestry Centre's Trees on Farms study,

calling it a "rare bit of green good news". Careful planning ensured that the Trees on Farms report was widely promoted before the Congress. This helped prime the media for the release of the report during the Congress, as well as whetting the media appetite for further agroforestry stories. The fertilizer tree, *Faidherbia albida*, received its share of interest, for its ability to provide natural fertilizer and improve yields of surrounding crops.

Radio interviews with Peter Minang, Global Coordinator for the Alternatives to Slash and Burn Partnership, were aired on *BBC Afrique* and *Radio France Internationale* on the opening day of the Congress. Overall media coverage appeared in ten languages including English, Dutch, French, Hungarian, Icelandic, Italian, Korean, Spanish, Portuguese and Vietnamese.

Tweeting along – social media at the Congress

As well as the 'traditional' news media, the Congress made full use of social media sites to get the message across, both among participants and for those who could not attend. The Congress blog was regularly updated with stories, highlights and comments.

Dennis Garrity, Director General of the World Agroforestry Centre, exclaimed on Twitter: "We have an opportunity at this Congress which we should not pass up – there is so much brainpower in one room!" Twitter also offered the opportunity for all participants and session organizers to post links to their reports and related pages, as well as highlighting issues they considered important for further discussion.

A Facebook page dedicated to the Congress attracted over 60 fans and provided a forum for

them to follow up contacts with each other directly. And, of course, holding it all together, the Congress website linked social media and traditional media, as well as providing a wealth of information on events, presentations and background materials.





The organizers

Global Organizing Committee

Dennis Garrity, Chair, Global Organizing Committee, World Agroforestry Centre, Kenya
Michael Hailu, Chair, Local Organizing Committee, World Agroforestry Centre, Kenya
P. K. Nair, University of Florida, co-chair of Global Organizing Committee, USA
Wahida Patwa Shah, Congress Coordinator, World Agroforestry Centre, Kenya
A K Singh, Indian Council of Agricultural Research, India
Aissetou D Yaye, African Network for Agriculture, Agroforestry and Natural Resources Education (ANAFE)
Daniel Nyamai / Ben Chikamai, Kenya Forestry Research Institute, Kenya
Eduardo Somarriba / John Beer, Centro Agronómico Tropical de Investigación y Enseñanza (CATIE) Costa Rica
Ephraim Mukisira / G. Keya, Kenya Agriculture Research Institute, Kenya
Fergus L. Sinclair, University of Bangor, Wales; World Agroforestry Centre, Kenya
Gregory A Ruark, United States Forest Service, USA
Harold "Gene" Garrett, University of Missouri, USA
Howard Yana-Shapiro, Mars Incorporated
Ibrahim Thiaw / Elizabeth Migongo-Bake, United Nations Environment Programme
John Kort / Bruce Neill, Agriculture and Agri-Food, Canada
Kurniatun Hairiah, Brawijaya University, Indonesia
Laercio Couto, Brazilian Agroforestry Society, Brazil
Mohamed Bakarr, Global Environment Facility, USA
Olavi Luukkanen / Mohamed El Fadl, University of Helsinki, Finland
Reinhard F. Hüttel, Wissenschaftlicher Vorstand und Sprecher des Vorstands GeoForschungs, Germany
Roger Leakey, James Cook University, Australia
Zhu Zhaohua, International Network for Bamboo and Rattan, China

Local Organizing Committee

Michael Hailu; Wahida Patwa Shah; Wangui Munyua; Betsy Namisi; Delicia Pino; George Mbiriri; Jacinta Kimwaki;
James Nyakundi; Francis Kinyanjui; Jimmy Kiio; Joannes Okumu; Jonathan Muriuki; Kate Langford; Lillian Gatubu;
Mahmouda Hamoud; Naomi Kanyugo; Priscilla Muisyo; Reagan Sirengo; Rebecca Selvarajah-Jaffery; Rita Mulinge;
Solomon Mwangi; Stella Muasya



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<http://www.worldagroforestry.org/wca2009/>