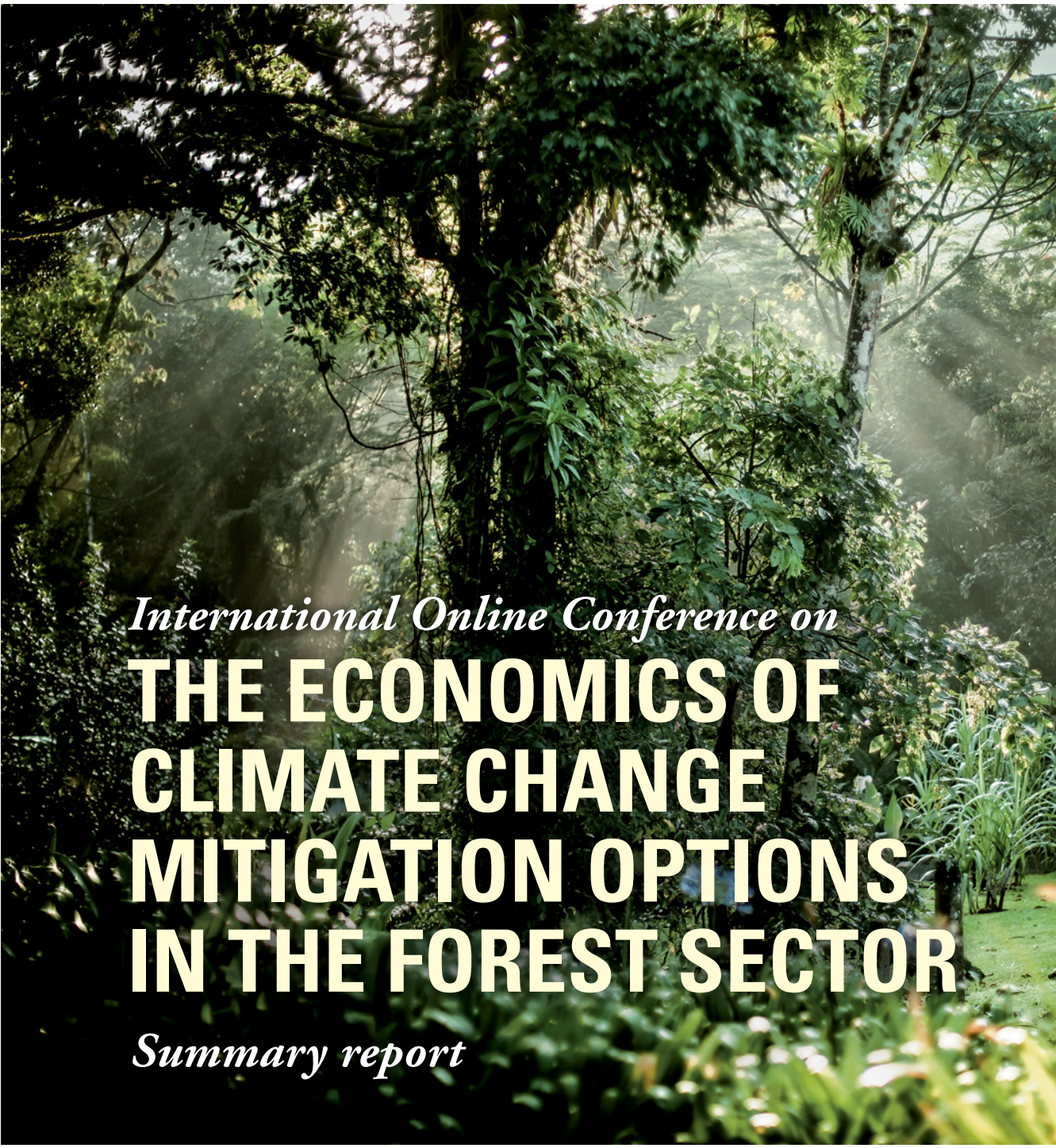
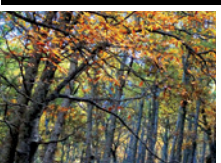
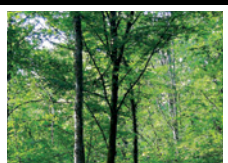
Food and Agriculture Organization
of the United Nations

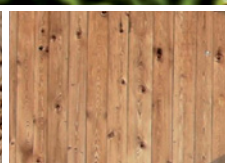


International Online Conference on

THE ECONOMICS OF CLIMATE CHANGE MITIGATION OPTIONS IN THE FOREST SECTOR

Summary report

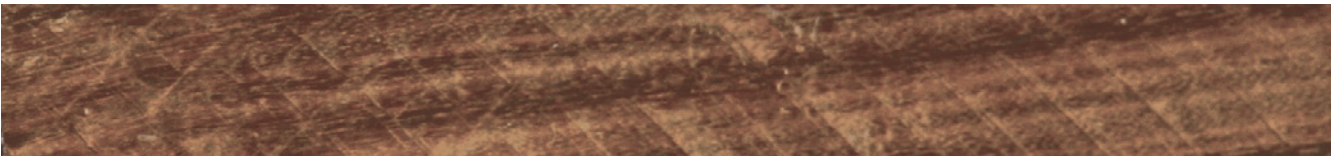

International Online Conference on

THE ECONOMICS OF CLIMATE CHANGE MITIGATION OPTIONS IN THE FOREST SECTOR

Summary report

Compiled by **RUTH MALLETT** *and* **ILLIAS ANIMON**

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS – Rome, 2015



Cover photos:
Different aspects of forests and wood products represent different climate change mitigation options.

CONTENTS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ACKNOWLEDGEMENTS

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Illias Animon conceived the idea for the online conference and led the process of making it happen.

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ACRONYMS

AFOLU	agriculture, forestry and other land use
AR	afforestation and reforestation
CDM	Clean Development Mechanism
CSR	corporate social responsibility
FLEGT	forest law enforcement, governance and trade
GHG	greenhouse gas
LULUCF	land use, land-use change and forestry
PES	payments for ecosystem/environmental services
RIL-C	reduced-impact logging practice that reduces carbon emissions
REDD(+)	reducing emissions from deforestation and forest degradation

CONFERENCE STRUCTURE

The International Online Conference on the Economics of Climate Change Mitigation Options in the Forest Sector, organized by FAO from 6 to 27 February 2015, attracted more than 900 participants from over 114 countries as well as 126 abstract submissions. The 51 technical presentations, which included 31 country case studies, combined with panel and plenary discussions provided opportunity for sharing country experiences. The conference commenced with opening remarks by Eva Muller, Director of the Forestry Economics, Policy and Products Division, and was closed by Eduardo Rojas-Briales, Assistant Director-General, Forestry Department.

The conference programme is presented in Annex A. For speaker profiles and recorded presentations, see the conference website (http://www.fao.org/forestry/cc-mitigation-economics).

Conference sessions were structured to allow interaction and participation (Figure 1).

FIGURE 1. **Structure of each conference session**

CONFERENCE TEAM

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Forestry Officer and
Conference Team Leader

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MARIA NUUTINEN

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Session 2 – Reduced deforestation and degradation

ADRIAN WHITEMAN

Head of Statistics, International Renewable Energy Agency
Session 4 – Wood energy

PETER MOONEN

National Sustainability Manager, Canadian Wood Council
Session 5 – Green Building

JOSEPH MPAGALILE

Agro Industry Officer, FAO
Session 6 – Sustainable packaging

JULIAN BLOHMKE

Consultant and researcher, Maastricht University, the Netherlands
Session 6 – Sustainable packaging

JONAS CEDERGREN

Forestry Officer, FAO
Session 3 – Changing forest management practices

ZUZHANG XIA

Forestry Officer, FAO
Session 4 – Wood energy

MARTIN HILMI

Enterprise Development Officer, FAO
Session 6 – Sustainable packaging

LUCIANA PELLEGRINO

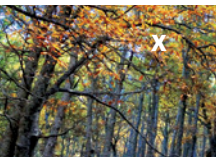
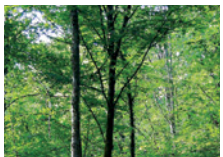
Executive director, Brazilian Packaging Association
Session 6 – Sustainable packaging

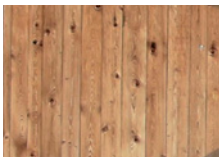
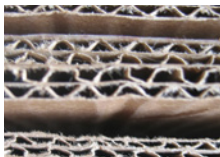
XIAOQIAN CHEN

Associate Professor, School of Economics and Management, Beijing Forestry University
Session 6 – Sustainable packaging

TAKE-AWAY MESSAGES

- Forests have multiple roles to play in climate change mitigation, well beyond capturing and storing carbon.
- Wood-based energy is a viable alternative to fossil fuels, provided that wood supply is sustainably managed and the right market conditions are established, including appropriate carbon prices.
- Wood use in construction can replace high-emission products and prolong the carbon storage role of wood.
- To accurately assess the cost-effectiveness of climate change mitigation options in the forest sector it is necessary to factor in forests' significant contributions to livelihoods and ecosystem services, including carbon sequestration and biodiversity.
- There is a huge gap between the reality and the potential of forests and wood products in climate change mitigation. To close this gap, public policies, positive incentives and concerted efforts are needed to stimulate supply and demand of sustainable forest products and ecosystem services.

SESSION 1

AFFORESTATION AND REFORESTATION

ATTENDANCE
10 presenters + 388 participants

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KEY POINTS

FROM SESSION PRESENTATIONS

>> VIDEO
>> SLIDE

CORNELIS VAN KOOTEN

- Forestry activities that create carbon offsets reduce costs of complying with emission reduction targets, but may also lead to less investment in emission-reducing technologies.
- Meta analyses suggest that costs of sequestering carbon via afforestation and reforestation are higher than some options that reduce emissions. The social costs are likely much higher still when leakages, transaction and monitoring costs, duration and opportunities for corruption are taken into account.
- Costs of removing CO_2 from the atmosphere via forestry activities depend crucially on what happens when forests reach maturity. Post-harvest use is a key component of any valuation of afforestation/reforestation (AR) climate mitigation investments.

>> VIDEO
>> SLIDE

ANDREW PLANTINGA

- Economic studies find that in the United States of America afforestation is a cost-competitive way to offset carbon emissions relative to abatement and mitigation strategies in the energy sector.
- Carbon sequestration cost estimates were developed for the United States with the following new features: county-level estimates, effects of future land development, afforestation of rangeland, climatic constraints on forest growth and improved estimates of tree planting costs.
- These new estimates showed that afforestation in the United States provides low-cost opportunities to offset carbon emissions, although the estimates are less optimistic than those in previous studies.

N H RAVINDRANATH

>> VIDEO
>> SLIDE

- Despite having a large baseline rate of afforestation, at about 1 million hectares per year, India has launched a large AR programme targeted at an additional 1 million hectares per year, aimed at mitigation over the next 10 years.
- The programme aims to promote mitigation-adaptation synergies and many ecosystem services.
- Implementation and monitoring will be through a participatory approach.
- It is estimated that the total mitigation cost over 30 years will be around USD 15.7 per tonne of carbon.

PAT SNOWDON

>> VIDEO
>> SLIDE

- Planting new woodlands is cost effective in the medium to longer term as tree growth accelerates.
- Uncertainties include major spatial variations linked to soils (both emissions and subsequently carbon absorption), species and forest management regimes.
- Wider benefits of woodlands include the delivery of other ecosystem services. This could have a major impact on cost effectiveness.

CHRIS STEPHENSON

>> VIDEO
>> SLIDE

- Scaling up is key to ensuring the financial viability of community-based forest carbon projects at current carbon prices.
- Keeping transaction costs low helps to ensure equitable benefit sharing for communities and smallholder farmers.
- There is a clear need in such projects to strike a balance between assurance of mitigation benefits and the cost and practicality of achieving highly accurate monitoring data.

>> VIDEO
>> SLIDE

WALTER VERGARA

- In Latin America and the Caribbean a large private and public effort is required to restore degraded forests, woodland savannahs and other degraded agricultural landscapes. An effort with the scope and character of Initiative 20x20 would result in substantial net societal benefits.
- The future ability of the region to sustain a low-carbon development path hinges on current efforts to reduce carbon emissions from land-use change and other agricultural activities. If private, public and local actors can contribute to carbon sequestration and avoidance of carbon emissions through a successful large-scale land restoration programme, the region could achieve a necessary and expandable step in this direction.

>> VIDEO
>> SLIDE

YOUN YEO-CHANG

- In the Democratic People's Republic of Korea, the cost of AR through the Clean Development Mechanism (CDM) is relatively high; there would be no financial incentive for investing in reforestation through the CDM scheme.
- However, there is potential for investing in reforestation in the Democratic People's Republic of Korea if the multiple benefits of reforestation are taken into account. Interest in supporting reforestation in the country is emerging, not only from the Government of the Republic of Korea, but also from civil society.
- The United Nations climate change framework could be employed as a facility for securing sustainable forestry in the Democratic People's Republic of Korea through international partnerships.

>> VIDEO
>> SLIDE

PHILIPPE DUBOIS

- Awareness-building and training programmes must precede any action. Local populations are able to contain deforestation if property rights of the lands in question have been secured (land tenure management).
- Local populations identify with the objectives of reforestation and conservation and are preparing to manage farmer-based forest restoration projects independently, but meagre international support and the inability to sell carbon credits would jeopardize these types of projects.

MARCO GUERRERO

>> VIDEO
>> SLIDE

- In Panama, the CO_2OL Tropical Mix project has reforested former pastureland in several provinces, mainly with native tree species, to create ecologically valuable mixed forests.
- The project aims to combine sustainable timber and cacao production with the protection of biodiversity and ecosystem restoration. Sustainable management creates employment opportunities and ensures knowledge transfer in close collaboration with regional stakeholders and respecting local indigenous communities' rights and territories.
- CO_2OL Tropical Mix is one of the world's first Gold Standard forestry projects. In addition, the project area is certified by the Forest Stewardship Council (FSC) and the cacao areas are UTZ certified.

OLIVIER BOUYER

>> VIDEO
>> SLIDE

- The costs and benefits associated with the hypothetical fulfilment of land use, land use change and forestry (LULUCF) accounting rules in Turkey under the second period of the Kyoto Protocol (2013–2020) were estimated.
- Turkey has made huge efforts in terms of afforestation/reforestation (roughly 170 000 ha per year over 2006–2014) and intends to maintain these efforts for the next few years. Thus estimated gross benefits associated with AR will be important both in terms of carbon benefits (around USD 600 million over 2013–2020) and non-carbon benefits (around USD 2 700 million over 2013–2020), and estimated net benefits are positive (around USD 100 million over 2013–2014). Carbon benefits were estimated based on the current EU carbon market price, around USD 4 per tCO_2e, and would be much bigger if the carbon shadow price is taken into account, i.e. the carbon price to keep temperature rise under +2°C (around USD 53 per tCO_2e in 2013).

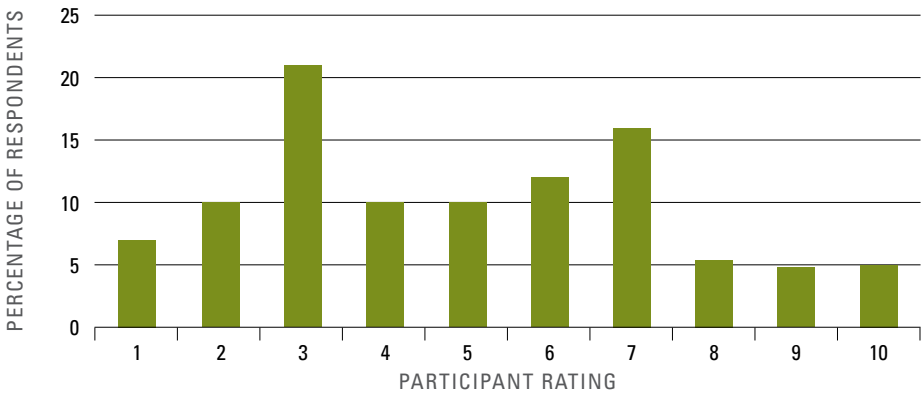
HIGHLIGHTS

FROM PLENARY DISCUSSIONS

1. DEGREE OF EMPHASIS

As shown in Figure 2, over 50 percent of participants rated their country's emphasis on AR ≤5, which indicates a moderate level of perceived emphasis on afforestation and reforestation as a climate change mitigation measure.

FIGURE 2. **Participants' ratings on the degree of emphasis given to afforestation/reforestation in their countries** (1= no emphasis, 10 = very high emphasis)



2. LESSONS LEARNED FROM EXPERIENCES WITH AFFORESTATION AND REFORESTATION

- Inclusive approaches are essential, as the potential social and livelihood benefits are potentially more important to local people than climate change benefits.
- Carbon benefits are not of interest to planters, in particular in tropical plantations where the main aim is to produce timber.

- Co-benefits (e.g. poverty alleviation, biodiversity benefits and adaptation) seem to incentivize funding for AR.
- Project implementation is hindered by many factors such as financial constraints, lack of access to government programmes or initial credit, and absence of ongoing donor support. There are concerns regarding the state of the voluntary carbon markets, and incentives for planting trees need to be higher as the struggle among land-use priorities continues.
- Opportunity costs are still too high, perpetuating competition between farmers and foresters for land use.
- Collaboration among all stakeholders is essential; conflicts of interest, controversy and disagreements between actors hinder processes.
- There is a need for incentivizing legislation and an enabling environment at the policy level.
- Multiple benefits are seen from established projects where income from carbon benefits as well as the sale of forest products has improved food security and livelihoods.

3. CRUCIAL CHALLENGES TO ACHIEVING ECONOMIC POTENTIALS OF AFFORESTATION AND REFORESTATION

The most common challenges reported by participants included:

- insufficient funding and financing to meet the opportunity costs of land and to provide alternate livelihoods for forest-dependent communities;
- land tenure and land classification issues;
- lack of sufficient national policy frameworks and government willingness to embrace implementation;
- achieving multiple benefits through planting so that carbon benefits go hand-in-hand with environmental sustainability;
- high transaction costs, including costs of monitoring, reporting and verifying;
- finding the right balance between forest expansion and food production.

SESSION 2

REDUCED DEFORESTATION AND DEGRADATION

ATTENDANCE:
9 presenters + 1 guest panellist + 356 participants

© FAO/Reza Esapour

KEY POINTS

FROM SESSION PRESENTATIONS

ARILD ANGELSEN

>> VIDEO
>> SLIDE

- Reducing emissions from deforestation and forest degradation (REDD) was an idea to address the fundamental cause of deforestation (the negative externality) by creating a multi-level payment for environmental services (PES). However, the application of PES is limited because of practical problems, political opposition and lack of funding.
- Other policy measures related to agricultural policies and enforcement of protected areas can be effective and can also be implemented before fully solving tenure and other institutional issues.
- REDD+ is a policy experiment. We should learn from it, update our views regularly, and not fall in love with particular solutions.

RODNEY TAYLOR

>> VIDEO
>> SLIDE

- In the short term, improving governance is the key to preventing forest loss. In the long term, producing food and fuel for a larger, richer global population will create a land squeeze. Halting forest loss will require forestry and farming practices that produce more with less land and water, while eliminating waste and overconsumption by the affluent.
- There has been a surge of private-sector commitments to take deforestation out of supply chains. This is a positive step, but more work is needed to define and verify deforestation-free production.
- Deforestation-free initiatives may backfire if they take a narrow approach. They need to supplement, not undermine, work on broader enablers of sustainable development.

>> VIDEO
>> SLIDE

IVO MULDER

- There is no conclusive evidence that a Kuznets type curve exists [whereby countries progressively deforest more rapidly as they develop economically until a point when this trend is reversed], but Brazil has shown that it is possible to "bend" the curve.
- Continuing political support for REDD+, combined with support from civil society, indigenous groups and the private sector, is paramount for REDD+ to become a success and be a viable abatement mechanism to combat climate change.
- As a number of countries are completing their REDD+ "readiness" phase, it is increasingly important to guide countries on how best to implement REDD+ at the national level. Embedding the implementation of REDD+ – including potential results-based finance – in national economic and development plans can enhance the success of implementation.

>> VIDEO
>> SLIDE

ROHIT JINDAL

- Measuring local impacts of REDD/carbon projects is extremely important if we want to scale them up as viable options for climate change mitigation.
- A field study in Mozambique distinguished the direct impact of forestry carbon activities from the impact of other development activities in the area.
- Based on field data from Nhambita community, it was found that local poor were able to participate in the project and that the project had a positive impact on household incomes. However, carbon payments were not enough to move people out of poverty; employment created by the project had a much bigger impact.

>> VIDEO
>> SLIDE

RALPH BLANEY

- An analysis of costs and benefits can help decision-makers address uncertainty about the extent to which forest conservation, and specifically REDD+, should play a part in future national development.
- As part of the UN-REDD Programme, a REDD+ cost-benefit spreadsheet tool is being developed for Cambodia, based on the main drivers of deforestation and the priority REDD+ response options.
- This work is being undertaken because a national workshop identified cost-benefit analysis as a country need. The project team has continued to engage with national REDD+ stakeholders during the development of the tool.

EDUARDO MARINHO

>> VIDEO
>> SLIDE

- REDD+ has emerged as a cost-effective solution for climate change mitigation, but little is known about the actual costs of subnational initiatives.
- In Brazil, personnel costs are high because of relatively high salaries and taxes. Community development is the major source of costs in initiatives run in settlements. Protection and enforcement are a federal task.
- In Indonesia, high ecosystem restoration costs emerge from the ecosystem restoration and concession (ERC) model requirements.

CARLOS CUBAS

>> VIDEO
>> SLIDE

- It is uncertain how the money required to continue the REDD+ mechanism will be obtained. Lack of coverage would influence the price of credits offered, which could result in non-competitive values.
- The design of the mechanism must consider cost-benefit distribution and make it clear how the costs would be covered for the project in the long term.
- The study reveals that mixed use of land is the best option in terms of a final balance.

MADEN LE CROM

>> VIDEO
>> SLIDE

- REDD+ result-based payments would not cover all REDD+ implementation costs at low carbon prices. However, REDD+ represents a significant co-financing opportunity.
- Integrating REDD+ co-benefits would be a meaningful way to capture the adaptation potential of Mediterranean forests for adaptation-based mitigation.
- More research and targeted support is needed to assess forest contributions to mitigation in low forest cover countries of the Near East and North Africa.

>> VIDEO
>> SLIDE

ANA FAJARDO

- Transaction costs vary according to the organization that does the validation and verification of carbon credits and tend to decrease according to the size and scope of the project.
- This fact prevents the individual participation of small farmers in projects for the generation of carbon credits.
- Understanding the transaction costs of forest carbon projects is the first step to finding ways to reduce them.

HIGHLIGHTS

FROM PLENARY DISCUSSIONS

1. DEGREE OF IMPLEMENTATION

Participants gave an overview of the degree of REDD implementation within their countries, from both a policy perspective (Figure 3) and a project or activity perspective (Figure 4). Responses indicated a low level of implementation on the ground.

FIGURE 3. **Participants' responses regarding the degree of implementation of REDD policy in their countries** (1 = no implementation; 10 = high level of implementation)

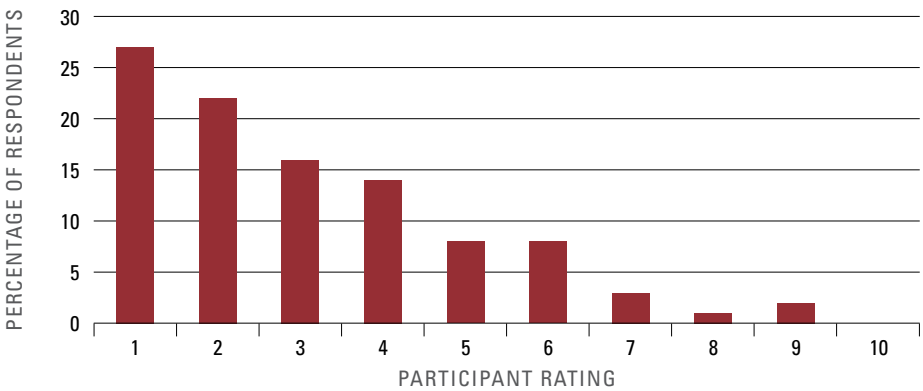
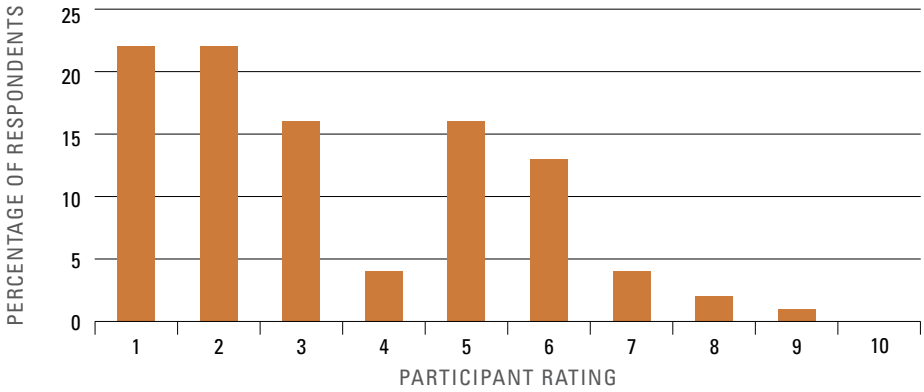


FIGURE 4. **Participants' responses regarding the degree of implementation of REDD projects/ activities in their countries** (1 = no implementation; 10 = high level of implementation)



2. SUCCESSFUL ASPECTS OF REDD IMPLEMENTATION

According to the participants, the following measures to reduce deforestation and degradation have proved successful:

- community participation, engagement and community-based projects (e.g. Colombia, Ethiopia, Nepal, United Republic of Tanzania);
- small-scale projects (e.g. Brazil, Egypt, Italy, Spain);
- stakeholder engagement (e.g. Bolivia, Mexico, Nepal, Nicaragua, Nigeria, Peru, the Philippines);
- private investment or collaboration with the private sector (e.g. Belize, Brazil, Peru);
- none in particular to date (e.g. Bosnia and Herzegovina, Italy, the Niger, Nigeria, Pakistan, Saudi Arabia, Tunisia).

3. FAILURE TO MEET EXPECTATIONS

Measures for reducing deforestation and degradation have failed to meet expectations in various ways, including:

- failure to address the root causes of deforestation in many projects;
- weak governance, environmental policies with a different focus, weak regulatory actions taken against deforestation (e.g. Bolivia, Brazil, Nigeria).

- lack of financing and delays in the set-up of adequate financial mechanisms (e.g. Bangladesh, United Republic of Tanzania), as well as financial mechanisms not yet reaching the communities as they should (e.g. Peru);
- lack of proper assessment of market drivers because carbon markets are undeveloped, and lack of sales of carbon credits due to a shortage of buyers (e.g. Argentina, Belize, Brazil, Nepal);
- slow project validation (e.g. Kenya);
- underestimation of the effort and time required to build capacity and to establish national approaches/strategies;
- lack of take-off/no sign of action or uptake at all (e.g. Ethiopia, Pakistan, Tunisia);
- unsustainable situation of banning local people living in extreme poverty from using forests and forest products without providing alternate livelihoods (e.g. Sierra Leone);
- continuing expansion of the agricultural frontier (e.g. Bolivia, Paraguay);
- inability to gauge performance and lack of capacity (e.g. Nigeria);
- impossibility of scaling up until national strategies are developed (e.g. Colombia, Ecuador, Nigeria, Peru, Uganda);
- low representation of communities in the development of a national REDD+ strategy (e.g. Republic of the Congo).

4. ROOT CAUSES OF DEFORESTATION IN COUNTRIES

The participants noted the main causes of deforestation in their countries as follows:

- agriculture/expansion/land-use change (Argentina, Belize, Benin, Bolivia, Brazil, Cameroon, Colombia, Costa Rica, Democratic Republic of the Congo, Ethiopia, India, Indonesia, Jamaica, Kenya, Malaysia, Mexico, Nicaragua, Nigeria, Paraguay, Peru, the Philippines, Viet Nam);
- building/construction/urban spread (Cameroon, India, Italy, Jamaica, Kenya, Lebanon);
- food security issues (Bolivia, Cameroon, Kenya);
- lack of/insufficient environmental policies (Argentina, Greece, Iran, Nepal, Nigeria, Spain);
- poverty (Burkina Faso, India, Kenya, Peru, Thailand, Tunisia);

- weak/poor governance (Bangladesh, Bolivia, Brazil, India, Kenya, Madagascar, Nepal, Nigeria, Peru, Uganda, United Republic of Tanzania);
- energy/charcoal (Benin, Democratic Republic of the Congo, Ethiopia, Jamaica, Morocco, Nigeria, Tunisia);
- illegal logging (Bosnia and Herzegovina, Brazil, Iran, Nicaragua, the Philippines, Tajikistan);
- mining (Cameroon, Colombia, Ecuador);
- pressure for wood and non-wood products (Argentina, Bolivia, Ethiopia, Italy);
- forest fires (Lebanon, Morocco, Portugal, Tunisia).

5. PERCEPTIONS ON HOW REDD ACTIVITIES ADDRESS THE CAUSES

- Some participants felt that the root causes of deforestation and degradation were not addressed by REDD activities because of a lack of either engagement or take-up (Argentina, Belize, Benin, Bolivia, Bosnia and Herzegovina, Cameroon, India, Jamaica, Madagascar, Nepal, Nigeria, Pakistan, Paraguay, Portugal, South Africa, Tunisia, United States of America).
- Some success has been observed in countries where a large reduction in deforestation occurred over the last decade (e.g. Brazil).
- In some countries attempts are being made to provide alternative livelihoods.
- REDD strategies can address the drivers of deforestation and degradation (Argentina, Brazil, Cameroon, Colombia, Iran, Sierra Leone, United Republic of Tanzania).
- REDD activities have minimal to poor impact, often only working at the individual small-scale project or subnational level (Bangladesh, Burkina Faso, Indonesia, Nigeria, Peru).

SESSION 3

CHANGING FOREST MANAGEMENT PRACTICES

ATTENDANCE:
10 presenters + 1 guest panellist + 219 participants

© FAO/Reza Esapour

KEY POINTS

FROM SESSION PRESENTATIONS

GERT-JAN NABUURS

- Global forests have a very large role in carbon sequestration, through the whole forest–wood chain.
- Stimulating this role through active or changed management has appeared very difficult in practice.

>> VIDEO
>> SLIDE

JANAKI ALAVALAPATI

- Forest management interventions will influence productivity and thus carbon stocks; however not all options that result in an increase of carbon stocks may be more profitable.
- Loblolly pine is more effective in terms of carbon sequestration at a low planting density than at a high planting density, based on economic revenue per megagram of sequestered carbon.

>> VIDEO
>> SLIDE

ADRIAN WHITEMAN

- Carbon storage in forests is a significant benefit of sustainable forest management; it should not, however, be considered in isolation.
- The carbon debt concept does not imply that we should stop harvesting forests.
- Using wood for bioenergy is carbon neutral, but not in the way in which it is most often described at present.

>> VIDEO
>> SLIDE

>> VIDEO
>> SLIDE

FABIANO XIMENES

- Sustainable management of native forests for wood production makes sense from both greenhouse gas and socio-economic perspectives.
- It is important to consider ways to optimize the contribution of sustainable native forest management to greenhouse gas abatement, primarily by maximizing physical permanence of carbon in harvested wood products and optimizing bioenergy generation from lower-value co-products.

>> VIDEO
>> SLIDE

MICHAEL GALANTE

- Reduced-impact logging is an "off the shelf" activity, relevant to climate policy and project developers.
- Carbon loss from reduced-impact logging ranges from 21 to 46 percent, compared with 58 to 90 percent from conventional harvest activities.
- Reduced-impact logging can avoid 24 to 44 tC per hectare over time frames ranging from 7 to 22 years.

>> VIDEO
>> SLIDE

TONY LEMPRIERE

- Potential for cost-effective mitigation from the forest sector is fairly large in Canada. However, strategies would need to be implemented in the near term in order to achieve much mitigation by 2030.
- In order to make the best decisions about forest-sector mitigation, it is important to look not only at the forest but also at how wood is used.
- Thus, it is important to consider not only forest ecosystem effects but also the effects of mitigation strategies on emissions associated with harvested wood products and bioenergy, and emission displacement effects resulting from the substitution of wood for other products and energy.

>> VIDEO
>> SLIDE

GIJS BRUEKINK

- Logging is a dominant land use in the tropics, affecting over 20 percent of natural tropical moist forests globally and playing a key role in economic development strategies.

- When selective logging is done properly, tropical forests retain most of their biodiversity and carbon stocks, with their emission reduction potential ranging from 25 to 50 percent.
- Reduced-impact logging practice that reduces carbon emissions (RIL-C) is the first practical methodology that aims to capitalize on emission reductions derived from improved management practices, offering promise for incentivizing best practice forestry and reducing forest degradation.

SIMON MARTEL

>> VIDEO
>> SLIDE

- In France, where planting of new forest is not really possible, a project is being implemented to develop new management strategies in existing forest stands.
- In this carbon project, forests continue to supply long-term products, but management also takes other concerns into account (e.g. carbon, biodiversity).
- The carbon project prompted a positive and collective action among forest owners on highly fragmented land, marking the beginning of a success story of sustainable forest management.

CECILIA SIMON

>> VIDEO
>> SLIDE

- Forest management that enhances carbon sequestration for carbon markets can increase the sustainable supply of timber yield over the long term and provide substantial economic benefits.
- The ability of carbon markets to influence forest management change depends on the market price of carbon.

EDER ZANETTI

>> VIDEO
>> SLIDE

- Corporate social responsibility (CSR) within a green economy context demands that companies measure their impact on ecosystem services to achieve significant environmental benefits and contribute to sustainability.
- Payments for ecosystem services (PES) derive from active and additional human interventions to manage natural resources.
- Green Farm optimizes positive environmental impacts from CSR investment, and its location within a federal conservation unit buffer zone is essential to achieve them.

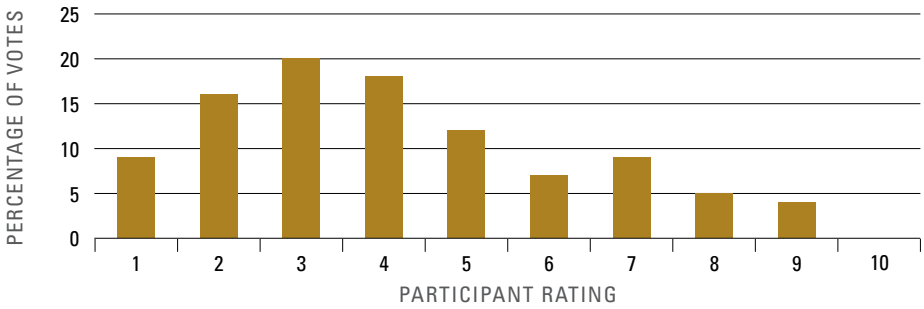
HIGHLIGHTS

FROM PLENARY DISCUSSIONS

1. DEGREE OF IMPLEMENTATION

Changing forest management practices as a climate mitigation measure is not widely implemented in many countries, as indicated by the dominance of scores below 5 in Figure 5.

FIGURE 5. **Participants' responses on the extent to which changing forest management practices has been implemented as a mitigation measure in their countries**



2. SUCCESSFUL ASPECTS OF CHANGING FOREST MANAGEMENT PRACTICES

- Community engagement and community-based management (e.g. Cameroon, Costa Rica, Ethiopia, the Gambia, Kenya, Mozambique, Nepal, the Niger, Nigeria, Pakistan, Peru, South Africa)
- Afforestation and reforestation programmes, mentioned alongside innovative approaches such as peri-urban planting and supporting private tree growers (e.g. Lebanon, Norway, Uganda)
- Conversion of coppice to high forest management (e.g. France)

- Various forms of offsets or subsidies (carbon, biodiversity) such as cap-and-trade systems awarded on the basis of improved silvicultural practices (e.g. Australia, Finland, Georgia, United States of America) and a subsidized bioenergy market (e.g. France)
- Reduced impact logging (e.g. Cameroon, Malaysia) and selective logging, forest law enforcement, governance and trade (FLEGT) implementation and certification (e.g. Cameroon)
- Adequate forest management service (e.g. Croatia, India, Tajikistan)

3. EFFECTIVE STRATEGIES TO ADVANCE CHANGING FOREST MANAGEMENT PRACTICES AS A CLIMATE CHANGE MITIGATION MEASURE

Suggestions from participants include:

- management practices that address multiple goals (Bhutan);
- FLEGT (Cameroon, Ghana, Russia);
- economic incentives such as PES and taxes (Australia, Ecuador, Finland, Nepal, Peru);
- timber certification;
- REDD+ (Cameroon, Ethiopia, Pakistan, Zambia);
- capable forest service and training of forest owners/officers (Germany, Greece, Zambia);
- policies that enable wood for renewable energy (Australia);
- extended rotations.

SESSION 4

WOOD ENERGY

ATTENDANCE:
10 presenters + 2 guest panellists + 212 participants

© FAO/Korea Forest Service

KEY POINTS

FROM SESSION PRESENTATIONS

ROGER SEDJO

>> VIDEO
>> SLIDE

- Both financial and environmental issues are important when considering wood for bioenergy.
- Knowledge regarding the financial costs of using wood for energy compared with the alternative, particularly fossil fuels, is relevant.
- Environmental damage also needs to be compared. Fossil fuels generate net emissions; however, since wood emissions will be recaptured in a sustainably managed system, no net emissions occur if wood is used for energy.

ROBERT BEACH

>> VIDEO
>> SLIDE

- A study applied inter-temporal partial equilibrium models of the United States forest and agricultural sectors to assess market, land use and greenhouse gas (GHG) implications of biomass electricity expansion.
- Results indicate that assessing net GHG impacts of biomass use is very complex and varies depending on scenario assumptions.
- Findings highlight the importance of considering feedstock eligibility, commodity substitution dynamics and forest and agriculture interactions.

>> VIDEO
>> SLIDE

LEIRE IRIARTE

- Sustainability goes beyond environmental considerations and must also embrace economic and social issues such as secure land tenure.
- GHG emissions accounting for forest bioenergy is complex and seems difficult to simplify. A precautionary approach should be adopted.
- Projects dealing with biomass and bioenergy implemented around the world provide a good basis for learning and replication.

>> VIDEO
>> SLIDE

DOUGLAS BRADLEY

- Pyrolysis oil is taking off as a product. EU markets alone are producing almost 80 million tonnes of oil equivalent.
- The market for pyrolysis oil now lies in the replacement of traditional fossil fuel oil in power stations, district heating, industry and residential use.
- Pyrolysis oil is competitive, with many markets not even needing government incentives. Evidence suggests it would be competitive even after an oil price collapse. Imports are supported by an EUR 200 million Biotrade equity fund.

>> VIDEO
>> SLIDE

PUNEET DWIVEDI

- Use of imported wood pellets for electricity generation replacing coal-based electricity could save at least 64 percent of GHG emissions in the United Kingdom.
- The average unit production cost of electricity generated from imported wood pellets is about 30 percent higher than the unit production cost of electricity generated from coal without any price support.
- Existing price support mechanisms assist trans-Atlantic wood pellet trade by lowering the unit cost of electricity produced from imported wood pellets. Existing price support mechanisms need to be revised to ensure economic efficiency.

ANIL BARAL

>> VIDEO
>> SLIDE

- Advanced biofuels from sustainably sourced forest slash can offer significant GHG reductions (54 to 61 percent) and contribute to rural economic development in the European Union.
- The cost of collecting and transporting forest slash plays an important role in determining the overall profitability of biorefineries and the need, if any, for additional financial incentives.

EMILY HOPE

>> VIDEO
>> SLIDE

- Research was done to assess the anticipated costs of GHG emission offsets that would make forest residue biomass economically attractive as a substitute for fossil fuels in energy generation in Canada.
- The research included accounting for various environmental and technical accessibility constraints in estimating GHG offset supply curves that depict the anticipated offset supply prices from fossil fuel substitution by forest residues.
- Results suggest that at the GHG offset price threshold of CAD 20, between 1.2 and 11.6 million metric tonnes of CO_2 equivalent could be offset annually via fossil fuel substitution, depending on the type of fossil fuel replaced.

SERGIO ALVAREZ

>> VIDEO
>> SLIDE

- Mixed stands need to be managed to take advantage of different species.
- Charcoal production could be increased in many new areas.
- In southern Mexico, these activities could constitute useful investments for social and political empowerment.

MARGARET MWANGI

>> VIDEO
>> SLIDE

- Three categories of wood energy are used across Maasai-inhabited rangelands: fuelwood, charcoal and teleposts. Diversity of use across sectors, decentralized demand and supply, and dominance of informal markets are key characteristics.

- Wood energy use in these rangelands significantly influences future generations; the few forests and trees outside forests have critical potential for mitigating climate change by sequestering carbon. Avoiding carbon emissions from Africa's rangelands is relevant because they are otherwise likely to rise rapidly.
- Cost-benefit analyses for wood energy use, policies and programmes need to be extended beyond broadened temporal and spatial scales. They should consider non-wood energy factors as well as environmental costs.

FRANCESCO DI NAPOLI

>> VIDEO
>> SLIDE

- An analysis of the energy chain in a region of Italy is being carried out to develop sustainable forest bioenergy systems that are cost-effective and efficient.
- The work includes spatial analysis and stakeholder consultations for biomass power plant creation.
- The primary benefits include optimization of forest management, reduction of energy dependence, enhancement of wood products and job creation.

HIGHLIGHTS

FROM PLENARY DISCUSSIONS

1. DEGREE OF USE AND IMPLEMENTATION

A majority of participants (59 percent) responded that wood was being used or promoted as a mitigation measure in their countries (Figure 6). Over 35 percent of participants gave a score of 7 or 8 on level of implementation, indicating a significant level of implementation in some countries. A low degree of implementation was also seen in many countries, given the prevalence of scores between 1 and 5 (Figure 7).

FIGURE 6. **Responses on whether wood energy is used or promoted as a mitigation measure in participants' countries**

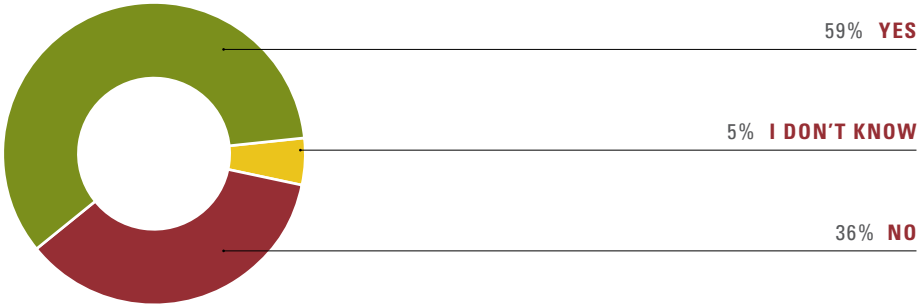
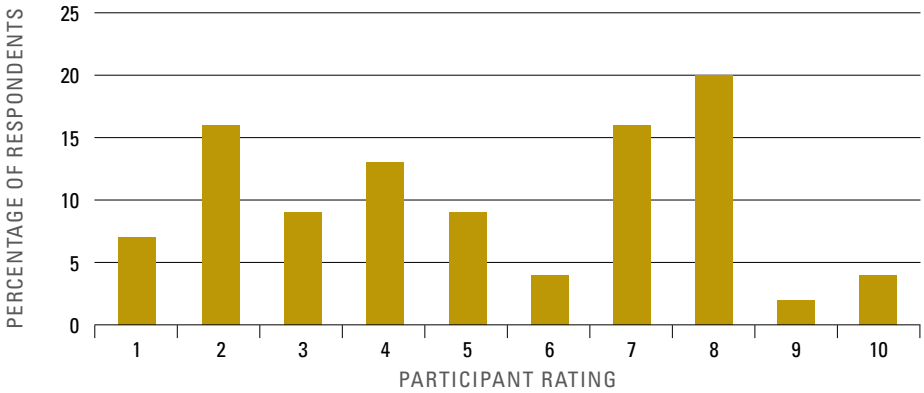


FIGURE 7. **Degree to which projects or activities related to wood energy are currently implemented in participants' countries**



2. SUCCESSFUL ASPECTS OF USING OR PROMOTING WOOD ENERGY

The most common aspects mentioned by participants included:

- the use of improved cook stoves (e.g. Ethiopia, Ghana, Nepal, United Republic of Tanzania; East Africa);
- the use of woody biomass (required under some countries' renewable energy targets, e.g. in the United Kingdom) to generate energy for homes, small-scale systems such as schools (United States of America) and industry (Bosnia and Herzegovina, Costa Rica, Guatemala, Indonesia, Morocco, Sweden, United States of America);

- cogeneration in industry (e.g. Portugal, India) and accelerated depreciation for cogeneration from plantations (Portugal);
- the use of wood pellets or their production (sometimes from waste wood) for export, primarily in developed countries (e.g. Australia, Canada, Portugal, United States of America);
- manufacture of biomass briquettes (Nepal);
- the use of waste wood by pulp mills and sawmills to generate their electricity (e.g. Canada, Czech Republic, Sweden);
- new methods of producing charcoal (Senegal) and biochar (Australia);
- the economical aspect of generating heat energy from woody biomass (e.g. Australia, France, United States of America);
- electric biomass plants (Portugal).

3. CHALLENGES IN PROMOTING USE OF WOOD ENERGY AS A CLIMATE CHANGE MITIGATION MEASURE

Participants noted the following constraints to successful implementation of wood energy for mitigation:

- financial aspects, including high initial costs of biomass boiler systems (United States of America), struggles of small-scale producers to achieve financial viability despite well-set policies for energy targets (Finland) and irrational pricing (India);
- policy failings (Portugal) and lack of collaboration among stakeholders (Indonesia);
- lack of policy (Ghana, Indonesia, the Philippines);
- lack of technology and expertise, including slower-than-hoped development of cellulosic ethanol conversion technology (United States of America) and lack of specialists impeding integration of wood energy practices (Costa Rica);
- slowdown of forest industries resulting in the closing of pulp and paper mills (Norway);
- use of wood for energy limited to the use of improved cook stoves (India, Nigeria);
- uncertainty remaining in many areas regarding the sustainability of woody energy systems and unfavourable public perception, especially in terms of finding a balance between carbon sequestration in forests and efficient use of forest products and biowaste from forestry activities (Bosnia and Herzegovina, Canada, France).
- (mis)perception that the use of wood for bioenergy is a significant cause of deforestation or forest degradation (Paraguay) and efforts to produce alternative sustainable energy sources (Nigeria).

4. EFFECTIVE STRATEGIES FOR PROMOTING THE USE OF WOOD ENERGY AS A CLIMATE CHANGE MITIGATION MEASURE

Strategies mentioned by participants include:

- government incentives and legal frameworks for switching to wood energy (Bosnia and Herzegovina, Brazil, Indonesia, United States of America);
- carbon tax or cap-and-trade systems that effectively make wood energy an affordable alternative to fossil-fuel based energy sources (Sweden, United States of America);
- targets for bioenergy use (EU, Indonesia, Spain, United Kingdom);
- using wood wastes and residues for bioenergy, i.e. empty fruit branches from palm oil production (Malaysia) and pruning and thinning waste from plantation forests (France, Senegal);
- creating policies and certification schemes to ensure sustainability of wood resources and accurate GHG accounting to recognize carbon savings (the Netherlands);
- promoting the use of wood energy (from biomass or pellets) for heat and power in industry, especially if incentivized by fiscal "green" benefits (Canada, Portugal);
- use of wood pellets and biomass briquettes for heat and energy in general (Canada, Nepal, Portugal, United States of America).

SESSION 5

GREEN BUILDING

ATTENDANCE:
8 presenters + 1 guest panellist + 175 participants

©FAO/Andrea Perlis

KEY POINTS

FROM SESSION PRESENTATIONS

LEIF GUSTAVSSON

>> VIDEO
>> SLIDE

- Climate implications of wood building construction may be analysed from a holistic life-cycle perspective using forward-looking analyses. Important aspects to consider in these analyses are forest management, building production and end-of-life management.
- Multi-storey wood buildings can give climate mitigation benefits but may be perceived as innovations that need policy support.

LAURI VALSTA

>> VIDEO
>> SLIDE

- The acceptance of wood products for mitigation is complicated because their use involves effects on forest ecosystems.
- To achieve carbon neutrality, emissions avoided by not producing alternative products need to be included.
- The forest sector must ensure that the total effects of wood use remain climate friendly. Hence, broad cooperation across scientific disciplines is mandatory.

JIM BOWYER

>> VIDEO
>> SLIDE

- Dry wood is 50 percent carbon by weight. That carbon remains stored for as long as the wood is in service.
- It takes relatively little energy to convert wood to useful products, and vastly less fossil fuel energy – a major carbon benefit.
- Wood in structures represents a large and growing carbon pool that supplements continually replenishing carbon stocks in sustainably managed forests.

PAULO CANAVEIRA

>> VIDEO
>> SLIDE

- The climate benefits of forests are usually associated with sequestration. The impact can be bigger when forest-based products are also considered because of the substitution effect.
- Forest products are often low-emission alternatives to products with the same function made from other raw materials and can thus reduce emissions in manufacturing when they substitute other products.
- Cork is also a forest product and provides a low-emission alternative for diverse uses, from bottle stoppers to flooring materials and textiles. Although the impact of all these products is not fully quantified, it is possible to conclude that cork oak forests have significant relevance in this respect.

EDER ZANETTI

>> VIDEO
>> SLIDE

- Increasing CO_2 in the atmosphere fertilizes tropical species, which could result in a net primary productivity increment of up to 30 percent for 2100 (450–550 parts per million). Without management, annual vegetation is more competitive than trees.
- National inventories from Latin America and Brazil do not include harvested wood products as a pool. As a result, emissions from agriculture, forestry and other land use (AFOLU) and land use, land use change and forestry (LULUCF) are overestimated.
- The Brazilian Minha Casa, Minha Vida (My House, My Life) programme in the Amazon involves the industrial use of 50 native tree species and holds potential to reduce the country's GHG emissions.

ANDREW WAUGH

>> VIDEO
>> SLIDE

- The global population will be 70 percent urban by 2050.
- Making a nine-storey concrete building emits 500 tonnes of CO_2.
- Making a nine-storey timber building sequesters 760 tonnes of CO_2.

SORIN PASCA

>> VIDEO
>> SLIDE

- Caution should be exercised in claiming avoided emissions in substitution of wood for concrete or steel. Carbon offsets from product substitution should not be accounted for when wood products are used to rebuild old wooden structures that have reached the end of their life.
- Only wood that results from increased production, in correlation with a growing demand for building materials, can be considered substitution for concrete or steel. Reforestation, afforestation and the use of fast-growing species are among sustainable practices that can contribute to an increased volume of harvested wood.

TINA MITTENDORF

>> VIDEO
>> SLIDE

- Environmentally friendly wood and bamboo solutions for flooring, wall panelling and furniture have been incorporated in the renovation strategy for conference rooms at FAO headquarters.
- Three different sustainable materials and technologies have been used in three conference rooms so far (Ethiopia Room, German Room and Philippine Room).

HIGHLIGHTS

FROM PLENARY DISCUSSIONS

1. DEGREE OF USE AND IMPLEMENTATION

Regarding whether wood for green building is used as a climate change mitigation measure in their countries, an even number of participants answered yes and no (Figure 8). In addition, the spread of responses in the lower part of the scale (from 1 to 7) was fairly even, indicating some implementation of projects and activities related to the use of wood for green buildings (Figure 9).

FIGURE 8. **Participants' responses on the use of wood for green buildings as a climate change mitigation measure in their countries**

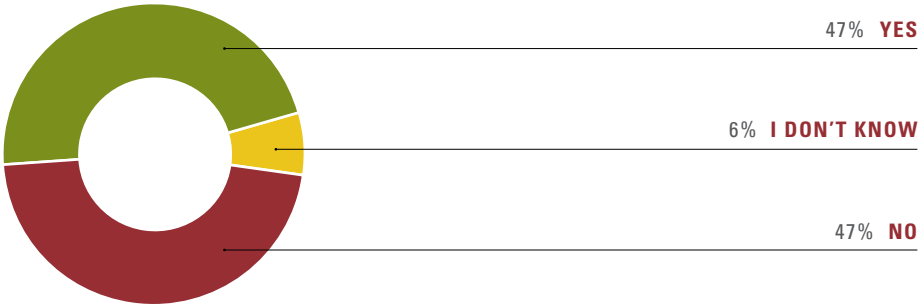
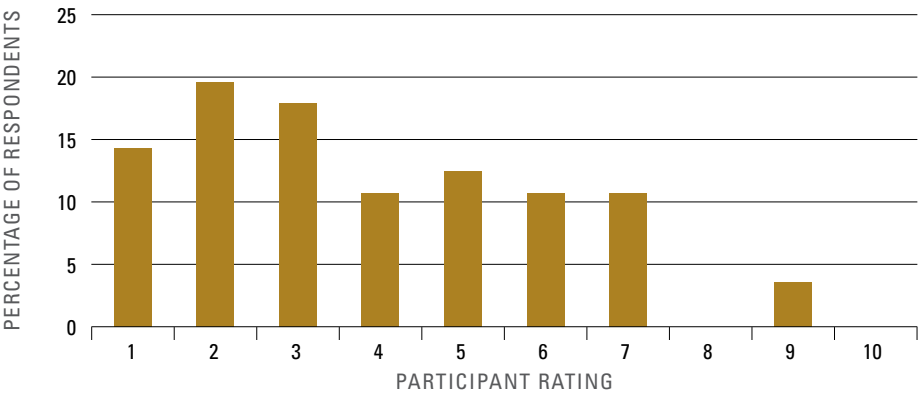


FIGURE 9. **Degree of implementation of projects or activities related to using or promoting wood for green buildings in participants' countries**



2. SUCCESSFUL ASPECTS OF USING OR PROMOTING WOOD FOR GREEN BUILDINGS

Use of wood for green buildings is successful when:

- the public perceives wood as a more sustainable, "healthy", natural material (Sweden), benefits include low energy consumption by buildings (Germany) and wood is used for aesthetic purposes, with climate change benefits as a by-product (Italy);
- it is used for ecotourism, in creating attractive hotels in developing countries (Guatemala);

- innovative methods are used with collaboration of multiple parties, including architects and engineers (Austria [some public municipal buildings], Sweden, United Kingdom, United States of America);
- enabling policies, building codes and other circumstances allow multi-storey wooden buildings (Canada, Norway, Switzerland), by tradition many single-storey family houses are made from wood (Sweden), or standards require responsible sourcing of construction products (United Kingdom).

Many participants, however, felt that green building and the use of wood in construction as a climate change mitigation measure was not a reality in their countries (e.g. Bangladesh, Cameroon, Colombia, Ethiopia, India, Kenya, Morocco, Senegal, South Africa, Spain, Tunisia, Turkey, Uganda, Viet Nam). At the same time, participants mentioned the use of wood for traditional and rural buildings as a necessity rather than a direct result of policy related to a foreseen carbon benefit.

3. CHALLENGES IN USING OR PROMOTING WOOD FOR GREEN BUILDINGS AS A CLIMATE CHANGE MITIGATION MEASURE

Challenges mentioned by participants include:

- general slowness of uptake or development of policies by governments to promote wood use;
- lack of widespread adoption by mainstream construction industry (United States of America), need for a change in industry mentality;
- slow rate of acceptance of new technologies (cross-laminated timber, modular buildings, multi-storey construction) in the construction sector (Norway), building regulations that differ from state to state (Austria);
- mission of green building in carbon accounting (Brazil, Finland; Latin America);
- public perception that wood products should not be used in order to protect forests (Italy);
- a standard practice of using wood in most developing countries, not related to climate change mitigation or carbon savings (Cameroon, Ethiopia)

4. STRATEGIES FOR USING OR PROMOTING WOOD FOR GREEN BUILDINGS AS CLIMATE CHANGE MITIGATION MEASURE

Strategies need to be embraced by governments and key partners. Different strategies will work in developing and developed countries. Strategies that show promise in developed countries include:

- contests or public awareness raising activities that bring tall or innovative buildings with wood into the spotlight;
- energy certification of buildings during construction and use phases (Spain), compulsory environmental "budget" for all new buildings, use of building research establishment (BRE) standards (Canada, United Kingdom);
- policies that consider embodied energy of building materials in energy-efficient policies for buildings (Canada), further use of life cycle assessment (LCA) in building design;
- inclusion of harvested wood products in carbon accounting (Canada);
- policies and government-based initiatives such as compensation for construction taxes (Germany);
- education of architects and engineers that addresses use of wood as a material, including the climate change benefits of wood in architectural engineering (Italy);
- awareness raising campaigns on the low costs and benefits of using wood versus other construction materials as well as sound cost benefit analysis comparing wood to other materials in the building sector;
- non-prohibitive building regulations (Finland), legislation that does not reduce opportunities for innovation and creative solutions;
- strong consumer demand.

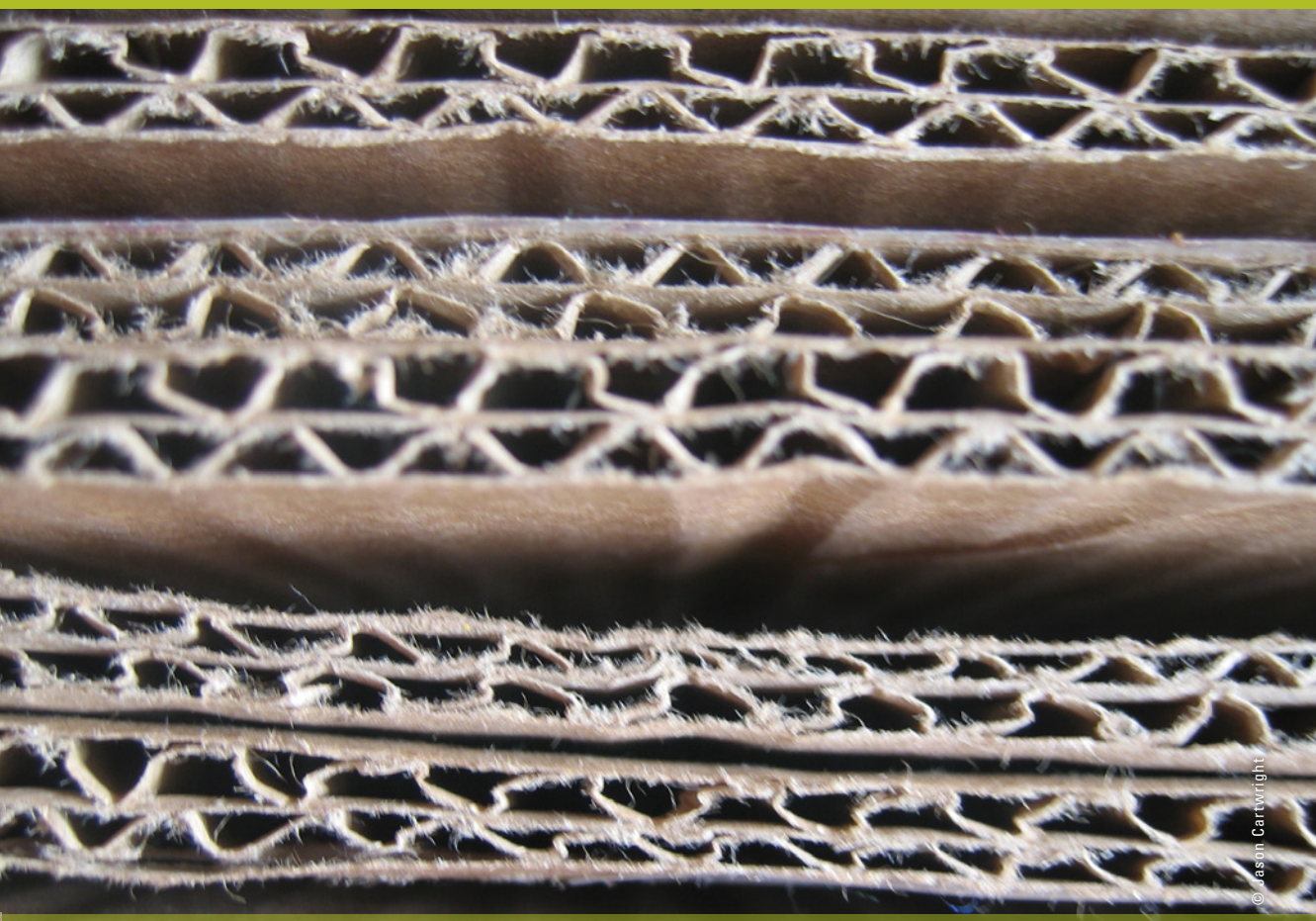
Strategies that show promise in developing countries include:

- promoting the use of fast-growing tree species such as bamboo at the household level through carbon financing (Ethiopia);
- public and private finance (Latin America);
- public institutions adopting the use of certified wood materials in construction (Colombia);
- certified sustainable building (Costa Rica);
- increasing the capacities of communities and providing concrete opportunities for wood construction in green buildings for climate mitigation (Cameroon);
- promoting sustainable raw material sourcing using not only wood but also non-wood forest products such as bamboo for green buildings (the Philippines);
- working to align all actors in the value chain and especially to address consumer behaviour (Guatemala).

SESSION 6

SUSTAINABLE PACKAGING

ATTENDANCE:
4 presenters + 5 guest panellists + 128 participants



KEY POINTS

FROM SESSION PRESENTATIONS

>> VIDEO
>> SLIDE

ALI HARLIN

- Plenty of renewable raw materials are available in the forest industry. Global industrial wood use in 2012 was 1 600 million cubic metres and chlorine-free pulp production reached only 94 million cubic metres, totalling more than 93 percent of the world market share.
- Minimizing the use of packaging materials will not lead to bigger product loss and the package will still maintain required functions and properties.
- Benefits of wood-based fibre packaging include a renewable raw material base, recyclability, biodegradability, established technology and user friendly solutions.

>> VIDEO
>> SLIDE

PASCAL KAMDEM

- Wood is a great material for packaging.
- Wood packaging stores CO_2 and thereby contributes to saving the planet.

>> VIDEO
>> SLIDE

IVONE NAMIKAWA

- Sustainable forestry entails best management practices.
- Efficient packaging considers the best results and is accessible to small-scale fruit producers.

UWE VOGELSKAMP

>> VIDEO
>> SLIDE

- A change from a 50 to 25 kg bag demanded a new, improved bag solution.
- Paper weight and plies were reduced.
- The right balance was found between performance and material reduction.
- Waste was reduced as a result.

HIGHLIGHTS

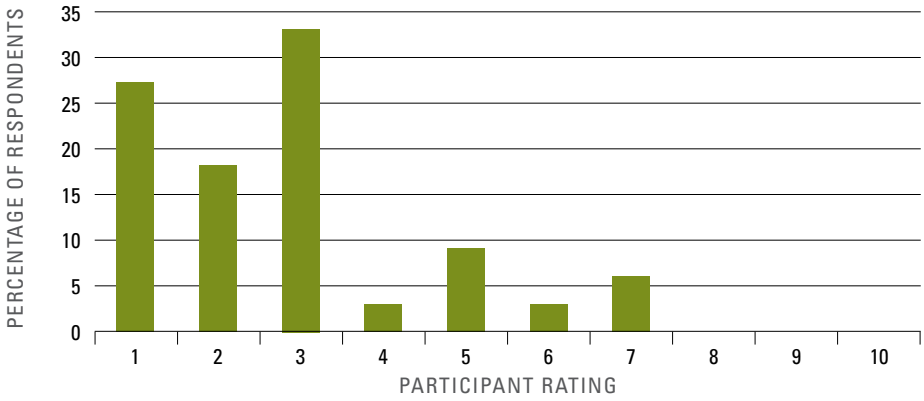
FROM PLENARY DISCUSSIONS

1. DEGREE OF USE AND IMPLEMENTATION

Over 50 percent of participants responded that wood products were not promoted for packaging as a climate mitigation measure in their countries (Figure 10). A large majority of participants also gave a very low score (less than 4), indicating low use of wood-based packing projects (Figure 11).

FIGURE 10. **Participants' responses on the use and promotion of wood and forest products for packaging in their countries**

FIGURE 11. **Extent of implementation of projects or activities related to the use or promotion of wood and forest products for packaging in participants' countries**



2. SUCCESSFUL ASPECTS OF USING OR PROMOTING WOOD AND FOREST PRODUCTS FOR PACKAGING

Successful aspects mentioned by participants include:

- well-marked sustainable forest certification (Finland);
- efficient, well established recycling systems for paper and wood products (Canada, Finland, Germany, Indonesia, Italy, Norway, United Kingdom, United States of America);
- use of wooden pallets for transporting rubber bales (Malaysia);
- use of paper bags in pharmacies and some supermarkets instead of the more common plastic bags (the Philippines).

Some participants' countries discourage the use of wood packaging (Colombia) or make no attempt to encourage it (Egypt, Ghana, Morocco, Nepal, the Niger, Nigeria, Saudi Arabia, Togo, United Republic of Tanzania, Viet Nam).

3. STRATEGIES FOR USING OR PROMOTING WOOD AND FOREST PRODUCTS IN PACKAGING AS A CLIMATE CHANGE MITIGATION MEASURE

Strategies mentioned by participants include:

- promoting sustainable material sources and the use of wood-based packaging materials (the Philippines);
- community awareness raising (Indonesia) and education (Ghana, Italy);
- imposing taxes on plastic bags (California in the United States of America), promoting incentives to encourage recycling (Canada, United States of America) or supporting financing policies to promote green packaging, including packaging products based on wood and wood fibre (China);
- campaigns to highlight the cost effectiveness of wood-based packaging to industry;
- promoting wood-packaging industries (via subsidies or tax incentives) in countries that currently need to import plastic packaging (Nepal);
- incorporating targets of wood use for packaging into environmental policies (China, Ghana);
- promoting entrepreneurship focusing on packaging, including bio-based plastic packaging from residual forest biomass;
- providing alternatives for consumers (Finland).

PARTICIPANT STATISTICS AND FEEDBACK

PARTICIPATION

More than 900 people participated, coming from over 114 countries across six continents (Figure 12), with Europe and Africa dominating, followed by Asia (Figures 12 and 13).

FIGURE 12. **Participation by region**

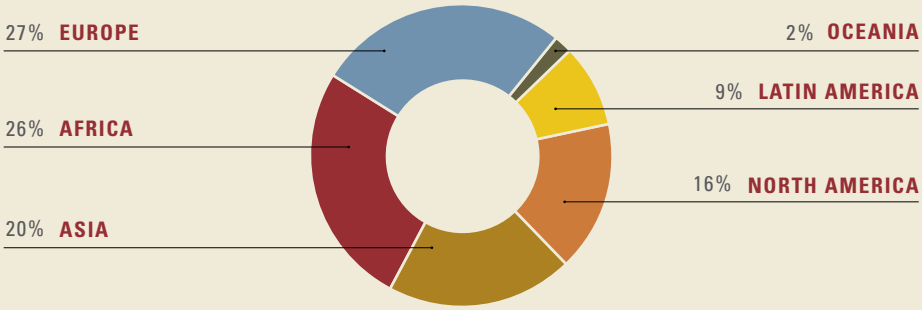
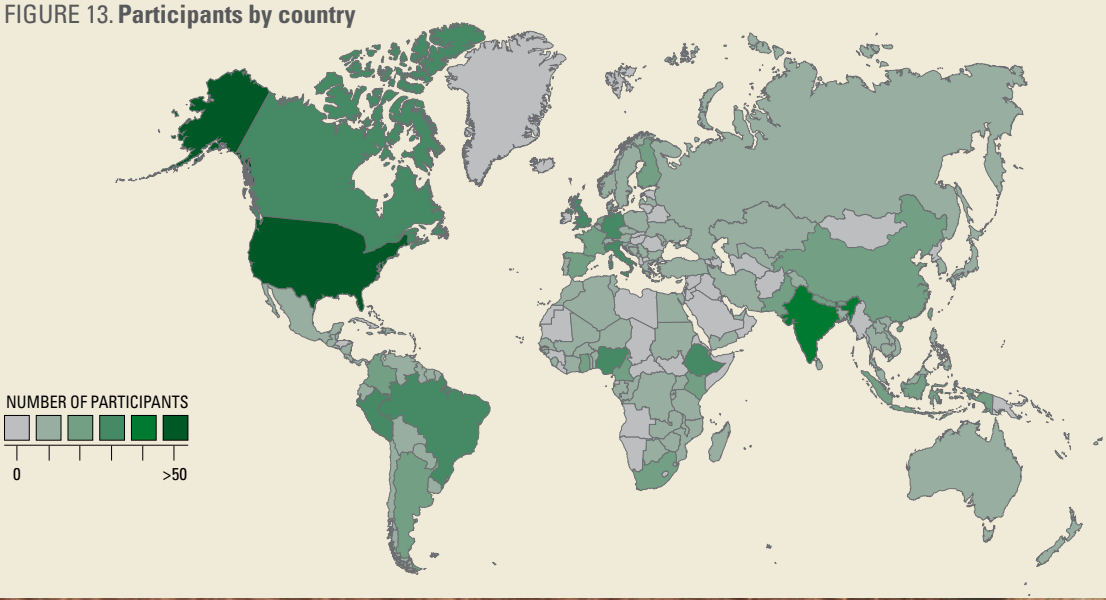
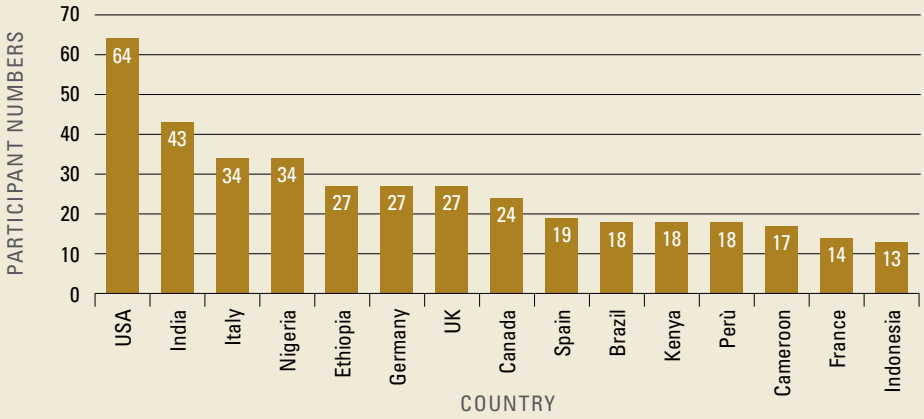


FIGURE 13. **Participants by country**



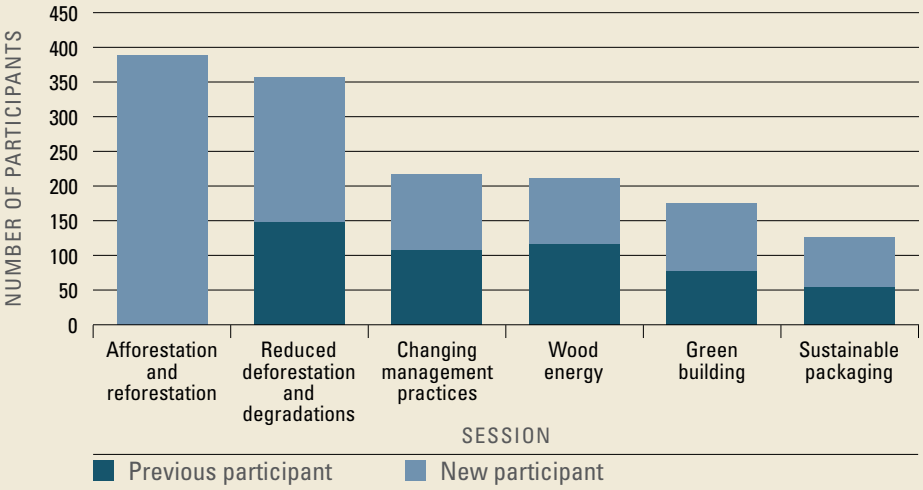
The highest number of participants came from the United States of America (64), India (43), Nigeria (34) and Italy (34). The 15 countries with the highest participation included a mix of developed and developing countries (Figure 14).

FIGURE 14. **The 15 countries with the highest participation in the conference**



Sessions related to forest management attracted higher attendance than those related to wood use (Figure 15).

FIGURE 15. **Participant numbers in each session, divided into those attending for the first time and those who participated in previous sessions**



PROFILE OF PARTICIPANTS

About one-third of participants (in Sessions 2 to 6) are involved in research or academic studies related to climate change mitigation. The remainder fall in diverse groups, which is ideal for cross-fertilization of ideas (Figure 16). More than one-third of participants work at the international or national level (Figure 17).

FIGURE 16. **Nature of participants' involvement in climate change mitigation (Sessions 2 to 6)**

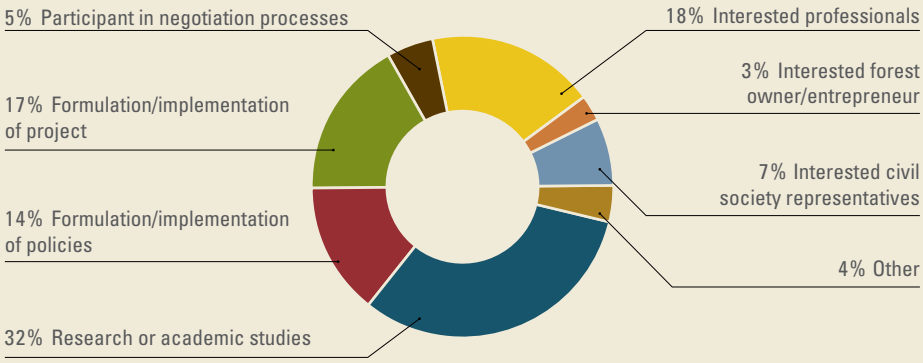
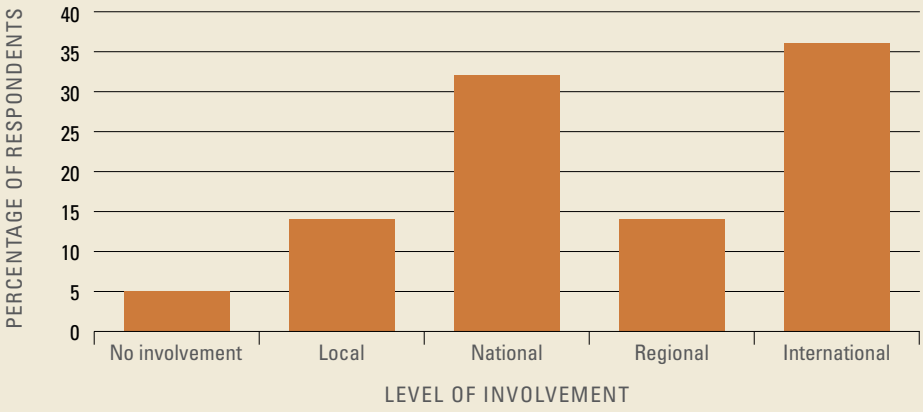


FIGURE 17. **Level of participants' involvement in climate change mitigation work (Sessions 2 to 6)**



FEEDBACK ON THE SESSIONS

Participants rated the sessions highly in terms of both their usefulness and their quality (Figures 18 and 19, respectively; see Appendix B for the questions posed to participants).

FIGURE 18. **Participant feedback on usefulness of the sessions (responses for all sessions combined)**

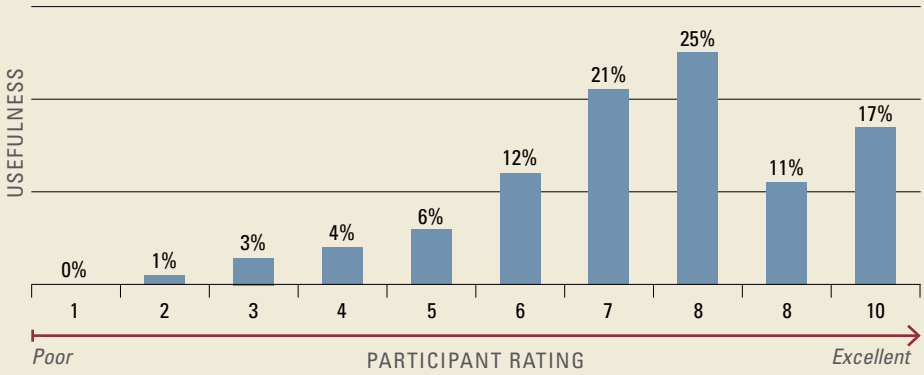
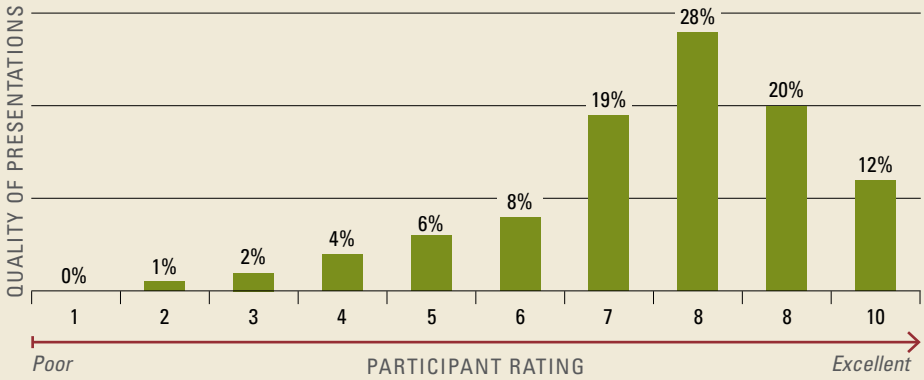


FIGURE 19. **Participant feedback on quality of presentations and technical content (responses for all sessions combined)**



FEEDBACK ON WHAT COULD BE IMPROVED NEXT TIME

SESSION: *Reduced deforestation and degradation*

- The session could have more connection with industry and markets.
- Participation of communities would be beneficial.
- Further discussion of AFOLU, NAMAs & REDD+ would be welcome.
- More emphasis could be given to deforestation commitments and the interface with REDD+.

SESSION: *Changing forestry management practices*

- Presentations could present perspectives concerning boreal, temperate and tropical forests, as the main conclusions for forest types may differ.
- Two separate sessions could be held for developed and developing countries, as this session was more focused on developed countries than previous sessions.
- A multi-scale application of concepts would be useful.
- It was suggested to have a more focused set of topics, as this session covered an extremely broad range of topics, which made it difficult to do more than scratch the surface for any topic.

SESSION: *Wood energy*

- The session should make a clear distinction between how wood energy is used in Annex 1 countries and how it is used in developing countries.

SESSION: *Green building*

- Content applicable to the most countries and regions should be sought.
- More comparative analysis, e.g. on costs of wood versus concrete, and more in-depth discussion of life cycle analysis would be appreciated.

FOLLOW-UP REQUESTS FROM PARTICIPANTS AND NEXT STEPS

SESSION: *Afforestation and reforestation*

- Provide learning evaluation tools for carbon planting and AR guidelines.
- Assess the conclusion that biomass is not carbon neutral in an "urgency" situation.
- Help in building capacity and developing awareness regarding carbon project registration in communities.
- Encourage governments to promote AR.
- Evaluate the importance of woody energy crops in AR projects.
- Perform comparative analysis of AR efforts on a regional basis.
- Deliver a new way of quantifying carbon sequestration.
- Help projects find financing and access to funds.
- Provide more technical training and networking for projects.
- Recognize and study AR challenges in arid and semi-arid areas, especially in Africa where challenges of food security are widespread and degradation is increasing.
- Standardize monitoring, reporting and verification (MRV) approaches in peat swamp and tropical forests in order to reign in long-term costs and make carbon markets sustainable.
- Encourage policies (national and international) to facilitate strong partnership between public and private entities.
- Develop mechanisms to ensure the sustainability of PES schemes.

SESSION: *Reduced deforestation and degradation*

- Produce a brief online publication on REDD that gives the current legal situation on REDD and insights from this discussion.
- Produce a publication on economic risk of agriculture, forestry and land-use projects.
- Compile and analyse needs, gaps and lessons learned so far in countries under official REDD programmes.
- Compile results of the preparatory phase of REDD+ including its impact on the livelihoods of populations, reactions, criticism and the presence of enabling conditions.
- Adopt more research-driven policy approaches to forest conservation, including REDD awareness.
- Provide specific case studies of REDD+ being integrated into Intended Nationally Determined Contributions (INDCs).
- Study further the indirect drivers of deforestation.
- Help solve governance challenges and target PES.
- Establish and facilitate such an online approach at the country level in REDD programmes.
- Provide a list of references and projects and a REDD+ map.

SESSION: *Changing forestry management practices*

- Have a session on emerging future technologies for competitive products based on forest biomass.
- Run a set of follow-up sessions focused on individual topics addressed here (e.g. extended rotations, reduced-impact logging).
- Perform in-country follow-up among participants to harmonize knowledge at the country level.
- Showcase good practices for others to emulate and for enhanced funding possibilities.
- Compile a short synthesis and a contribution to the twenty-first session of the Conference of the Parties (COP 21) of the United Nations Framework Convention on Climate Change (UNFCCC) in Paris.
- Organize regional conferences on opportunities and constraints for implementation of reduced-impact logging.
- Create knowledge products from the outcome of these sessions for circulation.

SESSION: *Wood energy*

- Collaborate with countries to implement wood energy projects or programmes that have carbon mitigation potential.
- Help plan at the policy level in developing countries where wood energy plays an important role in people's livelihoods.
- Increase research on bioenergy production in developing countries and improve policy frameworks, with national and international support.
- Provide a policy brief on the role of biomass energy for climate change mitigation.
- Aid in sharing information and experiences on the use of biomass for energy production.
- Work on global guidance for sustainable biomass criteria.
- Run a workshop surrounding the charcoal process as a climate change mitigation measure.

SESSION: *Green building*

- Promote wood as a building material, and provide support for interested parties and communities to take up this idea.
- Provide manuals, guides and in-depth analysis on the use of wood as a sustainable construction material and the impact of using different materials (e.g. wood, cork, bamboo).
- Pay more attention to wood consumption as a driver of forest cover maintenance.
- Increase research on the climate change mitigation potential of green buildings, and not only in temperate countries.
- Create a green building community of practice (if there is not one already) or a network to communicate research results.

SESSION: *Sustainable packaging*

- Help facilitate policy dialogue to promote green wood packaging development (China).
- Identify how small countries can adopt the use of wood packaging technology and scale it up.

Overall

Overall, follow-up requests from conference participants that were highlighted in each session included the following.

- Hold more online conferences on related topics, for different regions, for different time zones, in other official languages and following up sessions on specific themes.
- Create a community of practice or develop a forum for stakeholders and those interested to continue the discussion, to learn each from other, to develop best practice solutions and to share real-case experiences.
- Disseminate the conference results and session outcomes.
- Produce, distribute and make available a publication that documents lessons learned, including the characteristics of successful projects. Provide a possibility to comment on the draft document, specifically if technical expertise exists in the countries mentioned.
- Provide further help for implementation in countries, follow-up with concrete actions, project development and implementation.
- Promote the use of wood as a mitigation option.
- Provide links to research.
- Compile all questions to create new research areas.
- Do more research on the options presented for mitigating climate change in the tropics.

"More online conferences like this one. So that more people can be empowered and act local. More knowledge = more power to act."

The following activities have already been taken up:

- publication of the conference summary;
- posting of all conference presentations on YouTube;
- a community of practice and Dgroup to discuss further https://dgroups.org/fao/eccmofs (as needed after a follow-up survey);
- a publication on forest sector mitigation options through a collaborative effort;
- a "how to" guide for online conferences.

ANNEX A CONFERENCE PROGRAMME

THE ECONOMICS OF CLIMATE CHANGE MITIGATION OPTIONS IN THE FOREST SECTOR

INTERNATIONAL ONLINE CONFERENCE | 6-27 FEBRUARY, 2015

FOREST MANAGEMENT OPTIONS TO ADDRESS CLIMATE CHANGE

FRIDAY, 6 FEBRUARY – AFFORESTATION AND REFORESTATION	15:00–17:00 ROME (UTC+1)
Martin Gilbraith	Welcome and orientation
Eva Muller	Opening remarks
G Cornelis van Kooten	Economics of increasing afforestation and reforestation as a mitigation measure
Andrew Plantinga	Mitigating climate change through afforestation: new cost estimates for the United States of America
N H Ravindranath	Costs and benefits of the Green India Mission for mitigation
Pat Snowdon	Assessing the cost-effectiveness of woodland creation in the abatement of carbon dioxide emissions
Chris Stephenson	Transaction costs and incentive mechanisms of community based carbon projects
Walter Vergara	The economic argument for land restoration in Latin America and the Caribbean
Speed-talks	Republic of Korea (Youn), Madagascar (Dubois), Panama (Guerrero), Turkey (Bouyer)
M Gilbraith & Sheila Cooke	Q & A followed by facilitated group discussion
Martin Gilbraith	Wrap-up and feedback

FRIDAY, 13 FEBRUARY – REDUCED DEFORESTATION AND DEGRADATION	15:00–17:00 ROME (UTC+1)
Martin Gilbraith	Introduction
Arild Angelsen	The economics of REDD+
Rodney Taylor	Deforestation-free supply chains and investment: progress and challenges
Ivo Mulder	Policies and measure for REDD+ results-based actions
Rohit Jindal	N'hambita community carbon project, Mozambique
Ralph Blaney	Cambodia REDD+ costs and benefits
Eduardo Marinho	Dissecting REDD+ costs in Brazil and Indonesia: the cases of the sustainable settlements in the Amazon and Katingan peat conservation area
Speed-talks	Colombia and Peru (Cubas), Morocco-Tunisia-Lebanon (le Crom), Brazil (Fajardo)
M Gilbraith & Sheila Cooke	Q & A followed by facilitated group discussion
Martin Gilbraith	Wrap-up and feedback

TUESDAY, 17 FEBRUARY – CHANGING FOREST MANAGEMENT PRACTICES	13:00–15:00 ROME (UTC+1)
Martin Gilbraith	Introduction
Gert-Jan Nabuurs	Economics of changing forest management practices as a mitigation measure
Janaki R. R Alavalapati	Forest management interventions to address climate change mitigation: A United States Southeast perspective
Adrian Whiteman	Rotation adjustments and carbon implications
Fabiano Ximenes	Climate change and socio-economic drivers for native forest management: a perspective from New South Wales, Australia
Michael Galante	Carbon storage and the reduced-impact logging policy in Sabah, Malaysia
Tony Lempriere	Cost of climate change mitigation in Canada's forest
Speed-talks	Peru (Breukink), France (Martel), Mexico (Simon), Brazil (Zanetti)
M Gilbraith & Sheila Cooke	Q & A followed by facilitated group discussion
Martin Gilbraith	Wrap-up and feedback

WOOD UTILIZATION OPTIONS TO ADDRESS CLIMATE CHANGE

FRIDAY, 20 FEBRUARY – WOOD ENERGY	14:00–16:00 ROME (UTC+1)
Martin Gilbraith	Introduction
Roger Sedjo	Using wood for energy for mitigation
Robert Beach	Assessing the impacts of United States biomass electricity expansion on GHG mitigation
Leire Iriarte	Overview of sustainability challenges of wood energy in developing and developed countries
Douglas Bradley	Markets of pyrolysis oil from wood wastes
Puneet Dwivedi	Economic and environmental sustainability of transatlantic wood pellet trade
Anil Baral	Costs, carbon mitigation potential and economic benefits of producing advanced biofuels from forest biomass
Emily Hope	Costs of greenhouse gas emission offsets from substituting fossil fuels with forest residue biomass in Canada
Speed-talks	Mexico (Alvarez), Kenya (Mwangi), Italy (di Napoli)
M Gilbraith & Sheila Cooke	Q & A followed by facilitated group discussion
Martin Gilbraith	Wrap-up and feedback

TUESDAY, 24 FEBRUARY – GREEN BUILDING	15:00–17:00 ROME (UTC+1)
Martin Gilbraith	Introduction
Leif Gustavsson	Wood construction and climate change mitigation
Lauri Valsta	Conflicting effects of forests and wood use on climate change mitigation
Jim Bowyer	Carbon implications of wood construction
Paulo Canaveira	Substitution effect in cork products
Ederson Zanetti	Potential of wood use in the My Home, My Life Programme in Brazil and its carbon implications
Andrew Waugh	Wood for green building in the United Kingdom
Speed-talks	Product substitution (Sorin Pasca), Sustainable conference rooms (Tina Mittendorf)
M Gilbraith & Sheila Cooke	Q & A followed by facilitated group discussion
Martin Gilbraith	Wrap-up and feedback

FRIDAY, 27 FEBRUARY – SUSTAINABLE PACKAGING	14:00–16:00 ROME (UTC+1)
Martin Gilbraith	Introduction
Ali Harlin	Costs and benefits of using wood based materials in packaging
Pascal Kamdem	Wooden pallets, barrels, crates, boxes, baskets and containers in packaging logistics: benefit for climate change mitigation?
Ivone Namikawa	Sustainable packaging: using renewable virgin fibers to create carbon efficient packaging that prevent food waste
Uwe Vogelskamp	ONE & ONEPLUS – the one-ply concept that works!
M Gilbraith & Sheila Cooke	Q & A followed by facilitated group discussion
Illias Animon	Conference outcomes – next steps
Eduardo Rojas-Briales	Closing remarks
Martin Gilbraith	Wrap-up and feedback

ANNEX B QUESTIONS FROM PANEL DISCUSSIONS

SESSION 1

1. On a scale from 1 to 10, to what degree has afforestation/reforestation been given emphasis in your country as a climate change mitigation measure?
2. What is one key lesson you have learned from the experience with afforestation and reforestation as a climate change mitigation measure in your country? Please specify your country.
3. What one challenge do you consider most crucial to address in order to achieve the economic mitigation potential of afforestation and reforestation in your country? Please specify your country.
4. What practical examples, research studies, resources or support can you share to help others achieve the economic mitigation potential of afforestation and reforestation in their countries? Please share specific references and hyperlinks where possible.

SESSION 2

1. To what degree is REDD-related policy currently implemented in your country?
2. To what degree are REDD-related projects or activities currently implemented in your country?
3. What key aspect of REDD implementation has proven successful in your country? Name your country in your response.
4. In what respect has the reduction of deforestation and degradation as a climate change mitigation measure not met expectations in your country? Name your country in your response.
5. What do you see as the root cause of deforestation and forest degradation in your country? Name your country in your response.
6. How well are REDD activities currently addressing this root cause in your country? Name your country in your response.
7. What practical examples, projects, research studies, resources or help can you share to support effective policy development and implementation in this area? Please share specific references and hyperlinks where possible.

SESSION 3

1. To what degree are the projects or activities related to "changing forest management practices" currently implemented in your country?
2. What key aspect of changing forest management practices has proven successful in your country? Name your country in your response.

3. From experience in your country, what are effective strategies that will help in advancing changing forest management practices as a climate change mitigation measure? Name your country in your response.
4. What practical examples, projects, research studies, resources or help can you share to support effective policy development and implementation in this area? Please share specific references and hyperlinks where possible.

SESSION 4

1. Is wood energy used or promoted in your country as a mitigation measure?
2. To what degree are projects or activities related to "wood energy" currently implemented in your country?
3. What key aspect of using or promoting wood energy has proven successful in your country? Name your country in your response.
4. In what respect has using or promoting wood energy as a climate change mitigation measure not met expectations in your country? Name your country or countries/region in your response.
5. From experience in your country, what are effective strategies that will help in using or promoting wood energy as a climate change mitigation measure? Name your country in your response.
6. What practical examples, projects, research studies, resources or help can you share to support effective policy development and implementation in this area? Please share specific references and hyperlinks where possible

SESSION 5

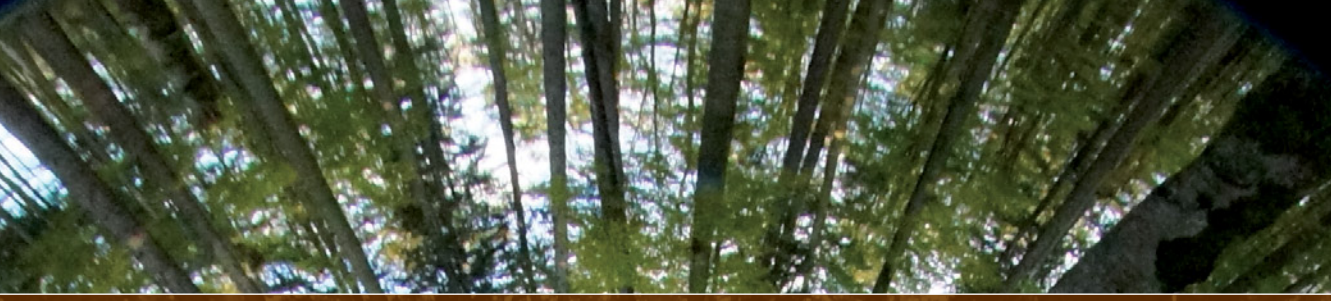
1. Is wood used or promoted for green buildings in your country as a climate change mitigation measure?
2. To what degree are projects or activities related to using or promoting wood for green buildings currently implemented in your country?
3. What key aspect of using or promoting wood for green buildings has proven successful in your country? Name your country in your response.
4. In what respect has using or promoting wood for green buildings as a climate change mitigation measure not met expectations in your country? Name your country or countries/region in your response
5. From experience in your country, what are effective strategies that will help in using or promoting wood for green buildings as a climate change mitigation measure? Name your country or countries/region in your response.
6. What practical examples, projects, research studies, resources or help can you share to support effective policy development and implementation in this area? Please share specific references and hyperlinks where possible.

SESSION 6

1. Are wood and forest products used or promoted for packaging in your country as a mitigation measure?
2. To what degree are projects or activities related to using or promoting wood and forest products for packaging currently implemented in your country?
3. What key aspect of using or promoting wood and forest products for packaging has proven successful in your country? Name your country in your response.
4. From experience in your country, what are effective strategies that will help in using or promoting wood and forest products for packaging as a climate change mitigation measure? Name your country or countries/region in your response.
5. What practical examples, projects, research studies, resources or help can you share to support effective policy development and implementation in this area? Please share specific references and hyperlinks where possible.

FEEDBACK QUESTIONS

1. On a scale from 1 to 10, how useful have you found this session?
2. On a scale from 1 to 10, how would you rate the quality of presentations and technical content?
3. On a scale from 1 to 10, how would you rate the overall organisation of the session?



This publication contains key messages from the **International Conference on the Economics of Climate Change Mitigation Options in the Forest Sector**, organized by FAO and held online in February 2015. It summarizes key points from 51 technical presentations and panel and plenary discussions of 6 thematic sessions: afforestation and reforestation, reduced deforestation and degradation, changing forest management practices, wood energy, green building and sustainable packaging.

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