

1st World Congress of Agroforestry Symposia and Session Report Summaries

The following summaries were transcribed from notes recorded by rapporteurs on session report forms during the Congress symposia and concurrent sessions, 28 June – 2 July 2004. The notes are presented as written, with minor edits in a few cases. Because most of the notes were hand written, there may be some errors or omissions in transcription. There are 2 symposia and 6 concurrent sessions for which notes were not received.

Symposium I: Biodiversity

Date: 28 June 10:00-12:00

Rapporteur: Jeff McNeely

Number attending: 200

- The key question is how to identify the differential impacts of different agroforestry practices on biodiversity; and which agroforestry practices are most likely to benefit biodiversity, under what conditions.
- Agroforestry has much to contribute to the Millennium Development Goals, especially when its practices are directed to achieving several MDGs simultaneously (e.g., hunger, environment, health).
- Global changes in demographics, markets, distribution of wealth, climate, energy, etc. will have profound effects on agroforestry, and should be taken fully into consideration in research, practice and policy.
- Maintaining the levels of biodiversity desired by society will require active management at the landscape scale, with agroforestry playing an active role.
- Farmers practicing agroforestry are often innovators, whose creativity, experience, wisdom, and knowledge have much to contribute to the further development of agroforestry; removing obstacles to their innovativeness may be better than trying to evaluate their behavior.
- The genetic component of biodiversity in agroforestry systems remains under-researched.
- Long-term studies (longer than a decade) are especially valuable in assessing the many relationships between biodiversity and agroforestry.

Symposium II: Ecological Basis of North American Agroforestry

Date: 28 June 10:00-12:00

Rapporteur: N.V. Thevathasan

Number attending: 80

- Features of agroforestry decision support modules should embrace aspects of production, population, community, and ecosystem ecology
- An understanding of terrestrial aquatic interactions in riparian systems will maximize environmental services associated with such systems with respect to water quality
- Shelterbelts that can deliver multiple benefits at both local and regional scales result from ecologically based selection of tree species

- Understanding the ecology of both intercropping and silvopastoral systems will foster the economic and positive rehabilitative impacts of these systems on agroforestry
- Understanding ecological underpinnings of temperate agroforestry systems is critically important

Session A1: **Agroforestry Education**

Date: 28 June 1:30-3:00

Rapporteur: August Temu

Number attending: not recorded

- Agroforestry education is attractive and necessary because of its ability to bring several disciplines together and strengthen a “systems approach” to farming and farm resource management
- AF education must also be contextualized in real/established community problems—so needs assessment is essential
- There is a need to internationalize AF education and partnerships in this area, especially:
 - Standardize core curricula and accreditation
 - Develop more, and share, teaching and learning resources and methods/tools
 - Share knowledge and experiences internally and across continents through networking, faculty and student exchanges etc.
 - Update the directory of institutions teaching agroforestry
- AF education will succeed better if it can be linked directly to business and sustainability or enhancement of livelihoods; in both rural and peri-urban environments
- Training of educators and trainers is a priority
- There is a need to secure favorable policy and institutional arrangements for agroforestry to be recognized as an area of expertise
- There is a need to reinforce the education programs with concepts of land-use/allocation models for smallholders systems that bring together biophysical and socioeconomic variables
- There is a need for regional and global forums to explicitly recognize agroforestry in debates on food security and sustainable development

Session A2: **Biophysical Interactions**

Date: 28 June 1:30-3:00

Rapporteur: Diomides Zamora

Number attending: 59

From the presentation on integrating tree-crop dynamic interactions with the HiSAFE model:

- There is a need to reduce the uncertainty concerning productivity and need of an integrated model to assess overall production
- Need to develop a model for temperate regions that would simulate below and above-ground processes
- Models of agroforestry system behavior should be used to guide policy-makers' and farmers' decisions

From the presentation on shelterbelts in Poland:

- Shelterbelt research should be promoted for water recycling, nutrient recycling (N), and biodiversity conservation
- Shelterbelts should be promoted to structure agricultural catchments, improve food security, and for ecological sustainability

From the presentation on shade trees and coffee in Costa Rica:

- This system is promoted to improve coffee quality and diversify farmer income
- There is a need to understand the biophysical factors affecting coffee production, including light, water, and nutrients

From the presentation on temperate alley cropping:

- There is a need to identify ways to increase production in alley cropping (e.g., trenching, pruning)
- Normal hardwood management techniques can improve alley recoverability
- Potential environmental benefits of alley cropping (reclamation of NO₃) should be investigated

Session A3: **Ecoagriculture**

Date: 28 June 1:30-3:00

Rapporteur: Sarah Scherr

Number attending: 120 (standing room only [SRO])

"Ecoagriculture" refers to 'working landscapes' that are managed both for productive agriculture and rural livelihoods, while also conserving or restoring critical ecosystem services and biodiversity at a landscape scale. Ecoagriculture systems are especially important to develop: in and around Protected Areas; in working landscapes critical for providing important ecosystem services (species habitat, watershed functions); and in areas where ecosystem degradation threatens local agricultural production and rural livelihoods. This session explored the potential role of agroforestry in ecoagriculture.

The conservation community is moving to landscape-scale analysis, and recognition of the critical importance of working landscapes in biodiversity conservation. The approach being developed seeks to integrate conservation and local livelihood objectives. Key elements are reliance on science to identify critical biodiversity challenges, design of spatially explicit actions, participatory planning with local communities and transparency. Agroforestry is playing important roles today in landscape-scale conservation action in Mesoamerica, Madagascar and the Amazon.

A recent global survey of the scientific foundations for ecoagriculture was undertaken by Cornell University. The review highlights the challenges for integrating conservation, production and livelihood goals even in basic conceptual frameworks and language. Agroforestry analysis and experience were found to offer valuable lessons for identifying and promoting positive synergies. Many agroforestry practices were documented in the scientific literature to conserve biodiversity, particularly hedgerows and woodlots around fields, organic agriculture, and shaded tropical perennial crop systems.

An example from the dehesa oak woodlands of Spain demonstrates that even in cases where agroforestry systems do generate significant ecosystem services (in this case, soil fertility and biodiversity), these do not always increase yields. Until systems can be improved to increase yields as well, farmers will not adopt or maintain the systems.

Research in the humid montane region of Southeast Asia illustrated that different ecosystem services (for example carbon, biodiversity and watershed protection) may require different landscape structures or components. Much more research is needed to understand how to "produce" ecosystem services in terms of the necessary investment of human, social, financial, physical and natural capital. Where ecoagriculture systems are not sufficiently profitable for farmers to maintain them, there may be a need for ecosystem service payments to bridge the gap. Land-use systems are highly dynamic, and thus planning processes must be adaptive and reflect local values and input. The degree of collective action required for ecosystem management is an important factor.

Session A4: **Economic Analysis**

Date: 28 June 1:30-3:00

Rapporteur: Troy Timko

Number attending: 45

Economics and policy analysis research related to agroforestry is on the rise but more is required. A lot of interest or demand is there for information on profitability of various agroforestry systems and markets for non-wood or agri products along with environmental services produced by agroforestry practices. Also, the audience felt that unless agroforestry practices have proven market advantage landowners may not adopt them.

Specific points:

- On modeling household decision making by farmers (in Cameroon) it was felt that the effect of external factors such as population growth would influence the decisions of farmers towards fallows.
- Several computer based models that are being used to assess economic impacts of agroforestry were presented. The strengths and weaknesses of the models were presented. It was felt by the session attendees that there are other models out there and it would be useful to develop a document about them.
- On factors influencing cattle production in Costa Rica, the methodology that was applied was good but can be extended in several ways. The audience felt that it was good to know that more sophisticated methodologies are being applied in agroforestry. There is much more scope to conduct rigorous analysis.
- The last presentation demonstrated that integration of agroforestry is possible in tropical forest management using a case study in India.

Summary: More economic and policy research is needed. Unless landowners perceive the economic advantage, they are less likely to adopt. The information that we produce must be credible and that calls for more rigorous methodologies.

Session A5: **Tree Domestication I**

Date: 28 June 1:30-3:00

Rapporteur: Tony Simons

Number attending: 54

- There is an under-appreciation of tree products (few statistics are kept)
- There is a need to integrate local and international markets
- There is a multiplicity of partners, so a degree of coordination is needed
- Resource allocation for tree research is skewed to short-term and yet it is a long-term endeavor
- Price fluctuations in conventional tree crops raises concern for the new tree crops
- Dual roles of income generation and household nutrition
- More favorable market environments are needed
- Greater recognition and status of value of indigenous fruit trees is needed

- Market ideotypes need to be extended at scale to rural communities
- Differentiation within and between tree products using biological and market ideotypes can increase returns to farmers and entrepreneurs
- Need to develop single purpose cultivars of multiple purpose species

Session B1: Agroforestry, Carbon Sequestration, and Landscape Ecology

Date: 28 June 3:30-5:00

Rapporteur: Holger Greunewald

Number attending: 40

- Agroforestry systems have a high potential for the regeneration of post-mining landscapes and other marginal sites in industrialized countries.
- Agroforestry should be considered in the subsidy policy of the EU. Major obstacles and how they can be overcome are mentioned in the “Toulouse Agroforestry Manifesto”.
- GIS-based ... can help to identify target regions for silvoarable agroforestry in Europe. These target regions are those pools of arable land where productive growth of trees is possible and which are at the same time marked by environmental risks. Target regions were identified all over Europe.
- A simple model was developed for the prediction of tree/crop growth and yield. Despite its simplicity first results are encouraging.

Session B3: Scaling up of Agroforestry Benefits

Date: 28 June 3:30-5:00

Rapporteur: Steven Franzel

Number attending: 45

- Research comparing different approaches and strategies for scaling up the adoption of agroforestry is needed to ensure effective and efficient extension programs.
- NGOs and projects provide valuable support in business development services to promote agroforestry, but privatizing such services and promoting a private market for business development services is a key element of developing the sustainable marketing of agroforestry products for small enterprises.
- Synthesis of the experiences of the various actors involved in disseminating agroforestry practices is needed to distill out the lessons we have learned

Session B4: **Tree Domestication II**

Date: 28 June 3:30-5:00

Rapporteur: Roger Leakey

Number attending: 62

- An excellent example [was given] of the combination of domestication, marketing, and processing—a 3-pronged approach.
- This approach should be attracting humanitarian aid since it is strongly focused on poverty alleviation.
- Urgent need to develop markets for timber/seedlings. The pricing mechanism for seedlings is important. Seed supply is a constraint for many species.
- Vegetative propagation is an important technique for timber and non-timber species as a means of producing planting stock—especially high-quality germplasm.
- Quality control is important for export of NTFPs.
- Need information on the scale of the global market for agroforestry tree products, and the number of people dependent on these products.
- Need to quantify the impacts of domestication on genetic diversity using molecular techniques.
- Need to promote the processing and packaging of AFTPs and need business plans and strategies. Developing markets (commercialization) and domestication pose a “Catch 22/chicken and egg” problem. They have to be done in parallel.
- How can we best provide marketing support to smallholders? Cooperatives?
- Marketing AFTPs needs a “level playing field”—many other commodities have subsidies.
- Need to develop new form of IPR to protect the traditional knowledge of farmers and rural communities.
- The domestication and commercialization of AFTPs is a more relevant strategy for poverty alleviation and agricultural development than biotechnology—at least in the short term.
- Scaling up the domestication programs to meet the Millennium Development Goals is the biggest challenge for agroforestry.
- Need further study of the intensification and diversification scenarios for agroforestry.
- Need further study of the relative merits of indigenous vs. exotic species in agroforestry.
- How feasible is the win:win:win scenario?

Session B5: **Tropical Homegardens**

Date: 28 June 3:30-5:00

Rapporteur: Tamara Benjamin

Number attending: 52

- Homegardens can be sustainable but more attention needs to be given to soil fertility
- Changes in the species mix found in homegardens can be caused by the market, by what farmers hear concerning the kinds of species that can be sold, and this can affect the diversity of species
- In addition to the market value of homegardens, there are important ecological aspects that need to be considered, and neoclassical economics does not always include them
- Policy changes directed to internalizing ecosystem services might include using existing direct subsidies to farmers for more rational reasons, e.g. payment for environmental services and for equitable trade
- Homegardens are not seen as important [in Kerala, India]; 60 years ago they used to be the norm but are now the exception. A possible solution is to help small farmers become associations to sell high-quality products.
- A difference was noted between homegardens (a multi-strata system near the house) and kitchen gardens (a vegetable garden near the kitchen)

Session C1: **Biodiversity**

Date: 29 June 1:30-3:00

Rapporteur: Jeff McNeely

Number attending: 75

- Trees on farms add to regional biodiversity
- Including trees in alfalfa plantations leads to greater diversity of beneficial insects and potentially to greater profits
- Agroforests maintain forest cover in at least some parts of the tropics, leading to greater biodiversity (though more research is needed to quantify such effects).
- Forest farmers have much to contribute to research into new agroforestry practices
- Markets play a critical role in the economic viability of agroforestry systems, and hence the welfare of forest farmers

Session C2: **Carbon Sequestration and Environmental Benefits**

Date: 29 June 1:30-3:00

Rapporteur: Louis Verchot

Number attending: 45-50

- Tree farming for C sequestration alone is not profitable, it would need to be combined with other economic activities and environmental services to be profitable
- Trees have a great potential for C sequestration in more humid environments but opportunity costs are higher in these areas
- Fast-growing trees have greater potential than slow growing trees over short rotation periods
- Sustainably managed pasture and rehabilitation of degraded land have the potential in some cases to increase C sequestration in the soil
- With respect to C sequestration we need to think beyond C stocks and focus on stable C which is that C that will remain in the system for the long term

Session C3: **Land Tenure and Gender Issues**

Date: 29 June 1:30-3:00

Rapporteur: Frank Place

Number attending: 36

- Granting of secure legal tenure is an effective incentive for planting trees
- Women can be integrated into agroforestry programs with training and sensitization of males
- Tenure systems in Africa are diverse but afford many opportunities for agroforestry, at least among males, however tenure clarity is needed
- The gender issue goes beyond access to resources, but information, time, etc.
- Tree tenure change in Ghana (planters own the trees) has helped the tree planting culture
- Energy needs will continue to be met by trees because alternatives are too expensive
- Other success stories for women in agroforestry were identified; keys were to link to women's' needs (e.g. health, food), their knowledge, and to handle potential conflicts with men.

Session C4: Mechanization in Agroforestry

Date: 29 June 1:30-3:00

Rapporteur: Manja Reuter

Number attending: 40

- The advantages of chopping machinery used to cut fallow vegetation are the high acceptance by smallholders (better working conditions) and independence from dry/rainy season
- In Brazil, farmers get access to machinery via municipal cooperatives and to spare parts because they are manufactured in Brazil
- In Africa, it is hard for farmers to use thinning equipment in coffee plantations because of the lack of spare parts and maintenance
- Mechanization and engineering in agroforestry systems mostly rely on human and animal power sources.
- The “matraca”, a farmer-proven planter developed in Brazil, has been successfully introduced to several African countries. It allows farmers to plant and apply fertilizer in one step, and is an example of how the energy requirement of farmers for crop production can be reduced by providing accessible equipment

Session C5: Short Rotation Woody Crops, Phytoremediation

Date: 29 June 1:30-3:00

Rapporteur: Jud Isebrands

Number attending: 50

- In NW India, poplar was selected to provide farmers additional income from plywood
- Poplar is compatible with other agronomic crops in India if the timing is managed, and large biomass production is possible
- Sustainable forestry in NW India is possible only with K fertilization because soil mineralization of K is very fast
- Trees present important opportunities for desalinization of agricultural regions
- Browsing is important in Canadian tree plantations; repellants and solar-electric fences can be effective
- Replanting costs for failed plantations are excessive
- Larger cuttings are more effective for poplar establishment
- Frost hardiness is essential in planted stock; planting material must be matched to the site

Session D1: **Agroforestry in Semi-arid Regions**

Date: 29 June 3:30-5:00

Rapporteur: Bocary Kaya

Number attending: 54

- Delineate the environmental conditions (climate, soil, and rainfall) where *Prosopis* can be grown without being invasive.
- Build linkages and synergy between UNEP, Dryland, and FAO low forest cover countries (LFCC) efforts in agroforestry research and development in dryland countries. Suggest that they support the creation of a working group on agroforestry in drylands to exchange information and germplasm.
- Recognize agroforestry as the only land use system which reinforces both ecosystem goods and services of dryland regions.

Session D2: **Environmental Amelioration**

Date: 29 June 3:30-5:00

Rapporteur: Sam Allen

Number attending: 39

Discussion points raised during the session:

- Agroforestry has an important role to play in salinity control in southern Australia coastal lands
- Alley cropping and silvopasture may play a role in reducing P loss, a major issue in the southeastern US
- Windbreaks may play an important role in reducing spray drift. Conifers are more effective at this than are hardwoods, due to the shape of their leaves. More research is needed in the application of windbreaks in organic systems.
- Agroforestry has an important role to play in environmental amelioration, an increasingly important issue.

Session D3: **Landowners' Session**

Date: 29 June 3:30-5:00

Rapporteur: Michael Bannister

Number attending: 53 (SRO)

The size of the room was too small for the number of participants interested in this very lively session. The session opened with Roland Bunch presenting a list of 17 questions that project designers should answer regarding dispersed trees on farms; the questions pertained to fitting the proposed practices to the needs and resources of farmers, based on his extensive experience working directly with farmers in Central America. This was followed by two presentations by landowners who practice agroforestry in Florida and in India. Some of the points raised by the landowners were:

- Innovation is essential for a production farmer to survive
- Agroforestry systems producing multiple crops stabilizes income

- Agroforestry sometimes requires more hand labor because the products are physically close to each other and may limit the use of machinery
- Some agroforestry systems can make a very large improvement in the local economy
- The addition of trees in agroforestry systems increases the value of the property

The popularity of this session and animation produced by the presentations argue for larger landowner participation in future agroforestry congresses.

Session D4: **Managing Genetic Diversity**

Date: 29 June 3:30-5:00

Rapporteur: Frank Place

Number attending: 41

- Genetic diversity is the foundation for productive systems, it needs to be managed with farmers
- Local populations of species can be very diverse and future generations can maintain diversity with simple management
- Diversity programs should be national and international in scope
- Diverse agroforestry systems serve a variety of functions and therefore comprise an enormous range of typologies
- Not all diversity is positive—some species bring pests that can attack the primary plants
- It is difficult in practice to enhance diversity when economics is driving systems to specialization
- Research and seed supply systems have not embraced genetic diversity in their programs

Session D5: **Policy and Institutions**

Date: 29 June 3:30-5:00

Rapporteur: Oghenekome Onokpise

Number attending: 65

- Agricultural policies often do not include agroforestry
- Agroforestry could be used in land reclamation areas especially in India.
- A policy issue from Japan to focus on African food and human security through agroforestry systems
- Agroforestry is suggested to remain a participatory affair
- The issue of marketing timber and non-timber products was discussed at length. A policy on setting standards for timber products
- Use for native grass species and legumes was discussed
- A suggestion was made to create a world agroforestry day on 27 June each year to correspond with the 1st World Congress of Agroforestry

Symposium I: **Water Issues**

Date: 30 June 10:00-12:00

Rapporteur: Greg Ruark

Number attending: 130

Questions raised:

- Are forested riparian buffers effective for e-coli?
- Aren't there studies that prove riparian forest buffers are effective against non-point source pollutants?
- In Australia markets for agroforestry trees are being developed for oils, wood, and charcoal.

Symposium II: **Agroforestry and Food Security Panel**

Date: 30 June 10:00-12:00

Rapporteur: not given

Number attending: not recorded

Recommendations from the symposium to the Congress declaration:

1. Agroforestry R&D institutions have numerous tested technologies available to enhance productivity and sustainability of small family farms which contribute to food security directly and indirectly. These require public extension services and NGO activity to enhance farmer capacity to evaluate, adapt, and adopt these technologies.
2. Tropical, subtropical, and temperate biodiversity offers numerous opportunities for domestication which will enhance nutritional quality and food diversity available for small family farmers, contributing to their food security and income generation when adopted into family agroforestry strategies. Their development requires expanded R&D interactions with public extension services and NGOs to develop participatory projects that will educate and organize small family farming communities to use appropriate technologies to domesticate some of these species and add value to them through processing for the market.
3. Agroforestry R&D institutions must recognize the enormous diversity present in their client groups and offer sufficient alternatives for these small family farmers to evaluate and adapt before adoption. Diversity is a fundamental aspect of food security, as well as of the people who need assistance in attaining full food security.
4. Agroforestry R&D institutions, researchers, extensionists, and NGO allies must become more vocal in explaining to a wider audience the advantages of focusing public policy on educating and organizing small family farmers and their communities to adopt the proven technologies available that can enhance food security. This requires efforts to communicate through all popular media outlets, as well as scientific ones.

Symposium I: **Technology Transfer**

Date: 1 July 10:00-12:00

Rapporteur: Rachel McCoy

Number attending: 100

- Regardless of the approach, landowners seem to continue to resist agroforestry, despite the current science to back up its principles. The time has come for us to look more closely at policy development that will bring agroforestry from the laboratory to the farm. We must strive for legislation to bring the benefits of agroforestry to light.
- Through collaboration and partnering, we must get out of our comfort zones and solicit support for agroforestry initiatives. This is challenging but will be very rewarding.
- The adoption of agroforestry practices requires addressing a real problem with sound scientific underpinnings. There must be the immediate application of knowledge and practices that are proven to be of value to the landowner.
- At the University of Missouri Center for Agroforestry, research is linked with active demonstration sites at research properties, which adds practical credibility and encourages feedback. An active partnership, or network, is created where landowners are being trained to then extend this knowledge to their fellow landowners. Training manuals, videos, guide sheets and field days are tools used for this purpose.
- “Hot Spots” for technology transfer have been established, which link UMCA field research and demonstrations to private lands and socioeconomic research. A key project is a series of sustainable agricultural grants offered to landowners for agroforestry practices conducted in a close radius of the University’s research and demonstration sites.
- We are also challenged to incorporate a wide range of land purposes and uses. Many woodlots are both public and private, and there is an increasing interest in the unique, quality products that can be harvested from them. Through training workshops, extension and education, a problem-based learning format can be established. Manuals should be producer-oriented, with step-by-step strategies. The benefits of agroforestry in land use planning can also be highlighted to increase adoption and reduce conflicts, especially where urban and agricultural lands meet. One challenge lies in a lack of knowledge of specific markets for agricultural products and crop interactions. Again, there is great need for landowners and communities to see an agroforestry system in place and working, a demonstration that creates “on-farm” experts to assist their peers.
- Agroforestry technologies can also be used to solve the challenge of farmers that aren’t able to grow enough trees to combat land degeneration, while at the same time, more tree plantations are needed for the lumber industry. (Australia)
- One barrier to adoption is entry costs – farmers need to see the value of this practice but that value may not materialize until years down the road. Agroforestry may become, in some cases, a set of technologies farmers can’t afford. One process is to show the need, the design, and the technology transfer,

- then the landowner rejects the idea. Subsidies are provided, the landowner adopts to suit particular needs, and is satisfied with the practice.
- We must work at the level of our farmers and our policy makers both. Market research is critical for raising landowner confidence in agroforestry practices. In Australia, this includes selling the idea – not just the technology. Assistance is offered to people who are designing multipurpose landscapes. We “let go of the answer” and see what evolves from the landowner. Farmer-led community groups can legitimize agroforestry in the eyes of the farmers and their stakeholders.
 - Agroforestry initiatives are not “solved,” they evolve through common sense and as the landowner applies the practice. This produces higher-quality results.
 - In the Midwestern U.S., agroforestry adoption is largely driven by subsidies – but are they working? There has actually been a decline in the acres of conservation plantings and windbreak establishments.
 - Barriers to adoption include reluctance to try due to knowledge gap; trees viewed as impediments to agriculture; subsidies may be inefficient or confusing; reluctance to take high value land out of production.
 - We need to rethink technology transfer: It is often seen as one-way, but should be a constant exchange of information, an evolving process.
 - This can be accomplished by identifying and better understanding the adopters, using farmer-to-farmer outreach, and geographically concentrating the outreach and demonstrations.
 - A high-touch approach, farmer-to-farmer, improves information delivery and engages local producers to actually “sell” the benefits of agroforestry to other farmers. In this way, a critical mass of adopters develops.
 - Another approach is market-driven. For example, the production of woody crops in conservation plantings that are shown commercially valuable. This creates new on-farm profit centers in situations that provide long term financial incentives.
 - Peer to peer extension: It works by combining high-technology with high-touch approach; encourages commitment; and encourages spontaneous spread of agroforestry adoption. The market-based approach also stimulates agroforestry adoption. A comprehensive technical package is necessary to induce adoption – all these elements must be present; all the landowner’s questions must be answered.
 - It’s time to shift gears. We must identify potential adopters and engage them in face to face contact with fellow landowners. We must show profit as a major motivator to adopting agroforestry practices, and we must encourage spontaneous replications of agroforestry practices through technology transfer efforts.

Symposium II: **Public/Private Partnership in Agroforestry and Development**

Date: 1 July 10:00-12:00

Rapporteur: Howard Shapiro

Number attending: 100

- Why is there no CGIAR center for cash tree crops (like cacao)?
- USDA role as a science training institution for young scientists
- There should be an international pollinator initiative
- For cacao, there should be global partnerships dealing with pests and diseases, genetic mapping, breeding, farmer field schools, diversification of crops/agroecology, and mutual exchange of information
- Industry, NGOs, governments, environmental groups, and smallholders collaborating with universities
- How do we measure the success of partnerships?
- Protecting biodiversity with cacao.
- Protecting existing fragmented hot spots using cacao agroforestry as a buffer
- Issues of optimized production in short/medium/long term plantings
- Facilitate access to markets for other agroforestry products
- NGOs acknowledged in economic development theory
- Transforming NGOs from not solely implementers to catalyst
- ICRAF + private sector combine efforts on tree crops
- What are the procedures/rules/keys for public/private partnerships?
- Land tenure policy issues

Session E1: **Agroforestry Adoption I**

Date: 1 July 1:30-3:00

Rapporteur: James Johnson

Number attending: 40

From the presentation on forestry extension in Karnataka, India:

- 90% of farmers are small scale
- A study was implemented to assess the impact of extension on agroforestry adoption
- Three extension methods (training, focus group discussion, and study tour) increased farmer perceptions toward agroforestry. Similar results occurred for farmers' motivation, knowledge, and adoption.
- Training proved to be the superior extension model

From the presentation about agroforestry adoption in Cape Verde:

- The study was implemented to determine opportunities and constraints to agroforestry in Cape Verde
- Constraints included lack of a line of credit, tree tenure, seedling availability, and space/land availability
- Discriminant analysis models were developed for farmers interested in planting trees for fruit, fuel, and shade

From the presentation analyzing agroforestry adoption with attribute-based choice experiments:

- A study was established in Mexico to determine the potential adoption of agroforestry models by using a survey technique based on attributes of the models. Attributes included labor, technical assistance, outputs, tree seedlings, and environmental impacts.
- Farmers chose agroforestry systems that had the strongest environmental benefits, and seedling source was the second most important factor. Labor had the least impact on the choice of agroforestry model.

From the presentation of agroforestry adoption in Cameroon, West Africa:

- Slash and burn agriculture is common in Cameroon. Agroforestry may be a suitable alternative.
- A household survey was conducted to query farmers about a series of agroforestry systems in the northwest, southwest, and center provinces.
- Alley cropping, improved fallows, live fencing, cut and carry fodder, and apiculture were all tested. Membership in farmer association was consistently positively related to agroforestry adoption.

Session E2: **Agroforestry and Food Security**

Date: 1 July 1:30-3:00

Rapporteur: Michael Bannister

Number attending: 35-40

The four speakers presented work done in Belize, South Africa, Philippines, and Brazil. The speaker from Belize noted that because 40% of the forest is protected, there is a challenge to resolve conflicts between conservation and development, and that conflict resolution processes are therefore important skills for all parties involved in agroforestry development to learn. A project in South Africa is attempting to change a group of people from subsistence agriculture (annual income = \$0) to a market-driven agriculture because the area has high potential for tourism due to its natural beauty. The presenter from Brazil explained how evolving government policy over decades influenced food security.

Session E5: **Tree Component Management**

Date: 1 July 1:30-3:00

Rapporteur: Sam Allen

Number attending: 38

One key point from this session echoes a number of other sessions: agroforestry science and extension need to continue to seek the experiential knowledge of landowners to broaden the information base of agroforestry.

Session F1: **Agroforestry Adoption II**

Date: 1 July 3:30-5:00

Rapporteur: Sarah Workman

Number attending: 55-65

European and North American speakers provided an analysis of methods for increasing awareness, providing information, designing programs to influence policies and promote implementation of agroforestry in France and the United States. Presenters described perceived benefits and obstacles to use of agroforestry, indicators of adopter willingness and factors affecting use of practices. Methods discussed analyzed economic, social and environmental reasons as factors influencing agroforestry adoption. Speakers emphasized the questions of ‘who are producers’, ‘who are the landowners’, ‘what segmentation of interest groups is possible’, ‘what factors motivate adopters’ and ‘what kind of language is effective in reaching stakeholders’. Subsidy programs and rigid policy definition were highlighted as barriers that often discourage implementation. Each speaker pointed out the need to improve information delivery, especially to non-adopters, and highlighted successes of active learning processes – for producers, professionals, and policy makers.

Major challenges facing agroforestry adoption include differentiating agroforestry from woodlands, in the case of the CAP and policies in France, and focusing on options based on producer practices, knowledge and needs. Descriptive information, technical guides, training materials for agroforestry curriculums (professional, landowner, K-12) and extension programs illustrated alliances for innovation within professional circles that include outreach to youth, family science, and a diversity of farmer groups. Field tours are proving successful to see how practitioners implement agroforestry, hear about practices in what ever terms they feel most comfortable describing them, and to provide an avenue for networking between and among landowners/producers and professionals.

Evident advances in iterative methods to analyze and deliver information about integrated tree-crop-livestock systems pointed to continued need to recognize policy constraints in light of realities for landowners and producers on all sizes of productive agricultural lands. Acknowledging we still have questions about how adoption will proceed under the variety of conditions – nationally, regionally and locally –, consensus from the presentations indicated a shift from subsidy based agriculture to profitable and conservation based systems to promote environmental literacy at all levels is a valid and saleable approach to integration of agroforestry in the landscape.

Session F2: Agroforestry for Health and Nutrition (AIDS/HIV)

Date: 1 July 3:30-5:00

Rapporteur: Marc Barany

Number attending: 40

- The lag in time between HIV infection and actual impact of symptoms creates a window of opportunity that agroforestry interventions can be implemented to provide benefits to households.
- There is a need to re-think interventions and to take into consideration different needs of affected households and appropriate labor schemes.
- Agroforestry can reduce labor burden of households during HIV/AIDS by increasing accessibility of fuelwood
- Natural woodlands provide a safety net for households coping with the economic impacts of the disease (i.e., source of income from NTFP)
- Impact of HIV/AIDS on agroforestry management needs more research
- Households impacted by sickness may be less likely to plant trees due to their uncertain future
- Nutrition is the primary intervention in prolonging the life of infected persons and preventing vulnerability
- Agroforestry can play an important role through improving food security

Session F3: Decision Support Tools

Date: 1 July 3:30-5:00

Rapporteur: Eddie Ellis

Number attending: 15

Some points raised were the use of decision support tools developed by communities for communities, emphasis on participatory methods, the value of remote sensing tools, and the accessibility of higher resolution remote sensing imagery.