



Advancing Agroforestry on the Policy Agenda

A guide for decision-makers



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WRITTEN BY

G rard Buttoud

EDITED BY

Frank Place and Michelle Gauthier

DESIGNED BY

Kristel Gallopin

SUPERVISED AND COORDINATED BY

Michelle Gauthier

DEVELOPED IN COLLABORATION WITH

CATIE (Guillermo Detlefsen)

CIRAD (Emmanuel Torquebiau)

ICRAF (Frank Place and Oluyede Ajayi)

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FOR FURTHER INFORMATION, PLEASE CONTACT

Eduardo Mansur
Director
Forest Assessment, Management and Conservation Division
FAO Forestry Department
Viale delle Terme di Caracalla
00153 Rome, Italy
E-mail : Eduardo.Mansur@fao.org
Web site: www.fao.org/forestry

Comments and feedbacks are welcome

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Dedication

This book is dedicated to Michelle Gauthier, a forestry officer at the FAO Forestry Department, who passed away suddenly in February 2013. Michelle championed urban forestry and agroforestry as important means for improving the livelihoods of millions of peoples, and she was the driving force in the publication of this book.

She will be sorely missed.

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ACRONYMS AND ABBREVIATIONS

AFAF	French Agroforestry Association [Association Française d'Agroforesterie]
CATIE	Tropical Agricultural Research and Higher Education Centre [Centro Agronómico Tropical de Investigación y Enseñanza]
CBD	Convention on Biological Diversity
CIRAD	Agricultural Research Centre for International Development [Centre de Coopération Internationale en Recherche Agronomique pour le Développement]
COP	Conference of the Parties
FAO	Food and Agriculture Organization of the United Nations
GFG Policy	Grain for Green Policy (China)
FONAFIFO	National Forestry Financing Fund [Fondo Nacional de Financiamiento Forestale] (Costa Rica)
ICRAF	World Agroforestry Centre
IFES	integrated food-energy system
iLUC	indirect land-use change
IPCC	Intergovernmental Panel on Climate Change
NAMA	Nationally Appropriate Mitigation Action
NAPA	National Adaptation Plan of Action
NGO	non-governmental organization
NOEL Program	Nurseries of Excellence Program
NSCA	National Steering Committee on Agroforestry (Malawi)
PINPEP	Programme of Forestry Incentives for Owners of Small Plots of Land used for Forestry and Agroforestry [Programa de Incentivos para Pequeños Poseedores (as) de Tierras de Vocación Forestal o Agroforestal] (Guatemala)
PES	payment for environmental services
UNCCD	United Nations Convention to Combat Desertification
UNFCCC	United Nations Framework Convention on Climate Change
USDA	United States Department of Agriculture

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FOREWORD

Agroforestry systems include both traditional and modern land-use systems in which trees are managed together with crops and/or animal production systems in agricultural settings. Agroforestry is practised in both tropical and temperate regions, where it produces food and fibre, contributes to food and nutritional security, sustains livelihoods, alleviates poverty, and promotes productive and resilient cropping and grassland environments. Agroforestry systems may also enhance ecosystems by storing carbon, preventing deforestation, increasing biodiversity, protecting water resources and reducing erosion. In addition, when applied strategically on a large scale, agroforestry enables agricultural lands to withstand weather events, such as floods and drought, and climate change.

Even though these benefits justify increased investment in the development of agroforestry systems, the sector is disadvantaged by adverse policies, legal constraints and a lack of coordination between the governmental sectors to which it contributes – namely, agriculture, forestry, rural development, environment and trade. It has not been addressed sufficiently in policy formulation, and nor has it been integrated into land-use planning or rural development programmes. Thus, the potential of agroforestry to enrich farmers, communities and, by extension, national economies has not been fully exploited.

To promote agroforestry in national policy frameworks and boost its impact, the Forestry Department of the Food and Agriculture Organization of the United Nations (FAO) – in cooperation with the World Agroforestry Centre (ICRAF), the Tropical Agricultural Research and Higher Education Centre (CATIE) and the Agricultural Research Centre for International Development (CIRAD) – has prepared this guide, designed to assist countries to support conditions that will optimize agroforestry's contribution to national development.



Eduardo Mansur
Director

Forest Assessment, Management
and Conservation Division, FAO Forestry Department

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An open inception workshop with more than 30 experts, held in Rome on 7-8 June 2010, benefited from the advice of two senior consultants: Jean-Marc Boffa and Gérard Buttoud. A participatory process was put in place, with a task force coordinated by Gérard Buttoud (University of Tuscia, Italy) and composed of Frank Place and Oluyede Clifford Ajayi (ICRAF), Emmanuel Torquebiau (CIRAD), Guillermo Detlefsen (CATIE) and Michelle Gauthier (FAO). A questionnaire was sent to specialists in several target countries and 66 experts responded, both from government administrations and non-governmental organizations.

At a taskforce workshop held in Rome on 15-17 March 2011, preliminary results of the questionnaires were presented and participants agreed on a process for developing the policy guidelines and choosing country case studies. The guidelines would not have been as rich without the case studies that were prepared, and special thanks are due to the case-study authors: André Luiz Rodrigues Gonçalves, Martin Meier, Andrew Miccolis, Roberto Porro and Jorge Luiz Vivan (Brazil), Divine Foundjem Tita (Cameroon), Francisco Casasola Coto, Guillermo Detlefsen and Muhammad Akbar Ibrahim (Costa Rica and Guatemala), Carla Cardenas Monroy (Ecuador), Kiros Meles Hadgu (Ethiopia), Emmanuel Torquebiau (France), J. Christine Wulandari (Indonesia), Peter Gachie, Simon K. Kage, Frank Place and Philip W. Wamahu (Kenya), Phiri Innocent Pangapanga and Oluyede Ajayi (Malawi), Julio Ugarte (Peru), Roberto Visco (Philippines), Luther Lulandala (Tanzania) and Gillian Kabwe (Zambia). The unedited final reports of these case studies, which are listed in the bibliography, are available on demand by contacting FAO. They will be published in 2013 as part of the FAO "Agroforestry Working Paper" series.

Gérard Buttoud synthesized the various case-study contributions. The peer review process benefited from substantial contributions by external experts and institutions, including Frank Boteler, Jennifer Conje, Hubert de Foresta, Elise Golan, Michael Idowu, Gillian Kabwe, Luther Lulandala, Andy Mason, Andrew Miccolis, Georges Mountrakis, Constance Neely, Linda Parker, Roberto Porro, Sara Scherr, Michael Schoeneberger, Rita Sharma, Richard Straight, Bruce Wight, Christine Wulandari and Jianchu Xu. From FAO, the following officers contributed to the peer review process: Carolin Anthes, Anne Bogdanski, Julien Custot, Theodor Friedrich, Jean Gault, Henri George, Paolo Groppo, Fred Kafeero, Irina Kouplevatskaya-Buttoud, Lars Gunnar Marklund, Ewald Rametsteiner, Cesar Sabogal and Marja Liisa Tapio Bistrom.

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EXECUTIVE SUMMARY

Agroforestry systems include both traditional and modern land-use systems where trees are managed together with crops and/or animal production systems in agricultural settings. When designed and implemented correctly, agroforestry combines the best practices of tree growing and agricultural systems resulting in more sustainable use of land. Agroforestry takes place in both tropical and temperate regions, producing food and fibre for better food and nutritional security. It also sustains livelihoods, alleviates poverty and promotes productive, resilient agricultural environments. In addition, when practised at scale, it can enhance ecosystems through carbon storage, prevention of deforestation, biodiversity conservation, cleaner water and erosion control, while enabling agricultural lands to withstand events such as floods, drought and climate change.

The potential of agroforestry to contribute to sustainable development has been recognized in international policy meetings, including the United Nations Framework Convention on Climate Change (UNFCCC) and the Convention on Biological Diversity (CBD), justifying increased investment in its development.

Yet agroforestry continues to face challenges such as unfavourable policy incentives, inadequate knowledge dissemination, legal constraints and poor coordination among the multiple sectors to which it contributes. Nor is it sufficiently addressed in national policy-making, land-use planning and rural development programmes. As a result, its potential contribution to the economy and sustainable development goals has not been fully recognized or exploited. One of the policy challenges facing agroforestry in many countries is the emphasis on monoculture food, industrial agricultural crops and mechanized farming (often subsidized) discouraging the integration of trees into farmland. Moreover, in some countries, the bureaucracy involved for accessing both land and tree-based products, combined with land ownership problems, creates long-term uncertainty that further restricts agroforestry initiatives. Farmers may also perceive trees as incompatible with their farm operations and may not benefit from programmes which offer training or access to tree related inputs (e.g. germplasm) to the extent that they do for other agricultural enterprises. A lack of knowledge of the advantages of agroforestry inadvertently leads to the perception that it is peripheral to agriculture and is a low output subsistence system.

The development of agroforestry is often impeded by legal, policy and institutional arrangements, its environmental benefits are mostly unrewarded, and investment is discouraged by the long time between adoption and returns. Policies are needed, therefore, to promote the benefits of agroforestry. The general objective of this guide is to assist countries to develop policy, legal and institutional conditions that facilitate the adoption of agroforestry and recognize its contribution to national development. This includes better communication between sectors and the mainstreaming of agroforestry in national policies.

These guidelines were developed from a mix of workshops, structured interviews with experts, and detailed national case studies from both the developed and developing world.

According to the lessons learned, there are four critical conditions that encourage agroforestry:

- it should be beneficial to farmers and other land users;
- there must be security of land tenure;
- intersectoral coordination is essential;
- good governance of natural resources is crucial.

In conclusion, the guidelines provide ten tracks for policy action:

1. **Spread the word.** Raise awareness of the benefits of agroforestry systems to both individual farmers and global society.
2. **Revise the context.** Appraise and reform unfavourable regulations and legal restrictions.
3. **Secure the land.** Clarify land-use policy goals and regulations.
4. **Create a new approach.** Elaborate new agricultural policies that take into account the role of trees in rural development.
5. **Organize and synergize.** Organize intersectoral coordination for better policy coherence and synergies.
6. **Provide incentives.** Create a clear context for payments for environmental services.
7. **Develop markets.** Strengthen farmers' access to markets for tree products.
8. **Communicate the know-how.** Enhance stakeholder information.
9. **Include the stakeholder.** Formulate or strengthen policy based on local people's needs and rights.
10. **Govern wisely.** Engage in good governance of rural activities.

It is expected that the actions outlined above will contribute to the formulation of coherent, interactive and proactive public policies that support the development of agroforestry systems.



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The guidelines: what, who and why?

These guidelines are aimed primarily at all those involved in making policies at national and regional levels, such as decision-makers, civil servants and key policy advisors. Their function is to support increased recognition of agroforestry benefits, facilitate the development of policies promoting agroforestry systems, and educate those that constrain agroforestry at the national level.

The guidelines present a set of principles rather than prescribed methods. They advise how to integrate agroforestry into policies, particularly helping countries to formulate policies for their specific conditions. They provide examples of good practices and success stories, as well as lessons learned from challenges and failures.

They are designed as an entry point for policy creation or change. In cases where agroforestry policy is completely absent, they can assist in creating awareness of agroforestry systems and show how policy issues can be addressed, through innovative policy design taking trees, crops and animal production into account. In other cases, where agroforestry is recognized in policy frameworks, the guidelines can assist in improving the economic, social and policy context, so that incentives for practising agroforestry are strengthened.



Indonesia, Banada Aceh – A woman buying fruits from a vendor at an open air market. Tree crops play an important role in the household economies of rural Aceh. As a result of the tsunami and civil conflict many tree gardens were damaged resulting in insufficient supply of fruits and vegetables. ICRAF and WINROCK's Nurseries of Excellence (NOEL) Program aims to support post-tsunami Aceh rehabilitation and reconstruction efforts by improving tree gardens with productive tree crops produced in community-based nurseries of excellence.

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Agroforestry: strategy and policy

Why develop agroforestry?

Almost half the world's agricultural lands has at least a 10 percent tree cover, suggesting that agroforestry, an integrated system of trees, crops and/or livestock within a managed farm or agricultural landscape, is widespread and critical to the livelihoods of millions of people.

In fact agroforestry is significant in the production of both local commodities (such as fuelwood, timber, fruit and fodder) and global ones (such as coconut, coffee, tea, cocoa, rubber and gum). It can also play a strategic role in helping many countries meet key national development objectives, especially those related to poverty eradication, food security and environmental sustainability. In towns and villages, its positive outcomes can be seen in food, fuelwood and watershed management, contributing to a more resilient food system.

Agroforestry is present throughout tropical regions of the world and to a significant extent in temperate areas. Within broad agroforestry systems, such as the parklands of West Africa, there are a diversity of species and practices, such as intercropping of fruits with cereal crops.

Optimizing agricultural production and environmental benefits through agroforestry

When designed and implemented correctly, agroforestry combines the best practices of tree growing and agricultural systems, resulting in more sustainable use of land.

For example, agroforestry:

- helps protect and sustain agricultural productive capacity;
- ensures food diversity and seasonal nutritional security;
- diversifies rural incomes;
- strengthens resilience to climatic fluctuations;
- helps perpetuate local knowledge and social and cultural values.

The combination of trees, crops and livestock mitigates environmental risk, helps create a permanent soil cover against erosion, minimizes damage from flooding and enhances water storage, benefitting crops and pastures. In addition, trees bring nutrients from deeper soil layers,

or in the case of leguminous trees, through nitrogen fixation, which can convert leaf litter into fertilizer for crops.

Agroforestry serves to improve the resilience of farmers and increase their household income through the harvesting of diverse products at different times of the year. It also brings job opportunities from the processing of tree products, expanding the economic benefits to rural communities and national economies.

Agroforestry systems can be conceived for spaces varying from plots to farms to landscapes. At plot level, farmers may combine nitrogen-fixing trees with cereal crops. At farm level, they may plant trees in woodlots or along boundaries, and at landscape scale communities may rehabilitate degraded areas through trees and other vegetation. Effective agroforestry systems make the most of positive interactions between their various components, so that the final product is more valuable than in the absence of trees, while the risks of failed harvests and dependence on chemical inputs are reduced. Even at plot level, where trees may compete directly with crops, experiments demonstrate that in well-managed agroforestry plots, trees have added value that exceed any loss in crop production value. However, these outcomes are not guaranteed, so attention must be paid to the type of agroforestry system used and species selected.

Box 1 – Cameroon: mixing fruit trees and cocoa – the benefits

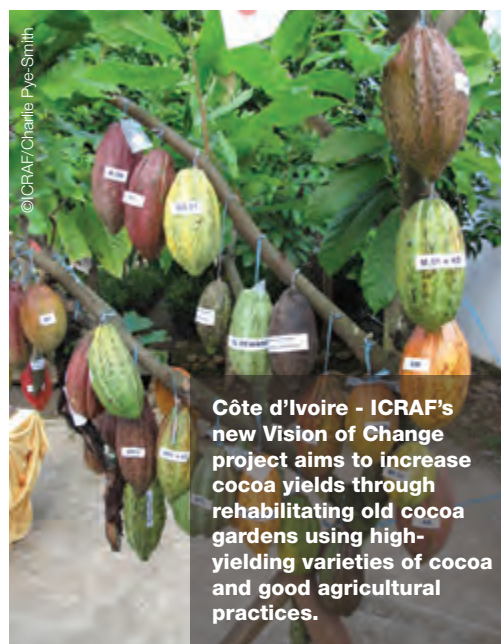
The association of fruit trees with cocoa or coffee plantations in Central and South Cameroon is a traditional way to enhance land and resource use. This system was developed during the mid-1980s and 1990s, when the price of major export crops, including coffee and cocoa, dropped.

This agroforestry system:

- reduces land degradation and provides beneficial shade cover to cocoa plants, while playing an important role in stocking carbon and thus mitigating climate change;
- provides an important alternative source of income when other main cash crops are not in production, thereby contributing to regular and stable rural incomes.

Cocoa agroforestry systems, enriched with fruit trees, both indigenous and exotic, may increase annual household income substantially. This system is very helpful to small-scale farmers with limited land.

Today, some of these fruit tree-based agroforestry systems are ageing and need to be renewed to maintain the optimum benefits.



Opportunities for agroforestry development

The potential of agroforestry to contribute to sustainable development has been recognized in international policy meetings. The UNFCCC and the Intergovernmental Panel on Climate Change (IPCC) increasingly acknowledge it as a component of climate-smart agriculture. During the 2011 Conference of the Parties (COP)17 meeting in Durban, agroforestry was frequently mentioned as having a strong potential for climate change adaptation and mitigation. Furthermore, National Adaptation Plans of Action (NAPAs) and Nationally Appropriate Mitigation Actions (NAMAs) talk of agroforestry as an important component in agricultural sector actions.

In addition, the United Nations Convention to Combat Desertification (UNCCD) acknowledges agroforestry's potential to control desertification and rehabilitation. It is also seen as an important practice in the ecosystem approach promoted by the CBD and contributes to its Global Strategy for Plant Conservation.

In a number of countries there have been attempts to harness agroforestry potential by improving the coordination of national activities, through the development of national information networks. New opportunities for agroforestry are also emerging, such as within the miombo woodlands (savannah) of central, eastern and southern Africa. This area covers 3 million km² over 11 countries and contributes to the livelihoods of some 100 million low-income persons. Similar is the expansion of natural regeneration of dry degraded land in the Sahelian area of Africa with the potential to mitigate climate change and increase rural income; in Niger, new legal conditions encouraged farmers to manage natural tree regeneration, leading to over 5 million hectares of newly generated parkland systems. In the United States, where agroforestry is not universally adopted, there is growing recognition of its ability to help farmers, ranchers, woodland owners and indigenous people to integrate productivity and profitability with environmental stewardship, culture and traditions.

Haiti, Fort-Liberté – The manager of a local nursery watering seedlings provided by FAO along with tools and equipment to better manage the nursery. The aim of the project is to contribute to the growth and diversification of agriculture, livestock and agroforestry and improve natural resources management for the municipalities of Fort Liberté, Capotille, Ouanaminthe, Ferrier, Mont-Organisé.



Box 2 – Agroforestry in IFES development

Integrated food-energy systems (IFES) present numerous benefits, especially for poor rural communities. By maximizing the synergies between wood and crop production, agroforestry may strongly contribute to the success of both.

In these systems, the management of agroforestry plots involves regular pruning. The pruned branches are used as ground cover (mulch) and serve in traditional kitchens for cooking, as well as a resource for pyrolysis. In the latter process, the branches are converted into biochar, which, when mixed with the soil, improves its structure, fertility and ability to store moisture. Using the litterfall of trees to grow crops, farmers save money that is not invested in fossil energy and may use these savings to buy inputs such as improved seed, to increase productivity.

Moreover, combining agricultural crop and fuelwood production saves woodland trees and frees up labour, especially of women, who traditionally collect wood. For example, the “pigeon pea” IFES model in Malawi is a farming

system based on intercropping. Smallholder farmers combine the production of staple foods (mainly maize, sorghums, millets) and pigeon peas, a nitrogen-fixing dual purpose plant, which delivers protein-rich vegetables for human consumption, fodder for animals and woody material for cooking. Depending on the variety, the stove technology and the type of meal, one local plant can provide enough energy for a family of five to cook one or two meals in a day.

IFES also provides new opportunities to mitigate climate change, especially through indirect Land-Use Change (iLUC), which increases land and water productivity, thereby also improving food security.

Some frameworks are needed for successful IFES development. In addition to technical means, there is a clear need to improve the policy and institutional environment supporting such systems.

Conditions for agroforestry development

While the actual and potential benefits of agroforestry have been well documented in several parts of the world, it is important to note that agroforestry is not a total panacea against food insecurity and environmental degradation. Even where it would make a valuable contribution, there are a number of conditions that could work against its widespread adoption by farmers.

To be effective and sustainable, agroforestry needs two types of integration: agriculture with trees, and trees with people. To succeed, this integration must have suitable underlying conditions, which may be technical, economic and social.

From a technical perspective, not all combinations of annual and perennial species are viable, and certain tree practices or species may overly compete for water and harbour crop pests – thus suitable species and practices must be used. From an economic perspective, farmers may be interested in tree products only when they do not decrease crop production, or where agroforestry does not limit their ability to farm with large equipment. In addition, farmers need to be informed about the profitability of any new system.

Socially, any innovation needs to be accepted by the groups directly involved in the new activities. Different societies and cultures may require different conditions for success. Within each society, there are early adopters and innovators who can show other farmers the benefits of changing to a system that includes agroforestry. However, more research is needed to determine the factors driving the adoption of agroforestry practices in various rural contexts.

Because agroforestry systems are diverse, vary from one place to another and can be observed at different scales, any decisions regarding management, policy or governance should be based on a rigorous analysis of the advantages of different scenarios. Decisions should be aimed – through specific criteria and indicators of minimum required standards – towards successful agroforestry development that meets local and national priorities. This cannot be done without the clear and sustained involvement of stakeholders, as well as of those with competing interests in existing natural resources.

Box 3 – Limits on timber harvesting in Central America

A recent study (Detlefsen and Scheelje, 2011) analyses the body of laws and policies governing the environmental and forestry sectors in seven countries of Central America. Regulation and control imposed by governments can either facilitate or constrain the development of agroforestry.

Three countries (Honduras, Nicaragua and Panama) have complex, tedious and demanding permit procedures for the harvesting and transport of timber produced on farms. Belize, El Salvador and Guatemala have designed a simplified permit protocol, although in practice, only Belize and Guatemala have an operationally simplified procedure. In Costa Rica, a permit is easy to obtain only if the harvest involves less than ten trees per year per farm. Similar regulation of tree products on farms is common throughout the tropics.



Wood harvesting in the Amazon.
The majority of wood produced in the Amazon regions is still harvested in a way that is detrimental to the forest. Governments can support agroforestry systems by facilitating permit procedures for harvesting of timber produced on farms.

Barriers to agroforestry development

Although there is a growing body of scientific literature to illustrate the benefits of agroforestry, there are also obstacles to its development and expansion. The barriers impeding agroforestry discussed in the following sections are particularly significant.

Delayed return on investment and under-developed markets

While the conventional production of agricultural crops destined for the market is expected to generate immediate income, investing in agroforestry may present various disadvantages.

Although trees become profitable as they produce positive net present values over time, the breakeven point for some agroforestry systems may occur only after a number of years. This implies that, unlike conventional agricultural, farmers may have to absorb initial net losses before benefitting from their investment, thereby reducing their enthusiasm for investing in agroforestry. Also, many agriculture projects and programmes need to demonstrate an impact within a relatively short period of time to be considered “successful”.

Furthermore market information systems introduced in some countries, often do not include tree products. As such, markets for tree products are both less efficient and less developed than for crop and livestock commodities and value chains related to agroforestry systems receive little support.

The lack of well-developed markets for agroforestry products, combined with the emphasis on immediate returns seen in some agriculture projects and the difficulty many farmers face in investing in activities that have a delayed financial return, force many farmers to rule out agroforestry as a viable option.

Emphasis on commercial agriculture

Agricultural policies can discourage farmers from practising agroforestry. Incentives for agriculture often promote certain agricultural models, such as monoculture systems, and tax exemptions are usually aimed at industrial agricultural production. The amount of credit supporting this may impact negatively on agroforestry development such as in the promotion of oil palm plantations.

In Brazil, for instance, sizeable tax cuts are offered to farmers producing biofuels provided that a portion of the feedstock is sourced from smallholders, regardless of the cropping system adopted. Similar incentives are currently encouraging the rapid extension of oil palm plantations in vast areas of the Brazilian Amazon.

Agricultural product price supports or favourable credit terms which are granted for certain agricultural activities but hardly ever for trees, are also discouraging agroforestry adoption. By not including agroforestry in the benefit package the system is discouraged, even while agricultural production becomes more economically dependent on imports and less ecologically sustainable. Zambia and Malawi are good examples of countries where subsidies for fertilizer are a disincentive for farmers to adopt more sustainable agroforestry systems.

Ignorance of the advantages of agroforestry

Overdependence on conventional agricultural methods and inadequate knowledge of sustainable approaches restrict the interest of policy-makers in agroforestry development. Limited dissemination of ideas and information prevents the spread of agroforestry systems and in many countries these systems are seldom included in the curricula of agriculture or forestry schools.

Limited experience and low capacity among some national extension services, in both traditional and new agroforestry systems, means that farmers are often reluctant to adopt them. For example, some agroforestry systems require novel management methods, compared with practices that farmers are already trained in and know well.

Lack of knowledge, different labour requirements and less established markets lead to more uncertainties with agroforestry systems. In turn, this leads to scepticism on the part of professionals and advisers, who may restrict access to information and training in agroforestry systems and the development of workable technical and business models.

Most research and development efforts are focused on short-term monoculture cropping systems and less effort is placed on the potential for improved varieties in multispecies agroforestry systems. Breeding for agroforestry conditions (such as shade tolerance, root morphology, structure phenology) has received relatively little attention.

Tree growth and productivity may be relatively low and variable, often owing to lack of access to better-quality germplasm. In developing countries, seed collection, propagation and multiplication methods, as well as vegetative propagation, are poorly known, and farmers often have no option but to protect or transplant trees that have germinated spontaneously. Moreover, because advanced propagation methods are not disseminated there are many missed opportunities to reduce the time needed to full production. Some promising ways of managing trees on farms (such as intercropping systems for soil health or introduction of improved fallows) are yet to be introduced to the vast majority of farmers and there are few nurseries providing a range of native multipurpose trees.

Box 4 – Inadequate research and extension services

If local farmers' needs are ignored, research and extension will miss the target. Many examples of failure in agroforestry development are clearly linked to this basic omission.

Extension of agroforestry technologies that are based on experiments with exotic species and intensive technologies – assessed in very different conditions and transferred to another place – is usually not relevant. Research aimed at developing new planting material sometimes pays no attention to studying the symbiotic relationships between species and interactions between species and soils.

In South Cameroon, for instance, the introduction of a planted fallow system was unsuccessful because farmers

were not facing problems of access to land or shortage of wood; they therefore saw no reason to shift to a new land use. Similarly, alley cropping systems did not spread to drier areas from the humid region of West Africa where they were tested successfully.

Research and extension systems should not concentrate solely on the biological efficiency of the technology, but must analyse the economic viability, in terms of yields and labour-related costs of the solutions they propose, as well as their social acceptability. It is essential that research and extension programmes involve stakeholders to ensure that the programmes are relevant, applicable and practical.

This situation is often made worse by a lack of publicity for agroforestry success stories, lack of investment in improving the productivity and profitability of agroforestry systems, and lack of stakeholder involvement – such as farmers' associations – in experiments. All these factors result in little or no training, weak extension capacity, poor information and little quality germplasm for many agroforestry tree species.

Finally, policy-makers lack knowledge, not only of the benefits of agroforestry – notably, the income-earning potential of tree products and the soil-enhancing services they provide – but also of the negative impacts of conventional agricultural and forestry production methods. A common belief is that introducing trees into fields will negatively affect the growth of agricultural crops. However, in northwestern India extensive integration of rows of poplar trees into wheat and barley farms by smallholders significantly increased income without any loss of crop production. The general perception of agroforestry is that of an activity peripheral to agriculture and other forms of land use and farmers engaged in it may be seen as inferior and old fashioned, compared with those practising monoculture.

Unclear status of land and tree resources

Unsecured or ambiguous land tenure, common in developing countries, results in confusion about land delineation and rights. Rights to trees may be separate from rights to land, and both land and tree tenure insecurity may discourage people from introducing or continuing agroforestry practices.

In many places, lack of long-term rights to land inhibits long-term investments such as agroforestry. When the rights to land are not clearly stated by law, the absence of legal recognition makes any other measures ineffective. This can manifest itself as a conflict of interest between the state and land users, especially where state ownership of land appears to be the main inhibitor of action.

There are various types of tenure insecurity. In many cases, tenant farmers, especially migrants, do not plant or manage trees because tree products belong to the owner. If people do not have title to land, there is a perception that there is no point in investing in trees, which can take a long time for benefits to be realized. Competing claims of tenure rights, such as seasonal rights to communal grazing, and wild fires, can jeopardize the protection of trees. Moreover, recent attempts by some governments to attract large-scale foreign investors have heightened the insecurity of rural communities.

In Cameroon, a 1974 land law gave all citizens the right to register and own land, but the procedures involved in obtaining land certificates are too complicated for many rural people. As a consequence, most farmland in rural areas is obtained through informal customary land rights, while legally owned by the state, creating a sense of insecurity. In addition, trees growing on land with no title also belong to the state. In those conditions, why would farmers have any interest in planting or managing trees on farms? Yet, if potential returns can be made with little investment, farmers may plant trees whatever the land tenure rules; right of tenure, while being a parameter, has to be balanced with profit expectations.

In some cases, forest regulations inhibit tree growing on farms by restricting the harvesting, cutting or selling of tree products and certain tree species; or forest services may control the management and harvesting of trees through permits so that farmers who introduce trees into fields are not free to manage the tree products as they wish. In turn, the permits may be difficult to obtain because of bureaucracy, or harvesting may be forbidden altogether. Although sometimes well intentioned, such protective measures, when applied to agricultural landscapes, discourage farmers from planting and protecting new seedlings that emerge.

As far as land tenure is concerned, there are some constraints that are common to most developing

countries. In both legal and customary practice, women and other vulnerable groups, who may need to grow more food (and thus to develop agroforestry), have only limited access to land and resources. Therefore developing private property through tenure laws may create a gender imbalance in land ownership, calling for more innovative approaches.

Generally, tenure rights to farmland are more privatized where population pressure is higher or commercial opportunities are increasing. In such cases, this may result in a positive impact on long-term investment in agroforestry.

Adverse regulations

Multiple legal restrictions on multifunctional land management and complicated taxation frameworks also restrict agroforestry development. Frequently the agricultural policy itself penalizes practices needed to implement agroforestry, while supporting a large-volume, large-scale approach to agricultural, food and fuel products.

Taxes applied to agricultural production may penalize agroforestry practices, as was the case with the Common Agricultural Policy of the European Union before 2001, when farmers' subsidies were based only on the surface area of crops. Between 2001 and 2010, beginning with intercropping systems, all agroforestry systems progressively became eligible for subsidies established by the policy, and now all agricultural lands are eligible, regardless of the degree of tree cover, except for forests and lands used for non-agricultural production. The tax regime may also be less advantageous for forests compared with agricultural lands, as in the example of France (Box 10).

Often, when a system exists to assist rural development activities, concretely promoting an agroforestry project requires the use of complicated bureaucratic chains to access such support; for example, the collaboration between agriculture and forestry ministries. In most cases, the legal framework acts as a disincentive; whether this is intended or not, the law ultimately benefits large farms and investors exclusively.

Even in cases where a specific programme targets agroforestry development, some provisions may restrict the introduction of trees on farms, such as in the Philippines, where the Uplands Agroforestry Programme (UAfP) targets public support for those planting more than 50 ha, while most agroforestry managers are currently small-scale farmers.

Lack of coordination between sectors

As an intervention affecting multiple sectors – including agriculture, forestry, livestock, rural development, environment, energy, health, water and commerce – agroforestry is often subject to policy conflicts and omissions, creating gaps or adverse incentives that work against its development. In addition, when policies are restricted to exclusively sectoral bureaucratic regulations, mistrust between farmers and decision-makers is the result.

In many countries, in principle, agroforestry is regarded as belonging to “all sectors”, but in practice, it belongs to none and rarely occupies a special line in a governmental body or has its own policy space. It falls between the agriculture, forestry and environment departments, with no institution taking a lead role in the advancement of agroforestry or its integration.

Agriculture departments emphasize crop production on agricultural lands; thus agricultural policies directly contribute to excluding trees from farms and the landscape. Some forestry

departments do not believe it is possible to grow good quality, widely-spaced timber on farms and have little interest in non-timber trees or the growing of trees with crops and/or livestock on the same plot of land. Yet, forestry departments are usually mandated to multiply and disseminate all types of tree germplasm. Moreover, environment departments may dislike regulated rows, intensive management and chemical control of weeds. This dichotomy exists even where a strong strategy for developing agroforestry is in place. In Malawi, for example, although agroforestry is clearly highlighted as a technical solution in both the Forestry Act of 1997 and the National Environment Policy since 2004, agricultural policies still support the extension of cropland, while forestry policy promotes conservation and full afforestation.

In conclusion, the harmonization and synchronization of policies and programmes require a combination of policy attention across the departments in charge of rural development, land use, agriculture, forestry, environment, finance and commerce, at both national and local level.

Why promote and regulate agroforestry through policies?

While the technological and biological aspects of agroforestry systems are important, they are never sufficient to guarantee their adoption or maintenance by farmers: social and economic factors are usually important as well. This implies that the policy and institutional context should play a significant role in the development of agroforestry. In addition, due to its long-term nature, adoption may not take place in a policy vacuum, as it often has to be facilitated by a conducive policy and by national and local institutional arrangements. The following issues lay out the reasons why the right policies are crucial for agroforestry development.

To eliminate legal and institutional constraints on agroforestry

An effective policy has to create the conditions for a public or private activity to contribute sustainably to the general welfare of the country. Where relevant science-based models of development exist – as is the case for effective agroforestry techniques and practices – those solutions should not be impeded by regulatory constraints or prohibitions. In many cases, these policy failures can override others, so their revision is critical to wider adoption.

To support positive outcomes of agroforestry

Agroforestry generates significant public ecosystem services, such as watershed protection, soil and biodiversity conservation, carbon sequestration and avoided emissions, and also minimizes climatic and financial risks. Yet without government involvement in providing greater incentives, the level of private investment in agroforestry will often be less than socially optimal.

When correctly designed and implemented, agroforestry, especially at landscape level, has many benefits that contribute to the sustainability of local communities and, on a larger scale, to ecosystems upon which populations depend. However, these environmental and economic services may not be valued by the market, meaning that development actors and farmers have to assume the costs of production and land-use systems that nevertheless benefit the nation. Financial support to farmers who are introducing trees onto fields can be considered a form of payment for environmental services (PES).

Without policy support, some existing agroforestry models will be underinvested and may not be sustainable. For example, in some parklands of sub-Saharan Africa increased grazing pressure will imperil the regeneration of trees, unless local institutions can identify modified grazing management strategies.

Box 5 – The “Grain for Green” (GFG) policy in China: compensating planting farmers

The Grain for Green (GFG) programme was introduced in 1999 in China, with the aim of reforesting uplands to reduce erosion, downstream flooding and rural poverty.

The policy consisted of providing grain, saplings and/or subsidies, over a period of five to eight years in the first phase, to be extended for another five to eight years, to encourage up to 30 million rural households to voluntarily convert part of their cropland to forest/grassland, especially on slopes. To support this strategy, the forest law was revised to recognize the importance of compensation in return for environmental services.

The central government used fiscal transfer payments to offset the reduction in public

revenues caused by the GFG, while local governments were expected to contribute to transport and training expenses. From the trial to full implementation, GFG applied a top-down procedure consisting of a vertical administrative hierarchy.

The interest of farmers, considered core implementers of the programme, was especially high, and the level of compensation sometimes exceeded the previous agricultural revenues. Those conditions led to a spectacular development of agroforestry technologies after 2001, mainly through fruit tree intercropping.

By 2010 the GFG programme covered more than 15 million ha in 20 provinces.



To compensate farmers for the delay in returns

Often a change in a production system requires investment by the producers, even though it may take some time before the new system produces as much as the previous one. This is particularly relevant when introducing trees on croplands and grasslands, as the productive cycle is longer. Private credit facilities for smallholder agriculture are almost universally unavailable and certainly not for long-term investment. Most farmers are reluctant to engage in tree planting or managing natural regeneration if they see that their income decreases in the short term. Since many of these investments produce environmental services that benefit everyone, the associated losses should be compensated. The level of community intervention may depend both on the value of the ecosystem services provided and on the loss of revenue resulting from the decrease in crop production during the period. For this purpose strong public policies are needed.

Considering the elements mentioned, there are several priority areas in which policy support is urgently needed, including institutional reform, land tenure security, and access to resources (information, genetic, financial), markets and incentives. Different types of policy interventions may include regulatory tools such as: state forest programmes and legal regulations; economic instruments such as taxation systems, in-kind and financial incentives; payments for environmental services; and information, including education and technical assistance. In all cases, the main goal of the policies would be to reduce risk while increasing returns on smallholder investment in trees. The policies should also ensure that monitoring activities are put in place.

Often the solution is not to have a specialized institution or policy for agroforestry, but to enhance support for it by using existing policy mechanisms or regulatory frameworks. In many cases, the shadow effect of economic or agricultural policy is far more important than the impact of measures specifically aimed at promoting agroforestry systems.

The solution may not be solely restricted to regulatory measures because there is little chance that agroforestry systems can be promoted by laws alone. In fact, any progress will come from a sound, integrated arrangement of regulations, economic incentives and information, to be designed and applied by all stakeholders.

Box 6 – Improved fallow in Zambia: the limitation of by-laws

Bush fires and grazing by livestock were major challenges to adopting improved planted-tree fallow in eastern Zambia. In view of this, in 1995 traditional chiefs enacted local by-laws requiring livestock owners to herd their animals and forbidding field burning during the dry season.

An impact study (Ajayi and Kwesiga, 2003) has shown poor results from this policy initiative for many reasons: difficulty in reaching the people who were burning fields; farmers' varying interpretations of the rights and duties of different community members under the by-laws; a lack of understanding that the aim of the by-laws was to minimize negative outcomes (and not to be directed

against a particular group of stakeholders); the limited effectiveness of moral persuasion owing to the declining power of local authorities; unclear responsibility for implementation; and confusion between community and private ownership of fallow areas.

However, those limitations also provide the framework for developing an improved institutional solution – a win/win situation. In any case, any policy promoting agroforestry needs to address the issues of farmers' and other stakeholders' awareness of long-term environmental effects and of the economic benefits of diversifying agricultural options. Economic mechanisms and informational means are both fundamental to this.

Drivers of agroforestry development

Contextual drivers

In many cases, prevailing conditions in society and institutions determine the development of agroforestry systems. Those conditions usually combine ecological drivers, on the one hand, with socio-economic and cultural factors on the other.

When population density is high on a limited area of arable land, pressure to maximize land use leads to an increase in agricultural practices and demand for soil maintenance. In such conditions, agroforestry models can help solve this dilemma, providing a variety of products while conserving the future production capacity of the land. One of the main effective drivers of agroforestry may be that, in high population areas, there is no more bush or forest available to support a shifting system of production or to provide for fuelwood and other tree products.

Urbanization and industrialization are boosting markets for a wide range of commodities. Where there has been deforestation there is also a high demand for products drawn from agroforestry systems, especially when certification and organic or environment-friendly labels can open opportunities in higher value green markets.

In addition, in some places smallholders have no access to mineral fertilizers, because of the high price and lack of subsidy. This is the situation in many African countries, where it constitutes a major driver of agroforestry. In other places, a lack of well-defined land boundaries may also be an incentive for farmers to plant trees as live fencing – also a form of agroforestry – to create private areas and reduce conflicts.

The particular importance of external contextual factors explains why a policy promoting agroforestry does not necessarily have to address the components of agroforestry systems, themselves, but rather the contextual characteristics of agroforestry practices.



Internal capacities

Agroforestry development is also driven by leading actors and early adopters who can promote agroforestry systems.

When small and medium-size producers have guaranteed access to land and to tree product markets, they can actively engage in agroforestry. Under such conditions farmers can compare experiences and exchange inputs leading to the diffusion of information and an expansion of agroforestry systems.

The private sector, including companies and trade associations, can also play a significant role in creating awareness of agroforestry practices that produce a relatively higher-value product, such as fruits. With new agroforestry systems, such as improved tree fallows and fodder shrubs, demand needs to exist or be created before private-sector support can be expected.

In other contexts, rural community dynamics may serve as a driver of locally based practices, including agroforestry. This may be the case in community-based forest management, which can strongly promote the integration of various systems and optimal use of land.

Policy as a driver

The role of policies as drivers is mainly to create a favourable economic and institutional environment, in which private local actions can be carried out without significant restrictions. Permanent or temporary incentives, including subsidies, aimed at establishing markets and decreasing economic risk in the long run, can enable farmers to get involved in agroforestry. In a context where control is limited, such as when tree planters have to be registered, local organizations can play an active role in development. Nevertheless, agroforestry development using specific policies is not a sufficient solution on its own.



Agroforestry: which policies?

Lessons from success stories

Some lessons can be drawn from an analysis of the development of national policies supporting agroforestry systems.

Agroforestry exists only where it is beneficial to farmers

Agroforestry systems prove successful and sustainable only when they have direct benefits for farmers. There is no agroforestry success story if incomes decrease considerably, even if only for a temporary initial phase. In most situations, farmers may not be willing to wait out a lengthy investment phase before realizing revenues. Strategies to fill the initial gap are often necessary to the adoption of agroforestry systems. For example, in Rio Grande do Sul, Brazil, smallholders planting bananas in association with palm trees sell the fruit for a higher value through better marketing channels, thus offsetting the lower yields that result from not using chemical inputs. Generally speaking, if trees are to be introduced into existing cultivated fields or pastures, short-term income is maintained by introducing low tree densities while intensifying agricultural practices. After some time, the tree products and services will boost income with the aim of raising overall system productivity.

If there is a clear risk of decreasing short-term revenues, although important social and environmental benefits are expected in the long run, policies should aim to create a beneficial context for farmers introducing trees. For example, it is possible to design agroforestry systems where a temporal sequence of different crops ensures that some annual commodities are harvested at all stages of tree development (for example, light demanding crops while trees are still small, and more shade-tolerant crops at a later stage). The importance of economic considerations partly explains why most success stories in agroforestry development did not involve significant inputs from governmental agencies. In fact the private sector has played a significant role in creating awareness of agroforestry and supplying seedlings (Box 7), although this may create a culture of dependency.

Box 7 – The promotion of arabic gum in Niger

The high commercial value of arabic gum has led to the planting of 200 ha of *Acacia senegal* and *Acacia seyal* in the region surrounding Niamey, initiated by the gum-processing companies. Some 40 000 seedlings were distributed free of charge to interested farmers, and production ranges from 8 to 20 tonnes, depending on the year. Exports of gum have reached 1 500-2 000 tonnes a year.

This development, which fosters a regeneration of the whole parkland, is directly dependent on the commercial interests of the companies in charge of distribution of the product. It is questionable whether free distribution of seedlings to farmers is a good solution, as it creates economic and technical dependency instead of promoting innovative behaviour. However, this case provides an example of a situation in which the maintenance of trees in rural areas derives directly from market demand.



Senegal, Thikene Ndiaye - Acacia Operation. Support to Food Security, Poverty Alleviation and Soil Degradation Control in the Gums and Resins Producer Countries (Burkina Faso, Chad, Kenya, Niger, Senegal, Sudan). A local villager tending a crop of acacia trees showing the sap or gum arabic that is harvested for eventual sale to a processing plant. (FAO Project)

Security of tenure rights is important

More than in other agricultural systems, trees on farms require stability and security of tenure rights. This is a significant issue in many developing countries.

Due to the longer period relative to annual crops – through which farmers' testing, adaptation and eventual adoption of agroforestry technologies takes place – the importance of property rights is greater than in many other types of agricultural enterprises and practices.

A clear guarantee of tenure rights can support a farmer's strategy to invest in trees on farms, including in cropland. Only then can farmers – as investors – make plans with the confidence that the parameters shaping their long-term vision will not change. There are few agroforestry success stories in an uncertain land tenure context.

Agroforestry is encouraged where associations of smallholders and community-based forest management are supported by public authorities. In the case of customary agroforestry systems (such as parklands and coffee/cocoa associated with fruit trees), a land title may not be essential because the customary tenure systems may have evolved towards providing sufficient private rights (e.g. as population density has increased). Moreover, management of common property resources can be achieved if local people are given the right to organize themselves. Agroforestry actually offers a means for solving tenure conflicts: when there is competition for land or superposition of uses, it can help farmers settle in a specific area and allow both intensification of practices and interplay between livestock keepers and cultivators. Trees are also planted around boundaries to demarcate property rights between farmers.

Agroforestry links sectors

Agroforestry requires coordination and collaboration among high-ranking decision-makers in various sectors, especially agricultural, environmental and forestry bodies. This connection between various public services may help where specific measures are elaborated to support the process. There is need to align visions of success across sectors. While agricultural ministers seek to improve food production, forestry ministries are keen to raise tree resources overall including those from farms, and thus the two visions may come into conflict. At the level of field implementation, where forestry departments have a mandate for provision of quality tree germplasm, it needs to work with agricultural and environmental departments in identifying useful species for farms or riparian areas.

Box 8 – National Steering Committee on Agroforestry (NSCA) In Malawi

Created in 1993 and chaired by the departments in charge of agricultural research and land resource conservation, the National Steering Committee on Agroforestry (NSCA) oversees issues relating to agroforestry. The inclusion of governmental bodies from various departments, NGOs and donors active in agroforestry is an important strength.

The NSCA helps to disseminate success stories and links science to practice at field level. It promotes priorities for research, reviews interesting technologies and establishes

priorities for dissemination. Such a committee can encourage the best use of research resources, reduce duplication and prevent the promotion of failed or limited technologies. It could take a stronger role in strategic issues, for instance establishment of a road map for enhancing agroforestry strategies within the national forest policy.

This type of flexible and open structure may play a significant role in promoting policies, without needing to change the whole context of institutional arrangements.

A strict enforcing of forest management rules promotes agroforestry

In *The State of World's Forests 2005*, FAO observes that in many countries bans on cutting trees may be a disincentive for tree planting on farms. Across all tropical regions, there are many countries which have highly restricted the cutting and management of a range of species valued by farmers, requiring costly permits. Mechanisms are needed to exempt trees planted in agricultural landscapes from such regulations. On the other hand, appropriate regulation of harvesting and effective penalties for illegal activities in natural forests could be an excellent motivation to integrate trees into farms. Under such conditions, industries are encouraged to develop new sources of wood supplies. The resulting rise in wood product prices would make timber-growing more attractive to farmers. Such dynamics have occurred in India and Kenya following logging bans in forests.

Where agricultural crops and forest products are not subject to effective sustainable management practices, there is no incentive to use resources well. Labour productivity in uncontrolled shifting cultivation and illegal wood harvesting is higher than in a regulated system like agroforestry. As long as a collective forest resource is considered open access (for forest products and land), and where regulation and monitoring are weak, farmers practising shifting cultivation may not wish to intensify production. In some African countries, a lack of control of – and the will to control – bush fires set in some seasons to hunt mice and regenerate grass hinders the introduction of trees into fields. Common efforts to better manage and restrict those fires would support agroforestry development.

Poor regulation of state-owned and managed woodlands and forests has led to undervaluing concessions and stumpage charges, resulting in an oversupply from those sources and an undersupply from farms. A weak governance context leads to instability and eventually to unsustainability of the local economic system. It never promotes complex integrated systems such as agroforestry.



Tanzania - Shinyanga Soil Conservation Programme. Woodlots provide significant income for farmers. (ICRAF Project)

So what?

Ten tracks for policy action

From lessons learned during years of action or inaction, it is possible to draw some general principles for an effective agroforestry strategy. Before creating agroforestry policy, policy-makers should be aware of the following:

- A lack of financial credit is seldom a major constraint when adopting agroforestry practices, due to the small size of farms and scale of operations, the incremental approach that farmers use to plant trees or manage natural regeneration, and the desire of most farmers to avoid risk. In many instances, offering free seedlings and inputs, or paying farmers to plant trees, discourages investment in germplasm improvement and propagation capacity, stifles private sector nurseries, and encourages dependency – all of which is a disincentive to planting when a project ends. Government interventions should promote short and long-term benefits and create favourable conditions for development.
- Policies must be oriented towards promoting agroforestry systems that meet the key goals of poverty alleviation, food security, gender equity and sustainable management of natural resources. If this were done, agroforestry would shift from being an exception to being a priority towards sustainable development.
- A public policy promoting agroforestry development should not be seen as simply creating norms. Rather, it should be viewed as a set of actions and tools that create favourable conditions for the development of such systems. In these policies, stakeholder input, access to information, appropriate technologies and extension services, private and public partnerships, and rewards for environmental services and good governance, are more important than the regulation itself.

Box 9 – Agroforestry policy in Kenya

In 2009, responding to deforestation, and to increase sustainable management of agricultural land areas while motivating farmers to plant trees, the government enacted a farm forestry regulation that requires at least 10 percent of all farms to be under tree cover. Special funding is being allocated to assist farmers in regions where these targets were not already met.

The government is also considering various options to increase agroforestry tree seed and seedling supply to meet the demand created by this regulation.



Kenya, Kisumu – An ICRAF pilot initiative exploring the potential benefits offered by urban agroforestry. The aim is to integrate agroforestry technologies into present peri-urban and urban farming practices in Kisumu.

1 Spread the word

Raise awareness of the benefits of agroforestry systems among farmers and global society

Policy decision-makers must believe in the process – that agroforestry development is a good solution. For this to happen, the importance of agroforestry must be demonstrated within and beyond the fields of agriculture and forestry, using rigorous evidence and a critical mass of tangible arguments. This may be done through involving interested stakeholders from relevant sectors

and quantifying the cost and benefits of agroforestry at both national and local level. Such data are of particular importance when assessing financial incentives for farmers in the framework of field projects. The argument may be stronger when based on specific criteria and indicators that define the best local practices in agroforestry and provide conditions for policy intervention.



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2 Revise the context

Appraise and reform unfavourable regulations, legal restrictions and restrictive financial mechanisms

Contexts in which articles of law are constraining agroforestry development – or more often specific regulations in forestry, agricultural and rural codes – are very common.

Tree protection policies dating from the colonial era in many developing countries, and land and tree tenure policies and traditions that prohibit cutting and transporting of trees and tree products, have to be removed or revised. They significantly inhibit the development of tree-product markets and farmer interest in growing trees. Where forest regulations affect tree management, regardless of location, simple systems should be designed for the registration of tree farmers, who could then be freed from costly permit procedures and constraints regarding the use of their trees.

In Costa Rica the situation changed dramatically when agroforestry systems were explicitly included in incentives previously provided for commercial planting of woodlots. A similar example is found in Niger, where a relaxing of the state's ownership of trees encouraged farmer-managed natural tree regeneration, leading to over 5 million hectares of newly generated parkland systems.

Revising the agricultural, forestry and environmental norms when those impede agroforestry development is essential: first, identify how policy constrains agroforestry, then, if possible, target changes in regulations (which is easier than changing laws).



3 Secure the land

Clarify land-use policy goals and regulations

A secure framework for tenure rights is a prerequisite for strong agroforestry development. This does not necessarily mean complete privatization of land to freehold (which often creates obstacles to poverty reduction and gender balance and is not always necessary to secure land access), but a clarification and consolidation of community-based rules. Land tenure security is essential to social equity, and should be a priority for governments. This may mean reforming farmers' rights to access not only land, but also the resources sustained by the land. This could involve linking land and tree tenure, developing a legal standard protecting farmers, and devolving rights and responsibilities for trees. However, formal land titling may not necessarily be the best option. Research has found that some customary forms of tenure provide the security to plant trees, while reducing the formalities and costs of administration. New inexpensive means of providing certificates of

land ownership are also increasingly used where insecurity is perceived to be high.

In some cases, the law could require that this reframing of tenure regulations allow farmers to become owners of the land in exchange for a code of conduct promoting sustainability (including agroforestry). In other cases, leases and tenant contracts can be modified in favour of agroforestry practices, such as through conditional environmental leases with natural resource conditions to be met at the end of the lease period. Additional measures linking agroforestry development with landscape planning and village land-use management can help. Depending on the social and ecological contexts, community-based land management may be promoted under detailed rules accepted by all stakeholders. Whichever tenure system is adopted, it must be clearly stated and must pave the way towards sustainable rural practices.



4 Create a new approach

Elaborate new agricultural policies that acknowledge the role of trees in rural development

In many countries, agricultural and forestry spheres are completely separate and supported by distinct policy measures and mechanisms. The dominant technical and economic model is based on monocropping of annual and perennial crops, and segregated tree plantations following silviculture methods. Reflection on the societal and environmental role of agriculture has generated critics of both models, so that a new approach to rural production is emerging. Agroforestry must be considered part of the sustainable intensification of agriculture approach, such as in the conservation agriculture model

promoted by FAO, as a multiple services provider, and not only as industrial production. Therefore agricultural policies that promote environmental conservation, economic performance and social equity are essential. They may include tax reform, grassland integration and landscape rehabilitation.

In some cases, such as in France (Box 10), a significant change in consideration of the role of trees in farming systems came from a joint lobbying effort by scientists and producers, grouped under the French Agroforestry Association (AFAF), directed at national decision-makers.

Box 10 – France: a new agricultural policy recognizing the role of trees in farm systems

In France, the recognition that agroforestry systems should be encouraged by public measures was slow, but a complete change in concept and strategy occurred during the 2000–2010 period.

In 2001, at the European level, tree-based intercropping systems were accepted for access to funding support from the Common Agricultural Policy of the European Union. In 2004, the European Commission launched Article 44 for support to agroforestry. Known as Measure 222, it had to be formally validated in national or regional rural development plans before becoming effective. In 2006, agroforestry plots of fewer than 50 trees/ha were declared eligible for European subsidies.

In France, there were difficulties in adapting Measure 222 to the national tax regime, but after strong lobbying by AFAF, the measure was adopted nationally in 2010, giving access to subsidies for agroforestry plots from 30 to 200 trees/ha. In the new regulation, trees in fields are considered production factors and do not decrease the surface area eligible for subsidies. Since then, agroforestry plots have been fully recognized as agricultural areas, opening the possibility for tax and funding advantages, although fences are excluded from the regulation. The state devolves the task of funding to the regions, which has led to some heterogeneity in applying the system.

5 Organize and synergize

Organize intersectoral coordination for better policy coherence and synergies

In most cases, institutional reform and related arrangements should reorganize departmental responsibilities and improve coordination between sectors. This can be done by creating consultative bodies and a strategy for fostering collaboration among staff of different governmental departments and ministries. This reframing should be used only when clear official policy statements have been approved (and not before, as has happened in many countries). These types of institutions are not the most important part of the policy, but they are a key tool for implementing a clear strategy. Multi-stakeholder forums and inter-departmental meetings can coordinate the planning and implementation of various ministries, and public agencies and other partners can jointly identify priorities and strategies. Through decentralization, local governments can play an important role in coordinating the approach to agroforestry

development and in creating synergies among the multiple sectors. Addressing strategies at this level also brings local government closer to the management decision-making level. Since agroforestry is practised mainly on farms, it is preferable that intersectoral coordination be given to agricultural agencies. Integrated land use planning through stakeholder-based participatory approaches can provide the necessary intersectoral coordinating and negotiating platforms (formal or customary, at different administrative levels within a country). Through such an approach, stakeholders can assess trade-offs when considering potential changes in land management and use (including agroforestry), thus informing the policy dialogue. Agroforestry should also bring together urban and rural areas (territorial approach) and contribute to a multifunctional production system (landscape approach).



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6 Provide incentives

Create a clear context for PES

Agroforestry is more efficient and more likely to lead to sustainability when the whole value of trees is taken into consideration. Farmers introducing trees on farms should be rewarded for the ecosystem services they provide to greater society. Many agroforestry practices provide such services, to be promoted through financial or other incentives in the form of grants (lump-sum payments on a unit-area-basis price premium to reflect environmentally sustainable practices), tax exemptions, cost-sharing programmes, microcredits or delivery in kind (especially extension services and infrastructure development).

These types of incentives should be restricted to creating the initial conditions to motivate farmers and other land users to adopt and continue agroforestry practices. Other incentives include the environmental certification of wood products and other sustainably produced commodities, and better integration into the carbon market. Certification of the whole land-use system, at landscape level, is also an option. In this case, all products (tree, livestock and crop and by-products) and services (such as ecotourism) from a certified or labelled area can benefit from the added value brought by the environmental services. This added value can be partly used to pay for auditing of the effectiveness of the practices leading to certification.

Long-term credit may be of some interest: as benefits to farmers planting trees may arrive only after some years, it is critical to have programmes extending longer-term credit for such purposes. The value of carbon sequestered and other environmental services by the trees could even be applied to paying the interest.

Any support mechanism should be designed to be predictable, long term and consistent with a clear government commitment. It has to be simple, transparent, flexible and enforceable. In Brazil, the Programme for the Socio-Environmental Development of Rural Family Production (Proambiente) was an ambitious attempt by the federal government to set up PES for farmers preserving the vegetation in their plots and abiding by certain principles of agro-ecology. It failed because it ultimately lacked mechanisms for paying farmers and monitoring compliance.

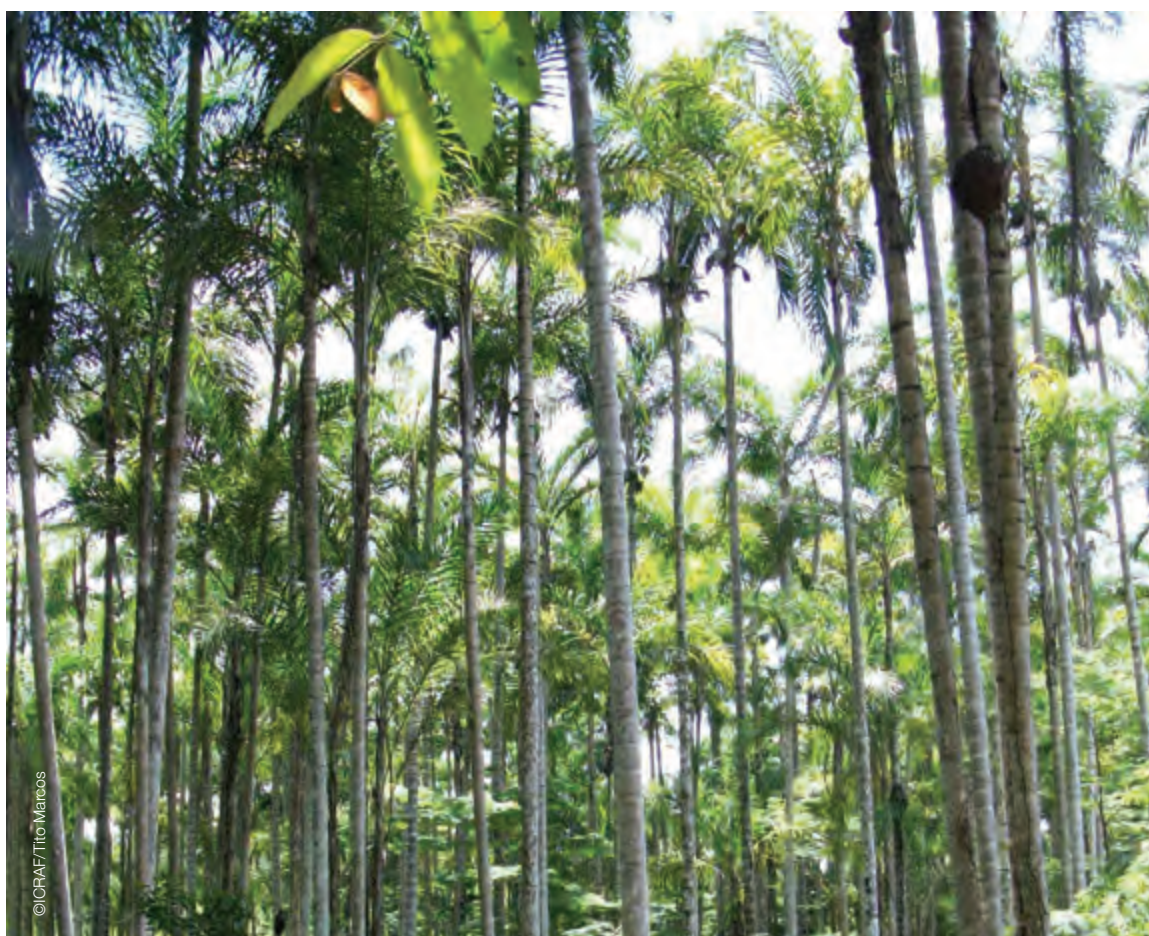
Government intervention is critical in developing institutions that help coordinate the actions of stakeholders and facilitate transactions at a minimum cost. The institutional stability of PES mechanisms depends on a set of basic conditions, including: trust and confidence in the monitoring and control process, transparency in the management of funds, a strong legal framework, political stability, continuous updating of regulations, and innovations based on the lessons learned from experience.

Box 11 – A PES experience: Costa Rica

Costa Rica enjoys one of the most advanced national systems of PES. A national forestry financing fund (FONAFIFO) was created in 1996 through a selective tax on hydrocarbon consumption, part of which was assigned by law to subsidize forestry activities. It was formally extended in 2002 and 2005 to agroforestry and silvopastoral systems, according to number of trees per hectare and under specific monitoring regulations. Supported by national and international donations, FONAFIFO aims to finance small and medium-sized producers through credits and other mechanisms employing a decentralized

procedure. This mechanism, destined to promote the introduction of trees on farms, contributed strongly to reforestation and afforestation in Costa Rica on private and community lands, especially through agroforestry systems. Over the last eight years, more than 10 000 contracts have been signed under PES for agroforestry, corresponding to the planting of more than 3.5 million trees on farms.

Among the main barriers that producers in the programme are facing are transaction costs (27 percent of the amount paid) and bureaucratic hurdles and slowness in the processing of PES applications.



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7 Develop markets

Strengthen farmer access to markets for tree products

Introducing or maintaining trees in farming systems is profitable only if farmers have access to markets in which to sell tree products. A policy promoting agroforestry should be based on developing market access, including sound market information for tree products.

Markets are important to meet the demand for tree products, which is ever growing. Markets also increase the value of tree products which, with proper regulation, will foster improved management of trees, avoid the destruction of natural forests and substitute an unsustainable land-use system with a more appropriate one. Demand for tree products or services at the household and market level is an important consideration in tree-planting promotion efforts. Similarly, assistance to identify and

develop markets can be an effective incentive to tree planting on farms.

Domestic markets can provide significant economic opportunities for small-scale agroforestry producers in certain product markets, where they enjoy competitive advantages such as lower cost structure and better monitoring and protection.

It is essential to remove policy barriers to small-farm participation in markets by creating a fair and open competitive market environment for business development, providing macroeconomic stability, investment-friendly strategies and infrastructure development, and involving farmers' organizations in policy negotiations.



8 Communicate the know-how

Enhance stakeholder information

Agroforestry needs specialized extension services and support to farmers together with backing from farmers' associations so that farmers learn that well-managed agroforestry practices are compatible and not in conflict with the aim of increasing agricultural production in the short and long term. The issue of germplasm for agroforestry trees is therefore fundamental, as most countries do not have enough germplasm to scale up the planting of many beneficial agroforestry species. Moreover, there is very little work on improving germplasm quality for trees, as is the case with annual crops. Farmer acceptance very often comes from a dissemination strategy based on participation by local producers. In the Sudano-Sahelian parklands of southern Niger, the mastering of natural regeneration has come directly from this strategy.

The dissemination process needs to be programmed with campaigns for agroforestry promotion, including plot demonstrations,

regional toolkits and other forms of education. Farmer-to-farmer and peer-to-peer training should be expanded through local organizations.

In some cases, a conceptual framework for agroforestry is useful for organizing information and guiding the analysis of factors associated with agroforestry development. It can help identify the resources needed to harness the national or subnational agroforestry potential. The framework may be national, as in the example of the United States Department of Agriculture (USDA) (Box 12), or regional.

In the Philippines, the UAfP, launched in 2005 by the Department of Environment and Natural Resources, aims to reduce poverty by increasing productivity and employment through the creation of agroforestry farms and plantations of 50 ha and above on 4 million ha of degraded and unproductive forestland.



In Indonesia, some programmes of social forest development – providing greater tenure security to local communities and farmers on forest lands officially belonging to the state – have led to clear progress in developing agroforestry systems.

In many cases, the strategies developed to promote community-based and collaborative forest management may contribute directly to enhancing

agroforestry systems, because they address the issue of satisfying local needs at the right level. Given the limited capacity of government extension staff, diffusion of agricultural technologies including agroforestry has tended to emphasize cost-effective models that rely on farmers and farmers' groups to help disseminate information to a larger number of other farmers.

Box 12 – Public planning as a promotion tool? The USDA Agroforestry Strategic Framework 2011–2016

In the United States, acceptance of agroforestry by farmers and landowners is generally low, except where government conservation programmes provide assistance. However in 2010, the USDA, with input from a diverse group of stakeholders and experts, recognized the need and opportunity to expand the application of agroforestry to increase profitability and benefits at farm scale, as well as to address larger issues at landscape scale. The latter included cleaner water for communities and large ecosystems (such as in the Gulf of Mexico), biodiversity, and an increase in the resilience of agricultural lands to weather events (such as floods and drought) and climate change. This approach was formalized in 2011 with the USDA Agroforestry Strategic Framework 2011–2016, dedicated to increasing awareness and creating a roadmap for advancing agroforestry research, technology transfer and application.

The USDA Agroforestry Strategic Framework includes three strategic goals:

- (i) adoption: develop partnerships with local stakeholders, educate professionals, support international exchange of experiences;
- (ii) science: plan needs and conduct research;
- (iii) integration: incorporate agroforestry into agricultural policies and programmes, assess performance and communicate the results of experiences.

An Agroforestry Executive Steering Committee (represented by executives from seven USDA agencies) has been established to guide implementation of the USDA Agroforestry Strategic Framework, which has 40 strategies for action. The USDA Agroforestry Strategic Framework strategy aims to develop a USDA agroforestry policy statement and, in the next Farm Bill, to legislatively define agroforestry and specifically authorize its application in conservation and natural resource programmes.

Box 13 – An agroforestry programme: PINPEP in Guatemala

The Programme of Forestry Incentives for Owners of Small Plots of Land Used for Forestry and Agroforestry (PINPEP) was created in Guatemala in 2010 to promote the introduction of trees on small farms (less than 15 ha), with the aim of providing support to small producers using agroforestry systems. These farmers receive incentives for the year of plantation establishment and two years of maintenance. To restrict the mechanism to small farmers, applicants must demonstrate that they do not benefit from any

other programme. PINPEP has been adopted at national level, although aimed at a priority area composed of municipalities suffering from poverty. A management committee leads PINPEP, supported by a technical committee in charge of monitoring and evaluation. More than 45 000 people (23 percent of whom are women) located in 79 poor municipalities, have benefited from PINPEP. Supported by international donors during the initial phase, the programme has been entirely funded by the Government of Guatemala since January 2012.

9 Include the stakeholder

Formulate or strengthen policy based on local people's needs and rights

All stakeholders involved in agroforestry, including farmers, pastoralists and especially women and other vulnerable groups, must participate in identifying the resources needed to adopt new technologies. In some cases, agroforestry is responding to a demand from farmers and local populations, while not being included in government policies and programmes. A participatory approach involving wide stakeholder consultation and including local organizations can identify when and where agroforestry may promote sustainable development. Policy considerations need to be based on human rights provisions and approaches aimed at empowering local people in a sustainable way. Special support must be provided for research in tree management, as well as in different combinations of trees, crops and/or livestock, to produce the products and services desired by farm families and the market.

Community-based institutional mechanisms are particularly relevant in imparting information to farmers, that may include business skills, market produce and quality standards. Policies should be based on the needs and legitimate claims of local people and on a validation of local knowledge, creating solutions through systematic, transparent negotiation. It is important to assist and encourage local people to become involved in processes that recognize their needs. In some countries where implementation of land policies and laws continues to be problematic, the concept of community-led reform should be emphasized.

In places where population density is high and agroforestry practices are established (e.g. parklands in Africa), any local arrangement of rights and duties needs to be based on local customs, then adapted to solve existing problems.

Box 14 – Area-based projects can enhance agroforestry systems: rural pacts in Quebec, Canada

New styles of policy-making, based on support to local projects, can contribute to the development of agroforestry.

This is the case in the province of Quebec (Canada) where “rural pacts” constitute the main policy tool for rural development. They consist of formal agreements between the Ministry of Municipal Affairs and Regions and regional agencies, which receive funding to implement a specific, validated

programme of activities. In the region of Haute-Gaspésie, this public arrangement has led to a significant increase in the adoption of agroforestry systems.

In this example, the bottom-up character of the public decision-making process guarantees consideration of expressed local needs, and thus contributes to a high level of acceptance of agroforestry systems among farmers.

10 Govern wisely

Engage in good governance of rural activities

No policy can work when decisions are not properly applied. As with other strategies – maybe even more so in the case of agroforestry, because of its special need for sustainability and permanence – proper implementation of decisions and regulations is required.

In all places where the legal framework is weak or poorly implemented, it is more attractive to continue illegal practices in the surrounding wooded area than to intensify agricultural production in a restricted area through integrating trees into farms and landscapes.

Decentralization is also usually presented as a relevant framework for agroforestry systems development. When decision-making is decentralized local institutions can exert their role in choosing appropriate interventions because they have direct knowledge of existing conditions, capacities and problems. These may

include strengthening networks of producers at local level, protecting local rights at regional level, and reforming financial and tenure systems at national level. As in other kinds of policy enforcement, the policy reform on which to base a solution can be a combination of market-based tools along the lines of the “provider gets/polluter pays” principle. This should be considered when revising agricultural and forestry regulations, together with a clear strategy to promote the benefits of agroforestry. This combined solution may be more effective when based on cooperation by institutions and a strong commitment by the government to promote agroforestry systems (and other models that sustainably optimize economic, environmental and social benefits and services from rural resources).

Box 15 – Agroforestry: you are the key

Delegates from more than 100 countries took part in the World Agroforestry Congresses organized by ICRAF (the first in Florida, United States, in 2004; the second in Nairobi, Kenya, in 2009). Participants noted significant progress over the past 30 years in building the scientific foundation of agroforestry. Recognizing the links to the United Nations Millennium Development Goals, they called on countries, international organizations, the private sector and representatives of civil society

to join their efforts to promote the full potential of agroforestry and its concrete implementation at the field level.

As in the example of France (Box 10), public policies, institutional innovations and extension strategies that facilitate the spread of agroforestry and increase economic and ecological benefits are the result of a reflective and constructed synergy among decision-makers, scientists, extension and development agents, and farmers.

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CASE STUDIES

A series of case-studies has been developed to support the development of these guidelines. The draft case studies (final report, not edited) are available on demand by contacting FAO. They will be published in the FAO “Agroforestry Working Paper” series.

Cardenas Monroy, C. 2011. *Practical cases of agrosilvocultura in Ecuador – A policy perspective*. Final report, not edited. FAO, Rome.

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GLOSSARY

Accountability: responsibility of political actors and experts to all members of society for their actions and decisions.

Adaptive management: a systematic process for continually improving management policies and practices by learning from the outcomes of previous employed policies and practices.

Administration: the management of affairs based on a mandate or official appointment.

Afforestation: establishment of forest through planting and/or deliberate seeding on land that, until then, was not classified as forest. Afforestation implies a transformation from non-forest to forests.

Agroforestry: all land-use systems or forms of technology where woody perennials are deliberately used in the same land management unit as agricultural crops and/or animals, in some form of spatial arrangement or temporal sequence, valorizing both ecological and economic interactions between the various components.

Biodiesel: alternative fuel made from vegetable oils or animal fats, either in pure form or mixed in any combination with petroleum-based diesel fuel.

Carbon sequestration: process by which atmospheric carbon dioxide is taken up by trees, grasses, and other plants through photosynthesis and stored as carbon in biomass (trunks, branches, foliage, and roots) and soils; the sink of carbon sequestration in forests and wood products helps to offset sources of carbon dioxide to the atmosphere, such as deforestation, forest fires, and fossil fuel emissions.

Certification: formal procedure by which an accredited or authorized person or agency assesses and verifies, then attests (by issuing a certificate) the attributes, characteristics,

quality, qualification or status of goods and services, procedures or processes, individuals or organizations, events or situations, in accordance with established standards.

Civil society: groups acting voluntarily in their capacity as citizens to advance common goals and agendas. These include both formally registered organizations and non-registered, loosely organized cause-oriented groups.

Climate change: a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

Compensation: something given as payment or reparation for a service or a loss.

Community-based forest management: management of forest lands and forest resources by or with local people, whether for commercial and non-commercial purposes.

Contract farming: agricultural production carried out according to an agreement between a buyer and farmers, which establishes conditions for the production and marketing of a farm product or products.

Deforestation: conversion of forest to another land use or the long-term reduction of the tree canopy cover below the minimum 10 percent threshold.

Ecotourism: travel undertaken to witness the unique natural or ecological quality of particular sites or regions, including the provision of services to facilitate such travel.

Environmentally friendly: terms used to refer to goods and services, laws, guidelines and policies claimed to inflict minimal or no harm on the environment.

Farm forestry: system where growing trees for timber, fuelwood or poles is carried out on farmland, in small woodlots or in boundary planting.

Germplasm: collection of genetic resources for an organism; it can be any plant part used for regeneration: seed, cuttings, scions, pollen, and also symbionts necessary for a tree's survival.

Green market: market for products and/or services based on their environmental benefits. Such product or service may be environmentally friendly in itself or produced and/or packaged in an environmentally friendly way.

Institutions: customs, behavioural patterns and regulations that define forest-related access, rights and duties, benefit-sharing and decision-making.

Integrated food-energy systems (IFES): farming systems designated to integrate intensively and then increase the simultaneous production of food and energy, seeking to maximize synergies between food crops, livestock, fish production and sources of renewable energy including wood.

Intercropping: cultivation of two or more crops simultaneously on the same field with or without a row arrangement (row intercropping or mixed intercropping); can also refer to the growing of two or more crops on the same field with the planting of the second one after the first has already completed development (relay cropping).

Landscape: a composite land area made of a cluster of interacting ecosystems that is repeated in similar form.

Multipurpose forestry: any practice of forestry that fulfils two or more objectives of management, whether products, services or other benefits.

Parkland: open land with scattered groups of trees, which is temporarily or permanently cultivated and/or used for grazing.

Participation: involvement of citizens and stakeholders in decision-making, either directly or through legitimate intermediaries representing their interests.

Payments for environmental services (PES): voluntary transactions whereby a defined environmental service – or a land use likely to secure that service – is bought by a buyer from a provider, on the condition that the provider secures provision of the service.

Private sector: encompasses for-profit business entities that are not owned or operated by the government.

Shifting cultivation: a system of cultivation in which a plot of land is cleared and cultivated for a short period of time, then abandoned and allowed to revert to producing its normal vegetation while the cultivator moves on to another plot.

Silvopastoral: any agroforestry system which includes grazing and animals.

Stakeholders: any individuals or groups who are directly or indirectly affected by, or interested in, a given resource and have a stake on it.

Tenure: agreement(s) held by individuals or groups, recognized by legal status and/or customary practice, regarding the rights and duties of ownership, holding, access and/or usage of a particular land unit or the resources therein.

Transparency: clarity and free flow of information enabling all members of society to access, understand and monitor processes, institutions and information.

Agroforestry is a dynamic, ecologically based, natural resources management system that, through the integration of trees on farms and in the agricultural landscape, diversifies and sustains production for increased social, economic and environmental benefits for land users at all levels (ICRAF). Yet it is still considered a peripheral activity of agriculture and many farmers and other land users are ignorant of its benefits.

This paper is a guide for policy-makers, advisers and other technocrats who wish to include agroforestry in the national agenda. It aims to assist countries to develop policy, legal and institutional conditions that facilitate the adoption of agroforestry and recognize its contribution to national development.

Part I explains the benefits of agroforestry systems, the necessary conditions for its development, the barriers that have prevented its adoption so far, and the drivers, contextual and internal, that make it possible.

Part II outlines 10 tracks for policy action, which if followed correctly will facilitate the development of national policies designed to promote the agroforestry concept and practices at plot, farm and landscape scale. Illustrated with case studies and examples of good practice from around the world, these guidelines are an invaluable addition to the agroforestry global agenda.

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