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Agroforestry for livelihood enhancement and enterprise development

James M. Roshetko[1,2], E. Nugraha[1], J.C.M. Tukan[1], G. Manurung[1], C. Fay[1] and M. van Noordwijk[1]

Abstract

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. By nurturing trees on their farms, pastures and homesteads farmers have been managing agroforestry systems for millennia. Most smallholder farmer agroforestry systems are diverse, multi-species and integrate trees with annual crops and/or animals. Traditionally, these systems are extensive in nature, with small quantities of many products produced for household consumption. Tree management tends to be non-intensive and largely limited to product harvesting. The advent of market economies and improved rural infrastructure has expanded commercial opportunities to many farm communities. However, traditional tree management often leaves communities ill-equipped to produce reliable quantities of high-quality products that meet market specifications. In addition, a lack of security of land tenure has, in many places, led to a corresponding lack of incentives for farmers to invest in long-term land management improvements. Experience also indicates that farmers lack access to professional technical assistance and have limited linkages to market channels and information. As a result, most farmers do not manage their trees because they are not sure where to focus and what can be sold. A system of technical assistance and innovation is needed to empower farmers to seize market opportunities by enhancing and diversifying the productivity and profitability of their agroforestry systems. This paper presents an integrated approach that emphasises market studies that appraise existing and future demand for products that are, or can be, produced by farmers; recommends farmer group extension to help farmers address market opportunities; and encourages farmer group evolution towards farmer enterprise development when appropriate. Examples of the impacts achieved through implementation of this approach and its components are provided.

[1] World Agroforestry Centre (ICRAF). Email: <j.roshetko@cgiar.org>.
[2] Winrock International.

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Wanatani sebagai matapencaharian tambahan dan pengembangan usaha

James M. Roshetko[1a,2a], E. Nugraha[1a], J.C.M. Tukan[1a], G. Manurung[1a], C. Fay[1a] dan M. van Noordwijk[1a]

Abstrak

Wanatani adalah sistem pengelolaan sumber alam berdasarkan ekologi yang dinamik melalui penggabungan pepohonan pada lahan perkebunan dan pertanian, keanekaragaman produksi berkelanjutan untuk menambah keuntungan dalam penggunaan lahan di segala tingkat social, ekonomi dan lingkungan. Petani telah melakukan pengelolaan sistem wanatani dengan memelihara pepohonan di kebun, lahan penggembalaan dan halaman rumah selama ribuan tahun. Petani usaha kecil kebanyakan menggunakan sitem wanatani beragam, multi-spicies, dan menggabungkan pepohonan dan/atau ternak yang dapat di ambil hasilnya tiap tahun. Secara tradisional, sistem ini meluas secara alami. Dalam jumlah kecil banyak hasil yang dihasilkan untuk konsumsi rumah tangga. Pengelolaan pepohonan cenderung untuk produk yang dapat dipanen dalam keterbatasan peningkatan dan perluasan. Terciptanya ekonomi-pasar dan membaiknya sarana di pelosok telah memperluas kesempatan komersial bagi banyak petani. Akan tetapi, pengelolaan pepohonan secara tradisional sering meninggalkan masyarakat tak berbekal untuk dapat menghasilkan produk dalam jumlah yang memadai dan dengan kwalitas tinggi yang memenuhi spesifikasi pasar. Selanjutnya, keamanan dalam kepemilikan lahan, di banyak tampat, berakibat pada semangat bagi petani dalam melakukan peningkatan pengelolaan lahan jangka panjang. Pengalaman menunjukkan bahwa petani tidak mendapatkan bantuan tehnis profesional dan keterbatasan hubungan dengan jaringan pasar dan informasi. Sebagai hasilnya, kebanyakan petani tidak memelihara pohon mereka karena ketidakyakinannya pada fokus kerja serta apa yang dapat di jual. Sistem bantuan tehnis dan inovasi perlu memberikan kuasa pada petani untuk diberi kesempatan menguasai pasar dengan menambah dan meragamkan produk/keuntungan untuk sistem wanatani mereka. Presentasi ini merupakan penggabungan pendekatan yang ber emphasi pada study pasar serta analisa yang dapat menyebar luaskan permintaan akan barang yang ada dan yang akan datang yang dapat di produksi oleh petani, kelompok tani yang menunjuk pada bantuan dalam menangani masalah kesempatan pasar, dan evolusi kelompok tani menuju pengembangan usaha tani apabila mungkin. Contoh dampak yang dihasilkan melalui implementasi pendekatan ini dan komponennya disediakan.

Introduction

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 2006). Agroforestry systems may be defined as land-use systems in which woody perennials (trees, shrubs, palms, bamboos) are deliberately used on the same land management unit as agricultural crops (woody or annual) and/or animals in some form of spatial arrangement or temporal sequence (Huxley and van Houten 1997). For millennia, farmers developed and managed agroforestry systems by nurturing trees on their farm,

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pasture lands and homesteads. Traditionally, these systems produced a wide variety of products—timber, fuelwood, fruits, vegetables, spices, resins, medicines, etc.—primarily to meet household needs but also to generate some income through sales in local markets. Declines in the area of forests, the advent of market economies, and improvement of rural infrastructure have opened commercial opportunities for farm communities to expand or intensify their agroforestry systems. This type of process has been documented in Bangladesh (Byron 1984), Sri Lanka (Gunasena 1999), North Mindanao, the Philippines and the highlands of Kenya (Place et al. 2002). In Indonesia the following commodity-oriented agroforestry systems have evolved: *repong damar* system (Krui, Lampung), jungle rubber system (Jambi and South Sumatra), tembawang fruit and timber system (West Kalimantan), pelak cinnamon system (Kerinci, Jambi), durian fruit garden (Gunung Palung, West Kalimantan) and parak fruit system (Maninjau, West Sumatra) (de Foresta et al. 2000).

Market opportunity and willingness to establish agroforestry systems does not always translate directly to technical capacity and success. Although market-oriented agroforestry systems have developed in many areas, there are a greater number of areas where such systems have not yet developed. Our experience indicates there are a number of factors that might stifle the development of smallholder agroforestry. In many areas smallholder farmers have little experience with intensive tree planting; and little access to technical information and germplasm (seed or seedlings). In Central America, the Caribbean and Kenya, Scherr (1995, 1999) identified the following conditions that favour the development of successful smallholder agroforestry systems: available planting material of species that are appropriate for the site and agroforestry system, experience with tree planting and management, and accessible markets. Potter and Lee (1998) found that the ability of smallholders to plant trees or expand traditional tree-based systems is limited by resource scarcity, absence of technical capacity and experience, and market and policy disincentives. In Lampung, Indonesia, a team of socioeconomic, forestry, horticulture and livestock specialists determined that smallholder agroforestry systems and the productivity of those systems are limited by a lack of technical information, resources and consultation (Gintings et al. 1996). Across South-East Asia, smallholders' tree planting activities are often restricted by limited access to quality planting material, poor nursery skills and a dearth of appropriate technical information (Daniel et al. 1999; Gunasena and Roshetko 2000).

Quality germplasm of appropriate species is an important innovation and intervention, particularly for smallholders farming marginal lands, who have low capacity to absorb high risk and few resource options (Cromwell et al. 1993; Simons et al. 1994). In South-East Asia quality tree seed is most often controlled by the formal seed sector (research organisations, government agencies and forest industry), to which smallholders have little access (Harwood et al. 1999). Efforts must be made to link smallholders with these sources of quality germplasm and expand smallholder access to a wider range of species that are suited to the biophysical and socioeconomic conditions they confront. This should include developing farmers' tree propagation and tree nursery management skills. Training and participatory nursery development are proven methods of building farmers' awareness, leadership, technical skills and independence regarding germplasm quality, production and management capacity (Koffa and Garrity 2001; Carandang et al. 2006).

Most smallholder agroforestry systems are characterised by limited proactive management and planning. Spacing is irregular and species components often primarily the result of chance (Manurung et al. 2005; Michon 2005). Harvesting products is often the most common management activity, with minimal weeding to control herbaceous and woody competition. As a result, the quality and quantity of products may be far below the system's potential. The productivity of most smallholder agroforestry systems can be improved by enhancing smallholder management skills. Key skills include: species selection for site; identifying tree farming systems that match farmers' land, labour and socioeconomic limitations—including annual crops, tree crops, intercropping and understorey cropping options; tree management options to produce high quality products; pest and disease management; and soil management. Efforts should seek to develop a range of deliberate management techniques for trees and systems that enable farmers to produce quality products for specific market opportunities.

Smallholders generally have weak market linkages and poor access to market information (Hammett 1994; Arocena-Francisco et al. 1999). Working in the Philippines, Predo (2002) found that tree farming

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was more profitable than annual crop production, but uncertain marketing conditions deterred tree planting. The existence of accessible markets for tree products is a vital criterion for site selection (Scherr 1995, 1999; Landell-Mills 2002); otherwise, the development of economically viable systems is doubtful.

In summary, the following factors seem to have strong bearing on the successful development of market-oriented smallholder agroforestry systems: (i) secure land tenure/use conditions; (ii) supportive policy conditions; (iii) access to and knowledge regarding the management of quality germplasm; (iv) tree management skills and information; and (v) adequate market information and linkages. The first two factors (land tenure and policy support) are basic enabling conditions, required to facilitate the development of smallholder systems. Developing supportive tenure and policy conditions often requires broad-based negotiations that include participation from local, regional and national governments as well as the private sector and community organisations. A central part of such negotiations is determining just what environmental services require careful regulation (Fay and Michon 2005). Successful negotiations lead to consensus land management agreements and natural resource security for local farmers. The other three factors (quality germplasm, tree management and market linkages) are technical issues that can be effectively addressed at the local level by government extension agencies, non-government organisations (NGOs), farmer organisations or individual farmers.

The World Agroforestry Centre and Winrock International have worked on these three technical factors in South-East Asia since the early 1990s. Our experience indicates that these factors can be successfully addressed through a replicable and efficient extension approach designed to reach motivated and innovative farmers who are committed to improving their incomes by increasing production and market access for their agroforestry products (Roshetko et al. 2004a). The approach includes emphasis in three components: market studies and analysis to appraise the existing and future demand for products that are or can be produced by farmers; farmer group extension to help farmers address market opportunities; and farmer group evolution towards farmer enterprise development when appropriate. These three components are interdependent and conducted simultaneously, with technical assistance and farmer group development based on market opportunities. This paper documents our experience with this approach and its three components.

Market studies and analysis

Experience in Indonesia indicates that farmers generally: (i) lack access to market information (product demand, specifications and prices); (ii) lack understanding of market channels; (iii) produce products of unreliable quality and quantity; (iv) rarely engage in grading or processing to improve product quality (and their profit margin); and (v) sell their products as individuals (not through groups to achieve economies of scale). These conditions also have negative consequences for market agents. They spend a lot of time and resources searching for, collecting and sorting smallholder products to get a sufficient quantity of mixed quality. The time and effort of engaging farmers is a main reason given by market agents to explain why farmers are paid low rates for their products (Roshetko and Yulianti 2002; Tukan et al. 2006a). In order to enhance farmers' livelihoods and develop agroforestry-based enterprises, the shortcomings mentioned above should be documented and then addressed.

In our approach we conduct market surveys using a rapid survey format modified from ILO (2000) and Betser (2001) to identify and understand: (i) the agroforestry species and products that hold potential for farmers (their specifications, quantities, seasonality and the like); (ii) the market channels that are used and hold commercial potential for smallholder products; (iii) the marketing problems faced by farmers and market agents; (iv) the opportunities to improve the quantity and quality of farmers' agroforestry products; and (v) market integration (through vertical price correlation and price transmission elasticity) and efficiency.

We start with informal visits to make observations in the study area and hold discussions with farmers and other stakeholders. The information from these visits and knowledge gained from relevant secondary information is used to customise the market survey. The survey is then conducted with farmers, market agents and other key stakeholders within the project area. The information provided by each respondent is followed through the market chain to the end consumer until information concerning the market channel is complete. The information gathered is cross-checked with direct observation and informal

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discussions with relevant respondents and different groups of stakeholders in the project area. The cross-checking process continues until the information gathered is clear and consistent, and no new information is found. A draft summary of the information is then shared with stakeholders in a formal meeting or workshop. This provides opportunity for additional cross-checking with individual and groups of stakeholders. Any inconsistencies or gaps in the information are identified and addressed through further field investigation. Once these questions are answered the summary of 'farmer marketing conditions and priorities' (priority species, marketing channels and agents, farmers' market roles, marketing problems and opportunities) is finalised. At this point, work plans are developed to identify what actions farmers, market agents and other stakeholders agree to take to improve the production and marketing of smallholder products.

Our approach is an iterative process. It utilises relevant information gathered from participatory appraisals (both individual and group discussions) with various stakeholders, direct observation, detailed surveys and secondary data sources. Its iterative feature and the utilisation of multiple sources allow all the information and data to be reviewed and checked for accuracy. Appropriate planning is a prerequisite for successful implementation of the marketing approach as well as for each component activity.

Farmer group extension

The farmer group extension approach seeks to empower motivated farmers to enhance and diversify the productivity and profitability of their agroforestry systems to seize market opportunities, both existing and developing. This approach can also be used with NGOs. Initial training is provided to farmer or NGO leaders so that they may: (i) analyse existing conditions and problems; (ii) identify technical options; and (iii) set work agendas. According to work agendas, more intensive follow-up assistance is provided to farmer groups that these leaders have helped organise. The approach is flexible and dynamic, adjusting to the actual conditions of the target communities. It is also informal, practical, impact-oriented and focused on priorities identified by target communities. To avoid wasting resources and time, efforts are made to keep the structure and process of the farmer group approach simple and straightforward.

Farmer leader training workshops focus on species, systems, problems, markets or other priorities. Common topics include seedling propagation and nursery management, tree and agroforestry system management, farmer–market linkages and farmer-operated commercial enterprises. Training events are participatory and typically planned and conducted in the following manner: After initial discussions, staff develop a training curriculum that is then reviewed by farmer leaders. During the events, staff or other resource persons provide relevant background information and then facilitate discussions. Working group sessions are held for farmer leaders to share and compile their experience and knowledge on relevant topics. Working groups then report to all participants in a plenary session. Practical sessions are common. The training events build the technical capacity of farmer leader participants. More importantly, the training exposes leaders to new ideas and helps them recognise the depth of their own knowledge and the capacity they can offer to local community development. The training is very valuable in motivating the farmer leaders and helping them identify appropriate local priorities. The development of draft work plans is an integral part of each training event.

Following training workshops, staff assist farmer leaders or NGOs to: (i) share the workshop ideas and results with a greater number of farmers, and (ii) review, revise and implement the work plan drafted at the workshop. These follow-up technical assistance activities may include farmer meetings, mini-training, and field implementation such as nursery construction and operation or farmer demonstration trial establishment and management (Roshetko et al. 2005). The activities are mutually supportive and integrated so that the objectives and topics of each activity are relevant to the objectives and results of earlier activities. The follow-up assistance forms a continuous flow of contact and activities between the farmer groups and staff. Activities are implemented through three main channels: (i) staff facilitating and monitoring progress towards achievement of farmer groups' objectives on a periodic (monthly, bi-weekly) basis; (ii) staff and other technical specialists (including market agents) providing subject-specific technical assistance as requested by farmer groups; and (iii) farmer-to-farmer and farmer group-to-farmer group technical assistance on an informal basis, with facilitation by staff (see Figure 1).

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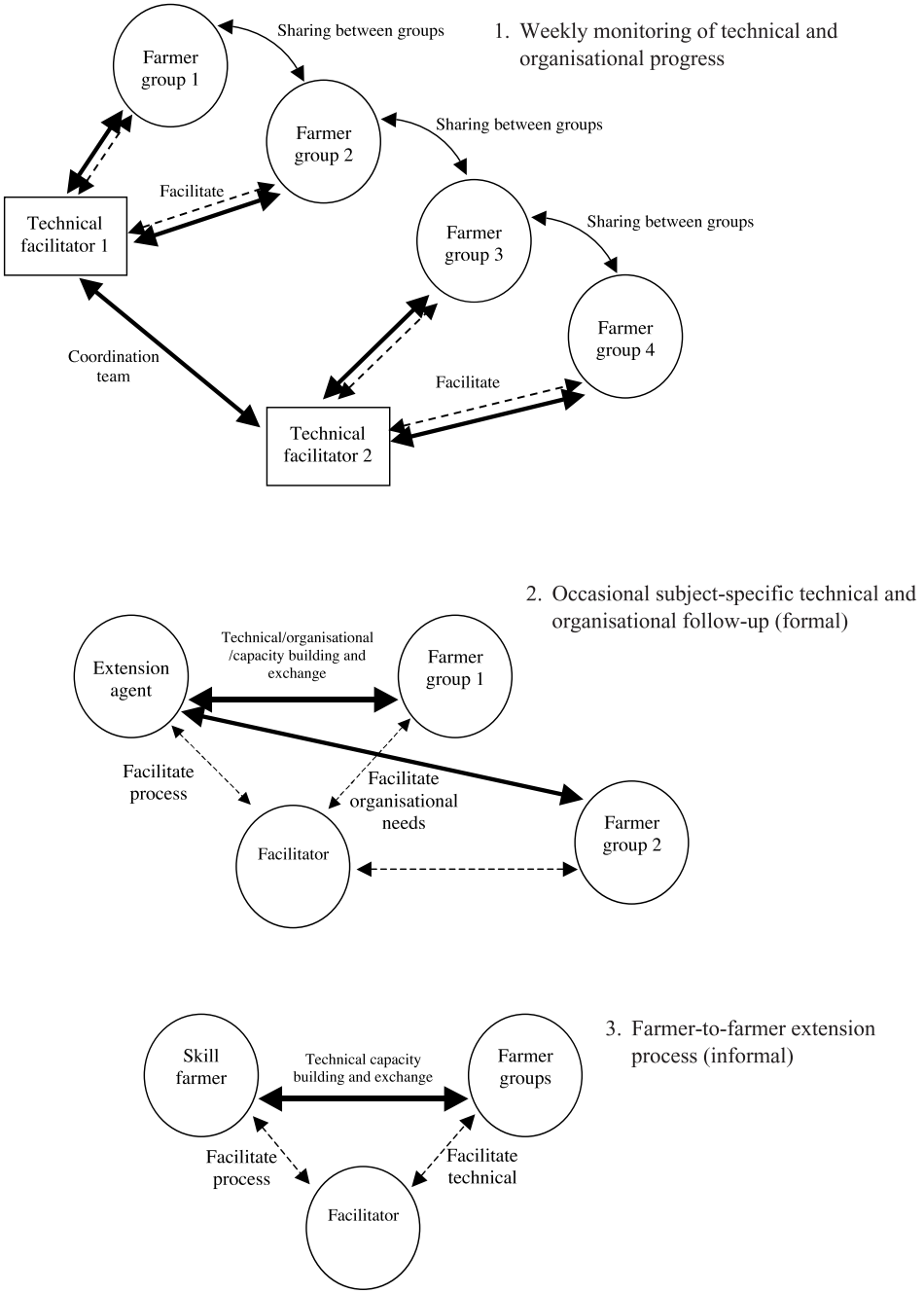

Figure 1. Channels to implement farmer group extension activities

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The first channel assures frequent contact, enabling staff to assist farmer groups to concentrate on their objectives and plans, monitor and gauge progress and, if necessary, change their objectives. The second channel enables staff or other specialists to provide technical assistance related to previous activities or new topics requested by the group. These two channels allow staff to assist farmers develop their organisational capacity and provide opportunities to coordinate activities between farmer groups; they are important early in a program or series of activities. Experience indicates that the greatest impact is achieved through the third channel, farmer-to-farmer and farmer group-to-farmer group technical assistance. Farmer specialists are farmers themselves and intimately understand the conditions and concerns of fellow farmers. Their language and communication style is readily understood by the farmer participants. More comfortable under such conditions, farmer participants ask questions and offer their own experience more often when farmer specialists are leading sessions. Active farmer participation leads to greater learning and sharing of knowledge. In the third channel staff retain a role in providing technical input, but their main role evolves to facilitating the extension process. A key function of staff is to identify additional local 'farmer specialists' and communities where successful 'farmer-based enterprises' are located. Identifying these farmer specialists leads to a strong network of farmers, farmer groups, technical specialists and related institutions—including market agents.

The third channel and resulting farmer network can lead to spontaneous farmer adoption, spontaneous farmer-to-farmer extension and expansion of the farmer network. This may be the single greatest impact of the approach. For example, in Nanggung, West Java, the International Centre for Research on Agroforestry (ICRAF)/Winrock team helped strengthen or form eight farmer groups that established eight tree nurseries. As the success of program activities was recognised, farmers from neighbouring areas sought help from ICRAF/Winrock, but also directly from the program farmer groups. Those farmer groups helped neighbouring communities develop eight subgroups and provide technical assistance, resulting in the establishment of an additional 38 group and individual nurseries. Using their own funds, some farmer groups even hired farmer specialists to provide training.

Box 1. Farmer groups achieve impact

Focusing on farmer groups or NGOs is an appropriate method to make efficient use of resources, reach a large number of farmers and promote the development of agroforestry-based enterprises. However, it is important to remember that the development or existence of 'farmer groups' is not an objective in itself. Farmer groups are an avenue to reach farmers, implement activities, affect change and achieve planned-for objectives. Farmer groups often change and may be ephemeral. Members come and go. The farmer group exists to serve the needs of the farmers—not the project, program or an outside institution. Successful farmer groups may disappear after farmers have learned all they can under group conditions. At such times it may be more appropriate for farmers to focus on individual action. Effort should not be wasted trying to maintain a farmer group that has served its purpose or is not a cohesive unit.

Farmer group evolution towards farmer enterprise development

The implementation of *market studies* and the *farmer group extension* components build farmers' awareness of market conditions, enhance their technical skills, and strengthen or form community-based farmer groups. The development of market awareness, technical skills and a farmer group all facilitate the development of farmer-based enterprises. But what is an enterprise? An *enterprise* can be broadly defined as any *venture, project, endeavour,* or *activity.* We consider farmer-based enterprises as any activity that contributes to farmers' livelihoods or incomes. We consider the role of ICRAF/Winrock is to assist or empower farmers to expand their activities (enterprises) to achieve improved livelihoods or higher incomes.

Experience indicates that initial efforts to expand farmers' activities/enterprises should focus on:

- improving the quality and quantity of farmers' products through intensification or expansion of their agroforestry system
- improving the quality and value of farmers' products through sorting, grading and packaging
- transforming farmers' products from the raw to the semi-processed state

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- learning about markets (product demand and specification) and developing market access (identifying channels and developing linkages with agents).

The first point represents the intensification of farmers' usual activities. This typically involves the use of more or better agricultural inputs (improved germplasm, fertilisers, pesticides and labour) and, most importantly, better planning to develop and utilise deliberate management regimes that will yield quality products to meet market specifications. The next three points may represent new activities for most farmers, but are well within their capacity. Undertaking these activities also requires more inputs from the farmer—labour, time, capital, skills and planning. This is a significant investment for farmers that will be rewarded with higher incomes. The keys to success are (i) a well planned/executed market study and (ii) expanding farmer enterprises based on the market opportunities identified in the market study.

Any of the four activities mentioned above can be conducted more efficiently by a farmer group united in purpose and social context. Group members can share experience, knowledge, resources and responsibilities related to the enterprise for mutual benefit. It is an appropriate next step for the farmer group to assume a marketing role through proactive and cooperative involvement with willing market agents. This process should start small and gradually expand as the capacity of farmers, program staff and agents grows.

In most circumstances, additional opportunities exist for individual farmers or farmer groups to form businesses or associations that focus on:

- assuming transportation, wholesaling or other mid-channel activities
- processing materials and manufacturing finished goods.

Such enterprises require a profoundly different set of resources, information, skills, planning and capital than are available to most individual farmers or farmer groups. They also require a lot of financial risk. Forming and operating those types of enterprises is not an easy progression and should be carefully evaluated before being pursued. Observation indicates that the development of such enterprises may depend on an outside champion or local leader who is connected and knowledgeable regarding the operation of the enterprise and/or is able to shoulder financial risk. It is advisable that most farmer groups focus on: (i) the capacity to produce reliable quantities of high quality products; (ii) establishment of permanent and profitable market linkages; and (iii) development of sufficient entrepreneurial capacity to assure financial success before considering other enterprises. In other words, mastering the four activities listed previously is a prerequisite before considering forming enterprises that tackle these other activities.

Discussion

ICRAF/Winrock have implemented market analysis, farmer group extension and farmer enterprise development components across a range of locations over different time periods and at various intensities. The components have been used both separately and as a whole approach. The following discussion cites examples of impact where the components and the whole approach have been used by ICRAF/Winrock, or where similar approaches have been applied by associates.

Indonesia has a large area of degraded lands and a long history of both government and privately organised reforestation and tree planting activities. Tree seed is a key input for conducting these activities. With encouragement from government organisations, private seed companies, NGOs and their own activities, farmers often source the tree seed, operating seed collection enterprises at the family or farmer group level. Based on orders for specific quantities and species, farmers collect, dry, clean, grade and even package tree seed. Some individual farmers and farmer groups even plant trees for the purpose of seed production. In the Wonogiri–Ponorogo area of Central and East Java it is estimated that up to 22,500 farmers are involved in tree seed collection activities annually. These farm families earn Rp795,000 to Rp275,000 from their seed collection enterprises; this equals 66–33% of their 3-month dry-season income (Roshetko et al. 2004b). An ICRAF/Winrock survey of associates indicates that 15 of 22 NGO respondents are involved in tree seed enterprises directly or through farmer group partners. In total these enterprises sell 16 tons of seed annually, earning a gross income of Rp36 million (Harum et al. 2006). NGOs consider tree seed enterprises as positive programmatic components that provide tree seed to support their planting activities and income to offset operational expenses. Farmers, farmer groups and NGOs have developed the market awareness,

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technical skills and market linkages to operate viable tree seed and seedling enterprises. ICRAF/Winrock work with these individuals and organisations in Indonesia and the Philippines to strengthen their enterprises. Market information, capital investment, policy support and technical training are the types of assistance these enterprises need to further expand their business (Carandang et al. 2006; Harum et al. 2006).

In Krui, Lampung, farmers have developed an agroforestry system based on the production of the resins damar (*Shorea javanica*), durian (*Durio zibethinus*) and duku (*Lansium domesticum*), and other fruit and timber trees. Over roughly a 100-year period, farmers have developed keen market awareness and market linkages with regional, national and international dealers. Farmers plant and deliberately manage these priority species for products that meet market demand. Farmers' roles includes harvesting, processing and grading fruits and resins. They are rewarded with higher prices for their high quality products (Michon et al. 2000). ICRAF and IRD (Institut de Recherche pour le Développement) have worked with these communities to enhance and document these locally developed agroforestry enterprises.

ICRAF/Winrock implemented all three components in Nanggung, West Java, to help farmers enhance their livelihoods through the development of agroforestry enterprises. Market studies identified a large unsatisfied demand in the greater Jakarta–Bogor area for five varieties of bananas (*Musa paradisiacal*). Results of the study included market specifications for different grades of bananas. ICRAF/Winrock conducted market awareness and technical training for interested farmer leaders in banana production, handling and marketing. We also revitalised farmer groups and conducted mini-training for a larger number of interested farmers. Market agents enthusiastically participated in these activities. Farmers and agents agreed that initial efforts would focus on improving postharvest practices; farmers assuming fruit grading responsibilities; and bananas being sold or purchased by grade weekly at a specific day, time and place. Through these efforts, participating farmers more than doubled their gross income from bananas (from Rp6,500–10,000 to Rp20,000/bunch) without incurring additional monetary costs. Farmers estimated that their involvement with bananas increased by 2 days/week, but the work was done in combination with other farm activities and did not represent an increase in their overall workload. Agents and their staff did spend more time and effort with farmer groups, but their overall workload decreased because they dealt with 'groups' instead of individual farmers, received bananas that were already sorted by grade, and procured larger quantities or better quality bananas (Tukan et al. 2006b). After successfully developing this market link, farmers began to expand banana cultivation focusing on the five priority varieties identified by the market study, and to intensify cultivation according to recommendations made by ICRAF/Winrock (Tukan et al. 2006b). As a result banana productivity (fruit weight per stem) increased by 20–25%. Additionally, deliberate stem management and improved postharvest management increased the portion of farmers' banana crop that met market grade specifications from 50–60% to 85%. As a result of improved banana production, handling and marketing practices, farmers report that their agriculture-based income has increased by about Rp2,161,000/year, representing an increase of 152% (Roshetko and Tukan 2006).

Similar processes have been used at other sites in West Java, where farmer group partners of ICRAF/Winrock have made field visits to study successful farmer-based enterprises. In Purwakarta and Cimande, Bogor district, an agriculture development project implemented by the District Agriculture Office from 1990–94 promoted the production and marketing of mangosteen (*Garcinia mangostana*) and salak (*Salacca edulis*). After the project finished, district agricultural officers and farmer leaders maintained cooperation and forged linkages with regional and international markets. The farmer group enterprise is now well established and operates independently, while maintaining collaboration with the district agriculture officers. In 1998 farmers in Cipaku, Bogor district, developed an enterprise focused on durian production and marketing though the assistance of the Fruit Research Agency in Bogor. A direct market linkage was developed with Jakarta-based agents, who guarantee a high price for quality fruit. This linkage benefits both the producer (farmer) and agent by avoiding local and district level collectors and agents. Farmers protect this lucrative market linkage by maintaining high-quality products through deliberate management of their durian gardens. Cipaku farmers have also diversified their enterprise by developing commercial tree nurseries that produce high-quality seedlings of durian and

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other fruit species. These farmers have also become technical specialists and been hired by farmer groups in neighbouring villages and by projects in Aceh to provide 'farmer-to-farmer' technical training. Farmers and farmer groups from other parts of West Java frequently visit Nanggung, Purwakarta, Cimande and Cipaku, seeking to duplicate the successful farmer enterprises in those communities. In most cases these individuals and groups lack the knowledge, experience, resources and confidence to start an enterprise themselves. Empowering such farmers and farmer groups to initiate agroforestry enterprises is an important role for development organisations, research organisations, NGOs and government agencies.

Conclusions

Commercial opportunities exist for farm communities to transform their traditional agroforestry systems using market orientation. To achieve this transformation, smallholder farmers must develop intensive, deliberately managed systems designed to yield quality products of priority species that meet market specification. Most farmers are ill-prepared for this challenge because their traditional extensive management approach produces small quantities of many products, primarily for household consumption, and limits market sales. Based on experience at multiple sites in Indonesia, ICRAF/Winrock recommend a replicable and efficient extension approach designed to reach motivated and innovative farmers who are committed to improving their incomes by increasing the production and market access for their agroforestry products. The approach includes three components: (i) market studies and analysis; (ii) farmer group extension; and (iii) farmer enterprise development. Training and activities undertaken in the farmer group extension and enterprise development components are based on market opportunities identified by the market survey. Initial attention is focused on farmer leaders, who then help extend more intensive follow-up assistance to farmer groups they have helped to organise. The approach is flexible and dynamic, adjusting to the conditions of target communities. The approach can also be used with NGOs. The approach defines *enterprises* broadly as any *venture, project, endeavour* or *activity*. Experience shows that farmers are best positioned to enhance their agroforestry-based incomes through the following activities (enterprises): (i) improving the quality and quantity of their products through intensification or expansion of their agroforestry system; (ii) improving the quality and value of their product through sorting, grading and packaging; (iii) transforming their product from the raw to the semi-processed state; and (iv) learning about markets (product demand and specification) and developing market access (identifying channels and developing linkages with agents). These four activities can be efficiently implemented through a farmer group united in purpose and social context. It is a natural next step for the farmer group to assume a marketing role through proactive and cooperative involvement with willing market agents. Program staff have the role of initiating and facilitating the approach and program activities. Farmer leaders, farmer specialists and market agents should be involved in planning and implementation from the start, and in time assume a leading role. Experience shows that farmer leaders, farmer specialists and market agents are keenly interested in the approach. The technical capacity, leadership qualities and confidence built through involvement in the approach benefit these stakeholders and lead to spontaneous farmer-to-farmer extension and spontaneous adaptation of program-promoted technologies by non-program farmers. We suggest that this approach has great potential to strengthen the success of national reforestation programs and environmental service programs through the development of market-based rewards.

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