



គំរោងគ្រាប់ពូជឈើកម្ពុជា
Cambodia Tree Seed Project



#40 Preah Norodom Blvd.
Department of Forestry and Wildlife
Tel/Fax: 023 215034 Email:ctsp@online.com.kh

***Costs, Benefits, and Enabling Conditions
Related to Village Seed Supply Systems***

September 2004

EXECUTIVE SUMMARY

The Forestry Administration, in collaboration with the Cambodia Tree Seed Project has established a number of indigenous tree seed sources throughout the country, and is now in the process of identifying appropriate management and conservation options. Although most seed sources have been established under the management of local levels of the Forestry Administration, participatory approaches are currently being piloted, through Village Seed Supply Systems, in Siem Reap and Koh Kong, and form the focus of this paper.

Local people are often those best placed to manage local resources, and participatory approaches to natural resource management have a potential to contribute both to poverty reduction towards sustainable livelihoods, and sustainable forest management. A number of constraints are identified that prevent the realisation of such potential, as well as issues related to the commercialisation of forest products which have implications for the seed sector, and that require actions by government through a people-centred approach.

The promotion and expansion of Village Seed Supply Systems requires a clear understanding of the distribution of associated costs and benefits according to the roles and responsibilities of the different stakeholders with the organisational structure. The optimal management system will draw on the strengths, whilst minimising the weaknesses of, the range of different stakeholders, which could include the Forestry Administration (Central and Triage levels), the Seed Office, communities, seed users, NGOs and the private sector. It is evident that most of the costs are currently incurred by the supporting agencies.

This document indicates that the participation of villagers in seed source management and forest genetic conservation can significantly reduce the costs of the Forestry Administration, whilst enabling effective management of forest resources through partnerships, and suggests a potential role for the private sector, in carrying further costs and risks. Commercialisation and marketing of quality tree seed alone, is however, likely to raise limited income for villagers, and highlights the importance of widening marketing opportunities to a broader range of forest products, and to adding seed source management and forest gene conservation into ongoing community forestry/development activities in order to secure greater potential for sustainability.

ABBREVIATIONS

AFSC	American Friends Service Committee
BAT	British American Tobacco
CFRP	Community Forestry Research Project
CTSP	Cambodia Tree Seed Project
DfID	Department for International Development
FA	Forestry Administration
FAO	Food and Agriculture Organisation
NGO	Non-Governmental Organisation
NTFP	Non-Timber Forest Product
RGC	Royal Government of Cambodia
RWEDP	Regional Wood Energy Development Programme

Contents

	<u>Page No</u>
Executive Summary	ii
Abbreviations	iii
Acknowledgements	iii
Contents	iv
1. Introduction	1
2. Structure and Roles	1
3. Village Seed supply Systems	4
3.1 Poverty Reduction	4
3.2 Sustainable Forest Management	4
3.3 Experiences of Participatory Seed Source Management	5
3.4 Enabling Conditions	5
4. Seed Commercialisation and Marketing	6
4.1 Impacts of Commercialisation	6
4.2 Evaluation of the Market	6
4.2.1 Seed Demand within the Established Informal System	6
4.2.2 Potential Buyers in a Formalised System	6
4.2.3 Potential Competitors	7
4.3 Product	7
4.4 Roles of the Private Sector	7
4.5 Promotion	8
4.6 Price	8
4.7 Marketing Information Systems	8
5. Costs and Benefits	8
6. Implications for Policy	9
7. Case Study – Establishment of Seed Sources in Krang Chek	9
8. Required Actions for Sustainable Village Level Seed Source Management	10
8.1 Contribution to Poverty Reduction	10
8.2 Seed Source Management	10
8.3 Marketing	11
References	11
<u>Diagrams</u>	
Diagram 1 – Structural Framework for Quality Seed Supply	2
<u>Tables</u>	
Table 1 – Strengths and Weaknesses of the Main Components	3
Table 2 – Conditions Required for the Realisation of Forestry Contributions Poverty Reduction	5
Table 3 – Costs and Benefits of Village Seed Supply Systems	8

1. Introduction

The Forestry Administration (FA), through the Cambodia Tree Seed Project (CTSP), has established a number of indigenous tree seed sources throughout the country, and is now in the process of identifying appropriate management and conservation options. Currently, most of the seed sources are under the management of local levels of the FA, but experience indicates that local people are sometimes better placed to manage such areas.

FA/CTSP is piloting participatory approaches to seed source management in selected locations, as an initial step towards forest genetic resource conservation. Such approaches have potential to contribute to poverty reduction, and improved management of local forest resources. However, a number of constraints are evident, for which a set of actions are identified that require implementation by governmental and non-governmental actors.

In promoting the Village Seed Supply System, a clear understanding is required of the financial, social, and environmental costs and benefits that are incurred and accrued, and how they are distributed between different stakeholders, and within groups of stakeholders. In general, costs and benefits covering seed source establishment and management, resource assessment, marketing, and training, can broadly be assigned to the different stakeholders.

This paper presents the structure for village seed supply systems and their relationship to the Forestry Administration, indicates their potential to contribute to poverty reduction and necessary conditions for it to be realised, describes the types of costs and benefits involved, and outlines the necessary marketing considerations involved in the commercialisation of quality seed and other forest products.

2. Structure and Roles

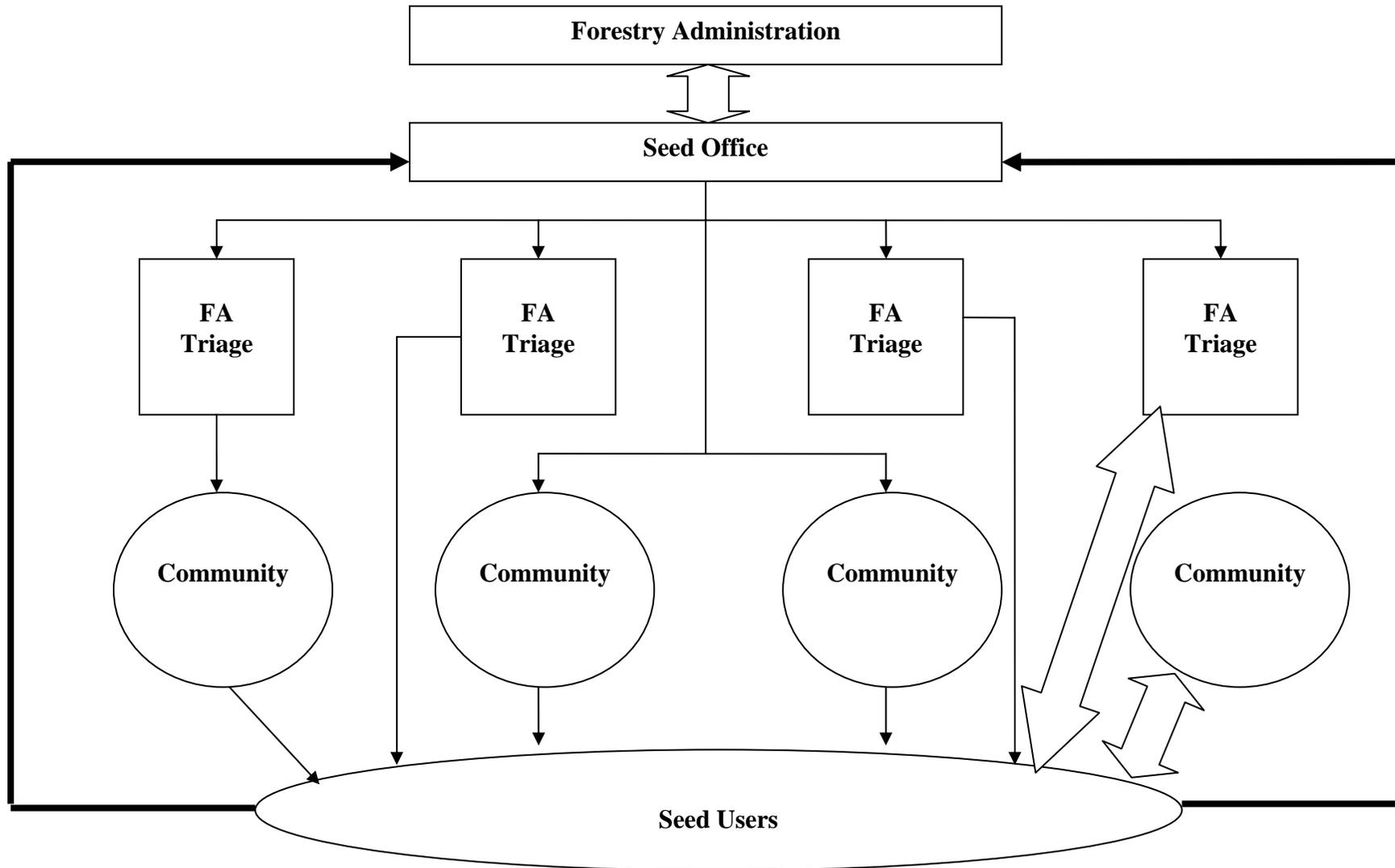
Diagram 1 presents the structural framework for seed supply. It illustrates a range of methods through which seed can be procured, and draws on the strengths of the different actors, whilst minimising their weaknesses, which are outlined in Table 1.

It is the responsibility of the Forestry Administration to initiate the co-ordination of relevant governmental agencies and their land use plans, facilitate fora for discussion with the full range of stakeholders, and to adopt appropriate supportive legislation.

The Seed Office, currently supported by the Cambodia Tree Seed Project, is based at the central level of the Forestry Administration. It provides technical expertise and assistance in the identification and establishment of seed sources, either through the triage, or in response to a direct request from a community. The Seed Office will facilitate the establishment and recognition of a committee responsible for forest management, develop participatory monitoring methods, provide training in seed procurement to community members and triage foresters, certify seed sources, maintain a seed source register, and in the absence of a marketing system will promote and facilitate transactions between seed suppliers and users until a more conducive environment develops for seed marketing. In addition, the Seed Office will be responsible for the development of relevant legal frameworks.

The triage will identify seed sources within its jurisdiction that are appropriate for community management, and will liaise between the Seed Office and community in seed sales. It will be responsible for providing technical support to the community, monitoring the seed sources, distribution of extension materials, and conducting phenology surveys of priority species. In the absence of opportunities for community participation, the triage will undertake the role of seed source manager and in such cases can negotiate directly with the users, or via the Seed Office.

Diagram 1 - Forestry Administration/Village Seed System



The community will manage the seed source, collect and sell seeds, and be supported by the triage or the Seed Office. It will be involved in the process of seed source establishment, including participation in data collection, evaluation of conservation objectives, and monitoring. It can respond to orders through the Seed Office/triage, or can deal directly with seed buyers/users.

Where NGOs are supporting communities, they may have a role in assisting mobilisation, organisation and information dissemination, and training in leadership and management roles. It is envisaged that as a seed marketing system develops, opportunities for private entrepreneurs will open.

Table 1 – Strengths and Weaknesses of the Main Components

	Strengths	Weaknesses
Community	<ul style="list-style-type: none"> - well placed to manage seed sources close to villages - interest in conserving economically/culturally important tree species - income generation through seed sales 	<ul style="list-style-type: none"> - lack of knowledge of marketing and potential seed demand - lack of seed quality controls - extremely weak local organisational structures - limited potential income for villagers
Forestry Administration	<ul style="list-style-type: none"> - formal authority over 40% of land cover - responsibility for forest gene conservation and tree planting - technical expertise - decentralised structure 	<ul style="list-style-type: none"> - lack of financial resources to support centralised system - limited budgets, transport and capacity at the triage level - lack of transparency - potential slow response to seed orders
Seed Office	<ul style="list-style-type: none"> - facilitation of seed transfer between seed suppliers and users - seed certification and legal procedures 	<ul style="list-style-type: none"> - inability to store/transport recalcitrant seeds - non-transparent seed quality
Private Enterprise (future)	<ul style="list-style-type: none"> - communication between seed suppliers and users - rapid and dynamic response to seed orders 	<ul style="list-style-type: none"> - lack of certified dealers and seed - lack of markets - non-transparent seed quality
NGOs (who are already working with communities)	<ul style="list-style-type: none"> - mobilise and organise community - support broader aspects of livelihood improvement through alternate income generating opportunities 	<ul style="list-style-type: none"> - short project time span - sustainability

3. Village Seed Supply Systems

3.1 Poverty Reduction

The main focus of national development plans is the alleviation of poverty. The Royal Government of Cambodia has paved the way for the forestry sector to contribute to these targets through the adoption of strategies for decentralised forest management that promote participatory approaches (RGC 2003a and 2003b).

Participatory forest management has the potential to contribute to poverty reduction towards sustainable livelihoods through increased income from the sale of forest products; improved food security through supplementation with forest foods, and wood fuel for cooking and boiling water; reduced vulnerability through the safety net function of forests; more sustainable use of the natural resource base resulting in improved environmental services; and increased well-being such as self esteem, a sense of inclusion, access to services, and political enfranchisement (Warner, 2000).

As a main goal in attaining poverty reduction, FAO's Forestry Department identifies

“the conservation, sustainable management and improved utilisation of trees and forest systems and their genetic resources” (cited in Warner 2000, p4).

Cambodia's Forest Gene Conservation Strategy notes that

“a strong participatory approach is essential for in situ forest gene conservation, through the integration of conservation and local development efforts” (FA/CTSP 2003c, p18).

Its recommendation expects an increase in utilisation of priority species in tree planting activities, whether within forest restoration and rehabilitation, or on-farm, to contribute to meeting local needs for tree products and services, and to provide cash income from the sale of products, whilst conserving genetic resources.

For seed source managers, guaranteed quality seed will attract a higher market price, and for seed users (including farmers), the use of good quality seed results in a higher rate of germination, thus reducing time and financial resources required in nurturing seedlings. The trees will be faster growing and healthier, with straight stems for good timber, thereby attracting higher prices in the market, and higher NTFP production, which increases income potential.

3.2 Sustainable Forest Management

Forest gene conservation and seed source management are crucial to sustainable forest management as they ensure the availability of good quality seed for tree planting programmes. However, forestry officials at the triage level are often unable to effectively manage forest areas, due to limited budgets, transport, and capacity. In comparison, communities are based close to the forest, and are well placed to manage their local resources.

The participation of villagers in seed source management and forest genetic conservation will significantly reduce the costs of the Forestry Administration whilst at the same time enable more effective management of forest resources through partnership. Clear rights over forest resources can help to resolve local conflicts, assist local development, and provide environmental benefits.

Forest gene conservation incurs a number of costs, in relation to (FA/CTSP 2003c) :

- ◆ planning and administration
- ◆ demarcation and management of *in situ* stands
- ◆ establishment and management of *ex situ* stands
- ◆ establishment and management of storage facilities
- ◆ build up, management and utilisation of collections
- ◆ supportive research and development activities

3.3 Experiences of Participatory Seed Source Management

Village seed supply systems are being piloted in Siem Reap and Koh Kong. Experiences gained are outlined below, whilst the procedure for establishment is detailed through the Krang Chek case study (Section 7). Two types of management are evident within this model, reflecting respective land jurisdiction, namely for those seed sources within natural forests, and those within other common access areas of the village, for example, regenerating forest patches within the agricultural landscape.

Generally, where seed sources are located in areas of natural forest, they are far from communities, and whilst villagers can collect seeds, they have difficulties in protecting the sources due to their remoteness, to disturbance by villagers from communities not involved, or to exploitation by more powerful businessmen. In contrast, forest land closer to communities is more usually degraded, but those areas established as community forests are well protected, as rights of use are secure.

Community participation in the management of seed sources in the natural forest can only be sustained if the villagers themselves perceive clear benefits for their efforts. However, as seed collection occurs once a year (or, for some species, every few years), and the profit relatively small, it is likely to be an attractive option only for a few.

One option to address these issues, where appropriate, is to establish community forests around seed sources. In this way, a buffer of protection wider than the seed source buffer zone is created, additional forest benefits are made available to the community, and scope is provided for the involvement of a greater proportion of the community in sustainable forest management. Seed collection and seed source protection would then be incorporated within a broader range of forest related activities, managed and implemented under the Community Forestry Committee (FA/CTSP 2003d).

Common access areas are often relied upon to provide a range of goods to meet immediate livelihood needs, especially for the poorer segments of the rural population. Where seed sources are established within these areas, it is highly important to develop a management plan to ensure their conservation and regulate seed collection.

Through partnership with NGOs, (such as AFSC in Krang Chek) seed collection is integrated into ongoing community development activities, thereby securing greater potential for sustainability. However, successful implementation of the pilot activities requires ongoing support in the clarification of legal frameworks, land tenure and use rights, forest demarcation, seed certification, training for villagers and local levels of forest administration, and the establishment of a marketing system.

3.4. Enabling Conditions

A number of constraints can be identified that prevent the realisation of the potential of forestry related activities to contribute to poverty reduction and sustainable livelihoods. They require actions by government, through a ‘people-centred’ approach, as listed in Table 2 (based on FAO/DfID 2001).

Table 2 – Conditions Required for the Realisation of Forestry Contributions to Poverty Reduction

Constraint	Enabling Conditions
Insufficient rights to manage forest resources	<ul style="list-style-type: none"> - secure tenure/use rights - strengthen rights, decision-making and governance for local control of forest resources - supportive legislation and regulations - devolution of responsibilities - access to, and transparency of, information on forest resources
Forest product dependence may turn into a poverty trap	<ul style="list-style-type: none"> - measures to protect access to forest products from privatisation and trade liberalisation - support tree planting outside forests - curb regulations that limit the use of forests by the poor - simplified forest management planning and monitoring - assistance out of dependence on forest resources

Poor access to markets, undervaluation of forest goods and services, and capture of valuable forest products by more powerful	<ul style="list-style-type: none"> - eliminate market regulations that discriminate against smallholder production and trade of forest products - recognise the true value of forest goods and services - ensure that markets for environmental services benefit the poor - strengthen producer organisations
Lack of inter-sectoral coordination in poverty reduction policies	<ul style="list-style-type: none"> - local participation in policy development - multi-stakeholder collaboration for a holistic approach to poverty reduction - partnerships between industry and local producers

4. Commercialisation and Marketing

4.1 Impacts of Commercialisation

Although it is the poorer segments of societies that mainly extract NTFPs, Neumann (2000) notes that their economic situation rarely changes even when markets are expanding and prices rising, emphasising the crucial need to overcome the constraints identified in Table 2.

In state managed forests, where access is perceived to be open, there is a strong incentive to harvest products early and in unsustainable amounts, before a competitor. This is likely to lead to the collection of low quality, immature seeds, and the reduced potential for forest gene conservation. However, community managed forests generally operate under agreed harvesting regulations, and therefore, seed quality will be higher.

Commercialisation of forest products provides an incentive for organising and strengthening community action. However, it may lead to increased disputes, privatisation, encroachment by outsiders, dependence on outside institutions, and state interference (Neumann 2000, p22). Careful consideration must be given to such potential outcomes in order to avoid their occurrence, or to minimise their impacts.

4.2 Evaluation of the Market

4.2.1 *Seed Demand within the Established Informal System*

A recent study (CTSP 2003a) identified five main groups of seed users as the Forestry Administration, Royal Cambodian Armed Forces, community groups and farmers, pagodas, and the private sector. However, at that time, it was not possible to estimate demand for seed because none of the users had long term plans for tree planting.

Records kept by the Forestry Administration (FA 2003) list the number of hectares planted, and the number of seedlings distributed to communities, from 1985 – 2002. Within the Forestry Administration, it is not possible to identify trends from the available information, which instead appear to reflect the uncertainty of budget allocations, with no plantings at all in some years. Within the private sector, however, there is a clear increase in seedling production by British American Tobacco (BAT).

The current distribution system operates in an informal manner, with requests made to local forestry officials to source seeds. This work is, effectively, contracted out to villagers, but without assurance of the collection of good quality seeds.

4.2.2 *Potential Buyers in a Formalised System*

In introducing a more formalised system of seed marketing and distribution, it is necessary to evaluate the potential impacts on the current system, and the ability/willingness of the users to pay a higher price for the assurance of a quality product.

BAT are the largest users of seed at the time of writing, with a total nursery capacity of 1.7 million seedlings, supported by long-term plans and budgets. However, in general, it is difficult to determine the potential size of the market, given the lack of planning by most seed users. Although current seed demand has been estimated (CTSP 2003a), it was based on a sample survey, and not therefore, considered appropriate for assessment of future market demand. However, the same source indicated that major seed

users, with budgetary responsibilities, could cover the costs of good quality seed. In the long term, the initial seed investment is considered small in comparison to the better quality, and therefore, higher value of the end product.

Those most likely to buy quality seed will be the private sector interested in maximisation of profits, and donor funded rural projects aimed towards sustainable livelihoods. However, there is a risk that potentially large seed users, such as the Forestry Administration, may not agree to purchasing seed from areas under its overall jurisdiction.

4.2.3 *Potential Competitors*

The main competitors may be those who operate in the current, informal market, collecting low quality seed, which they are able to offer at a low price, reflecting the lower costs of production. The importance of using good seed is evident in the quality of the trees which they produce, a trait not visible for a number of years, and highlights the need for certification of good seed sources.

4.3 Product

Within each seed source, assessments of seed availability are required to determine the amount that can be sustainably harvested, and the amount needed for natural regeneration within the site. This type of information needs to be made available within a register, and catalogues, at the Seed Office. For successful marketing, the seeds must be packaged in an appropriate manner to guarantee certified seed sources as their place of origin.

Potential revenue of a given stand can be estimated, but difficulties arise surrounding the question of the long-term sustainability of that revenue, which in itself is dependent on the responses of seed source managers to price changes, including over-harvesting, or cultivation and domestication (Neumann 2000). In the latter case, the issue of forest genetic conservation is critical, to ensure the availability of seed for infusion into domestication programmes. Revenue of end products can also be affected by substitution by other natural or synthetic products, which in turn may reduce the demand for seed.

It should be noted that the characteristics of some tree seed increase the possibility for market failure. Tree seed is available only at certain times of the year, and for some species the life span of the seed is as short as a few days. The timing of the marketing of different species is therefore, quite crucial, and infrastructure needs to be in place to enable swift transfer of recalcitrant seed, which cannot be stored. Some tree species do not seed every year, they may have limited seed, or may suffer insect attack, all of which limit opportunities for advance ordering, or long-term agreements. Tree seed is a highly non-transparent product, as its quality is not proven for many years.

4.4 Roles of the Private Sector

Marketing networks are highly complex and dynamic. NTFPs are currently marketed in Cambodia through informal methods, sometimes with a lengthy chain of transporters and traders, whose roles within the system need to be fully understood to determine their potential role in seed marketing. A detailed example of the wood fuel marketing network is illustrated in FAO/RWEDP (1998), along with the increase in product prices as they move along the chain.

Middlemen are often criticised for exploiting NTFP collectors, especially in cases where they hold a monopoly on transport and information, and in cases where they act as creditors to the collectors leaving them powerless to gain higher prices. On the other hand, however, middlemen are sometimes in debt themselves, but they also carry costs of seed transport and storage, and risks of price fluctuations and losses of recalcitrant seed.

If, as suggested above, the economic situation of the seed collectors does not improve through marketing, a set of enabling conditions are required to strengthen their bargaining powers in order to redress the inequitable distribution of benefits through the system, whilst acknowledging the important roles of middlemen.

4.5 Promotion

In the absence of a marketing system for tree seed, the Seed Office will assume a role in advertising. It will maintain a register of certified seed sources, and a catalogue of species, locations, availability, and price. Advertising leaflets will be developed for each Village Seed System for distribution and promotion to potential users, which will enable them to procure seed directly from the source.

The market for quality seed is fairly small, potential users have been identified, and can be individually targeted. An advertising campaign would be beneficial in raising awareness of the importance of using quality seed. The Seed Office has conducted such campaigns in the past through TV spots aimed towards farmers, and this experience can be tapped in aiming campaigns towards larger scale seed users.

4.6 Price

Calculation of a competitive price for quality seed needs to consider a number of factors that truly reflect the costs of production, including:

- ◆ seed source establishment and management
- ◆ availability of seed and costs of packaging
- ◆ seed collection equipment, storage facilities
- ◆ labour, skills and experience involved in seasonal seed collection and packaging, and long-term management of the seed source/conservation area
- ◆ quality control, testing and certification
- ◆ transport to markets, and use of private sector intermediaries
- ◆ advertising
- ◆ financing (loan repayments)
- ◆ training in seed collection, storage, marketing, etc
- ◆ record keeping and administration

Not only is the price of seed from well managed sources likely to be high, given the costs listed above, but it will have to compete with that from freely exploited resources. However, quality seed forms one product within the seed source, and it is necessary to widen marketing opportunities to include other forest products, to enable benefits to be maximised.

4.7 Marketing Information Systems

Seed producers should be able to receive regular updates on marketing through the structure defined in Section 2. However, at this stage of development, and the relatively small foreseen range of seed users, marketing information systems are not envisaged as a priority.

5. Costs and Benefits

A range of costs and benefits, to a number of actors, are highlighted throughout this document in relation to village seed supply systems. They are presented here in tabular form for ease of comparison. A number of threats to the village seed system can also be identified, which need to be factored in to feasibility decisions. They include poor planning and lack of demand for quality seed, the risk of trading poor quality seed, the low short-term profit, and unclear benefit sharing (especially at the village level).

Table 3 – Costs and Benefits of Village Seed Supply Systems

	Forestry Administration	Seed Producers	Seed Users
Costs	- seed source establishment - seed certification and quality control - training and extension - technical support - monitoring - advertising and marketing campaigns - species research	- seed source demarcation - seed source management (including monitoring, record keeping and administration) - resource assessment and valuation - seed collection equipment - storage facilities - packaging	- higher price of quality seed - transport

	- administration	- transport - benefit distribution	
Benefits	- improved management of the forest resource through partnership - significant reduction in costs of forest management - improved environmental services	- secure access to resource - income from seed sales - improved community organisation - improved self esteem - enhanced capacity (eg. forest skills, management, organisation) - market access for other forest products - reduced local conflicts	- lower overall expenditure on planting programmes - higher market prices of high quality end product

6. Implications for Policy

In Cambodia, a range of governmental sectors have an interest in tree planting and NTFP production, for example, agriculture, rural development, fisheries, health, energy, and municipal offices (FA/CTSP 2003b). To ensure successful tree planting programmes and the production of high quality end products, the use of quality seed is essential.

Harmonisation of sectoral policies is necessary to ensure that these needs for good seed are met, that forest genetic resources are conserved for future tree planting programmes, and a holistic approach to poverty reduction through the realisation of forestry related contributions. Policy development should address the current constraints faced by villagers, and the enabling conditions identified in Table 2, to ensure that tenure policies decentralise resource management and encourage people's participation in sustainable forest management.

Recognition must be given to the importance of NTFPs within the national economy, in order to gain higher levels of support for policy development and implementation. The real economic value of NTFPs is generally higher than their financial value within markets, but the adoption of appropriate methods for assigning values to resources enable comparisons of the benefits of conservation measures with costs incurred if such measures were not undertaken.

The higher cost of quality seed source management is reflected in a higher market price in comparison to freely exploited seed. In addition, seed sales are expected to offer limited income potential for villagers. Quality seed could be made more competitive through subsidy. A viable alternative would be to promote the use of, and markets for, a wider range of NTFPs, which could also be managed in and around the seed source. Opportunities for additional income generation would be greatly enhanced through partnerships between villages/communities, the forestry sector and other agencies that deal with NTFPs, NGOs, and the private sector.

7. Case Study – Establishment of Seed Sources in Krang Chek

The villagers of Krang Chek secured access to their forest resources through a community forestry agreement with the Forestry Administration and Samling Forest Concession Company. An organisational structure is in place, through the establishment of a Community Forestry Committee consisting of 10 members, including 4 women. The villagers receive ongoing assistance from the American Friends Service Committee (AFSC), in natural resource management and community development, and from the Community Forestry Research Project (CFRP) in the establishment of the community forestry, and development of management plans.

AFSC facilitated the collaboration between the villagers and the Seed Office, through an invitation to visit the village and make an assessment of potential for seed source establishment, with the objective of gaining an additional benefit to the ongoing forestry and community development activities.

Preliminary discussions with community representatives were conducted at the time that they were initiating a resource inventory within the community forest. At this time, potential seed stands were identified with participation of the villagers, the triage level of the Forestry Administration, and staff of AFSC and CFRP. Special management requirements for the identified stands will be included within the overall community forestry management plan.

The next step was a participatory land use planning exercise, during which the villagers, with advice from the Seed Office, identified and mapped potential seed sources within and outside the community forest, and locations for agro-forestry development and small-scale plantation of trees considered valuable to the community. Subsequently, the potential seed sources were visited and assessed, resulting in the identification of seed sources for a total of 11 species for which promotional leaflets have been developed for dissemination to seed users.

The costs and benefits of seed source management, and their distribution have yet to be fully assessed against those identified above, although most of the financial costs are incurred by the supporting organisations. However, the villagers of Krang Chek are interested in managing seed sources of species that are valuable to them, whether in terms of economic value or traditional value, many of which appear on the Forestry Administration's priority species list. In conserving the species, they will receive additional benefits from the tree products, such as sales of malva nuts, and high value resin. Some of the seeds will be used in the village for rehabilitation of degraded areas, and private planting.

The villagers have secure rights of use through their community forestry agreement, and customary use rights in common access areas within the village, and they have ongoing support from an NGO with a keen interest to develop alternate income generating opportunities. AFSC have, however, noted that the poorer segments of the population are less likely to participate in forest activities due to their needs to secure their immediate subsistence requirements.

8. Actions Required for Sustainable Village Level Seed Source Management

8.1 Contribution to Poverty Reduction

A number of conditions must be present to realise the potential of the forestry sector to contribute to improved livelihoods. Critical factors for this 'people centred' approach must be addressed by government in order to secure rights, devolve responsibilities, remove barriers to market entry, and ensure inter-sectoral co-ordination for a holistic approach to poverty reduction and sustainable forest management.

Such conditions require a high level of political support, which could be greatly enhanced through recognition of the contribution of non-timber forest products to the national economy. Given that the economic value of NTFPs is higher than their financial market value, some valuations of seed sources is recommended.

8.2 Seed Source Management

To increase its potential for sustainability, seed source management must be integrated into wider forestry related activities. The establishment of a community forest around the seed source offers a wider buffer of protection, and for the village members, secure access to a wider range of non-timber forest products.

A range of different roles could be assumed by the Forestry Administration, communities, supporting organisations, and the private sector, to allow a broad distribution of costs/risks and benefits. Such partnerships would greatly reduce the cost burden of the Forestry Administration whilst improving forest resource management. Based on experiences gained to date, a standard for seed source management should be documented, including cost/benefit sharing.

8.3 Marketing

The market failure should be mitigated. Given authority the Seed Office is well placed to facilitate the transfer of seed between producers and users, whilst promoting the establishment of a formal marketing system. Ongoing quality seed availability requires the networking and full cataloguing of seed sources, and the development of a quality control and certification system. Government subsidies might be a necessity and could be accompanied by a strong advertising campaign to promote the importance of using good seed, and ongoing research into seed demand to ensure availability of the required species.

References

Forestry Administration, 2003, *Cambodia: Forestry Statistics to 2002*

Forestry Administration/Cambodia Tree Seed Project (FA/CTSP), 2003a, *An Assessment of Tree Seed Demand, Future Requirements and Constraints*

FA/CTSP, 2003b, *An Overview of Biodiversity Conservation and Reforestation Activities in Cambodia*

FA/CTSP, 2003c, *Forest Gene Conservation Strategy*

FA/CTSP, 2003d, *Participation of Local Communities in Seed Source Management and Seed Collection*, presented to the Regional Project Management Unit, No 11, Laos, PDR, December

FA/CTSP, 2004, *Concept Paper for Decentralised Joint Forest Management*

FAO, 1995, *Non-Wood Forest Products for Rural Income and Sustainable Forestry*

FAO/DfID, 2001, *How Forests can Reduce Poverty*

FAO/RWEDP, 1998, *Woodfuel Flow Study of Phnom Penh, Cambodia*

Isager, L, Theilade, I, and Thomsen, L, 2002, *People's Participation and the Role of Governments in Conservation of Forest Genetic Resources*, IPGRI/FAO/Danida Forest Seed Centre

Ministry of Planning, 2003, *Cambodia Millennium Development Goals Report*

Neumann, RP, and Hirsch, E, 2000, *Commercialisation of Non-Timber Forest Products: Review and Analysis of Research*

Royal Government of Cambodia (RGC), 2003, *Forestry Law*

RGC, 2003, *Sub-Decree on Community Forestry*

Scherr, SJ, White, A, and Kaimowitz, D, 2002, *Making Markets Work for Forest Communities*

Sunderlin, WD, Angelsen, A, Wunder, S, 2004, *Forests and Poverty Alleviation*

Warner, K, 2000, *Forestry and Sustainable Livelihoods*, in *Unasylva* 51(202): 3-12