

Report on the
Research and Analysis of Available Information
For CDM Forestry Definitions

for the

National Consultation Workshop on Policy Dialogue to
Define
CDM Forest Definitions for Cambodia
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and
Forestry Administration

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Executive Summary

The Cambodian Climate Change Office and the Forestry Administration are working towards determining forestry definitions for CDM forest projects. This research paper was prepared to stimulate discussions and to increase the understanding of the implications of decisions on the types of project eligible.

The objectives of the research were

- To identify CDM eligible areas using forest and land cover use maps
- To provide an overview of the types of afforestation/reforestation (A/R) projects that are currently under implementation, and their links to Cambodia's sustainable development objectives and plans
- To assess the implications of different forest definitions on eligible A/R projects
- To make recommendations for MAFF policy makers

Mapping information, not yet widely available within Cambodia, was based on satellite imagery from the United States Geographical Survey. Data from 1989 and 2003 – 2005 was used to demonstrate comparisons between the different years in assessing land eligibility. However, eligibility does not signify availability, and the importance of further field surveys was emphasised.

National development objectives set the scene for afforestation and reforestation activities within Cambodia. An overview of current afforestation and reforestation activities illustrates the diversity of types of tree planting being implemented through the Forestry Administration, large scale private plantations, smallholder commercial plantations, and through rural populations on public and private land, as well as within community forests and community protected areas.

The forestry definitions that are selected will affect the types of tree planting activities that are eligible under CDM, and it is important therefore to carefully consider the major categories of tree planters, and the types of areas that area eligible. These relationships are identified, demonstrating that high forest definitions will maximise the land area eligible, and will allow for rehabilitation and enrichment of degraded forests, but other activities, such as agro-forestry and some community forestry will not then be eligible if trees planted cannot grow to meet the defined tree height parameter.

The key to CDM eligibility, therefore, is to establish definitions that optimise the eligibility of government afforestation/reforestation priorities and their contributions to national development objectives.

Abbreviations

A/R	Afforestation/Reforestation
ASSDP	Agricultural Sector Strategic Development Plan
CDM	Clean Development Mechanism
CTSP	Cambodia Tree Seed Project
DFW	Department of Forestry and Wildlife
FA	Forestry Administration
FAO	Food and Agriculture Organisation of the United Nations
GIS	Geographical Information System
MAFF	Ministry of Agriculture, Forests and Fisheries
MoE	Ministry of Environment
NGO	Non-Government Organisation
NTFPs	Non-Timber Forest Products
RCAF	Royal Cambodian Armed Forces
UNFCCC	United Nations Framework Convention for Climate Change

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1. Introduction

Having ratified the Kyoto Protocol, the Kingdom of Cambodia is eligible for activities through the Clean Development Mechanism (CDM). The Cambodian Climate Change Office and the Forestry Administration are working towards determining forestry definitions for CDM eligibility (crown cover, tree height, and forest area).

In order to stimulate discussions and increase understanding of the implications of decisions on the types of project, the Cambodian Climate Change Office recognised a need for research and analysis of available information. The following main objectives were identified:

- To identify CDM eligible areas using forest and land cover use maps
- To provide an overview of the types of afforestation/reforestation (A/R) projects that are currently under implementation, and their links to Cambodia's sustainable development objectives and plans
- To assess the implications of different forest definitions on eligible A/R projects
- To make recommendations for MAFF policy makers

This document presents the results of the research and analysis undertaken. Section 2 begins with an overview of maps comparing the base year, 1989, with the present time, in identifying CDM eligible land. This is followed, in Section 3, by an analysis of ongoing tree planting activities within the national strategic frameworks, to identify those suited to CDM. Section 4 considers the implications of forestry definitions on the range of identified afforestation/reforestation activities. Some preliminary recommendations are presented for further consideration in Section 5.

2. Maps and CDM Eligible Land

The basic requirement for CDM forestry projects that land eligible for reforestation must have been cleared before 31st December, 1989, is somewhat difficult to determine based on information within Cambodia, as official Forestry Administration maps are available only from 1992.

The information presented in this document is based on satellite imagery obtained from the United States Geographical Survey. However, it must be noted that this data is not widely available within Cambodia, and is used with permission from Dr. Peter Li, who is currently developing maps for the whole of Cambodia based upon imagery from 1989. These maps should be generally available within the next few months, and will be invaluable in assisting the Forestry Administration in their task.

Figures 1 and 2 show the same area of Cambodia at two different times, Figure 1 indicates land cover in 1989, which can be compared with that in 2005 presented in Figure 2. Figure 1 clearly shows a number of areas that may have been eligible for CDM in 1989 in colours ranging from brown to pink, whereas green indicates vegetation. Whilst Figure 2 shows an expansion of these areas, it can be seen that the seemingly eligible areas in 1989 remain eligible in 2005.

Zooming in to certain areas allows a greater level of detail, as can be seen in Figure 3, where the degree of forest loss becomes more apparent. At a height of 10 kilometres, details of land use become visible.

Figure 1 – Land Cover in 1989

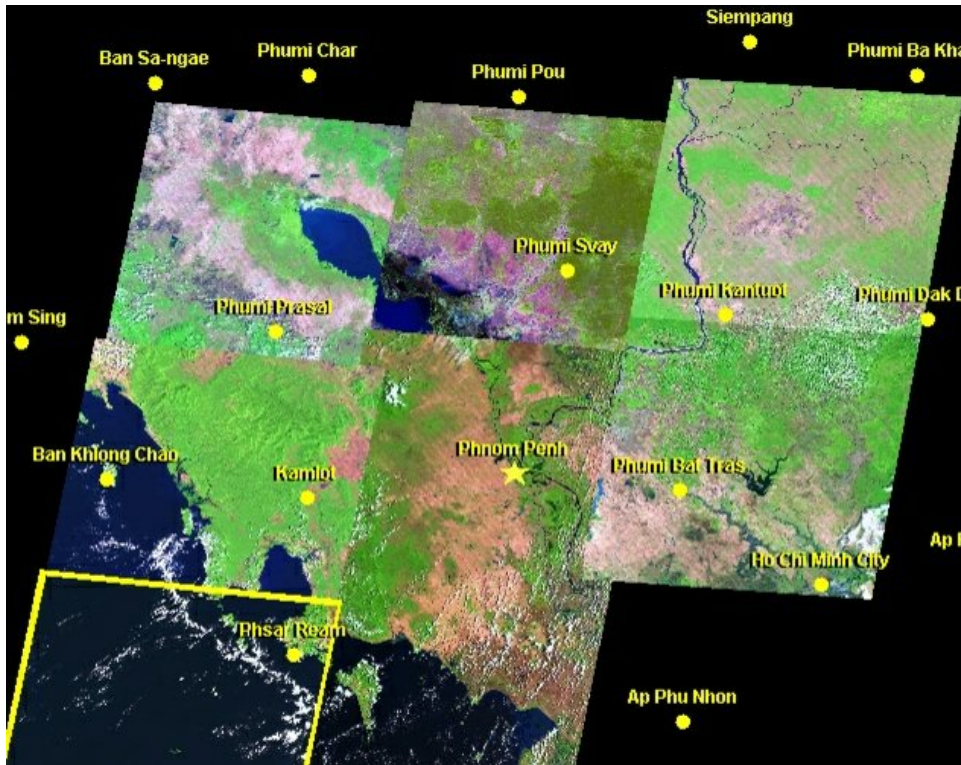


Figure 2 – Land Cover in 2005

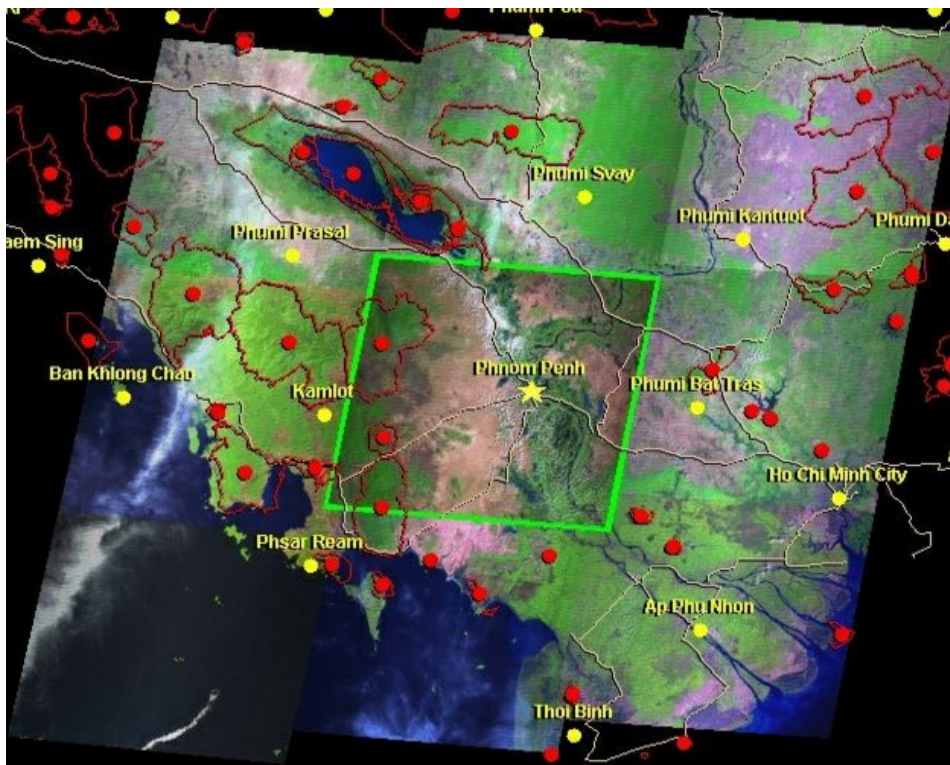


Figure 3 - Detailed Land Cover

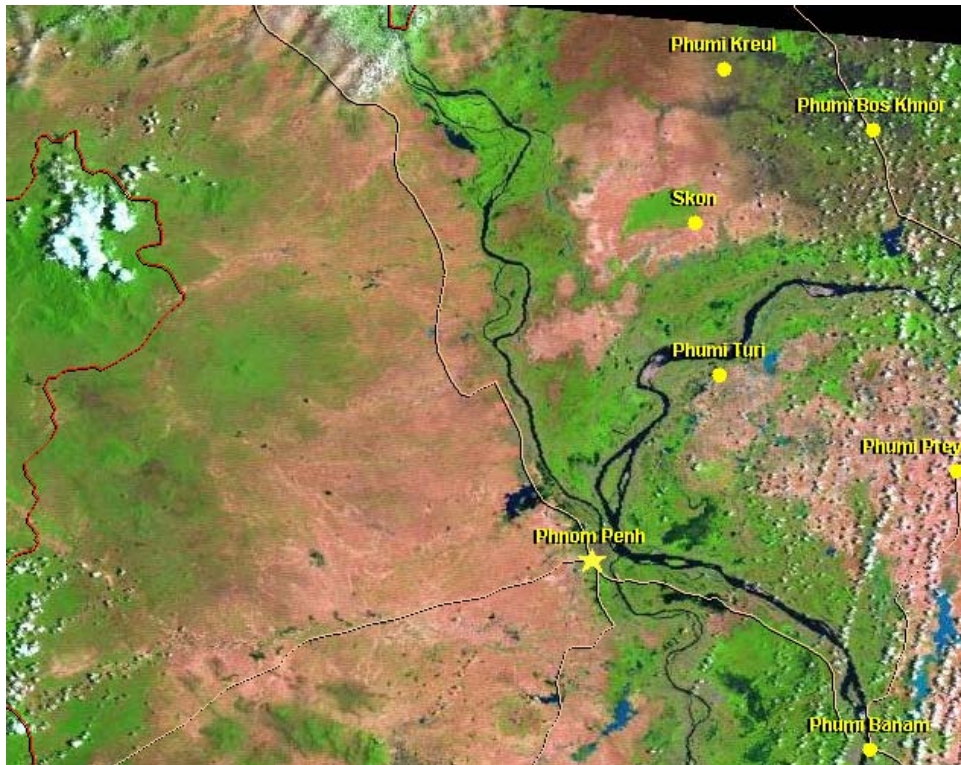


Figure 4 – Detailed Land Use Visible from 10 Kilometres



Figure 4 clearly indicates the layout of rice fields, ponds, tracks, and a water channel. However, there appears to be an area of scrub land towards the north-eastern, which may be eligible for CDM.

However, *eligibility* does not signify *availability*, for example, Figure 2 shows protected areas that may not be available for CDM forest projects. Likewise, land concessions and other types of concession can be added.

Areas appearing eligible in 1989 must, therefore, be thoroughly checked through field surveys to assess major criteria for successful afforestation/reforestation projects. In particular, security of land tenure/use rights is essential, as well as an understanding of the current land use and users, potential conflicting uses, and others outlined within the Guidelines for Site Selection and Tree Planting in Cambodia¹.

3. Afforestation/Reforestation within Cambodia

3.1 National Development Objectives

The strategic considerations of the Royal Government of Cambodia are outlined in the Rectangular Strategy (2004), based upon the National Poverty Reduction Strategy and the Millennium Development Goals, and considerations of international commitments, such as the United Nations Framework Convention for Climate Change (UNFCCC).

Agriculture forms a strategic ‘growth rectangle’ and includes *improved productivity and diversification of agriculture, and forestry reform*.

3.1.1 Agriculture

The overall goal of the agricultural sector is defined as “*poverty reduction and economic growth through the enhancement of agriculture sector development*”². This builds upon the recommendations of the Second Socio-Economic Development Plan, specifically in relation to :

- Crop intensification and diversification
 - cultivation of industrial and commercial crops on idle and scrub lands, such as rubber, fruit, cashew, coconuts and coffee
- Forest reforms
 - community based forestry, agro-forestry and agro-forestry-livestock farming systems, sustainable production of fuel wood, and protection and management of critical watersheds

Regarding afforestation and reforestation, the Agricultural Sector Strategic Development Plan (ASSDP), 2006 – 2010, identifies a constraint as “*little participation from private sector and limited community/government motivation for forest planting and reforestation especially indigenous species*”³.

3.1.2 Forestry

Forestry sector contributions towards national development goals are guided by the Statement of the Royal Government on National Forest Sector Policy (2002), which aims to:

¹ Prepared through consultative processes by the Forestry Administration and Cambodia Tree Seed Project, 2005

² MAFF, ASSDP, 2006 – 2010, p 16

³ MAFF, ASSDP, 2006 – 2010, p 27

- Promote conservation and sustainable forest management
- Maximise contributions of forest resources to socio-economic development
- Maximise involvement of the private sector and local populations
- Implement coordinated multi-stakeholder processes
- Afforest arable land

Forest policy is translated into action plans, which, in specific relation to afforestation and reforestation include :

- Classification, registration, and demarcation of permanent forest estate
- Substitution of timber supply from natural forests by manmade plantations through private investment and public participation
- Promotion of tree planting on private, public and community lands according to needs for end products and long term environmental protection
- Implementation of the forest gene conservation strategy to ensure the availability of quality planting materials and improved reforestation techniques

The natural forest accounts for almost 60% of total land cover, but is under threat from a number of pressures including encroachment, over-logging, land conversion, and other human activities. It is estimated that 60% of all forest land is degraded and in need of rehabilitation⁴, leading to an emphasis on increased tree planting activities within forestry reforms.

3.1.3 Protected Areas

Approximately 18% of the forest area falls within protected areas, and is under the jurisdiction of the Ministry of Environment. The main objective of the Protected Area Action Plan 2004 – 2008, is “*promoting sustainable natural resource management for sustainable development in Cambodia*”.

Each protected area is managed through a zoning system, which allows different levels of intervention. Rehabilitation of biodiversity is possible within the buffer zones but cannot be subject to procurement for private holding. Socio-economic development for local communities can take place within the community zone.

3.2 Current Tree Planting Activities

Forestry reforms encourage tree planting by the Forestry Administration, the Royal Armed Forces, communities and the private sector. Additionally, many trees are planted each year within the agricultural landscape (around rice fields and chamkars, and in home gardens) and public lands (pagodas, schools, and along roadsides).

3.2.1 Agriculture

The cultivation of industrial and commercial tree crops through land concessions, and small scale agro-forestry fall under the Ministry of Agriculture, Forestry and Fisheries. Table 1 presents land concessions allocated by MAFF⁵, but does not indicate the amount of land that has been planted, or the status of production. However, the data source does note land conflicts in a number of these concessions, highlighting the fundamental requirement for land security in identifying such areas.

⁴ DFW, 2001, Second Five-Year Plan for the Forestry Sector, 2001 – 2005

⁵ The legal requirement for concessions is 10,000 hectares

Rubber production is overseen by the General Directorate of Rubber Plantations. Agricultural statistics⁶ suggest that 23,787 hectares are currently productive, whilst an additional 16,010 hectares are too young to be productive, and 17,575 hectares are past production.

Smallholder rubber development is ongoing within family and private holdings of 2 to 500 hectares, and is estimated to amount to 10,000 hectares⁷.

Information relating to agro-forestry is not available, and such systems are not thought to be under implementation within the country, although rural populations do plant fruit trees within homesteads, and on small adjacent land areas. However, agricultural diversification should provide opportunities for joint cultivation of field crops with one or more tree species that benefits farmers by providing regular income from a wider variety of products with different harvesting times.

Table 1 – Land Concessions Allocated by MAFF⁸

Crop	Province	Area (ha)	Total (ha)	Average (ha)
Teak	Stung Treng	7,400	113,252	37,751
		100,852		
		5,000		
Cashew	Pursat	3,000	17,906	5,969
	Kampong Cham	2,400		
	Kampong Speu	12,506		
Oil	Koh Kong	36,700	107,100	21,420
	Sihanoukville	11,000		
	Kampong Speu	23,000		
	Kampot	16,400		
	Rattanakiri	20,000		
Rubber	Kampong Cham	9,900	20,850	5,213
		1,070		
		500		
		9,380		
Acacia / Eucalypt	Koh Kong	60,200	395,028	98,757
	Pursat & K.	315,028		
	Chhnang	10,000		
	Kampot	9,800		

3.2.2 Forestry

Tree planting activities conducted through the Forestry Administration are recorded in annual statistics. The local levels of Forestry Administration also support community forestry and other tree planting activities through the Commune Development Planning process. There appears to be little distinction made, within records, of trees planted by communities within community forest areas, public lands and private/agricultural areas, and therefore, all community level planting will be addressed within this section.

⁶ Agricultural Statistics Sheet obtained from the TWG-Agriculture and Water

⁷ MAFF, 2005, ASSDP, p 7

⁸ Document provided by MAFF to the Technical Working Groups

3.2.2.1 Forestry Administration

Table 2 shows the areas planted since 2001, directly by the Forestry Administration during Arbour Day celebrations, and within Planting Stations; through the Royal Cambodian Armed Forces; and by communities. Whilst data for Forestry Administration and RCAF planting is recorded by area, that for communities is recorded by seedling distribution, and has been converted into hectares assuming that the majority of seedlings planted were acacia and eucalypt, and therefore requiring 2,500 seedlings per hectare⁹. The table clearly shows by far the largest amount of tree planting to be undertaken by communities.

Table 2 – Tree Planting Activities under the Forestry Administration¹⁰

	2001 (ha)	2002 (ha)	2003 (ha)	2004 (ha)
Forestry Administration	869	1,008	1,573	250
Military		195	440	417
Communities	907	942	1,049	1,435

3.2.2.2 Community Forestry

Approximately 260 community forests have been established on 218,647 hectares of forest lands. Although relatively small (less than 2% of the total forest area), community participation in forest resource management is expected to increase.

A small survey was conducted within community forestry areas to gain a better understanding of eligibility of these areas for CDM projects, and to identify preferences for tree planting, both in terms of end uses and planting sites. Table 3 shows the conditions of 13 community forests within 5 provinces at the end of 1989 and at establishment, based on villager testimonies obtained through interviews, and at present, based on observation.

Table 3 contains data on all the forestry definition criteria, indicating all the areas surveyed to be large enough not to be affected by the 'area' criteria. The tree height shows the majority of areas to have been higher than 3 metres in 1989; the height variation over time probably reflects the type of management, for example, pruning or coppicing. Crown cover data suggests that the community forests may have been established in response to a decline of forest resources, and managed through protection and regeneration methods. However, it also indicates that such areas would not have been eligible for CDM forestry projects in 1989.

The survey found a desire for tree planting, both within degraded areas of community forests, and on agricultural lands (small scale plantations and home gardens). Forest products required by respondents were strongly identified as fuel wood (100%), forest foods (100%), timber and other NTFPs (92%), and medicinal plants (31%). These parameters together suggest a potential for small scale fuel wood/multi-purpose plantations, and agro-forestry that may be eligible for CDM projects depending on the availability of non-forest land.

⁹ FA/CTSP, 2005, Guidelines for Site Selection and Tree Planting in Cambodia

¹⁰ Forestry Administration, 2004, Cambodia: Forestry Statistics.

Table 3 – Condition of Community Forests

Village	CF Size (ha)	Year of Establishment	Condition of Community Forests					
			Late 1980s		At Establishment		Now	
			Crown Cover (%)	Tree Height (m)	Crown Cover (%)	Tree Height (m)	Crown Cover (%)	Tree height (m)
Baktra	842	1999	40	3-5	30	1-3	50	10
Kampeng	198	2000	50	3-5	40	3-4	60	10
Bonkong Kmum	299	1999	50	>5	60	1-3	70	4-6
Stung	10	1998	80	20	50	10	60	15-20
Rovieng Tatum	59	2005	70	15	40	9-10	40	5
Kropoeu	99	2001	60-70	15	30	10	50-60	10
Tbeng Lech	210	2000	50	10	30-40	7	60-70	15
O Kombot	145	2004	90	8	50	5	80	6
Bonchosh Thiet	29	2004	60	2	20	1.5	60	2
Tang Bompung	73	2003	80	3	20	1	80	3
Domnak Rolosh	642	2004	50-60	6-7	20	1-2	40	2
Bantaey Angkor	500	1992	30	1-2	0	0	40	>5
Prey Kmao	196	2003	50-60	6-7	20	3	60-65	6-7

An example of a small scale initiative is found at Bantaey Angkor, in Takeo. As indicated in Table 3 it was a plantation established on bare land, which has now reached the end of its first rotation. The community is working with the Cambodia Fuelwood Saving Project to transform the wood into charcoal and wood vinegar.

Benefits of participating in community forestry focus on access to forest products, conservation, and security of land rights, although still, in most cases, use by outsiders and encroachment are considered as main threats.

3.2.2.3 Commune Development Plans

Table 4 provides a summary of Commune Development Plans that prioritised tree planting in 2005. As such, it includes tree planting sites much broader than community forests, for example, within public areas such as pagodas and schools, along roadsides and canals, as well as home gardens. The detailed proposals separate fruit trees into “Agriculture”, and other tree planting into “NRM”.

The seedling requirements of individual communes have been tallied into the provincial totals, and the area of planting calculated as above, ie., 2,500 seedlings per hectare. However, whilst this provides an idea of the area discussed, the data is not detailed enough to determine the proportion of seedlings planted in blocks, such as small plantations, as opposed to those in lines (roadsides and canal sides), or home gardens. Seedling requirements per hectare for different species can be found in the Guidelines for Site Selection and Tree Planting in Cambodia¹¹.

Whilst difficult to draw conclusions at this level, it would be realistic to expect a higher demand for tree planting from communities within forest poor areas.

¹¹ FA/CTSP, 2005

Table 4 – Tree Planting within Commune Development Plans¹²

Province	No. of Seedlings	Area (ha)	Province	No. of Seedlings	Area (ha)
Banteay Mean Chey	85,263	34	Otdar Mean Chey	60,004	24
Bat Dambang	76,728	31	Pailin	700	0.3
Kampong Cham	854,998	342	Phnom Penh	11,755	5
Kampong Chhnang	61,480	25	Pousat	778,751	312
Kampong Spueu	92,160	37	Preah Vihear	1,590	0.6
Kampong Thom	54,994	22	Prey Veang	675,445	270
Kampot	458,833	184	Rotanak Kiri	300	0.1
Kandal	286,244	115	Siem Reab	221,590	89
Koh Kong	72,000	29	Stueng Traeng	300	0.1
Kracheh	76,160	31	Svay Rieng	776,167	310
Krong Kaeb	210,000	84	Takaev	804,224	322
Krong Preah Sihanouk	142,000	57			
Mondulkiri			Total	5,801,686	2,324

Table 5 – Tree Planting in Pursat, 2004¹³

District	Tree Species	No. of Seedlings	Planting Site	Area (ha)
Krokor	Acacia, Sdao	193,350	School, pagoda and along road	77
Bakan	Acacia, Beng Sdao	181,872	School, pagoda and along road and community forests	73
Sampov Meas	Acacia, Beng	19,730	School, pagoda and along road and community forests	8
Phnom Krovanh	Acacia, Beng Sdao	150	along road	0
Kondieng	Acacia, Beng Sdao	7,950	along road	3
Others (NGOs, military ..)	Acacia, Beng Sdao	26,350	along road, military compound	11
Total		429,422		172

¹² Information from Ignas Dummer regarding communes that prioritised tree planting within the 2005 Commune Development Planning process

¹³ Information from Ignas Dummer, DANIDA/CCBNRM

Table 5 presents a more detailed breakdown of tree planting activities in Pursat in 2004. Tree planting took place in public areas, and reflects perceptions of areas considered to be secure over the long term. Unfortunately, there is no breakdown of tree species, but given past experience it is safe to assume that the majority of seedlings were acacia. Other species listed are *Azadirachta indica* (sdao) and *Azadirachta indica* (sdao).

Roadside planting was clearly a major activity in Pursat, and possibly other provinces given the ongoing rural infrastructure developments. Planting along roadsides not only provides shade for road users, but stabilises the edges of the road, thereby preventing erosion. Although accounting for a potentially large amount of tree planting, it is likely to be outside the scope of CDM projects, in terms of crown cover and land area.

3.2.3 Protected Areas

As noted above (Section 3.1.3), tree planting for rehabilitation of biodiversity, and for socio-economic development of local communities is encouraged within appropriate zones of protected areas. The Biodiversity and Protected Areas Management Project, based in the Ministry of Environment is understood to be considering CDM projects within the Protected Area System.

3.2.3.1 Rehabilitation of Biodiversity

Discussions with Conservation International¹⁴ reveal no current plans for reforestation, but suggest that areas within the Cardamom Mountains may be appropriate for rehabilitation, with two options identified. Preliminary mapping analysis suggests that a large area around Chiphat may have been non-forest in 1989, and will be analysed in greater detail for rehabilitation. The second consideration is forest enrichment based on *Aquilaria crassna*, a critically endangered tree species, heavily exploited for its valuable fragrant oil.

Conservation International is keen to examine further the possibilities for CDM forest projects within the Cardamom Mountains, and would be supported by its Centre for Environment Leadership in Business, that has experience of developing projects in Latin America and the Philippines.

3.2.3.2 Socio-Economic Development of Local Communities

About 69 Community Protected Areas have been established throughout the Protected Area System, within 'sustainable use' zones. These are similar in nature to community forests, but are guided by legislation under the jurisdiction of the Ministry of Environment.

Two examples illustrate quite different types of tree planting undertaken by communities; one is in Boeung Per, where indigenous species are being planted into degraded and open areas of the forest. The second example is Bokor, where with support from Save Cambodia's Wildlife, a large degraded area is being planted with acacia¹⁵.

However, given the fact that protected areas were allocated their status in 1993, it may be assumed that they were in good condition at that time, and probably not eligible for CDM projects.

¹⁴ Personal communication with Mr. Jake Brunner

¹⁵ Personal communication with Mr. Sy Ramony

4. Decisions on Forest Definitions

As a host country, Cambodia has authority to define forestry definitions within the ranges provided by UNFCCC. These are :

- Tree Cover 10 – 30%
- Land Area 0.05 – 1 hectare
- Tree Height 2 – 5 metres

The forest definitions that are selected will affect the types of tree planting activities that are eligible under CDM. In setting the definitions, it is important therefore, to consider the major categories of tree planters, and the type of areas that are eligible. Section 3 outlines a number of tree planting activities, which, in the main, fall into 2 categories, of forest enrichment and rehabilitation; and establishment on non-forest land through large scale concessions and small scale community/private based plantations. Preliminary mapping assessments do indicate areas to be eligible, respectively within degraded forest and within the agricultural landscape, but will require further analysis, once the maps for 1989 become more widely available.

A simple assessment of the forestry definitions in terms of their affect on the eligibility of different types of tree planting identified in Section 3 is provided below, and summarised in Table 6.

4.1 Forest Enrichment and Rehabilitation

In 2001, the Forestry Administration estimated 60% of all forest land to be degraded and in need of rehabilitation. Given that forest cover assessment has been based on the FAO criteria of 10%, the CDM definition needs to be set higher to allow degraded forests to become eligible. Care must be exercised in this decision, to prevent areas that then become eligible as ‘non-forest’ from being cleared.

4.2 Community/Private Tree Planting

4.2.1 Community Forestry

Research indicates that community forestry may not be eligible, as in all the areas surveyed, crown cover was greater than 30% in the late 1980s. In areas with lower crown cover, eligibility could be affected by tree height, as the areas surveyed report fairly low tree height, perhaps reflecting the harvesting methods.

4.2.2 Planting in Public Areas

The Commune Development Plans suggest that most tree planting at commune level takes place in public areas; those places considered to have a high level of land security, such as within pagoda and school grounds. Eligibility is not likely to be affected by forest definitions.

4.2.3 Planting Along Roadsides and Canals

This practice seems widespread at the moment due to rural infrastructure development. Its eligibility for CDM will clearly be determined according to the area and crown cover criteria.

4.2.4 Home Gardens and Rice Fields

Many rural people plant fruit trees within home gardens, and around rice fields. Areas within home gardens are likely to be small, and planting around rice fields will require a low forest cover definition.

4.2.5 Agro-Forestry

There is little evidence of agro-forestry within Cambodia at the moment, but there appears to be a high potential, especially in relation to smallholder rubber production, and in the future to mixed cropping systems that allow risks and benefits (income) to be spread throughout the year in reflection of the different harvesting seasons for the different crops. Eligibility of agro-forestry could be affected by definitions for crown cover and tree height.

4.2.6 Small Scale Community/Private Wood Fuel/Poles/Mixed Species Plantations

Approximately 83% of Cambodia's poor reside in rural areas, and these families are heavily reliant on forest resources, especially for food, fuel wood and small-scale timber, for income generation and as a safety net for household subsistence in times of crop failure. This type of tree planting, therefore, offers huge potential for rural livelihoods. Eligibility will not be affected by the forest definitions.

4.3 Large Scale Agricultural Concessions

According to Table 1, agricultural concessions could include tree crops such as oil, cashew, and rubber, as well as teak, acacia and eucalyptus. Eligibility of some crops, particularly oil palm will be affected by the tree height definition.

Table 6 – Criteria Required According to Type of Tree Planting

Type of Tree Planting Activity	Main Criteria for Eligibility		
	Crown Cover	Area	Tree Height
Forest Enrichment and Rehabilitation	High		High
Community Forestry	High		Low
Public Areas			
Roadsides and Canals	Low	Small	
Home Gardens and Rice Fields	Low	Small	Low
Agro-Forestry	Low-Medium		Low-Medium
Small Scale Fuel Wood/Poles/Mixed Species Plantation			
Large Scale Agricultural Concession			Low-Medium

From Table 6, it becomes evident that selection of certain forest definitions will allow only certain types of tree planting to become eligible for CDM projects. This same information is represented in Table 7 to indicate these relationships.

Table 7 – Forest Definitions and Implications for Eligibility

Forest Definition	Eligible Planting Type	Ineligible Planting Type
High crown cover High land area High tree height	Forest enrichment and rehabilitation Small scale fuel wood/poles/mixed species plantation Public areas	Agro-forestry Home gardens and rice fields Roadsides and canals Some community forestry Agricultural concessions
High crown cover	Community forestry	Forest enrichment and

Any land area Low tree height	Small scale fuel wood/poles/mixed species plantation Public areas Agricultural concessions	rehabilitation Home gardens and rice fields Agro-forestry Roadsides and canals
Low crown cover Any land area High tree height	Public areas Roadsides and canals Small scale fuel wood/poles/mixed species plantation	Forest enrichment and rehabilitation Community forestry Home gardens and rice fields Agro-forestry Agricultural concession
Low crown cover Low land area Low tree height	Agro-forestry Home gardens and rice fields Roadsides and canals Small scale fuel wood/poles/mixed species plantation Public areas Agricultural concessions	Forest enrichment and rehabilitation Community forest

5. Conclusions and Recommendations

5.1 Identification of Eligible Areas

5.1.1 *Eligible Areas*

Forest cover maps are not available in Cambodia for 1989, leaving 2 options for determining land eligibility in the base year of 1989.

- Compare the 1986 and 1992 maps and make a judgement on eligibility in 1989
- Wait for a composite map to be developed from landsat data

The second option is under construction by Dr. Peter Li, it will be a 500 resolution map, and will be available within a few months from the Cambodia Firewood Saving Project.

It is recommended

- To maintain contact with Dr. Peter Li in order to follow the progress of development of 1989 data

However, the end decision on the most appropriate maps for CDM eligibility would benefit from inputs from the GIS Office in the Forestry Administration.

5.1.2 *Available Areas*

Eligible areas are not necessarily *available*. One of the largest problems facing Cambodia at the moment, and particularly in terms of long term investment, is that of land security. The Forestry Administration is currently in the process of forest demarcation and management planning, providing an opportunity of ‘on the ground’ identification afforestation/reforestation areas.

It is recommended that

- The identification of areas eligible for CDM forest projects is integrated into the ongoing forest demarcation and management planning process within the Forestry Administration
- *Eligible* areas be thoroughly assessed for *availability*. Guidelines to assist this process are available at the Forestry Administration (FA/CTSP, 2005, Guidelines for Site Selection and Tree Planting in Cambodia).

5.2 Types of Afforestation and Reforestation

Afforestation/reforestation has a central role in national development, whether in meeting commercial (timber), livelihood (agro-forestry, living fences, home gardens, fuel wood, etc), or environmental (watershed protection, erosion control) objectives.

There appears to be a distinction between planting in forests and planting on other lands, which is reflected in the types of tree planting for reforestation (enrichment and rehabilitation), and afforestation (for example, community/private small scale plantations).

A diverse range of tree planting activities was found, but the research results suggest a great potential for small scale community based and private multi-purpose plantations. Community level tree planting currently outstrips government planting, although the individual areas are fairly small. Communities currently have management responsibility for less than 2% of the total forest area through community forestry agreements¹⁶.

Conversely, the Forestry Administration estimates 60% of forest land to be degraded and in need of rehabilitation. Whilst no detailed plans have been prepared for this work, it could be envisaged to include a number of different types of planting activities.

It is recommended to

- Consider appropriate management options for the 60% of forest land in need of rehabilitation
- Further analyse priority accorded to tree planting in commune development plans (these detailed data tables became available too late for full analysis within this report)
- Assess the potential for small scale A/R methodology and/or bundling to allow for small scale projects
- Assess the potential for CDM in shifting cultivation areas (these areas did not appear in this short research study, but are thought to exist in Rattanakiri and Mondulokiri, and maybe some other provinces)
- Consider afforestation/reforestation activities against sustainable development criteria
- Assess forest areas through the process described in 5.1

5.3 Implications of Forestry Definitions

The implications of forestry definitions on tree planting activities are outlined in Table 6. This indicates that adoption of high definitions will maximise the land areas eligible, but will limit the types of planting that are eligible. Likewise, the process of determining forestry definitions will lead to a 'trade-off' in eligible activities. The key to CDM eligibility, therefore, is to establish definitions that optimise the eligibility of government A/R priorities and their contributions to national development objectives.

¹⁶ Forestry Administration, 2004, Cambodia Forestry Statistics

It is recommended that

- A set of scenarios is developed with the Forestry Administration that begin to assess the amount of eligible land according to different crown cover definitions
- Forestry definition decisions carefully consider those afforestation/reforestation activities that best fit national development objectives, the major categories of tree planters, and the locations of eligible and available land
- This process considers the workshop discussion, detailed in the proceedings, around the advantages and disadvantages of adopting the FAO definitions, or selecting a new definition

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