

# Cambodia's forests and climate change: Mitigating drivers of deforestation

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## Abstract

*The United Nations Framework Convention on Climate Change (UNFCCC) is exploring a mechanism to reduce emissions from deforestation and forest degradation (REDD) to address global warming. This represents a major expansion of earlier forest-oriented initiatives under the Clean Development Mechanism (CDM) that focused on afforestation and reforestation activities. While the scope of REDD projects is still being defined, potential categories include conservation, stock enhancement, and sustainable management, creating a range of new opportunities for forest-related climate projects. The core concept behind REDD is that deforestation trends can be slowed, halted, or even reversed conserving billions of tons of carbon that would otherwise be emitted. To succeed, REDD projects will need to control powerful drivers of deforestation and forest degradation operating at multiple levels and carried-out by a variety of actors, from rural people to political and economic elites. This case study of a REDD pilot project in northwest Cambodia explores how drivers might be contained under a project scenario and how the future international articulation of project design parameters could enable or constrain a global REDD strategy. The paper concludes that to be successful REDD projects will require a hybrid approach in which local drivers are controlled by communities and national drivers are mitigated through policy actions necessitating strong partnerships between diverse institutions.*

*Keywords:* REDD; Climate change; Forests; CDM; Deforestation.

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## 1. Introduction

Forests are estimated to generate approximately 17% (Lovera, 2009) of greenhouse gas emissions each year, consequently effective measures to reduce this contribution to atmospheric carbon would be significant. If nothing is done to address this problem some analysts predict that the global economic cost of climate change resulting from deforestation could reach US\$ 1 trillion a year by 2100 (Eliasch, 2008). After several years of debate, starting in Montreal in 2005 (COP 11), the proposed REDD initiative gained further support in December 2007 at COP 13 meetings in Bali. At COP 14 in Poznan, however, indigenous and forest-dependent people raised important questions regarding their forest tenure rights and future benefit flows. Other important technical issues were also raised concerning the quantification of forest degradation,

baseline establishment, and the future financial architecture of REDD. At the upcoming COP 15 in Copenhagen in December 2009, the challenge will be to effectively address these and other key issues.

Emerging REDD agreements and developing carbon markets have generated enormous interest among climate change specialists, with growing attention to potential national REDD initiatives. Special technical committees (SBSTA) operating under UNFCCC processes are focusing on setting standards, with an emphasis on developing procedures for verifying emissions reductions. Far less attention has been given to the fundamental challenges involved in mitigating the impact of powerful drivers of deforestation and degradation operating in developing countries. There appears to be an assumption among some policymakers that a global REDD initiative will create financial incentives that will change forest use policy and practice causing a significant and verifiable decline in GHG emissions from forests. The problem is that the dynamics of deforestation and forest degradation are multiple and highly complex. The 'drivers' operate at a number of levels, influenced by the global economy, regional trade, national

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politics and economy, as well as local land markets, power dynamics, subsistence forest dependencies, population and poverty. As noted by Karsenty (2008), 'Market instruments are very effective tools for achieving specific goals, such as improving efficiency of economic agents, but they will probably be unable to change the socio-political context underlying tropical deforestation'. A recent CIFOR report cautioned: 'REDD policies will be neither simple nor straightforward, given the complexity of the social, economic, environmental, and political dimensions of deforestation. Many of the underlying causes of deforestation are generated outside the forest sector, and alternative land uses tend to be more profitable than conserving forests. REDD policies will have to deal with the fact that institutions for aligning the behaviour of individual economic actors with the public interest are generally weak. . . .' (Kanninen *et al.*, 2007).

Nonetheless, REDD strategies have tremendous promise, if structured appropriately, to enable and finance a broader historic forest transition in the developing world. In Asia, over the past twenty years, a new generation of forest policies has been developed after a century of industrial logging that led to the degradation of hundreds of millions of hectares of once dense tropical forests. One of the prominent approaches is community-based forest management, a model of community resource stewardship that has been widely implemented in Cambodia, India, Indonesia, Nepal, the Philippines and Vietnam (Poffenberger, 2006a). The impact of community forestry (CF) has sometimes been dramatic. For example, in India, by 2006, over 17.3 million hectares or 27% of state forest land, had been formally allocated to 85,000 forest-dependent communities under the national Joint Forest Management scheme, significantly contributing to the stabilization of forest cover in that country (World Bank, 2006). In the Philippines, 37% of public forests have been devolved to approximately 6,000 upland communities under CF management agreements, while an estimated 21% of Vietnam's forests are under the administration of rural communes (Poffenberger *et al.*, 2006b).

After centuries of marginalization, in some countries indigenous and forest-dependent communities are beginning to see their forest rights recognised under newly promulgated ancestral land laws. Community-based forestry has the potential to restore watersheds, conserve biodiversity, improve local livelihoods, and sequester carbon. While huge areas of forests have been devolved to rural communities in Asia over the past twenty years, funding to support these sustainable forest management transitions has been erratic and inadequate. As a result, some of the world's poorest people, dwelling in remote upland watersheds, are struggling to protect and restore local forests with few external resources. REDD programmes could create a framework for financing community-based forest conservation on a global scale and long-term basis, while establishing empirical

methods to quantify and value important environmental services.

The success of REDD will partly depend on policymakers not repeating mistakes made in the design of the Afforestation and Reforestation project parameters instituted under the Clean Development Mechanism (CDM). Lack of project development financing, complex methodological requirements, and rigid eligibility criteria, combined with a highly bureaucratic process for project approval resulted in only three A/R projects being approved by the CDM up to the end of 2008. In addition, past CDM projects focused on plantation strategies which needed to be implemented on a large scale to meet the substantial transaction costs involved in certification. As Skutch (2005) notes regarding CDM rules:

'Forestry is permitted as a sink measure under the clean development mechanism (CDM), but only in the forms of 'afforestation' and 'reforestation'. These tend to involve large-scale plantation systems which, although cost-effective in terms of carbon sequestered, in most cases have very limited benefits to local populations'.

It is important that the rules governing REDD projects under a forthcoming international climate change agreement be rigorously field-tested in a variety of national and sub-national contexts before they are finalized and ratified. Flawed policy and project parameters, once adopted, could constrain the emergence of an effective global forest conservation strategy by frustrating the efforts of communities, civil societies, and national governments through the imposition of bureaucratic barriers, and complex methodological and certification requirements that challenge local capacities and result in high transaction costs.

The many and complex methodological steps that go into the establishment of a carbon baseline, the estimates of leakage, project scenario calculations, and the financial architecture of a REDD project are beyond the scope of this paper. Rather, this paper describes and analyzes the challenges a new generation of sub-national REDD projects may confront as they attempt to mitigate powerful drivers of deforestation and forest degradation that operate in many developing countries.

This paper draws on experiences from Oddar Meanchey Province in northwest Cambodia where one of the world's first REDD projects is under development. The author identified the potential for a REDD project in Oddar Meanchey province in 2007 while directing Community Forestry International's (CFI) support programme in Cambodia. Based on the interest of local communities, NGOs, and the national Forestry Administration, CFI and its partners provided technical support for the design of the project. The project methodology, together with the Project Design Document (PDD), was one of the first REDD strategies to be submitted to the Voluntary Carbon Standard (VCS) for certification, a process that is currently ongoing.

## 2. Case study methodology

The case study presented in the following pages is based on information generated from extensive discussions with local and national stakeholders during the development of the project. The drivers of deforestation and the mitigation activities were identified through a series of social appraisals involving forest dependent communities, local government, Forestry Administration (FA) field staff, and other stakeholders that were conducted in 2008 and 2009. Visits to most of the 13 participating forest blocks and villages, together with in-depth interviews with forest-dependent families and other stakeholders provided insights into driver dynamics. Discussions with the Buddhist monks of Samrong Pagoda and the staff of the Children’s Development Association, both of whom have been instrumental in supporting nascent Community Forestry Management Committees (CFMCs) in the province for the past five years, provided additional historical perspectives on the evolution of CF groups and deforestation issues.

Information presented in the case study is also drawn from field observations and secondary sources.

## 3. Oddar Meanchey REDD project goals

The project is located in Northwest Cambodia’s Oddar Meanchey Province which has experienced some of the most rapid deforestation in that country over the past decade at an average annual rate of 2.1% (see Figure 1). The 68,696 hectare Oddar Meanchey (OM) Community Forestry REDD Project was conceptualized by CFI, a non-profit organization that had supported the national transition to community-based forest management in Cambodia over the past five years. In November 2007, the FA, supported by the joint donor Technical Working Group on Forests and the Environment (TWG-F & E — a multi-donor body), unanimously approved the REDD pilot project in Oddar Meanchey. With the endorsement of the Cambodian Government, a one-year grant from the Danish government,

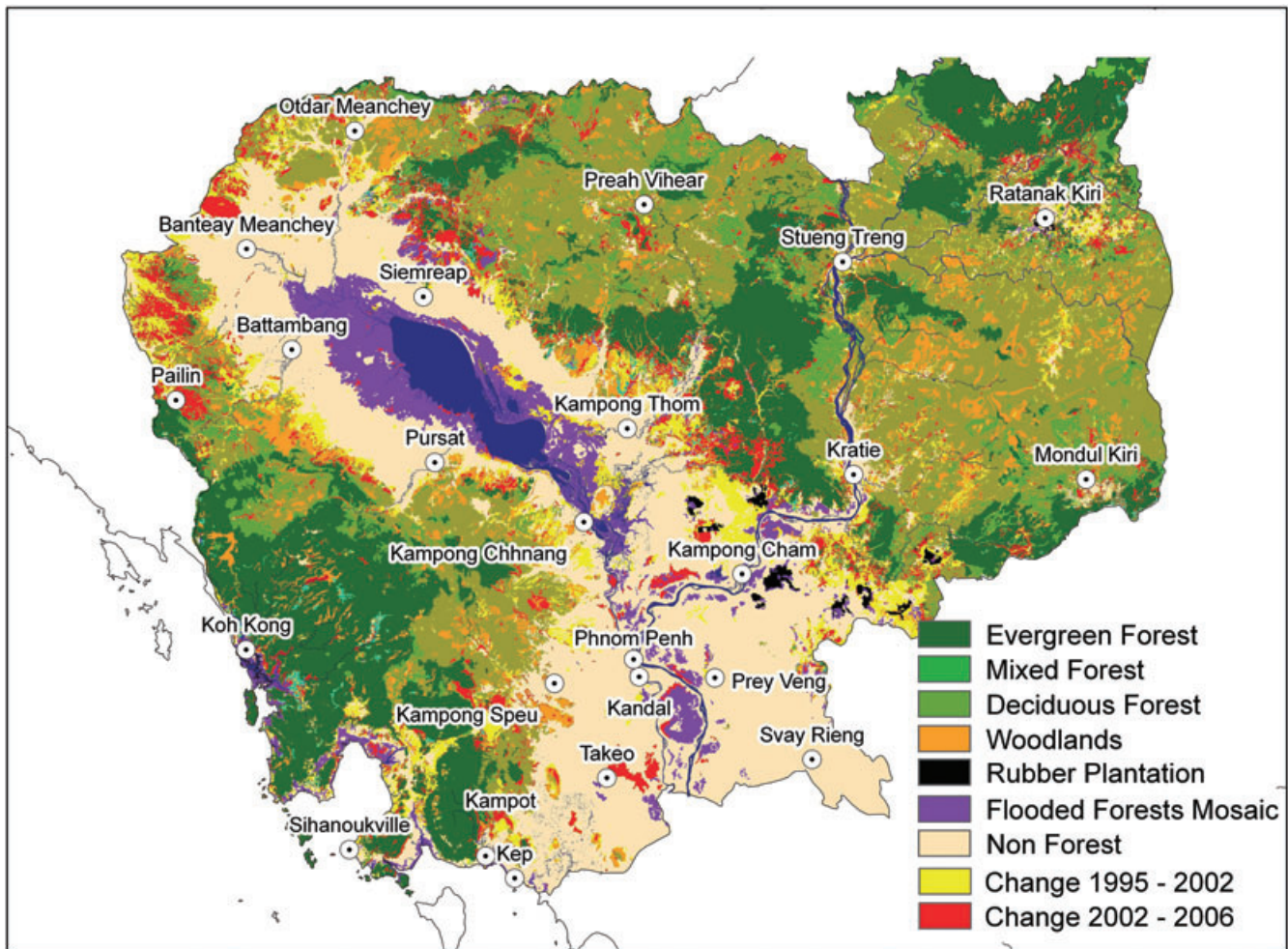


Figure 1. Cambodia forest cover and forest cover change, 1995–2006.

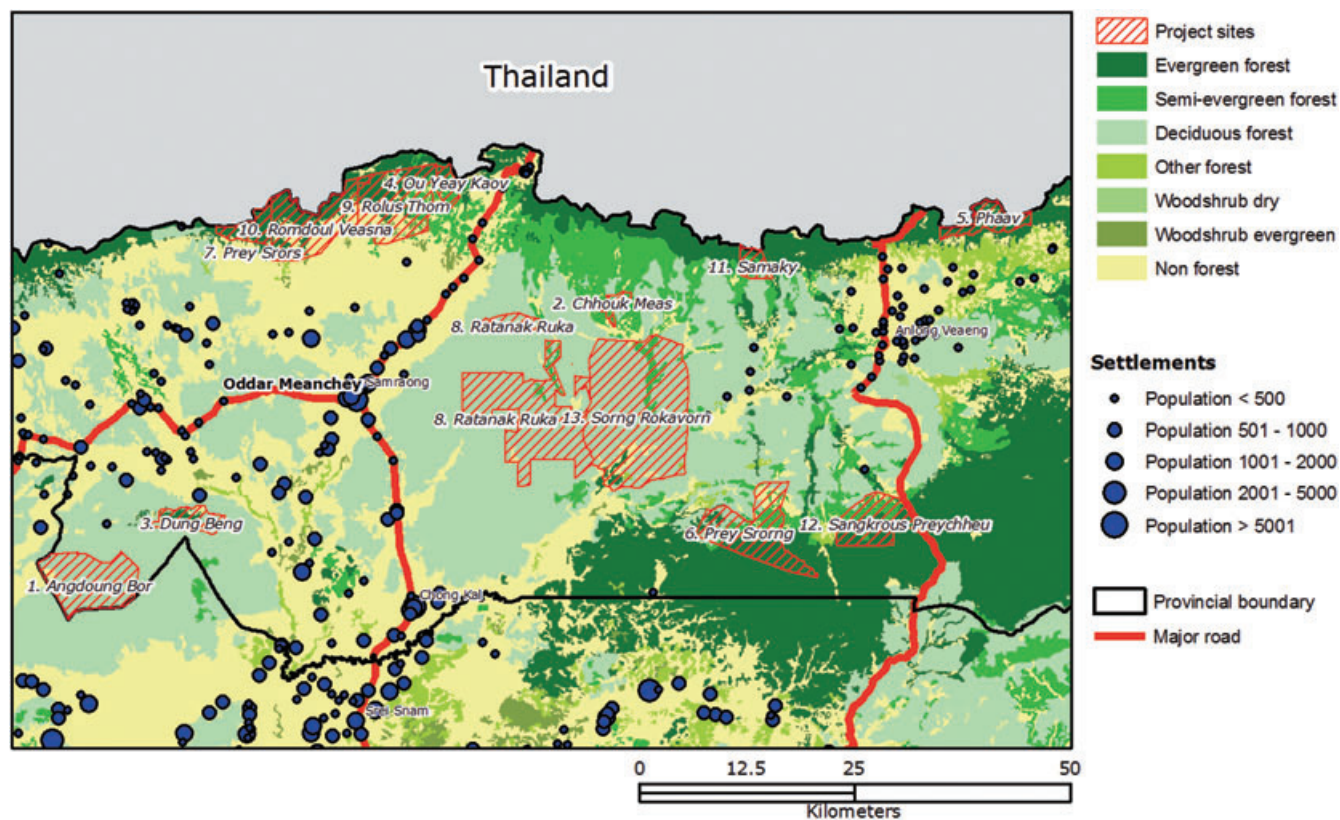


Figure 2. Map of Community Forestry carbon project sites in Oddar Meanchey Province.

and technical guidance from Terra Global Capital (TGC), a San Francisco-based carbon development company, the project sought to test emerging REDD policies with 58 villages organized into 13 CF groups in Northwest Cambodia (see Figure 2). The project methodology was designed to comply with emerging REDD guidelines developed by the VCS and the Climate and Community and Biodiversity Alliance (CCBA). The project is expected to sequester 7.1 million tons of CO<sub>2</sub> over the next 30 years.

The OM project seeks to mitigate the impact of a number of drivers of deforestation and forest degradation, while responding to the economic needs of the low-income rural populations that inhabit the project area. According to the project design the Royal Government of Cambodia will recognize the CFMCs in the project area under the national community forestry programme, providing them with a 15-year renewable lease and a minimum 50% share of carbon revenues. The project intends to create a 30-year income stream that will enhance livelihoods and build natural resource management capacity among the project's 10,000 participating households.

#### 4. REDD project context

Cambodia provides an interesting context to explore the feasibility of REDD projects development at the national

and local levels. After nearly three decades of political instability, the national social and economic infrastructure was extremely weak and economic growth was a priority for government policymakers and donor agencies. Timber exploitation was seen as an answer and expanded rapidly during the 1990s. During this period approximately 60% of the country's forests were leased to private concessions. Industrial forestry proved to be a failed strategy for the country, with unsustainable exploitation leading to widespread forest degradation, while generating limited income for the national government. In 1997, an external review team estimated that the state collected only 12% of the revenues due from logging, while actual extraction was nearly 10 times the sustainable yield (ARD, 1998). The FA has cancelled or suspended 6 million hectares of logging concessions since 2001, and is exploring REDD strategies at the national and sub-national levels as a means of generating revenues to support the National Community Forestry Program (NCFP). REDD creates a potential management alliance between an important national government agency and hundreds of forest communities. Whether REDD revenues can provide sufficient income to meet national economic development goals remains an important question. Other uses of the forest, such as conversion to plantation crops under the Economic Land Concession programme, might generate a larger income stream, but would frustrate Forest Administration efforts to

achieve the national target of retaining 60% of the land area under forest cover.

At the local level, REDD project development has potential due to the presence of social and ecological capital in the form of motivated communities eager to conserve threatened forests, and some of the last remaining lowland evergreen and dry deciduous forest in the province. While the project area has characteristics conducive for project development it also faces serious challenges. In the late 1990s, after 25 years of political insecurity, peace came to Oddar Meanchey province. This sparsely populated, heavily forested region located in a remote corner of Northwest Cambodia began drawing a growing flood of migrants from the Lower Mekong region, as well as from neighbouring provinces. Over the next decade the population expanded at a remarkable rate of 12% per year, while forests disappeared at over 2% annually.

With a national policy mandate to preserve 60% of the country under forest cover, an alliance between the national Forestry Administration and local communities, financed through REDD carbon payments, could be a viable strategy to address the rapid loss of forest cover. While the FA possesses considerable legal rights under the Forest Law to manage much of the province's land area, it inevitably must compete with other government agencies that desire to control these resources. This includes the military, Ministry of Interior, and other units within the Ministry of Agriculture, Forestry, and Fisheries. At the local level, forest fires, illegal logging, migrant land clearing, and other activities are also key drivers of deforestation and can only be addressed by resident communities with the support of government agencies and civil society organizations.

Oddar Meanchey has the 'perfect storm' setting for a potential REDD project with a historic high rate of deforestation, multiple drivers of deforestation and forest degradation with powerful political, economic and demographic momentum. The project's goal is to slow these trends by supporting communities to conserve the remaining forest 'islands' and fragments while restoring the recently degraded forests that are sending up hopeful green shoots. The community forestry groups in this remote corner of Cambodia may have a chance. They are highly motivated, not by the illusive promise of carbon payments, but by the realities of their daily lives. Sokh Smit, a 41 year old CFMC member notes: 'The people with money in our village go to Samrong town when they are sick, the poor people go to the forest to collect traditional medicine'. Not only medicinal herbs, but much of the daily requirements of rural Cambodians come from the forest. The timber to build houses, barns, and tools, fibres for basket making, foods ranging from wild fruits and berries, mushrooms, edible leaves and tubers which are a stable food between harvests — all make the forest an essential part of the village economy. Equally important are the water sources that healthy, intact forests

recharge and protect. Forest communities like those in Oddar Meanchey are also just beginning to see opportunities in conserving forests to obtain carbon payments. As one CF group leader says expectantly:

*We are going to sell the air to the people who are polluting in the city.*

The project communities have allies in their efforts to protect threatened forests. Venerable Bun Saluth, an energetic young Buddhist Monk who heads the Samraong Pagoda, has mobilized his fellow monks and neighbouring villages to protect over 18,000 hectares of forest that still retains leopards, monkeys, alligators, and bears, as well as endangered bird and plant species. In addition, a local NGO has been working with dozens of local communities to help them form CFMCs and proceed through the six steps that lead to a community forestry management agreement under the Forest Sub-decree. Nine of the thirteen participating CFMCs have completed this process and been granted 15-year stewardship rights, while the other four are still in process. While many of the project communities are comprised of recent migrants who have settled in the area over the past ten to fifteen years, they are motivated to retain their local forests, have substantial local knowledge of the forest ecosystems, and are economically dependent upon forest resources. Due to their physical presence in and around the forests, they are well positioned to defend forest resources from illegal logging and further clearing by more recent migrants. At the same time, they lack the political influence to address more powerful drivers such as economic land concessions and military encroachment. Their association with external support organizations, especially the national FA, is an essential element in protecting their community forests.

In summary, the Oddar Meanchey context was selected for a REDD project because it fit emerging parameters conducive for project development including a rapid forest loss, a sufficiently large amount of viable forest where deforestation could be avoided, and a national government willing to provide the policy and political support required to address tenure and enforcement issues on public forest lands. At the same time, the province had the social capital needed to contain local drivers of deforestation in the form of highly motivated rural communities, local NGOs, and civil society groups ready to protect forest assets on the ground and restore degraded ecosystems. Finally, the area had ecological capital reflected in both well-stocked and recently disturbed forests that showed signs of biological resilience characterized by vigorously coppicing tree species, high seasonal rainfall, and relatively fertile soils. The project design team seeks to assess whether these components would allow for the development and implementation of effective mitigation strategies that could control powerful drivers of deforestation.

## 5. Deforestation drivers and REDD mitigation strategies

In the following section a number of drivers of deforestation and forest degradation will be described (see Table 1), including a review of mitigation strategies being proposed by project communities, the FA, and the project design team. The drivers are broadly divided among those that operate at an international, national, and local level. International and national drivers typically require high level political interventions to mitigate their impact, while local drivers can often be addressed by the community itself, sometimes with assistance from local NGOs and FA field staff. Without a coordinated effort by local communities and national planners the complex, multi-tiered interaction of deforestation drivers cannot be effectively addressed.

### 5.1. International level

At the international level, commodity prices, investment capital, and high rates of regional economic growth can act

as drivers impacting the effectiveness of local REDD projects, as can transboundary political and military conflicts. In Oddar Meanchey, for example, it is clear that land speculation by Thai private sector interests, driven by high sugar prices, has accelerated forest clearing in recent years. These types of drivers of deforestation are extremely difficult to control at the project level.

### 5.2. National level

National drivers may be reflected in forest allocation and management policies or related laws and decisions taken by ministries of agriculture, finance, interior, as well as by the armed forces. National market conditions and the state of the political economy are also important forces that can impact forest cover. Sub-national REDD projects face serious difficulties mitigating such drivers. However, if linked to a broader national REDD initiative, local projects may reduce their exposure to these forces. Several examples of national drivers and mitigation activities are

**Table 1. REDD drivers of deforestation and proposed mitigation strategies**

MAJOR DRIVERS OF DEFORESTATION	POTENTIAL CF MITIGATION STRATEGIES
<b>INTERNATIONAL</b>	
<b>Commodity Markets</b> — rapidly rising prices of sugar, rubber, and palm oil	Controlling commodity prices is beyond the national and sub-national project capacity.
<b>Investment Capital</b> — for commercial plantations and land speculation	Trans-boundary capital flowing into forest land development may be subject to national government control, especially related to policies on issuing concessions to foreign firms or investors.
<b>NATIONAL</b>	
<b>Military</b> — military bases and roads for legitimate defence purposes, as well as support to illegal logging and encroachment on forests by soldiers	National defence needs will likely trump forest conservation, though more routine military demands on forests may be negotiated at the national level — a dialogue between forestry officials and military commanders may be required to resolve illegal activities.
<b>Government Officials</b> — local government officials engaged in illegal land sales and forest clearing	Transparent and public meetings between national government planners and local government officials can communicate the importance of protecting project areas from manipulation and illegal activities.
<b>Economic Land Concessions</b> — large tracts of forest land allocated to private sector firms displace local residents and stimulate social conflict	Senior forestry staff and national REDD project directors need to be in close dialogue with key Ministries and committees involved in issuing Economic Land Concessions, as well as long-term public land planning processes.
<b>SUB-NATIONAL</b>	
<b>Forest fires</b> — suppress natural regeneration of degraded forests, create carbon emissions from burning	Hunters, gatherers, farmers and other forest users who often start fires need to be advised and monitored by the community. Fire control strategies require funding, tools, and capacity building to maintain firelines and suppress fires.
<b>Migrant Encroachment</b> — migrants seeking forest land to farm or resell	Educate migrants regarding community protected forest territory, combined with patrolling, demarcation of boundaries and sanctions for land clearing.
<b>Land Speculation</b> — forests are felled to establish a claim on land that is later sold, or resold as land prices increase	Identify middlemen financing forest land grabs and report forest crimes to the police, local government, and forestry agency. Monitor areas. Patrols, boundary demarcation and signage is also required throughout the project area.
<b>Agricultural Expansion</b> — population growth drives additional forest clearing for agricultural land creation	Community-based land use planning exercises to identify existing and future agricultural land. Design and implement sustainable agricultural intensification project to raise productivity.
<b>Illegal Logging</b> — ‘high grading’ of luxury woods causes ongoing forest degradation and loss of biomass	Limiting access of illegal loggers with small tractors through patrols, trenching along boundary access points, identifying agents and gaining support of forestry agency, police, and military
<b>Firewood Consumption</b> — 90% fuel use from wood with increasing demands from subsistence and commercial users	Introduction of fuel-efficient wood stoves in early project phase with gradual transition to liquid petroleum gas and solar.

Source: Adapted from: Poffenberger and Smith-Hanssen (2009).

provided below drawing on experiences from Oddar Meanchey.

### 5.2.1. Military personnel

Oddar Meanchey has been contested domain since the mid-1970s when it was first occupied by the Khmer Rouge who continued to use it as a guerilla base until the late 1990s (Brinkley, 2009). More recently, tension with neighbouring Thailand has made the province a sensitive area and consequently the presence of the military is widespread. As in some other parts of Asia, in Oddar Meanchey the military have often used forests and forest land as a source of income. Senior officials of the FA's Siem Reap Inspectorate reported over 20 cases of military encroachment into CF areas in 2009. Since defence strategies are classified it is difficult to get information from the military regarding their operations in the area. In some cases, soldiers are involved in illegal logging, forest clearing for agriculture and land sales, while in other situations their presence is part of an effort to establish approved 'camps' for national defence. According to FA senior staff, each CF area has a unique set of issues and social hierarchy that require a site-specific approach. A senior officer notes that:

*The FA's field staff lives and interacts with the military and this may prevent their ability to confront the soldiers due to their friendships and existing local relationships. Also, the local FA officials may not have the status to gain the attention of senior military officials. The level of FA response needs to reflect the status of the actor.*

**Mitigation strategy** — The Director General of the FA has consulted military commanders operating in Oddar Meanchey regarding the community-based REDD project and the need to respect these areas and control their soldiers. A joint follow-up visit by other senior FA officials and a military unit successfully evicted soldiers illegally occupying CF areas. The commitment of the FA to resolve this issue is necessary in order to raise the awareness among military commanders. The FA has the authority to defend the integrity of CF carbon project areas due to the endorsement of the project by the Office of the Prime Minister, however potential future conflicts with Thailand could give the military priority over project areas including building roads and establishing military camps.

### 5.2.2. Local government officials

In a number of CF areas, commune chiefs, district, and provincial government officials are reported to be involved in encroaching on forests within the CF areas. In the past, local government officials had some authority to legitimize forest occupancy, though such letters and documents were often reversed by judicial courts and higher levels of government. Community forestry groups are reluctant to challenge their authority and often need to appeal to higher level officials in order to control encroachments that have

the endorsement of local government officials. (Fox *et al.*, 2008). Judicial systems are weak and subject to corruption and cannot be expected to efficiently address all cases of illicit activities involving local government officers supporting land encroachment, and as a result some mitigation measures can only be taken at the national level.

**Mitigation strategy** — A recent national policy limiting the authority of provincial and district governors to grant land concessions has constrained their legal capacity to encroach on REDD project areas. At the same time, CFMC's are being supported to actively patrol forest boundaries and install boundary posts and signage to reinforce their claim to project areas. A series of workshops at the district and provincial level are being organized for government officials to inform them regarding the national government's recognition of the CF areas and their inclusion in the REDD project.

### 5.2.3. Economic Land Concessions (ELCs)

In recent years, ELCs issued at the national level have been a major driver of deforestation in Oddar Meanchey. Recent ELCs seek long-term leases to convert forest land to plantation crops including sugarcane and rubber. In 2007, 44,000 hectares of forest land was granted to large concessionaires in Oddar Meanchey representing 7% of the provinces' total land area. ELC issuance frequently results in very rapid and extensive deforestation of the concession area, while displacing forest-dependent populations that transfer pressures that degrade or deforest neighbouring areas. In the case of Oddar Meanchey, ELC applicants and CFMCs were in direct competition for the control of some of the proposed forest blocks in the REDD project area. The FA sought the support of the Prime Minister to secure the CFMC forest areas as a REDD pilot project. Without this support, it is unclear if the project would have had the political backing needed to secure the 68,000 hectare project site.



**Plate 1.** My Li Heng Sugar concession neighbouring REDD project site, 2008.



**Plate 2.** Cleared, burned and fenced land concession in central Oddar Meanchey Province, 2008.

**Mitigation strategy** — Mitigating the impact of ELCs on deforestation is certainly beyond the capacity of communities and REDD project design teams. ELC issuance takes place at senior levels of government, often with the backing of powerful political and economic actors. In the case of the Oddar Meanchey REDD project, with the support of the Office of the Prime Minister and the Director General of the FA, discussions were held with the Ministry of Agriculture, Forestry, and Fisheries (MAFF) to ensure that ELCs did not conflict with the project area.

### 5.3. Sub-national level

Subnational drivers may operate at a provincial, district, commune or hamlet level and be influenced by a variety of more local actors. National mitigation strategies may have limited impact on forces operating in the field, requiring the engagement of community partners and other local stakeholders. Examples from Oddar Meanchey illustrate some forms local drivers may take and the types of activities being designed to control them.

#### 5.3.1. Forest fires

Forest fires are natural events in dry deciduous forests in Oddar Meanchey Province. The frequency of fires, however, is greatly increased by human activity. Perhaps 90% of dry season forest fires are caused by people including hunters, children, careless smokers, and farmers burning agricultural residue. In the case of degraded dry deciduous forests, natural regeneration is suppressed due to almost annual ground fires that destroy or damage coppice shoots and saplings. As a result, biomass is lost and re-growth is slowed. At the same time, fuel wood and timber is extracted leading to a gradual erosion of vegetative material and forest health.

**Mitigation strategy** — A number of community members noted that the key to restoring local forests was fire control. If fire can be stopped for 4 to 5 years, many young regenerating trees can develop the height and bark

thickness to withstand future ground fires. This would indicate that Assisted Natural Regeneration (ANR) strategies implemented by CFMCs under the project should focus on halting fire in degraded forests that have ‘high potential’ for rapid re-growth. Project activities may include identifying degraded forests sites that have a high density of coppice shoots and saplings characterized by at least 250 to 300 shoots per hectare, with good soil conditions and moisture levels. The project participants suggest beginning with areas that are close to communities. The project would also train community members in fire prevention and control techniques providing equipment and hiring unemployed village youth to act as fire watchers. Project funds would support the construction and maintenance of fire lines of, at least, 5 m width.

#### 5.3.2. Migrant encroachment

Migration into Oddar Meanchey has been very rapid over the past decade. The increase of the rural population is estimated to be over 12% per annum between 1998 and 2008, of which around 9% is due to in-migration. Migrants from the Lower Mekong provinces, where land is scarce, hear by word of mouth that the frontier forests of the northwest offer opportunities to secure land. Usually, migrants follow other family members who have already established a ‘base’ in the province. Migrant clearing of small parcels of forests has accelerated deforestation throughout the province and is a major driver of deforestation, though it may be slowing as an increasing amount of the frontier (unoccupied) forest is claimed by local villages, ELCs, and the military. A number of villages noted that migrants were no longer welcome in their communities and that even local families have no ‘free’ land to expand their agricultural lands. Some national policies may also increase migration. The military may encourage retired soldiers to settle in such less densely populated provinces, while the Ministry of Interior may view them as suitable sites for Social Concessions for landless households.

**Mitigation strategy** — Where migrants have settled and communities can accommodate them, they need to be included in CFMC activities and participate in land use planning activities. Where no available forest or unused land exists, migrants need to be informed by communities of that situation and encouraged to communicate the information to their home villages so that in-migration decreases in that area. Inter-agency coordination at the national level is also required to ensure REDD projects are not in conflict with policies and programmes of other sectors of government.

#### 5.3.3. Land speculation

Land speculation is often driven by businessmen, officials, and local villagers who seek to claim and clear forest land for sale. According to reports, ‘power men’ hire migrants or local villagers to fell and burn forest cover for US\$ 50 to



**Plate 3.** Migrant hut on cleared forest land.



**Plate 4.** Buddhist monks participating in CFMC Forest Inventory.

US\$ 100 per hectare. Small huts are constructed to indicate residence, although these are frequently unoccupied. This pattern reflects attempts to claim available public forest land and hold it until it can be resold at a higher price. While these actions are usually illegal, letters from local officials are used to create an appearance of legitimacy. Once one plot is opened it may encourage others to open forests in neighbouring areas. In some cases, poor migrants may occupy the plot for one to two years waiting for land values to rise. These plots are then sold to a ‘consolidator’ or businessman who buys a number of them to form a larger plot. Land speculation is slowing as the frontier forests disappear and are claimed by legitimate stakeholders. The global economic recession rapidly cooled local land markets during 2009 and with fewer buyers, forest clearing for sale has slowed. Yet, this is most likely a temporary phenomenon given rapid population growth.

**Mitigation strategy** — Community-based land use planning and forest land demarcation will be accelerated to clarify tenure over remaining forest land in the province, especially in and around the REDD project area. Where possible, the project seeks to extend CF areas to neighbouring forest tracts and communities, establishing social fencing activities such as community patrolling and facilitating natural regeneration. Meetings and workshops with local government officials and village leaders are essential in controlling illegal land sales. NGO monitoring and reporting of land conflicts and illegal sales to local government officials can make such activities more transparent. Enforcement is also needed to impose sanctions against local officials who organize, facilitate, or provide ‘official’ endorsements of such sales.

#### 5.3.4. *Agricultural expansion*

With the province’s rural population expanding at an estimated rate of 2,500 to 3,000 households per year, demand for farm land may require an additional 5,000 to

6,000 hectares annually, based on 2 hectares for each household. Aside from migrant pressures on forest clearing, local communities also require an increasing amount of farmland as children marry and establish independent farms. In the past, village elders were responsible for identifying forest areas that are suitable for rainfed paddy fields. Young families or migrants requiring land approach the elders to request a farmland allocation. Usually a 2 hectares plot with good soil moisture was selected within the forest. For the most part, these were created before the formation of the CFMCs and it is difficult for the poor farmers that own them to be evicted. Many CFMCs are accepting these inholding plots if the occupant agrees not to expand the existing fields.

**Mitigation strategy** — Interviews with communities in Oddar Meanchey indicate that rainfed rice yields are averaging between 1 to 1.5 metric tons per hectare, while Thai and Vietnamese farmers may obtain yields 4 to 5 times this much for the same area. Rapid deforestation in Cambodia has expanded potential agricultural land to approximately 3.5 million hectares. Cambodia’s need is not to clear more forests for farming, but rather to intensify agriculture on existing farm lands. Improved farming systems, as well as better access to irrigation, financing, and markets could allow existing farmland to become two to three times as productive. The project seeks to finance the development of water resources, organic farming, the introduction of new varieties, while improving access to markets as key components to increase crop yields, shift to higher value crops, and enhance cropping intensity. Community-based natural resource management plans also need to consider long-term needs for agricultural and settlement expansion around the REDD project site.

#### 5.3.5. *Illegal logging*

Illegal logging remains an important driver of forest degradation. Due to the presence of high value ‘luxury’

timber that is popular for furniture and buildings in cities and tourist areas, timber smuggling is profitable and widespread. Illegal logging results in the ‘high grading’ of the forest causing degradation, loss of biodiversity, the creation of access paths and roads; all of which contribute to the further erosion of forest cover and carbon loss. Armed soldiers are often involved in these activities presenting control problems for weaker community forestry committees.

**Mitigation strategy** — Regular CFMC patrols and forest monitoring systems are essential components in creating a deterrent for small groups of illegal loggers. One CFMC reported that in 2008 it had been successful in reducing illegal logging from an estimated 100m<sup>3</sup>/year to 20–30 m<sup>3</sup>/year. While illegal logging operates locally, it sometimes requires the support of local military commanders who may be able to restrict soldiers engaged in these activities. The project relies on the FA to facilitate cooperative action between the military and the CFMCs.

#### 5.3.6. *Fuelwood consumption*

In Cambodia 95% of the population is dependent on wood fuel for cooking (NIS, 1998). A study in the neighbouring province of Kampong Thom found that the per capita wood fuel consumption rate was approximately 200 kgs of greenwood per year (Top Neth, 2004). A typical household might consume between 1 to 2 mt/year of fuel wood reflecting a 10,000 to 20,000 mt of fuelwood used in the project area each year. Some households also burn biomass to create smoke that inhibits mosquito attacks on livestock. Depending on extraction levels and harvesting practices, fuelwood consumption can be an important contributor to gradual forest degradation. This is exacerbated in areas where charcoal production is a local industry linked to urban centres.

**Mitigation strategy** — Fuel efficient stoves are probably the most immediate and cost effective approach to reducing fuelwood consumption. Depending on stove type and use practices, this type of technology can decrease wood use by 25 to 50%. Some stoves also include piped smoke stacks that can reduce pollution inside the home and improve family health. Over the longer term, the introduction of LPG distribution centres and increased household income can reduce dependency on fuelwood. Mosquito control combined with low-cost mosquito nets can eliminate the need for burning biomass to protect livestock.

## 6. Discussion

Emerging experience with REDD project development in Cambodia suggests that linking national CF and REDD initiatives with grassroots forest protection activities may be an effective strategy to control multi-tiered drivers of deforestation and forest degradation. This ‘hybrid’ REDD approach is demonstrating that national policy and sector

coordination can shelter local REDD projects from more powerful forces causing forest loss. At the same time, in Oddar Meanchey, only through the engagement of forest dependent people can local drivers be contained.

To date, the Oddar Meanchey Project has received an extraordinary level of political support from the Office of the Prime Minister, based on the strong endorsement of the FA (Sar. Chor. Nor. 699). This likely reflects the desire of the government to: 1) conserve a substantial proportion of forest cover; 2) respond to the needs of forest dependent communities; and 3) generate income from forest land. The REDD project framework offers a mechanisms to address the first two goals, while still achieving the third element of economic revenue flows. The Royal Government of Cambodia views the Oddar Meanchey REDD project as a ‘test case’ to see if payments for forest carbon are a viable alternative to other production-oriented forest land management strategies. In this paper the discussion focuses on the challenges confronting project managers and participants in controlling the drivers of deforestation. To be successful, the project will also have to show it is financially viable and that the transaction and implementation costs can be met either through carbon sales or REDD funds. Since forest markets are nascent and volatile, and international discussions regarding possible REDD funds are still underway, this will require a number of years to assess.

The project would not have been possible without the presence of the National CF Program providing an enabling policy framework which allows for the legal empowerment of forest communities as resident managers. Over the past decade, Cambodian foresters, academics, NGOs, and development agencies have created this strategy to facilitate a longer-term sector transition that enables a broader engagement of rural villages in the stewardship of the public forest estate. With the closure of large timber concessions that operated unsustainably during the 1990s, large tracts of forest require new management systems creating a window of opportunity for CF. Prior to the initiation of REDD there was limited funding available to support CF groups or technical support services provided by the FA and NGOs. Even when donor support was forthcoming it was typically site specific and time bound, rarely extending beyond a five year grant.

REDD represents a major paradigm shift in the way CF may be funded at the national and local level, as well as the goals of forest management. A criticism of many national CF and Joint Forest Management strategies is that while communities have received varying degrees of legal recognition, many have experienced limited economic benefits. This results, in part, from a lack of adequate funding flowing into CF groups, as well as limitations placed on their capacity to make important management decisions. REDD could respond to this problem by creating a 30 year funding flow that finances CF conservation activities, finances livelihood enterprises, and injects capital into cash poor rural communities. This will require

equitable and transparent financial mechanisms, with funding based on performance.

Conventional CF projects are often designed by forestry agencies reflecting traditional silvicultural practices. REDD, with its emphasis on conservation, and restoration and sustainable management (REDD-Plus) shifts the goals towards carbon storage and sequestration. Conserving forests is often a major goal of forest-dependent communities due to their reliance on non-timber forest products, water resources, and other services, rather than timber harvesting. As a consequence, REDD project goals and community objectives may be better aligned in comparison to conventional CF projects which often focus on timber production. REDD could provide a performance-based framework creating incentives and allowing communities to monitor their progress.

Long-term carbon contracts with buyers, governments and communities as co-signatories, help provide extended tenure security for forest-dependent villages and for forest conservation. This creates a clear opportunity to link National REDD initiatives with local REDD projects. National REDD initiatives could be structured as enabling mechanisms that provide legal, technical and financial support to local project activities. National REDD initiatives would shelter projects from national drivers of deforestation, nurturing the development of local projects and gradually populating the country-wide REDD strategy. Technical support to CF groups for carbon monitoring, certification, and verification could be included as key roles for National REDD managers. Such a relationship could dramatically reduce transaction costs, improve the quality of monitoring data, better coordinate mitigation activities, and accelerate the replication of projects.

The Conferences of Parties to the UNFCCC spend an inordinate amount of time discussing the measurement modalities for REDD project development and are currently leaning towards national carbon accounting systems. Enormous attention is given to the difficulties of establishing accurate ‘baselines’ for REDD, problems of preventing leakage, ensuring permanence, and anticipating the impact of REDD on global carbon markets (Peskett *et al.*, 2006; UNREDD Programme, 2009). Initial experiences from Oddar Meanchey indicate that reducing emissions from deforestation and degradation will not be done with a stroke of a pen or a successful vote at an international meeting. Nor will it be achieved through the certification of a Project Design Document. The success of the Oddar Meanchey REDD project in controlling the drivers of deforestation will not be determined for at least five years until the first verification of carbon stocks are made. Until that time a number of questions will be pending including: Can the communities slow deforestation in the project areas? Will funding agencies provide financing to implement project activities until carbon revenues begin to flow? Will carbon payments create sufficient incentive to retain the political commitment of the Royal Government of

Cambodia to support the project and sustain the engagement of rural communities?

As climate change policy negotiators meet and define the ‘rules of the game,’ they must do so in ways that enable project designers and stakeholders to create strategies that address multiple goals. At the same time, policymakers must allow for flexibility to respond to diverse contexts and problems. Since communities and development field specialists are rarely members of policymaking groups, there may be a tendency to give priority to the methodological rigour of carbon calculations and monitoring systems and tight bureaucratic control over certification and registration processes. This approach may inhibit the capacity of local organizations to develop REDD projects. By raising the technical bar so high that only a team of highly trained specialists can calculate carbon, while imposing transaction costs for certification and verifications that are beyond the capacity of local groups with limited start-up financing, REDD policymakers will ensure that grassroots participation in this potentially promising strategy will be limited. Instead, user-friendly methodologies that can be adopted by communities (ITC, 2009), technical and financial support for project design, local certification centres, and streamlined approval processes could accelerate the emergence of a global network of REDD projects that would not only address deforestation problems, but enable rural communities to emerge as empowered resource managers with new sources of income. Alternatively, small sub-national REDD project participants and designers may be better served by voluntary markets and a diverse group of certifiers that can compete to cut transaction costs and allow flexibility in project design, financing arrangements and monitoring mechanisms.

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