Efficacy of forest law enforcement and incentive based conservation to prevent illegal logging in developing countries: experience from Bangladesh

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Abstract

Forest law enforcement has long been considered as the most effective strategy to prevent illegal logging and is widely practiced across the tropics. However, the efficacy and the role of forest law enforcement in preventing illegal logging have very often been questioned, particularly in developing countries, in which a complex socio-political context exists amid conditions of chronic poverty and high unemployment. Rehabilitation of illegal loggers through provision of access to various alternative income generating (AIG) opportunities is quite a recent and unique approach that has been adopted in some forests of Bangladesh. An exploratory study was conducted to understand the effect of forest law enforcement and economic incentives in different forms of AIG schemes to prevent illegal logging in two conservation areas in the north-eastern territory of Bangladesh, in which the government implemented economic incentives to curb the activities of illegal loggers. Thirty (n= 30) illegal loggers were interviewed between early 2007 and early 2009 using a semi-structured questionnaire. Additionally, some informal interviews were arranged with local forest officials and politically influential persons. Both qualitative and quantitative data were collected. The study suggested that enforcement of customary forest law had no or very little impact on the overall situation; in some cases, such enforcement has even worsened conditions, as in both conservation areas some illegal loggers were found to have continued illegal logging just to meet the fees associated with court appearances and legal costs. In contrast, different AIG options designed to influence illegal loggers appeared to be very useful to tackle illegal logging as in both study areas both the frequency and amount of illegal timber harvested were reduced considerably compared to earlier period. The number of cases filed against illegal loggers was also reduced, and, most interestingly, illegal loggers responded most positively to AIG schemes when they found themselves much closer to forests, with clearly defined rights and responsibilities. Some other major factors that were identified to be hindering good outcomes were—livelihood and tenure insecurity, high demand for timber attributable to comparatively lower local timber prices, easy transportation networks, lack of conspicuous forest boundaries, inappropriate forest law, and inadequate staffing and capacity of the Forest Department. It is concluded that, ensuring greater benefits to illegal forest users with tenure rights, providing greater access to AIG options, revision of existing forest law and bringing country's rapidly declining forests under REDD+ mechanisms could secure the sustainability of forest resources in Bangladesh.

Key-words: forest law enforcement; illegal logging; AIG; tenure insecurity, incentive based conservation; Bangladesh.

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Introduction

Over the last few decades, international concerns about illegal logging have grown markedly, and nowadays illegal logging is considered to be one of the major threats to the world's forests, particularly in the tropics, which have long been subjected to rapid deforestation and degradation driven in large part by the complex socio-economical and political settings in tropical countries (Contreras-Hermosilla 2001, 2002, Hirakuri 2003, Kaimowitz 2003, Tacconi et al. 2003, 2004). Plausible evidence suggests that, globally, illegal logging is worth potentially around $22.5 billion per annum (JPC 2005) and costs developing countries $15 billion in lost revenues per annum (Tacconi et al. 2003). In Indonesia alone, illegal logging continues at a rate of at least 40 million m^3 annually, jeopardizing the sustainability and future of forests all over the tropics (Obidzinski et al. 2006).

Illegal logging can be defined from various perspectives (see, for example, Inoguchi et al. 2005, Mir and Fraser 2003). Underlying factors determining illegal logging and its impacts on biodiversity, people, livelihoods, and national economies are still not properly understood, although there is plenty of speculation and action being taken to tackle the problem without a basis in evidence. It is, however, clear that while illegal logging does have negative impacts, it also, controversially, and paradoxically, benefits diverse stakeholders, including local forest-reliant communities (Tacconi 2007). Once again, although law enforcement is broadly considered as the first step in coming to terms with illegal logging, among all those involved, the rural poor are amongst the first and hardest hit by it (Inoguchi et al. 2005). In recent years, governments and international donor countries have placed stronger emphasis on tackling illegal logging and two developments in this area include greater community involvement in forest management through different kinds of support mechanisms (Inoguchi et al. 2005), and an action plan on illegal logging developed by the European Commission (EU 2003). Today, community involvement is considered to be critical in effective forest management and in controlling illegal activities in many developing countries since local residents have greater stakes in forests than people in any other region on earth - they are both responsible for deforestation and forest degradation and are also the most vulnerable to their consequences (Mukul and Quazi 2009, Inoguchi et al. 2005).

Bangladesh is one of the most densely populated (1090 person/ km^2) countries in the world, with relatively low per-capita income and forest coverage (World Bank 2009). According to FAO (2009), the forest cover of the country is about 5%, even though nearly 15% of the

landmass of the country is under some kind of management by the Forest Department (FD) (Mukul et al. 2008). The country also has one of the highest deforestation rates in South and South-East Asia, at nearly 3.3% per annum (Poffenberger 2000). Since poverty and unemployment are widespread in the country, particularly in rural areas adjacent to forest areas, illegal forest activities and logging are quite common, and undeniably pose major challenges to the sustainability of forest resources in the country. Until very recently, enforcement of customary forest law was considered to be the only way to control illegal logging, pursuant to the *Forest Act 1927* formulated during the British colonial era with minimal amendments by the government of Bangladesh (GoB) in 1994. However, acknowledging the fact that law alone can never save forests, the GoB, with support from the United States Aid for International Development (USAID), has commenced a rehabilitation program for illegal loggers in selected protected areas of Bangladesh, under the broad banner of community-based protected area management. Efforts to date, however, are still inadequate, covering only a tiny proportion of the illegal loggers active in the country and being chiefly accomplished through provision to locally-recognized illegal loggers of economic incentives in the form of Alternative Income Generation (AIG) support, often with clearly defined rights and responsibilities regarding the forests on which illegal loggers depends.

This paper is based on a case study in which illegal loggers from two conservation areas in north-eastern Bangladesh (i.e., Lawachara National Park and Satchari National Park), both with and without AIG support, were interviewed to uncover the effectiveness of forest law enforcement and economic incentives to prevent illegal logging. Illegal logging in Bangladesh is somewhat typical of such activity in other South-East Asian countries (e.g., Indonesia and Malaysia), despite there being larger forest coverage in these countries, with some sort of organized illegal logging taking place in the country mainly to supply the global market. Additionally, this study was designed to identify other underlying factors that affect illegal logging in developing countries with similar social-political settings to Bangladesh, considering the area as a microcosm of the whole system in South-East Asia.

Field techniques

This study was conducted between early 2007 and early 2009 through series of field visits. The two case study sites, viz., Lawachara National Park (area – 1245 ha) and Satchari National Park (area – 243 ha) were selected purposively (Figure 1), since both protected areas

were amongst the five pilot sites in which the FD initially started rehabilitation programs under co-management schemes. The illegal loggers (n=30) were identified with the help of key informants and were interviewed using a semi-structured questionnaire. Standard ethical protocols were followed during the process, and illegal loggers were assured full confidentiality of their participation. All information collected was recorded anonymously, with each respondent being assigned a unique number. Amongst the interviewees, 18 were under different AIG schemes and were found to be working in harmony with the FD. The rest (12) were without any AIG support. Furthermore, in order to obtain further insight into socio-political dynamics and other factors that might influence illegal logging, several informal interviews were undertaken with local FD field staff members and politically influential persons who apparently had substantial influence on neighboring forests and local communities.

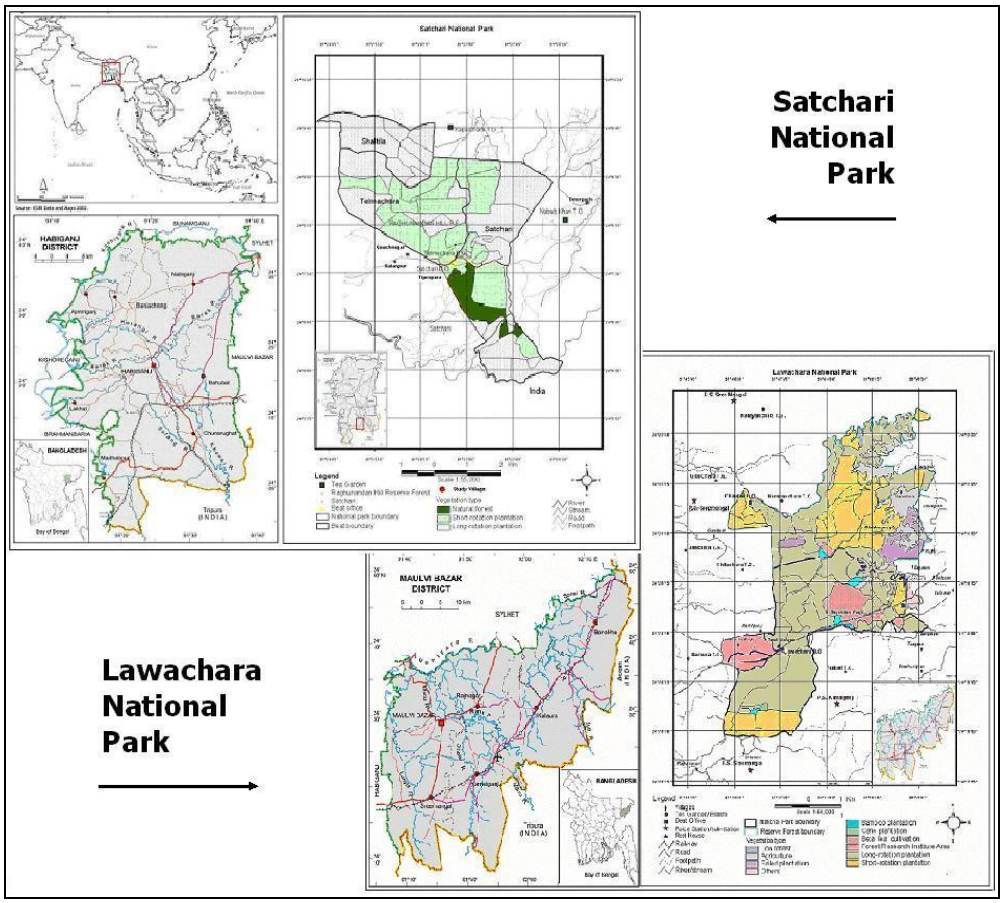

Figure 1. Map of the study sites

Results

Profile of the illegal loggers

Average age, family size and literacy rate of the interviewees (i.e., illegal loggers) were 37 (SD±4.5), 7 (SD±2.08), and 20% respectively. The mean monthly expenditure of the respondents was around 7,500 Tk[†], whilst 70% of them were without any kind of permanent job. The number of years in which respondents had been involved in illegal logging activities varied from between 2 and 11 years. Amongst the respondents, 17 persons had been accused of illegal logging by the FD several times, and had, on several occasions, received punishment according to the provisions made by existing forest law. The average number of cases filed against these illegal loggers was about 6.5 (SD±2.85).

Types and form of economic incentives in the area

The provision and types of economic incentives offered under different AIG schemes are given in Table 1. In most cases, economic incentives took the form of technical or skill development support (e.g., training), or the form of provision to former illegal loggers startup materials for intended AIG development instead of giving them cash directly. In certain circumstances, small amounts of seed money were also given, but in these exceptional cases, respondents were monitored closely to secure appropriate use of the investment. It was, however, apparent that all AIG schemes in the areas provided neither the same level of support nor potentiality equal levels of benefits offered (in terms of financial return/profit) to the stakeholders. Furthermore, some of the AIG schemes seemed to be much closer to current forest management (e.g., forest patrol guard and eco-tour guide), and the rest of the schemes had very little or no involvement with forests.

Table 1. Different AIG schemes and number of illegal loggers under each form of support

AIG support	Number of illegal logger	Form of support
Eco-tour guide	1	training, promotion (to tourists)
Fisheries	1	hatched fish
Forest patrol guard	7	uniform, monthly salary
Livestock (beef, pig)	3	cow, pig (for ethnic people)
Nursery	1	seeds, poly-bags, fertilizer, small amounts of

[†] 69 Taka or Tk. ~ $1 (during the time of the study)

		money for fencing, support during selling
Poultry rearing	2	Hatched chicken, small amounts of money for housing
Vegetable gardening	3	seeds, small amounts of money for fencing
Total	**18**	

Source: Field survey (2007-09)

Law enforcement vs. economic incentives: *quantitative effects on illegal logging*

A quantitative analysis of illegal logging, frequency, and quantity collected (in cubic feet, cft) amongst the respondents with and without AIG support during 2007 and 2009 is given in Table 2. It was found that in most cases the former illegal loggers responded positively to different AIG support mechanisms. Some of the respondents under different AIG initiatives were found to be involved in illegal logging even with AIG support, but the number of times they entered forests for illegal logging and the quantity of timber they collected were reduced as compared to before their involvement in various AIG support initiatives. It was found that the former illegal loggers who received supported as eco-tour guides received support for nursery activities and for fisheries activities stopped illegal logging, possibly because these provisions were able to generate income on a regular and sustainable basis. In contrast, AIG initiatives like support for poultry rearing and vegetable gardening appeared to have less influence on illegal logging since financial outcomes are much more uncertain with these initiatives and benefits accrue more slowly than they do for other types of initiatives. Illegal loggers without any kind of AIG support (n=12) were found to be more active in illegal logging than previously. The average number of entries into forests and quantity of timber collected illegally were 11.5 (SD±3.18) and 136.5 (SD±27.8) cft respectively during 2007 and 12.7 (SD±2.15) and 158.7 (SD±50.1) cft respectively during 2009. One explanation for these results might be that the illegal loggers found themselves less privileged in their abilities to maintain their families and, most interestingly, were also under pressure to find a way to fund the cost of their legal support and regular appearances in court for cases filed against them by the FD for illegal logging.

Issues influencing illegal logging in the areas: *overview and insights*

Based on field surveys and informal interviews with FD staff and politically influential local persons, major factors identified that potentially affect illegal logging in the areas are briefly described hereafter:

Table 2. Frequency of illegal logging (monthly) among illegal logger with and without AIG supports during 2007 and 2009

Type of AIG support	**2007 (pre-support period)**			**2009 (post-support period)**		
	No. involved	**No. of entries***	**Quantity (cft)****	**No. involved**	**No. of entries***	**Quantity (cft)****
Eco-tour guide	1	16	80	0	-	-
Fishery	1	8	96	0	-	-
Forest patrol guard	7	11.14 (±3.98)	106.85 (±46.35)	1	0.285 (±0.76)	2.3 (±6.05)
Livestock (beef, pig)	3	8.33 (±0.58)	96 (±42.33)	1	0.67 (±1.15)	10.67 (±18.48)
Nursery	1	8	96	0	-	-
Poultry rearing	2	12 (0)	144 (±33.94)	2	2 (0)	24 (±5.65)
Vegetable gardening	3	9.33 (±2.3)	90.66 (±9.24)	2	7.33 (±6.43)	80 (±69.28)
Without any support	12	11.5 (±3.18)	136.5 (±27.8)	12	12.7 (±2.15)	158.7 (±50.1)
Total	**30**	**10.83 (±59.3)**	**116.87 (±59.1)**	**18**	**6.07 (±67.08)**	**74.66 (±81.74)**

Source: Field survey (2007- 09); values in parenthesis indicates standard deviation (±SD);

* approximated monthly entries for illegal logging from the nearby forest;

**averaged volume in cubic feet, after balancing individuals' log holding capacity and number of entries per month.

i) Livelihood insecurity

Livelihood insecurity driven by chronic poverty and unemployment is the most critical and most frequently mentioned problem for the areas. From the field work, it was also evident that a 2.5 ft trunk of any good quality wood is worth around 500-700 Tk, and this could secure the livelihood of a poor illegal logger for at least 3-4 days. In some cases, illegal loggers were reportedly used by politically corrupt and greedy individuals on a day/contract basis, in which they were paid by these individuals for helping them to obtain the desired wood from forests.

ii) Tenure insecurity/conflicts of customary use

It is quite evident that people with no clearly defined rights and responsibilities associated with neighboring forest areas engaged more actively in illegal logging and other illegal forest activities than others since they had long-established traditions involving neighboring forests and their exclusion from forest management areas means denying their traditional rights. Furthermore, poor and inadequate rehabilitation efforts/focus of non-government organizations (NGOs) and government agencies (mainly the FD) generate conflicts amongst the forest villagers, potentially leading to more unsustainable use of forests by some villagers that might be in the form of illegal logging.

iii) High demand for timber attributed to comparatively lower market prices locally

Since wooden furniture is still seen as a symbol of aristocracy in Bangladesh, there is always high demand for good quality timber in the urban market. Again, due to poor infrastructure in areas adjacent to forest areas, the price of timber is comparatively lower than it is in the urban market (Table 3). This means that there is always a high demand for timber from these areas by urban furniture shops, and this undoubtedly fosters illegal logging in rural forest areas. The presence of sawmills and furniture shops in the vicinity of forests also influences illegal logging to a great extent.

Table 3. Price differences of major timber species at local and urban (regional) market

Species	**Local name**	**Price** (Tk/cft)*		**Source** (%)	
		Local market*	Urban market	Forest	Non-forest†

Acacia auriculiformis	Acacia	400-500	750-1000	65	35
Acacia mangium	Mangium	350-400	700-800	55	45
Albizzia procera	Koroi	300-350	900-1200	55	45
Albizzia saman	Raintree	300-350	500-800	50	50
Artocarpus chaplasha	Chapalish	250-300	600-900	95	05
Artocarpus heterophyllus	Kanthal	450-600	650-800	60	40
Gmelina arborea	Gamar	400-450	750-1000	70	30
Swietenia spp.	Mahagoni	400-450	900-1200	0	100
Syzygium spp.	Jam	500-600	900-1200	30	70
Tectona grandis	Teak	700-900	1500-1800	90	10

Source: Field survey (2008)

[†]including homesteads, roadside plantation and timber brought from outside places (market or imported!)

iv) Lack of conspicuous forest boundary, ease of transportation and road networks

Construction of roads and easy transportation facilities are also responsible for illegal logging across the tropics. In greater Amazonia, construction of road networks has been found to be one of the main reasons for rapid deforestation (Kaimowitz and Angelsen 1998). In the areas studied, there are several foot trails that connect local villagers on every side of the forest (border), along which traffic is entirely unregulated. Bus and truck transportation is also very common through the main streets which also go through the forests. Furthermore, the presence of tea (*Camellia chinensis*) and rubber (*Hevea brasiliensis*) gardens with no clearly delineated boundaries with neighboring forests in sites bordering both forest areas studied also enhances encroachment of forest land and illegal logging by villagers living inside these tea and rubber estates.

v) Poor capacity, monitoring and infrastructure of local organizations

Finally, the inadequate capacity of the FD, inadequate facilities for its staff, unskilled labor, and outdated technologies restrict the ability of FD staff to contribute significantly to the control of illegal logging.

Discussion and suggestions for future work

Although quantification of the amount of illegal logging is quite difficult and depends on being able to obtain reliable information, we believe this study fairly accurately represents the overall scenario of the areas that were studied that might be common to other developing nations with similar socio-economic and political contexts to Bangladesh. The most important and significant part of the study is that even though support is still very limited and inadequate, economic incentives in the form of AIG support could potentially contribute to preventing or reducing illegal logging, although efficiency varies with the type of scheme. Correspondingly, however, the use of conventional forest law may only worsen the situation because such reliance does nothing to change the lives and incomes of poor illegal loggers who have no other means to earn money to support their families other than illegal logging; very disappointingly, in many cases, such reliance actually creates a vicious cycle of illegal logging (Figure 2), in which the illegal loggers continue and increase the level of their illegal activities to enable them to afford the fees of their legal representation and appearance in the court as well as enabling them to sustain their livelihoods.

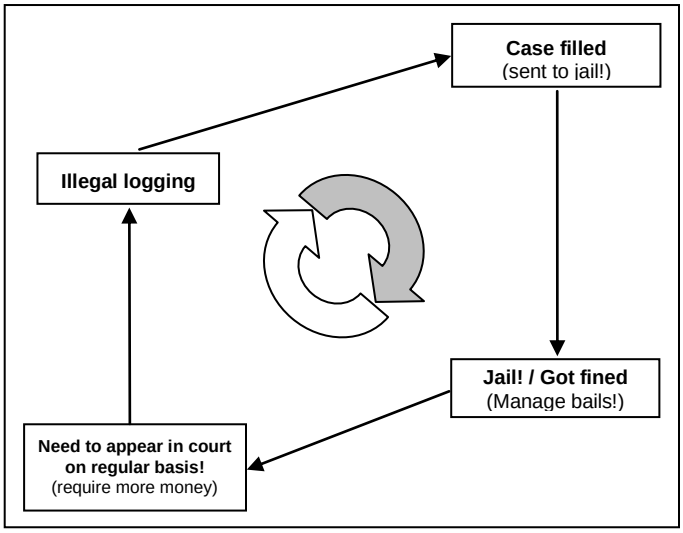

Figure 2. The vicious cycle of illegal logging

When looking at the factors that influence illegal logging in the areas studied, it was evident that livelihood insecurity is the most critical issue that affects illegal logging in these areas. Figure 3 represent a conceptual model showing how different factors influence illegal logging in the areas, such factors presumably being similar to those present in other parts of Bangladesh (and indeed other parts of South-East Asia). It is quite clear that, in general,

factors driving illegal logging include the needs of the poor, the greed of other people, and poor law enforcement (see Tacconi et al. 2003). From our study, however, it is also obvious that although promoting forest law enforcement might seem to be the simplest way to control illegal forest activities, stricter law enforcement could actually worsen the situation and hurt thousands of forest dwellers if such enforcement just means applying existing laws more vigorously and denying or overlooking other options that might be available to encourage activities other than illegal logging.

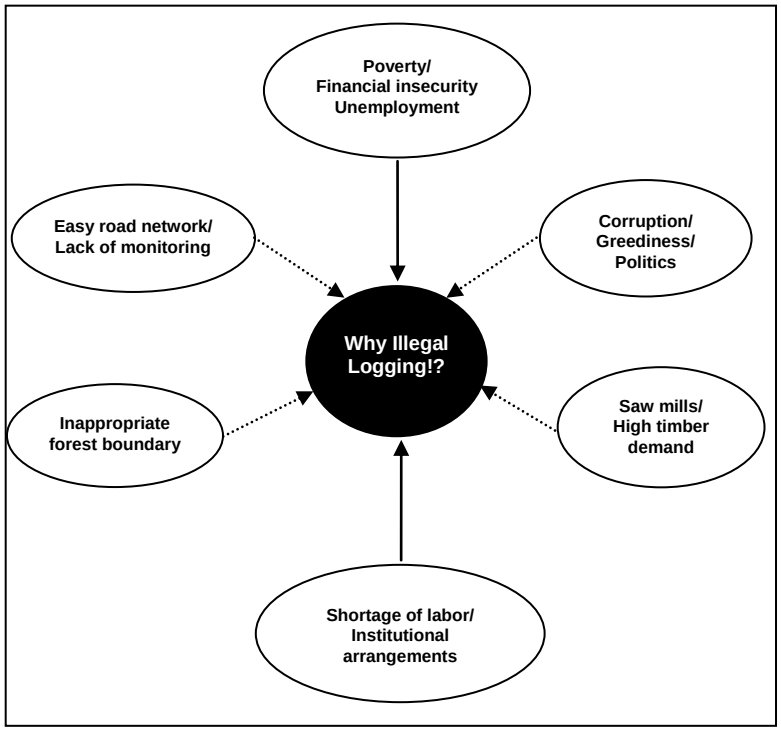

Figure 3. Conceptual model delineating how factors affect illegal logging

It is therefore important to revise the existing forest law and provisions for illegal logging. Traditional livelihoods and forest dependency should be kept in mind while applying the law. Further, since there are lot of limitations with projects and their funding, some sustainable financing schemes based on protecting local resources including Reducing Emissions from Deforestation and Forest Degradation (REDD+) and promoting eco-tourism could be followed to ensure economic progress as well as to ensure the sustainability of forest resources.

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