

Beyond over-logging?

From non-democratic era timber exploitation towards democratic and sustainable forest governance

Oliver Springate-Baginski¹, Thorsten Treue², Kyaw Htun³

¹University of East Anglia, UK; ²University of Copenhagen; ³EcoDev & retired DDG, MoF. September 2015



Plate 1: Continuing logging in an evidently over-logged forest, Katha FMU, Sagaing, Spring 2015

KEY FINDINGS:

- 1. Forests cover about half of Myanmar** and provide multiple benefits to society. Yet, widespread deforestation and forest degradation calls for urgent action.
- 2. Forests have been systematically over-logged for decades:** Colonial and military governments have focussed on export-oriented timber exploitation and significantly exceeded estimated sustainable levels (the Annual Allowable Cut) for decades.
- 3. Illicit logging practices appear widespread:** Policy pronouncements, interviews and observation indicate there is a new mood of improved stringency to enforce harvesting regulations. But there is also lack of transparency and entrenched interests. Unaccounted illegal flows and malpractice evidently persist, although the extent is unclear.
- 4. Felling still continues but is 'scraping the barrel':** Today, the harvested volume as well as the sawing grade quality is far lower than in the 1980s, and preferred species have become very scarce. Many sawmills are idle or running below capacity.
- 5. The timber industry is in a difficult transition from exporting logs to further processing:** The business model of 'mining' old growth forest resources has precipitated the current crisis and is no longer viable or legal.
- 6. Forests are now widely degraded.** There has been an abrupt decline of the 'growing stock' over the last 25 years. In response, the 'Annual Allowable Cut' level has been repeatedly downgraded.
- 7. Over-extraction of timber is closely tied to land use change (deforestation).** Remote sensing data and visual observation indicates a pattern of major and widespread changes: Secondary logged-over forests are being converted to agriculture. Primary forests are converted to agribusiness plantations. This generates conversion timber of yet unknown quantities and end-uses.
- 8. Supply of timber and wood for domestic use is a major blind spot in forest governance.** Historically, domestic supply has been marginalised in favour of export revenues. This has pushed a large and growing domestic demand into mainly illegal and ad hoc, supply from reserved and unreserved forests further undermining sustainability.
- 9. An inter-related set of actions are urgently required** to transform the forest sector from the current cycle of decline to a 'virtuous cycle' of regeneration through participatory management focused on growing and marketing of timber trees:

POLICY RECOMMENDATIONS:

- **Secure and assess the remaining forest areas,** gazette Unclassified Forests, review existing concessions, stop any further land use change away from forest, and update inventory data for forests with apparent timber production potential.
- **Reform land and tree tenure to secure private and community rights.** Promote a sustainable timber supply through liberalising timber and wood production and marketing conditions.
- **Introduce sustainable forest management in conjunction with local communities.** Much forest should be treated as 'logged-out' and allowed to recover for years ahead. Community Forestry and other joint governance models should be widely promoted.
- **Capacitate FD to be 'fit for purpose' and privatise MTE** (through non-preferential corporatisation).
- **Promote good governance and rule of law:** Update and enforce rules and guidelines. Publish forest and logging data, introduce third party monitoring of logging, transport and export of timber and wood products. Train the judiciary on forestry matters.
- **Facilitate citizen-led multi-stakeholder landscape planning:** Re-negotiate management objectives. Build multi-stakeholder alliances between citizens, public servants and enterprises, particularly Small and Medium Enterprises in wood processing.
- **From conflict economy to peace dividend:** resolve political conflicts in ethnic areas and decentralise forest governance. Challenge illegal timber conflict economy. Improve border control in partnership with neighbouring countries.
- **Promote further processing of legal timber.** Establish credible Chain of Custody, liberalise and streamline export procedures.
- **Overall sectoral policy review:** revise the Forest Law, promote community forestry and other forms of citizen rights to forests, forest products, and forest revenues.



Introduction to the problem

Myanmar’s forest and timber sector is currently undergoing a process of reform, indicated by a number of policy changes, most significantly the 2014 Log Export Ban, and the Government engagement in a Voluntary Partnership Agreement (VPA) process with the European Union’s Forest Law Enforcement Governance and Trade (FLEGT) initiative, requiring transparency and compliance improvements. This policy redirection is essential, albeit long overdue. Practical implementation will inevitably take time and face obstacles.

This study:

Under the EcoDev FLEGT project the authors have conducted a detailed field study in Spring 2015 on the current status of the timber trade and forest change. We have pursued this through two simple questions:

1. What is the current status of the timber and forest sectors?
2. What policy measures can promote democratic governance processes, sustainability of the resource, and equity in distribution of the costs and benefits?

Our method involved interviews with a wide range of stakeholders nationally and regionally, field study of forests at timber extraction sites in three state/regions, visits to log depots and processing factories in Kachin, Tanintharyi, Sagaing, Mandalay and Yangon, analysis of previously unreleased Ministry of Environmental Conservation & Forestry (MOECAF) data. Remote sensing-based mapping of forest condition and change.

Figures 1 below illustrates the extent of forest in Myanmar and its administration. Figure 2 below illustrates the main aspects of the timber extraction and marketing channels.

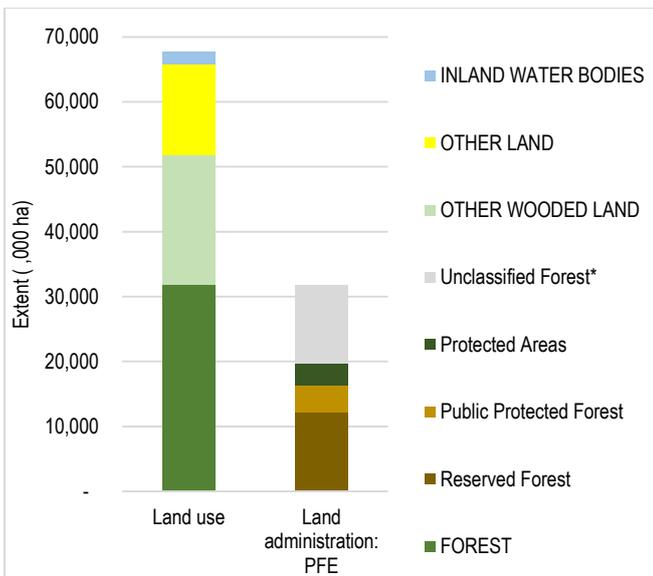


Figure 1: Myanmar Land use and Permanent Forest Estate (Data: MOECAF 2011) *note Unclassified Forest extent is an estimate. Note: 'Forest here = >10% canopy cover.

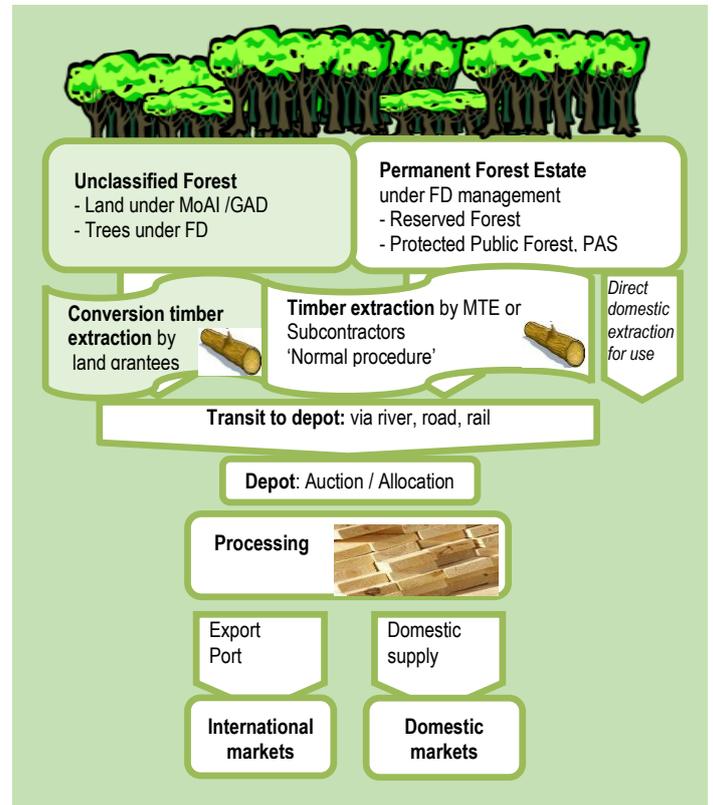


Figure 2: Elements of the forest and timber governance system

1. Logging has systematically exceeded sustainable levels for decades

The Issue: silvicultural system in theory

Myanmar has almost 50% forested landscapes, of which around two thirds are under the ‘Permanent Forest Estate’. Sustained yield forest management here requires that harvest does not exceed growth. The Annual Allowable Cut (AAC) is the forester’s upper limit for sustainable extraction, which is equal to or less than the annual increment of a given forest area. Under the Myanmar Selection [felling] System (MSS), the AAC is determined by measurement of the growing stock, a 30 year felling cycle and minimum girth limits. Before logging takes place, foresters must mark each and every tree that may be felled to enforce the girth limit (so-called Selection Felling, or SF, marking). When the AAC is reached, tree marking stops for that year. Accordingly, 1/30 of a forest area will, on average, be harvested annually. Inspections by forestry department staff during and after logging are prescribed to ensure compliance. Every 10 years the forests are re-measured (inventoried) to assess the growing stock and adjust the AAC. In practice, however, this system has not been strictly followed during the non-democratic military era.

Data and method

The best available evidence we have for over-extraction and its effects is official extraction data, supplemented with satellite-based forest cover change analyses and field observation.

Findings: long term over-extraction

Teak has historically been the priority timber species and since the colonial era official annual harvest levels have been staggering. For comparison with the prescribed AAC, wastage during harvesting and transport as well as unrecorded (illegal) harvest must be added to the official figures.

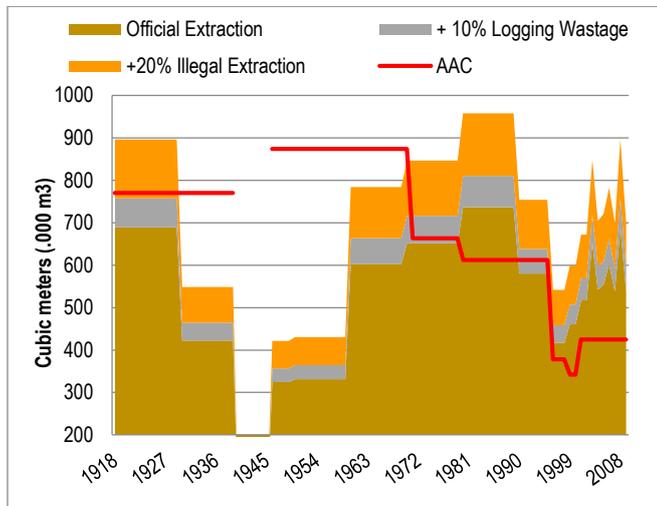


Figure 3: Teak AAC, production plus estimated wastage and illegal extraction. Data: MOECAF 2011, Castrén 1999. Note: Data unavailable for the period 1940-45.

Figure 2 illustrates the MOECAF (2011) data for AAC and harvesting of teak over the period 1918-2009. Following Castrén (1999) we have including estimates of wastage (at 10% for felling damage) and illegal including domestic use harvest (at 20%). The figure shows that the AAC was exceeded probably from the early 1970s and definitely throughout the 1980s, where the recorded harvest peaked at 740,000 m³ annually, as well as in the late 1990s and throughout the 2000s. The reduced, but not respected, AAC reflects the concurrent forest degradation and probably also significant conversion of forest to agriculture (Bryant 1996, pp. 158-168). Observe that the AAC for teak was increased in 2001 (perhaps politically) even though the resource was clearly overharvested.

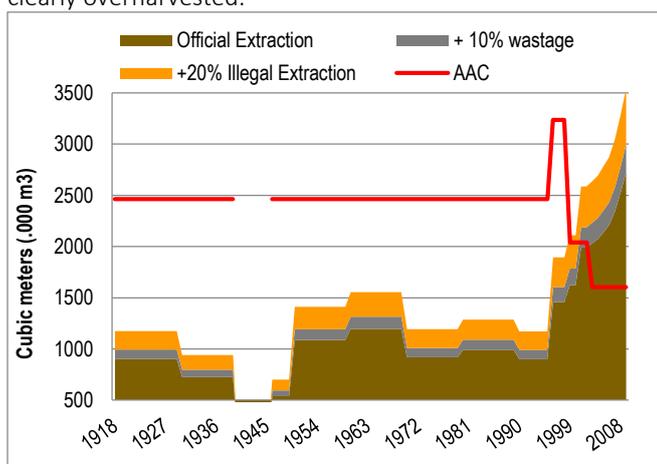


Figure 4: 'Other hardwoods': AAC, production plus wastage and illegal extraction 1918-2008. Data MOECAF 2011. Note: Data unavailable for the period 1940-45.

The story for non-teak commercial species - the category of 'other hardwoods' (mostly Kanyin, i.e. Dipterocarps) is similar although obvious over-extraction is a more recent phenomenon: while the AAC for other hardwoods does not

seem to have been officially exceeded until the early 2000s, the AAC has nevertheless been drastically reduced, presumably because available forest resources had been degraded or cleared (figure 4). The odd-looking increase in 1996 and following decrease in 1998 of the AAC suggests that it is not *only* a technical term but also subject to political influence, which temporarily 'compensated' logging companies for the 1996 reduction of the teak AAC. Persistent over-harvesting of 'other-hardwoods' was the response.

Recent patterns of over-extraction 2010-15

Based on inventories at forest management unit-level in 2010, the AAC for teak was drastically reduced from the previous 147,300 to 48,897 trees (or 424,790 to 141,000 m³), while the AAC for other hardwoods was moderately reduced from 1,131,416 to 817,043 trees (1,602,034 to 1,156,896 m³) (Data: MOECAF 2015). Yet detailed official data for years since 2009/10-2014/15 illustrates that harvesting has not been commensurately reduced. The aggregate AAC has been significantly exceeded every year until 2014-15 and in one year the national AAC for teak was exceeded in Sagaing region alone (Figure 4).

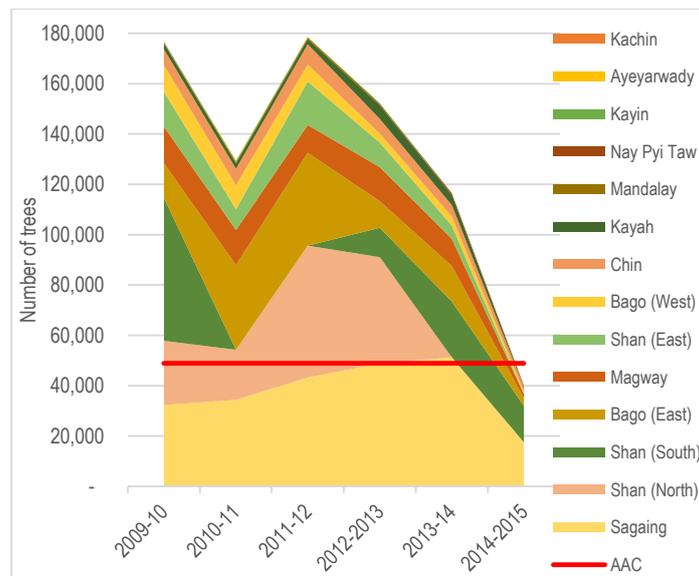


Figure 5: Teak – National aggregate AAC and Trees actually marked for felling by FD for 2009-2015 (Data: MOECAF 2015)

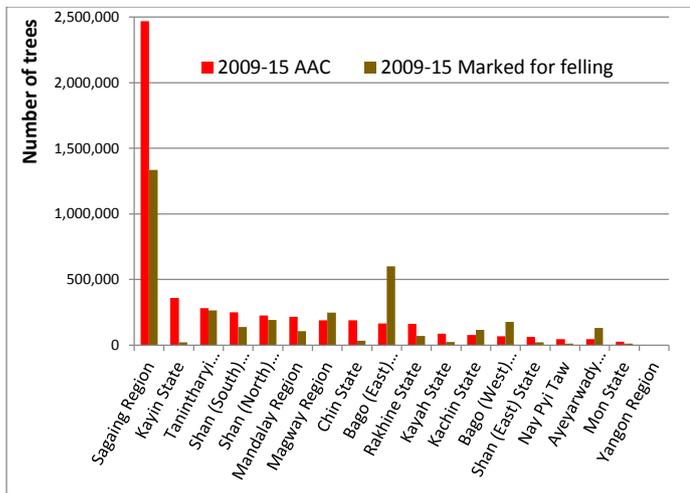
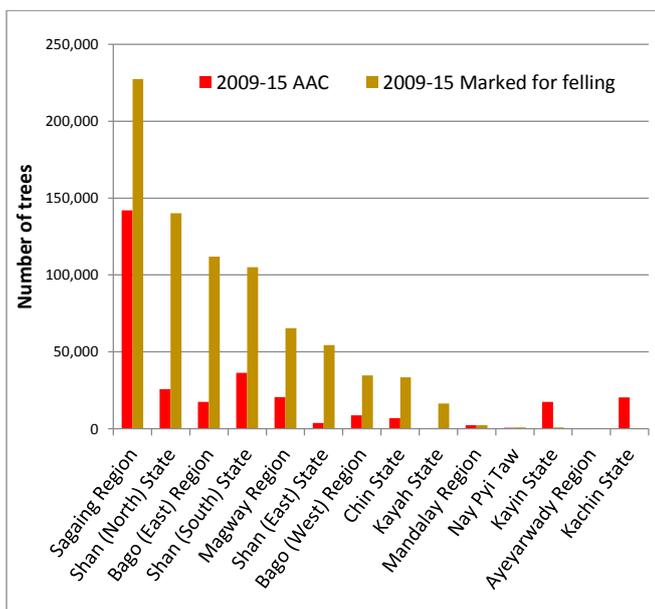


Figure 6: 'Other hardwoods' – Cumulative AACs and number of trees marked for felling 2009-15. (Data: MOECF 2015)

Although Figure 5 above shows that extraction has been exceeding the AAC until this year for teak, the actual extraction levels are likely to have been even higher for four main reasons:

1. Harvesting under Modified Procedure (MP) in conflict areas is poorly monitored.
2. Conversion timber (discussed below) is not marked and recorded in the normal way
3. Conflict timber and other unaccounted/illicit extraction is not included
4. The 2014-15 data may be incomplete

The exceeding of AAC for teak is a common pattern across the forested states and regions, with few exceptions (Figure 7). It is evident from the above figures that Sagaing Region has been treated as the country's 'teak basket'. In general, teak has been overharvested and grossly so in Sagaing, Shan Bago, Magway, and Chin. In 2012/13 and 2013/14, up to the 2014 log export ban, teak was harvested at levels that tremendously exceeded the AACs in almost all regions and districts.



The situation for 'other hardwoods' seems to be less alarming as, with the exception of Bago (East and West), Magway, and Ayeeyarwady Regions and Kachin State, these

have been harvested at or below the AAC (Figure 6). This suggests a shift from the period of over-harvesting in 2000-9 (Figure 5 above). Yet, a more likely explanation might be that logging companies have focussed primarily on over-harvesting teak, while they could get away with it, such that less capacity has been available to harvest the economically less attractive other hardwoods. Supporting this view is that fact that Tanintharyi Region, where teak was logged out long ago, also experienced a 'logging rush' up to the 2014 log export ban. Here, the AAC was exceeded by more than 250% in both 2012/13 and 2013/14.

Reasons for and management of the over-extraction

The documented official over-harvesting is in stark contrast to the Myanmar Selective Harvesting System. Politically determined annual revenue targets have, however, triumphed sound silvicultural principles and instituted a

Figure 7: Teak: contrast between cumulative AACs and actual number of trees marked for felling 2009-15, by state. (Data: MOECF 2015)

'Myanmar Revenue Target System' according to which the government passed down 'revenue orders' to MOECF. This 'burden' was then shared among forest management units at annual meetings between the Director Generals of the Forestry Department and the Myanmar Timber Enterprise, and their regional directors. The 'teak rush' up to the log export ban, however, suggests that a 'final round' was handed to private and semi-private interest through political patronage (an apparent case of grand corruption).

Visually observed impact and follow-on processes of timber over-extraction

In field visits we observed natural teak-dominated forests where all recently felled trees were only just above the minimum girth limit of 6'6" and the entire harvest was official assessed to be of the lowest log grade (signified by one out of five stars). These forests may regenerate if closed for the prescribed 30 years. However formal rules were widely ignored by local people who we observed accessing the forest to extract timber, firewood, and various non-timber forest products (orchids, fish, bushmeat). In another forest we visited the composition had been a mixed teak dipterocarp forest but all above girth limit teak trees had been cleared only seven years ago. Here, marked above girth-limit dipterocarps were being extracted but in addition we found several fresh stumps of undersized and unmarked, teak. Again, it was obvious that local people accessed and passed through the forest. Yet Forestry Department field staff also mentioned that, after they had marked trees for felling, Myanmar Timber Enterprise staff commonly paid them to refrain from carrying out logging and post-logging stump inspection (an example of petty corruption). One observed forest reserve was under massive degradation as past clearance of all teak and dipterocarp timber was now followed by rampant firewood cutting that Forestry Department staff were unable to control.

2. Although compliance seems to be improving illicit practices appear to remain widespread

The issue

It has been widely recognised that during the dictatorship era there has been corrupt practice and non-compliance across many aspects of the timber sector. Weakening of the rule of law around forest governance and the timber trade occurred due to a number of factors: the pressure to generate revenues above all other concerns, military corruption and patronage relations with client companies, the marginalisation of Forest Department enforcement authority and the lack of realistic salaries. Now that the dictatorship era is passing it is important to understand the risk areas for 'non-compliance' in order to restore rule of law and transparent governance in the sector. This is particularly important if management planning around harvesting is to be implemented effectively, and also if higher price / higher compliance international markets are to be accessed. There is clearly a serious official effort now underway, although these efforts are likely to encounter resistance from those seeking to continue to benefit.

Data and method

Corruption and non-compliance is difficult to study directly, as those involved seek to keep their illicit activities undetected. We have relied on interviews and field

observation. The evidence and personal observation of current and retired staff and traders, both senior and junior, we found to be compelling.

Findings

There have been a wide range of potential 'Modes of Non-Compliance' in the sector. We do not have proof that all these crimes are currently occurring, rather we have received credible allegations and rumours that they have existed under the dictatorship era, and that some continue in some areas. We have no proof to dispel these allegations. Figure 7 below illustrates, overlaid on the 'normal' timber extraction procedure (Figure 1 above) the major probable modes of non-compliance, and table 1 below explains the issues. It is important to note here that not all corruption is entirely voluntary: it seems that many junior staff have become involved in illicit practice reluctantly, partly as a necessity to retain their jobs, and partly as methods of topping up their salaries.

Implications

A lack of transparency and apparent prevalent lack of compliance undermines credibility of the Forest Department, MTE and Myanmar timber exports, which are considered 'very high risk for non-compliance' for those international markets that care about compliance in the chain of custody. Ensuring transparency of processes and timber flows, and involving third party participatory monitoring would reduce risks and improve rule of law.

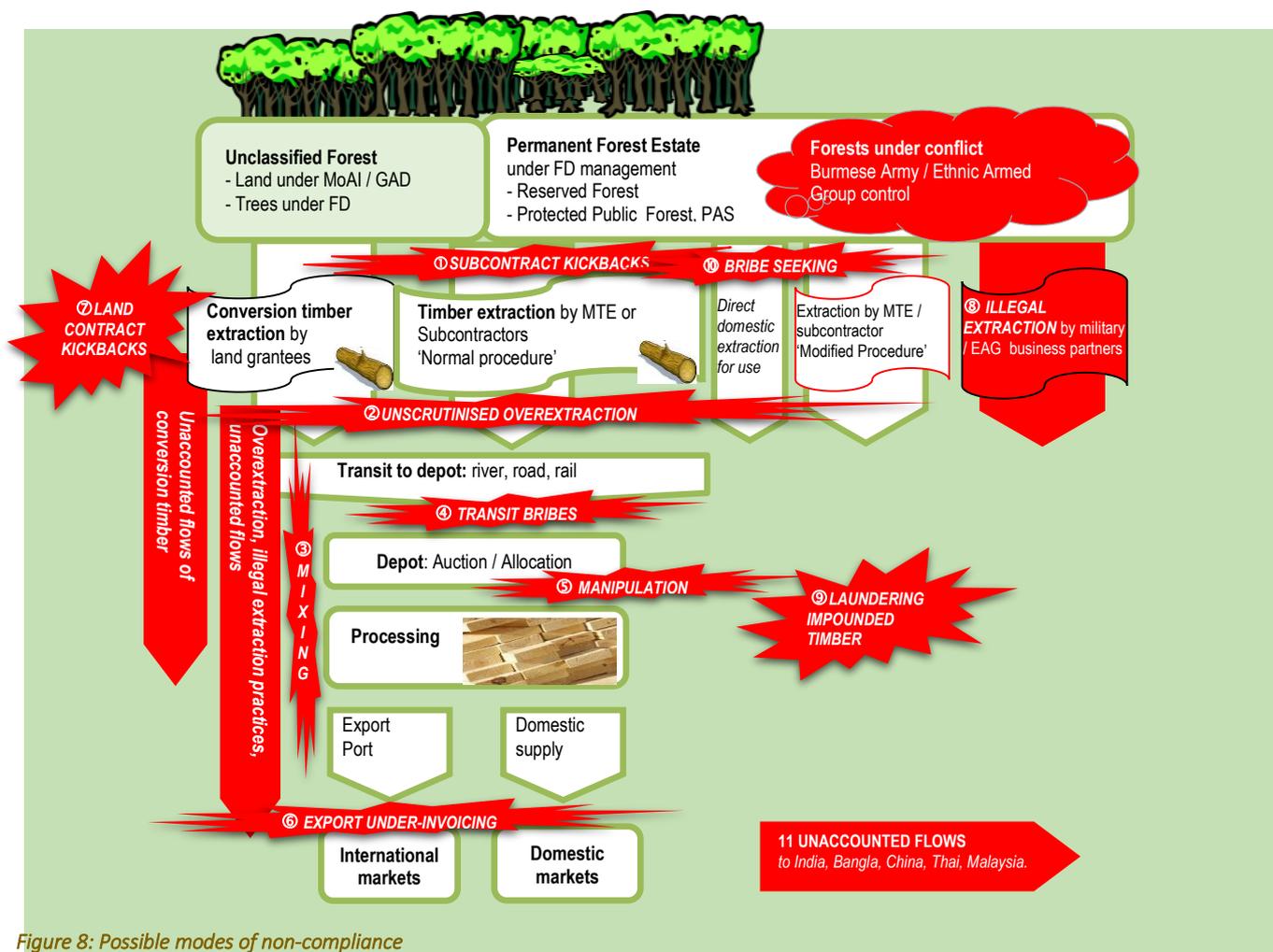


Figure 8: Possible modes of non-compliance

Table 1: The range of reported modes of non-compliance, and issues for enforcement

Modes	Details	Is it changing post –LEB?
1. Contracting kickbacks to secure logging subcontracts.	Subcontracts are allocated at FMU-level for one year at the time and can be very lucrative. Accordingly, prospective subcontractors may wish or need to 'influence' the allocation process on an annual basis. Allegedly, senior figures in the Military and MTE have, through this process, enriched themselves by taking bribes in the past.	<i>Unclear. Some subcontractors are blacklisted for irregularities of unknown nature.</i> Action needed: Transparent tender system with no discretionary element to maximize public revenues. Independent monitoring
2. Unscrutinised logging allowing illicit and over-extraction as well as breaking of other harvesting rules.	Widespread allegations (particularly in Sagaing) suggest that MTE and subcontractors systematically pay FD staff to stay away from logging operations. Low salaries make FD staffs vulnerable to such 'offers'. Lack of field-level scrutiny enables irregularities including extraction (i) of unmarked trees, (ii) from non-specified areas, and (iii) undersized trees, producing 'unaccounted' timber. Further, logging roads are opened at excessive density and not closed after extraction. Compartments are re-entered before 30 years. Unscrutinised Modified Procedure (MP) ; Timber felling in conflict areas where trees are not marked by FD staff. Subcontractors extract trees above girth limit at will. Log sizes are only scrutinised at the depot providing opportunities for irregularities.	<i>This seemed to be 'standard procedures' in some areas of Sagaing and apparently not changing. Apparently, the MP system has been discontinued from 2014-15, because of problems.</i> Action needed: Effective monitoring of harvesting and enforcement of rules and guidelines. Sound incentive structure for FD staffs. Independent monitoring
3. Mixing of unaccounted and accounted timbers.	Unaccounted timber may be 'laundered' through mixing with accounted timber during transit. This allows for persistent mixing, and creates aversion from foreign markets, which require due diligence regarding chain of custody (CoC).	<i>Widespread rumours suggest this continues. The absence of a comprehensive CoC system prevents provenance validation of timber flows.</i> Action needed: Comprehensive CoC system.
4. Transit bribes.	Timber is transported from forest to market by river, rail or road. Numerous checkpoints should ensure that transported logs and wood products are legal. Yet, checkpoints appear porous with payment of bribes or menaces from powerful interests, and some unaccounted timber definitely moves through. In conflict areas the Burmese army and/or ethnic armed groups may control the checkpoints and 'tax' unaccounted timber flows, which gives an incentive to maintain the conflict.	<i>So far unclear</i> Action needed: Comprehensive CoC system. Sound incentive structure for rule enforcing staffs at checkpoints. Independent monitoring. Ending of armed conflicts around the country.
5. Manipulation of Timber Allocation, Auctioning, and Grading.	In the past, MTE controlled timber flows and selected which logs to auction domestically and which to export. This allowed for large discretionary timber allocations to favoured clients. In part such irregularities were necessitated by as MTE had little or no working capital and thus became obliged to use timber as payment to sub-contractors providing extraction, transport, and export services. Further, the pre-LEB auction and allocation system involved fraudulent assessment of timber quality (Sawing Grades) thus allowing for, de facto, under-invoicing and creation of unofficial cash-flows.	<i>In 2014, the system was changed to direct auction at field depots, and MTE's marketing division closed. This appears to improve transparency, enhance state revenues, and may reduce wastage. Yet, the new auction system appears open to some level of manipulation.</i> Action needed: Independent monitoring.
6. Under-invoicing of export consignments.	Internationally, the volume of timber consignments is often understated to evade taxation and to facilitate export of unaccounted/illegal timber. The extent to which this has happened is unclear. However, the sizeable discrepancy between stated exports and imports of destination markets (EIA 2013) indicates that significant volumes of 'unaccounted timber' have evaded formal export invoicing systems. To some degree timber traders 'admitted' to this but also emphasized that under-invoicing was a necessity evil, when international currency accounts were difficult to open in Myanmar and thus had to be opened elsewhere.	<i>Conditions seem to be improving, but it is very difficult to verify.</i> Action needed: Transparency of export volumes. Independent monitoring inclusive of timber and wood product export-import data.
7. Contracting kickbacks for land conversion leases and conversion timber irregularities.	In principle, forests are converted for other uses according to a formal system. Yet, practice establishes ample opportunities for irregularities. It is widely rumoured that some state chief ministers' and state/regional governments' judgement on land concessions are influenced by payments. Flows of poorly scrutinized conversion timber invites mixing with other unaccounted timber. Further, land conversion grants form part of a military strategy against armed ethnic groups and crops/plantations are not always established after clearings and selling of conversion timber (Woods 2015).	<i>Very unclear. There have been policy pronouncements on a moratorium on land allocation, but there seems to be no register of concessions. Pronouncements from the President's office have said land allocation will be suspended.</i> Action needed: Political engagement from the highest level to sanitize conversion practices
8. Rampant and illegal extraction in conflict areas.	Upland conflict areas contain some of the ecologically most valuable remaining forests, partly because the conflict has deflected logging activities elsewhere. Yet, when forests are controlled by one or other of the combatant organisation logging takes place. In Kachin, Chinese logging convoys are reportedly a frequent problem, stripping several valleys of trees.	<i>Enforcement may be increasing, although to an extent this risks contributing to a struggle for power with armed ethnic groups.</i> Action needed: Peace talks should include forest conservation resolutions
9. Laundering impounded timber.	Internationally, unaccounted timber often becomes accounted when it is impounded and then sold on. No direct evidence of this was discovered. Yet, low salaries may tempt FD staffs to collude with illegal loggers.	<i>Guarding high value products by low paid staffs presents an inherent risk.</i> Action needed: Sound incentives for FD staffs
10. Rent seeking from domestic extractors	There is a grey area between domestic extraction for own use, and for commercial sale. Apparently, low FD field staff salaries promote routine rent seeking from less powerful 'rule breakers' (petty corruption).	<i>A 'criminalized' domestic wood market and low paid FD staffs is an unhealthy combination.</i> Action needed: Market liberalization.
11. Un-accounted border flows	Since many borders are areas of conflict border transit of unaccounted timber is easier than through the regulated docks in Yangon.	Action needed: Peace talks to include modes of effective enforcement and cooperation with neighbouring countries' border guards.

3. Felling still continues but it is ‘scraping the barrel’ in terms of low quantities, low quality, less desired species

The issue

After the intense rush to fell and export logs before the Log Export Ban came into force, there are now clearly problems with sustaining timber supplies.

Data

A range of sources are needed to establish a clear picture of the current quantity and quality of timber supplies, only some of which have been available. Site visits to forests, industry sources and sawmill observation were used.

Findings

Field observation in forests, as discussed above, indicates that the growing stock of above girth limit commercial species is limited except in the most remote areas. Over-extraction of teak in particular, and lack of remaining seed trees has already changed the ecological composition of most forests.

Observation at log yards indicated much old and low quality wood, but limited quantities of higher quality and more commercially valuable timber.

Visual evidence from site visits to sawmills and wood processing factories confirms this. In Mandalay MTE compound the Win & Win / MTE joint venture sawmill stood idle due to lack of supply. Many other businesses report a similar scenario.



Plate 2: Idle sawmill capacity in MTE compound (Win & Win/MTE joint venture), Mandalay



Plate 3: So-called ‘rubbish’ timber at National Wood Enterprise factory, Yangon being processed into furniture

There are some remaining well-stocked forests, particularly interior areas of Tanintharyi (e.g. Kauthawng FMU), although these too are being logged.

4. Myanmar’s national timber industry is in transition from logging to processing

Issue

For many decades the traditional forest sector business model has been to harvest, transport, and export logs for processing elsewhere. The main cost and technical challenge being transport. This has been very lucrative whilst accessible good forests were ‘mined’. But in the new reality of depleted forests and timber shortage, how is the timber industry adapting?

Data

We have mainly relied here on interviews, a workshop and field visits to understand this issue

Findings

Timber businesses are taking one of three strategies:

1. **Diversifying out of the sector / ‘moving out’.** Much of the capital of the timber industry are transport vehicles. This is suited for roadbuilding, other haulage etc. Several business representatives said that as logging business is drying up they are moving their capital into other sectors, particularly roadbuilding.
2. **Recalcitrant persistence / ‘hanging in’:** A few respondents told us their traditional business model can continue fine. This approach may work in the few conflict / ceasefire areas where there are still valuable trees, but even there, there seems to be an element of denial of the looming issue of dwindling stocks.
3. **Investing in processing ‘rubbish’ / ‘stepping up’.** The most dynamic businesses are learning the technical challenges and investing in advanced processing equipment to add value to the low quality but relatively cheap wood available. There is a very large international demand and growing domestic demand for wood products. A skilful processor can convert low quality inputs into a final product of apparently similar standard to those from high quality inputs. Good profits can clearly be made. The main challenge for investment, especially for larger scale is certainty of continued wood supply. Processors need to keep many months stock in hand, and if this becomes difficult to assure the financial return on their capital investment is threatened.

Implications

Policy adaptation is needed to assure production of wood, even at lower quality to keep the emerging wood processing industry supplied with adequate volumes. Technical support and international partnerships are also needed.

5. Forests are now widely over-logged, degraded, or cleared for other purposes

The issue

Forest degradation is directly caused by over-logging and follow-on activities. Outright deforestation has also occurred across Myanmar on a very large scale due to different forms of land use change. These processes are problematic for several reasons. Most importantly:

1. The ways in which land has been allocated is not transparent and corruption allegations are widespread.
2. Timber flows from conversion may have given a false impression of the permanent forest estate's productivity.
3. Destroying forests undermines the future supply of timber, non-timber forest products, and environmental services (carbon storage, watershed protection, species habitats, aesthetic, cultural and religious values).

Data and method

The best available data on forest condition, until recently, has been Myanmar Forest Department's submission to the UN-FAO Global Forest Resource Assessment. However, EcoDev's recent remote sensing study provides important updated information. Field observation was used to further qualify the satellite image-based analyses.

Findings: Drastic decline of dense forest, gradual conversion of degraded forests to other land uses

The FAO dataset, comparing the years 1990, 2000, 2005 and 2010 shows a clear pattern of drastic collapse. In 1990 'dense forest' (i.e. >40% canopy cover) was the largest land use in the country, at 45%. By 2010 it had been more than halved to 18% while the area of open forest (10-40% canopy cover) had doubled.

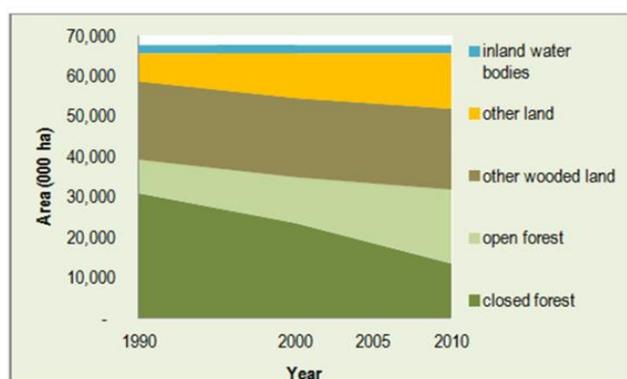


Figure 9: Myanmar land use 1990-2010 (Data: FAO Global Forest Resource Assessment 2010, Myanmar submission)

Today, EcoDev's study confirms that most forest areas are degraded (using the measure of less than 80% crown coverage) and intact forest (80% crown coverage or higher) is confined to the most remote areas, patches within degraded forest, and areas affected by conflict (Figure 9). EcoDev's preliminary land cover-change analyses show that, during the period 2002-2014, Myanmar has lost more than 2.28 mha (12%) of its intact forest. The area of degraded

forest has increased slightly by 0.1 mha (0.4%) because the conversion of forest in this category to non-forest/agriculture (below 10% crown coverage) and water bodies was almost equal to the area of intact forest moving to this category. Non-forest areas have increased by 1.54 mha (7.5%), mainly due to clearance of intact forest (1.1 mha) and of 0.44 mha of degraded forest. The area of plantations has increased dramatically from 0.98 to 1.55 mha (58%) all of which came from intact forest.

Clearings for agriculture have generally spread up-hill and up-stream as an extension of existing non-forest (agricultural) areas. New large-scale plantations are more clustered but have also in general been established in areas with existing plantations, e.g. in Kachin State, around Myitkyina Town (see below).

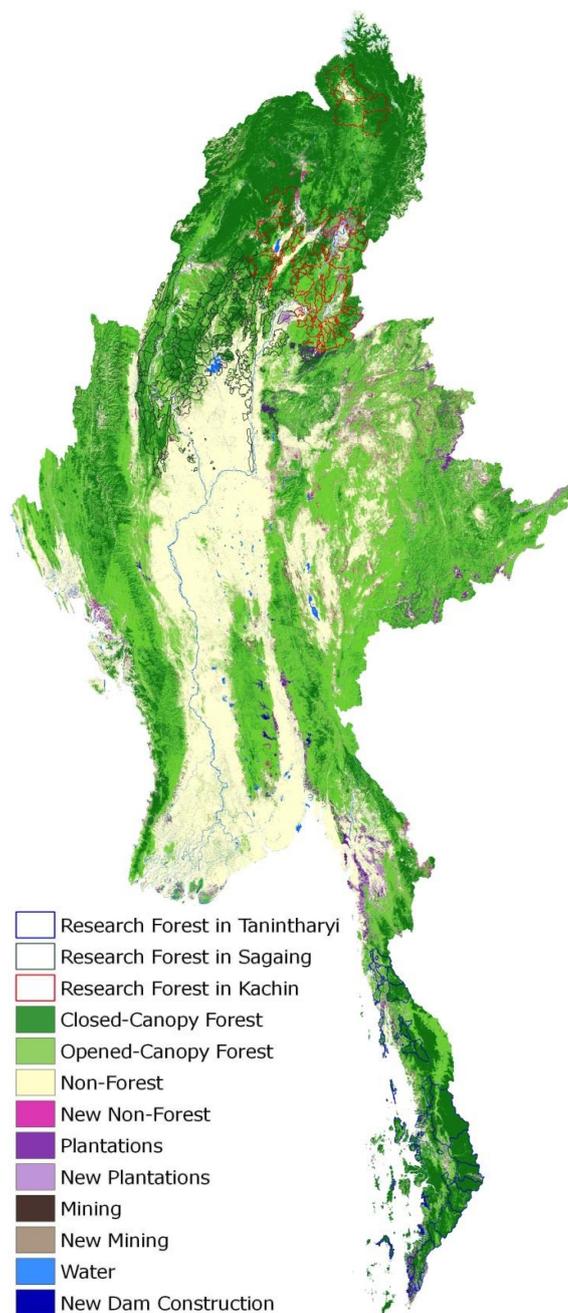


Figure 10: Forest Cover and Forest Cover Change in Myanmar 2002-2014 (Source: EcoDev 2015)

Details from Sagaing

Sagaing is Myanmar’s ‘timber basket’ but as Figure 11 below illustrates, many forest reserves in Sagaing are now degraded, which was confirmed through field observations. Further, one large reserve is converted to plantation and large reserve areas have no forest cover at all. This said, remaining intact forest areas are, in fact, under formal reservation.

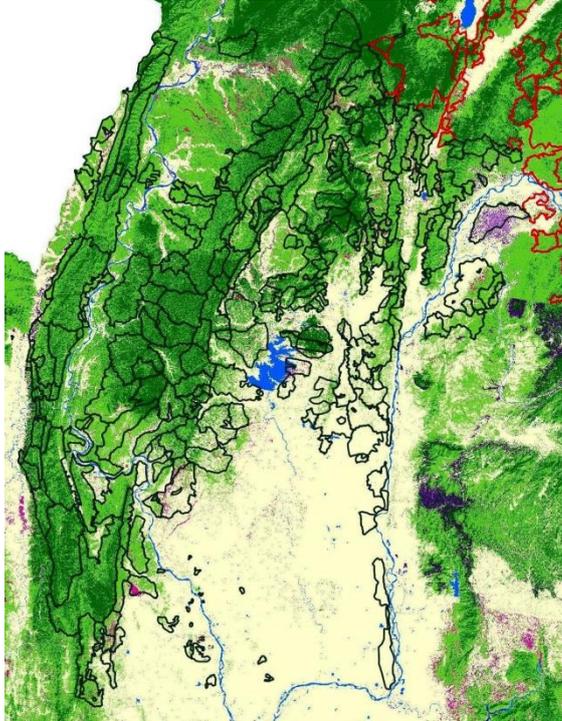


Figure 11 Sagaing Region including forest reserves (black polygons) and Landsat forest cover. Note the many degraded forest reserves (light green) and wholly or partially cleared areas within reserves (cream colour)



Plate 4: Conversion of degraded Unclassed Forests in Sagaing to privatised agroforestry landscape

Details from Kachin

Official timber extraction in Kachin State has mostly taken place in the areas South and West of Myitkyina town. However, as shown in Figure 12 most of these reserves are now degraded (light green colour) and several reserve areas around Myitkyina town have been converted to plantations (verified through field observations). Large parts of the remaining intact forests in Kachin are reserved under the Protected Areas System (dark green polygons on the adjoining map) where no timber harvesting is supposed to

take place. Yet, one notable exception is the vast areas bordering China (Figure 12).

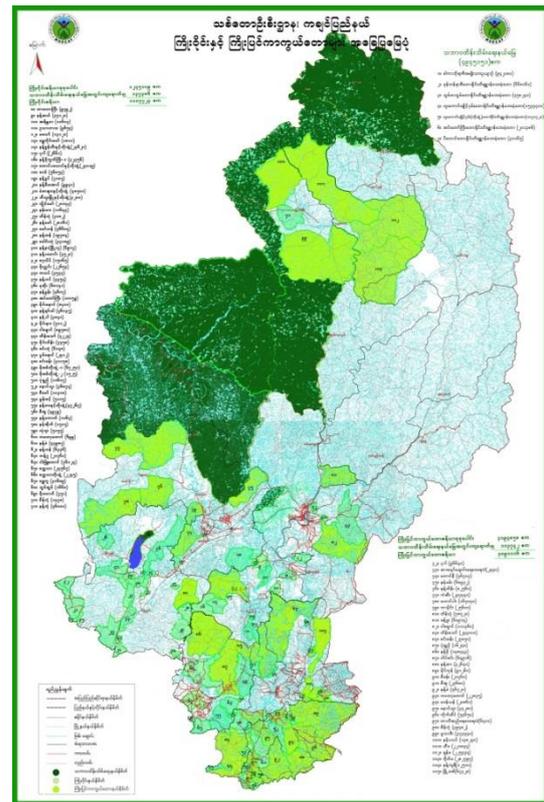
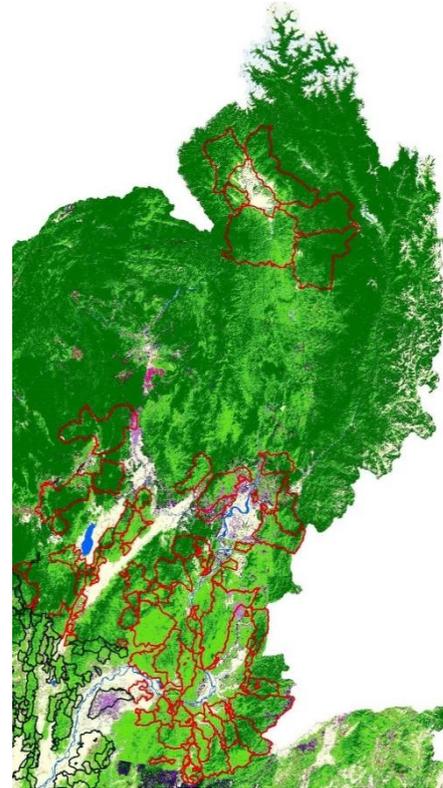


Figure 12: Kachin State including forest reserves (red polygons) and Landsat forest cover. Note the many degraded forest reserves (light green) and the concentration on plantations (purple colour)



Plate 5: New rubber plantation in Monyin area, Kachin

Details from Tanintharyi

Overall, Tanintharyi Region still holds massive areas of intact forest. However, in the Northern part (Dawei District) it is evident that many forest reserves are partly or entirely degraded (light green colour). Further, around town areas, along the coast, along the main road to Thailand, and in the extreme South, large plantations are replacing degraded as well as intact forest - within and outside forest reserves. Field observations confirmed such large-scale conversion of forest to other land-uses, but careful and selective harvesting was observed in intact forest.



Plate 6: Barren recently forested hills above Dawei, under conversion process to plantations



Plate 7: The forest frontier in Kawthaung, Tanintharyi. Reaching here requires driving for hours through recently destroyed forests.



Plate 8: Recently destroyed forest in Kawthauwng, burnt off to make way for betel nut crop for Indian market.

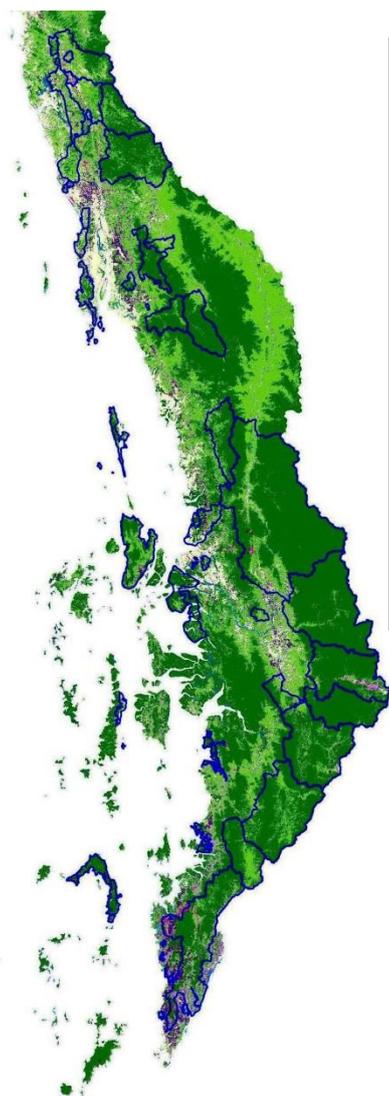


Figure 13
Tanintharyi Region including forest reserves (blue polygons) and Landsat forest cover. Notice the many degraded forest reserves in the North (light green) and the concentration on plantations (purple colour)

Implications

Together, the AAC and harvesting data, the satellite image analyses, and field observations including key informant interviews send clear messages:

- Many forest reserves have been badly degraded by ‘revenue target harvesting’ followed by unregulated extraction.
- Substantial areas of unreserved forest (unclassified forest, virgin land forest) has been degraded and then converted to agriculture.
- Agri-business plantations have expanded rapidly, both within and outside forest reserves, mostly at the expense of intact forest.

The past century's over-exploitation renders the current AACs grossly outdated. After decades of systematic overharvesting and associated loss of control over increasingly degraded forest reserves, statistically sound inventory data as well as satellite-based spatial forest assessments are urgently needed. A first step could be, for every FMU, to overlay forest reserve polygons on Google Earth images and assess the apparent forest condition before technically demanding and expensive forest inventories are conducted. The next step would be to establish protected areas to preserve unique forest habitats and, for production forests, to devise new joint management approaches that offer local communities fair and secure rights to future forest and timber revenues such that get an incentive to support and help enforce forest restoration and conservation rules. Otherwise the Forestry Department's increasing loss of control over forest will lead to even further loss of remaining forests (see below).

6. Domestic supply is in a regulatory vacuum undermining sustainability

The issue

The colonial regime was established to extract export quality timber to wealthy buyers in Europe. Local demand and local processing development were neglected. Local people mostly live in wooden houses built from locally supplied wood and use fuelwood for cooking. Domestic use is therefore potentially the largest demand on forests and potentially the largest threat to forest conservation if not effectively managed. But coordinating and managing supply for this demand in a sustainable manner largely remains neglected under the official system.

Data sources

In the absence of any comprehensive study we relied on aggregate official estimates and field observations and local key informant interviews.

Findings

Castrén (1999) cites some basic FD projections for a growing divergence between supply and demand 1990 to 2005, and concluded that the gap between sustainable supply and consumption would be widening. Current data shows that the official harvest of teak has largely been export oriented while a bigger share of the officially recorded other hardwoods has gone for domestic consumption (Figures 14 & 15)

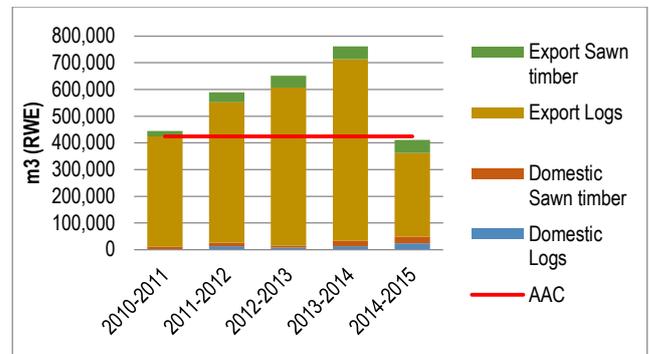


Figure 14 Official teak consumption m³ RWE (Data: MOECAF 2015)

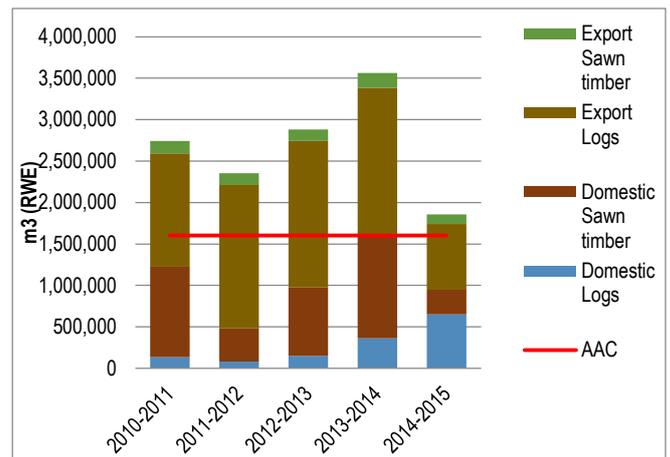


Figure 15 Official Non-teak hardwoods consumption (m³ RWE) (Data: MOECAF MTE 2015)

These figures re-iterate Castrén's concern; virtually every year the combination of both domestic and export market demand exceeds the AAC for both teak and 'other hardwoods'. This appears most obvious for 'other hardwoods', but the export vs. domestic consumption of teak hardly reflects the field reality: conversion timber from clearings of degraded forest for agriculture seemingly goes largely unrecorded, and supplies local markets (both rural and urban). The vast majority of rural houses are made almost exclusively of timber, most of which is chainsaw lumber, or processed on-site with mobile sawmills. In addition, all gathered anecdotal information suggests that small scale carpenters and private individuals satisfy their timber needs almost wholly from the informal (black) market. Reliable data on domestic consumption and sourcing of wood products appear non-existent. While scarcity of forests will promote on-farm fuelwood production, historical accounts from other countries suggest that local people will also begin to extract timber from forest reserves. This already seems to be happening, c.f. above.

From where should timber for the domestic market come? Realising the inadequacy, the GoM has instituted a 1 acre per village plantation system, but this is hardly more than a drop in the ocean. Meanwhile the criminalized commercial domestic supply provides a basis for FD staff to augment inadequate salaries (a 'make it illegal but don't stop it from

happening' approach), which antagonizes relations with local people.

In this respect, section 17 in the Forest Law 1992 is relevant: *'Forest produce may only be extracted after obtaining a permit. However if for domestic or agricultural or piscatorial use not on a commercial scale, forest produce may be extracted in an amount not exceeding the stipulated quantity [however there is no reference to which stipulation], without obtaining a permit'*

In addition, domestic timber from unclassified forest (outside PFE) is largely open access as the rules stipulate that:

1. Felling should only happen within a 20 mile radius of people's home.
2. The timber must be used within 1 year.
3. The felled amount should be sanctioned as appropriate to need.

Furthermore the district office should be notified. Yet, people generally do not bother going through such anachronistic processes.

Agri-business conversion timber from the establishment of large scale plantations appear to happen in a sequence where logging companies initially extract above minimum girth limit timber trees only. How the remaining commercially valuable timber below minimum girth limit is handled including how and in which quantities it enters which markets remains unclear. In a sense agribusiness conversion timber is even more unsustainable than cropland conversion timber as it mainly comes from clearing remaining intact forest much of which is habitat for rare and endangered species. Furthermore, many of these plantations are controversial as they form part of a conflict and land-grabbing economy where powerful and rich individuals accumulate large territories in ways that local people perceive as illegitimate, environmentally unsound, and harmful to the local economy (e.g. Woods 2015).

Thus, for domestic use, forests are effectively open access, and since state laws supersede customary regulations, no community regulatory mechanisms would be enforceable. Domestic timber supply is therefore in an institutional vacuum, personal use is open access but commercial access outside of the official system is criminalised. Yet, in practice it appears quite normal for commercial domestic timber suppliers to bypass the official channels and rely on the 'black market' (see above). Accordingly, there is a major 'blind spot' in form of an unregulated and furtive illegal domestic extraction supplying a population of some 55 million citizens.

To clear or to produce?

In Ghana, India, Indonesia, and Thailand, the political focus on timber export revenues and associated neglect of how the domestic market may be supplied on a sustainable basis has created huge informal and thus unregulated timber markets. This, together with (growing) rural populations' need for cropland and the fact that their countries' official tree tenure arrangements undermines incentives for them

to grow and market timber trees, has become the most immediate threat to sustainable forest management including inside reserved forests, simply because the forests are impossible to effectively police by forest authorities (see for example, Hansen and Treue 2008, Hansen et al 2012, and Bryant 1996, pp. 194-225).

Given Myanmar's huge teak deficit it seems highly relevant to consider how liberalization policies could promote teak production in areas that may otherwise remain permanently deforested. Specifically, section 8(a) in Myanmar's 1992 Forest Law, which reads: *"A standing teak tree wherever situated in the State is owned by the State"* needs to be replaced with rules that establish socially acceptable secure ownership to and fair marketing conditions for private and community teak producers. Today, Nepal's timber production is dominated by community forests (pers. com. B.N. Oli, Former DG of the Department of Forests, currently head of the Foreign Aid Division in the Ministry of Forests and Soil Conservation). Section 25(1) in Nepal's 1993 Forest Act reads: *"The District Forest Officer may hand over any part of a national forest to a users' group in the form of a community forest in the prescribed manner entitling it to develop, conserve use and manage such forest, and sell and distribute the forest products by independently fixing their prices, according to an operational plan."*

7. Concussions and recommendations

Diagnosis: The political economy of forest & timber decline:

In just a few decades of mismanagement, Myanmar has gone from having extensive, highly valuable, and productive forests providing multiple social and environmental functions to having shrunken, degraded and unproductive forests. In the process massive profits from this national asset have benefited small elites while corrupting the forestry and timber sectors. The key elements of this decline are:

1. Systematic 'revenue-target' driven over-extraction. Formally this was mainly legal but substantial illicit practices and high wastage occurred under political favouritism in relation to Myanmar Timber Enterprise and 'crony' subcontractor companies.
2. Expansion of agriculture and 'land grab' agri-business concessions destroying forests.
3. A disempowered and somewhat demoralised Forest Department with inadequate staffing, monitoring capacity, enforcement powers, and inadequate salary necessitating petty corruption.
4. Unregulated and partly criminalised domestic timber and wood extraction without effective management regime.
5. Insecure land and tree tenure for local people, marginalising civil society and undermining incentives to conserve, protect and plant trees, and to work with the Forest Department to do so.
6. Conflict economy in many upland areas bordering neighbouring countries

Prognosis: Without concerted action, forests will continue to decline. Myanmar must now decide whether to accept this, or work towards conserving and recovering forests.

Prescription: Integrated reform agenda

Several interrelated steps must be taken before it is too late:

1. Secure and assess the remaining forest areas, gazette remaining unclassified forests, review existing concessions, stop any further land use change away from forest, and update inventory data for forests with apparent timber production potential.
2. Introduce sustainable forest management in collaboration with local communities. Much of the forest should be treated as 'logged-out' and allowed to recover for many years ahead.
3. Capacitate the FD to be 'fit for purpose' and phase out the Dictatorship-era position of MTE.
4. Enforce rules and guidelines, assure transparency and introduce third party monitoring of logging, transport and export of timber and wood products
5. Facilitate citizen-led multi-stakeholder landscape planning and build multi-stakeholder alliances between citizens, public servants and private sector enterprises,

particularly employment-generating Small and Medium Enterprises in wood processing.

6. Promote a sustainable timber supply through secure private / community land and tree tenure and fair marketing conditions.
7. Resolve political conflicts in ethnic areas equitably.
8. Overall policy review: revise the Forest Law, promote community forestry and other forms of citizen rights to forests, forest products, and forest revenues.

Detailed policy recommendations are shown in the table below.

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Table 2: Detailed recommendations:

Issue	The political economy of decline:	Suggested policy agenda for forest restoration and sustainable timber production
Timber Extraction and Sustainable Forest Management	<p>There has been systematic & sustained over-extraction far beyond sustainable levels for short term (and short-sighted) revenue generation</p> <ul style="list-style-type: none"> ✘ AAC itself is unrealistic: as inventory is not technically adequate, and AAC should be <100% of annual increment to be realistically sustainable ✘ Extraction has not been technically planned but <i>ad hoc</i> – with repeat visits to compartments within 30 years, and <i>ad hoc</i> harvesting from other forests to achieve revenue targets. 	<p>A shift to long term forest recovery and restoration for multiple environmental and social benefits needs to be the overriding forest sector policy.</p> <ul style="list-style-type: none"> ➤ Conduct rigorous resource inventory. ➤ Close over-logged areas for logging , allow other areas to improve through harvesting below regeneration level ➤ Harvest according to ‘bottom-up’ technically sound site level plans, and make the FD independent of political/revenue pressures. ➤ Don’t harvest without Management plan context, e.g. in PPF and Unclassified Forests ➤ Where conflict obstructs harvesting it should not be, <i>ad. hoc</i>, transferred elsewhere. ➤ Minimise wastage – efficiency increase & RIL – minimise forest roads ...
Corruption, Compliance Rule of Law, and	<p>The fundamental problems are: extensive unaccounted flows and lack of compliance – particularly through MTE/‘crony’ subcontractor client relationship.</p> <ul style="list-style-type: none"> ✘ Complicity of military and authorities with illegal cross-border trade. ✘ There are multiple ‘modes of non-compliance’ 	<p>Commit to legality: strengthen rule of law, improve monitoring and enforcement</p> <ul style="list-style-type: none"> ➤ Culpability of illegal logging enforced, starting with largest culprits. Bribe taking should be considered a criminal act. Reverse culture of tolerance of corruption in FD - & rebuild trust of local people ➤ Subcontracts scrutinised and irregularities punished. FD staff must have dignified salary and adequately punished for irregularities. ➤ Introduce transparency of land and timber allocation systems for civil society to understand. ➤ Promote credible independent third party civil society monitoring and participation with democratic governance systems within and around forests
Regulatory capacity	<p>The FD authority to regulate and protect has been disempowered, MTE given political permission for overriding principles of responsible forestry</p> <ul style="list-style-type: none"> ✘ Lack of transparency ✘ Lack of effective capacity or motivation: Inadequate salary and powers. ✘ Lack of institutional ability or motivation to monitor and enforce. ✘ Strong incentives to ‘look the other way’, and supplement inadequate salary with bribes. 	<p>Capacitate FD with proper funding, salary structure, resources. Corporatize / phase out MTE’s current position and establish transparent non-preferential logging concession tenders</p> <ul style="list-style-type: none"> ➤ Empower FD enforcement in respect to MTE and subcontractors abuses ➤ Build alliances between FD and civil society to strengthen monitoring, regulation and enforcement
Domestic timber supply	<p>Lack of regulated system for domestic timber and fuelwood extraction and supply</p> <ul style="list-style-type: none"> ✘ Largely criminalised leading to salary supplements for staff ✘ Hit-and-run logging and felling practices 	<p>Establish regulated basis for domestic supply</p> <ul style="list-style-type: none"> ➤ Facilitate citizen based landscape management planning, through which local communities get meaningful and enforceable rights to local forest resources and revenues from these through fair marketing and taxation rules ➤ Promote Community Forestry and other Participatory CO-Management models for larger forest areas ➤ Manage demand through substitute fuels for charcoal/fuelwood, e.g. through the abundant natural gas.
Land and tree tenure & land conversion	<p>Weak security vulnerable to appropriation by powerful commercial interests</p> <ul style="list-style-type: none"> ✘ Incomplete reservation forest estate leaving large areas to be destroyed/ cleared under GAD ✘ Insecure private land and absence of secure tree tenure discourages private and community timber production ✘ Expansion of agribusiness concessions into forests resulting with certainty in conversion timber and political tension while benefits to society at large appear much less certain. 	<p>Secure forests for the national interest and provide legal basis for private / community timber provision</p> <ul style="list-style-type: none"> ➤ Secure remaining forest area through gazetting of Unclassed Forest ➤ Review of land concessions – any that have transgressed regulations to be cancelled ➤ Secure land tenure of communities and citizens ➤ Legal provision for ownership of products from private and community teak production ➤ Review, clarify purposes of different forest categories, and re-categorise as necessary – production / livelihood / biodiversity and ecosystem services.
Conflict economy	<p>Illicit timber flows have created incentive to perpetuate conflict for the Myanmar army and some armed ethnic groups</p>	<p>Resolve conflicts equitably through ceasefire process in which military business interests are cancelled</p> <ul style="list-style-type: none"> ➤ Facilitate return of displaced people ➤ Introduce devolved forest governance in ethnic areas ➤ Work with neighbouring countries, , to introduce border checkpoints which respect Myanmar laws for wood exports. .