

## **The Greener Side of REDD+**

Lessons for REDD+ from Countries where  
Forest Area Is Increasing

Hans Gregersen, Hosny El Lakany,  
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The Rights and Resources Initiative (RRI) is a strategic coalition comprised of international, regional, and community organizations engaged in development, research and conservation to advance forest tenure, policy and market reforms globally.

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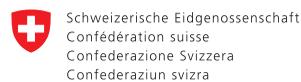
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## ABSTRACT

In the last decade, countries have committed major resources to reducing carbon emissions from deforestation and forest degradation in developing countries (REDD). A debate continues on how REDD financing should include related activities, such as the enhancement of carbon stocks through afforestation, reforestation and rehabilitation of degraded lands. Meanwhile, several countries have added to their net forest area with little fanfare or donor funding.

This paper assesses the factors that underpin the transition from net deforesters to net forest growers in China, South Korea, Vietnam, India and Chile. The authors review the literature on forest policy processes and government-led reforestation and restoration programs, and find their success relied on government support at the highest levels, and forest governance reforms (particularly land and resource tenure systems) to incentivize good forest management and tree-planting. However, constraints to wood supply have caused some countries to rely on wood imports and “export” deforestation, diminishing global carbon benefits.

The authors argue that the experiences of these reforesting countries carry implications for current REDD countries. Reforestation programs appear to have a clearer benefit for the rural poor in forest areas than REDD programs. However, both depend on improvements to forest governance and forest tenure. Major reforestation activities must be included to effectively confront leakage and additionality issues inherent in REDD. In sum, while debates on REDD implementation continue at the international level, the authors conclude that improving forest stocks is a necessary complement to successful REDD and recommend that national policymakers focus serious effort on these activities.

## 1

## Introductions

In the last decade, great effort and major resources have been committed to finding ways of reducing emissions of greenhouse gases (GHGs) from deforestation and forest degradation in developing countries (REDD). REDD is currently being discussed under the United Nations Framework Convention on Climate Change as a possible financial mechanism for reducing GHG emissions from developing country forests in the post-2012 climate change regime. Recently, the term REDD+ (also ‘REDD-plus’) has been coined to indicate that “...forest conservation, the sustainable management of forests, and the enhancement of carbon stocks” should be included in any future REDD mechanism.

While the debates on REDD+ continue, many countries have been adding to their net forest area, usually with little fanfare or outside funding. According to the 2010 Global Forest Resource Assessment (GFRA) of the Food and Agriculture Organization of the United Nations (FAO)<sup>2</sup>, 78 countries with more than 200,000 hectares (ha) of forest, increased or maintained their forest area over the period 1990–2010 (see Table 1.)<sup>2</sup> These forest-adding countries (FACs) now contain more than half the world’s remaining forest area.

This paper provides an assessment of why and how countries have moved from being net forest-losing countries (FLCs) to becoming FACs, looking in depth at five countries (China, Republic of Korea<sup>3</sup>, Viet Nam, India, and Chile) that did so in fairly recent times.

The paper also addresses the following closely related questions:

1. What lessons can be learned from the FACs in terms of the broader goals of decreasing the overall net GHG emissions from forests—or, more optimistically, of increasing the net sequestration and storage of carbon in forests? What have the FACs done differently from the FLCs?
2. What do the experiences of the FACs imply for the implementation of REDD+, and what needs to be included in the ‘D+’ component, which so far has received so little attention?

How is the second set of questions related to the first? In addition to reducing deforestation, most FACs (including all five countries used as case studies in this paper) are implementing measures that we think should be included in D+. For example, they are managing more of their production forests on a sustainable basis, establishing major areas of protection forest and forest biodiversity preserves and, crucially, designing and implementing major programs of afforestation, reforestation and restoration of degraded lands (ARRDL).<sup>4</sup>

To this end, many of the FACs have undertaken major forest-tenure reforms to help encourage the grassroots sustainable management of and investment in forests. These reforms, as highlighted in the case studies, attest for the need to consider the potential role that tenure reform plays in making a large-scale impact on reducing deforestation and supporting productive ARRDL activities that expand livelihood opportunities for forest dwellers. In particular the forest transitions of India, Viet Nam, Chile and China carry lessons, both positive and cautionary, on how tenure systems incentivize for-

TABLE 1: GREATEST GAINS IN FOREST AREA FROM 1990-2010, BY COUNTRY

Country (case studies in <i>italic</i> )	Forest area				Annual change rate						Net gain
	1990	2000	2005	2010	1990-2000		2000-2005		2005-2010		1990-2010
	Mha	Mha	Mha	Mha	Mha/yr	%/yr	Mha/yr	%/yr	Mha/yr	%/yr	Mha
<i>China</i>	157.14	177	193.04	206.86	1.99	1.2	3.21	1.75	2.76	1.39	49.72
EU-27	141.95	149.26	151.65	153.92	0.73	0.5	0.48	0.32	0.45	0.3	11.97
United States	296.34	300.2	302.11	304.02	0.39	0.13	0.38	0.13	0.38	0.13	7.68
India	63.94	65.39	67.71	68.43	0.15	0.22	0.46	0.7	0.15	0.21	4.49
<i>Vietnam</i>	9.36	11.73	13.08	13.8	0.24	2.28	0.27	2.21	0.14	1.08	4.44
Turkey	9.68	10.15	10.74	11.33	0.05	0.47	0.12	1.14	0.12	1.08	1.65
Philippines	6.57	7.12	7.39	7.67	0.06	0.8	0.06	0.76	0.06	0.73	1.1
<i>Chile</i>	15.26	15.83	16.04	16.23	0.06	0.37	0.04	0.26	0.04	0.23	0.97
Norway	9.13	9.3	9.68	10.07	0.02	0.19	0.08	0.81	0.08	0.78	0.94
Belarus	7.78	8.27	8.44	8.63	0.05	0.62	0.03	0.39	0.04	0.46	0.85
<b>World</b>	<b>4,168</b>	<b>4,085</b>	<b>4,061</b>	<b>4,033</b>	<b>-8.32</b>	<b>-0.2</b>	<b>-4.84</b>	<b>-0.12</b>	<b>-5.58</b>	<b>-0.14</b>	<b>-135.34</b>

Source: FAO GFRA 2010. For complete table, see Annex 1.

est protection and growth and community development. While the incentives for growing trees differ from those for avoiding their future loss, just and clear land and resource tenure systems are of great concern for REDD as well as ARRDL, as reflected in the REDD proposal agreed to in Cancun.

An important component of ARRDL is production plantations. It is no coincidence that the FACs were responsible for 85 percent of the 86 million ha of forest plantation area added globally in the period 1990–2010 (from a total of 178 million ha in 1990 to 264 million ha in 2010).<sup>5</sup> Plantation-grown wood is already important economically, accounting for more than one third of the industrial roundwood consumed in 2000.<sup>6</sup> Planted forest is still growing in all regions (by almost 5 million ha per year globally in the period 2005–10). In 2010 planted forests accounted for only 7 percent of the global forest area (about 2 percent of land use), but had the potential to produce two thirds of the 1.8 billion cubic meters of the global industrial roundwood demand, with an anticipated increase to 80

percent by 2030.<sup>7</sup> However, when considering net forest cover statistics, it is crucial to bear in mind that high plantation growth can conceal significant depletions of native forest— in some cases, native forest may even be cleared to make way for new plantations.

In the case-study countries, another significant change has been the liberalization of wood imports, which has provided easier access through global markets to raw materials, in several cases to feed expanding wood products export businesses. In many FACs, the imposition of domestic logging bans, the control of illegal logging and the expansion of protected areas have caused a dwindling of local wood supplies, even as wood demand has increased. Since local planted forests were not at a stage where they could meet the increased demand, there has been a rapid increase in wood imports in the FACs.<sup>8</sup> There is a risk that FACs are exporting deforestation and especially forest degradation, leading to international leakage of emissions avoided at home.<sup>9</sup>

Emerging FACs are implementing major programs of ARRDL with the view that, eventually, planted forests will provide an increased percentage of local wood requirements, thus reducing international leakage from potential REDD programs. This critical connection between REDD+ and ARRDL is discussed in more detail later.

We use the acronym ARRDL in this paper for convenience and to make a clear distinction between REDD and REDD+. The '+' in REDD+ has not been defined or agreed upon operationally in international debates beyond the following: "the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries".<sup>30</sup> If it transpires that, ultimately, REDD+ includes all ARRDL activities as major components, so be it—we have no vested interest in seeing ARRDL separated from REDD in negotiations. We argue in this paper, however, that major ARRDL activities, including those carried out through agroforestry, are a *necessary* complement to REDD and should get equal billing. This same need to look at REDD in a broader context becomes particularly clear when considering how to confront leakage and additionality issues, as others have stressed.<sup>31</sup>

Many of the lessons from FACs only emerge when one looks at the situations in FACs and FLCs in a much broader, holistic, and global context than is often the case in REDD discussions, which tend to have a more narrow country-level or project-level focus. In deriving lessons, we need to consider, among other things, the implications of:

- the dynamics of interacting global wood supply and demand, and the implications for leakage in REDD programs. This includes the risk of exporting deforestation and forest degradation from FACs and the role of illegal logging and global wood trade;
- the desirability, in a 'green' economy, of using more rather than less wood as a renewable raw material that can substitute for energy-intensive, non-renewable raw materials;
- changing global market and production trends for non-forest commodities such as beef, soy beans, and palm oil that are responsible for much of the deforestation taking place globally;
- changing trends in the productivity of major agricultural crops and their implications for forest clearing. The demand for agricultural crops is expected to increase steadily in the next decades because of growth in both population and income. Between 1980 and 2000, more than 55 percent of new agricultural land in the tropics came at the expense of intact forests and another 28 percent came at the expense of disturbed forests.<sup>32</sup> At the same time, breakthroughs in biotechnology have resulted in increased agricultural and forestry productivity, and may significantly lessen pressures on forests.

In examining the history of the FACs in a broad and dynamic global context, our assessment leads to comprehensive conclusions that link ARRDL and REDD as necessary complements in both FACs and FLCs.<sup>33</sup>

## 2

## Net forest-adding countries, 1990–2010

In reviewing the experiences of countries that either increased or maintained their net forest area over the 20-year period between 1990 and 2010, three provisos should be kept in mind. First, putting aside the shortcomings of GFRA data, even a net ‘positive’ deforestation result (i.e. where there has been either a net increase in forest area through ARRDL activities in a country or no change because deforestation has been matched by ARRDL) may conceal important negative change. In India, for example, net forest area increased in the previous decade, even though the area of native forest declined at an alarming rate.<sup>34</sup> We know that a similar depletion of native forest is has happened in Chile and continues in Viet Nam.<sup>35</sup> While a globally comprehensive data set permits useful comparison of overall policies and forest dynamics, it obscures differences such as these within countries.

Second, in terms of the focus here on forests and climate change, a net increase in forest area says little about what is happening to net forest-related GHG emissions at any given time; this would require much more detailed data and analysis, especially of carbon densities of different forest types. Adding a hectare of new plantation, or restoring a hectare of degraded forest, does not fully offset the emission of GHGs that would result from the loss of a hectare of mature forest; there are great differences in the ecology and function of each.<sup>36</sup> For that matter, the carbon stored in a hectare of mature natural bamboo forest is not the same as that stored in a hectare of mature mixed tropical hardwood forest.

Third, and perhaps most important, the balance of area of forest and trees lost and gained in a country very much depends on the definition of forest used.<sup>37</sup> This can lead to over-accounting of either sequestration benefits or of a country’s gross emissions from land use. ARRDL activities include a variety of tree-planting and restoration activities, such as agroforestry plantings, that may add trees and thus carbon sequestration capacity to a country but not forest as defined and used in the GFRA.<sup>38</sup> The GFRA does include a category called ‘other wooded land’<sup>39</sup>, but this excludes agroforests or trees planted on predominantly agricultural lands (which FAO treats as ‘trees outside forests’).

There remains little consensus on methods to measure forest degradation or account for trees outside of defined forest areas, and yet the inclusion or exclusion of ‘other wooded lands’ and agroforests has major implications for the balance of GHG emissions and carbon sequestration associated with trees. For example, Ekadinata et al. point out that:

*One-third of Indonesia’s forest emissions (total of 0.6 Gt carbon per year) occur outside institutionally defined forests, and are not accounted for under the current national policy for Reducing Emissions from Deforestation and forest Degradation (REDD+) ... If carbon emissions from outside the institutional defined forest are accounted for, it becomes clear that*

*there are no net emission reductions in Indonesia.<sup>20</sup>*

Van Noordwijk and Minang point out a need to revisit the definitional issues associated with RED, REDD, and REDD+. Their perspective is that:

*The international debate has partially recognized these issues, and a progression of concepts—from RED to REDD to REDD+ to REDD++—reflects the tendency to include an ever larger share of total land-use change...Reducing Emissions from Any Land Use (or across all land uses) or REALU is the logical next step in the REDD debate.<sup>21</sup>*

This discussion of the scope of REDD efforts will be revisited later on in the context of “exporting” deforestation and related emissions through increased wood imports.

Even within what should be a well-defined category of forest, such as planted forest, major discrepancies can be found. For example, a global study of plantations in tropical countries found that the estimate of plantation area derived from FAO’s 2006 State of the Forests report<sup>22</sup> was almost double that derived from the 2005 GFRA.<sup>23</sup> The study pointed out that these differences were due mainly to differences in definitions, particularly of semi-natural forest and plantations. Moreover, the 2005

GFRA gave figures on forest area according to their primary functions (such as productive, protective, conservation, multiple use, etc.)—a distinction that is difficult to make in practice, and relies wholly on the reporting given by government sources.<sup>24</sup>

Keeping in mind these provisos, we assess the experiences of FACs and draw lessons that may be useful for countries that are still net deforesters.<sup>25</sup> Several factors distinguish FACs from FLCs. First, some countries that show no net change in forest area, such as Guyana, Suriname, and Bhutan, have not yet experienced the kinds of population and market pressures on their forests that most FLCs are facing. Countries with major portions of their original forest still largely intact are the exceptions rather than the rule.<sup>26</sup> Since we are looking for lessons that might be applicable to FLCs that are under population and market pressures, we do not deal further with the few countries that have never faced such pressures.

A much more common experience in the majority of current FACs is that they were once deforesting countries—sometimes in a major way. In fact, in many countries that are now FACs, such as Sweden and the U.S., forests once helped fuel economic growth. Now, these countries are adding to their forest areas through ARRDL activities complemented by the adoption of sustainable forest management practices and reduced deforestation, achieved in various ways.

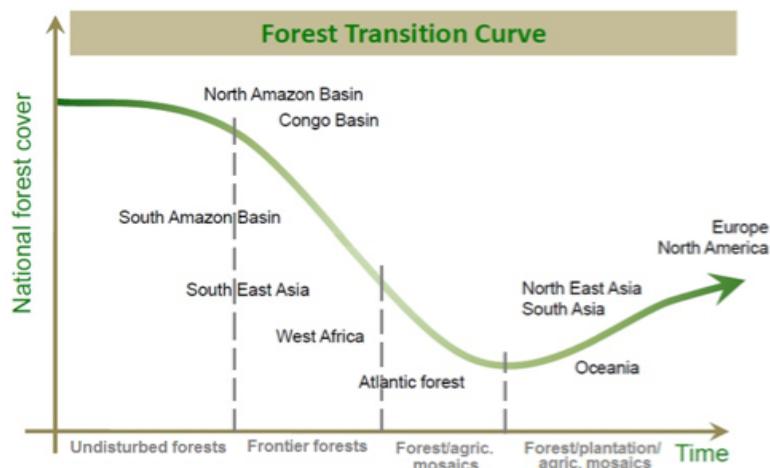
## 2.1

### **FOREST TRANSITION: HOW AND WHY COUNTRIES TURN THE CORNER FROM NET FOREST LOSERS TO NET FOREST ADDERS**

What have the FACs done differently from current FLCs, and why did they turn the corner? Most went through long periods of economic and social development (how long was highly variable, depending on the country and its situation); this was the case for most of the now ‘developed’ countries in Europe and North America. Forests often pro-

vided the capital and raw materials for investment in conversion to farmland and economic growth, with associated multiplier effects from the use of their forest capital. These countries emerged from this development period sufficiently advanced economically, socially, and technologically to support conditions conducive to a forest transition.<sup>27</sup> Figure

FIGURE 1: FOREST TRANSITION CURVE



Source: Andrasko, Ken and Benoît Bosquet. 2010. *Introduction and Early Lessons: Briefing Guyana Civil Society. Forest Carbon Partnership Facility presentation on April 21, 2010.* Adapted from: Angelsen, Arild. 2007. *Forest Cover Change in Space and Time: Combining the von Thünen and Forest Transition Theories. Policy Research Working Paper 4117.* Washington D.C.: World Bank.

1 diagrammatically shows a theoretical forest transition curve, and provides examples of countries at different stages of the transition.

Thus, it is evident that as countries develop economically and socially, a rural exodus to cities occurs, which lowers population pressure on rural land. At the same time, economic activity generally shifts towards activities that do not involve forest clearance. Demand for wood for fuel and energy decreases dramatically as other energy sources become available. Agricultural yields per unit area increase, sometimes significantly, reducing the demand for agricultural land. There is a shift towards the sustainable management of remaining forest areas. A growing proportion of forests are set aside for protection, such as in large national parks, wildlife reserves, and other forms of protected area. Importantly, major investments in ARDL occur.

As an economy develops and grows, governance—including of the forest sector—tends to improve, leading to reductions in illegal forest clearing and corruption and improvements in tenure laws and security as well as the country's legal structure in general. This in turn provides an

incentive for improved private and community management of forests. In some cases, governments develop and enforce zoning regulations and other laws that forbid the cutting of certain trees on private lands.

Increased education, training, and scientific research and development contribute to the shift in forest management from purely exploitative to a more sustainable approach. The function of forests as protectors of watersheds that feed agricultural and urban areas is better understood and given greater importance, as is their role in biodiversity conservation. As the wealth and education of a nation increase, forests tend to take on greater national (as opposed to local) cultural and spiritual meaning. As a result, large areas of natural forest are set aside, deforestation declines, and investments are made in forest renewal, protection, and rehabilitation, ultimately leading to an increase in net forest area. In many cases, aggressive programs of afforestation and assisted natural regeneration are initiated.

In some cases FACs experienced net deforestation for several centuries before turning the corner to become net forest-adders.<sup>28</sup> This is an important point to keep in mind: the transition from FLC to FAC does not occur, and should not be expected to occur, overnight; the same could be said about the reform of governance, tenure, and rights. The length of the transition is often overlooked in discussions about improved forest governance for REDD programs. It begs the following question from less-developed forested countries: "How can you ask us not to cut down our forests now, since it is what you did for a long time to fuel your economic growth? If you want us to stop-- or avoid-- cutting down our forests, then you need to finance our development in other ways."<sup>29</sup> The logic of this point is, of course, one of the reasons that REDD payments are being proposed and made. But how large do they need to be? And how long will it take to make a difference? These remain unanswered questions.

A range of factors other than economic growth and development can also trigger the forest transi-

tion. The most important of these, as mentioned in the literature, is growing wood scarcity. To this we can add environmental disasters linked to deforestation such as fire, insects and other pests,

diseases, and severe weather events that exacerbate these threats. In several of the case studies discussed in the next section, both these factors have played a role.

## 2.2 FOREST TRANSITION: FIVE EXAMPLES OF RELATIVELY RECENT TRANSITIONS

Here we summarize the main changes associated with the forest transitions in five major forested countries. Table 2 shows the change in forest area in each of the five countries over the period 1990–2010. For each country, Annexes 1-5 present data on forest cover change over the full transition periods (i.e. prior to 1990).

As shown in Table 1, four of the five selected countries count among the ten developing countries with the most net forest growth over the past two decades. Republic of Korea (ROK) is in fact a net deforester during this period, as their main efforts to restore forests were in force in the late 1970s and early 1980s. Looking over this longer term, these measures have to date resulted in 0.6 Mha more forest area and an eightfold increase in annual stocking rate (from 10 to 80 m<sup>3</sup>/ha).<sup>30</sup> Furthermore, this recent deforestation since 1990 is the result of

deliberate land use policy decisions, rather than a failure of sectoral governance.

These countries were selected for the role that aggressive government-sponsored programs of ARRDL played in their transition, along with various incentive programs and logging bans aimed at reducing the degradation and deforestation of native forests. Combined, the five countries more than doubled the area of planted forest during the transition, not including additions of trees on farms, including in agroforestry systems. We chose countries that had not only managed to expand forest areas, but did so through concerted government programs, rather than a rise in independently managed projects or private sector investment. Spurred by the donor promises of REDD financing, many countries are now developing national plans to prevent deforestation and encourage reforestation. It is our estimation that

TABLE 2. CHANGE IN FOREST AREA FROM 1990-2010 IN FIVE CASE-STUDY COUNTRIES

Country	Total Forest Area (Mha)				Planted Forest Area (Mha)				Net Gain, 1990-2010		
	1990	2000	2005	2010	1990	2000	2005	2010	Total (Mha)	Planted (Mha)	Planted (% of total gain)
Chile	15.26	15.83	16.04	16.23	1.71	1.94	2.06	2.38	0.97	0.68	70%
China	157.1	177	193	206.9	41.95	54.39	67.22	77.16	49.72	35.21	71%
India	63.94	65.39	67.71	68.43	5.72	7.17	9.49	10.21	4.49	4.50	100%
Republic of Korea	6.48	6.41	6.37	6.33	-	1.74	1.78	1.82	-0.15	0.09	-
Viet Nam	9.36	11.73	13.08	13.8	0.97	2.05	2.79	3.51	4.44	2.55	57%
<b>Total (5 cases)</b>	<b>252.2</b>	<b>276.4</b>	<b>296.2</b>	<b>311.7</b>	<b>50.34</b>	<b>67.29</b>	<b>83.34</b>	<b>95.09</b>	<b>59.47</b>	<b>44.75</b>	<b>75%</b>

Source: FAO GFRA 2010.<sup>31</sup> Includes both natural forests and plantations, not “other wooded lands”

Note: Korea is still included despite showing a slight decline in forest area between 1990 and 2010, as the main period of forest transition in the late 1960s and early 1970s.

ARRDL activities will demonstrate that the returns for rural livelihoods and biodiversity make these activities a worthy national goal— with or without carbon financing.

We identified five factors that the five case-study countries generally have in common and which supported their forest transitions.<sup>32</sup> They are:

1. major changes in attitude at the highest levels of government regarding the value of domestic forests and the environmental and economic problems that deforestation and forest degradation cause;
2. major shifts in policies and programs that led to greater support for forest conservation, forest planting, and forest protected areas;
3. shifts in the ways in which Indigenous Peoples and forest communities are brought into the forestry picture—towards intensified forest-tenure reform and the establishment of various forms of protected areas that respect forest dwellers' uses of the forest for essential goods and services and to meet livelihood needs;
4. the liberalization of trade policies, and
5. major programs of ARRDL activities (e.g. plantation development and the restoration of degraded forest and other degraded land).

Below we look briefly at each of the case-study countries in terms of these five factors.

**Major changes in attitude at the highest level of government regarding the value of domestic forests and the problems caused by forest depletion**

- In China, these changes in attitude came about due to, among other things, the massive damage caused by flooding associated with deforestation, and a growing scarcity of wood and resultant hardship among rural people and the wood-based industries.
- In ROK, a shift in attitude arose as a result of crises in villages that found themselves without fuelwood or wood for coffins, etc., and subject to an increase in environmental problems (e.g. nutrient depletion in agriculture because, with the unavailability of fuelwood, rice straw was burned instead of being returned to the fields).

- In Viet Nam, the attitude towards forests changed due to an increasing scarcity of wood for a rapidly growing industry, plus environmental and local socio-economic problems associated with deforestation.

- In India, there was a major change in attitude as a result of increased flooding associated with deforestation on steep hillsides, an increasing scarcity of wood for fuel and industry, and increased agitation among the 200 million or so citizens who depended on forests for survival and livelihoods.

- In Chile, there was widespread belief at high levels of government that a forest-based industry could be an important economic sector.

**Major shifts in policies and programs that led to greater support for forest conservation, forest planting, and forest protected areas**

- In China, policies and programs included government investment in aggressive and major programs of afforestation (for both environmental protection and production), the decentralization of forest responsibilities, rights, and tenure reform that started in the mid-1980s, a new and radically different forest law (passed in 1985), and logging bans that applied to a large part of the natural forest area.

- In ROK, much forest activity (mainly tree-planting) took place at the provincial level immediately after the Korean War. The forest transition accelerated in the early 1970s with the issuance, at the national level, of the First Forest Plan and the Forest Rehabilitation Project, which started in 1973 and was supported by the President down. ROK wisely connected its major push for expanded forest activity to the much broader *Samaeul Undong* or 'new community movement', which focused more broadly on village development.

- In Viet Nam, the basic policy direction was set by the Central Communist Strategy for Industrialization and Modernization. It identified forest-related activity as a central pillar, partly because the forest industry was growing rapidly due to a rapid increase in export demand. Environmental problems were also a factor, as were the urgings of

international groups that had resources to invest in forest programs in Viet Nam. Major policy-related programs such as the Five Million Hectares Reforestation Program and the Support for Development of Forest Plantations Program were initiated.

- In India, recognition of the failure of past forest policies and approaches led to a radically different forest policy in 1988: instead of focusing on industrial roundwood production and government revenues, as previous ones had done, it aimed to increase the country's forest cover through afforestation and social forestry and to promote the environmental services of forests (e.g. watershed and wildlife protection). It also focused on meeting fuelwood needs and expanding the productivity of existing forests. This reorientation was supported by the establishment of 'joint forest management' (JFM) programs that involved local people working with government to protect and manage forest resources.

- In Chile, pro-forest support existed for a long time and plantation forestry was encouraged and supported by the democratically elected government as well as by the military government that assumed power in the 1970s and ruled until the early 1990s. The watershed Law 701 was enacted in 1974 to help the plantation-based, export-focused forest industry expand more rapidly.

#### **Shifts in the ways in which Indigenous Peoples and forest communities are brought into the forestry picture**

- In China, a massive program of forest-tenure reform was in progress during the forest transition that was designed and implemented largely at the provincial and lower levels of government. The state's monopoly over the purchase of timber from collectively owned forests was abolished and timber markets were opened to allow communities to negotiate sales and purchases of wood. Local communities were paid to afforest areas and to create protected forest areas.

- In ROK, village forestry associations (VFAs) were established to manage and carry out village-level afforestation and forest management. The 1972 Forest Development Law gave the private

(often absentee) owners of degraded or denuded forest land (mostly in surrounding villages) the choice of either reforesting and rehabilitating their land themselves or allowing it to be rehabilitated and managed by a VFA in exchange for a percentage of the output. By 1980 some 675,000 ha of private forest land were managed by VFAs, about one-seventh of private forest land, bringing them income and various environmental benefits.

- In Viet Nam, the reform of forest land tenure—or 'forest land distribution'—was designed by government to take place on a massive scale. As of 2010, some 3.3 million ha of forest land were under household or community tenure, mostly long-term rights that are renewable at the end of the tenure period. (The land remains in the ownership of the state but land-use rights, including the right to mortgage, inherit, and lease, are held by the households or communities involved.) However, the on-the-ground benefits to Indigenous Peoples and forest communities remain unclear today.

- In India, the shift towards co-management under joint forest management (JFM) started in the early 1990s. This program involved contracts between villages or other groups and state forest departments to jointly manage and protect state forest lands, with certain benefits going to the villages or other groups. The state forest departments maintained control of the land, however, and the terms under which JFM was carried out were restrictive. In 2006 the Forest Land Rights Act was passed after much contentious debate; it requires states to transfer tenure rights and decision-making powers to the villages and individuals who have, de facto, been using and managing the lands involved. In many states the implementation of the law is proceeding very slowly.

- In Chile, much of the forest land is in private hands. Issues related to Indigenous Peoples are not prominent, since rural-based Indigenous Peoples make up a small part of the total population and live in the most isolated parts of the country. However, locally important steps have been taken to accommodate the tenure rights of at least some of the Indigenous Peoples living in forests, which in

some cases harbor their ancestral homes and are the source of their livelihoods.

#### **Liberalization of trade policies**

All five countries liberalized their wood import and export policies, and greatly expanded their wood imports, some time before the forest transition. As discussed later, this has significant implications for REDD.

#### **Major programs of ARRD activities**

- In China, priority was placed on plantation establishment, both for protection and production purposes; the rehabilitation of degraded and steep lands became a major goal under, for example, the fast-growing and high-yielding timber plantation development program in China, begun in the late 1980s, the Three North Shelterbelt Program, and the Forest Industrial Base Development Program. In the former program, 9.2 million ha of plantations were established and 7.3 million ha of forest were placed in reserves and protected areas and were rehabilitated.
- In ROK, the main focus was on the establishment of village fuelwood plantations and the rehabilitation of degraded forest lands around villages, often with fruit- or nut-producing species. In many areas multi-purpose trees were planted because it was anticipated that the rapidly occurring transition from fuelwood and charcoal to other sources of energy (i.e. electricity and petroleum-based fuels) would make the production of fuelwood from plantations obsolete. This did indeed occur and the plantations are now being managed for timber production as well as for other purposes, such as recreation.
- In Viet Nam, major afforestation programs took place at the same time as logging bans were imposed; these allowed the majority of the natural forest land to be rehabilitated with the aim of increasing the growing stock for both protection and production. In 2007 the government issued a

new Production Forest Development Policy, which runs to 2015. The goal of this policy is to develop 250,000 ha of plantations per year and in so doing to contribute to rural employment and livelihoods and the supply of raw materials for the country's fast-growing wood processing industry (such as pulp and paper and particleboard).

- In India, the 1988 forest policy emphasized "increasing the country's forest/tree cover ... through massive afforestation and social forestry programs, especially on all denuded, degraded and unproductive lands".<sup>33</sup> Major afforestation and reforestation took place and is on-going in India. In 1992, India created a national forestry board with the main purpose of facilitating and promoting forest plantations and environmental forest rehabilitation projects. Most of the projects were on public land, but the program also supported tree planting on private lands: "government supported investment achieved an annual growth in forest plantations of almost 1 million hectares on degraded lands and about 500,000 hectares on private and communal lands."<sup>34</sup> In February 2011, the Prime Minister's Council on Climate Change approved a 10-year, US\$10.1 billion "Green India Mission." The Mission's 2020 goal is to increase forest area by 5 Mha, sequestering an additional 50-60 million tons of carbon, and improve the livelihoods of 3 million forest-dependent households.<sup>35</sup>
- The foundation of Chile's major wood-based export sector is its plantation resource, which has been established since the 1930s. This is a different case to China and Viet Nam, which have also built up major wood products export businesses but based more on an expansion of secondary wood imports than on their own plantation resources and restored natural forests, which are still maturing. ARRD activities are a major part of Chile's forest strategy. The 2007 Native Forest Law calls for the restoration of at least 30,000 ha of degraded land each year into the future.

## 2.3 BRAZIL: MOVING TO BECOME A FAC

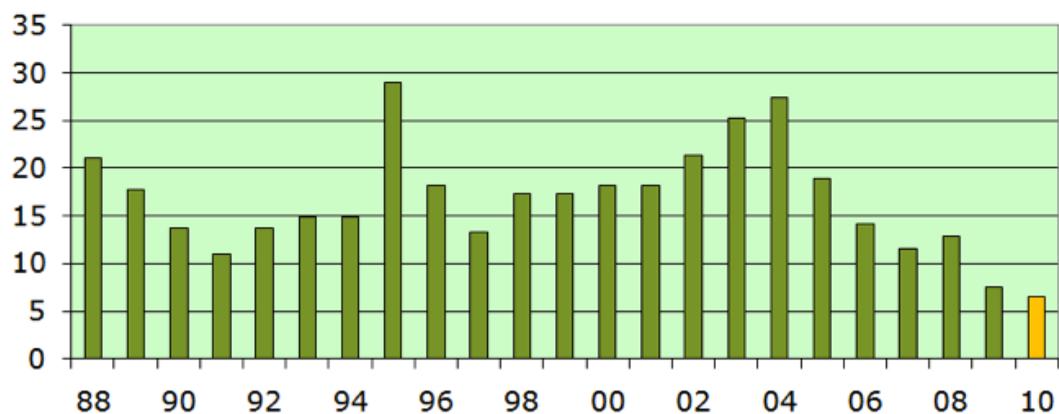
Other countries are making rapid progress in their fight against deforestation, even though they have not yet turned the corner of their forest transitions. For example, deforestation in Brazil's Legal Amazon has declined significantly in recent years. The average annual rate of deforestation was growing from 2001–2004 and averaged 23,246 km<sup>2</sup> (2.33 Mha) during those years. This began to decline in 2005, with 2005–2008 seeing an average deforestation rate of 14,465 km<sup>2</sup> (1.45 Mha) per annum.<sup>36</sup> According to Brazil's National Institute for Space Research, deforestation is estimated to have dropped even further to 0.75 Mha in 2009.<sup>37</sup> The decline was due partly to the downturn in the world economy as a result of the global financial crisis, which led to reduced demand for the products normally produced on deforested land—soybeans and cattle, among others. However, some of the credit for the reduced deforestation may be attributed to the Government of Brazil, which has instituted a number of measures to improve forest governance and regulation of agricultural land use. The results have been very positive, drawing recognition from International NGOs<sup>38</sup> and REDD+

resources from countries such as Norway. According to a recent report, illegal forest clearing in the Brazilian Amazon has fallen by 50–75 percent over the past decade<sup>39</sup>, paralleling the overall decline in deforestation there. According to the report, the rate of return on the investment in strengthening law enforcement is very high in terms of reduced GHG emissions:

*Compared with a generous rough estimate of the total amount spent worldwide on helping reduce illegal logging in the three countries (Cameroon, Brazil and Indonesia) over the last ten years, these reductions represent an impressive rate of return: possibly as little as ten cents per tonne of carbon dioxide, or as much as \$6 in additional revenues for every \$1 invested.<sup>40</sup>*

The highest levels of government in Brazil also recognized the importance of clear and secure tenure, and legislation has been passed that sets up a huge program for land titling and the clarifica-

FIGURE 2. RATE OF DEFORESTATION IN THE AMAZON BY CLEAR-CUTTING, 1988-2010 (1,000 KM<sup>2</sup>/YR)



Reproduced from: Brazilian National Institute for Space Research (INPE). 2010. "PRODES 2010 - Estimativa de desmatamento da Amazônia no período 2009-2010" Presentation by the Director of INPE to the Plan to Prevent and Control Deforestation in the Amazon (PPCDAM). <[http://www.dpi.inpe.br/gilberto/present/prodes\\_taxa2010.ppt](http://www.dpi.inpe.br/gilberto/present/prodes_taxa2010.ppt)>

tion of land ownership in the Brazilian Amazon. The government has also set aside a vast area of the Amazon as protected area; established legal reserves for Indigenous Peoples; greatly improved the ability to track and monitor deforestation and land-use change; passed laws related to agricultural expansion; set up the Amazon Fund to fund various REDD+-related initiatives; and experimented with and learnt from a wide variety of REDD+-focused project models.

Do problems still exist in Brazil? Yes. But progress across a broad front is being made, and many lessons can be learned that may be of use to

other deforesting countries. Chief among these is that progress will only be made if there is high-level government commitment to reducing illegal forest activity and corruption among civil servants. At the same time, Brazil recognizes the importance of interesting and involving local people, including Indigenous Peoples, in policing local forest areas and reporting illegal activity to authorities.

As in the case-study countries, Brazil has major programs involving ARRDL activities—plantation programs, mainly in south and central Brazil, as well as forest rehabilitation programs in the Atlantic coastal forests and various other places.

## 2.4

### LESSONS LEARNED FROM FACs: IMPLICATIONS FOR FLCs

In this section, we look beyond the five case-study countries, also drawing on the experiences of countries that appear to be on their way to a forest transition and countries that made the transition in the past. Developing-country FACs are not greatly different from developing-country FLCs in terms of their ambitions, their quests for development, or the need for governance reform. Nevertheless, there is wide variation both within and between the two categories in terms of their size, the level of development, and the nature of their forests.

Few, if any, developed countries are still FLCs. While one cannot say that increasing development and wealth are the definitive causes of the forest transition in the FACs, the evidence of a relationship between the two is indisputable. In one study of 50 countries, no country with a per-capita income greater than US\$4,600 was a net deforester in the period 1990–2005 (and most countries gained forest area).<sup>42</sup> It is possible for a country to build its forest estate beyond what it needs for environmental services and physical forest outputs. ROK (where more than 60 percent of the land area is forested), for example, drew down its forest area by two percent over the period 1990–2010; this was not unplanned,

uncontrolled deforestation but rather the result of long-range planning. It should be noted that many countries with much lower per-capita incomes have also gone through a forest transition, including three of the case-study countries (China, Viet Nam, and India), which all had per-capita incomes below US\$1,500 in 2004 (in Viet Nam and India, per-capita incomes were US\$500 or less).

To a large extent, the current FLCs are embarking on the same path—that is, deforesting to increase the area of land on which to produce commercial crops, and degrading forest through logging to gain the capital for economic development. Developed countries that have already used their forests as engines of development now want developing countries to stop deforestation. The simple response from developing tropical countries is ‘then pay us’. To date, the focus of these payments has been on increasing law enforcement, governance and monitoring systems to prevent the loss of standing forests. We posit that lessons gleaned from the FACs will show that pro-active measures to reforest and restore are a crucial part of plans to reduce deforestation.

## THE LESSONS

The three main categories of lesson that can be derived from the case studies and the literature are as follows:

1. The forest sector needs to attract the attention and support of government at the highest levels.
2. The following forest governance reforms are needed in most countries:
  - a. Forest-tenure reforms of various types to create incentives for good forest management and protection and to encourage tree-planting. Security of tenure is key.
  - b. Improved control of illegal forest activity and corruption.
  - c. The liberalization of wood imports (along with consideration of its implications in terms of illegal timber and the ‘exporting’ of deforestation and especially forest degradation).
3. In most countries, major ARRDL programs are essential for expanding the forest area, improving growing stock, and reducing international leakage over time.

### **Lesson 1: The attention and support of government is needed at the highest levels.**

In all five case-study countries, high-level government support and a growing sense of urgency among key leaders to do something to correct a deteriorating forest situation or (in the case of Chile) to take advantage of a perceived opportunity preceded the transition. Because support was at the highest levels, things got done. In some countries it is possible to identify a series of leaders down the years who were influential in directing the forest sector in new, improved directions.

Building up the forest sector is not a one-time event that occurs in a short period of time. Just as trees take time to grow, countries should look at the forest transitions as long-term, dynamic processes, and frequently results from natural forest regrowth, plantation development and assisted restoration of degraded areas. The transition may occur at different times and rates in different parts of the country. In most large and mid-sized

countries, the transition starts in one region and spreads, sometimes slowly (e.g. in the U.S.) and sometimes relatively quickly (e.g. in China). The history of Brazilian forestry is interesting in this regard. It can be argued that Brazil has started its forest transition because parts of southern and eastern Brazil are already net forest adders; having slowed deforestation they are now adding forest through various ARRDL activities.<sup>42</sup>

### **Lesson 2: Improvement in forest governance is usually needed before the pieces can be put in place for the forest transition.**

Efforts to implement REDD (or variations such as REDD+) will only be successful if they support developing countries in addressing the fundamental governance challenges that drive deforestation. A failure to tackle problems of accountability, transparency, public participation, weak institutional capacity, and unclear forest-tenure arrangements may exacerbate current conflicts over the use of forest resources and risks creating perverse outcomes for forest-dependent people, forest ecosystems, and the global climate. Potential REDD or REDD+ mechanisms are more likely to succeed if they are designed to incentivize and support developing countries to improve forest governance.<sup>43</sup>

The five case-study countries and most of the other FACs analyzed went through positive adjustments in their governance structures and processes during the period of the forest transition. They had strong and relatively effective central governments and provincial governments that for the most part communicated with central government and with the local populations. In Viet Nam and China, strong central governments had good representation in the provinces. In India, many of the state governments (which are responsible for forests) were strong and had existing forest departments.

There was some level of real commitment at both high and lower levels of government to improving the forest situation and the livelihoods of forest communities. In ROK, the local forest management capacity was well developed and communication between villages, provinces, and

the central government was good, as was lateral communication between government and communities. In all five case-study countries, laws were passed and policies established that were sufficiently clear for enforcement to be reasonably effective. Those in charge had a good-enough grasp of the situation to be able to approach forest plans and programs with the breadth of vision and commitment needed to get things done at a scale large enough to be meaningful. They also had enough sense to allow much of the decision-making to be done at the provincial or even lower levels, which was often critical (e.g. in ROK) in obtaining good participation in programs. In Chile, the government eventually allowed the private sector to drive the growth of the forest sector, with the government providing support and guidance.

A majority of the FACs are developed countries. Most had undergone major changes in the form and structure of governance by the time they turned the corner in their forest transitions. In some cases this involved centuries of trial and error, as countries developed governance models that fitted their socio-economic and political contexts.

Governance reform in a working democratic society is seldom easy or fast: it takes time and effort. In a free society, the quality of overall governance can be defined in terms of six main characteristics<sup>44</sup>:

1. *Voice and accountability*—capturing perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.
2. *Political stability and absence of violence*—capturing perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism.
3. *Government effectiveness*—capturing perceptions of the quality of public services, the quality of the civil service and the extent of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.

4. *Regulatory quality*—capturing perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private-sector development.

5. *Rule of law*—capturing perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.

6. *Control of corruption*—capturing perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as 'capture' of the state by elites and private interests.

Viet Nam, China and India rank poorly in the World Bank's Worldwide Governance Indicators for Control of Corruption, Rule of Law and Government Effectiveness (0.1 or less on a scale of -2.5 to 2.5).<sup>45</sup> Nevertheless they still functioned and developed and they were sufficiently effective to enable a turning of the corner in their forest transitions. Not all the elements of good governance were in place, but we suggest that there was 'good-enough' governance, a term coined by Grindle.<sup>46</sup> If there hadn't been good-enough governance, the transitions would most likely not have occurred.

A great deal has been written on the problems of forest governance in tropical countries and the improvements that will be required to achieve effective REDD+.<sup>47</sup> We believe that this discussion should be tempered by thinking on good-enough governance, as experienced in the case-study countries. Although Grindle was talking about good-enough governance to achieve poverty reduction, lessons can be drawn from her work when combined with the experiences of the case-study countries. In Grindle's words:

*The good governance agenda is unrealistically long and growing longer over time. Among the multitude of governance reforms that "must be done" to encourage development and reduce poverty, there is little guidance about what's essential and*

*what's not, what should come first and what should follow, what can be achieved in the short term and what can only be achieved over the longer term, what is feasible and what is not. If more attention is given to sorting out these questions, "good enough governance" may become a more realistic goal for many countries faced with the goal of reducing poverty.<sup>48</sup>*

It is worth considering Grindle's comment in the light of the experiences of the five case-study countries and calls for 'good forest governance' for REDD and ARRDL. More time and effort should be spent:

- Considering what is essential (in terms of governance change to make REDD and ARRDL happen) and what is not.
- Deciding what governance change in support of REDD and ARRDL are feasible, and what are not. Focus on the latter—what is not feasible now may become more so as other changes take place. Learn from what other countries have done successfully, rather than focusing solely on governance gaps.
- Determining what should come first and what should follow. Can improvements in forest governance precede improvements in the overall governance of a country? Should forest tenure reform precede the stronger enforcement of logging bans and regulations? What can be achieved in the short term, and what can only over the longer term?
- Taking more seriously the role of forest communities in forest protection and meeting ARRDL potential and goals.

Trade-offs need to be considered. These are not static but, rather, they are dynamic relationships that change with the changing contexts and circumstances of the countries involved. For example, Viet Nam ranks relatively poorly in the World Bank's indicators of good governance, except for 'government effectiveness'.<sup>49</sup> A fairly effective, authoritarian government such as that in Viet Nam can compensate for other weaknesses in governance, at least at a certain point along the journey to economic growth and development. However, as governments prepare REDD-readiness reforms—

some more effectively than others— there is a risk of a growing governance gap between countries. Such a gap would allow leakage to accrue, as the lower operating cost and lack of law enforcement in more poorly regulated forest areas attracts attention from industrial timber and agriculture interests looking to move out of more stringent REDD-participating countries.<sup>50</sup>

**Lesson 2a: Forest-tenure reform and efforts to secure the rights of forest dwellers are needed in most countries.**

All the case-study countries started forest-tenure reform prior to their transitions. Such reforms are continuing in China, Viet Nam, and India, the latter having passed the landmark Forest Rights Law in 2006. Forest-tenure reform is important in keeping countries on the net-forest-adding path over the long term. Such reform can also have spillover effects for other governance factors, such as participation in decision-making and the control of illegal forest activity. Forest-tenure reform can take many forms depending on the country and its overall system of government.<sup>51</sup>

It is estimated that a little over one-quarter of forests in developing countries are owned or controlled by communities.<sup>52</sup> In China, Viet Nam, and India, most of the forest used by communities is actually owned by the state. Communities, or individuals within them, have long-term, renewable tenure rights for specific activities and outputs, as well as specific responsibilities. In some cases the rights are poorly defined, in others they are not very secure, and, in others, local communities and tribal groups have not assumed rights that are theirs by law. Much therefore remains to be done in this area. Nevertheless, progress is being made; changes are occurring and reform is under way.<sup>53</sup>

The following two main tenure-related lessons can be drawn from the case studies.

There is no single 'right' forest-tenure model. Moreover, tenure reform should be regarded as a process, not an end state. Worldwide there is a very wide range of forest-tenure models, from those dominated by individual ownership to those in

which almost all forests are under state ownership. The majority of countries—and particularly developed countries that have passed through their forest transitions—have a mixed public–private forest-tenure system. However, whether tenure is private or communal, whether local poor people use public lands, or whether governments manage public forest lands directly, in well-governed countries all involve clearly defined forest tenure, forest-use rights, and responsibilities that are supported by clear laws and enforced by relevant government agencies. The lesson is that clarity and security of tenure are prerequisites for good forest management. Where tenure is insecure and unclear, there is a tendency to take anything of value now, because someone else might take it tomorrow.

It makes sense to move forest rights and responsibilities towards communities and individuals living in or near the forest. As Chhatre and Agrawal have emphasized, this logic holds true whether the bottom line is rural livelihoods or tons of carbon sequestered.<sup>54</sup> Since 2002, 15 of the 30 most forested countries worldwide have increased the forest area available for use, management, or ownership by local communities.<sup>55</sup> This is happening for a number of reasons, as Deere points out: “Among the reasons for this global trend is the growing recognition that conservation, sustainability and enhanced livelihoods for those who have traditionally depended upon the forests may be complementary goals.”<sup>56</sup> That is the lesson for countries contemplating forest-tenure reform: such reform provides an opportunity for win–win–win situations. In the case-study countries, there was an implicit recognition of this by government when forest-tenure reform was initiated. Where the basic ownership of the land remained with the state and rights and responsibilities for using the land were transferred to individuals or communities, there was no downside risk for the government. If people treated the land poorly, the rights and responsibilities could be taken back. As with any contract, if it is broken it is annulled.

**Lesson 2b: Wood import liberalization is needed if it does not exist: however, wood imports**

**bring the risk of leakage (‘exporting deforestation and forest degradation’) and illegal timber trade**

The lesson here is an important one for the global community. It is that, in many cases, efforts to save and increase forests in countries such as those assessed in the case studies could simply transfer the problems elsewhere. The risk of leakage through an increase in imports needs to be acknowledged. Meyfroidt and Lambin expressed the general lesson well in their study of the forest transition in Viet Nam:

*When policies—such as may be implemented through a REDD scheme—aimed at protecting forests lead to a decrease in harvests without accompanying measures to control wood consumption and/or increase wood production from plantations and processing efficiency, then leakage abroad will most likely occur. Leakage should thus be directly addressed in forest protection policies.<sup>57</sup>*

While deforestation, forest degradation, and domestic wood production are declining in the increasing number of countries that have turned the corner in their forest transitions, the demand for forest raw materials and products—including in the forest-transition countries—is expanding, not contracting. Often, this increased demand is being met through imports; often, too, significant portions of those imports consist of illegally logged wood. For example, when China banned the harvest of its own natural forests its wood imports soared, primarily from Russia, Indonesia, Malaysia, Thailand and Papua New Guinea.<sup>58</sup> By one estimate<sup>59</sup>, China has become the number-one importer of illegal wood, with much of it being processed into furniture that is then exported, for example to the U.S., Japan, EU and others.<sup>60</sup> This raises the question of accountability: does the blame lie with the poorly governed countries exporting illegal logs, the unregulated imports of China and other wood processing countries, or the wealthy nations sustaining the demand for cheap finished products?

To take it a step further, who is responsible for the emissions that result from this supply chain?

To take one example, Viet Nam's recent forest transition gives us an indication of how much deforestation and forest degradation is 'exported' when a country begins protecting its own forests. Viet Nam banned the harvest of wood in major areas of its own forests but its relatively rapid plantation expansion still cannot satisfy the demand of its blossoming wood products export businesses and other wood-based industries. Thus it has turned increasingly to wood imports, 48 percent of which were found to be illegal by Meyfroidt & Lambin. The issue of exporting deforestation and forest degradation has been the subject of a detailed quantitative analysis, the results of which are instructive:

*Forest recovery in Viet Nam during the last 20 years has been rapid. Yet, it was not only the results of domestic efforts but also of the displacement of wood extraction to neighboring countries. The equivalent of 39.1 percent of the volume of wood re-growth that took place in Viet Nam's forests has been extracted from forests abroad to supply Viet Nam's needs. The leakage due to policies restricting harvests in natural forests and displacement due to the growing wood consumption and exports represented, respectively, 22.7 percent and 16.4 percent of the increase in growing stock of Viet Nam's forests. **Without the rapid increase in fast-growing wood plantations in Viet Nam that stabilized the domestic supply, total displacement would have been greater** [Emphasis added.]<sup>61</sup>*

As is the case with China, the great majority of wood imports are processed and re-exported as finished products, making attribution of the "displaced wood extraction" unclear. In response to the high levels of illegal wood imported by China and Viet Nam (most of which is processed and then exported to Europe, North America and Japan),

Lawson and McFaul point out that the governments of both China and Viet Nam:

*have now studied both the problem and possible solutions to some extent. All relevant Chinese government agencies are now engaged, and China has also commissioned a study into the country's role as an importer of illegal timber. However, neither country has a national action plan to tackle illegal timber imports. China and Viet Nam also do not yet have legislation in place to prevent the import of illegally sourced timber, nor is either country currently planning to implement such legislation.*<sup>62</sup>

At the same time, due more to pressure from export markets than to a domestic government policy response, there has been "significant progress on the part of the private sector in Viet Nam in cleaning up supply chains, and some limited initial progress in China. Similarly, while estimated imports of illegally sourced wood by both countries have been declining recently, policy responses by the Chinese and Vietnamese governments have not been a causal factor."<sup>63</sup>

A survey of eight forest transition countries by Meyfroidt, Rudel and Lambin (2010) expands the calculation of emissions from land use changes. They considered how these changes influence imports and exports of wood as well as agricultural commodities. Under this more comprehensive view, the FACs they studied:

*compensate for the land use displaced through their imports of wood products with the land use absorbed through their exports of agricultural products. Thus, it is important to include not only imports but also exports and the associated absorption in calculating the net land-use effects of forest transitions. During the last 5 yrs, net displacement by all sectors increased to around 52% of the accumulated reforestation. The net gains through land*

*sparing decreased over time. Four countries— Chile, Costa Rica, India, and Viet Nam...have shifted from net absorbers to net displacers during the last 5 y. For China, the displacement is smaller than its accumulated reforestation and offsets 45% of its reforestation in total (and 74% during the last 5 y).<sup>64</sup>*

In a global context and for future forest transitions in current FLCs, the lessons derived here are important: leaving aside the other issues hounding a global agreement on REDD, it appears that without better controls on the leakage associated with the trade in illegal wood, the effectiveness of REDD is questionable. On the other hand, if the illegal wood trade becomes significantly better controlled, and programs are introduced to pay people or governments not to log, wood prices in global markets will increase. This is because illegal wood that flows through the global markets depresses prices (and reducing this flow would reduce the effect), and because the wood supply would shrink.<sup>65</sup>

With increasing prices, trade may decline somewhat, but the incentive to harvest wood and export it would increase; this, in turn, may lead to the need for increased REDD payments to keep countries from cutting their forests or a risk of new leakage. Increasing prices can also (legitimately) affect decisions on harvesting and production in countries that have already turned the corner in their forest transitions.

Some may claim that the solution is to reduce wood consumption. We believe the opposite: while we fully agree that increased processing efficiency is an important step to take, some wood consumption cannot be reduced without causing severe hardship and social tension—such as of fuelwood and wood for subsistence use, coffins, and other essential products. Moreover, wood is more environmentally friendly than, and should be substituted for, high-energy-consuming non-renewable raw materials.<sup>66</sup> Lippke et al., for example, compared the carbon emissions and storage in the life cycle of wood products harvested from a sustainably man-

aged, carbon-neutral forest with alternative materials used in residential structures. They found that:

*The carbon stored in wood products as an offset to emissions was ... significant. Comparison of various building materials—wood, steel, and concrete—showed that wood was more environmentally friendly because of reduced carbon emissions because of fossil fuel combustion, carbon stored in products, permanent avoidance of emissions from fossil fuel-intensive products, and use of a sustainable and renewable resource.<sup>67</sup>*

Bowyer et al. have called for a more comprehensive take on land use carbon accounting in United Nations Framework Convention on Climate Change (UNFCCC) negotiations, one that privileges wood consumption over more carbon-intensive materials:

*One aspect of HWP [harvested wood products] manufacture and use that is not yet being fully considered by climate negotiators is formal recognition that substitution of wood for more energy-intensive, nonrenewable materials results in substantially lower carbon emissions. The substitution effect may be a mechanism for addressing leakage concerns in carbon protocols.<sup>68</sup>*

Others advocate a more comprehensive view of deforestation emissions, focusing on forest-agriculture dynamics. In light of Meyfroidt, Rudel and Lambin's research, the Partnership for the Tropical Forest Margins (ASB) has advocated for UNFCCC negotiations to provide guidelines to countries on dealing with these "emissions embodied in trade."<sup>69</sup> They highlight concerns that REDD implementation could trigger greater displacement, if not well implemented. This reflects the view put forth by Scherr et al. (2011) that "successful REDD+ depends less on forestry strategies than on agricultural

development strategies that retain and sustain forests.”<sup>70</sup> The concept of “Reducing Emissions from All Land Uses” (REALU) has been introduced to tackle leakage problems, and encourage policymaking that pays attention to dynamics in the agricultural sector as well as inside the forests.<sup>71</sup>

We make these points to show that the lessons from FACs are relevant not only for FLCs in the context of REDD+, they are also important for the global community as it searches for options to reduce GHG emissions from the global forest sector. We believe that ARRDL is a necessary complement to REDD—unless wood consumption is to be

reduced, something that is undesirable as well as highly unlikely in our view.

As can be seen in the cases of China and Viet Nam, reducing or eliminating illegal wood in international markets is just as relevant to ARRDL as it is to REDD. This is another reason why the global community should work simultaneously on the issues that affect the success of both REDD and ongoing efforts to expand ARRDL in a responsible way.

In the next section, we examine what is needed to expand global ARRDL activity, what has been learned from past ARRDL activity, and why it is important that ARRDL and REDD are treated as equal partners.

# 3

## Expanding ARRDL: A Complement to REDD

ARRDL activities have quietly been taking place in most FACs and some FLCs. ARRDL has not, however, received the same level of attention and

financial support that the ‘reducing deforestation’ part of REDD+ has received in recent years. It has not yet captured the minds of key government leaders.

### 3.1

#### WHERE AND HOW DOES ARRDL FIT WITH REDD+?

Some may hold that ARRDL is nothing more than the ‘+’ in REDD+.<sup>72</sup> Whether or not that comes to be the case, for the purposes of this discussion we prefer to separate ARRDL from REDD, since there is as yet not mention of “REDD+” in UNFCCC agreed text, let alone consensus on what the ‘+’ actually represents. There is even less agreement on the meaning of the second ‘D’ (‘degradation’) in REDD. As suggested at the UNFCCC’s Conference of the Parties (COP) 15 in Copenhagen, “Forest degradation is one of the key, unresolved topics in the debate on reaching an agreement for a REDD mechanism.”<sup>73</sup> In preparation for COP 16, other authors pointed out that: “Consensus has not yet been reached on whether there should be a primary set of measures for deforestation/degradation, and a secondary set for other forest-based mitigation options.”<sup>74</sup> As mentioned earlier, monitoring degradation continues to be a challenge, and there remains no agreement on how to best categorize and measure it. This question was unresolved at COP 16 and remains a contentious issue in ongoing discussions, under the

broader guise of how to deal with land use, land-use change and forests.

By focusing on a new acronym, ARRDL, we are not proposing a new architecture for a separate program. Rather, we hope to draw attention to the fact that these activities may better be treated as a *necessary complement* to REDD, or as an equal partner to REDD, rather than as a small part of it—a little ‘+’ tacked onto the end of the big REDD. In the case-study countries and in most other FACs, both ARRDL and REDD measures have been taking place side by side for some time: FACs account for 85 percent of the plantation area added globally during the period 1990–2010. Millions more additional trees (not counted in GFRA statistics for definitional reasons) have been planted in agroforestry systems or on degraded forest lands, abandoned agricultural lands, and steep areas that are unsuitable for anything other than perennial vegetation.

ARRDL activities deserve much more attention, in all countries. In one representative scenario from the literature it has been suggested that more than half the additional carbon sequestration in the world’s

forests through 2030 could come from ARRDL activities and improved sustainable forest management.<sup>75</sup>

Looking forward to 2012 and the UN Conference on Sustainable Development (Rio+20), we believe there will be a paradigm shift at the multilateral level. The focus will no longer be on legally binding decisions that regulate national activities, but rather on new cooperative mechanisms to ensure human well-being, and resource use strategies that are applicable to all countries. In order to address the two greatest challenges of our time, climate change and eradication of poverty, a consensus is emerging that for achieving sustainable development, transition to a green low carbon economy and society is necessary.<sup>76</sup> We expect that ARRDL will be one of the principle pillars of green economy and green society.

At the same time, we are also aware that many people are concerned about adding ARRDL into the mix of activities that will qualify for carbon credits. We address this criticism in detail in the next section. We agree that, in a market-based model, much remains to be sorted out if ‘real, additional, quantifiable, permanent, verifiable, and enforceable compliance-grade carbon offset credits’ are to be offered for both REDD and ARRDL activities. Some observers feel that the issues and the barriers that exist, and the principles involved, argue against the suitability of terrestrial carbon as a tradable commodity. For example: “I see no role for biological sequestration in a carbon trading scheme given the impermanence, volatility and onerous transaction costs related to duration, measurement and monitoring.”<sup>77</sup>

In what follows, however, we keep in mind that there are funding and incentive options other than those based on carbon-offset markets. One of these is a fund-based approach that relies principally on bilateral and multilateral support but also on private voluntary funds that support specific programs and activities. A wide variety of such private voluntary funds already exist.

Another option for ARRDL is a market-based approach based on outputs from sustainably managed planted forests and agroforests rather than on carbon offset credits. In this case, improved

livelihood benefits would be the driving incentive for the afforestation or reforestation, such as is already the case in several of the case-study countries. Incentives for sustainable management could come from a variety of sources, including forest product certification, payments for watershed services, and extension services. The EU’s signing of two Voluntary Partnership Agreements with Liberia and Indonesia in mid-2011 attests to the continued interest in creating market opportunities for sustainably sourced products.<sup>78</sup> Carbon sequestration would be a co-benefit that could attract additional payments for communities and smallholders in exchange for maintaining forest integrity.

Such an approach would only work if the smallholders and communities have secure tenure of the land on which they would be expected to establish and manage the planted forests, and if they have access to markets. Under REDD, entities would be required not to undertake a particular activity (i.e. deforestation) on their forest land. Livelihood-focused ARRDL programs, on the other hand, ask people to do something positive for themselves—to produce new or improved forests on non-forested or degraded lands and new and improved livelihood options. The incentive structures involved are therefore quite different.

The potential for market-based community-based forest management is highlighted by strong evidence in long-developed forested countries like Sweden, Finland, Mexico, the United States, Canada, and Norway.<sup>79</sup> Molnar et al. found that smallholder and community enterprises could generate double the forest revenue and double the jobs and sustain or double the provision of ecosystem services that they generate today. Robust local enterprises have emerged in several densely-forested, developing countries. Table 3 presents evidence in twelve tropic countries where the tenure transition is under way and where community rights are recognized on 82 Mha of community owned or managed forest lands. The potential scope for growth in these and others countries where the transition is nascent is substantial.

TABLE 3. POTENTIAL FOR EXPANSION OF ENTERPRISES IN FOREST AREAS WHERE COMMUNITIES AND SMALLHOLDERS HAVE TENURE RIGHTS

Country	Case-study area ('000 ha)	Key mechanisms	Area of similar forest resources/ownership transition (in '000 ha)
Colombia (1 case study)	20	Peace Accords: Hydropower watershed basin	400
Mexico (3 case studies)	100	Ejidios/communities with forest management plans	14,000
Central America (3 case studies)	500	Social forestry or community concessions	3,000
Amazon region (3 case studies)	100	Indigenous territories, associations or extractive reserves	30,000
Nepal (2 case studies)	3	Forest user groups	1,000
India (1 case study)	70	Joint forest management, community forestry/agroforestry	20,000
West/Central Africa (3 case studies)	53	Village forests	4,200
East Africa (1 case study)	2	Village forest reserves and joint forest management	3,342
China (1 case study)	0.3	Village bamboo forests	4,000
Philippines (1 case study)	10	CBFM plans	1,570
Papua New Guinea (1 case study)	10	Customary lands	1,000
TOTAL	868		82,512

Source: Molnar, Augusta, Megan Liddle, Carina Bracer, Arvind Khare, Andy White, and Justin Bull. 2007. *Community Forest Enterprises: Their Status and Potential in the Tropics*. Yokohama, Japan: International Tropical Timber Organization and Washington, DC: Rights and Resources Initiative. p 60.

In addition to secure tenure, other incentives for investment in ARRDL, often left out of the picture, are the availability of reasonably priced credit and access to technical support and markets. All the case-study countries initiated major plantation programs, but some initially forgot these additional critical elements. ROK is a good example of a country that included all these elements in its approach.

In many cases (e.g. in China, ROK, and India), ARRDL activities have been prompted by the need for environmental protection, such as in critical watersheds or on steep slopes. In such cases, smallholders have been paid to plant and tend forests. China, for example, has one of the world's

biggest 'payments for environmental services' (PES) schemes involving protection-focused ARRDL, which incidentally is also sequestering carbon. This decade-old reforestation effort, which was launched in response to the flooding of the Yangzi River and involves paying farmers a yearly amount per reforested hectare managed, "has delivered 9 million hectares of new forest".<sup>80</sup> In the case of ARRDL projects for environmental protection, one can envisage payments that are for both carbon sequestration and other specific protection functions.

## 3.2

## RESPONDING TO ARGUMENTS AGAINST INCLUSION OF CERTAIN ARRDL ACTIVITIES IN AN OVERALL FOREST CARBON PROGRAM

Two basic types of argument have been made as to why the focus of forest-related climate-change mitigation should be on reducing deforestation only.

**1. The potential gains in carbon storage from ARRDL in some cases are small per hectare compared to the carbon loss avoided through reductions in deforestation.<sup>81</sup> Thus, the cost of ARRDL per unit of carbon sequestered could be prohibitive and above the cost per unit carbon of preventing the deforestation of some natural forests. Particularly when planted forests are compared to large areas of natural forest under the control of one entity, transactions costs also could be higher.<sup>82</sup>**

This argument is made without recognizing that the incentives that drive REDD and those that drive most ARRDL activities are different. Under REDD, the only possible incentive for people not to deforest or degrade the forest (assuming that they intend otherwise to do so) would be payments that exceed the benefits they expected from deforesting or degrading.<sup>83</sup> For ARRDL activities the incentives are likely to vary according to two types of scenario or combinations of them. One of these involves production-oriented ARRDL activities, which are undertaken to increase income, improve livelihoods and tenure security, and obtain other benefits that arise from the production of wood and non-wood forest products. Carbon sequestration is a by-product and, in that sense, the amount of carbon sequestered per hectare or per capita is less of an issue. Nevertheless, directing some payments for carbon benefits towards ARRDL can help to kick-start production and market-oriented programs.

The second type of ARRDL scenario involves payments for carbon sequestration, and is likely to be particularly common on private land. If the purpose of the ARRDL activity is purely to sequester carbon, the lower-carbon-per-ha and thus high-cost-per-unit-of-carbon argument would be relevant.

However, ARRDL projects done solely for carbon sequestration (with no co-benefits in mind) are likely to be few, at least until all the lower-cost REDD possibilities for natural forest have been funded. In fact, all the case-study countries are undertaking major ARRDL projects for a variety of primary reasons, with carbon sequestration a recognized co-benefit or by-product. Ironically, sustainable ARRDL programs that help to avoid international leakage in REDD projects are indirectly aimed at the REDD goal and help make REDD activities more valuable-- another reason why REDD and ARRDL are complementary and not competitive activities.

With ARRDL activities it is possible to focus strongly on co-benefits such as the links between ARRDL for environmental protection and Millennium Development Goal (MDG) 1: 'poverty reduction'. Much of the degraded land in developing countries is owned or occupied by poor families, so the potential to achieve poverty reduction through some kind of production-oriented ARRDL program that creates new livelihood options and improves land use is good. Such projects can also provide public goods such as watershed protection and carbon sequestration, as happens in most of the case-study countries.

In many cases such as China and ROK, afforestation, reforestation, or forest restoration can be combined with other activities to provide sustainable livelihood opportunities for the poor. Small-scale producers of tropical forest products are actually well-positioned for growth, as domestic and regional markets grow in developing countries, and efficient new bioenergy technologies increase international demand for wood exports. Furthermore, land scarcity is becoming a serious issue for larger enterprises, causing them to consider sourcing raw materials produced by forest communities.<sup>84</sup> Large companies are increasingly divesting their investments in land and forests by encouraging smallholders and small companies to

use their lands to grow trees through “outgrower” agreements. Companies must take great care in negotiating these partnerships, as conflict can be sown quickly by coercion or negligence of farmers’ rights.<sup>85</sup> Relatively small PES may be needed, at least initially, to kick-start an ARRDL program, but over time these increased livelihood benefits may be sufficient motivation to make the projects sustainable financially, as well as environmentally.

A caveat to an increased role for ARRDL is that there is an urgent need to clarify and define the tenure and other rights of the poor, and to make those rights secure over the long term, so that such people have an incentive to invest. But this also applies to REDD: it is very awkward to pay people not to deforest if they do not have the right to do so in the first place and if they have no right to enter agreements not to deforest land they do not own or control. Again, there is a complementarity here between the needs of REDD and ARRDL. Under an approach of good-enough governance, dealing with tenure and rights issues is a fundamental priority for both REDD and ARRDL.

A second, related point in response to this argument is that, while it may be correct and relevant on the basis of unit carbon per ha per year, it is also true that the total area of already-degraded forest and other land ready for ARRDL treatment is immense: it could be more than a billion hectares (see Table 3).<sup>86</sup> Although not all of this land will be available for tree-planting, the total potential for gain in carbon sequestration and storage over time from ARRDL activity is very high. We emphasize again that most proponents of expanded ARRDL are arguing for it as complement, not a competitor with REDD.

One of the main opportunities for expanded ARRDL is through agroforestry systems. A recent detailed study by Zomer et al. concluded that, even now:

*Agroforestry, if defined by tree cover of greater than 10 percent on agricultural land, is widespread, found on 46 percent of all agricultural land area globally, and affecting 30 percent of rural populations.*

*Based on our datasets, this represents over 1 billion hectares of land and 558 million people. Agroforestry is particularly prevalent in Southeast Asia, Central America, and South America.<sup>87</sup>*

Taking the lower estimate of tree cover—ten percent—and applying this factor to “over a billion hectares” of existing agroforestry lands is equivalent to over 100 million ha of forest that is sequestering and storing large amounts of carbon. Another study, by Albrecht and Kandji, concluded that:

*The C sequestration potential of agroforestry systems is estimated between 12 and 228 Mg ha<sup>-1</sup> with a median value of 95 Mg ha<sup>-1</sup>. Therefore, based on the earth’s area that is suitable for the practice (585–1215 × 10<sup>6</sup> ha), 1.1–2.2 Pg C could be stored in the terrestrial ecosystems over the next 50 years. Long rotation systems such as agroforests, home gardens and boundary plantings can sequester sizeable quantities of C in plant biomass and in long-lasting wood products.<sup>88</sup>*

Looking at the restoration potential of “mosaic” landscapes—encompassing forests, cropland, on-farm trees and degraded or unused land—reveals a huge area, and correspondingly significant carbon sequestration potential (Table 4). More than a billion hectares of clear-cut or degraded forest can be regrown by this reckoning. It will not replicate the former forest in carbon density and biodiversity in all cases, but restoring a former forest to an agroforestry mosaic still represents significant boost to local livelihoods in addition to the carbon benefit.

However, one key constraining factor to bear in mind is hydrology. While increasing forest cover can have a positive effect on water availability and provide a buffer against flooding, developing plantations on the scale of a billion hectares would have a tremendous effect on climate processes by increased evapotranspiration and decreased water

TABLE 4. FOREST LANDSCAPE RESTORATION POTENTIAL (MHA)

	Higher probability		Lower probability	
	Broad-scale	Mosaic	Irrigated croplands	Rain fed croplands
North America	10	89	15	218
South America	90	252	10	187
Africa	43	401	4	153
Insular SE Asia	21	48	8	43
India and Pakistan	9	13	131	88
Russia	8	23	8	108
Europe	7	61	31	278
Mainland SE Asia	70	63	153	160
Central Asia	2	25	4	27
Australia and New Zealand	11	85	15	45
Total	272	1060	379	1306

Source: Christophersen (2010).<sup>89</sup>

runoff. Proponents of large-scale reforestation will need to take local water resources into account with every project to avoid depriving communities in the watershed of runoff and undermining yields from rain fed crops.<sup>90</sup>

Planting trees on farms could be an important part of a production-oriented program of ARRDL that is additional to newly established planted forest, the reforestation of cut-over forest land (under a sustainable forest management regime), and the restoration and restocking of degraded lands (both forests and agricultural or grazing lands reverting to forest). While the additional carbon sequestration and storage may be small per unit area compared to those that can be achieved by avoiding deforestation, the total potential area available for ARRDL is immense. The opportunities to improve the livelihoods of millions of impoverished rural farmers, through financial incentives from ARRDL programs and possibly carbon credits, as well as timber, fiber, fuel, food, forage and shade for animals, and other forest products and services.

Part of the argument against ARRDL based on its cost-effectiveness for climate-change mitigation is that it will be difficult to keep down the transac-

tion cost per unit of carbon sequestered because of the large numbers of smallholders, small communities, and groups of rural people who would be involved. There are several responses to this concern. First, while the transaction costs involved in REDD market-based programs (as distinct from voluntary payment programs) are still unknown, many ARRDL programs have been under way for decades and it has already been proven that they can be instituted by smallholders and the rural poor on a very large scale with acceptable transaction costs. When ROK, for example, was undergoing its successful village fuelwood plantation establishment program in the 1970s and early 1980s, governments at various levels found ways to generate economies of scale in dealing with the approximately 11,000 villages involved.<sup>91</sup>

Many of the countries now making net additions to their forest areas have done so exactly because of the ARRDL projects they have implemented—providing prima facie evidence that the transaction costs were acceptable to those who had to pay them. For projects that aim to encourage ARRDL on private land, private incentives of various sorts will be part of what drives action; in many

cases the carbon-related payments required and associated transaction costs may be quite small. This is not the case for REDD, where the main incentive is the money that will be paid not to deforest.

REDD also faces issues of meeting additionality and non-leakage criteria. Assuming 100 percent additionality and non-leakage, the transaction costs per unit of emissions reduction may be quite low. However, as argued elsewhere,<sup>92</sup> these costs will climb if likely scenarios of expected levels of ‘environmental blackmail’ and leakage are factored in. ‘Environmental blackmail’, which, for example, could involve REDD payments to forest owners or rights holders when they had no genuine intention of deforesting in the first place, will result in infinite transaction costs per unit of carbon actually saved. Significant leakage can also be expected for reasons mentioned earlier: the literature suggests that it could be as large as 90–100 percent.<sup>93</sup> Leakage can also substantially raise transaction costs per actual unit of carbon emissions avoided. Over time, sustainable ARRDL activities have the added co-benefit of reducing the market pressures that would lead to international as well as national leakage from REDD. Thus, ARRDL and REDD complement each other in yet another way.

Lastly, it bears mentioning that the relative merit of REDD or ARRDL activities will vary with countries’ geography and demographics. Transaction costs or environmental variables may make certain activities prohibitively costly per unit of carbon. This fact supports the need for international climate finance mechanisms to take a flexible and comprehensive view of how to deal with terrestrial carbon emissions. Since the REDD payment format will not work for all areas, any trajectory toward net zero emissions from the forest sector must needs turn to reforestation and restoration. Trines et al. provide the following prioritization of activity types by region in Table 5.

**2. From a biodiversity point of view, afforestation and reforestation should be kept out of any REDD+ agreement.**

This second major argument against including ARRDL in a REDD mechanisms can be summed up as follows:

*In order to not counteract biodiversity objectives, REDD+ funding for afforestation and reforestation should be limited to forest restoration with native tree species and the target should be to establish site-adapted, structured, close-to-nature secondary forests. Therefore, plantations should be regarded as a separate land use category with a clear definition .... Plantations should be excluded completely and be reported in a separate land use category.<sup>94</sup>*

A more direct statement of the argument is as follows: “REDD must clearly distinguish between forests and plantations and exclude afforestation and reforestation.”<sup>95</sup>

One could for the sake of argument imagine an equally focused statement by advocates of MDG 1: ‘Given scarce resources, only REDD+ activities that also help improve livelihoods of the poor should be included; we should not be saving forest areas from deforestation if the deforestation is deemed necessary for the economic development and livelihood survival of the poor’.

The point is that neither view should be acceptable to those debating REDD and REDD+ unless those persons favor a strong, separate ARRDL program. The carbon-sequestration and emissions-reducing qualities of ARRDL activities should be part of the overall forest-related climate-change mitigation architecture that eventually emerges—but with controls and use of best practices.<sup>96</sup> For example, there should be safeguards to deal with the concern that creating incentives for ARRDL might induce the transformation of high-biodiversity forests into plantations. (This is a real concern, which we assume arose partly because of the massive forest clearing that has taken place to make room for oil palm plantation, etc.). It seems to us that any enterprise with the legal right to convert natural

TABLE 5. BROAD CATEGORIES OF FOREST CARBON SEQUESTRATION OPTIONS AND AN INDICATION OF THEIR POTENTIAL

Region	Measure (broad)	Technical Mitigation Potential (CO <sub>2</sub> y-1)
OECD North America	Afforestation	Medium
OECD North America	Reducing Deforestation	Very Small
OECD North America	Forest Management	Large
OECD North America	Bio-energy	Medium
Europe	Afforestation	Small
Europe	Reducing Deforestation	Very small
Europe	Forest Management	Small
Europe	Bio-energy	Small
OECD Pacific	Afforestation	Small
OECD Pacific	Reducing Deforestation	Small
OECD Pacific	Forest Management	Small
OECD Pacific	Bio-energy	Very small
Centrally Planned Asia	Afforestation	Medium
Centrally Planned Asia	Reducing Deforestation	Small
Centrally Planned Asia	Forest Management	Medium
Centrally Planned Asia	Bio-energy	Small
Countries in Transition	Afforestation	Medium
Countries in Transition	Reducing Deforestation	Small
Countries in Transition	Forest Management	Medium
Countries in Transition	Bio-energy	Medium
Central & South America	Afforestation	Medium
Central & South America	Reducing Deforestation	Large
Central & South America	Forest Management	Medium
Central & South America	Bio-energy	Medium
Africa	Afforestation	Medium
Africa	Reducing Deforestation	Large
Africa	Forest Management	Medium
Africa	Bio-energy	Medium
Other Asia	Afforestation	Medium
Other Asia	Reducing Deforestation	Large
Other Asia	Forest Management	Medium
Other Asia	Bio-energy	Medium
Middle East	Afforestation	Very small
Middle East	Reducing Deforestation	Very small
Middle East	Forest Management	Very small
Middle East	Bio-energy	Very small

Note: 'Large' indicates >500 Mt CO<sub>2</sub> y-1 by 2030; 'Medium' indicates: 250-500 Mt CO<sub>2</sub> y-1 by 2030; 'Small' indicates: 100-250 Mt CO<sub>2</sub> y-1 by 2030; and, 'Very small' indicates: <100 Co<sub>2</sub> y-1 by 2030.

Reproduced from: Trines, E., Höhne, N., Jung, M., Skutsch, M., Petsonk, A., Silva-Chavez, G., Smith, P., Nabuurs, G., Verweij, P., and B. Schlamadinger. 2006. Integrating Agriculture, Forestry and Other Land Use in Future Climate Regimes: Methodological Issues and Policy Options. Report 500102 002. The Hague: Netherlands Programme on Scientific Assessment and Policy Analysis (WAB) Climate Change.

forest to planted forest would be doing so only because the net benefits exceed the payments that are offered not to deforest. It would be feasible, with today's technology, to determine whether land has been cleared recently (e.g. X years before the initiation of a REDD program) and to stipulate that in such cases no payments would be made for plantation establishment.

It would not seem worthwhile to ignore the potential of ARRDL activities for climate-change mitigation and livelihood improvement because of the danger that some natural forest will be cleared to establish plantations that would then obtain REDD+ payments. It would be much better to build in safeguards and incentives to ensure that REDD+ does not encourage the conversion of natural forest to plantations. For example, differential payments could be made depending on the type of land being afforested or reforested.

Friedman and Chamley<sup>97</sup> add to the above that the decisions for plantation and (biodiversity) reserve establishment and management should take into account their advantages to local people, who should have a strong voice in developing the social contract for managing neighboring forests. In sum, we accept the more moderate, pragmatic view of this argument put forth by Bowyer et al., who concluded that:

*Despite environmental concerns and problems associated with the establishment and sustainable management of some forest plantations, the benefits that accrue from plantations of rapidly*

*growing trees are so significant that further development of forest plantations is virtually assured. Benefits include high commodity production on relatively small land areas, vastly reduced overall environmental impact associated with wood production and use in comparison to available alternatives, and potential for concomitant restoration of degraded land areas and associated biodiversity. However, not every aspect of rapidly growing plantations is beneficial. To recognize the tremendous advantages of forest plantations or the inevitability of further development does not mean that environmental concerns linked to plantation development should be dismissed. Rather, it is to the advantage of everyone that forest plantations operate sustainably in every sense of the word, and that they provide the greatest possible array of benefits.<sup>98</sup>*

Biodiversity is important and should be a major consideration in REDD+. At the same time, however, improving the livelihoods of the poor and achieving MDG 1 are also important and should not be ignored. Furthermore, many other ARRDL activities—especially agroforestry landscapes—can have significant levels of biodiversity. There is the possibility to maximize the benefits of planted forests while avoiding the main potential negative effects of such forests.

## 4

## Concluding Comments

Based on the assessment presented, we reach at least four basic conclusions.

**1. ARRDL is a necessary complement to successful REDD.**

If REDD is pursued aggressively and successfully, but demand for wood and wood products continues to rise<sup>99</sup>, then REDD alone will not be enough. That is because, as a country locks up its forests and reduces illegal logging under REDD programs, domestic wood supplies will dwindle and countries will turn to imports, thereby exporting their deforestation and forest degradation, unless the imported wood comes from sustainably managed, oftentimes planted forests.

With the exception of Chile, the country case studies discussed in this paper illustrate this point. Imports of wood increased rapidly before and during the forest transitions, and some of those imports were illegal. One way to help avoid such international leakage over time is to invest in new, sustainably managed sources of wood. Expanded areas of sustainably managed, highly productive forest will eventually help meet the demand for wood at reasonable prices and at the same time reduce GHG emissions. That is what happened in Chile, and new potentially productive forests are being created in a major way in all the other four case-study countries. In the ideal case, such sustainably managed production forests eventually can help to reduce or even eliminate international leakage, thus making

domestic REDD programs more valuable in terms of preserving the world's natural forests.

**2. A major co-benefit of aggressively expanding rural ARRDL programs can be a contribution to meeting MDG #1**

ARRDL and associated small-, medium- and large-scale forest-based enterprises, supported by low-cost credit and assistance in gaining market access and encouraged and developed as a package, can directly benefit poor forest dwellers more than REDD (as currently envisioned) may. In a competitive carbon market, buyers are likely to focus first on lower-cost offset credits available for avoided deforestation of large areas of public and private forest. Only then will they move to activities with higher transaction costs that are more difficult and costly to implement, such as those needed to bring *successful and sustainable* REDD to smallholders, migrant forest-farmers, forest dwellers, and Indigenous Peoples.<sup>100</sup>

It should be borne in mind that existing REDD projects comprise agreements between corporations or other groups to pay a community or government not to deforest specified areas of forest. Many of these projects are carried out for their public relations value, if the corporations involved have no legal obligation to reduce their carbon footprint. Some may stem from an altruistic desire to protect the environment and its biodiversity as well as to offset GHG emissions. But they are not set up as part of a functioning market, nor are many

set up with a particular desire to help achieve the first Millennium Development Goal (MDG 1). In a full market-based scenario, such co-benefits will be of even less concern, since companies will be scrambling to meet their legally binding GHG reduction targets at a cost that does not infuriate shareholders. Forest-based offsets may or may not be part of the mix; and they may come at the expense of MDG 1, impoverished forest communities, and Indigenous Peoples.

To be successful in a broader sense, publicly funded ARRDL programs should focus on impoverished rural people from the beginning, even if the degraded land involved belongs to the state. With adequate financing, these programs have a great potential to contribute to rural employment. Nair and Rutt estimate that an investment of US\$1 million in sustainable forest management activities in developing countries will create 500-1000 full-time jobs. By their reckoning, an annual outlay of US\$ 8 billion for “afforestation, reforestation and desertification control” could create 4-5 million new jobs and affect 5 Mha worldwide.<sup>101</sup> Furthermore, forestry investments tend to have a high multiplier effects on in local economies, creating perhaps 1.5-2.5 additional jobs per full-time forest sector worker.

Large forest owners and corporations, guided by appropriate government policies, have the profit motive for being involved in expanded sustainable forest management and ARRDL activities. This contrasts with REDD, where the main incentive for this type of larger forest owner is the payment that they will receive not to deforest their lands. For ARRDL activities carried out by commercial forest enterprises, the role of governments and the international community is to guide, not subsidize (except possibly at the beginning in order to kick-start development and market access.) With the right incentives and disincentives—both fiscal and regulatory—such enterprises will focus on ARRDL activities and sustainable forest management that complement REDD programs and which do not involve deforesting natural forests in order to make room for fast-growing plantations. Their complementarity with REDD is evident: by providing an

alternative source of wood, ARRDL activities can help reduce REDD leakage while also generating livelihood opportunities for rural people, particularly where further processing is developed and markets are expanded.

**3. The success of both REDD and ARRDL, in terms of the magnitude and fair distribution of the benefits that will be generated, depends on the extent to which countries improve their governance and forest-tenure structures and the rights of local communities and Indigenous Peoples.**

In this, REDD and ARRDL will also be complements. To create effective, efficient, and equitable programs in both, “good-enough” governance is required. In many countries, improved governance is needed to reduce corruption and illegal activity; increase public participation and voice and government effectiveness, efficiency and accountability; ensure respect for the law; and clarify and provide security of tenure. Importantly, the combination of REDD and ARRDL add urgency to the national task of achieving a rational forest-tenure system, in which impoverished communities and individuals living in and around the forest are given the rights to the land and resources and long-term security for such rights. For REDD, such a forest-tenure system is required so that people and communities are able to make long-term legal contracts to dedicate their forests to REDD or to protect the public lands on which they dwell. For ARRDL activities, a clear and fair forest-tenure system is required to provide the incentive for planting and managing trees on a long-term basis and for restoring degraded lands in a way that they can benefit from the higher value that eventually results. (In many cases the incentive might not be sufficient unless secure tenure is accompanied by the availability of low-cost credit for small-scale enterprise development and help in accessing markets.)

#### 4. ARRDL is a means to ‘hedge our bets’ on REDD.

As currently discussed, and particularly a major carbon market becomes the dominant payment mechanism, REDD might take much longer and cost much more to develop and implement on a meaningful scale in tropical countries than initially thought. Thus, while REDD planning progresses and goes through the ‘proof of concept’ stage, we should hedge our bets and focus serious effort on proven, easier to design and implement, complementary programs for expanded global ARRDL activities.<sup>102</sup> We should also be promoting—much more strongly—the implementation of sustainable forest management for existing production forests. The addition of major ARRDL activities can reduce the risks and uncertainties associated with the current path toward a global, *effective* REDD program at a scale large enough to be meaningful in the achievement of the ultimate objectives of both REDD and ARRDL.<sup>103</sup> If properly planned, ARRDL programs can enhance the chances, in the medium and longer terms, that REDD programs will meet the additionality criterion. We stress that this potential is mainly in the future. However, the current problems facing REDD negotiations—such as on issues of finance, governance, and monitoring, reporting, and verification—may be less difficult to deal with if negotiators pay more attention to the complementarity of ARRDL activities.

In sum, our four related conclusions lead to an overall conclusion that ARRDL is a *necessary* complement to REDD. The two complement each other as long as planted forests are not established on land that has been deforested for that purpose (a major concern of many environmental groups). Such a possibility can be guarded against in the requirements that must be met in any ARRDL payment scheme. Some ARRDL activities will probably be incorporated within the ‘+’ of REDD+, although there is still no clear operational agreement on this.

In the bigger scheme of things, we are dealing here with dynamics that go beyond ARRDL and REDD at the project and country levels. In the long run, and as long as the demand for wood-based

products expands, an increase in forest resources through afforestation and reforestation, along with forest restoration, agroforestry, and sustainable forest management, will be required to both meet the growing demand for wood-based products and reduce emissions of GHGs from natural forests. In the process of expanding ARRDL programs it is possible to directly address MDG 1 and poverty reduction; and many countries, China and India included, are undertaking major ARRDL programs within the context of MDG 7, enhancement of the environment. Countries should take seriously the need for policy and governance reform. They particularly need to be more aggressive in instituting effective and equitable programs to clarify and reform forest tenure.

As indicated in Section 3, a number of arguments have been put forth against the inclusion of ARRDL in any future climate-change regime. In this paper we have responded to these arguments with what we believe are reasonable alternative arguments. However, one argument for which we currently have no response is that forest-based market approaches will fail for both REDD and ARRDL, particularly in developing tropical countries where the difficulties in creating real, additional, quantifiable, permanent, verifiable, and enforceable compliance-grade carbon offset credits are believed by some to be insurmountable. Given the size and growth of existing voluntary forest carbon offset payments, we believe that a wait-and-see approach is appropriate, in the meantime remembering that other funding and market-based mechanisms are available to drive REDD and ARRDL investments.

This paper has separated REDD and ARRDL only to stress the importance of both. REDD—implicitly or explicitly without the ‘+’—seems to gain most of the attention and thus resources at present. That needs to change. In fact, in the case-study countries, on-the-ground ARRDL activities exist in a major way alongside REDD activities, despite the lack of discussion of the ‘+’ component of REDD+. In developed countries, however, programs to reduce deforestation are often dealt with by different agencies and civil-society groups than those deal-

ing with ARRDL-related activities and programs, particularly farm forestry, agroforestry, and woodlot forestry. Moreover, some of the funding sources differ.

In most FACs, measures to reduce deforestation have been complemented by ARRDL activities to increase the size and improve the quality of the forest estate. In many FLCs that are now being targeted for REDD, ARRDL is already a major part of forest plans and strategies. In the context of climate change, whether REDD and ARRDL activities are administered and implemented separately or together shouldn't really matter, as long as ARRDL, or the '+' in REDD+, is given its due consideration and support, and effectiveness and efficiency are taken into account. REDD and ARRDL are complementary and can achieve the same ultimate goals of carbon sequestration, biodiversity protection and the improvement of livelihoods for impoverished forest communities and Indigenous Peoples.

## ANNEX 1. NET FOREST ADDING COUNTRIES, 1990-2010

Country	Forest area				Annual change rate						Net Gain
	1990	2000	2005	2010	1990-2000		2000-2005		2005-2010		1990-2010
	Mha	Mha	Mha	Mha	Mha/yr	%/yr	Mha/yr	%/yr	Mha/yr	%/yr	Mha
<b>China</b>	<b>157.14</b>	<b>177.00</b>	<b>193.04</b>	<b>206.86</b>	<b>1.99</b>	<b>1.20</b>	<b>3.21</b>	<b>1.75</b>	<b>2.76</b>	<b>1.39</b>	<b>49.72</b>
European Union (24/27)	141.95	149.26	151.65	153.92	0.73	0.50	0.48	0.32	0.45	0.30	11.97
U.S.	296.34	300.20	302.11	304.02	0.39	0.13	0.38	0.13	0.38	0.13	7.69
<b>India</b>	<b>63.94</b>	<b>65.39</b>	<b>67.71</b>	<b>68.43</b>	<b>0.15</b>	<b>0.22</b>	<b>0.46</b>	<b>0.70</b>	<b>0.14</b>	<b>0.21</b>	<b>4.50</b>
<b>Viet Nam</b>	<b>9.36</b>	<b>11.73</b>	<b>13.08</b>	<b>13.80</b>	<b>0.24</b>	<b>2.28</b>	<b>0.27</b>	<b>2.21</b>	<b>0.14</b>	<b>1.08</b>	<b>4.43</b>
Spain*	13.82	16.99	17.29	18.17	0.32	2.09	0.06	0.36	0.18	1.00	4.36
Turkey	9.68	10.15	10.74	11.33	0.05	0.47	0.12	1.14	0.12	1.08	1.65
Italy*	7.59	8.37	8.76	9.15	0.08	0.98	0.08	0.92	0.08	0.88	1.56
France*	14.54	15.35	15.71	15.95	0.08	0.55	0.07	0.47	0.05	0.30	1.42
Philippines	6.57	7.12	7.39	7.67	0.05	0.80	0.05	0.76	0.05	0.73	1.10
<b>Chile</b>	<b>15.26</b>	<b>15.83</b>	<b>16.04</b>	<b>16.23</b>	<b>0.06</b>	<b>0.37</b>	<b>0.04</b>	<b>0.26</b>	<b>0.04</b>	<b>0.23</b>	<b>0.97</b>
Norway	9.13	9.30	9.68	10.07	0.02	0.19	0.08	0.81	0.08	0.78	0.93
Sweden*	27.28	27.39	28.20	28.20	0.01	0.04	0.16	0.59	0.00	0.00	0.92
Belarus	7.78	8.27	8.44	8.63	0.05	0.62	0.03	0.39	0.04	0.46	0.85
Uruguay	0.92	1.41	1.52	1.74	0.05	4.38	0.02	1.48	0.04	2.79	0.82
Cuba	2.06	2.44	2.70	2.87	0.04	1.70	0.05	2.06	0.03	1.25	0.81
Greece*	3.30	3.60	3.75	3.90	0.03	0.88	0.03	0.82	0.03	0.79	0.60
Bulgaria	3.33	3.38	3.65	3.93	0.00	0.14	0.06	1.58	0.06	1.47	0.60
New Zealand	7.72	8.27	8.31	8.27	0.05	0.69	0.01	0.11	-0.01	-0.10	0.55
Poland*	8.88	9.06	9.20	9.34	0.02	0.20	0.03	0.31	0.03	0.30	0.46
Ukraine	9.27	9.51	9.58	9.71	0.02	0.25	0.01	0.14	0.03	0.27	0.43
Serbia	2.31	2.46	2.48	2.71	0.01	0.62	0.00	0.13	0.05	1.85	0.40
Tunisia	0.64	0.84	0.92	1.01	0.02	2.67	0.02	2.00	0.02	1.72	0.36
Germany*	10.74	11.08	11.08	11.08	0.03	0.31	0.00	0.00	0.00	0.00	0.34
Ireland*	0.47	0.64	0.70	0.74	0.02	3.16	0.01	1.82	0.01	1.24	0.27
United Kingdom*	2.61	2.79	2.85	2.88	0.02	0.68	0.01	0.37	0.01	0.25	0.27
Finland*	21.89	22.46	22.16	22.16	0.06	0.26	-0.06	-0.27	0.00	0.00	0.27
Puerto Rico	0.29	0.46	0.51	0.55	0.02	4.92	0.01	1.83	0.01	1.68	0.27
Uzbekistan	3.05	3.21	3.30	3.28	0.02	0.54	0.02	0.51	0.00	-0.12	0.23
Hungary*	1.80	1.91	1.98	2.03	0.01	0.57	0.02	0.78	0.01	0.46	0.23
Lithuania*	1.95	2.02	2.12	2.16	0.01	0.38	0.02	0.98	0.01	0.37	0.22
Bhutan	3.04	3.14	3.20	3.25	0.01	0.34	0.01	0.34	0.01	0.34	0.21
Romania*	6.37	6.37	6.39	6.57	0.00	-0.01	0.01	0.08	0.04	0.56	0.20
Côte d'Ivoire	10.22	10.33	10.41	10.40	0.01	0.10	0.02	0.15	0.00	n.s.	0.18
Latvia*	3.17	3.24	3.30	3.35	0.01	0.21	0.01	0.34	0.01	0.34	0.18



Country	Forest area				Annual change rate						Net Gain
	1990	2000	2005	2010	1990-2000		2000-2005		2005-2010		1990-2010
	Mha	Mha	Mha	Mha	Mha/yr	%/yr	Mha/yr	%/yr	Mha/yr	%/yr	Mha
New Caledonia	0.84	0.84	0.84	0.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Western Sahara	0.71	0.71	0.71	0.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Yemen	0.55	0.55	0.55	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Montenegro	0.54	0.54	0.54	0.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bahamas	0.52	0.52	0.52	0.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vanuatu	0.44	0.44	0.44	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Libya	0.22	0.22	0.22	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>World</b>	<b>4168.4</b>	<b>4085.2</b>	<b>4061.0</b>	<b>4033.1</b>	<b>-8.32</b>	<b>-0.20</b>	<b>-4.84</b>	<b>-0.12</b>	<b>-5.58</b>	<b>-0.14</b>	<b>-135.34</b>

Source: FAO FRA 2010.

Notes: Ranked by net forest area increase, 1990-2010. Case studies in bold. \* designates EU-27.

ROK is in fact a net deforester during this period (albeit a slight one, at 148,000 ha, net.) Their main efforts to restore forests were in force in the 1970s and 1980s, and have to date resulted in 0.6 Mha more forest area and an eightfold increase in annual stocking rate (to 80 m<sup>3</sup>/ha). Furthermore, this recent deforestation is the deliberate result of land use policy decisions, rather than a lack of sectoral governance (Gregersen 1982.)

## ANNEX 2 - CASE STUDY: CHINA

The low point in China's forest cover was in the mid to late 1970's when total forest area sank below 100 Mha. From the end of the civil war in 1949 and through the Cultural Revolution that ended in 1976 with the deaths of Premier Zhou Enlai and Mao Zedong, forests were heavily cut to provide raw materials and fuel in order to meet the needs of the ever growing population. There was little concern for the environmental benefits of forest nor for their sustainable use.

By 1998 forest cover represented 16.5 percent of the national land area and economic development was proceeding at a rapid rate. Regions in the interior finding themselves with reduced population pressures on the forest estate as people migrated to coastal cities and towns. At the same time, as incomes increased, people found themselves less dependent on local forests for their everyday needs, such as fuelwood. This mirrors very much the experience in Korea and its transition during the "greening" period.<sup>1</sup>

Since 1978, forest area has increased to over 200 Mha, i.e., more than doubling in the last 40 years (see Table 1 in the main report, and Figure A1 of this annex). A significant portion of the increase was due to massive forest plantations that were established in various parts of China. Another factor was the rehabilitation of lands that in earlier years was not qualified as "forest" according to the FAO definition. Many of these lands were restored to at least 10 percent canopy cover, and became growing "forests."

While these plantation and rehabilitated lands sequester less carbon per hectare than "old-growth" forests, the impact of the scale of these activities is still exceptional. It is interesting to note that Fang et al (2001), using an improved estimation method of forest biomass and the 50-year national forest resource inventory in China, estimate that China's forests had a significant positive net sequestration balance by 1998:

*Chinese forests released about 0.68 petagram of carbon between 1949 and 1980, for an annual emission rate of 0.022 petagram of carbon. Carbon storage increased significantly after the late 1970s from 4.38 to 4.75 petagram of carbon by 1998, for a mean accumulation rate of 0.021 petagram of carbon per year, mainly due to forest expansion and regrowth. Since the mid-1970s, planted forests (afforestation and reforestation) have sequestered 0.45 petagram of carbon, and their average carbon density increased from 15.3 to 31.1 megagrams per hectare, while natural forests have lost an additional 0.14 petagram of carbon.*

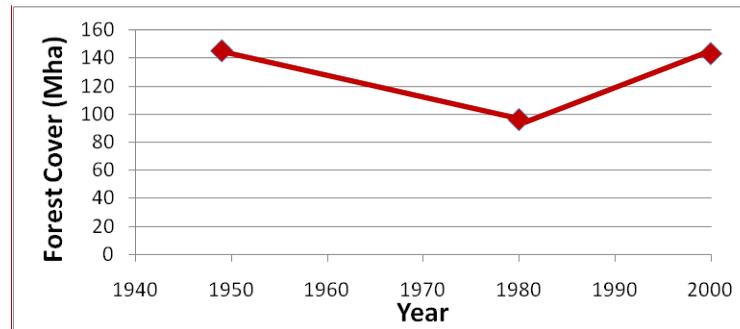
Given the expansion of forests in China since 1998, one can surmise that the rate of sequestration has increased significantly since then.<sup>2</sup>

A number of events came together since 1978 to give forests in China greater importance beyond just being a non-renewed source of capital for carrying out the wishes of an autocratic government. Zhang 2000; Lei 2008 and State Forest Administra-

<sup>1</sup> It is interesting to note in this regard, that Cooke et al (2008), in a regression analysis of forest transition in China, found "cautious optimism for a restrictive dual to Malthusian arguments about population—that is, declining rural populations may go hand-in-hand with forest recovery; and more confident support for a variation of the environmental Kuznets curve for forests; that is, as incomes rise, the natural forest is first drawn down, then, when incomes rise above some level, the natural forest begins to recover. As incomes continue to rise, the managed forest eventually grows even more rapidly and offsets any continuing draw on the natural forest, with an aggregate impact of net expansion for all forests, managed and natural combined."

<sup>2</sup> See the special issue on Carbon Sequestration in China's Forest Ecosystems in the Journal of Environmental Management, Volume 85, Issue 3, November 2007.

FIGURE A1. CHINA'S FOREST TRANSITION CURVE



tion (SFA) 2008 provide comprehensive descriptions of the main events in the early years that contributed to the Chinese forest transition. First, an economic reform and a process of “opening doors to the outside world” were implemented in China in 1978, which opened the door to trade in wood products and raised the importance of creating a sustainable national wood supply. In February 1979, the Ministry of Forestry was established and a new (trial) forest law was issued, which was then enacted as the Forestry Law of the People’s Republic of China on January 1, 1985. Subsequently, a nationwide afforestation campaign was initiated under the aegis of the National Afforestation Committee. The state’s monopoly over purchase of timber from collectively owned areas was abolished and timber markets were preliminarily opened to allow forest dwellers to negotiate sales and purchases.

These institutional and trade reforms at the central government-level were complemented by a generalized devolution of forest governance. In rural areas, households were given forestry-related responsibilities under contract according to defined outputs. In the south, authorization was given for land tenure in mountain and forest areas. Between 1981 and 1983, peasant households operated 71 percent of the collective forest land under contract. In the early to mid-eighties, tenure reform was taking place, including stabilization of tenure in mountain and forest lands, determining ownership in hilly lands and defining forest production

responsibilities. The tenure reform continues in the collective forest areas. Throughout this period of the late 70s and mid-80s, both the central government and its citizens became very aware of the environmental damage that had been caused by the heavy deforestation and the need for environmental forests in addition to production forests.

In 1988, the 3rd national forest resource inventory revealed that forest cover had increased to 13 percent of the nation’s land area. With the revelation that China now had some 125 Mha of forest land, the forest transition was confirmed.<sup>4</sup> Progress on the transition continued into the nineties and on through the turn of the century. China still has a growing net forest gain today. Further significant events contributed to the continued buildup of forest resources and reduction in deforestation (as indicated in Zhang 2000; Lei 2008; SFA 2008).

ARRDL activities were strengthened and expanded considerably; rehabilitation of degraded lands became a major goal and activity. In the early 1980s, significant achievements were made by the Three North Shelterbelt programme, including afforestation of 9.2 Mha and preservation of 7.3 Mha of forest along the Yangtze River Basin. Five other major forestry programmes were initiated (Lei, 2008):

- The Natural Forest Protection Program.
- The Program for Conversion of Cropland into Forests.

<sup>4</sup>The transition actually came at different times in different regions. Thus, “from the figures, some general conclusions can be drawn: the turn from contracting to expanding forest area in the Northwest of China occurred during the late 1970s; in the North and South-Southeast the turn occurred during the early 1980s; in the Northeast and Southwest the transition started during the late 1980s and early 1990s.” (Zhang, 2000.)

- The Desertification Control Program for the Vicinity of Beijing and Tianjin.
- The Wildlife Conservation and Nature Reserves Development Program.
- The Forest Industrial Base Development Program in Key Regions with a Focus on fast-growing and High-yielding Timber Plantations.

Forest administrative units were strengthened at all levels and a forestry administrative system was gradually developed. Increased emphasis was placed on forest protection, and modern forest fire fighting capacity was improved. Forest laws were more strictly enforced and illegal activity punished more severely. In May 1989, the Ministry of Forestry strengthened the forest harvesting license system, with the result that a coordinated nationwide licensing system was created and enforced with varying degrees of success (see the discussion of annual logging quotas below.) Forest tenure reform for both state-owned and collectively owned forest areas was accelerated.

After the Ministry of Forestry was reorganized into the State Forest Agency in 1998, forestry development enjoyed its most productive years in history. Reforms during the late 90s tried to rebuild institutions and forest related management organizations with respect to (Zhang 2000):

- Clarification of forestry land property rights through forestry land owner retitling. While there still was no recognition of private land ownership rights, private land-use rights and forest property rights were recognized;
- The de-collectivization and reorganization of collective forestry land progressed through the Household Responsibility System and the Share-holding System and other types of joint or co-operative management; also
- Decentralization of the state-owned forestry land occurred through dissolution of the management authority and budget regime;
- Free domestic trade in timber was gradually permitted.

Developments in the 1990 to 2010 period indicate that China is committed to expanding and intensifying further the management of its forest

estate, as it has been doing over that period. The implications deriving from all of these forests related activities and policies can be categorized as increased protection of forests by the state, improved incentives for sustainable forest management via the collective forest tenure reform, and the rise of China as the central trading partner in the global forest products market.

### **INCREASING FOCUS HAS BEEN PUT ON THE PROTECTIVE FUNCTIONS OF FORESTS**

The shift in priorities from timber production to forest environmental services was gradual over time. It has happened partly because of the mounting evidence of what past mistreatment of forests has meant in terms of environmental problems (e.g., flooding and desertification); and partly because wood and wood products can be imported, while environmental services from forests cannot (with the possible exception of forest carbon credits.) Thus, as the value of both wood products and protective services expanded, China found relief for rising wood prices through increased imports and mounting use on a sustainable basis of the plantations that have been built up over the past two decades. Such import opportunities do not exist for environmental services; and their values continue to rise. Thus, a complete ban on harvest of remaining natural forests was instituted in the 90s; and a major Payments for Environmental Services (PES) program has evolved to encourage private and communal consideration of environmental values in forest management. Zhang (2000) points out that,

*In China more than 16 mill. Ha of protection forests, accounting for 14% of the total forested area, is aimed at environmental services. The protection forests are mainly located in the three northern areas (North, Northwest, Northeast; see Table 4). Ten of the eleven recently implemented massive afforestation programs were initiated specially to combat environmental problems (Zhang et al. 1999). In addition, about 9 mill. ha of forestry land*

are preserved as natural reserves, for either environmental or ecotourism purposes.

### **TENURE REFORM CONTINUES TO IMPROVE INCENTIVES FOR INTENSIVE AND SUSTAINABLE FOREST MANAGEMENT AND PROTECTION**

With secure rights to land and its outputs, the incentive to manage it appropriately exist; and the more secure those rights become and are believed to be by the owners, the more aggressively they will pursue sustainable practices that involve planning over long periods of time. A detailed review of the history of the Chinese forest tenure reform is provided in Xu et al. (2010). The authors state:

*In this context, China's recent forest land reforms provide an important case study with useful implications for global attempts to reduce forest emissions and decrease forest-based poverty and conflicts. These reforms are arguably the largest ones undertaken in modern times both in terms of area and people affected, as China's collectively owned forest totals approximately 100 million hectares and is home to more than 400 million people (SFA 2008). The reforms offer important lessons for other developing countries that have recently begun to address the problem of unclear forest tenure; they have done so with a dominant trend toward legally recognizing the land rights of indigenous peoples and strengthening access and ownership rights of other forest communities and households (Sunderlin et al. 2008). In the few countries where large-scale rigorous research has been conducted, the moves towards the recognition and clarification of community land rights have yielded positive results in terms of forest cover (Bray et al. 2008).*

Ping and Keliang (2007) studied the legal structure of the forest land tenure reform. They conclude that:

*The ongoing reforms of collective forestland are paving the way for securing farmers' property rights to forestland in line with China's goal of building a harmonious society. However, this new round of reforms is, to a large extent, driven and guided by the policy directives of the central government. Having been defined and characterized as property rights under the new Property Law, farmers' rights to collective forestland should be better protected and more functionally regulated under the law. Further legislative reforms are imperatively needed to reinforce the collective forestland reforms as well as to facilitate the establishment of rule of law in the countryside.*

China has made great strides in developing a workable institutional framework and system for the forest sector. However, as is to be expected, glitches still remain. Thus, for example, Ping and Keliang (2007) point out that there is "...a non-transparent and discretionary process in reviewing applications for logging permits....Because the demand for logging (permits) far exceeds the allocated 'annual logging quota' (ALQ) in most areas, forest owners and developers have to compete fiercely for the limited quota. As a result, bribery and corruption appear to be fairly common, which further compromises the integrity of the ALQ system."

China has become a major participant in the global forest products market

As markets became liberalized in China, and as availability of local timber became more restricted (due to the logging ban on natural forests and increase in protected forest areas), China started importing significant volumes of wood from Southeast Asia, Russia and other areas to meet its rapidly growing domestic demand for wood. Thus, "the volume of China's total forest product imports more than quadrupled between 1997 and 2007, rising from 40 million to 175 million m<sup>3</sup> roundwood equivalent (RWE)." At the same time, China accounts for more than one third of the global trade in furniture. Between 1997 and 2007, the volume of manufactured wood product exports grew more

than eight-fold, from 5.1 to 48.5 million m<sup>3</sup> RWE (Northway et al., 2009).

At the same time, China has earned the dubious honor of probably being the largest importer of illegal (or at least questionable origin) timber, much of it converted into furniture and exported to markets in the U.S., Europe and Japan. China is an example of one of the broader problems that arise globally when major countries curb their own deforestation, but still have a rapidly growing demand for wood. At best, they “export” their deforestation to other countries that then increase exports of raw wood or processed wood and gain income in the process. At worst, the exported deforestation involves illegally harvested wood, which leaves little behind in the way of benefits to the exporting country.

There are many potential lessons, some derived from successes in the Chinese system and some due to its now recognized shortcomings. Forty years of changes that contributed to China’s

forest transition demonstrated that support for forest sector reforms was widespread in the central government. The reforestation policies created large-scale projects of plantation development, rehabilitation of degraded lands, and natural forest growth through protective efforts. Government support of forest reforms permitted a significant devolution of forest tenure rights to farmers. The liberalization of domestic and international trade policy developed markets, and allowed local populations to derive revenue from managing the devolved forest areas. However, this liberalization has created its own problems, raising imports of illegally logged wood and displacing deforestation.

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## ANNEX 3 - CASE STUDY: REPUBLIC OF KOREA

### FROM DEVASTATION TO DENSITY: KOREA'S FOREST TRANSITION

Before the Japanese colonization, the Republic of Korea (ROK) was a forested country with large areas of dense, mainly private forest. During the colonization and the Korean War, forests suffered excessive and massive cutting for fuel and as a source of capital. Even after this turbulent period, forest degradation kept escalating due to the unsustainable cutting and slash-burn cultivation. "In the 1950s, for several years immediately after the Korean War, forests were left in a state of extreme devastation as the result of excessive cutting during and after the war. The devastated forests caused serious social problems, like lack of fuel, severe floods and drought" (KFS, 2010). ROK forests thus reached a low point in the late fifties. Many rural communities were in a crisis mode.<sup>1</sup>

The government reacted with major forestry initiatives, instigated by the President and with popular support. Legal and institutional preparations in the 1960s included the passing of a forest law, establishment of ROK Office of Forestry in the Ministry of Agriculture, and the expansion of community forest cooperatives, which later were legally established as Village Forestry Associations (VFAs). These cooperative village-level organizations were established to provide for village forestry needs by establishing plantations and managing forest areas for various outputs, including fuelwood, erosion control and in some cases high-value non-timber forest products (NTFPs).

Some 690,000 ha of fuelwood blocks were established between 1960 and 1970, according to the Office of Forestry (later renamed the ROK Forest Service (KFS)). By 1973, a total of 800,000 ha had been established. However, the quality of the established fuelwood blocks was poor in a majority of

cases and many of them were in need of extensive repair and enrichment because of lack of proper management. By early in the seventies, villagers' were again unable to meet their fuelwood needs. The government felt the urgent need for a major program to establish additional plantations for fuel and to put existing blocks under effective management. The first thrust of this program during the 1960s was somewhat ineffective, but nonetheless marked the beginning of the forest transition in ROK. As mentioned, ROK was at a crises stage due to fuelwood shortages and increased flooding and erosion of infrastructure and agricultural areas in denuded landscapes.

In response, the government initiated in 1973 its major "Forest Rehabilitation Project" and the First Forest Plan of ROK (Gregersen, 1982). The project's main goal was to restore 1 Mha of denuded forest with fast-growing tree species through public participation. The government declared the Nationwide Tree Planting Period and Silviculture Day to draw out active participation from the public. In fact, the government generated very active public participation at village level, as will be discussed in detail later.

The ten year Forest Rehabilitation Project was completed four years in advance of its target. By the end of 1978, over three billion seedlings had been produced, more than 1 Mha had been reforested, some 4.2 Mha of existing forest had been put under management and were being rehabilitated, and the fuelwood needs of thousands of villages had largely been met. By 1978, more than 20,000 Village Forestry Associations had been established; and millions of dollars of income were flowing into the villages from NTFP sales, including exports of such forest products as kudzu fibre wallpaper, shitake mushrooms and Ginseng, as well as from

<sup>1</sup> Unlike tropical countries, large parts of ROK are very cold in the winter, so fuel is needed not only for cooking, but also for heating.

seedling production and nursery sales (Gregersen, 1982).

The area statistics for ROK mask some of the dramatic progress that the country has made in terms of the condition of its forest estate. The country is a good example of how definitions can be misleading. Considering official forest area alone, statistics for 1970 showed that there was a defined 6.7 Mha of forest land, of which 5.7 Mha was considered stocked, or “forest,” the rest denuded bare or scrub forest land. But the “stocked forest” was heavily degraded and had an average stocking rate of only about 10 m<sup>3</sup>/ha (Gregersen, 1982). Today, ROK has some 6.3 Mha of actual forest (by FAO’s definition of 10 percent forest cover), but with a national average stocking rate of around 80 m<sup>3</sup>/ha (KFS, 2010). Thus, comparing 1970 forest area to current area is to some extent misleading. The 5.7 million ha of forest then looked completely different from the 6.3 million ha of today. Unfortunately, this same shortcoming applies to all countries. Forest area only touches the surface of the information needed to say something about biomass and wood availability, biodiversity and carbon stocks.<sup>2</sup>

### **FACTORS CONTRIBUTING TO SUCCESS IN THE FOREST TRANSITION**

The forest transition involved a variety of actions including improvement of national forest lands and better controls of illegal forest activity and expanded protection against fire, insect and diseases. However, by far the major thrust of the First Forest Plan, and the one that is most interesting in terms of identifying lessons for other countries, is the program that involved the thousands and thousands of villages in ROK establishing, managing and protecting plantations and carrying out various activities to restore degraded lands. The village forestry program was at the core of the first

forest plan, and is credited with the “re-greening” of ROK. It involved some very interesting features and actions that contributed to the success of the program and the forest transition of ROK (Gregersen, 1982, and other references as cited for specific quotes).

### **The Saemaul Undong: Gaining the interest and trust of communities**

The government recognized that massive infusions of resources into rural villages would not alone achieve positive results. Understanding that such resources might merely increase farmers’ dependence on outside assistance, the government sought to improve rural organization and attitudes toward cooperation and self-reliance. This recognition would shape the form of the coming community forestry program to a great extent. The Saemaul Undong, or “new community movement,” was initiated by President Park Chung Hee on April 22, 1970. The President emphasized the essence of Saemaul Undong – the “new community movement” as diligence, self-help and cooperation.

Experimental projects started in rural villages in 1971; and by 1972-73, the movement was in full progress in most villages. It is not possible to describe here the breadth of the movement in terms of its full range of changes and accomplishments. Projects (including forestry projects) were selected on the basis of villagers themselves agreeing on priorities, their potential to accomplish the projects successfully, their willingness to commit their own resources to the project, and the prospect that the project actually would increase their incomes in the short run. The government provided different kinds of support: financial and in-kind resources (e.g. cement, bricks, steel, seedlings, etc.), and low interest loans. Forest authorities at times did pressure to villages implement projects. However, Eckholm

<sup>2</sup>The concept of “Forest Identity” (FI) has been developed to overcome this shortcoming of dealing with expanse or area only. Thus, FI “defines the four attributes of expanse, growing stock, biomass and carbon in terms of measurable forest area (A), forest density (D), biomass to growing stock ratio (B), and carbon concentration (C)” (Waggoner, 2008). Unfortunately, FI requires a level of detail not readily available for most countries; and it says nothing about biodiversity at the forest level. See also an interesting paper by Kauppi et al. (2006) as cited in endnote 41.

(1979) demonstrates that, “Village level forestry (in ROK) would have failed if government had simply ordered people to carry it out.”

It was within this context that the community forestry project and the First Forestry Plan were implemented, side by side and integrated with other activities that contributed to community livelihoods and incomes.

### **GETTING THE LEGAL BASIS RIGHT: KEY PROVISIONS OF LAWS SUPPORTING THE PROGRAM**

It is important to understand that the legal basis for a successful program goes far beyond laws that deal exclusively with forests. The Forest Development Law of 1972 provided the main vehicle through which the First Forest Plan was implemented. However, others included the Law on Erosion Control (1962), the Law on Voluntary Forest Guard Dispatchment (1963), and the Shifting Cultivation Resettlement Law.

A key provision in the 1972 Forest Development Law was that the government was given the right to require forestry development on private lands. If the landowner did not comply himself within a year, the government had the right to assign an implementer (often the local VFA) to execute the required work. In most cases, the implementer would receive 90 percent of the output and the landowner would receive 10 percent (If fruit orchards were established on the land, then the split was 80-20). Many of the village forestry plantations were established under this arrangement, since the owners either didn't have the money to comply, or they didn't want to be bothered with it. Even as early as 1973, it was recognized that ROK was developing rapidly and that all the wood from the plantations might not be required for fuel. Thus, multipurpose trees were planted on some of the land so that the trees could be left to grow up to timber size. The landowner could choose to keep his or her 10 percent of the output growing to commercial timber size.

Throughout the forest transition, forest ownership in ROK remained stable. According to the KFS (2010), today about 69% is private forest, 23% is national forest, and 8% is public forest-- owned by local governments and public organizations such as educational institutions.) These percentages have remained remarkably stable over the past four decades. Thus, 73 percent of forest was private in 1970, 20 percent was national and 7 percent was public. Now there are about 1.96 million private forest owners and 63 percent own less than 1 ha. Only 6,000 owners own more than 50 ha. The average area per forest owner is 2.3 ha, down from 2.6 ha in 1970.

Given this stability, it is evident that ROK's turning point was not associated with massive tenure reform involving distribution of rights on public or communal lands. Thus, ROK is quite different from the cases of China and Viet Nam. There was a different kind of shifting of land use rights that took place in ROK. As indicated above, the 1972 Forest Development Law gave the private owners of degraded or denuded forest land the choice to either reforest and rehabilitate their forest themselves, or let their land be rehabilitated and managed by VFAs in exchange for a percentage of the output. By 1980 some 675,000 ha of private forest land was being managed in this way by VFAs.

Another important provision of the Law was the establishment of a “Forest Development Fund” that provided low-interest, long term loans to VFAs or villages. And another key legal development was the shifting in 1973 of the ROK Office of Forestry from the Ministry of Agriculture to Ministry of Home Affairs. This was particularly important in terms of getting local involvement in the village forestry program, since the Ministry of Home Affairs controlled the local police and local government resources. It thus connected directly forestry to local financial and political power.

### **Getting the logistics right**

Despite having to gear up in just a couple years a program that involved over 10,000 villages,

Korea navigated around the most severe logistical hurdles. It is certain that some major problems existed as the government, the provinces and local governments developed the logistics and organized themselves for such a difficult and widespread endeavor. The right species had to be picked for plantings in different parts of the country; technical assistance had to be available when needed, and so did seedlings. As a consequence, nursery production had to be ratcheted up quickly. This was first accomplished in large centralized nurseries, and later increasingly through local village level nurseries that provided income for local women's groups. The National Federation of Forestry Association Unions (NFFAU) also had to gear up to be able to handle the greatly expanded demand for solving technical problems, providing administrative services and generating quality markets for outputs of NTFPs (eventually it handled the export business for the VFAs to ensure that they received the best price possible). Getting the logistics right involved major funding, and required strong support from the World Bank and various bilateral programs.

#### **NECESSARY BACKSTOPPING: RESEARCH, TECHNOLOGY DEVELOPMENT, AND EXTENSION SUPPORT**

ROK already had in place excellent forestry research facilities. By the time the First Forest Plan began, their personnel had already begun work on species selection and options, disease and insect control relevant to the region, and economic issues related to processing timber and non-timber forest products and markets for such. Also, a cadre of forest technicians and extension agents had already been established by the time the program started having the technologies and technical knowledge in place. It was a crucial factor in avoiding failures, and benefitted from government support as the administration realized that failures would come with a high cost—namely discouraging the villages from participating again.

#### **SHORT-TERM GAINS IN INCOME AND LIVELIHOODS, ENSURING LONG-TERM GOALS**

The government recognized that command and control methods would not work in the long run, but that strong government persuasion could work if the incentives were right for local people that were the key to success of the program. Time preferences for poorer local people tend to be heavily weighted towards the present and immediate future. Thus, the government realized that it had to provide the right incentives through short-term gains, even though the main objectives of the program were longer term. Again, the Saemaul Undong provided a logical mechanism for creating such incentives. Villages that actively would participate in the forestry components often found themselves being first on the list to receive government support, build health facilities or better schools (education of villagers' children was very important to them). Bringing tree nurseries into local areas, and having women's groups and other groups operate and manage them, provided a source of immediate income to the villages. Undertaking erosion control projects for the government in conjunction with forest plantation work provide immediate income for local men.

A unique administrative hierarchy was developed. It was a top-down/bottom-up one with good lateral interactions between government and private and community entities (e.g., VFAs) at each level. Communication and interaction between these entities was strong, and helped key people at each level to anticipate problems and to take corrective action. The key point is that government fully recognized the need for local, immediate, and strong involvement, and that meant local incentives in order to get the type of input that was needed to make the program a success over the longer term.

## CONCLUDING COMMENTS

The “greening of ROK” during the 1970s and 1980s has been characterized as “...probably the best orchestrated and publicly cohesive reforestation event in world history” (Tak et al., 2007). Although one might argue that the Chinese afforestation program is equally remarkable, the difference was that in the ROK case, the afforestation, reforestation and forest rehabilitation program was smoothly integrated into the lives of the citizens of over 11,000 villages within a matter of a few years. This is not all because of the big push after 1973. It should be emphasized that ROK government had a long history of forestry cooperatives and cooperation at the village level, and had learned from what worked and what didn’t work. This meant that it was not all new when the big push came in 1973. Another element was the fact that the forestry program was integrated into the Saemaul Undong. Further, the program was backed by some key pieces of forest related legislation, including particularly the 1972 Forest Development Law.

ROK is an example of a country where stopping deforestation (and thus REDD) was much less important than getting the population involved in major ARRDL activities to build up a devastated forest landscape with a new forest estate. Despite

the success, ROK still is a major importer of wood, and imports are growing rapidly. Currently, some 94 percent of timber consumption is imported-- since the majority of forests in ROK are less than forty years old, the quality of available roundwood is variable, and the costs of domestic roundwood are high due to a combination of high labor costs and steep terrain (Tak et al., 2007). Thus, as in the other cases assessed in this paper, one can say that ROK’s growing consumption of wood merely “exports” forest loss to other countries.

This again brings up a major conclusion of this paper: merely stopping deforestation and forest degradation is not going to be effective in reducing forest GHG emissions from forests so long as wood consumption increases; and control of the world’s wood consumption is neither desirable nor feasible. A key to the future is ARRDL which the global community can either formally endorse as a major component of REDD+ or treat as a separate, but inseparable complement to REDD. In the case of ROK, of course, ARRDL was much more than increasing carbon sequestration: it was a matter of restoring a damaged landscape for its environmental goods and services, and supporting community livelihoods.

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## ANNEX 4 - CASE STUDY: VIET NAM

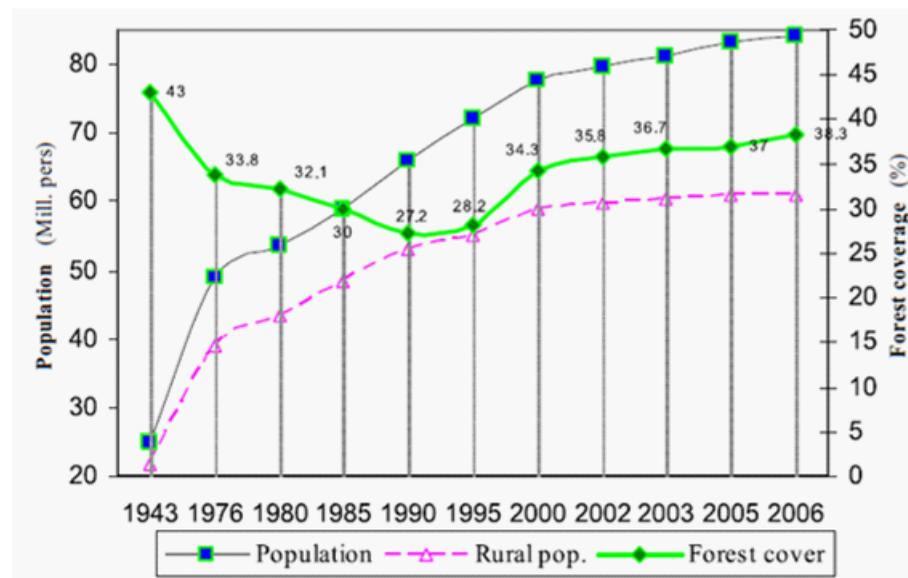
Viet Nam's turning point along its transition curve was fairly recent, as indicated in Figure 1. Forest area dropped from an estimated 43 percent of total land area in 1943 to a low of 27.2% in the early 1990s; and then started growing, to some extent due to stricter deforestation control, but primarily because various ARRDL activities, mainly plantation development and restoration of degraded lands. As of 2008, forest area was estimated by the Ministry of Agriculture and Rural Development (MARD) to be 38.7% of total land area, or about 12.9 Mha, 2.8 Mha of which were plantations (UN-REDD, 2009). About 16.2 Mha of forest are officially classified as being best suited for forest. This is approximately 3 Mha less than the previously approved figure of 19.2 Mha (MARD, 2008).

### CURRENT SITUATION

Deforestation in the natural forests is still significant in Viet Nam, although it has been reduced some through a series of stringent logging bans and somewhat better control of illegal logging. Meyfroidt and Lambin (2009) summarize the history of log bans in Viet Nam as follows:

*"In 1993, logging was banned on all "special-use" forests (protected areas and reserves) and on all natural forests in the Northern provinces, and a 30-year moratorium was imposed on logging in important watershed areas (20). In 1998, the ban on commercial logging in natural forests was extended to the whole northern highlands, the southeast, and the Mekong River and Red River Delta provinces, represent-*

FIGURE A2. VIET NAM'S FOREST TRANSITION CURVE



Source: Cuong (2008)

*ing 58% of natural forests (21). Extraction quotas for large-diameter logs in natural forests decreased from 1.2 M m<sup>3</sup> in 1992 to 300,000 m<sup>3</sup> per year since 1998 (21), and 250,000 m<sup>3</sup> per year after 2003 (22).”<sup>2</sup>*

The actual rate of loss of natural forest remains to be determined. Unfortunately, as the Ministry of Agriculture and Rural Development itself admits (MARD, 2008):

*“The statistical information on forest data is inconsistent and questionable. In the last decade, for instance, the statistics show the total area of all types of natural forest has been increasing at a rate of approximately 196,000 ha/yr, but this is largely due to the inclusion in Cycle 3 of the inventory of some 637,000 ha of previously-omitted limestone forests. Discounting this, the natural forest area actually declined between 2000 and 2005, but only at about 6,000 ha/yr, but many observers think this is a considerable underestimate.”*

The MARD goes on to explain:

*A recent case study of the World Bank on deforestation in Krong No district of Dak Nong province in the Central Highlands uses satellite image interpretation to provide a more accurate picture of forest trends in upland areas of Viet Nam. In this district, with a total area of 81,549 ha, the natural forest area decreased from 72,887 ha (89%) in 1987 to 37,972 ha (46%) in 2007 – a reduction of nearly 50% in 20 years. Of this total, 13,200 ha of forest were lost during the period from 1987-1996 and 21,700 ha were lost between the period from 1997-2007. The annual deforestation rate therefore increased*

*over time. If this trend continues, all natural forests in the district will disappear in 12 years. Furthermore, DARD of Dak Nong reported that, during the period from 1997-2007, the deforestation rate in neighbouring districts was much higher than that of Krong No.*

So for the present, we are left with uncertainty concerning how much Viet Nam actually is gaining in net forest area and how rapidly its natural forests are disappearing. We know that plantations are expanding at a fairly rapid rate; and we know that some of the gain in forest area is because of “... the expansion of natural forests regenerated from grass and shrub land.”(MARD, 2008).

In the meantime the country is losing its mature natural forests, and at a significant rate in many areas it appears. Furthermore, much of the remaining natural forest is being degraded at a rapid rate. A recent UN-REDD report (UN-REDD, 2009) indicates that:

*Over two-thirds of Viet Nam’s natural forests are considered poor quality or recovering quality, while rich and closed-canopy forest constitutes only 4.6 percent (in 2004) of the total and mostly located in the remote mountainous areas.<sup>6</sup> Lowland forests (mangrove and Melaleuca) supporting their full natural biodiversity have been almost entirely lost. The chances of full forest regeneration are rapidly decreasing with the isolation of the rich natural forest patches. Reports by the National Forest Inventory, Monitoring and Assessment Program (NFIMAP) show that the quality and biodiversity of forest are continually deteriorating. Between 1999 and 2005 the area of natural forest classified as rich decreased by 10.2% and medium forest reduced by 13.4%. The major*

<sup>2</sup>The footnotes inserted by Meyerfort and Lambin that provide their sources are as follows:

20). McElweeP (2004) You say illegal, I say legal: The relationship between ‘illegal’ logging and land tenure, poverty, and forest use rights in Vietnam. *J Sustainable Forest* 19:97–135.

21). Tuynh VH and Phuong PX (2001) in: *Forests Out of Bounds: Impacts and Effectiveness of Logging Bans in Natural Forests in Asia-Pacific*, eds Durst PB, Waggenger TR, Enters T, Tan LC (FAO Regional Office for Asia and the Pacific, Bangkok, Thailand).

22). Ministry of Agriculture and Rural Development. (2003) *Forest Sector Manual—Chapter 3: Forestry Development Orientation* (Ministry of Agriculture and Rural Development—Forest Sector Support Partnership, Ha Noi).

*areas of loss of natural forest during the period from 1991-2001 were the Central Highlands and the northwest.*

### **DRIVERS OF DEFORESTATION AND DEGRADATION**

Much of Viet Nam's deforestation and degradation is driven by commercial interests (both wood- and agricultural crop-related) and a lack of adequate control of illegal logging. There is a huge demand in Europe, Japan and North America for inexpensive wood furniture. Domestic demand for furniture, paper and pulp also runs strong. Forest industries in Viet Nam, with access to a tradition of skilled craftsmanship and low labor costs, are rapidly responding with increased production, based on what local supply of wood can be had and imports for the rest. Viet Nam currently exports four times more processed timber products by volume than it officially harvests from its own forests. In 2007, exports of furniture reached US\$ 2.4 billion in value for Viet Nam, a ten-fold increase since 2000. Wood products are now Viet Nam's sixth largest export earner. The full economic value of domestic timber markets is more challenging to quantify, but is surely significant.

Another driver of deforestation is rapidly increasing demand for energy and improved infrastructure. "Viet Nam has ambitious plans for hydro-power and road development carving up parts of the countryside" (UN-REDD, 2009). Hydropower and road development can have major impacts, both direct and indirect on forests and involve significant deforestation. Other drivers are the continuing shifting cultivation practices used by the poorest communities, particularly in the isolated mountainous regions.

Some 60 percent of Viet Nam's forest area has been designated with "protection" or "conservation" as the primary function. However, the extent

to which this forest area actually is managed for these purposes is questionable at the present time. Also, as discussed below, conflicts arise between the protection objective and the poverty alleviation objective.

### **PROGRESS IN VIET NAM**

Despite this somewhat discouraging picture of the forest situation in Viet Nam, the country appears to be building a solid forestry program, one that by necessity involves some degree of decentralized decision making and with communities being given management and use responsibilities and rights. Much remains to be done, but the government has signaled its willingness to commit to the development of a strong forest administration, given donor support.

### **OVERALL FOREST POLICY DIRECTION AND FOREST DEVELOPMENT PROGRAMS**

Viet Nam's overall policy direction for the forest sector is framed by the Central Communist Party Strategy for industrialization and modernizations.<sup>2</sup> It has identified five clear Objectives (MARD, 2010):

- (i) Increasing overall forest coverage to 43 percent of the national land area;
- (ii) Completing the allocation of forest land to households and other entities;
- (iii) Promoting forestry-based livelihoods;
- (iv) Protecting 10 million hectares of natural forests through management contracts with smallholder households; and
- (v) Accelerating the development of forest plantations.

Subsequent Party resolutions have stressed the need to conserve watershed and coastal-pro-

<sup>2</sup>For example, the 2001-2010 Strategy on accelerating Socialist-oriented industrialization and modernization, building infrastructure base to lead Viet Nam to be an industrial economy by 2020; Social Economic Development Orientation in 2001-2005, Communist Part of Viet Nam, IX Congress document, 2001; Social Economic Development Orientation in 2006-2010, Communist Part of Viet Nam X Congress document, 2006.

tection forests; and reform State Forest Enterprises (SFEs). All subsequent laws, decrees, policies and strategies pertaining to the forest sector have been guided by these decisions.

The first major policy initiative to tackle forest degradation was the National Target Program for the reforestation of denuded lands and barren hills, started in 1992. From 1993 to 1998, “Program 327,” as it is called, allocated 1.6 Mha forest to farmer households, established new plantations on 638,500 ha and undertook forest tending, protection and regeneration of some 748,100 ha (Hung, 2003). Program 327 was replaced by the ‘Five Million Hectares Reforestation Program’ or ‘Program 661’ in 1998, which runs through 2010. It focuses only on protection and special use forests (MARD, 2008).

The cornerstone of forest protection and development efforts in Viet Nam up to now is the Five Million Hectares Reforestation Program (5MHRP) or the 661 program. “Of the five million hectares needed, two million hectares were planned as protection forests and three million hectares as production forests. The results from the program have been mixed. Although it has gone a long way in meeting its targets for protection forest, it has fallen below its expectations for regeneration, particularly for plantations” (MARD, 2010). As a result of this shortcoming, “Program 147: Support for development of forest plantations (2007-2015)” was established, with its focus on production forests. Problems persist, as has been documented in various reports, cited by MARD (2010).<sup>3</sup> As these reports highlight, there is a “the need for more involvement of local communities in the overall decision-making process, the introduction of provisions for improved planning, controls and audits, and a lack of externally verified information highlighting the actual situation at the field level.”

One problem pointed out by Thuan et al (2005) is that economic efficiency was not part of the plan-

ning in the case of the 661 program and its less successful predecessor, the 327 re-greening program: Thus, tree planting was not done in a cost-effective and optimal fashion. Costs ran high compared to expected benefits. “The programs did not fully appreciate the strategic importance of matching tree and wood production to the marketing possibilities. There are now mature trees from these programs that cannot be used in any economic sense, as they are in locations without roads or other possibilities to market them if harvested. Many cases of technical shortcomings have also been documented, and the overall quality of plantations may be low” (Thuan et al, 2005).

Some believe that the government went too far in the direction of creating protection forests at the expense of the rural people who depend on forests for their livelihoods. For example, Thuan et al (2005) point out that:

*There are many reports from different parts of the country that strong implementation of protection policies have undermined the possibilities of local people to survive and prosper. There are instances where even the basic needs of local populations have been placed out of bounds: wood for construction of houses and coffins, developed agricultural lands, has been classified to be inside protection areas that cannot be used. There are wider negative economic effects of the past policies. The ‘closing’ of the forests has had stark effects on the viability of forest-based industries and livelihood options. These effects are not restricted to the areas close to the forests, but are felt as well by all craftsmen and traders involved in production and trade of wood- and forest-based products. The economic implications are substantial: the annual volume of timber extraction has decreased from as much*

<sup>3</sup> Such as: Salmi, J, N. X. Nguyen, and T. Q. Le. 1999. Study on Financing Strategy for Sustainable Forest Management in Viet Nam. Hanoi, Viet Nam; United Nations. 2010. Design of a REDD-Compliant Benefit Distribution System for Viet Nam. UNDP, UNEP and FAO. Hanoi; and GFA. 2007. Towards a Program-based Approach in the Forest Sector in Viet Nam? Study to provide a basis for revising Program 661 and preparing an ODA financing modality for a revised program, taking into account experiences and results from KfW co-financed forest projects, Hanoi.

as 1.2 million m<sup>3</sup> in 1995, to 300,000 m<sup>3</sup> in less than ten years (Sunderlin and Huynh Thu Ba 2005).

Currently, government policy and action are now directed at creating a balance between priority protection functions and enabling livelihoods for the majority rural population that lives near and in the forests.

In 2007 the Government issued a new Production Forest Development Policy (2007-2015) to encourage investment in forest plantations and production forestry. It represented a shift in the government's focus away from subsidies for protection and special-use forests toward investments and subsidies for production forestry. The specific objectives of the policy were to encourage development of 250,000 hectares of plantations each year until 2015— and, in so doing, to contribute to livelihoods and employment and the supply of raw materials for the country's fast-growing wood-processing industry (World Bank, 2010). The Bank goes on to say that:

*The policy targets specific geographical areas, including the central highlands and remote mountainous areas in the northwest and center and offers preferential terms and cost norms for ethnic minority and poor communities and households...The Policy has several improvements over previous national programs. It focuses on smallholder production forestry and stresses the need for land allocation as a precondition. It promotes further decentralization of implementation down to district, commune and village levels.*

At the present time, the Policy is to be implemented through the 5MHRP at an estimated cost of around US\$500 million. "It remains unclear, however, which specific investments are to be funded by public resources and whether public subsidies to production forestry rather than private sector activity will advance the achievement of the sector targets" (World Bank, 2010).

## FOREST LAND TENURE REFORM

Forest land tenure reform has been key to past successful ARRDL activities, and is crucial for determining recipients of REDD payments. Clear, secure rights to the land and what it produces are keys to creating the incentives to invest in longer term sustainable forestry. Viet Nam had a major forest land allocation program starting in the early nineties. In September 2007, MARD started a new program to speed up the allocation of Land Use Rights Certificates, to all the remaining unallocated forest land to local communities, households, and other economic entities (UN-REDD, 2009).

Forests held under local tenure (either by households or communities) amount to a total of around 3.3 Mha – over a quarter of the country's total forest area. A further 19% of forest area, some 2.6 Mha, is under the temporary management of communal authorities, but is expected to be partially or wholly allocated to local people as part of the forest land tenure reform (RECOFTC, 2010). By 2009, more than one million households had been issued certificates of land ownership for both natural and plantation forests (UN-REDD, 2009).

The impetus for the forest land tenure reform in Viet Nam was related to two main events: failure of the State Forest Enterprise System to adequately manage and protect national forest resources, and the success of the agricultural land tenure reforms of the eighties provided the main impetus for forest tenure reform (Tan et al, 2008). Two key pieces of complementary legislation and their subsequent amendments give the legal basis for forest land allocation program: The Forest Protection and Development Law (FPDL) and the 1993 Land Law (Tan et al., 2008 and UN-REDD, 2009):

First passed in 1991 and updated in 2004, the FPDL provides the legal framework for managing forests and for allocating forest resources to a variety of entities, including individual rural households, communities, private businesses (World Bank, 2010; UN-REDD, 2009). In the 2004 revision, the law recognized eight distinct categories of forest ownership, with varying responsibilities and rights

for forest management. Community forest land use rights were thus recognized (although this common property arrangement did not allow for legal ownership of forest rights, unlike categories of individual property rights.) In addition, UN-REDD (2009) points out that:

*Whereas previously only barren land and plantations could be allocated to households, under this new policy special-use forest less than 1,000 ha and protection forest less than 5,000 ha, or composed of scattered plots, and natural forest considered to be production forest can be allocated to households and individuals for management, protection, and development. Households, individuals, and village communities can also participate in the management of special-use, protection, and production forests under contract to forest owners (state forest enterprises, management boards of special-use and protection forests).*

Another key point about the 2004 FDPL is that it dealt-- at least on paper-- with the sticky issue of reconciling issues associated with customary vs. statutory land rights. Thus, Beaney et al (2009), point out that a significant challenge for Viet Nam in its forest land allocation process was "...the question of how local/customary land rights and institutions can be formally recognized in statutory land rights allocation systems." The authors point out that to some extent, this issue was resolved, at least in a statutory sense, in the FDPL since "... Articles 29 and 30 recognize all households and individuals living in the same village as rights holders to forests they have been managing or using efficiently, and the law acknowledges customary practices and culture as the basis for assigning forests to these populations." This issue has particular relevance in cases where benefits from any REDD+ (including ARRDL activities) need to be fairly distributed at the village level.

<sup>4</sup>This latter conclusion is troublesome, since some 5 percent of Viet Nam's population is classified as "forest dependent." Two thirds of forest-dependent households are poor with incomes below the poverty line (World Bank, 2010). Of note is the fact that poverty status of these people has generally not improved over the past years. In contrast, the non-forest dependent households have seen a fairly rapid decrease in poverty.

This second important piece of legislation, the Land Law, provided the basis for giving households and villages secure, longer term renewable Land Use Rights Certificates (20 to 70 years) that included rights to trade, to mortgage and lease lands, and to transfer, inherit and transfer their rights. A 2003 revision recognized the legal status of community (common property) land tenure.

In between the passage of the Forest Protection and Development Law in 1993 and 2010, a number of other key policies were issued that helped to guide the implementation of the forest allocation process. (cf. Tan et al, 2008). One that is of particular interest is the Production Forest Development Policy (2007-2015).

### **IMPACTS OF THE VIET NAM FORESTRY PROGRAM ON THE EXPANSION OF FOREST AREA**

So have the forest land allocation program and related forest policies and programs been a success? And how do they relate to the annual net increases in forest area that Viet Nam is experiencing? With regard to the forest land allocation program, which is the main change that has happened in the past fifteen years or so, Tan et al, (2008) conclude that: "the process of devolving forest management to local people has been very slow and has had mixed results...In most cases, the effects of these (forest land allocation) policies on the poor have been rather limited, or even negative."<sup>4</sup>

The "mixed results" experienced in Viet Nam lead to mixed interpretations of the success of the forest land allocation process and its impacts on reforestation and forest growth in Viet Nam. Thus, Nawir et al. (2007) found that "the allocation of land (conferral of formal long-term tenure rights) to individual households and entities around 1990 had an almost immediate positive impact on the number of forest and cash crop plantations established by smallholders. From 1990 to 2005 the productive for-

est plantation area in Viet Nam increased 7 percent per year, mainly through farm-based initiatives.” One of the reasons for this growth, they suggest, is that the markets for fast growing plantation wood were, and still are good in Viet Nam. Markets include the mining industry, wooden furniture industry, export chip industry and urban fuelwood sales. They give a specific example of “...the Bai Bang Pulp and Paper Mill, which purchases some 200,000 tons of wood per annum, all from a large number of small, mainly farm-based producers.”

Viet Nam is well on its way to becoming a major entity in the forest products sector with annual growth rates in the double digits (20 percent in 2005) according to a 2010 World Bank study. But the growth is possible almost entirely because of growth in imports of roundwood and sawnwood, mainly from neighboring countries; and that increase in imports is associated with some major problems and an issue that needs to be confronted within the context of a global REDD+ program: export of deforestation, which is discussed in the next section.

Regarding the impacts of the FDPL, Sikor (2001) concludes that, based on three detailed village studies:

*“...the new forest policy (forest land allocation policy) had minor effects on actual property rights, as villagers resisted its implementation. Instead, forests expanded, mainly due to the liberalization of agricultural output markets and availability of new technology. Changes in markets and technology motivated farmers to intensify crop production, reducing agricultural pressure on land. The research findings suggest the potential of market-based instruments and technology policy to facilitate forest regeneration.”*

The above observation fits with the conclusion reached by Meyfroidt and Lambin (2008) that agricultural intensification contributed to reforestation:

*“In marginal regions, land scarcity associated with population growth, land degradation, and political restrictions led to, on the one hand, a decline in cultivation on hillsides followed by reforestation and, on the other hand, an increase in labour inputs on the plots with the highest agro-ecological potential. The development of markets for agricultural inputs and outputs did also contribute to reforestation by raising agricultural productivity in mountain paddies and maize fields. This reinforced the concentration of agriculture on the most suitable land.” However, they also believe as Nawir et al (2007) do that the policy of “...allocating forestry land to households, local scarcity of forest products, and development of remote demand for timber contributed to forest cover increases.”*

#### **VIET NAM AS AN “EXPORTER OF DEFORESTATION”**

As Viet Nam banned harvesting in its own regenerating forests, it also increased imports of raw wood to feed its rapidly expanding wood products industry. In other words, more trees were cut in other countries because of the policies of Viet Nam to let its forests recover. Meyfroidt and Lambin (2009) have studied the Viet Nam case in detail and it is worth repeating their conclusions verbatim:

*Forest recovery in Viet Nam during the last 20 y has been rapid. Yet, it was not only the result of domestic efforts but also of the displacement of wood extraction to neighboring countries. The equivalent of 39.1% of the volume of wood regrowth that took place in Viet Nam’s forests has been extracted from forests abroad to supply Viet Nam’s needs.*

*The leakage due to policies restricting harvests in natural forests and displacement due to the growing wood consumption and exports represented, respectively, 22.7% and 16.4% of the increase in growing stock of Viet Nam’s forests. Without the rapid increase in fast-growing*

*wood plantations in Viet Nam that stabilized the domestic supply, total displacement would have been greater. The growth of the wood processing industry, large programs of plantations, and natural forest protection were all part of the same national forest strategy. In the case of Viet Nam, displacement, exports, and forest transition are thus interlinked. When policies—such as may be implemented through a REDD scheme—aimed at protecting forests lead to a decrease in harvests without accompanying measures to control wood consumption and/or increase wood production from plantations and processing efficiency, then leakage abroad will most likely occur. Leakage should thus be directly addressed in forest protection policies. Illegal trade flows contributed to 48.1% of the displacement of wood extraction generated abroad by Viet Nam. The exports from Viet Nam represented 84% of the imports. Attribution of the displacement and corresponding forest extraction to Viet Nam, the source countries or the final consumers is thus debatable. Such an increase in exports of wood products is uncommon for places undergoing a forest transition. Yet, 60.9% of the regrowth that actually took place in Viet Nam's forests can be considered as free of displacement. This constitutes a net gain for the world's forests and carbon sink.*

So the good news is that Viet Nam is making a net contribution in terms of sequestering and storing carbon. The bad news is that Viet Nam contributed to encouraging the illegal wood harvest and trade in other countries and 39.1 percent of the increase in growing stock in Viet Nam was displaced as losses of growing stock and forest degradation in other countries. Unfortunately, this situation is repeated to a greater or lesser extent in all countries that import roundwood instead of using wood from their own forests.

## CONCLUDING COMMENTS

While perspectives differ on the primary factors in Viet Nam's transition to a net forest adder, it is remarkable that individual households in the country went from having no statutory forest rights in 1990, to becoming the second largest owner group by 2005 – 23 percent of the total, coming close to the state enterprises, which owned about one-quarter of forests in 2005 (Tan, 2005). As the World Bank (2010) says, "It is widely acknowledged that Viet Nam's forests do not contribute as they should to development through provision of timber, forest products or services, including environmental services." The government of Viet Nam has expressed its commitment to learning from past mistakes and misguided actions. The government also says that it will focus on the poorest and most isolated citizens, such as the indigenous tribes in isolated mountainous regions, out from poverty so they can benefit from the rapid growth being experienced in the rest of Viet Nam. Among other activities, several forestry programs considering the particular situation of these isolated populations are being developed under the aegis of the national REDD+ plan.

Viet Nam has had some successes as it moved through its forest transition to a point where it is adding net forest area instead of rapidly losing it as it was up through the early nineties. However, at the same time, many of the lessons that evolve from the forest transition in Viet Nam are ones that derive from policies and programs implemented with little or negative effect in terms of objectives and in terms forest resource conservation and use, reduced carbon emissions, poverty alleviation and biodiversity preservation. The lessons are certainly not unique to Viet Nam.

- *Don't underestimate the cost and difficulty of controlling illegal forest activity and corruption and graft in implementing programs aimed at building up the forest resource estate. Corruption can be a particularly difficult*

thing to curtail when programs with major resources are being implemented.

- *Involvement of, and respect for local people is essential*, which entails tailoring policies and implementing programs in such a way that the current rights, cultures, resource levels and patterns of land use are considered. Policies and programs imposed from above and outside without such consideration are doomed to be at best ineffective and at worst to be failures.
- *Programs have to consider what is needed for success and plan accordingly*: One of the criticisms of the Viet Nam forest land allocation program is that it did not in parallel include in all area complementary low interest credit and adequate extension resources to permit the poorer new household and village forest land owners to adequately implement improvements desired on their new forest lands.
- *Pay more attention to design of policy implementation programs*: Tan et al (2008) point out that: “The lessons from FLA program in the study provinces indicate that without a clear approach, the implementation of state policy may become very confusing. (It is important to have) clear definition of roles and responsibilities of actors involved, and a well-defined system for monitoring the implementation. The design should also allow room for the integration of local variations and feedback during the course of implementation.”

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## ANNEX 5 - CASE STUDY: INDIA

India has a federal form of government made up of 28 separate states and 7 union territories. Since 1935, India has devolved forest management to the governments of these states and territories, in contrast to other case study countries. The 28 state-level forest departments still manage the country's forests under their respective state governments, often with somewhat different rules and procedures. Thus, the experiences of different states depend very much on the politics and policies adopted by the different states. While they must be consistent with national law and policy, as in any federal country, states retain certain rights and authority and act in different ways to enforce those rights and authority. This poses a true challenge to describe anything definitive about forest policy impacts in India as a whole, without looking in detail at dynamics in the different states. With that in mind, we provide below to our best ability an overview of trends in the country as a whole that are related to the Indian forest transition from net deforester to net forest adder.

India's forest resources declined steadily into the twentieth century as population grew and local needs for fuelwood, timber, etc. grew. Sometime in the early to mid-1990s India turned the corner on its forest transition curve and it started to add net forest (Mather, 2007; Saxena, 1997; Richards and Flint, 1994).

### LEADING UP TO THE FOREST TRANSITION IN INDIA

"Social Forestry" (SF) as a program was introduced in 1976 in India, and resulted "...in extensive tree planting amounting to over 1 Mha per year in the 1980s. While the initial objective had been to help provide for local needs, planting became increasingly associated with commercial industrial objectives and increasingly involved larger farmers planting for commercial reasons" (Mather, 2007).

Despite the significant tree planting that took place during that period, India kept losing forest area, until the turn occurred in the 1990s and it started adding net forest area.

Saxena (1997) explains the situation leading up to the transition as follows:

*Neither of the two initiatives taken by the government in the last two decades-- industrial plantations on forest lands and 'Social Forestry' on village lands-- were able to halt the degradation of India's natural forests. Forests were over-exploited because of government concessions to forest industries, granted in an eagerness for Industrialization, which made forest raw materials available to industries at much below the cost of regeneration, in fact almost free. As such there was not much incentive for industries to invest in regeneration. The unsustainable exploitation of forest raw materials exhausted the sources of supply much sooner than expected by the forest industries themselves...Furthermore, this exploitation occurred at the cost of local needs and broader conservation functions of the forests. To raise new plantations, natural forests were clear-felled even in ecologically sensitive regions, such as steep slopes. Such clear felling and lack of proper regeneration led to landslides, soil erosion, and siltation of rivers, reservoirs and tanks downstream. Local people were deprived of their biomass supply, and were also hit by a reduction in employment in the informal sector that depended on NTFPs.*

It was with this situation as background that a new forest policy came into effect in 1988. In contrast to previous forest policies that emphasized industrial roundwood production and generating government revenue from forest areas, the new forest policy sought to "[increase] the country's

forest/tree cover ‘through massive afforestation and social forestry programmes, especially on all denuded, degraded and unproductive lands’ (Mather, 2007). The goal was to have one third of the land area of India under forest (presently, the 2010 FAO GFRA reports that this percentage is 23 percent). The focus of the new policy also was on environmental services from forests, meeting fuelwood needs, and expanding productivity of existing forests and outputs of minor forest products for rural and tribal populations.<sup>3</sup>

The policy also had some key things to say about industrial wood that opened the door to a rapid expansion of wood imports from other countries: “The practice of supply of forest produce to industry at concessional prices should cease. Industry should be encouraged to use alternative raw materials. *Import of wood and wood products should be liberalised*” (Saxena, 1997, citing para. 4.9 in the Policy; italics added).

At the same time, in 1992 India created a national forestry board with the main purpose of facilitating and promoting forest plantations and environmental forest rehabilitation projects. Most of the projects were on public land, but the program also supported tree planting on private lands (ITTO, 2009). According to the International Tropical Timber Organization (ITTO) report, “government-supported investment achieved an annual growth in forest plantations of almost 1 million hectares on degraded lands and about 500,000 hectares on private and communal lands.”<sup>2</sup> The national forest policy in the nineties encouraged industry to get its wood from local private sources. Pulp and paper companies started promoting farm forestry. “As a result, a large number of tree-farming and agroforestry enterprises have flourished throughout the country. In 2002, private tree planting covered an area of over 6 million hectares, with 2005 estimates at slightly over 8 million hectares” (ITTO, 2009).

<sup>3</sup>A detailed and well-written review of the 1988 Forest Policy is provided by Saxena (1997). He cites a number of paragraphs from the policy that indicate that it is focused on environmental functions of forests and meeting the need of forest communities and tribal groups as a priority.

<sup>2</sup> ITTO (2009) (as cited in endnote 24 of main report) points out that India’s large plantation area is a result of strong national policies that were formed long before the forest transition in the early nineties. Such programs included, for example, the Twenty Points Program for Afforestation of the mid-1970s.

There also has been substantial activity related to community forest plantations (CFPs), both for meeting fuelwood needs of the rural poor and for other biomass products. Thus, Kohlin and Amacher (2005) and Kohlin and Ostwald (2001), studied in detail the livelihood implications of the hundred thousand ha of CFPs established in the state of Orissa between 1985 and 1992 through an aid project to support the subsistence needs of rural poor and to relieve heavy pressure on the natural forests. Based on their major data collection and analysis, they perceive the following policy implications:

- i) Village plantations in social forestry projects have the potential for substantial welfare improvements for the target population, especially women;
- ii) Welfare improvements can come about through increased consumption of biomass, decreased time for collection, decreased pressure on natural forests or through sale of the harvest;
- iii) Benefits from plantations vary dramatically between villages and the benefits are not necessarily closely correlated with each other. This implies that interventions need to be selective in order to be successful;
- iv) Given the limited sample and the focus on time saving and decreased pressure on the natural forest, this study indicates that, as a rule of thumb, village woodlots are more beneficial further away from the natural forest, where biomass is scarce and market purchases of fuel are common. This is not to say that many of the plantations without these characteristics have been failures. On the contrary, the combined benefits for many of the plantations would pass a rigorous social cost-benefit analysis.

Kohlin and Amacher (2005) conclude further that since a key benefit from community forest plantations is time savings for local villagers in terms of fuelwood collection, it is critical to consider location of CFPs relative to the location of the intended beneficiaries and the availability or abundance of natural forest sources of biomass and the damage inflicted from fuelwood collection on such natural forests. Both studies caution that CFP interventions have to be highly selective in relation to location and the relationship between the intended CFP project location and natural forests.

It also is interesting to note with regard to India, in the context of the purpose for our case studies, that several forest plantation projects related specifically to carbon sequestration are under consideration by international entities.

The Orissa and Andhra Pradesh Project is the first Land Use, Land Use Change and Forestry (LULUCF) project to be implemented under the CDM in India. It aims to establish 3,500 ha of forest plantations that will sequester 0.18 Mt CO<sub>2</sub> by 2012 and 0.53 Mt by 2017, while also benefiting small local farmers. The Bagepalli Afforestation Program in the District of Kolar in Karnataka is intended to promote forest plantations as a source of income for small farmers through agroforestry. The project will benefit 1,400 families and the plantation will sequester 8,000 tons of CO<sub>2</sub> (ITTO, 2009).

### **MIXED IMPACTS OF “JOINT FOREST MANAGEMENT”**

Implementation of the new Indian forest policy was facilitated by the Government of India passing a resolution in 1990 suggesting that the State Forest Departments should get local people involved in managing forests. “By 1995, fifteen state governments had issued enabling resolutions (GRs) permitting partnerships with local people. These 15 states have 75 percent of the country’s Forest land and 91 percent of the country’s tribal population. The Joint Forest Management (JFM) programme is likely to be the central point of future forest development projects funded by the Government

of India and the donor agencies” (Saxena, 1997). By 2007, all states had adopted some degree of JFM and some 99,000 local forest protection committees had been established to help manage 21.4 Mha, or 31 percent of India’s forests cover (Mather, 2007).

Saxena (1997) sums up the changes brought to Indian forestry as follows:

*From 1864 to 1988, forest management strategies were markedly biased in favour of commercial and industrial exploitation, with little attention paid to sustainability or to social justice. However, in the last decade, as the forestry debate has intensified, the State has increasingly responded to the claims of forest dwellers voiced by the activists and NGOs. Their call for a decentralised and democratic system of forest management has finally been accepted, at least in theory, through the programme of joint forest management or JFM.*

Mather (2007) adds that “Much debate has surrounded JFM, both in terms of how ‘joint’ management actually is (Forest Departments retain title to the land) and of how successful the policy has been (e.g. Lele 2000). As Sundar et al. (2001) suggest, JFM is probably too diverse to allow generalized conclusions to be reached.” This last sentence enforces the point made before that each state has approached JFM in its own unique way, considering the balance of politics and expressed needs (by the powerful, elite and wealthy citizens) within the state.

On the question of what impact the New Forest Policy and the rapid spread of JFM had in terms of India turning the corner to become a net forest adder, both Saxena (1997) and Mather (2007) agree that the hard evidence is not there to say definitively that the new policy and the wide establishment of JFM as a key forest program were the main cause. However, Saxena believed in 1997 that “it is a real possibility that if the trend of improvement in forest cover continues for a longer period, it could well be due to participatory policies.” The trend has continued. Saxena also believed that liberalized

wood import policies contributed by taking some of the pressure off domestic forests as a source industrial raw material.

### **A MISSING PIECE: LOCAL LAND RIGHTS**

One has to look at a country's expanding forest area in the context of the country and its needs for forests and their many outputs. In the case of India, its forests are critical for the survival of millions of the poorest and most disenfranchised citizens. It is for that reason that the Forest Land Rights law is so critical. Bose, (2010) points out that about 300 million people (or 60 million households) live below the 'poverty line' in India; and approximately two thirds of these people are partially or wholly dependent on forest resources for their livelihoods (Khare et al., 2000). Forest dependent groups in India contain both 'tribal' groups and non-tribal forest users. An estimated 84% of the tribal ethnic minorities live in areas defined as "forest" (World Bank, 2006). Thus, an important question of great interest, parallel to the one above of "how did the major shift in forest policy and the JFM program affect the forest transition?" is how did the policies and programs affect the forest communities and tribal groups?

It appears that both gave local forest communities and tribal communities a bit more involvement in forestry. However, the state forest departments still kept power and control of forests. "People are thus made dependent on the State even for their right to organize the protection committees or to remain as members, not to mention of the limits on their rights in decision making or to challenge the decisions of the FD (Forest Department)" (Saxena, 1997).

Major progress in terms of local people's participation in decision making in forestry did not really come in policy and law until the passage of the Forest Rights Law in 2006.<sup>3</sup> In December 2007, the rules for implementation were established.

<sup>3</sup> Full title of the law is: The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act.

<sup>4</sup> A number of 2010 papers from the IPPG program, headquartered at the the University of Manchester provide the most recent assessment of the status of the Forest Rights Law and its implementation (or lack of such) in a couple of states. (see [www.ippg.org.uk](http://www.ippg.org.uk)). Bhullar, 2008, provides a thorough and detailed legal review of the act, pointing out its various inconsistencies and weaknesses.

However, as of now there is little evidence of implementation on the ground.<sup>4</sup> Furthermore, Sarin and Springate-Baginski, (2010) found that:

*Due to the technical challenges and political contests during drafting of the Act and the subsequent rules for implementation, a number of dilutions, ambiguities and omissions contained by them make implementation highly contingent upon whether implementing agencies follow the spirit of the Act or seek to obstruct it or minimise its impact. Areas of dilution/ambiguity/omission may be summarised as: 1. limitations on the full identification of the rights deprived groups, 2. Adequacy and safeguards within the implementation procedures and its timetable, 3. The local institutional basis for the claims process, and 4. Effectiveness of awareness raising for prospective claimants.*

Progress on this difficult task has been mixed, although a systematic review of implementation is now available. In 2010, the Ministry of Environment and Ministry of Tribal Affairs formed a Joint Committee on the Forest Rights Act, composed of retired civil servants, forest officers, tribal department officers and civil society representatives. The Committee found that overall enforcement of the Forest Rights Act (FRA) has been poor and its goals have not been achieved, although there are exceptions (Ministry of Environment and Ministry of Tribal Affairs, 2010). In the State of Madhya Pradesh for example, which in 2009 received an award from the federal government for best implementation of the Act, reportedly some 103,028 claimants have been awarded Forest Land Rights Certificates (Central Chronicle, 2010). On the whole however, the Joint Committee reported that the realization of the FRA has been seriously hindered, and placed much of the blame on a lack of pro-active support

from State- and District-Level Monitoring Committees which were ordained to oversee the FRA's implementation (Ministry of Environment and Ministry of Tribal Affairs, 2010).

The Act has taken on a greater importance in the context of the India's new national plan to increase forest cover. In February 2011, the Prime Minister's Council on Climate Change approved a 10-year, US\$10.1 billion "Green India Mission." The Mission's 2020 goal is to increase forest area by 5 Mha, sequestering an additional 50-60 million tons of carbon, and improve the livelihoods of 3 million forest-dependent households. According to India's Minister of State for Environment and Forests, Jairam Ramesh, compliance with the Forest Rights Act "has been made a precondition for release of funds" to the Mission's implementing agencies, the first instance where the Ministry would be required to conform to the Act (Hindustan Times, 2011). This announcement demonstrates not only the governments' willingness to engage in large-scale ARRDL activities, but also its recognition of the importance of local land rights in growing forest areas.

### LESSONS FOR REDD

India's transition to a forest adding country was accompanied by significant policy change related to concerns at the highest levels of government with the social, economic and environmental problems associated with deforestation. This concern was translated into a new, radically different forest policy. Along with the policy changes, came major new forestry initiatives such as the nationwide Joint Forest Management (JFM) Program. While the government touted the program as one that was benefitting the poor forest communities and tribal forest areas, it did not in fact amount to a land rights reform, as discussed earlier. But the pent-up citizen demand for such reform was growing steadily and manifested in several ways.

Eventually the pressures grew to such an extent that the milestone Forest Land Rights Act was passed (see Bose, 2010; Sarin, M. and O. Springate-

Baginski, 2010; and Springate-Baginski et al., 2009).

A related policy event was the liberalization of imports of wood to meet the growing shortage faced by a growing forest products industry. And the government continues to support large-scale measures to improve the quality and extent of their forests, as evinced by the new large-scale reforestation program, a cornerstone of their National Action Plan on Climate Change.

The types of changes that accompanied the forest transition in India are shared with the cases of Korea, China and Viet Nam. The evidence builds that making the forest transition to a forest adding country requires what happened in India (as well as the other three case study countries):

- A major change in attitude at the highest level of government regarding the value of domestic forests;
- Major shifts toward more pro-forest, pro-forest dweller policies;
- Major programs of ARRDL activities (plantation development, restoration of depleted forest and other degraded land);
- Some kind of shift in the way in which IPs and forest communities are brought into the forestry picture (in this case it first was JFM and greater formal involvement of local people in forest protection; only later did the legislation get passed to make sure that forest dwellers actually are given clear rights to and responsibilities for the forests that they traditionally have lived in and used);
- A liberalization of import policies to bring in the demanded wood at acceptable prices during the time when the domestic forest resource is protected to let it build up again after deforestation and degradation.

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## ANNEX 6 - CASE STUDY: CHILE

Chile turned the corner on its forest transition curve in the 1970s, the result of massive afforestation efforts pursued by the central government to develop the country into a major industrial wood products producer and exporter. According to FAO's Global Forest Resource Assessment for 1990 (FAO, 1991), between 1981 and 1990, Chile gained some 729,000 ha of plantations, leaving it with a total plantation area of 1.45 Mha in 1990. However remarkable the speed and scale of this development, it did incur some serious environmental and social costs. After the saleable timber was extracted from the native forests, these areas were frequently converted to radiata pine plantations. By 1990 Chile was seeing a net gain in forest area, but was still losing its native forests at about 0.8 percent per year. Chile has been gaining forest area ever since, entirely because of the rapid growth in plantations. At the same time, tensions over land rights between the indigenous Mapuche people and the forestry companies still run strong and have led to violent conflict. These impacts provide compelling lessons on the risks of forest development policies that fail to protect natural forests or respect local communities.

### CHILE'S LONG TERM FOCUS ON INDUSTRIAL FOREST PLANTATIONS

Chile now has some 16.2 Mha of forest, 16 percent of which is plantation forest (Chile, 2010). Even before the military government took over Chile in 1973, the country has focused on forest industries and on forest plantation development. In the words of Clapp (1995):

*For 60 years the Chilean government studied, promoted, managed, and subsidized plantations; it bribed, cajoled, and threatened land-owners to plant trees; it funded, nationalized, and privatized the industries to process them*

*and then nationalized and privatized them again. The policies were contradictory in their particulars, but consistent in the government's commitment to the forestry sector. Some policies were ineffective, others were effective but blunted by contradictory policies, and at least one was stunningly successful-- the 75 percent reforestation subsidy established in 1974. In a generation Chile has created one of the world's most competitive forest resources, at a relatively low environmental cost. It is not a natural forest capable of supporting multiple use, but as an economic forest it is almost a masterpiece.*

A major step forward in the development of plantations and forest industry in Chile was the Decree Law (DL) 701, enacted under the military dictatorship in 1974. This law provided very generous subsidies – 75 percent, and sometimes up to 90 percent of the cost of commercial tree plantations (Silva, 2004). DL 701 also provided tax breaks and export incentives. Additional payments subsidized other forestry tasks, such as thinning and pruning and annual costs of administration. The participating private entities had to have land designated by the national forest agency (CONAF) to be suitable for commercial plantations, and the owner had to present a management plan and show that 75 percent of seedling planted survived for one year. A key provision was that planted lands were declared exempt from expropriation forever (Clapp, 1995).

However, some of the plantations under DL701 were established on native forest lands that had been cleared to make way for the plantations. There are some parallels with what Puyravaud et al. (2010) showed in the case of India, and others have indicated for Viet Nam as noted in the Viet Nam case: while forest area and activity expanded due to plantations and expanding imports, natural forests and biodiversity shrank. The difference is

that in Chile, where plantation forestry started much earlier than in the case of India and Viet Nam, it appears that the country has come to a stage where it is relying on its plantations for most of its industrial wood needs and thus can and will restore and conserve much of its remaining native forest in parks and preserves of various kinds and put the rest under sustainable management. Despite the significant loss of natural forest in the past, native forests in Chile still cover a substantial area – some 13.6 million ha (Chile, 2010). Even as early as 1990, Chile relied on its plantations for 85 percent of its industrial wood requirements, and that included the wood required by the large wood products export sector (Clapp 1995). Thus, in taking the pressure off its native forests, Chile is able to avoid “exporting” its deforestation as Viet Nam and China have done.

### **CURRENT SITUATION: PROTECTION OF NATIVE FORESTS**

From 1981-1990, the country lost 601,000 ha of its native forest (FAO 1991). While the resource-based economic development of Chile cannot bring back the lost forest, in recent years it has sought to improve protection of existing native forests. In 2007, increased environmental awareness and concern led to the passage of the native forest law which is aimed at preserving and restoring natural forests (Leighton, 2007). This law had been debated for some 15 years, the longest time any bill has been discussed in Chile before becoming law. All the same, numerous critics of the law say that it does not go far enough to be effectively implemented in such a way that remaining natural forest is protected (cf. Kerosky, 2007).

A number of significant advances in conservation lead up to the passage of the native forest law. For example, in 2005, “The inauguration of the new Valdivian Coastal Reserve —59,691 ha of coastal temperate rainforest in southern Chile — marks a major advance in overcoming an era of clear cutting and forest conversion in the area, and makes

way for new public access and cooperation for local community development” (WWF Chile, 2005). This major Reserve actually is an interesting example international cooperation in the acquisition and planning of reserves that protect the resource as well as the traditions of local forest inhabitants in using the forest in a sustainable manner. In this case, the Nature Conservancy, working with World Wildlife Fund (WWF), first acquired the Valdivian property for US\$7.5 million in late 2003 at a public auction following the bankruptcy of the forestry company Bosques S.A. WWF and The Nature Conservancy then worked with their Chilean partners to transfer ownership and management of the reserve into Chilean hands. The designation of the property as a reserve is part of a larger partnership among WWF, The Nature Conservancy, local organizations and the Chilean environmental agency (WWF-Chile, 2005). As mentioned, some 3.9 Mha of native forest – about 25 percent of the total - already is in reserves, parks, and various other types of preserves.

### **A LEGACY OF CONFLICT OVER LAND RIGHTS**

Despite gains in preservation of some natural forests, Chile has jeopardized the well-being of many forest communities, especially indigenous communities, in order to foster its own timber industry. During the years in which timber production has been promoted by the government, rural communities with large indigenous populations in the central south regions of Chile have suffered from,

*“Loss of biodiversity, and therefore traditional and medicinal plant uses; indiscriminate clearcutting and subsequent erosion which gravely affects indigenous crops and livestock; soil and water pollution from chemical, pollen, and industrial runoff; the deterioration of internal community paths; and the lack of available water due to the great consumption used in tree plantations”<sup>1</sup>*

<sup>1</sup>Translated from Cardenas & Antileo, 2006.

The late 1990s was a time of elevated conflict in the Mapuche territories, during which Mapuche crops were intentionally flooded, water sources were intentionally contaminated with chemicals, and criminal acts (particularly arson) were even committed by some forest companies against themselves and their own property, and then blamed on Mapuche “terrorists” (Seguel 2005).

Mapuche issues received international news attention in 2010 was due to the prosecution of several Mapuche under the anti-terrorist legislation, a law enacted under the military dictatorship. In the most controversial case, the defendants were accused of attacking and intending to kill a public prosecutor in 2008 (El Austral, 2010). By indicting the suspects under this law, the legal process took a very different course, including, most controversially, allowing the testimony from anonymous witnesses. Many Mapuche prisoners participated in a four-month hunger strike to denounce the use of the anti-terrorist law in this and other cases (UNPO 2010). Just a month after the end of this strike, the Chilean government also fought back against protests by the Rapa Nui indigenous peoples of Easter Island claiming recognition of their lands.

## CONCLUSION

It is encouraging for future native forest conservation that most of the industrial roundwood needs of Chile— including for its major forest products exports come from plantations, grown on approximately 16% of the forested land in the country (Chile, 2010). Plantations taking the pressure off natural forests are coupled with significant programs establishing reserves of various kinds— both public and private— and a growing environmental awareness in the national forest agency and in the forest industry. In the words of Fortney (2010):

*While plantations have caused environmental problems in Chile and in the past contributed to the loss of native forest cover, new policies and programs from both the private and public sector are promising protections for Chile’s*

*remaining native forest. The plantations of Chile can be incorporated into the solution to the remaining threats to the native forest by providing wood for the needs of the people and the economy.*

One of the key lessons from the Chile case supports the conclusion that ARRDL is a necessary percent of complement to REDD if international leakage is to be avoided. In other words, if Chile were not producing 85 its roundwood needs on a sustainable basis from its plantations, it most likely would be putting much greater pressure on its native forests and importing some of the needed wood from other countries, as do China, Viet Nam, and India. For the most part, their plantations still are too young to supply their needs. However, Chile’s experience also demonstrates that heavy-handed approaches to encouraging plantation development can foment serious social conflicts that endure long past the turning point of forest transition.

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## ENDNOTES

- <sup>1</sup> FAO. 2010a. Global Forest Resources Assessment. Rome: FAO.
- <sup>2</sup> This includes 59 countries that increased their forest area and 19 countries that reported the same forest area. We fully recognize the weaknesses in the GFRA statistics used to identify the 80 countries. However, it is the only globally comprehensive dataset available. Whether it is 60 or 80 or 100 countries, the point is that a large number of countries are adding to or maintaining their forest estates. These countries have more than 50 percent of the remaining global forest area.
- <sup>3</sup> The Republic of Korea. NB: Korea is in fact a net deforester during this period (albeit a slight one, at 148,000 ha, net) as their forest transition occurred in the late 1970s and 1980s and involved a change in stocking rates more so than an expansion in surface area. This reduction represents an adjustment for over-planting during the transition.
- <sup>4</sup> Pronounced *arde!*
- <sup>5</sup> FAO 2010a. As cited in endnote 1.
- <sup>6</sup> Oliver, R and B. Donkor. 2010. Leveling the playing field: Options for boosting the competitiveness of tropical hardwoods against substitute products. ITTO Technical Series No 36. Yokohama: ITTO.
- <sup>7</sup> FAO. 2010b. Planted Forests in Sustainable Forest Management: A Statement of Principles. Rome: FAO. <http://www.fao.org/docrep/012/al248e/al248e00.pdf> citing Carle and Holmgren, 2008.
- <sup>8</sup> FAO. FAO statistics database (FAOStat). Accessed May 6 2011. <<http://faostat.fao.org/site/628/default.aspx>>
- <sup>9</sup> As discussed later and in the case studies, in some cases much of the expansion of imports comes from illegal sources and not from sustainably managed forest operations that benefit the exporting country.
- <sup>10</sup> UNFCCC. 2010. Outcome of the work of the Ad Hoc Working Group on long-term Cooperative Action under the Convention (The Cancun Agreements for the AWG-LCA). Advanced Copy. Bonn, Germany: United Nations Framework Convention on Climate Change. [http://unfccc.int/files/meetings/cop\\_16/application/pdf/cop16\\_lca.pdf](http://unfccc.int/files/meetings/cop_16/application/pdf/cop16_lca.pdf)
- <sup>11</sup> For example, the Informal Working Group on Interim Finance for REDD (2009) states:
 

“To be effective, the incentive structure (for REDD) must meet two criteria: (i) it must have **close to global coverage** – an incentive that is attractive for one country but not others is likely to lead to international leakage (simply displacing emitting activities to another country) and hence represent an ineffective use of scarce finances; (ii) the frameworks to address deforestation and degradation in developing forest countries must be **nationally coherent** – finance that is made available primarily on a project basis may cause domestic leakage and similarly lead to ineffective use of public and private capital.” [p.10, emphasis added]

Similarly, Sohngen (2010) states:

“Given that the literature suggests that leakage could be as large as 90% - 100%, it would have large implications for costs, potentially reducing the benefit cost ratio below 1. Importantly, leakage can only be reduced by including more countries into the control program.”

Informal Working Group on Interim Finance for REDD. 2009. Report of the Informal Working Group on Interim Finance For REDD+. October 27, 2009. Discussion Document. <[http://www.unredd.net/index.php?option=com\\_docman&task=doc\\_details&Itemid=&gid=1096](http://www.unredd.net/index.php?option=com_docman&task=doc_details&Itemid=&gid=1096)>; Sohngen, B. 2010. An Analysis of Forestry Carbon Sequestration as a Response to Climate Change. Copenhagen Consensus On Climate. Copenhagen: Copenhagen Consensus Center.
- <sup>12</sup> Gibbs, H., A. Ruesch, F. Achard, M. Clayton, P. Holmgren, N. Ramankutty, and J. Foley. 2010. Tropical forests were the primary sources of new agricultural land in the 1980s and 1990s. *PNAS* 107:38. <[www.pnas.org/cgi/doi/10.1073/pnas.0910275107](http://www.pnas.org/cgi/doi/10.1073/pnas.0910275107)>
- <sup>13</sup> Cf. comments in Martin (2008). Martin, R.M. 2008. Deforestation, land-use change and REDD. *Unasylva* 59:230, 3–11.
- <sup>14</sup> Puyravaud, J-P, P. Davidar, and W. Laurance. 2010. Cryptic Loss of India's Native Forests. *Science*, 329 (5987), 32.
- <sup>15</sup> Sikor, Thomas and Phuc Xuan To. (forthcoming) Illegal Logging in Vietnam: Lam Tac (Forest Hijackers) in Practice and Talk. *Society and Natural Resources*; Clapp, R.A., 2001. Tree farming and forest conservation in Chile: do replacement forests leave any originals behind? *Society and Natural Resources* 14, 341–356.

- <sup>16</sup> Moreover, it says nothing about the net loss or gain of biodiversity. Cf. Puyravaud et al. (2010), as cited in endnote 13.
- <sup>17</sup> FAO (2006a) used the following definition of forests: Forest Land spanning more than 0.5 hectares with trees higher than 5 meters (m) and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use. Forest is determined both by the presence of trees and the absence of other predominant land uses. The trees should be able to reach a minimum height of 5 m in situ. Areas under reforestation that have not yet reached but are expected to reach a canopy cover of 10 percent and a tree height of 5 m are included, as are temporarily unstocked areas, resulting from human intervention or natural causes, which are expected to regenerate. Includes: areas with bamboo and palms provided that height and canopy cover criteria are met; forest roads, firebreaks and other small open areas; forest in national parks, nature reserves and other protected areas such as those of specific scientific, historical, cultural or spiritual interest; windbreaks, shelterbelts and corridors of trees with an area of more than 0.5 ha and width of more than 20 m; plantations primarily used for forestry or protective purposes, such as rubber-wood plantations and cork oak stands. Excludes: tree stands in agricultural production systems, for example in fruit plantations and agroforestry systems. The term also excludes trees in urban parks and gardens. FAO. 2006a. Global Forest Resources Assessment 2005: Progress Towards Sustainable Forest Management. FAO Forestry Paper 147. Rome: FAO.
- <sup>18</sup> A well-known example of which is the United Nations Environment Programme's Billion Tree Campaign, which has encouraged the planting of over 10.3 billion trees, many of which have been planted in FLCs. Brazil, still a major FLC, is also a major country in terms of its ARRD activities.
- <sup>19</sup> *Other wooded land* is land not classified as forest, spanning more than 0.5 hectares; with trees higher than 5 m and a canopy cover of 5–10 percent, or trees able to reach these thresholds in situ, or with a combined cover of shrubs, bushes and trees above 10 percent. It does not include land that is predominantly under agricultural or urban land use. FAO (2006a), as cited in endnote 17.
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- <sup>22</sup> FAO. 2006b. State of the World's Forests 2005. Rome: FAO.
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- <sup>24</sup> ITTO. 2009. Encouraging Industrial Forest Plantations in the Tropics: Report of a Global Study. ITTO Technical Series No 33. Yokohama: ITTO.
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- <sup>32</sup> Consistent with the forest transition theory discussed above, all five countries had fairly high rates of economic growth over the periods covered. These prompted demographic changes that lessened pressure on forests and contributed in part to reforestation success, although as economic growth accompanies great forest loss in many countries, we focus on other more proximal causes.
- <sup>33</sup> Mather (2007). As cited in endnote 26.
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- <sup>39</sup> Lawson, S. and L. MacFaul. 2010. *Illegal Logging and Related Trade: Indicators of the Global Response*. London: Chatham House.
- <sup>40</sup> *ibid.*
- <sup>41</sup> Kauppi, P., J. Ausubel, J. Fang, A. Mather, R. Sedjo, and P. Waggoner. 2006. Returning forests analyzed with the forest identity. *PNAS*, 106(46):17574–17579. <[www.pnas.org/cgi/doi/10.1073/pnas.0608343103](http://www.pnas.org/cgi/doi/10.1073/pnas.0608343103)> Since no countries that had no net forest loss between 1990 and 2005 were net forest losers between 2005 and 2010, we can safely say that none of the countries with greater than US\$4,600 per capital income had net forest loss between 1990 and 2010.
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- <sup>101</sup> Nair, C.T.S. and R. Rutt. 2009. Creating forestry jobs to boost the economy and build a green future. *Unasylva* 233, Vol. 60. Rome: FAO.
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