



## Reinforcing REDD+ with reduced emissions agricultural policy

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- A reduced emissions agricultural policy (REAP) can be an effective, efficient and, potentially, equitable REDD+ policy option.
- A REAP should prioritise agricultural assistance to growers in productive agricultural areas close to major centres of population.
- A REAP in forest-rich countries might feature low tariffs on agricultural products, while a REAP in forest-poor countries might emphasise biofuel production.

### **Introduction: The significance of agricultural policy changes**

Agriculture and agricultural expansion account, directly or indirectly, for approximately 31% of global greenhouse gas emissions (IPCC 2007). Any attempt to reduce these emissions must acknowledge people's continuing need for food and fibre and, despite state and other efforts to curb it, the growing demand for animal protein among affluent consumers. To meet these competing needs requires both advances in technology to increase production from limited land, and political solutions that recognise and resolve potential conflicts between competing land uses.

Many of the most dramatic changes in the global landscape during the twentieth century had their origins in national policies. Decisions by the Brazilian government to prioritise the development of the Amazon basin region in the late 1960s accelerated the rate of agricultural expansion and deforestation around the edges of the world's largest tropical forest. When farmers in Niger perceived a shift in the state's tree tenure policy from the state to cultivators, they began to treat trees as valuable assets, and tree cover increased significantly in Sahelian Niger (Larwanou *et al.* 2006). After Mexico joined the North American Free Trade Agreement (NAFTA), the area of maize, soya, bean and cotton in Mexico declined by more than 1.2 million hectares, because competition with US growers became more intense. In pursuit of soil conservation and flood control objectives, China subsidised farmers to take marginal lands out of production during the 1980s and 1990s. In response to these policies, the area cultivated for wheat in China fell by 7.8 million hectares between 1990 and 2005 (FAO 2009a). Plainly, changes in agricultural policy can dramatically enlarge or reduce cultivated areas very quickly. Because the changes in land use driven by changes in agricultural policies affect greenhouse gas (GHG) emissions, they are clearly important for reducing emissions from deforestation and forest degradation (REDD+).

The following sections analyse recent agricultural policies and examine the connections between agricultural policies and REDD+, propose a reduced emissions agricultural policy (REAP), examine what the effects might be in forest-rich and forest-poor countries and, finally, assess the effectiveness, efficiency and equity of REAP policies.

## **Agricultural policies in the South: Historical patterns and the implications for landscape change**

In the two decades following World War II, governments in the South adopted a series of policies that shaped national agricultural activities. With the goal of keeping food prices down for urban consumers, government marketing boards paid low prices for food produced by farmers for domestic consumption. To encourage domestic production under these conditions, governments tried to help producers cut costs by subsidising agricultural inputs, such as fertilisers, pesticides and credit. In some instances, governments subsidised inputs for export crops that they then taxed (Lopez and Hathie 2000). In Asian countries in particular, governments expanded irrigated areas to encourage domestic production of rice. In addition, governments established national agricultural research and extension services. Governments also pursued other policies which had important indirect effects on the agricultural sector. They imposed tariffs on agricultural imports and maintained overvalued exchange rates. The overvalued currencies boosted the prices of agricultural exports

on the world market and, at the same time, reduced the cost of imported manufactured goods.

Beginning in the 1980s, neoliberal policies transformed national agricultural policies. Structural adjustment programmes (SAPs) curtailed overvalued exchange rates (Lopez and Hathie 2000). Taxes on export crops declined as SAPs prioritised the production of export crops as a way to ease balance of payments problems. SAPs, and a scepticism about government intervention in general, led to lower government expenditures on agricultural research and extension, particularly in Africa, but also in Latin America. Only in the rapidly industrialising nations of South and East Asia did the agricultural sector garner more support from governments (Anderson 2009).

Governments also pursued geographically targeted programmes of assistance to cultivators. Building on initiatives begun during colonial eras, governments established new land settlement schemes that promoted agricultural expansion in remote, usually forested, regions by building roads and settlements. Beginning in the 1960s, Indonesia's Transmigration Programme targeted the sparsely settled outer islands of Indonesia for agricultural development. A series of regional development programmes, *Poloamazonia*, *Polonoroste* and, most recently, *Avanca Brasil* promoted agricultural development in the Brazilian parts of the Amazon basin. In the early 1970s, a newly independent Zambian government promoted a 'village regroupment' scheme (Moore and Vaughan 1994). These initiatives differed fundamentally from previous agricultural policies in their geographical focus. The new land schemes all identified high priority areas for agricultural development and concentrated expenditure for agricultural expansion in these regions. But, with the ascendancy of neoliberal political economies during the 1980s, these kinds of agricultural development projects targeting specific areas lost favour among policy makers in the South.

In different ways, these agricultural policies encouraged tropical deforestation and GHG emissions. Subsidies for agricultural inputs, such as fertiliser, encouraged cocoa growers in Cameroon to expand cultivated areas at the expense of forests (Wunder 2003). Subsidised credit programmes encouraged small-scale cattle ranchers in Ecuador to convert more of the forest on their land into cattle pasture (Rudel and Horowitz 1993). Government contractors built roads as part of new land settlement schemes. These roads opened up remote forested regions to settlement and agricultural expansion. In so doing, these programmes spurred deforestation and, with it, GHG emissions. Clearly, during the second half of the 20th century agricultural policies spurred the destruction of forests. Can they have the reverse effect? The proposal outlined below suggests that they can.

## REAP: A proposal

Just as central place theory (von Thünen 1966) can be used to explain accelerated rates of deforestation during the second half of the 20th century (Angelsen 2007), it can also be used to provide the intellectual foundation for policies that reduce deforestation, as is done in Chapter 10. In a wide ranging survey, 'Agriculture for Development', in 2008 (World Bank 2008b), analysts noted that during the past two decades agricultural policies the world over have become 'placeless', i.e., applicable everywhere in a country. While credit, tax and price support schemes benefited many farmers, they also led to a relative neglect of various place-specific public works, like irrigation schemes or farm-to-market roads that would have promoted agricultural intensification in particular regions. Given the relative neglect of such agricultural infrastructure, World Bank analysts argued for more place-specific agricultural development policies (World Bank 2008b).

Extending this line of thinking, this chapter argues that agricultural policies intended to encourage REDD+ should be place specific, that is they should strengthen agriculture near central places (major centres of population). Such policies would resemble the new land settlement schemes of the 1960s and 1970s in focusing on building up agricultural infrastructure in particular places, but they would differ dramatically in the kinds of places that would be targeted. Rather than focusing on agricultural expansion in remote rural regions, these policies would promote agricultural intensification in peri-urban and interstitial rural regions close to cities. Intensification could take a variety of forms:

1. Irrigation of easily accessible land along roads to enable rice farmers to double or triple cropping in areas where they now grow only one rice crop a year.
2. Credit programmes and extension services that target peri-urban farmers and urban gardeners.
3. Support for organisations that facilitate direct marketing to consumers, like farmers' markets or community agriculture.
4. Agroforestry that takes advantage of large local markets to produce and sell a wide range of fruits.
5. More research and development on agricultural intensification.

For reasons that are spelled out below, these reforms represent a REAP. This package of policies assumes, reasonably, that most farmers in long-established agricultural areas close to cities have secure land tenure (Alston *et al.* 1999). The intense, peri-urban agriculture that REAP tries to foster is already practised around a wide variety of cities so, in this sense, REAP builds on existing trends in agricultural sectors of the South. REAP reduces emissions

in a variety of ways, for example, by reducing ‘food miles’, the distances that foodstuffs travel from farms to markets. REAP could also encourage low input sustainable agriculture (LISA) through research programmes that, for example, try to extend the geographic and agronomic reach of techniques like no-till agriculture (Coughenour 2003; Holland 2004). REAP also reduces emissions by directing agricultural development, not to agricultural expansion along forest frontiers with its high cost in terms of GHG emissions, but to rural and rural–urban fringe areas that no longer have old-growth forests.

By focusing agricultural development on peri-urban environments, policy makers could reduce agricultural opportunities for landowners in remote forest-rich areas. The opportunities for agricultural enterprises in remote forest-rich environments might not disappear, but public support for extensive agriculture around the remote, rural margins of forests would decline. Intensive agriculture in remote regions that does not destroy forests (e.g., some kinds of aquaculture) and forest friendly agroforestry, like Açai palm cultivation, would continue to receive support from the state (Brondizio 2008). But agricultural development policies that focus on areas around major centres of population (central places) should bring down the opportunity costs and make participating in REDD+ more attractive to cultivators in remote forest-rich regions. In this respect, there should be synergies between REDD+ and REAP.

**Table 15.1. Reduced emissions agricultural policies (REAP) in forest-rich and forest-poor countries**

Types of policies	Forest-rich countries	Forest-poor countries
Place-based agricultural policy	Focus on peri-urban areas	Focus on peri-urban and established agricultural areas
Agroforestry	Extensive agroforestry (e.g., ‘jungle forestry’)	Intensive, peri-urban agroforestry
PES (payments for environmental services)	Yes, to landholders in remote rural regions	Yes, especially for intensive, peri-urban agroforestry
Biofuels	No	Yes
Tree tenure	Strengthen in remote rural regions	Strengthen in remote rural regions
Agricultural zoning	Yes, for forests	Yes, for unprotected forest fragments and buffer zones around parks, reserves
Tariffs on agricultural products	Lower	Higher

The ways in which REAP would strengthen REDD+ depend on the country context, in particular on the stage of forest transition. Forest transitions occur when landscapes undergo large-scale, long-term changes in forest cover. During the 20th century in the South, these changes almost always involved large-scale losses of forest cover and tropical deforestation, followed, more recently, by smaller-scale recovery of forests in some places. Countries that have never undergone extensive deforestation and contain large tracts of forest are 'forest rich'. Other countries that were extensively deforested in the 20th century and where only small fragments of the original forests remain are 'forest poor'. In the following section, we outline what REAPs would look like in forest-rich and forest-poor countries, and how they might influence REDD+ programmes.

## **REAP and REDD+ in forest-rich and forest-poor countries**

### **Policy options in forest-rich countries**

A set of REAPs could help deliver REDD+'s '3 Es' (efficiency, effectiveness and equity) plus co-benefits in countries which still contain substantial areas of old-growth tropical forest that sequester carbon at relatively rapid rates. Countries that are rich in extensive forms of agroforestry, referred to variously as 'jungle rubber' (de Jong 2001), 'shaded coffee' and 'shaded cocoa', would also be compatible with REDD+, because they preserve the forest canopy and sequester significant amounts of carbon.

Policies that set low tariffs for imports of staples would reduce the opportunity costs of participating in REDD+ programmes to preserve old-growth forests. Imports of low-cost agricultural products from less forested countries would minimise the economic incentives for farmers to expand production of staples at the expense of old-growth forest. Such a policy would also hold down food prices for urban consumers and, for that reason, would be politically acceptable. While a policy setting low tariffs for staples would make REDD+ more effective and would reward agricultural efficiencies in the world market for food, there are two potential problems. First, such a policy could contribute to international leakage in REDD+ because low tariffs could encourage countries that participate in REDD+ to import low-cost wood from abroad, even as they preserve wood and sequester carbon in their own forests (Wunder 2008). This type of leakage is especially likely when countries, like Cambodia, with weak governance and unexploited forests, border countries, like Vietnam, that are trying to increase forest reserves and are sequestering carbon (Meyfroidt and Lambin 2009). Second, a low tariff policy would have inequitable effects within countries, because it would reduce economic opportunities for rural populations which are almost always the poorest segment of the population

(World Bank 2009e). To have equitable effects, this kind of policy must be accompanied by a REDD+ programme that returns a portion of the payments for carbon sequestration to the rural populace, even if the forests sequestering carbon are on publicly owned land. This would counteract the 'urban bias' in low tariff policies and provide some benefits to populations living near revenue generating natural resources (Bezemer and Headey 2008). It would also institutionalise recent political initiatives in oil producing states, like Ecuador and Peru, to provide streams of revenue for people who live in the often remote rural regions where oil is extracted.

Although experience with land use planning in the Brazilian Amazon has underscored the difficulties of enforcement (Mahar and Ducrot 1998), policies to zone forests could, like low tariff policies, reinforce REDD+. In many forest frontier contexts, where titles are uncertain and land clearing signals land ownership, forested lands risk being invaded, and zoning forests does not work. When landowners acquire titles to forested lands, they become more willing to defend these lands, and 'forest zones' begin to take on a practical meaning. In sum, for forest zoning to work, states must strengthen land tenure systems in remote forested areas.

Policies that focus agricultural research and development expenditures on crops that grow near urban centres could also reinforce REDD+. Otherwise, research and development could boost yields of crops in forest-rich zones, which in turn could increase incentives for farmers in these zones to convert forests into cropland. Any low tariff agricultural policy must be accompanied by educational policies that ensure that young people in remote forest-rich rural areas have opportunities to prepare for non-farm occupations.

### **Policy options in forest-poor countries**

In countries with little forest cover and poor populations, REAP could focus on encouraging agroforestry. Policies could help smallholders in densely settled districts to acquire secure titles to their land, support research on new, more productive crop varieties, facilitate the creation of markets and establish low cost nurseries. Where there is little forest cover, wood and fruit produced in woodlots could make a significant contribution to household incomes (Cavendish 2000). In East Africa, this kind of policy would build on the tree planting campaigns initiated by Wangari Maathai and the Green Belt movement. It could also benefit smallholders in countries like El Salvador and rural communities in the interior of Vietnam. In these environments, compensation through REDD+ would probably focus on rehabilitating degraded forest.

The Chinese success with the 'Grain for Green' programme since the mid-1990s suggests that conservation 'set aside' programmes that focus on reforesting degraded agricultural land can quickly achieve impressive gains in forest cover. Upland farmers in interior China participated in the Grain for Green programme in much greater numbers than did farmers elsewhere in China (Xu *et al.* 2006). As its name implies, this programme provided participating farmers with a supply of grain proportional to the amount of land that they had taken out of production. In some instances, Grain for Green led to the creation of rubber plantations, dubiously defined as 'forests', on steep slopes (Fox 2008). These instances notwithstanding, the relative success of this programme suggests that large-scale payments for environmental services (PES) can be both effective and, in this instance, efficient. PES schemes convert the least productive agricultural land into reasonably efficient storehouses for carbon. The Chinese programme has also been equitable in that it has disproportionately benefited poorer upland farmers. Not all conservation set aside programmes will have such equitable effects. The likelihood that the benefits from PES programmes will be distributed equitably will depend on the pre-existing distribution of land ownership in a country. In a largely deforested country with an inequitable distribution of landholdings (like Paraguay), set aside programmes would benefit large landowners disproportionately if the programme pays benefits proportional to the area of land covered by the programme.

Subsidies for biofuel production on idle but deforested land could be part of REAP provided that analyses of the biofuel production life cycle include the indirect effects of biofuel production on land use and demonstrate net benefits in GHG emissions. These policies could only be considered effective if there are net reductions in GHG emissions. They could only be considered efficient if subsidies encourage biofuel crops on agriculturally underutilised land, as opposed, for example, to land that is used for growing staple crops. The equity dimension of a subsidy for biofuel crops would again depend on the pre-existing distribution of landholdings. The challenges of making the impact of these programmes equitable would be significant in Latin American countries with inequitable landownership. Again, the geographical focus for these programmes would be established centres of agricultural production, near population centres, if at all possible.

Finally, REAP in poor countries with largely deforested landscapes could focus on rehabilitating degraded land dominated by invasive species like bracken fern (*Pteridium aquilinum*). For example, incentivising cocoa production on the island of Sulawesi, Indonesia, might involve subsidising cultivators who try to restore old cocoa plots dominated by invasive species (Ruf 2001). This same type of geographical focus would extend to infrastructure projects. Port



facilities for shipping crops overseas would target, for example, ports which serve deforested hinterlands.

Larger national budgets for agricultural research and development could complement REDD+ by boosting yields in domestic agriculture, thus reducing demand for agricultural imports. Because largely deforested poor countries often protect fragmented forest remnants, the risk of encouraging forest conversion from policies to boost domestic agricultural yields is not as great as in forest-rich countries.

## **Conclusion: Assessing the 3Es plus co-benefits of a REAP-assisted REDD+**

Agricultural policy can best advance the objectives of REDD+ through a return to agricultural policies that focus on promoting agricultural production in particular areas. In contrast to earlier agricultural policies that promoted agricultural expansion in sparsely settled peripheral regions, REAP would promote agricultural production in already settled regions near major centres of population (central places).

### **Would REAP make REDD+ more effective?**

The conservation set aside programme recently implemented in China suggests that REAP can quickly bring about major changes in degraded cultivated areas. This suggests that REAP is likely to be effective in reducing GHG emissions and facilitating REDD+.

### **Would REAP make REDD+ more efficient?**

Clearly, REAP focusing on peri-urban and established agricultural zones should reduce the opportunity costs of enrolling forested land in a REDD+, provided that the land is in a remote forest-rich region. Rugged topography might increase enrolment rates in REAP and REDD+ programmes. In mainland southeast Asia, where upland areas have been periodically cultivated, a combination of PES and REAP could increase the opportunity costs of continuing to cultivate these areas. Because the yields from such uplands are typically below those of lowlands, PES and REAP programmes would increase the efficiency of agriculture in these areas and, depending on the rate of regrowth, conceivably increase the efficiency of REDD+.

### **Would REAP make REDD+ more equitable?**

Whether REAP will make REDD+ more equitable will depend on the context and provisions in a REAP. History indicates that the impact of conservation

set aside programmes in developed countries has not been equitable, largely because 1) payments were tied to the area of a farmer's land, and 2) farm workers did not receive any payments (Winders 2009). If the distribution of land is inequitable, a REDD+ reinforced by a REAP could produce inequitable benefits. A REAP-assisted REDD+ would probably produce inequitable benefits in Latin America, but more equitable benefits in Asia and Africa, given the more equitable distribution of landownership in these regions. A focus on agroforestry in a REAP would redress some of these inequities if there was some support for smallholders.

Finally, because biodiversity is typically higher in old-growth forests, and in mountain areas with their many micro-environments, a REAP which reinforced REDD+ would produce co-benefits, both better protection of biodiversity and, by assisting small-scale farmers on topographically marginal lands, some poverty reduction.