

## IIASA Policy Brief

# Climate change: clearing the “REDD hot” air

### Introduction

Deforestation and degradation release up to 20 per cent of the greenhouse gas emissions that cause global warming. A major initiative promoting Reduced Emissions from Deforestation and Degradation (REDD) features in current negotiations under the UN Framework Convention on Climate Change. This Brief explores ways to build forest “ecosystem and social services” into the carbon economy, proposing specific policy actions to resolve two underlying issues: first, creating an international body to generate measurable, reportable and verifiable REDD credits; and secondly, adopting a Dutch auction mechanism for credits to maximize emission reductions and the social and ecological co-benefits forests provide to millions of people.

### Key Points

- Two key requirements of any potential REDD mechanism, acceptable to both developing, tropical countries and developed (or “Annex 1”) countries, are first: the generation of measurable, reportable and verifiable (MRV) REDD credits; and secondly the provision of sustainable emission reductions.
- In turn, the first requirement depends on producing globally-consistent, national reference emissions scenarios, that provide a transparent, consistent and “fair” baseline against which additional reduction efforts can be measured, credited and compensation claimed.
- Because avoided deforestation and degradation in developing countries would be matched by financial compensation from “Annex 1” countries, a consistent and

credible method for measurement is absolutely essential in order to avoid REDD "hot air" caused by inflated, inconsistent baselines.

- One way to prevent this is to create an International Emission Reference Scenario Coordination Centre (IERSCC), which would act as a global clearing house for collecting and processing harmonized data to be used in reference-scenario modelling, and so function as an independent technical implementation body to the UNFCCC policy process.
- The second requirement of any potential REDD mechanism can ideally be fulfilled by adopting the proposed "Dutch tender auction" mechanism to distribute REDD compensation benefits (e.g. credits), in a way that would not only secure emission reductions, but also capture, or even maximise, the ecosystem and social co-benefits of avoided deforestation.
- Ecosystem co-benefits cover broad thematic areas such as the retention of high conservation value forest and preserving the enormous biodiversity of plants and animals. Social co-benefits include, tourism, employment and recreation as well as important cultural services and benefits.
- Last but not least, it is essential to note that such a co-benefit maximising auction design might attack the root causes of deforestation and degradation, such as extreme poverty, more effectively than other more expensive development policies, combining the biggest ecosystem "bang" for one's avoided deforestation "buck".

## Measurable, Reportable and Verifiable Credits

The United Nations Framework Convention on Climate Change (UNFCCC), working through its Ad Hoc Working Group on Long-Term Cooperative Action, has collected proposals on Reducing Emissions from Avoided Deforestation and Degradation (REDD). Policymakers in both the developing, tropical-forest countries and Annex I countries tend to agree that REDD credits need to be measurable, reportable and verifiable (MRV). A key to the supply of MRV REDD credits is an appropriate reference (or baseline) emission scenario of deforestation and degradation (DD), against which reduction efforts can be measured, credited and compensation can be claimed.

Parties participating in a REDD mechanism would have to inform the UNFCCC about their reference baseline DD emissions, taking into account "historical data and national circumstances", as well as possible "developmental adjustment". However, if the process of developing and reporting such baseline scenarios is not carefully designed, there is a risk of creating REDD "hot air" in the form of globally inconsistent and inflated baselines, leading to an oversupply of cheap REDD credits. Because DD emissions would be matched by financial compensation, a credible method for measurement is absolutely essential.

A second essential consideration is that REDD-related measures, recognized by UNFCCC mechanisms, must support wider sustainability goals in recognizing the ecological and social values (co-benefits) of forests. A competent REDD mechanism should be able to distribute compensation benefits (e.g. credits) based not only on the amount of emissions reduced, but also on the ecological and social value of the forests in question. An *ideal* REDD mechanism should aim at providing the maximum total benefit from emission reductions, ecological and social values.

## Globally Consistent Emission Reference Scenarios

Globally consistent DD emission reference scenarios at the country or possibly project level are crucial for many reasons, including taking account of international leakage as well as ensuring transparency and equity. To achieve these aims, it is essential to set up and implement harmonized and/or standardized rules and procedures for the collection, interpretation and consistent processing of various sources of forest data.

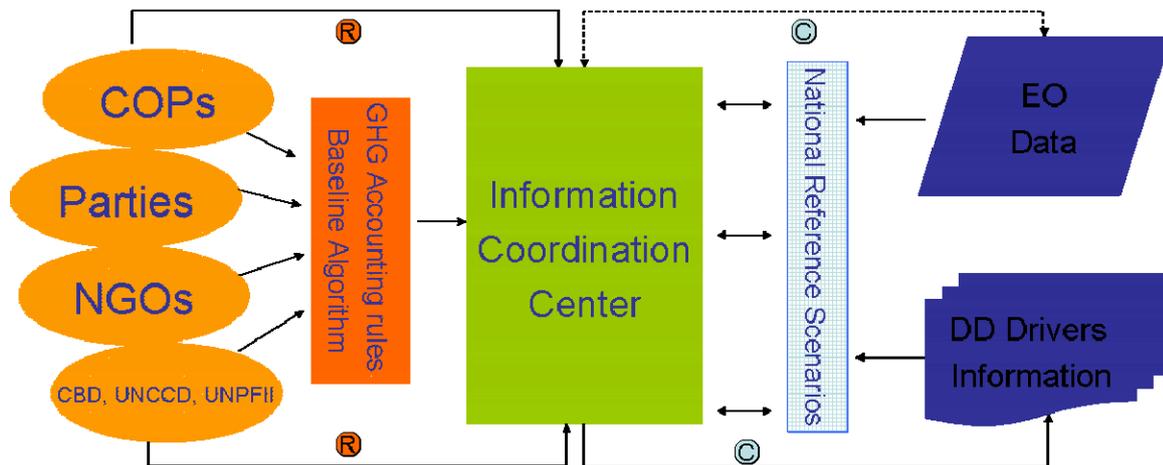
Data may include historical deforestation, estimates of the associated emissions and their uncertainties, current forest carbon stocks and carbon stock-change maps partitioned by the various carbon and nitrogen pools (e.g. soil, litter), and forest stand structure (e.g. species, age structure). These data can be sourced from a multitude of remote sensing instruments (e.g. satellite-based) and their derived products, as well as from *in situ* sources (primarily, forest inventories) and possibly biophysical ecosystem models.

Other types of input, necessary for countries to undertake consistent development of reference scenarios, include activity data relating to the respective pressures and drivers of deforestation, as well as information on forest management planning, forestry supervision and inspection. Depending on the overall policy context of REDD implementation, such information should *inter alia* include not only forest ownership information, forest management plans with associated annual allowable cuts, and forest protection, but also transportation infrastructure development, agricultural management data and food consumption projections.

What is important is that the data used by different countries should be known, and models should be applied in a consistent manner by those countries, according to specific

data and interoperability standards, as well as the respective greenhouse gas (GHG) accounting rules. The modelling tools themselves should also be standardized and certified. **Figure 1** depicts a possible constellation of stakeholders and associated information flows.

**Figure 1.** Institutional set up for determining harmonized emission reference scenarios for REDD (EO = Earth Observation, DD = Deforestation and Degradation, R = Rules, C = Consistency).



### Creating an International Clearing House

Both Earth-observation data and REDD-driver information could either be collected by national constituencies, according to a negotiated standard, or by international agencies in cooperation with national entities. In many countries, substantial capacity-building efforts would have to be undertaken to provide this information according to globally applicable standards, with sufficient quality and in a geographically explicit manner, as far as possible.

However, at the international level, a specific institutional entity needs to be created to achieve this globally consistent use of data and models, and thereby arrive at accepted REDD reference scenarios. This could be called the International Emission Reference Scenario Coordination Centre (IERSCC). Such an entity would be tasked with helping countries develop internationally recognized and accepted reference scenarios, with the data used by countries available to it. It would act as a clearing house for harmonized data use in reference scenario modelling.

Also through this entity, global integrated assessment model(s) would deliver sector-specific national scenario information (e.g. trade flows, prices, socio-economic development information) to the respective REDD host countries. The latter would use this information as exogenous variables driving their national reference scenario model/algorithms. Ideally, these scenarios would, in turn, be determined by using geographically explicit, economic, bottom-up type models, whose methodologies could be validated by this or another international validation entity. Such international quality assurance would ensure internationally recognizable REDD reference scenarios of a national model(s) by providing confidence and information security to Parties.

Respective UNFCCC bodies (e.g. the Intergovernmental Panel on Climate Change and the Global Earth Observation System of Systems), would provide inputs in the form of agreed GHG accounting rules, as well as rules (possibly in algorithmic form and

parameterization) of the computation procedures for globally consistent DD national reference scenarios. In this way, the IERSCC would function as an independent technical implementation body to the UNFCCC policy process by supporting and validating consistent collection of Earth observation and other forest and REDD-driver data, based on rules defined by the UNFCCC policy process.

The body could also be tasked with developing and applying calibration routines of global top-down modelling with national bottom-up modelling to generate consistency between the two. Global consistency is necessary to avoid (or account for) international leakage of larger scale REDD policies. Finally, the IERSCC could help in building capacity for REDD response strategies through additional scenario analysis.

## **Recognising the Danger of REDD Policies**

As noted above, there is general agreement that, under REDD mechanisms, national-, regional- or project-level actions would be tailored to maximize emission reductions. However, there is a danger that aggressive implementation of REDD policies could run into conflict with basic food-security issues, create social conflict and, under certain conditions, lead to further environmental degradation on a total landscape level. Such conflicts can only be avoided if REDD policies are appropriately designed and implemented. Any action supported by international REDD mechanisms should simultaneously recognize the different ecological and social co-benefits of forests.

In fact, forests are important refuges for terrestrial biodiversity and a source of ecosystem services essential to human well-being. They provide habitat for up to 90 per cent of the world's known terrestrial plants and animals, are the source of three-quarters of the world's accessible freshwater, provide timber and non-timber products essential in the economic life of hundreds of millions of people, and play important cultural, spiritual and recreational roles in many societies.

To avert this danger and resolve this key issue, a linked policy action is required that would create a broader, innovative REDD mechanism, which not only distributes emissions reduction credits but also retains the essential co-benefits of avoiding deforestation, or even better, is able to maximize them.

## **How to Maximize REDD Sustainability Benefits**

The solution could be a "Dutch tender auction" mechanism, which first of all ensures that a fixed quantitative REDD supply cap is achieved in a competitive setting. The auction mechanism would avoid excessive producer rents by minimizing a REDD "arbitrage gap", the difference between the REDD costs and the potential revenue from Annex I emission reduction credit supply. But it would also allow for flexibility in targeting the allocation of supply by geographic or thematic areas, thus maximizing sustainability co-benefits

Co-benefit areas are assumed to be those key dimensions usually considered in land- use or forest-sustainability assessments. The ecosystem benefit dimensions cover thematic areas such as the retention of high conservation value forests and biodiversity. Social benefits comprise, for example, employment and recreation or cultural services and benefits.

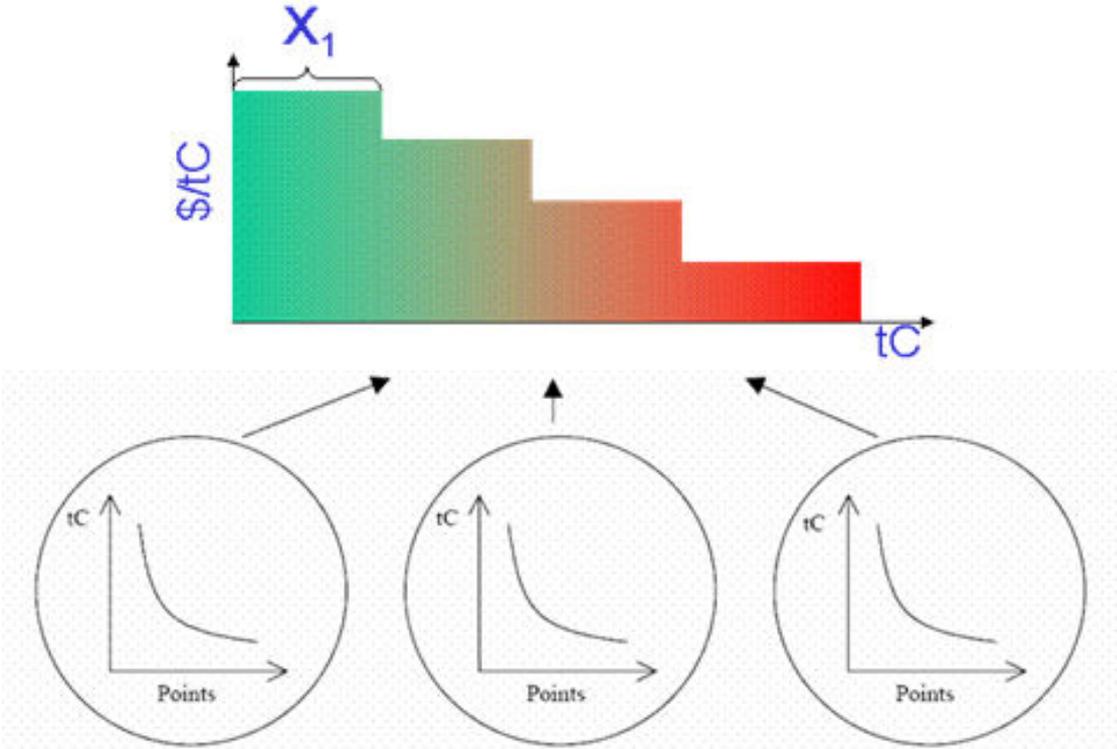
To qualify for the financial compensation mechanism would require a measured, reported and verified REDD unit, which would be fully fungible at a determined rate to an Annex I emissions reduction credit. However, the competitive criterion would be the provision of sustainability co-benefits. These would need to be included as the quantified and certified amount of ecosystem value points plus social value points, calculated according to pre-

specified, co-benefit assessment rules. One approach would be the current, widely-applied, forest certification processes of Sustainable Forest Management. Total land-use certification processes would be preferable, but the processes are currently still in a primordial state.

**How the Implementation Mechanism Works**

**Figure 2** describes the proposed REDD Dutch tender auction for REDD contracts. The implementation mechanism foresees a sequential auction system, with in order to avoid regrets on the part of REDD supplying countries. First, a central agency verifies the eligibility of MRV REDD units according to specified criteria. Next, the central agency announces an auction of the right to sell 1:X fungible REDD units at a fixed price. The price of the REDD unit either remains unchanged throughout the auction or is lowered in each consecutive step of the auction. When the carbon price stays unchanged, the trait which changes during the auction is the amount of sustainability co-benefit value points provided by a REDD unit (1:X fungible), which in Figure 2 is denominated in  $\$/tC$  (Total Sustainability Co-benefit Value (US dollars) / REDD (tonnes Carbon)).

**Figure 2.** Supply scheme of the REDD Dutch tender auction mechanism maximizing sustainability points, i.e. total sustainability co-benefit value.  $X_1$  represents the highest REDD purchasing tier (determined by a threshold of sustainability co-benefit points). The auctioneer continues to lower the required points (and price) in a stepwise fashion until the fund or trading cap is filled (i.e. moving from green to red). Circles indicate various ecosystem services (e.g. biodiversity, etc.) and the relationship between sustainability points and tonnes of carbon.



The REDD Dutch tender auction design allows competitive bidding based either on price or quantity. In this particular option, where bidding is based on the delivery of total sustainability co-benefit points from REDD action, additional ecosystem and societal services of forests will not only be retained, but their value would even be enhanced.

The Dutch tender auction mechanism, through endogenous discounting, would guarantee that excessive REDD producer rents would be avoided. Thus, the proposed mechanism design would be able to contain the risk of a REDD “hot air bubble” inflating the environmental integrity of an Annex I emissions trading system. Compliance with environmental and social standards could be ensured through appropriate auditing and possible certification, as an entry condition to participate in the mechanism. *For a full description of how the mechanism would function, see **Further Information** at the end of this Brief.*

### **Deflating REDD “hot air”, Leakage and Other Issues**

As acknowledged, a risk is that, if the process of baseline-setting is not carefully designed, it will lead to an inflated supply of REDD credits (or REDD “hot air”). One inherent problem is “information asymmetry”, where not all the agents taking part in the process have access to the same quality or quantity of information. Because the “true” REDD effort is poorly observable, individual market agents have an opportunity to use this information asymmetry to over-report on their individual efforts and the easiest way to inflate reported efforts is to increase the baseline emission level.

Asymmetrically inflated baselines would lead to windfall profits for the inflating countries, resulting in an unfair allocation of global financial resources dedicated to REDD. Due to its inflated reference emission scenario, country X might receive all of the global REDD resources and country Y would get nothing by imposing a stringent baseline scenario. This leads to two main problems: first, cooperation within tropical countries would be put under threat. Clearly, country Y would try to sabotage negotiations under such conditions, since it would face zero revenues from a global REDD mechanism while its competing tropical country would be gaining revenues. Second, “REDD sponsoring” countries/markets would face an environmental integrity problem. The entity sourcing REDD credits could *ex-post* be blackmailed for having undermined the environmental integrity of its emission reduction claims and have spent 50% of its REDD resources on REDD hot air.

However, under a consistent framework of globally harmonized and consistent national reference emission scenarios, countries X and Y would share the globally available REDD resources on a 50:50 basis. This is the strongest reason for creating such an International Emission Reference Scenario Coordination Centre, specifically tasked to establish globally consistent national reference emission scenarios based on standardized and consistent data and algorithms, according to the outcomes of the continuing REDD negotiations under the UNFCCC. More realistic reference scenarios would also lead to more transparency and finally to “fairness” in the REDD process. “Real” baselines are a precondition for more robust cooperation between Parties under the UNFCCC.

Another issue of that of “leakage” which is closely linked to the issue of how the drivers of deforestation get included in baselines. This rapidly becomes highly contextual, so that the baselines of one place or country can depend on the REDD actions of other market participants. For example, in a particular country where forest conversion is due to the expansion of intensive agriculture, then AD actions in this area will lead to high leakage to other regions/countries. However, if the driver is extensive cattle-ranging and if REDD measures target the intensification of livestock production systems, then geographic leakage will most likely be small. Thus, baseline setting of one country must be established in a globally consistent manner, taking into account a full land-use

perspective and covering all GHG sources in order to address the problem of geographic and sector leakage.

A major demand on such a proposed REDD mechanism is the need to map, with higher precision and more comprehensively, the ecosystems and societal values *per se*. Agreement would be needed at the international political level on how to quantify sustainability co-benefits, such that they could be incorporated into the proposed AD mechanism. Clearly, overly ambitious criteria would endanger the implementation of such a scheme and substantially increase transaction costs. What would be needed to implement the ecosystem service-maximizing auction is the identification and verification of the absolute or relative magnitude of these values. The current, widely applied forest certification processes could act as a platform on which to build.

What is essential to note is that, by adopting such a co-benefit maximising auction design, the root causes of deforestation and degradation (e.g. extreme poverty) might be attacked more effectively. It would also allow for a wide portfolio of REDD implementation instruments. Currently, only a handful of countries are "REDD ready", which would call for the implementation of even simpler REDD mechanisms, if REDD is to be implemented on the national scale. Substantial capacity building will be required to render tropical forest countries or other potential REDD suppliers not only REDD ready, but REDD *mechanism* ready.

### Further information

This Policy Brief was prepared for a side-event at COP 14 of the UN Framework Convention on Climate Change negotiations, held December 1–12, in Poznan, Poland. It accompanied a joint presentation under the title, *Avoiding REDD Hot Air*, given on the second UNFCCC Forest Day, December 6. More information is available at: [http://www.cifor.cgiar.org/Events/COP14-ForestDay/forest\\_day2008.htm](http://www.cifor.cgiar.org/Events/COP14-ForestDay/forest_day2008.htm)

The Brief is drawn from *Towards a sound REDD – ensuring globally consistent reference scenarios and safeguarding sustainability co-benefits*, a paper written for the online journal, ***Carbon Balance and Management*** <http://www.cbmjournal.com/>

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