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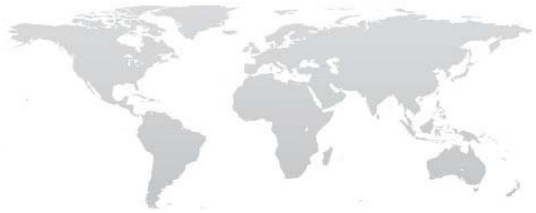

The Feasible Supply of RED Credits:

Less than Predicted by Technical Models[1]

Erin Myers Madeira, Michael J. Coren, and Charlotte Streck[2]

Key Points

- The supply of RED credits that can realistically be expected to enter international carbon markets is about 50 percent or less of the technical supply reported in the literature.
- If resources are not used efficiently to help countries develop the institutional and technical capacity to implement robust REDD+ programs, the realistic supply of REDD+ credits will be less than what was modeled in this paper.
- The success of climate programs that rely heavily on REDD+ credits to meet domestic emissions goals and contain costs—such as those considered in the United States—will depend on the ability of Brazil, Indonesia, and other major developing forest nations to implement market-oriented REDD+ programs that deliver robust, credible REDD+ credits.
- Because feasible supply is expected to be significantly less than technical supply, reported in the literature, concerns about market flooding may be overstated.

[1] An expanded study has been accepted for publication by *Climate Policy*.

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Introduction

REDD (reducing emissions from deforestation and forest degradation) has made clear progress in international climate talks despite frustrating setbacks elsewhere. During the 2009 negotiations in Copenhagen at COP-15, the final negotiating text for REDD was virtually completed and expanded to account for conservation, sustainable management of forests, and enhancement of forest carbon stocks (referred to now as REDD+). While the structure of the incentive mechanisms is not yet defined, REDD+ promises to attract the participation of a large pool of developing countries with forest carbon assets. The absence of a binding agreement in Copenhagen has not reversed the progress of REDD+ on the ground: at least 77 pilot programs or demonstration projects are under way across the developing world, primarily in Asia (40), South America (19), and Africa (18) (Cerbu et al. 2009).

REDD+ has been a main component of offset provisions in proposed U.S. climate policies aimed at curbing global GHG emissions because economic analyses predict that REDD+ activities will be less costly than mitigation options in other sectors, such as transportation (Eliasch 2008). Further, REDD+ activities are expected to have significant co-benefits for adaptation, biodiversity conservation, and sustainable livelihoods. According to leading analyses, offsets or carbon credits from REDD+ activities that enter a U.S. carbon market will reduce the overall cost of climate legislation while maintaining or even improving the climate benefits (U.S. EPA 2010).

However, these analyses overestimate the availability of REDD+ credits because they do not take into account factors that would constrain the supply of REDD+ credits into a U.S. market. Predicting the feasible supply of REDD+ credits is fundamental to understanding the impact REDD+ will have on the cost of climate policies and is the focus of this study.

Research estimating REDD+ supply of market credits frequently equates *biophysical* potential with *feasible* potential or fails to explore the significance of this critical distinction. In fact, the feasible supply of viable credits is likely to be a fraction of the total emissions reductions given the constraints on generating and delivering credits acceptable for offsetting developed-country emissions, as was demonstrated by the Kyoto Protocol's Clean Development Mechanism. Political, technical, and environmental constraints in developing countries are perhaps the most important limiting factors in determining credit supply.

In this study, we estimate the supply of credits from reducing emissions from deforestation that can be expected to enter a U.S. carbon market, what we call "the feasible potential supply," by using three different scenarios: Forest Carbon Index (FCI) risk indicator, a customized delay and exclusion score based on political readiness and willingness, and an additional customized own-efforts score based on developing countries' domestic climate mitigation goals. Our study found

that the feasible potential supply of credits falls significantly below the technical potential estimates cited in the literature.

While the international climate policy community refers to REDD+, many economic analyses still model emissions reductions from deforestation alone due to limited availability of reliable data on emissions from degradation and on emissions benefits from conservation, sustainable forest management and enhancement of forest carbon stocks (the second D and + in REDD+). This study is based on the Forest Carbon Index model's (Deveny et al. 2009) estimates of feasible credit supply from emission reductions from deforestation (RED) only. However, because our feasibility screens discount the technical supply, they can be applied to models of REDD+ supply. When we refer to our specific results, we use the acronym RED, and when we refer to the general policy, we use REDD+.

According to our analyses, the feasible potential supply would be around 99 million to 125 million annually at $10 per ton, compared to an estimated technical potential supply of 400 million annually. At $20 per ton, we estimate the feasible potential supply at 0.9 billion to 1.8 billion, compared to a technical potential supply of 2.8 billion tons annually. In other words, at $10 per ton, U.S. offset markets can expect to see approximately 35 percent of the technical supply predicted by leading models. At $20 per ton, U.S. offset markets can expect to see approximately 40 percent of the technical supply predicted by leading models prevalent in the literature.

Our analysis indicates that climate programs that rely heavily on REDD+ credits to meet domestic emissions goals and contain costs—such as those considered in the United States—will depend on Brazil, Indonesia, and other major developing forest nations to supply emissions reductions. These countries' abilities to implement market-oriented REDD+ programs will shape the supply of offsets in a robust global market. To create the necessary conditions for REDD+, many countries will need credible measuring and monitoring systems and the institutional framework to implement national REDD+ programs that meet standards for good governance. These resources can come from either developed countries' public funding commitments to REDD+ or from REDD+ countries own investments in creating the enabling conditions for REDD+. Without these resources, the feasible supply will likely be less than what is calculated in this report.

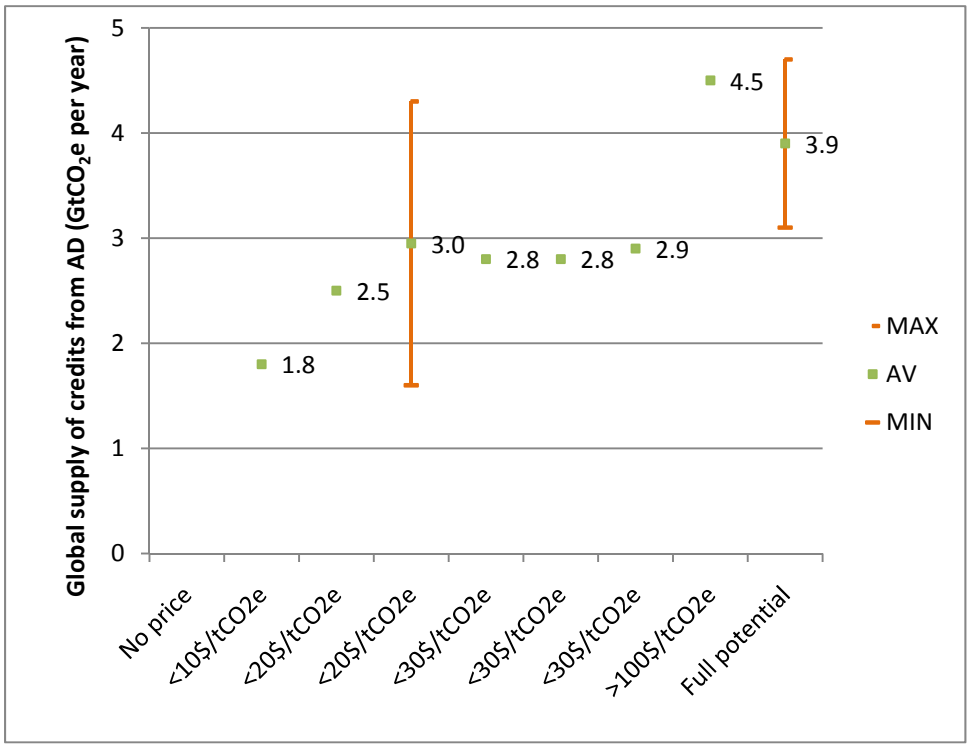
This analysis suggests that under robust compliance regimes, REDD+ credits as defined here will not lead to rapid oversupply of markets or regulated sovereign demand.

Technical Supply from the Literature

Studies in the scientific literature of biophysical REDD potential estimate the emission reduction potential is between 1.8 gigatons of carbon dioxide equivalent ($GtCO_2e$) per year at $10 per ton and 2.5 $GtCO_2e$ per year at $20 per ton, ranging as high as 4.5 $GtCO_2e$ at $100 per ton. The

general trend is that high prices lead to more abatement. The majority of emissions reductions are secured at prices below $30 per ton, roughly broken down as 35 to 60 percent of total emissions reductions below $10 per ton, 50 to 87 percent of total emissions reductions below $20 per ton, and 69 to 92 percent of total emissions reductions below $30 per ton. Few additional emissions reductions are achieved above $60 per ton. Figure 1 describes REDD+ credit projections in the literature.

Figure 1. Global Supply of REDD Emission Reductions According to Price



Notes: AD=avoiding deforestation; Gt=gigaton; t=ton; CO_2e=carbon dioxide equivalent. The data points draw on modeled REDD volumes in the following studies at <10$/tCO2e (1.8, Murray et al. 2009); <20$/tCO2e (2.5, Murray et al. 2009; 1.6–4.3 Kindermann et al. 2008); <30$/tCO2e (2.8 Kindermann et al. 2008; 2.8 Sohngen 2009; 2.9 Murray et al. 2009); and >100$/tCO2e or full potential (4.5 Tavoni et al. 2007; 3.1–4.7 Kindermann et al. 2008).

Table 1. Global supply of REDD+ credits ($GtCO_2e$ per year)

	AD (RED)	REDD+
No price		3.5 - 4.9 (Grieg-Gran 2008)
<10$/tCO2e	1.8 (Murray 2009)	2.7 (McKinsey 2009) [3.6 *]
<20$/tCO2e	2.5 (Murray 2009)	4.3 (McKinsey 2009) [5.2 *]
	1.6 - 4.3 (Kindermann *et al.* 2008)	
<30$/tCO2e	2.8(Kindermann *et al.*2008)	4.6 (Sohngen2009)
	2.8 (Sohngen 2009)	
	2.9 (Murray 2009)	
>100$/tCO2e or potential	4.5 (Tavoni 2007)	7.2 (Tavoni 2007)
	3.1 - 4.7 (Kindermann *et al.* 2008)	7.8 (McKinsey 2009)*

*includes peat emissions reductions

Methods

We calculated the feasible supply of REDD credits by applying three scenarios to technical potential estimates from the Forest Carbon Index: an FCI proxy risk indicator, an exclusion or delay of countries based on readiness and an additional own-efforts criteria based on countries' contributions to internal mitigation before supplying market credits. We calculated the feasible supply for these scenarios at four carbon prices: $5, $10, $15, and $20.

TECHNICAL POTENTIAL FROM THE FOREST CARBON INDEX

The FCI is a GIS-based model developed by Resources for the Future and Climate Advisers that calculates the global potential to generate emission reductions from stopping or slowing deforestation (Deveny et al. 2009). This model combines economic data about opportunity costs and biological data about carbon storage potential at a resolution of 85.5 square kilometers.

To calculate opportunity costs and emissions reduction potential, the FCI uses global datasets on forest area (JRC 2003), forest carbon density above ground (Kindermann et al. 2008), geographical remoteness (Jennings unpublished), and the land use opportunity costs (Naidoo and Iwamura 2007; Kindermann et al. 2006). Reference levels are the projected rate of future deforestation and are important for REDD+ because they are the baseline from which emissions reductions are measured. Reference levels for deforestation are based on historical rates from 2000 to 2005 (FAO 2006).[3, 4] The parameters are outlined in Table 2.

[3] Transaction and administrative/programmatic costs are not included in the Forest Carbon Index cost calculations.
[4] The FCI applies a 20 percent "permanence" discount to all countries to reflect the risk of future release, a methodology drawn from the Voluntary Carbon Standard.

Table 2. Explanation of Variables Used in the Forest Carbon Index to Calculate Technical Supply of RED Credits

Variables	Forest Carbon Index
Reference-level design	Historical Food and Agriculture Organization baseline 2000–2005 (country level)
Carbon density (above ground only)	Estimates aboveground carbon content (Kindermann et al. 2008)
Carbon price ($/ton carbon dioxide)	$5, $10, $15, $20
Geographical scope	All tropical countries plus countries that are part of UN-REDD and World Bank Forest Carbon Partnership Facility programs
Modeling period	2013–2020
Opportunity cost	Estimated opportunity cost of avoiding land conversion from forest to agriculture. Opportunity cost is calculated using foregone agricultural rents (Naidoo and Iwamura 2007) and a one-time timber harvest (Kindermann et al. 2006) when timber rents exceed agricultural rents.
Forest cover	Delineates areas identified as forest using Global Land Cover 2000 data (JRC 2003)

The FCI uses GIS to combine the carbon potential and opportunity cost to calculate a unique cost per ton of carbon in each 85.5 square kilometer grid cell. The FCI calculates the volume of cost-effective RED emissions reductions that technically can be supplied from each grid cell at different carbon prices ($5, $10, $15, and $20 per ton). This is then aggregated to a country level, and each country has a unique cost curve for RED. The national-level deforestation rates from the Food and Agriculture Organization are applied to the national cost curve for RED.

FEASIBLE SUPPLY: SCREENING CRITERIA AND SCENARIOS

The core FCI model calculates the technical potential of countries to supply forest carbon assets. In reality, investment risks, political positions, and governance and readiness conditions constrain the amount of forest carbon assets that ever reach a global market or meet an offset demand. We modeled the expected supply of forest carbon assets under three different scenarios to account for political, readiness, governance, and investment conditions. The scenarios are described below and in greater detail in Appendix I. Each scenario uses different proxies for feasibility, taking different approaches to correcting for the factors that will limit the potential technical supply. Under each scenario, a discount factor is determined for each country. That discount factor is applied to the technical supply, resulting in the feasible supply. Appendix 2 provides a list of country scores.

Table 3. RED Scenario: Technical and Feasible Potential (Description of Scenarios)

Scenario	Description
0–Technical Potential	Represents technical potential calculated by Forest Carbon Index (FCI)
1–FCI Risk Indicator	Applies governance, ease-of-doing-business, and readiness factors based on quantified indices and globally available data
2 – Exclusion/ Delay	Eliminates or delays countries' entry to a RED market based on the technical and political capacity of countries to supply REDD assets
3–Own Efforts	Further discounts Scenario 2 based on the portion of countries' voluntary commitments to reduce emissions that will be met by REDD

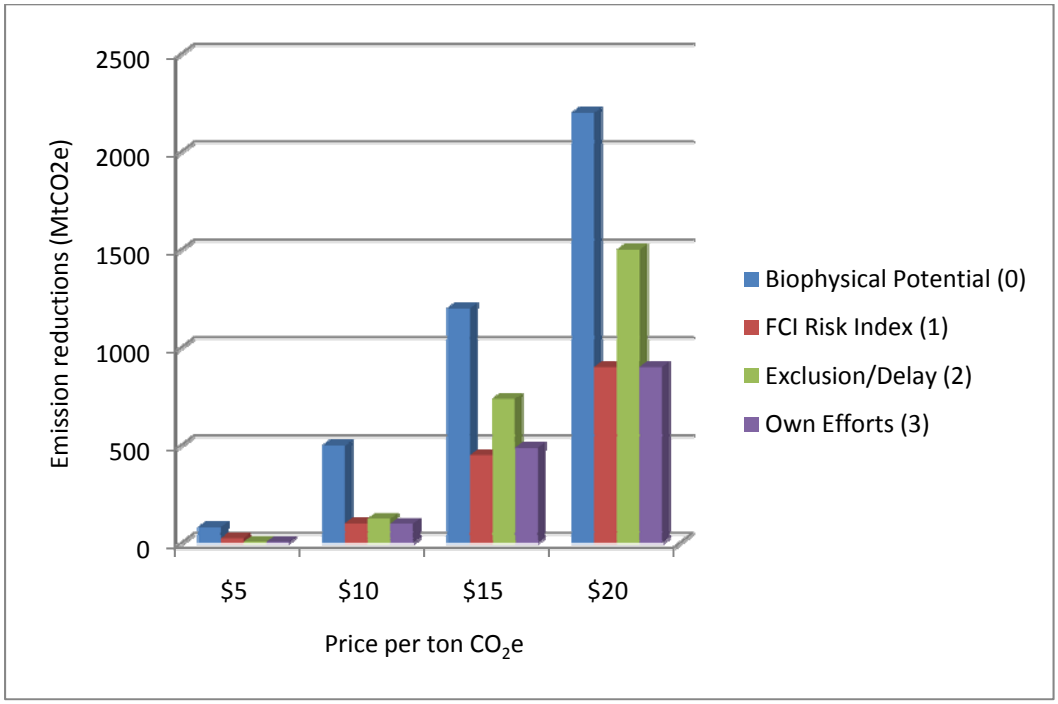
Note: All scenarios are applied to the technical potential modeled by the FCI.

Scenario 0 is the technical potential calculated by the FCI, described above. Scenario 1 applies a risk adjustment based on published data about indicators of a country's governance, ease-of-doing business, and readiness conditions. This risk adjustment draws on published and reported data and findings; it does not independently evaluate a country's political willingness or capacity to engage in REDD+, nor does it consider countries' positions in international climate negotiations. Scenarios 2 and 3 are based on technical and political capacity, as well as voluntary commitments to reduce emissions. Scenario 2 (Exclusion/Delay) is a combination World Bank development statistics, countries' political position toward a forest carbon market mechanism, progress in the REDD+ readiness process, technical capacity, and governance. This screen eliminates or delays countries' entry in a REDD+ framework. Scenario 3 (Own Efforts) builds on Exclusion/Delay and subtracts a percentage of credits based on a country's voluntary climate commitments because these commitments will be met at least in part through REDD+.

Results

The feasible supply of RED credits is significantly less than the technical supply reported in the literature. Model results consistently show the volume of feasible credits falls far below the technical potential. At $5 per ton, feasible potential supply ranges from 6.6 million to 25 million annually, approximately 20 percent of the estimated technical supply of 82 million. At $20 per ton, the feasible supply is approximately 0.9 billion to 1.5 billion tons annually, or 50 percent of the technical supply of 2.2 billion tons. Figure 2 and Table 3 show the results of the different feasibility scenarios compared to the technical supply.

Figure 2. Annual Emissions Reductions at Four Price Scenarios



Notes: $MtCO_2e$=megatons carbon dioxide equivalent; FCI=Forest Carbon Index.

The illustration shows that feasible emissions reductions in both risk and policy-adjusted estimates are just a fraction (approximate half) of the technical potential. It is also interesting to note that the FCI and Own Efforts Scenarios result in similar final estimates.

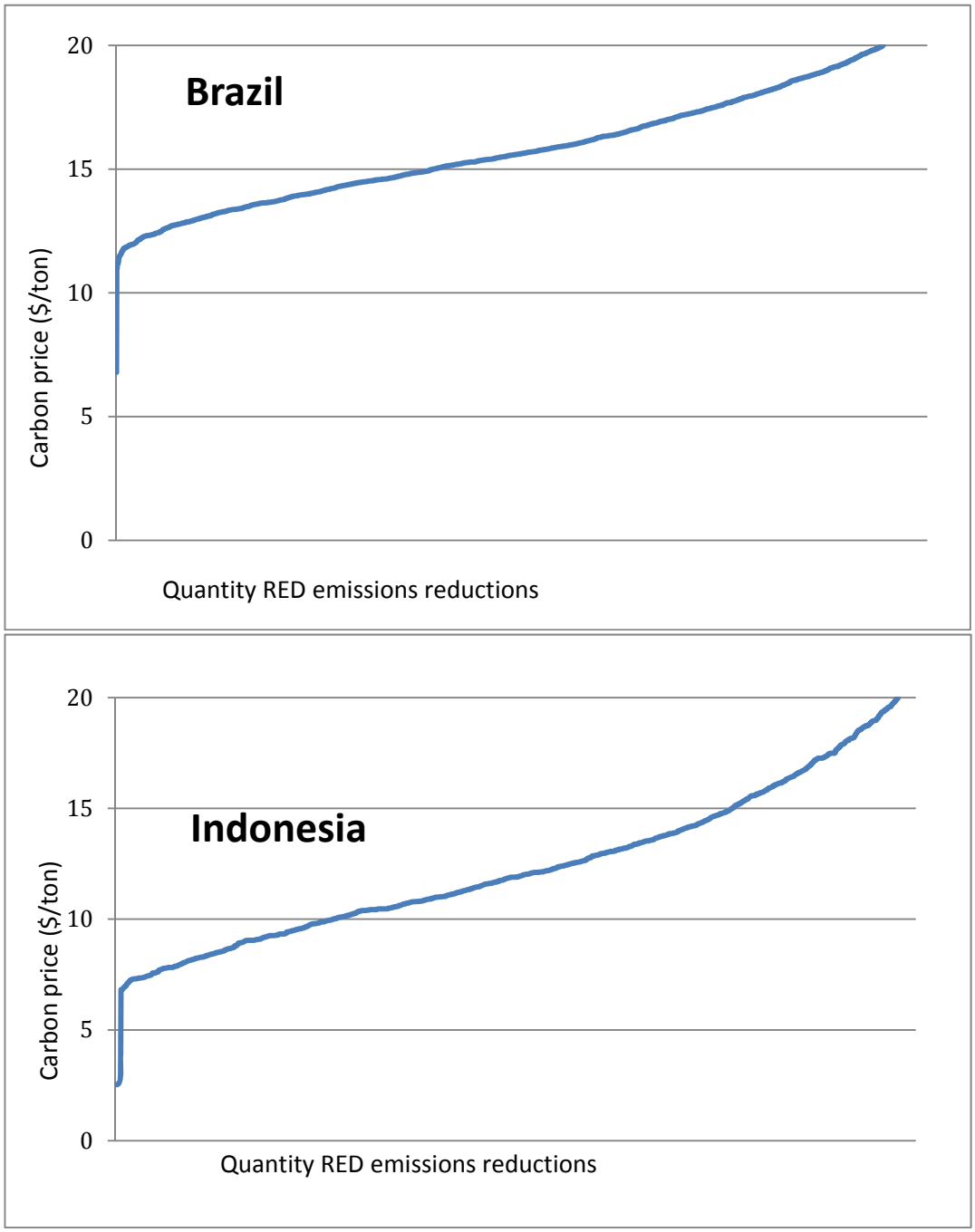
Table 4. Results: Supply of RED Credits for Different Feasibility Scenarios and Carbon Prices

		0–Technical Potential (tons)	1–FCI Risk Index (tons)	2– Exclusion/ Delay (tons)	3–Own Efforts (tons)
FCI $5/ton	Annual average	82 million	25 million	7.4 million	6.6 million
	Cumulative 2013–2020	658 million	202 million	59 million	53 million
FCI $10/ton	Annual average	500 million	102 million	125 million	99 million
	Cumulative 2013–2020	2.5 billion	812 million	1.0 billion	790 million
FCI $15/ton	Annual average	1.2 billion	450 million	738 million	488 million
	Cumulative 2013–2020	9.3 billion	3.6 billion	5.9 billion	3.9 billion
FCI $20/ton	Annual average	2.2 billion	0.9 billion	1.5 billion	0.9 billion
	Cumulative 2013–2020	17.7 billion	7.2 billion	11.9 billion	7.3 billion

Notes: FCI=Forest Carbon Index. At carbon prices of $10, $15, and $20/ton, Scenarios 1 and 3 yield very similar results for the cumulative supply of RED credit despite the significant differences in methodology and inputs into these scenarios.

At carbon prices of $20 and $15 per ton, approximately half of feasible emissions reductions would be supplied by Brazil and Indonesia. Brazil and Indonesia become less prominent players at lower carbon due to low supply available at these prices, shown by their cost curves in Figure 3.

Figure 3. Supply of RED Credits at Difference Carbon Prices



The table below shows the top RED credit suppliers at different carbon prices.

Table 5. Countries Providing Greatest Supply of RED Credits at $20 per ton (millions of tons, total supply 2013–2020)

1–FCI Risk Index		2–Exclusion/Delay		3–Own Efforts	
Brazil	3,533	Brazil	6,495	Brazil	3,247
Indonesia	864	Indonesia	2,112	Indonesia	1,478
Malaysia	325	Malaysia	523	Malaysia	366
Mexico	291	Mexico	297	Tanzania	280
Nigeria	249	Bolivia	294	Zambia	239
Bolivia	169	Tanzania	280	Bolivia	235
Tanzania	147	Cameroon	252	Cambodia	219
Top 7 countries	*5,578*		*10,253*		*6,064*
Total (All) supply	*7,165*		11,916		7,329
Percent total	*78%*		*85%*		*82%*

Given the uncertainty around global forest carbon estimates and the assumptions about the proxies for feasibility, the modelled volumes should be considered with caution and used for purposes of understanding the limits of supply rather than predicting volumes. The scenarios use proxies for feasibility and were created to correct estimates of technical supply to account for the real-world conditions that will limit supply. These scenarios are not meant to precisely model the absolute volume of expected credits.

Despite the uncertainty in underlying data and relationships, results produced under multiple scenarios may be considered more reliable. Under all feasibility scenarios at $20 per ton, the top seven countries supply more than 75 percent of total RED credits. This suggests that a few key countries will supply the global market for RED credits. Brazil, Indonesia, and Malaysia are the top credit suppliers under all scenarios, with the majority of all credits supplied by Brazil and Indonesia. Because Brazil, Indonesia, and Malaysia are top performers using different criteria to evaluate feasible supply, these countries are more certain to contribute to early feasible supply. The presence and absence of other countries suggests that their ability to deliver credits is less certain.

Conclusions

The feasible supply of forest carbon credits that can be expected to meet demand for offsets is significantly less than the technical supply that is calculated by leading models. As a result, public funding must be available to help countries develop the capacity to be able to enter the market. Our delay factors assume that funding will be available to finance the development of regulatory and technical capacity in these countries so that they can enter the market in 2011 or 2016. If funds are not available—for example, because funds are not appropriated in the U.S. budget for sustainable landscapes—countries will not be able to enter the market, and supply will be further reduced beyond what is modeled in this study.

Leading U.S. climate bills rely on REDD+ credits to deliver significant cost savings. For example, the U.S. EPA estimates that REDD+ credits will produce a 25 percent reduction in the cost of legislation, assuming a supply of 3,056 million tons for 2013–2020 (U.S. EPA 2010). According to our analysis, the U.S. market for credits would demand 25 to 40 percent of the best-case estimate of global supply of RED credits available during this time assuming money is invested to create the enabling conditions to generate these credits.

This analysis suggests that the U.S. offset market will likely rely heavily on REDD+ offsets from Brazil and Indonesia to meet its targets for emissions reductions and carbon price. Because feasible supply is expected to be significantly less than technical supply reported in the literature, concerns about market flooding may be overstated. Mechanisms should still be developed to protect the market from volatility produced by sudden changes in supply.

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Appendix I. In-Depth Explanation of Feasibility Scenarios

SCENARIO 1: FCI RISK INDICATOR

The FCI Risk Indicator is composed of three separate metrics—governance, ease of doing business, and readiness—each on a scale of 0 to 1 according to the equation below:

FCI Risk Factor = (Governance X 0.4) + (Ease of Doing Business X 0.4) + (Readiness X .02)

The governance metric uses the World Bank's Governance Index and Ease of Doing Business metrics. The readiness metric was created for the FCI and combines a remote-sensing capacity indicator with an environmental markets indicator. The remote-sensing indicator captures the willingness of countries to provide or participate in efforts to measure their forest carbon and is based on data from the Committee on Earth Observation Satellites and the Group on Earth Observations. The environmental market indicator is based on Clean Development Mechanism projects completed or in the pipeline. The readiness score is the average of the remote-sensing and environmental market indicators.

Governance is considered because government stability and the government's ability and willingness to create and enforce laws related to land rights and forests will influence the extent to which forest conservation projects are sufficiently protected by the government. Ease of doing business is considered because intrusive governments that create burdensome application

procedures for starting a business and obtaining permits will slow the ability of a forest carbon project to establish itself. Finally, the readiness indicators are included because the institutional capacity within a country to access forest carbon markets and the technical capacity to monitor forests with remote-sensing systems will affect the degree to which changes in forest carbon can be rigorously measured and compensated.

SCENARIO 2: EXCLUSION/DELAY

Readiness—the technical and political capacity of each country to generate compliance-grade REDD+ credits—is modeled by eliminating or delaying countries' participation in a market or credit-based REDD+ mechanism. Delays reflect the time various countries need to establish institutional capacities, a supportive policy framework, and the technical capacities to generate and collect data necessary to generate compliance-grade REDD+ credits. We assume that the ability to build and maintain systems and capacities to measure, report, and verify emissions, and, possibly, participate in an international carbon market stands in correlation to general governance indicators (World Bank's Governance Index). We further assume that those countries that have already engaged in REDD readiness by participating in the World Bank Forest Carbon Partnership Facility or the UN-REDD program are more committed and advanced in achieving REDD readiness than countries that have chosen not to engage. See Annex I for an extended description of the methodology.

To assign delays, we have used the following methodology:

- We checked the following governance indicators (using the 2008 World Bank Governance Indicators):
    - control of corruption,
    - government effectiveness,
    - rule of law, and
    - regulatory quality.
- We estimated that countries that rank among the bottom 20 of two or more indicators will most likely participate in a fund-based REDD+ financing scheme.
- We reinserted those countries that already engaged in the readiness process, assuming that they would have already engaged in building capacities and data sets for market participation. Reflecting the prevailing constraints, we assigned to these countries a 20-year delay in entry (2031–2035).

- We assigned a delay of 15 years to those countries that rank at the bottom 30 of at least two of the relevant governance indicators (2026–2030).

- The rest of all countries are estimated by default to be ready for delivery of carbon credits in 2020, except that the positive corrections have been applied to acknowledge engagement and committed efforts:

    - Those countries that have already engaged in the readiness process receive a credit of 5 years, resulting in a point of entry between 2016 and 2020.

    - Those countries that have particularly high governance indicators, are actively involved in the policy process, and have pledged own action are expected to be ready for trading in the period 2011 to 2016; and

    - Those with higher governance but without active involvement in the readiness for trading in the period 2016–2020.

Six countries (Malaysia, Brazil, Chile, China, Panama, and Indonesia) enter REDD+ in 2011, most others enter in 2016, and several are only included in periods beyond the modeling horizon. Our delay factors assume that funding will be available to finance the development of regulatory and technical capacity in these countries so they may enter the market in 2011 or 2016. If funds are not available—for example because funds are not appropriated in the U.S. budget for sustainable landscapes—countries will not be able to enter the market, and supply will be further reduced.

It is important to note that while the ability to supply compliance-grade REDD+ credits may coincide with greater institutional capabilities, countries that rank low on our scale for delivering early REDD+ credits may (and are likely) to still play an active role in a REDD+ mechanism. They may deliver important emissions reductions and be supported by international funds without actually generating compliance-grade REDD+ credits.

SCENARIO 3: OWN EFFORTS

This scenario takes into consideration countries that are eligible to supply REDD+ credits and have made voluntary commitments to reduce their own GHG emissions through REDD+ activities. These countries' voluntary commitments will reduce the volume of credits available for an international crediting mechanism. For example, Brazil announced it would cut greenhouse gas emissions by at least 36 percent from business as usual by 2020, most of it by reducing deforestation in the Amazon by 80 percent and in the dry Cerrado by 40 percent (Fransen 2009), and China pledged to cut its emissions intensity to reforest 40 million hectares of its territory. We therefore applied discount factors to emissions reductions from developing countries likely to assume such goals. The criteria that we applied to estimate the efforts are based on communicated ambition and our own political assessments through our involvement in the

REDD+ negotiation process under the UN Framework Convention on Climate Change. The discounts are as follows:

- Countries with high emissions and announced mitigation goals (i.e., Brazil and China) withhold at least 50 percent of emissions reductions from offset market.[5]
- Countries with high emissions, high GDP, or announced mitigation goals (i.e., Indonesia, Chile, Malaysia and Panama) are assumed to contribute 30 percent of their emissions reductions as own efforts.
- Least-developed countries have no-own efforts discount.
- Remaining countries are assumed to contribute 20 percent of their emissions reductions as own efforts.

The own-effort calculation is additional to the Delay/Exclusion Scenario.

Appendix 2. Discount Factors

Below is a list of the countries with technical potential to supply RED credits and the discount factors applied under different scenarios.

	Scenario 1	Scenario 2	Scenario 3
Country	**FCI Risk Indicator**	**Exclusion/ Delay**	**Own Effort**
Angola	0.10	0.00	0.00
Argentina	0.55	0.63	0.8
Benin	0.29	0.00	0
Bolivia	0.36	0.63	0.8
Botswana	0.54	0.63	0.8
Brazil	0.54	1.00	0.5
Burkina Faso	0.20	0.00	0
Burundi	0.34	0.00	0
Cambodia	0.23	0.63	1

[5] The reference date is November 2009. By the time of publication, more countries, Indonesia being of particular relevance, have announced emissions reduction goals.

Cameroon	0.18	0.63	0.8
Central African Republic	0.11	0.00	0.00
Chad	0.05	0.00	0.00
Colombia	0.49	0.63	0.80
Congo	0.16	0.00	0.00
Congo, DRC	0.03	0.00	0.00
Ecuador	0.36	0.00	0.00
Equatorial Guinea	0.07	0.00	0.00
Ethiopia	0.22	0.63	1.00
Gabon	0.19	0.63	0.80
Ghana	0.62	0.63	0.80
Guatemala	0.39	0.63	0.80
Guinea	0.07	0.00	0.00
Guinea-Bissau	0.17	0.00	0.00
Honduras	0.42	0.63	0.80
Indonesia	0.41	1.00	0.70
Kenya	0.50	0.63	0.80
Laos	0.13	0.00	0.00
Liberia	0.15	0.00	0.00
Madagascar	0.25	0.63	1.00
Malawi	0.28	0.00	0.00
Malaysia	0.62	1.00	0.70
Mali	0.34	0.00	0.00
Mexico	0.61	0.63	0.20
Mozambique	0.35	0.63	0.80
Myanmar	0.00	0.00	0.00
Namibia	0.57	0.00	0.00
Nepal	0.31	0.63	1.00

Nicaragua	0.46	0.63	0.80
Nigeria	0.35	0.00	0.00
Panama	0.63	1.00	0.80
Papua New Guinea	0.45	0.63	0.80
Paraguay	0.39	0.63	0.80
Peru	0.54	0.63	0.80
Philippines	0.39	0.00	0.00
Senegal	0.27	0.00	0.00
Sierra Leone	0.19	0.00	0
Somalia	0.00	0.00	0.00
Sudan	0.13	0.00	0.00
Tanzania	0.33	0.63	1.00
Togo	0.12	0.00	0
Uganda	0.34	0.63	1
Venezuela	0.12	0.00	0
Zambia	0.31	0.63	1
Zimbabwe	0.09	0.00	0