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HIGH-LEVEL CONFERENCE ON WORLD FOOD SECURITY: THE CHALLENGES OF CLIMATE CHANGE AND BIOENERGY

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FINANCIAL MECHANISMS FOR ADAPTATION TO AND MITIGATION OF CLIMATE CHANGE IN THE FOOD AND AGRICULTURE SECTORS

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I. BACKGROUND

1. Climate change will have a disproportionate impact on poor developing countries - compared to the expected net effects in developed regions - due to a combination of more severe climatic impacts in areas that are already vulnerable today, coupled with inadequate resources, technology and organizational capacity to adapt to them. Agricultural and other related activities, fundamental to safeguarding food security and providing livelihoods to the majority of the world's rural poor, are particularly at risk. This implies that those who have contributed the least to the causes of climate change will tend to bear the brunt of its negative effects.
2. Within the framework of international climate policy and its associated mechanisms, under the United Nations Framework Convention on Climate Change (UNFCCC), it is therefore imperative to identify how the rural poor in developing countries could more effectively benefit from financing mechanisms, including the growing carbon market, in order to mobilize the financial resources, technology and capacity necessary for reducing their vulnerability in the coming decades.
3. This implies a renewed focus on activities in developing countries that not only contribute to global climate change mitigation efforts, but also ensure that appropriate levels of adaptation and sustainable development of rural livelihoods are achieved, in line with the objectives of the Nairobi Framework and those being set within the negotiation process, under the aegis of the UNFCCC.
4. There is large potential in the agriculture, land use, land use change and forestry sectors of developing countries, for generating emission reductions and associated financial flows from the carbon market that are of great relevance to world food security, the livelihoods of the rural poor and the provision of environmental services.

A. GREENHOUSE GAS EMISSIONS, ADAPTATION AND MITIGATION

5. Annual anthropogenic emissions of greenhouse gases (GHGs) from all human activities are currently about 50 billion tonnes of carbon dioxide (CO₂) equivalents per year (Table 1), the majority of which are from non-agriculture/forestry sectors in developed countries. Roughly one-third of global emissions are from agriculture, Land Use, Land Use Change and Forestry (LULUCF).

Table 1: Annual anthropogenic greenhouse gas emissions.

	2005		2030
	Giga tonne CO ₂ e	% of total	Giga tonne CO ₂ e
World Total	50		65-75¹
Agriculture	5-6	10-12%	7-9*
Methane	(3)		
N ₂ O	(2-3)		
Forest	8-10	16-20%	8-10**
Deforestation	(5-6)		
Decay and Peat	(3-4)		
TOTAL	13-16	26-32%	15-19

¹ Emissions assume a range of socio-economic scenarios based on projected population and economic growth. The emissions given herein are the mid-range of a number of plausible scenarios (IPCC AR4, WGIII SPM). (*) Assuming the same share in 2030 as in 2005. (**) Assuming deforestation rates in 2030 are the same as in 2005. Source: Intergovernmental Panel on Climate Change (IPCC) AR4 WGIII

6. In order to avoid dangerous anthropogenic interference with the climate system in coming decades - i.e., in order to limit expected warming to levels that do not endanger ecosystem processes and human development - stabilization of atmospheric GHG concentrations must be achieved. This requires significant cuts in anthropogenic emissions. How this will be achieved forms part of the current negotiations, under the aegis of the UNFCCC, in follow-up to the Bali Roadmap.

7. A certain amount of climate change is however unavoidable, due to the slowness with which the climate system will respond to emission reductions. For instance, stabilizing carbon dioxide concentrations at 450-550 ppm of CO₂¹ is expected to be associated with warming of between 2-4°C by the end of this century. Therefore, adaptation actions to reduce climatic vulnerability of ecosystems, people, and the economy are needed regardless of current and future agreements on emission reductions. In this context, it is imperative to protect the livelihoods and safeguard the food security of the rural poor in many developing countries, who are expected to be the most vulnerable under climate change.

8. Emission reductions are nonetheless necessary and urgent. In fact, the earlier mitigation measures are implemented, the lower the likely impacts in future decades. The degree of mitigation to be undertaken depends on scientific information about potential impacts, as well as on the expectation that implementation costs paid now will be less than the benefits achieved in future decades. To this end, a realistic yet very challenging scenario, identified by UNFCCC and consistent with IPCC estimates, will guide the international response to climate change. Under this scenario, emissions would be allowed to rise by a reduced rate until 2030, with significant cuts implemented in the following decades. This would require cutting GHG emissions in 2030 to current levels, corresponding to annual cuts of 15-25 billion tonnes of CO₂e, or roughly 20-30 percent of the emissions expected in 2030, if no mitigating action is taken. (Table 1).

¹ Current atmospheric concentrations are 380 ppm (parts per million), and growing about 0.5 percent annually.

B. ADAPTATION AND MITIGATION COSTS RELEVANT TO AGRICULTURE AND FORESTRY

9. Adaptation and mitigation activities require investment and financial flows that are additional to those normally carried out. It is estimated that the global annual cost of climate change mitigation in 2030 would be US\$250-380 billion (Table 2). About half of this amount would be needed in developing countries. More specifically, about one-half of the expected mitigation costs and almost all of the adaptation costs in developing countries are expected in economic sectors relevant to the rural poor.

10. The total bill necessary in 2030 to protect the livelihoods of the rural poor in developing countries under climate change is estimated to be in the order of US\$83-127 billion per year, or about one-third of global costs. Specifically, US\$55-65 billion will be needed for mitigation options in the agriculture, land use, land use change and forestry sectors. This includes costs for achieving emission reductions from avoided deforestation, forest management and afforestation/reforestation (A/R); as well as from enhanced agro-forestry and grassland/rangeland management, as well as improved methane and N₂O management (fertilizer and livestock management).

11. Adaptation costs needed to cushion the rural poor from the impacts of climate change are between US\$28-67 billion per year. They are likely to be underestimates, since they include only a limited set of possible response actions, such as adapting some production and processing activities, research and development, improving water supply; fighting diarrhoeal disease, malnutrition and malaria; safeguarding low-lying coastal areas; and upgrading infrastructure.

12. It is important to note that the expected mitigation potential in the agriculture, land use, land use change and forestry (LULUCF) sectors in developing countries is significant - making this sector nearly carbon-neutral - and cost-effective. Mitigation actions relevant to rural livelihoods by means of agriculture and forestry projects in developing countries may cost about one-fourth to one-third of total mitigation in all sectors and regions, but they generate one-half to two-thirds of all estimated emission reductions. In particular, the potential cost-effectiveness of projects that focus on avoided deforestation and degradation (REDD) is very high. Therefore enhanced climate policies relevant to the rural poor should focus not only on their adaptation needs, but also on their significant potential to contribute to, and tap into global carbon markets.

13. Agricultural and forestry activities that preserve or enhance carbon sinks do, however have several distinctive characteristics that must be taken into account: saturation over time of carbon sequestration in vegetative biomass and soils and the potential of reversibility, or re-release back into the atmosphere of sequestered carbon through natural or man-made disturbances. Leakage refers to GHG emissions that may occur outside the project boundaries. Saturation, reversal or leakage risks need to be taken into account when calculating mitigation potential. Technical calculations for agriculture and forestry are complex and more work is need in this area.

Table 2: Annual investment and financial flows needed for mitigation and adaptation in developing countries in 2030, with attention to sectors relevant to the rural poor

	Mitigation US\$ billion *	Adaptation *	TOTAL	2030 Reductions G tonne CO ₂ e
Global Costs	200-210	50-170	250-380	15-25
Developing Countries	90-100	30-70	120-170	
Rural Livelihoods				
Agriculture	28	4	32	1.0-1.5
Methane, N ₂ O	(13)			(0.5)
Agroforestry	(15)			(0.5)
Soils	--			(0.5)
Food Production and Processing		(5)		
Water Supply and Infrastructure		9	9	
Malnutrition and Health		5	5	
Coastal Zones		5	5	
Infrastructure		2-41	2-41	
Forests	21	2	23	10-12
Deforestation	(12)			(5-6)
Forest Management	(8)			(5-6)
A/R	(.5)			
R&D	5-10	1	6-11	
TOTAL	55-60	28-67	83-127	11-13.5

(*) 2005 US\$. Source: UNFCCC 2007; IPCC AR4 WGIII.

C. FINANCIAL MECHANISMS AND THE RURAL POOR

14. The expected costs for climate change adaptation and mitigation in sectors relevant to the rural poor in developing countries is estimated to be roughly US\$100 billion per year in 2030. Although US\$100 billion is only a relatively small share (3-5 percent) of the projected agricultural gross domestic product (GDP) in 2030, it would represent a 15 percent increase in investment and financial flows directed towards the agriculture and forestry sectors in developing countries in a scenario without climate change (Table 3). It is noteworthy that these additional climate change costs would exceed foreign debt by a factor of three, and would be about 15 times the projected total investment and financial flows directed towards the agriculture and forestry sectors in developing countries from combined foreign direct investment (FDI), overseas development assistance (ODA), bi-lateral and multilateral aid sources.

15. Financial incentives are therefore needed to bridge the gap created by these additional costs of climate change. For example, the creation of enhanced carbon markets could be considered that encourage farmers and rural communities in developing countries to adopt GHG reduction strategies, combining carbon sequestration, rural development and improved ecosystem resilience and services. This might involve such activities as REDD projects, sustainable forest management and agro-forestry, improved agricultural practices that reduce non-CO₂ GHGs including improved livestock manure management systems, improved fertilizer and input management for crops, and generally

a wide set of land and water conservation practices that lead to increased carbon sequestration in soils, while enhancing agricultural and forestry systems productivity and resilience to climatic shocks. Bioenergy production from either waste products or grasses also have potential for mitigation by displacing equivalent amounts of fossil fuels, in addition to poverty reduction potential through increased demand of land-based products and diversification of incomes.

Table 3: Comparison of expected climate change annual costs in 2030 and business-as usual monetary flows.

	2005	2030
	US\$ billion	
World GDP	30,000	60,000
Agriculture GDP	1,200	3,000
Agricultural Investment	175	750
International Debt	(9)	(35)*
FDI, ODA, other	(2)	(7)*
	--	
Climate Costs for Rural Livelihoods		83-127

Currency is 2005 US \$. (*) Assuming same share as in 2005. Sources: UNFCCC, 2007; Tubiello and Fischer, 2007.

16. Climate-related financial mechanisms currently available include UNFCCC flexible mechanisms, such as the Clean Development Mechanisms (CDM), Joint Implementation (JI), and the Global Environment Facility (GEF) Trust Fund and associated Adaptation Fund(s). In addition, a number of Voluntary Market mechanisms have been established in recent years. Several public and private actors, including carbon funds, contribute to facilitate access to funding, especially for developing countries participants, by targeting capacity building; technology transfer and support; and by helping lower entry costs such as transaction fees by supplying upfront payments for expected emission reductions. They are briefly described in the following sections.

II. UNFCCC FINANCIAL MECHANISMS

17. The Kyoto Protocol of the UNFCCC is the first international climate policy agreement aimed at reducing dangerous anthropogenic interference with the climate system. It establishes a set of emission reductions that developed countries (Annex 1 Parties) must meet in order to limit their overall GHG emissions during the period 2008-2012 - the first Kyoto commitment period - to a level that is on average 5 percent lower than in 1990.

18. Compliance by Annex I countries under the Kyoto Protocol includes the possibility of using emission credits from flexible mechanisms, such as the Clean Development Mechanisms (CDM). This allows investments in climate change abatement projects in developing countries that are parties to the Kyoto Protocol, but without emission commitments - referred to as non-Annex I countries. Another similar mechanism, the Joint Implementation (JI), allows Annex I countries to invest in project activities located in economies in transition countries. Together with a third mechanism, International Emissions Trading, they allow access to lower abatement costs in many developing countries, provided that the project activities proposed contribute to sustainable development of those regions.

19. Another important UNFCCC funding mechanism is the GEF Trust Fund. Funding is available from the GEF for both mitigation and adaptation projects. Over US\$17 billion has been allocated since its inception in 1991 for projects addressing mainly climate change mitigation. Funds available for adaptation under the GEF Trust Fund include the Strategic Priority Adaptation pilots (SPA), the Special Climate Change Fund (SCCF), and the Least Developed Countries Fund (LDCF). More recently, a special Adaptation Fund has been set up that receives funding directly from the sale of 2 percent of the CDM carbon credits.

20. Investment and financial flows for developing countries linked to climate change mechanisms are currently dominated by the UNFCCC CDM market. Under the CDM (and JI) mechanisms, a project activity in a non-Annex I country that results in avoided GHG emissions with respect to a baseline scenario - in addition to those that would have happened in the absence of the project activity - is issued by the UNFCCC with an equivalent number of certified emissions reductions (CERs), each representing one tonne of CO₂. These CER units can then be sold on the carbon market to compliance buyers that represent entities in Annex I countries with reduction needs.

21. Registered CDM projects already generate about 200 million tonnes of CO₂e annually, corresponding to financial flows of US\$2 billion per year, at current carbon prices of US\$10 per tonne of CO₂. It is expected that current and future CDM projects would result in financial flows of US\$10-15 billion per year during 2008-2012, assuming average carbon prices of US\$25 per tonne of CO₂ (Table 4). In addition, according to the UNFCCC, investments associated with current CDM projects total about US\$25 billion, half of which comes from private domestic sources. Assuming a ten-year CDM project cycle, this translates into investment flows of US\$2.5 billion per year. However, as the UNFCCC does not estimate future investment flows related to the CDM, these additional flows will not be considered further. Nevertheless, these rough calculations indicate that the estimated total monetary "benefits" from the CDM would increase by 15-25 percent if these investment flows were included.

22. Further analysis of currently registered CDM projects indicates that project activities of relevance to the rural poor - i.e., activities focused on the relevant agriculture and forestry sectors, including energy generation from biomass - correspond to about 10 percent of the CDM market. As a result, CDM-related financial flows in agriculture and forestry in developing countries are currently US\$200 million per year, and are likely to reach US\$1.0-1.5 billion per year during the first commitment period of 2008-2012.

23. Investment and financial flows related to the UNFCCC JI mechanisms are currently much smaller than those going to the CDM. The same applies to the GEF Trust Funds. Total contributions from GEF since 1991, including leveraged funding from the private sector, result in flows of about US\$1 billion per year for all sectors. Funding for the GEF Adaptation fund should add another US\$200-300 million per year during the first commitment period.

Table 4: CDM, GEF Financial Flows, Adaptation Fund, and underlying emission reductions

	Current	2008-2012	2030 (low)	2030 (high)
US\$ billion per year				
All sectors CDM	2	10-15	10-15	100-150
GEF Trust Fund		1		
Agriculture and LULUCF	.2	1.0-1.5	1.0-1.5	10-15
GEF Adaptation Fund	.04	0.2-0.3	0.2-0.3	2-3
Million tonnes CO ₂ e per year				
All sectors	200	400-600	400-600	4000-6000
Agriculture and LULUCF	~20	40-60	40-60(*)	400-600(*)

Currency is 2005 US\$; (*) Assumed share of agriculture & forestry projects is the same as in 2008-2012. Source: UNFCCC, 2007.

24. How do the projected UNFCCC funds compare to climate change adaptation and mitigation needs of the rural poor in developing countries? Investment and financial flows in 2030 were projected by UNFCCC under two distinct scenarios (Table 4). The first is a “low” compliance scenario, which assumes that the 2030 demand for CERs remains at 2008-2012 levels. The second is a “high” compliance scenario, which assumes that demand for CERs in 2030 will increase up to ten-fold compared to 2008-2012 levels, i.e., 4-6 billion CERs per year. The latter implies full commitment by all Annex-I parties - including Australia and the USA - and none by non-Annex I parties, including China and India.

25. Therefore, in 2030, CDM project activities of relevance to the rural poor in developing countries—including agriculture and the LULUCF sectors, plus energy from biomass waste - could therefore generate annual financial flows of about US\$1.0-1.5 billion and up to US\$10-15 billion in the event of full post-2012 Kyoto compliance. Such funding through the carbon market corresponds to 2-25 percent of the total mitigation needs estimated previously for relevant sectors in agriculture and LULUCF. Annual investment flows in 2030 from the GEF Adaptation Fund could be US\$200-300 million, and up to US\$2-3 billion, corresponding to 3-10 percent of the total adaptation needs for the rural poor in developing countries.

26. There is consequently a significant gap between the level of funding needed for adaptation to and mitigation of climate change in sectors relevant to rural livelihoods, and the carbon funding currently available under UNFCCC flexible mechanisms.

III. THE CLEAN DEVELOPMENT MECHANISM AND THE RURAL POOR

A. PROJECT ACTIVITIES IN AGRICULTURE, FORESTRY AND ENERGY FROM RENEWABLE BIOMASS

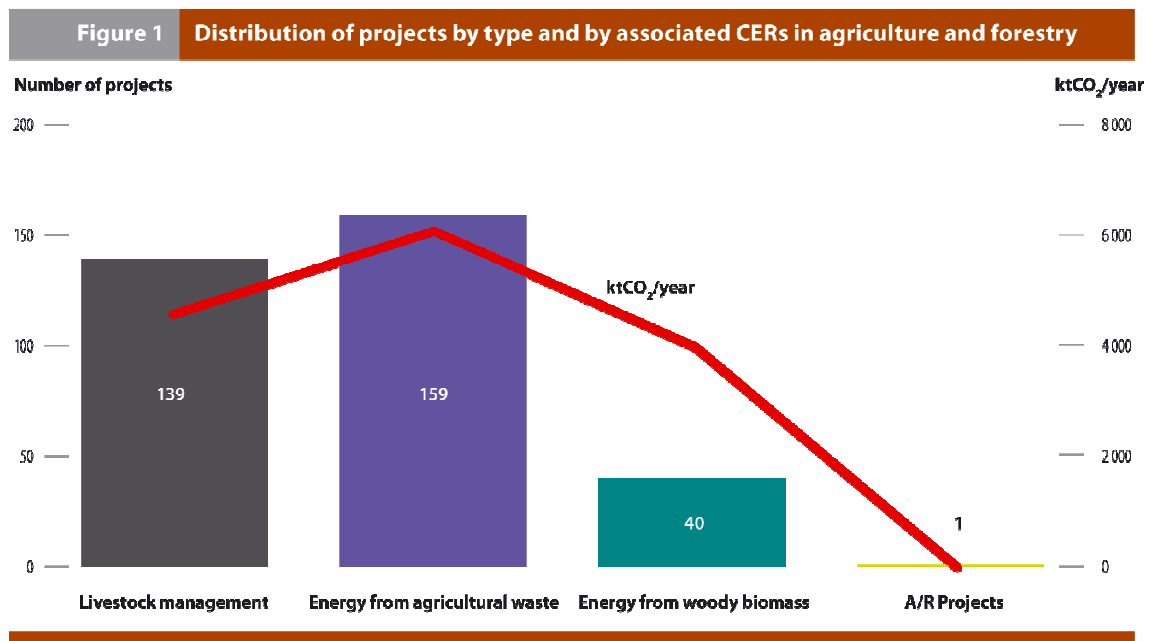
27. Project activities under the CDM relate to a broad range of sectors and regions where carbon offsetting is possible. To date, CDM projects of relevance to poor rural communities have largely focused on the agriculture and forestry sectors, including

renewable energy from biomass waste or captured biogas from animal manure management systems. The CDM and JI financial mechanisms have not yet covered climate change response activities in the areas of fisheries and coastal zone management.

28. Out of a total of 974 projects currently registered by UNFCCC², 339 registered projects - over a third of the total - are either undertaken in agriculture and forestry sectors directly, or focus on a renewable energy process in agro-industry. These 339 projects are expected to generate annually 16 240 000 CERs, or slightly over 8 percent of the 197 113 607 CERs generated annually by all CDM projects until 2012.

29. Only some of the CDM activities surveyed - for instance new technology for recovery of farm-generated methane, or forest restoration in watersheds - are directly linked to on-farm or forestry activities relevant to the rural poor. Others, such as renewable energy projects utilizing residues from either agro-industry or farm production, have a more indirect link to rural livelihoods. The more indirect benefits accruing to the poor are dependent on complex social and market impacts on rural communities.

30. Only 41 of the total 339 CDM projects analyzed, slightly more than 12 percent, are related to the forestry sector. Of these, 40 projects are in renewable energy from woody biomass, and one in the afforestation/reforestation (A/R) sector (see Figure 1 below).



31. The large majority of these 339 CDM projects are related to the agricultural sector. They comprise 298 projects, or about 88 percent of the total considered herein, and generate about 75 percent of total CERs. They focus largely on two sets of activities, i.e., methane capture in improved animal manure management systems and bioenergy production from agricultural biomass waste.

32. The geographic distribution of the 339 CDMs relevant to rural livelihoods is extremely skewed towards a few regions and a few countries within those regions. Together Latin America and Asia host 335 of the total CDM projects currently registered - over 98 percent of the total, and account for 98 percent of total CERs generated (Figure

² The 1000 CDM project mark was surpassed in mid March 2008.

2 and Table 5). Three countries - Brazil, Mexico and India - contribute 264 projects, or more than three-quarter of the total, which generate over 60 percent of total CERs. With the addition of China and Malaysia³ to these three countries, their total becomes well over 80 percent of all CERs generated in agriculture and forestry activities. Africa and the Near East are underrepresented regions. Out of the roughly US\$180 million CDM annual income in developing countries, from activities relevant to rural livelihoods, only about US\$2.6 million reach sub-Saharan Africa (Table 6).

Figure 2: Geographic distribution of registered CDM projects in agriculture and forestry

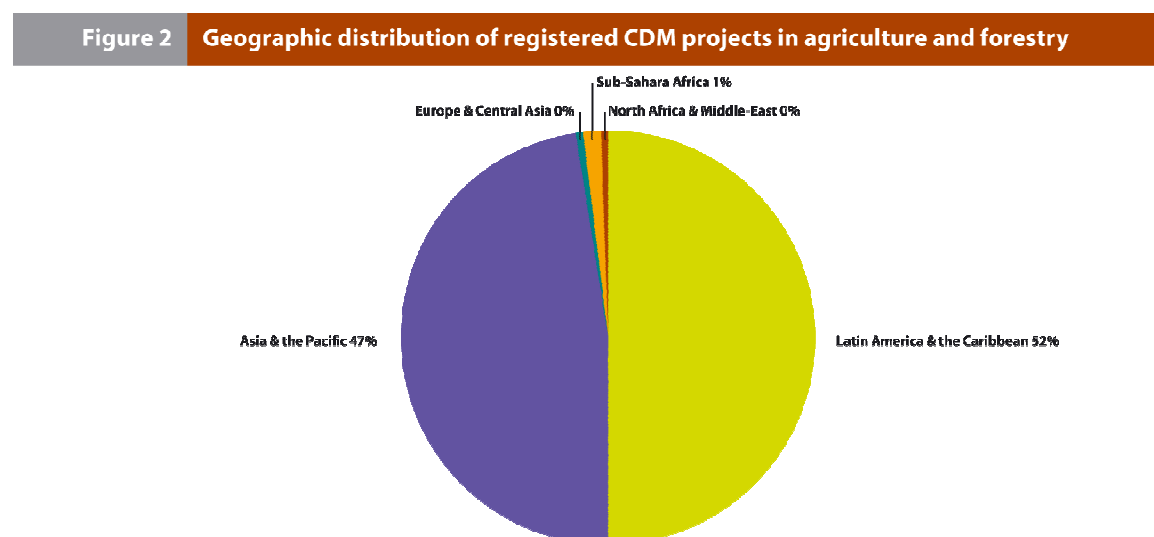


Table 5 : Registered CDM project activities of relevance to rural livelihoods

Countries/Regions	Projects	ktCO ₂ /yr
Latin America & the Caribbean	174	7 259
Brazil	67	3 679
Mexico	85	2 284
Asia & the Pacific	161	8 651
China	10	1 361
India	112	4 315
Malaysia	14	1 884
Europe & Central Asia	1	63
Armenia	1	63
Sub-Saharan Africa	2	241
South Africa	2	241
North Africa & the Middle East	1	27
Total	339	16 240

Source: UNFCCC database.

³Together these two countries have a total of only 24 projects in the agriculture and forestry sector. However the CERs they generate per project are the highest, about 135 kt CO₂e/yr/project, compared to 54, 28 and 36 kt CO₂e/yr/project for Brazil, Mexico and India, respectively.

Table 6: Financial flows through the CDM to agriculture and forestry - registered projects

Regions	ktCO ₂ /yr	Annual financial flow (\$1000)
Latin America & the Caribbean	7 259	79 849
Asia & the Pacific	8 651	95 161
Europe & Central Asia	63	693
Sub-Saharan Africa	241	2,651
North Africa & Middle-East	27	297
Total	16 240	178 640

Average CER price used US\$ 11 (UNFCCC 2007).

B. OBSTACLES TO ACCESSING THE RESOURCES OF THE CDM

33. A number of obstacles and problems currently reduce access of the CDM funding mechanisms to the rural poor, resulting in uneven distribution of projects across regions and sectors. With regard to agriculture, land use and forestry, problems can be divided into several broad categories: those related to either administrative or technical bottlenecks that arise from insufficient capacity to understand existing methodologies, or to develop new ones to cover relevant activities allowed under the CDM, insufficient capacity to utilize funds and markets for improved access in many developing countries, and problems related to insufficient sector coverage under current CDM procedures. In this last category, it is most pertinent that LULUCF activities, which have significant mitigation potential and are closely related to the livelihoods of the rural poor, are currently excluded from the CDM. If the scope of the CDM could be enlarged to include LULUCF activities, it could generate high levels of CERs that would enable rural communities to have access to new and significant financial flows.

Few project types and approved methodologies for project development

34. The scope of mitigation measures currently implemented under the CDM is quite narrow. It mainly covers project activities in animal waste management and biomass residue use for renewable energy production. In addition, there are only a few approved methodologies for project activities in the agriculture and forestry sectors relevant to rural livelihoods. Their range could be usefully expanded so as to benefit agricultural activities at farm-level. In fact, there is a broader range of activities with the potential to reduce GHG emissions in the agricultural sector than is currently the case under the CDM⁴. For example, reduced enteric fermentation, reduced agrochemical inputs and machinery use, increased irrigation efficiency and improved agronomic management, including agroforestry are cases in point (Table 7). Time and resources should be directed towards developing new methodologies. Greater attention should be given to formulating and implementing project activities that reduce emissions of nitrous oxide from soils and methane emissions from enteric fermentation and rice cultivation.

⁴ Soil carbon sequestration in agricultural soils has significant potential, but it involves largely LULUCF activities that are not allowed - with the exception of A/R projects - under the first phase of the Kyoto Protocol.

Table 7: Approximate shares of non-carbon dioxide GHG from management operations

Emission source	Share of total emissions (percentage)
N ₂ O from soil	45.5
N ₂ O from manure management	3.5
CH ₄ from enteric fermentation	30.5
CH ₄ from manure management	3.5
CH ₄ from rice cultivation	10.5
CH ₄ from other sources	6.5

Source: UNFCCC, 2007.

Fragmented project counterparts

35. Another major obstacle to project activities of importance to the rural poor, under CDM, is their small scale and high fragmentation levels over large areas. Because transaction costs of CDM projects are high, aggregation of many players and regions is required to generate emission reductions that are large enough to ensure project viability and attractiveness to compliance buyers. The new “programmatic CDM” tool, discussed below, may facilitate such aggregation needs. Other innovative ways of aggregating should also be sought.

Country risks and underdeveloped financial markets

36. Most developing countries do not have clear policies, nor do they have large and sophisticated financial markets. Project activities in such environments may be perceived by some foreign private investors to have high levels of risk. Such risks include political instability, low economic growth, unclear government policies and leadership, bureaucracy, corruption, opaque tax regimes and a lack of readiness to embrace change. The following factors have been identified as having a negative impact on the implementation of CDM project activities.

Lack of capacity in human, institutional and financial

- CDM projects must use an approved methodology and be validated by an accredited designated operational entity (DOE). CERs are issued by the CDM Executive Board only after the emission reductions achieved have been verified and certified by an accredited DOE. Thus a CDM project incurs costs (validation of the project) before it can be registered, and further costs (certification of the emission reductions) before CERs are issued.
- Lack of capacity by regulators to mainstream climate mitigation into their national agenda and structures is perceived as a principle barrier to CDM project activities. As a prerequisite for participation in the CDM financial mechanism, non-Annex I countries must have a designated national authority (DNA) in place, and have completed a national strategy study on their greenhouse gas emissions. Thus far, 33 non-Annex I Parties have not yet established a national CDM authority. In the case of Africa, 47 of its 53 countries have ratified the Protocol, yet only 35 have DNAs, and only seven a registered project under the CDM. Moreover, 68 developing countries have still had no experience in the CDM.
- Lack of capacity at stakeholder level is also a major obstacle. Accessing financing through the CDM is a complex process; it is difficult for a potential project owner to develop a project idea without external support. Financial support where there

is a lack of capacity does not yet exist. The UNFCCC plans to launch a review of capacity building needs in 2008.

- There are high transaction costs, which reach up to US\$100 000 per CDM project. Consequently, large emission reductions are necessary to keep transaction costs per unit CER low. For developing countries, specific tax incentives may be needed to lower transaction costs and facilitate entry into the carbon market. On the other hand, developing efficient monitoring methodologies for projects aggregating many small activities creates additional challenges to project participants.

37. All of these factors have severely limited participation in the CDM by some countries and have led to a limited number of countries playing a dominant role, as mentioned above. They also tend to be an obstacle to participation for smallholder farmers or their organizations.

C. APPROACHES TO INCREASE ACCESS TO CARBON MARKETS

38. The growing realization that most developing countries, and the poor rural communities within them, face serious problems in identifying and implementing CDM projects has brought about a number of initiatives to promote and foster CDM capacity building. The core objective of these initiatives is to identify approaches that minimize transaction costs, remove CDM-related barriers, and facilitate efficient and equitable CDM distribution. Their core activities include: workshops and training sessions for DNA staff, potential project developers, national CDM experts and other stakeholders; preparation of analytical work such as guidebooks, market analysis and research; (promotion activities including organization/participation in carbon events; and facilitation of information management, including web-based tools (Hinostrroza, 2008). Further simplification and streamlining is needed if access is to be broadened and deepened.

The Nairobi Framework

39. The single most important initiative to catalyze CDM access has been The Nairobi Framework⁵, initiated by the United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP), World Bank Group, African Development Bank, and the UNFCCC with the specific target of helping developing countries, especially those in sub-Saharan Africa, to improve their level of participation in the CDM (Table 8).

Africa-Assist: A special effort for Africa

40. Recognizing that African countries lack supportive national CDM approval systems, have high transaction costs and risks, and are largely bypassed in favor of larger transactions in middle-income countries, a consensus has emerged to ensure an equitable share of benefits from carbon finance mechanisms in Africa. The Carbon Finance Unit of the World Bank launched Africa-Assist in 2006 in order to better address these issues.

⁵ http://cdm.unfccc.int/Nairobi_Framework/index.html

Table 8: Key Initiatives under the Nairobi Framework.

Program	Donor/executive agency	Capital, US \$ million	About the program
CD4CDM	UNEP, funded by Dutch government	12.5	Capacity Development for CDM; 12 countries Phase I + 8 countries Phase II; completion in 2009
CF-SEA (Sustainable Energy in Africa)	World Bank Carbon Finance Unit	1	Five countries; jointly with World Bank's CDCF; completed
CD for MEA	European Commission	4	APC countries; planned to start in August 2008
Danida CDM Green Facility in Africa	Danish government	1	6 countries in Africa
East Africa CDM Capacity Building	UNDP-UNEP	1.7	-
CASCADE Project	UNEP GEF	3	Carbon Finance for Agriculture, Sylviculture, Conservation and Action against Deforestation; Francophone countries
UNFCCC CDM Bazaar	UNFCCC UNEP	-	Hosting and management; platform for CDM info exchange

Source: Hinostroza (2008)

41. In order to achieve its goals, Africa-Assist focuses on four fields of activities, including:

- strengthening institutional capacity;
- engaging the financial and private sectors;
- scaling-up project pipeline and deal flow;
- creating knowledge and awareness.

42. Africa-Assist consists of a six-month preparation phase followed by a five-year active implementation phase, with a core focus on facilitating CDM project development. Similarly, a two-year partnership programme of the World Bank, UNEP and the UN Foundation will help to build capacity in government agencies and intermediaries as well as support local NGOs and entrepreneurs to develop and transact CDM projects.

43. The results of the programme so far are as follows:

- over 1500 stakeholders exposed to training programmes and events;
- nearly 50 CDM projects in various stages of development in Sub-Saharan Africa;
- focus on development of the forestry sector in Madagascar and Senegal;
- 23 African countries assisted with participation in 2007 Carbon Expo, including 16 exhibitors;
- institutional strengthening in Botswana and The Gambia (Carbon Finance Assist, 2008).

44. The next Priorities for Africa-Assist include:
- extend assistance to Cameroon, Mauritania, Sierra Leone, Liberia, Angola and Ethiopia;
 - strengthen collaboration with partners: Nairobi Framework, bilateral and regional partners and Africa Carbon Fund for Biofuels and Renewable Energy;
 - promote regional centres of excellence;
 - address emerging topics of programme of activities (POA) and sector focus;
 - develop innovative delivery mechanisms: e-modules, and distant learning.

D. CARBON FUNDS

Adaptation and Mitigation Funds for the Rural Poor

45. Several funds focus on poverty alleviation in developing countries, while providing financing for climate change adaptation and mitigation activities. Two of these (as mentioned in section II) are managed under the GEF Trust Fund: the Least Developed Countries Fund (LDCF) and the Special Climate Change Fund (SCCF), providing grants for urgent adaptation projects in developing countries. The World Bank administers two additional funds: the Community Development Carbon Fund (CDCF) and the BioCarbon Fund (BioCF), designed to direct financial resources to mitigation activities that also bring multiple environmental and social benefits to rural communities in developing countries. The capital of these funds amounts to US\$470 million.

46. In addition to the BioCF and the CDCF, the World Bank administers funds that purchase CERs from mitigation projects in developing countries and countries with economies in transition. Some of the funds, such as the Umbrella Fund and the Carbon Fund for Europe, have multiple contributors, comprising governments as well as private entities. Other funds are designed to meet compliance needs of a particular country - e.g. the Netherlands CDM Facility and the Spanish Carbon Fund. These funds seek to contribute to sustainable development in developing countries, but they do not explicitly target poverty alleviation, nor do they require additional social or environmental benefits from purchased CDM projects.

47. The resources accumulated through the World Bank funds can be sizeable. For instance, the Umbrella Carbon Facility has a purchasing agreement with two projects in China totalling US\$250 million. This level of funding and this project type do not, however, guarantee sustainable development per se - in fact, equivalent funding levels may have made a greater contribution to poverty alleviation and development assistance, if allocated instead to diverse projects within the BioCarbon Fund (see paragraph 56 below) and the CDCF in poor regions of participating developing countries. These two funds amounting to about US\$220 million currently support more than 40 projects.

Table 9: Carbon funds managed by the World Bank

Carbon funds	Capital (million US\$)
Prototype Carbon Fund	180
BioCarbon Fund	92
Forest Carbon Partnership Facility	300
Community Development Carbon Fund	129
Carbon Fund for Europe	75
Umbrella Carbon Facility	Resources from other funds and additional sources
The Netherlands CDM Facility	200
The Netherlands European Carbon Facility	60
Italian Carbon Fund	15
Danish Carbon Fund	90
Spanish Carbon Fund	255

Source: www.carbonfinance.org

48. Finally, the GEF Trust Fund, under the GEF 4 replenishing period, will focus on mitigation in the LULUCF sector as one of six strategic priorities for funding. In addition, the GEF is proposing a cross-cutting strategic programme on sustainable forest management (SFM) that will draw from biodiversity, and land degradation, as well as climate change focal areas.

The Least Developed Countries Fund

49. The LDCF, as noted in section II, is designed to support projects addressing the urgent and immediate adaptation needs of the LDCs as identified by their national adaptation plans of action (NAPAs). The LDCF contributes to the enhancement of adaptive capacity to address the adverse effects of climate change, including, as appropriate, in the context of national strategies for sustainable development. Priority sectors that are expected to receive the most attention under the NAPA and to be eligible for financing include: water resources, food security and agriculture, health, disaster preparedness and risk management, infrastructure and natural resources management.

50. The capital pledged to the Fund amounts to US\$173 million. Allocations of US\$30 million have been made for 10 approved NAPA implementation projects. Co-financing of these projects amounts to US\$63 million.

The Special Climate Change Fund

51. The Special Climate Change Fund (SCCF) was established in 2001 to finance activities related to climate change in developing countries and is operated by the GEF. Adaptation activities to address the adverse impacts of climate change have top priority for funding and include: water resources management; land management; agriculture; health; infrastructure development; fragile ecosystems, including mountainous ecosystems, and integrated coastal zone management. Technology transfer and its associated capacity building activities are encouraged under the SCCF. Activities to be funded should be country driven, cost-effective and integrated into national sustainable development and poverty-reduction strategies.

52. The total amount pledged to date is US\$75 million. Nine projects have been approved under the SCCF, totalling about US\$34 million.

The Community Development Carbon Fund

53. The Community Development Carbon Fund (CDCF) provides carbon finance to projects in poor regions of developing countries that would otherwise find it difficult to attract carbon finance because of country and financial risk. CDCF support projects measurably benefit poor communities and their local environment. What distinguishes the CDCF from other funds of the World Bank is the overarching requirement for its supported projects to generate community benefits, in addition to generating GHG emissions. Community benefits may include: a focus on clean water, improved health conditions, enhanced job opportunities for women.

54. The CDCF is a public/private initiative designed in cooperation with the International Emissions Trading Association and UNFCCC. Nine governments and 16 corporations/organizations are participating. It became operational in March 2003 with US\$129 million for the first tranche. Additional resources have been mobilized to support technical assistance, capacity building, and project preparation. A quarter of the CDCF resources are to be invested in projects located in priority countries, including: a) World Bank's International Development Association (IDA) list of countries; b) countries commonly referred to as "IDA blend" with a population of less than 75 million; and c) countries designated as Least Developed Countries (LDCs) by the United Nations.

55. As of March 2008, the CDCF had purchased 8.5 million CERs for a value of about US\$70 million. The current CDCF pipeline comprises over 44 projects, representing a potential value of over US\$159 million. Six of the CDCF projects are related to agriculture. Three of them comprise the establishment of new technology for manure treatment in China and Nepal. The other three, located in Colombia, Guyana and Uganda, utilize agriculture residues for energy generation. There are no projects related to afforestation and reforestation.

The BioCarbon Fund

56. The BioCarbon Fund provides carbon finance for projects that sequester carbon in forests, agricultural soils and other ecosystems. The World Bank has mobilized the Fund to demonstrate how LULUCF activities can generate high-quality emission reductions while promoting biodiversity conservation and poverty alleviation. The fund also aims at delivering carbon finance to many developing countries or to countries with economies in transition that otherwise have few opportunities to participate in the flexible mechanisms of the Kyoto Protocol.

57. The Fund is composed of two phases: Tranche One started operations in May 2004, has a total capital of US\$54 million; Tranche Two began in March 2007 with a total capital of US\$38 million. It is a public/private initiative administered by the World Bank. For Tranche One, four governments—Canada, Italy, Luxembourg and Spain - and ten private entities from Japan and France have contributed to the fund. The second Tranche involves Ireland and Spain, as well as five entities from the private sector. The Fund can consider purchasing carbon from a variety of land use and forestry projects; the portfolio includes Afforestation and Reforestation, Reducing Emissions from Deforestation and Degradation (REDD). Innovative approaches to agricultural carbon are under consideration.

58. The purchasing policy of the BioCarbon Fund pays special attention to the environmental and social features of the projects it purchases. Projects are selected in terms of both social criteria: ability to improve livelihoods; carbon payments to

communities; new job creation; additional income from alternative activities; and improved know-how and environmental criteria: ability to conserve biodiversity; expand natural habitat; reconnect forest fragments; protect against soil erosion; fight against desertification; and improve moisture retention.

IV. VOLUNTARY FINANCIAL MECHANISMS

59. The voluntary carbon markets include all carbon offsets that are not required by regulation. Voluntary market transactions include purchase of carbon credits by individuals or institutions at a retail level to offset emissions; by project developers for retirement or resale; and the donation to GHG reduction projects by corporations in exchange for credits. At the broadest level, the voluntary carbon markets can be divided into two main segments: voluntary but legally binding cap-and-trade systems, such as the Chicago Climate Exchange (CCX), and the broader non-binding, over-the-counter (OTC) offset market (Hamilton, *et al.* 2007).

A. THE CHICAGO CLIMATE EXCHANGE (CCX)

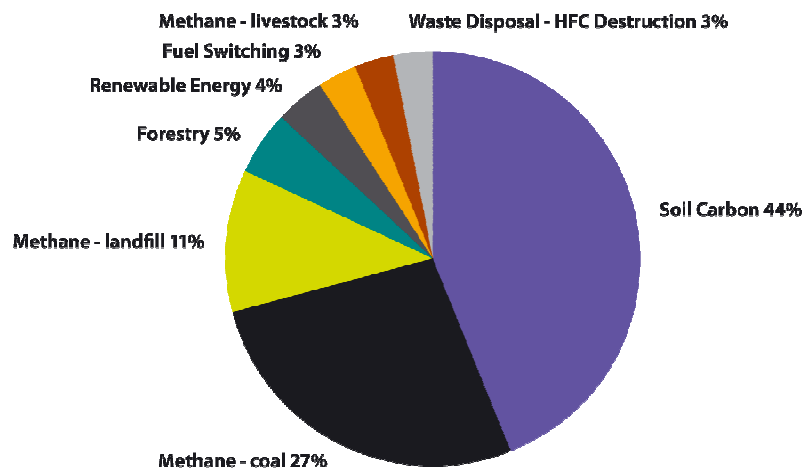
60. The CCX is a voluntary, legally binding, rule-based greenhouse gas emission reduction and trading system based in North America. Members voluntarily join the CCX and sign up to annual emission reduction goals. These were set at 4 percent below baseline for 2006 and 6 percent below baseline by 2010, the baseline being 1998-2001 emissions of the CCX members. The commodity traded at CCX is the Carbon Financial Instruments (CFIs), each of which represents 100 tonnes of CO₂ equivalent. CFI contracts are comprised of Exchange Allowances and Exchange Offsets. Exchange Allowances are issued to emitting Members in accordance with their emission baseline and the [CCX Emission Reduction Schedule](#). Exchange Offsets are generated by qualifying [offset projects](#), including activities in agriculture and forestry. Importantly, the CCX market is not limited to offset projects in the USA, but is open to credits generated worldwide.

61. Eligible CCX carbon offset activities with relevance to agriculture and rural livelihoods in developing countries are carbon sequestration in soils and methane capture and flaring - from animal waste management systems - for renewable energy. Specifically, credits from soil carbon sequestration projects issued since 2003 total 11 million tonnes of CO₂e⁶, and represent the majority of all offset types under the CCX (Fig. 3; Table 10). They comprise conservation tillage and pasture conservation projects. By contrast, methane recovery from livestock manure management systems accounted for 3 percent of all emission offsets. Allowed CCX Forest carbon offset categories of relevance to rural livelihoods in developing countries include Afforestation and Sustainable Forest Management. Almost 1.5 million tonnes of CO₂e in forestry offsets have been issued to date, representing 4 percent of all CCX credits.

⁶ Carbon Dioxide Equivalent.

Table 10: CCX Offset credits issued as of Feb 2008

Offset Type	Amount Issued (ktCO ₂ e)
Soil Carbon	11 609
Methane - coal	7 321
Methane - landfill	2 856
Forestry	1 475
Renewable Energy	1 140
Methane - livestock	795
Waste Disposal - HFC Destruction	728
Energy Efficiency	2
Total	26 859

Figure 3 Carbon offset

62. Although CCX project activities can be located worldwide, credits issued so far from international projects are few. For instance, soil carbon and livestock methane projects offsets are all located in the United States and Canada. By contrast, three LULUCF projects were located in Central and South America - specifically in Brazil, Costa Rica and Uruguay.

Box 1: Example of forestry offset projects in the CCX

Costa Rica

The Swiss-based company Precious Woods has reforested about 4,600 hectares of formerly degraded pasture in Costa Rica. The company is the registered owner of all land. Planting is performed in compliance with the environmental and social criteria of the Forest Stewardship Council (FSC). The selected tree species are teak (72 percent), pochote (21 percent) and other native species (7 percent). In 2006, the project generated 221 700 metric tons of offsets and the first credits were registered at CCX. The World Bank Group has purchased 22 000 tonnes from this reforestation project, in order to offset GHG emissions produced by its operations and business transportation tracked from its headquarters.

Source: www.preciouswoods.com

Financial Flows under the CCX Relevant to the Rural Poor

63. Offset prices at the CCX range from around US\$1.50 to US\$6.00 per tonne of CO₂e, with recent trends showing rising prices in the expectation of a cap and trade system to be implemented in the USA in coming years. Annual carbon offset credits generated in agriculture and forestry in 2008-2012 are expected to be similar to those in 2006, i.e. generating financial flows of over US\$50 million, representing 3-5 percent of the CDM flows for the same sectors (Table 11).

Table 11: Annual financial flows in agriculture and forestry at CCX in 2006

Offset sector	Amount Issued (ktCO ₂ e)	Financial flows (\$1000)
Agriculture	12 404	45 896
Forestry	1 475	5 456
Total	13 879	51 352

Source: Capoor & Ambrosi, 2007.

64. The Chicago Climate Exchange has continually expanded since 2003 in terms of new members embracing voluntary commitments as well as in terms of trade intensity. If it continues to increase in size and adopt, as expected, new emission reduction goals after 2010, its potential for mitigation activities in the agriculture and forestry sectors can be substantial. Foreign projects are expected to play a more important role in future, thereby opening the door to a range of agriculture and LULUCF activities of relevance to the rural poor. In addition, because CDM CERs can be traded within the CCX, an expansion of this market may increase demand for CDM projects supplying offsets from land-based sectors.

B. VOLUNTARY MARKETS

65. Almost all carbon offsets purchased outside of a cap-and-trade system originate from project-based transactions. Their trading typically operates outside of formal exchange mechanisms and is often referred to as a voluntary over-the counter market. Credits in this market, each corresponding to one tonne of CO₂e, are referred to as Verified or Voluntary Emissions Reductions (VERs).

66. At least 13 million VERs were traded in 2006 (Hamilton, *et al.* 2007). The volume-weighted average price of carbon in these markets was about US\$4 per tonne of CO₂e, corresponding to annual financial flows of US\$52 million in 2006. Over 40 percent of the carbon credits that were transacted in 2006 originated from offset projects in North America. Asia and South America generated 22 percent and 20 percent of total VERs, respectively. Africa accounted for 6 percent of the VER market, with about 500 000 tonnes of CO₂e.

67. Carbon offset forestry projects have generated to date a large share of VERs, accounting for about 36 per cent of the market. These projects include avoided deforestation, establishment of plantations, afforestation/reforestation with mixed native tree species, and carbon sequestration activities in new forests (see Table 12 and Box 2 on REDD).

Table 12: VERs transactions in 2006 in agriculture and LULUCF, by project location and type

Offset type	Asia	Africa	North America	Latin America	Total
1. Forestry	19	328	2343	659	3,505
Afforestation/reforestation plantation	18	4	6	193	221
Afforestation/reforestation mixed native	1	308	2,337	157	2,957
Avoided deforestation	0+	16+	0	309	327
2. Agriculture Methane - livestock	28	0	81	1	110

+ More transactions of this type likely exist but information about the volume is not available.
Source: Hamilton, *et al.* 2007.

Box 2: Indonesia eyes 100 Mt of avoided deforestation VERs

In February 2008, USA investment bank Merrill Lynch joined an Indonesian-based avoided deforestation project, which is expected to generate 100 million tonnes of voluntary emission reductions (VERs) over 30 years. The group will work on the validation and sale of avoided deforestation credits as well as official development aid funds to provide financial incentives to Aceh's residents to deliver forest protection. These activities are budgeted at US\$48 million over five years, with US\$26 million earmarked for direct payments to communities. Current funding from the World Bank Multi-Donor Fund's Aceh Environment and Forest project is to be joined in the near future by carbon credit sales under the reducing emissions from deforestation and degradation (REDD) model, as well as from the recently established World Bank Forest Carbon Partnership Facility. The project was recently certified under the Rainforest Alliance Climate, Community and Biodiversity Alliance (CCBA).

68. By contrast, VERs originating from methane recovery at livestock farms are few, with about 110 000 tonnes of CO₂e, or 1.1 percent of the total.

Financial Flows from VERs Relevant to Rural Livelihoods

69. Carbon credits for voluntary purposes are diverse and are not yet a standardized commodity. As a result, the current market is fragmented and there is a lack of reliable data on total financial flows. A survey of Hamilton, *et al.* (2007) identified a large price range of US\$0.5-45 per tonne of CO₂e. Prices vary according to the project type. For example, VERs from avoided deforestation are estimated to range from US\$10-18 per tonne of CO₂e by retailers, whereas credits from afforestation/reforestation with mixed native tree species have been sold with much greater price ranges, from US\$0.5-45 per unit VER. In agriculture VERs from livestock management were sold at around US\$6 per tonne of reduced emissions.

70. Importantly, prices paid by the end user do not reflect the prices paid to project developers. In general, projects owners typically receive half of the retailer price (Neeff, 2007). The year 2006 saw record volumes for the voluntary carbon markets. The volume of VERs sold grew by almost 80 per cent in one year—from about 7 million in 2005 to 13 million VERs in 2006. In 2006, these volumes corresponded to financial flows from forestry and agriculture offsets of US\$10-15 million (Table 13).

Table 13: First-order estimates of financial flows to projects in 2006

Project type	Average retailer price (\$/tCO ₂ e)	Average developers price (\$/tCO ₂ e)	ktCO ₂ e in 2006	Financial flows (\$1000)
Forestry			3 505	12 323
- Plantations	13	6	221	1 326
- Afforestation	6	3	2 957	8 871
- REDD	14	6.5	327	2 126
Agriculture Livestock Manure	6	3	110	330

Sources: Neeff, 2007.

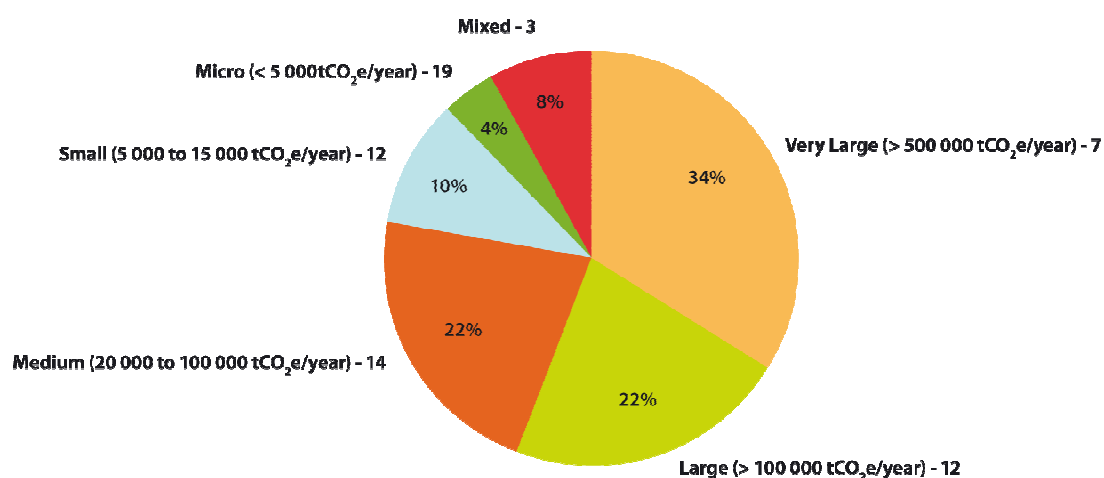
71. The ICF (2007) estimates that the global annual offset demand in 2008-2012 will be 26-76 million tonnes CO₂e annually. Assuming the same share for LULUCF projects as in 2006, and keeping conservatively VER prices at 2006 levels (US\$4 on average), this volume corresponds to financial flows of about US\$40-100 million, or 3-6 percent of the financial flows generated by the CDM in the agriculture and forestry sectors during the same period.

C. LULUCF OFFSETS IN VOLUNTARY MARKETS

72. Compared to the UNFCCC regulatory markets, VERs markets have a higher proportion of forestry based credits out of total market transactions than the CDM (36 percent as compared to 1 percent for CDM), and a slightly higher proportion of credits sourced from Africa (6 percent as compared to 3 percent for CDM). Importantly, they are already providing carbon finance for avoided deforestation projects.

73. The voluntary markets are also more open than the CDM to smaller offset projects. A survey of LULUCF offset projects in 2006 indicates 19 micro size projects, i.e. generating less than 5,000 tonnes CO₂e/year. Indeed, one third of offset credits were by projects generating less than 100,000 tonnes of CO₂e (Fig. 4). This feature currently provides greater opportunities for voluntary markets, compared to the CDM, to contribute to sustainable development in small rural communities.

Figure 4 VER transactions by project volume size in the LULUCF sector (2006)



Source: Hamilton, 2007.

74. The large share of small-scale projects generating VERs is also probably related to the possibility of making up-front payments to project owners, helping them to cover start-up costs. This reduces the development burden on small producers, but also results in payments being made for reductions that have not yet occurred (Peskett, 2006). By contrast, CDM buyers typically purchase credits only after CERs have been generated and verified. Small projects in a VER market are also encouraged by the ability to use simpler methodologies and flexible mechanisms for monitoring and verification. At the same time, this may also limit scaling up such markets, compared to the CDM, since the absence of stringent oversight mechanisms may negatively affect the quality of the VERs produced. In order to reduce such concerns, several independent voluntary standards have been established in recent years, aiming at enhancing the credibility of offset projects (see Box 3 and Table 14).

Box 3: VER Standards

Gold Standard (GS) was developed by a group of environmental and social non-profit organizations to strengthen the social and environmental benefits of carbon offset projects. It can be used for voluntary as well as CDM projects. It has a very well developed stakeholder process and stresses environmental and socio-economic co-benefits for the host communities. It does not yet apply to LULUCF projects.

Climate, Community & Biodiversity Standards (CCBS) focus exclusively on bio-sequestration projects and emphasize the social and environmental benefits of such projects. CCBS is a project design standard and offers rules and guidance for project design and development. It has a very well developed stakeholder process and stresses environmental co-benefits.

Plan Vivo is an offset project method for small-scale LULUCF projects, with a focus on promoting sustainable development and improving rural livelihoods and ecosystems. Plan Vivo works very closely with rural communities, emphasizes participatory design, ongoing stakeholder consultation, and the use of native species.

VER + Standard. Introduced in 2007 by project verifier TÜV SÜD, it is used to certify carbon neutrality as well as credits from voluntary carbon offset projects. The standard is based on CDM and JI methodology.

The Voluntary Carbon Standard (VCS) was launched in 2006 by the Climate Group, the International Emission Trading Association and the World Economic Forum. It focuses on GHG reduction attributes only and does not require projects to have additional environmental or social benefits. The VCS is broadly supported by the carbon offsets industry (project developers, large offset buyers, verifiers, projects consultants).

Voluntary Offset Standard (VOS) is a carbon offsets screening mechanism that accepts other standards and methodologies. It currently accepts Gold Standard VER projects and projects that employ CDM procedures but which are implemented in countries that have not ratified the Kyoto Protocol and are therefore not eligible for CDM. The International Carbon Investors and Services (INCIS) launched the VOS in June 2007. INCIS is a not-for-profit association of large investment companies that provide carbon-related investments and services.

Table 14: Co-benefits requirements for current VER standards

Standard	Environmental requirements	Social Requirements
Gold standard	<p>Must demonstrate environmental benefits.</p> <p>Major negative impacts that cannot be mitigated lead to project disqualification.</p>	<p>The project must demonstrate social, economic or technical development benefits.</p> <p>Major negative impacts that cannot be mitigated lead to project disqualification. Stakeholder consultation required at initial project planning stage.</p> <p>There are specific requirements as to which stakeholders have to be invited actively.</p>
CCBS /only for LULUCF/	<p>Must demonstrate environmental benefits.</p> <p>Major negative impacts that cannot be mitigated lead to project disqualification.</p> <p>Extra points are given for positive environmental impacts such as use of native species and biodiversity protection.</p> <p>Extra points are given for capacity building and use of best practices in community involvement.</p>	<p>Must generate positive social and economic impacts.</p> <p>Stakeholder involvement is required and must be documented. 21-day public commenting period.</p>
Plan Vivo /for LULUCF except commercial forestry/	<p>Must demonstrate environmental benefits. The Standard includes explicit requirements for ecosystem and livelihood benefits and is reviewed periodically.</p>	<p>Must demonstrate social benefits. Projects are required to increase capacity over time and promote extra activities contributing to wellbeing (e.g. micro-enterprises, fuel-efficient stoves etc.)</p>
VCS	<p>Must comply with local and national environmental laws.</p> <p>Does not focus on additional environmental and social benefits.</p>	<p>The project document must include “relevant outcomes from stakeholder consultations and mechanisms for ongoing communication.” (VCS 2007, p. 14)</p>
VER+STANDARD	<p>Negative environment impacts must be stated in the PDD and minimized.</p> <p>Does not focus on additional environmental and social benefits.</p>	<p>Local stakeholder consultation required only:</p> <ul style="list-style-type: none"> - if required by national law of host country; or - if the project proponent cannot demonstrate local impact.
VOS	<p>Same as CDM or GS</p> <p>Does not focus on additional environmental and social benefits.</p>	<p>Same as CDM or GS</p>

Source: Kollmuss, 2008.

V. FINANCING ADAPTATION AND MITIGATION IN COMING DECADES

75. The examples presented in the previous sections summarize the many opportunities that the carbon market offers for project activities that focus on the rural poor in developing countries and their ability to contribute to global climate mitigation while enhancing their adaptation capacity. These opportunities comprise a wide range of options, from international climate policy agreements such as UNFCCC mechanisms to voluntary frameworks.

76. The following sections makes suggestions for improving the current mechanisms, as well as for the inclusion of project activities - within both post-2012 Kyoto flexible mechanisms and enhanced voluntary markets - in sectors of importance to the rural poor, such as avoided deforestation and degradation (REDD) and a wide range of agro-forestry practices, including agricultural land conservation.

A. EXPANDING THE BASE: ENHANCED VOLUNTARY MARKETS AND ENLARGED CDM

77. The Bali Roadmap indicates that actions aimed at safeguarding food security and rural livelihoods under climate change in coming decades must necessarily focus on synergies between adaptation and mitigation strategies for the rural poor—in order to address the climate, environmental, social and economic concerns expressed within both the UNFCCC and MDGs. In particular, a focus on agriculture, land use, land use change and forestry in developing countries offers the opportunity to address these issues from within the dominant economic sectors of most poor developing countries, strengthening their basis for sustainable development.

78. The review of the different existing mechanisms shows that there is scope for enhancing the ability of carbon markets to reach rural poor communities, by both broadening their scope to be more inclusive of agriculture and forestry sectors or LULUCF and making their procedures more flexible. The economic potential for additional carbon sequestration from these sectors - linked to REDD, sustainable forest management, agro-forestry techniques, soil conservation in agriculture and renewable energy from biomass—is substantial, corresponding to 5-10 billion tonnes of CO₂e per year by 2030 at carbon market prices ranging from US\$4-10 per tonne of CO₂e (IPCC AR4 WGIII). Therefore annual financial flows from these offsets could be as high as US\$20-100 billion in 2030, thereby allowing them to make a substantial contribution to meeting the expected costs of adaptation to climate change in developing countries.

79. Many of these activities are currently eligible under a number of voluntary schemes and pilot funds, but are excluded under the CDM, the largest of the existing carbon markets. Allowing credits from REDD, as well as from a range of agricultural and forestry activities, not only provides efficient means for reducing emissions but also has the added value of increasing financial flows to rural poor people in developing countries. In examining the financing mechanisms for a post-2012 regime, these considerations should be taken fully into account.

B. LINKING ADAPTATION AND MITIGATION: PREMIUM CARBON CREDITS

80. Several adaptation activities leading to increased agricultural and forestry system resilience, as well as improved natural resources management and productive practices

may be attractive to carbon markets because of their associated mitigation value. No-regrets, win-win strategies include forestry management and agro-forestry techniques, agricultural “good practices” that conserve soil and water resources; and properly scaled bioenergy projects for rural communities, with potential positive spin-offs in terms of food security, rural incomes and environmental services.

81. A possibility for enhancing the role of several of these land-based projects activities relevant to the rural poor is the development of “premium credits,” i.e. carbon credits generated in projects that not only sequester carbon, but that specifically enhance adaptation capacity through improved ecosystem resilience. On top of likely demand from voluntary markets and carbon funds, a regulated market could be created for post-2012 Kyoto, by requiring compliance buyers to include a fixed percentage of such credits in their portfolios. The resulting higher prices for premium credits, compared to standard offsets, may significantly increase direct financial flows to project participants in rural communities.

C. MAINSTREAMING OFFSETS INTO NATIONAL DEVELOPMENT THEMES, PROGRAMMES OF ACTIVITIES

82. Land-based project activities in rural areas face several barriers to entering the carbon market: high start-up costs; expensive entry fees; insufficient knowledge about project registration cycles; small project scale and fragmentation, etc. In order to provide “economies of scale”, the individual emission reductions of many small project activities will need to be bundled together, so that they become cost-effective and thus attractive to carbon and compliance buyers. In fact, especially with regard to the implementation of large-scale forestry and agriculture projects, including bioenergy for rural communities, bundling of individual projects is a solution that is routinely performed today within the CDM and would be a necessary, yet not sufficient, condition for success. Rather, success on a large scale should be achieved by “mainstreaming” a number of mitigation strategies into regional and national-development policy “themes.”

83. The existing CDM Program of Activities (PoA) provides exactly such a tool. This project category could be used both within UNFCCC funding mechanisms and voluntary schemes, providing a means of linking large-scale, land-based mitigation projects to sustainable development policies. Under the PoA, a policy or market entity - whether a local, regional, or national government, association, or corporation - would set a regional-wide theme that links development policy with mitigation. For instance, it may set forth a plan for regional adaptation activities, based on “good agricultural practices,” aimed at strengthening food security in the face of climate variability and change. In such a case, a PoA offset project could allow certification of the carbon credits associated with such large-scale adaptation solutions, provided it can be demonstrated that the plan would not have been implemented without the additional income from its associated carbon credits.

84. Along the same lines, integrated approaches to natural resource management in the context of climate change, including medium- to large-scale ecosystems, may also provide opportunities for bundling. The GEF will be giving priority to activities which address several of its mandated programme areas, which may also facilitate this.

D. LEVERAGING OF DEVELOPMENT RESOURCES AND TARGETING NEW FUNDS

85. The financial leveraging needed to create a new carbon market capable of generating US\$20-100 billion per year in 2030 through large-scale land-based mitigation

could be realized by properly channelling investment and financial flows to rural development. These flows - comprising international debt, FDI, and ODA - are small compared with the expected costs of adaptation and mitigation in agriculture and the LULUCF sectors. Yet, if specifically utilized in the context of climate change planning, for instance for development programmes that also support entry into the carbon markets, they could offer significantly more benefits and safeguards for rural communities under climate change.

86. Two main areas that could be targeted in this way are capacity building and technology assistance. Capacity building would be needed to i) inform and educate with regard to adaptation techniques and options; ii) inform and prepare entry into existing and future carbon mechanisms, with a focus on the development of programmes of activities and; iii) lower barriers to entry into the carbon market. Technology support could be expanded to adaptation pilot projects that focus on resilience and food security, and the development of expertise and technology solutions related to activities linked to carbon sequestration in forestry, agroforestry, and soil conservation.

87. Of relevance to facilitating the links between development and carbon financing, the World Bank is in the process of elaborating a new package of strategic Climate Investment Funds, with the overall objective of providing support for policy reforms and investments that achieve development goals through a transition to a low carbon development path and climate-resilient economy. They include the Clean Technology Fund, the Forest Investment Fund, and the Adaptation Pilot Fund. Finally, the Adaptation Fund is expected to be the major source for financing adaptation activities in developing countries (see Box 4).

Box 4: New Climate Change-Related Funds

Clean Technology Fund. Will provide resources in the near-to-medium term for investment financing, supporting ‘rapid deployment of innovative low-carbon technologies’ through lending and other forms of financing, blended with other sources of public and private financing (target size US\$5-10 billion).

Forest Investment Fund. Aimed at providing investment financing for forestry sector reforms, to reduce deforestation and preserve existing forests through sustainable forest management and conservation, with a strong emphasis on achieving co-benefits for environmental ecosystem services, adaptation and mitigation (target size US\$1 billion).

Adaptation Pilot Fund. Focused on technical assistance and financing for capacity building in mainstreaming climate risk and resilience into development planning and budgeting in five to ten pilot countries (target size \$1 billion).

Adaptation Fund. Established to combat poverty while providing financing for adaptation projects, taking into account national sustainable development strategies, poverty reduction strategies, national communications and national adaptation programmes of action. Funded through the sale of 2 percent of CERs generated in the CDM, its projected annual revenues could be US\$1 billion to 5 billion per year in 2030.

VI. POSSIBLE NEXT STEPS

88. FAO, IFAD, and their partners, in supporting countries to discuss, decide on and utilize financing mechanisms for climate change adaptation and mitigation, could:

- raise awareness of the potential, within the agriculture and LULUCF sectors, for synergies among options for reducing GHG emissions, carbon offsetting, adapting to climate change and achievement of Millennium Development Goal of poverty and hunger reduction;
- advocate for broadening the scope of the financial mechanisms under the UNFCCC and Kyoto Protocols, so that they are inclusive of LULUCF;
- also advocate for and contribute to guidelines, procedures, modalities and requirements that enhance accessibility of developing countries to financial resources, drawing where appropriate on the approaches of voluntary carbon markets to mainstreaming mitigation into sustainable development and bundling of activities, with a view to allowing greater benefits to flow to those more vulnerable to climate change impacts, whose livelihoods depend on agriculture, forestry and related activities;
- undertake work on technical methodologies relating to baselines, verification, and measurement but also challenges such as reversibility and leakage in the agriculture and forestry sectors;
- support, drawing on their respective technical and financial expertise, developing country participation in and benefits from mechanisms financing climate change mitigation and adaptation, including UNFCCC mechanisms, as well as a variety of voluntary carbon markets established by private-public partnerships and that such support should include developing and testing, in partnership with the International Food Policy Research Institute (IFPRI) and other Consultative Group on International Agricultural Research (CGIAR) Centres, innovative policy and institutional solutions to enable smallholder farmers to engage in and benefit from climate change mitigation measures and carbon markets, as well as developing capacities and providing technical support to vulnerable countries and communities to formulate projects in the agriculture and LULUCF sectors, which can qualify for financial support under current and emerging financial mechanisms, both public and private;
- explore how larger financial flows, than are currently possible under the existing carbon market, could be created by adding a range of land-based activities within post-2012 climate mitigation and adaptation mechanisms, in particular reduced deforestation and degradation (REDD), agricultural land restoration and soil carbon sequestration, agroforestry, and many land conservation practices, which are of direct relevance to the Bali Roadmap; and
- based on the above considerations, play a supportive role in informing national governments on the linkages among climate change mitigation and adaptation, food security, poverty reduction, sustainable livelihoods and environmental services in the agriculture and forestry sectors, so that synergies and trade-offs can be more optimally managed within international and national policy frameworks and supported by financial mechanisms.

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