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Moving towards Emissions Neutral Development (MEND)

Final Technical Report

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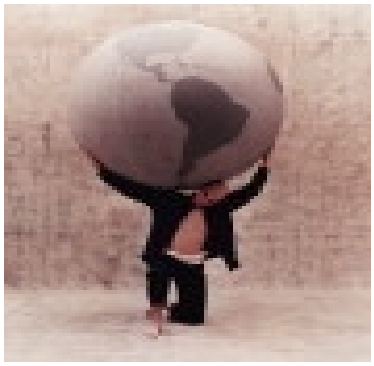

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Moving towards Emissions Neutral Development (MEND)

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In separate report:

Executive Summary

This two-year research project was carried out in four small to medium developing countries: Bangladesh, Colombia, Ghana and Sri Lanka. The objectives were to: examine the developmental potential of the CDM; to investigate strategies to encourage CDM investment flows in small to medium developing countries; and to suggest ways that donors could get involved in capacity building to facilitate the participation of small to medium developing countries in the CDM. The approach to the research was consultative in nature: the project partners established steering committees and national stakeholder groups to assist in the research process.

Different interest groups have different expectations of the CDM. The 'North' (countries with GHG limitation or reduction commitments) cares about having access to a mechanism that delivers the lowest cost emissions reductions. For the 'South' (developing countries with no emissions reduction commitments), the concern is for the CDM to deliver sustainable development. These conflicting expectations of the CDM are replicated at the level of CDM project implementation between three key groups of stakeholders: the communities benefiting from a more equitable CDM; the investor party who cares about least-cost mitigation opportunities; and the host country government who cares about the overall contribution that the CDM can make to the country. Without robust frameworks for implementing the CDM there is a high risk of distributional inequity, with the losers being the poorer people in smaller countries who lack information, resources and influential national governments. The challenge is to devise strategies to encourage CDM projects that benefit all stakeholders.

The MEND research shows that clean technology transfer through the CDM can contribute to developmental objectives in developing countries, but that appropriate action is required at the institutional and policy level and at a practical project implementation level to enable the implementation of CDM projects with high developmental benefits. The research shows that there is a clear absence of any supporting policy and legal frameworks for the CDM in the research countries, and that the level of integration of the climate change mitigation in sectoral policy frameworks is lacking or entirely absent. The institutional base required for implementation of the CDM is also largely absent. Capacity at the level of individuals is focused on a limited number of actors and institutions.

There is a clear role for donors in helping to scope out the potential benefits of the CDM for poverty reduction, and, for developing countries where the CDM is likely to bring significant benefits, to help bridge the gap between private sector investor concerns and the development concerns of stakeholders within the host country government. Possible roles for the donor could be:

Strategy formulation;

- An assessment as to whether potential CDM flows are sufficiently significant to a developing country to merit involvement of the country in the CDM;
- Development of a comprehensive climate change strategy for mitigation, exploring the linkages with adaptation;
- Technology needs assessment.

Policy and institutional support

- Awareness raising and building of technical expertise;
- Development of regulatory frameworks;
- Development of institutional structures for CDM implementation;
- Development of standardised approaches to the baseline and monitoring protocols for CDM projects.

Direct project implementation assistance

- Support funds for preparation of development-focused projects;
- Design Risk mitigation tools and mechanisms for private sector investment in development-focused projects;
- Lending cash advancements against expected future CER streams;
- Support to dedicated carbon purchasing programmes for small-scale, development-focused projects.

Policy and institutional support can be delivered through:

- demonstration CDM projects with developmental benefits;
- workshops to: encourage national debate on CDM policy and supporting sectoral policies; feed into the process of national strategy building; develop national technical capacity to develop and assess CDM projects; develop standardised data and approaches to baseline determination and monitoring for GHG mitigation projects;
- studies and assessments to contribute to and support the process to strategy building;
- developing information sharing and dissemination channels between North-South and South-South.

Capacity building for the CDM should be developed within existing policy and institutional frameworks in the host country government. Linkages are emphasised for the following:

a) **Policy** Poverty Reduction Strategy Papers (PRSPs) are supposed to be the "master documents" of national level poverty reduction measures, and are supposed to be used to coordinate donor and other activity on reducing poverty. They are also supposed to make it easier for developing countries to interact with other stakeholders on poverty reduction issues by simplifying the process. If the CDM is going to be playing a part in reducing poverty, it seems clear that work on the CDM should be incorporated into PRSPs.

b) **Actors & Institutions** Climate change stakeholders in donor governments (and possibly private sector consultancies and NGOs) are not sufficiently "plugged in" to poverty reduction policy directions and vice versa. This means that synergies are not being identified and conflicts may occur. There should be increased dialogue between these stakeholder groups.

c) **Institutional** Developing countries do not have the capacity to run a whole range of institutional structures on sustainable development, climate change and poverty reduction. Therefore, if there is a need for new institutional capacity to enable CDM projects to take off, this capacity should be developed within existing institutions.

By implication a capacity building strategy aimed at encouraging development-focused CDM projects should be country-specific, reflecting the fact that poverty profiles and the institutional and policy frameworks are different for different developing countries.

The full report and appendices can be downloaded on the following website:

http://www.ecosecurities.com/mend/index.html

1. The impact of the CDM on poverty reduction

Summary

The CDM is an instrument to promote greenhouse gas mitigation harnessing private finance in countries with emissions reduction and limitation targets to achieve least-cost emission reductions in developing economies. The CDM is therefore a market instrument directing investment flows to least-cost mitigation options rather than to the poorest communities.

Fundamental questions persist about the developmental potential of the CDM. The greatest potential for least-cost emission reduction exists in sectors with high emissions growth so that the boost provided by the CDM to private finance is distributed according to emissions growth predictions rather than fundamental inequities. Most models agree that the countries with growing emissions profiles such as Russia, China and India will benefit the most, and regions such as Africa will benefit the least in a pure price-driven market. The CDM also offers an incentive to investment in limited development sectors - those which can yield a greenhouse gas emissions mitigation benefit principally through energy provision and through forestry activity.

The MEND research has attempted to examine more closely the developmental value of the CDM. Our four case studies were chosen because they contribute relatively small amounts to total emissions: less than ½ a per cent of global emission in 1997.

The approach in this project has been to establish a poverty baseline against which scoped CDM projects with a particular development focus are compared to assess the developmental potential of the CDM. The poverty baseline was constructed by adopting a country indicator approach as a starting point to identify key national poverty priorities. To account for regional and geographical disparities in access to key public assets, as well as social and cultural factors, an iterative, consultative process with the stakeholder steering groups and the project partners was undertaken. National poverty strategies and other national development strategies as well as the international development targets were considered. Development priorities were rated high, medium and low. The priorities identified by the steering groups were cross-referred with a broad range of national strategy documents and UNDP development indicators. Project partners selected ten projects, each in consultation with national steering groups, covering a range of sectors including electricity generation from a range of renewable sources, such as cogeneration and waste, and the provision of alternative energy and energy services in the transport, agriculture and industrial sectors.

Poverty is generally a rural phenomenon *in the MEND countries*, and, as such, the highest-ranking projects are aimed at the rural communities; they are aimed at providing energy services to unelectrified communities; and at increasing the returns from agricultural and forestry activities. Grid-connected electricity generation projects also tend to score highly if they are focused on the consumption of biomass (thereby providing added value to waste biomass or the production of biomass). The majority of projects scoped were energy-related projects, which potentially give rise of benefits such as:

- improving income levels;

- economic development through enterprise development;
- improving access to clean water;
- improving access to health services;
- improving sanitation levels;
- promoting gender equality through reducing women's time spent on collecting fuel wood, water;
- improving access to education and information;
- improving levels of security.

The impact on developmental objectives (the level of services the project provides) is crucially dependent on the design of the project.

A full poverty assessment was not possible in the course of the project and assessment methods were subjective and subject to bias. Nevertheless some tentative conclusions can be made:

- National poverty baselines have made clear that poverty is context-specific.
- Different projects fare differently between countries because of a mixture of factors including the relative ranking of key impacts, and also because of key features of the project design.
- Most of the projects identified had some highly rated impact on a priority indicator demonstrating the potential for CDM to deliver real development benefits.
- Employment and income generation are marked features of many projects.
- Project design is crucial in maximising the developmental benefits of the CDM. The aim should be to implement clean technology projects that provide a wide range of services;
- Many projects were found to have considerable replicability suggesting these projects are susceptible to being treated in a programmatic fashion for the purposes of baseline selection, verification and monitoring. As transaction costs are a key barrier to investment in smaller scale development projects, the bundling of such projects and the development of common standards for their approval should be investigated.

The mitigation costs of some of the scoped projects are much higher than the current average price offered by international tendering programmes for emissions reduction projects, which pay around $3 per tonne of CO_2 mitigated. Even with reductions in transaction costs (see the Capacity Building paper) these figures show that dedicated purchasing programmes for some types of development-focused projects will be necessary if the CDM is to benefit poverty reduction objectives. For other CDM project types scoped by the project partners carbon value over the 21 crediting period covers the whole cost of the project, dispelling the belief that development-focused CDM projects are necessarily more expensive than the CDM transactions seen to date.

The CDM does present potentially significant investment opportunities even for countries with a relatively low expected market share in the CDM. With efforts to widen the focus of the CDM to projects with development objectives, some of this funding could be re-directed to projects that can make a real difference to reducing levels of poverty in developing countries.

1.1. Overview

1.1.1. The CDM and sustainable development

Article 12 of the Kyoto Protocol establishes two purposes for the Clean Development Mechanism (CDM);

1. greenhouse gas (GHG) emissions reduction internationally; and
2. a contribution to the sustainable development of host countries.

To date, most effort in the discussion of detailed rules and procedures for verifying and monitoring GHG emission reductions from CDM projects has focused on ensuring that certified emissions reductions (CERs), the output of the CDM, represent real and additional emissions reductions. Even more controversy has surrounded the terms for the use and calculation of GHG removal through sinks or sequestration projects, rules for which are to be established by COP 9 in 2003.

The sustainable development benefits of GHG-reducing investments have received less attention. In part this is because the Protocol and implementing rules have left the question of whether a project contributes to sustainable development to be resolved at national level by the state that will host the project. Provided investment can be attracted to a project that has measurable GHG potential, Non-Annex B countries are left to promote any project they consider to be within their own sustainable development priorities.

There have been several initiatives on the development of sustainable development criteria for CDM, though none deal directly with development or poverty reduction *per se*. Assessment of projects against social indicators such as local employment may operate as a rough approximation of development or poverty reduction priorities in limited circumstances. Effort has focused on screening projects for negative impacts: local environmental pollution and employment reduction or displacement, rather than promoting positive developmental impacts - in particular poverty reduction benefits.

1.1.2. CDM and equity

Development priorities and efforts to achieve greater equity between and within countries (where poverty reduction plays a key role) will undoubtedly be affected by climate change and international efforts to manage change within safe limits. The equity debate dominates discussions on the allocation of responsibility for dealing with climate change and responsibility for dealing with impacts (Muller 2001: Unpublished).

The GHG emission limitation and reduction obligations of richer countries in Annex B represent their responsibility to take a lead in early action to mitigate the causes of climate change derived from their historic responsibility for the emissions. In the developed world the need for equity is therefore seen for the most part as governing the distribution of mitigation effort through allocating national emission targets, and as a precondition, the ultimate participation of key developing countries in targets as their emissions grow.

In the developing world, equity demands not merely early action but acceptance and allocation of responsibility for the impacts of climate change to which the world is already committed and which will impact disproportionately on the poor and vulnerable[1]. Indeed to some the CDM provides a least-cost alternative to the development of radical GHG mitigation efforts in the North, representing the dilution of the developed world's first mover responsibility.

Nevertheless the Clean Development Mechanism represents a compromise between North and South. (indeed this was its origins, in the Brazilian proposal for a Clean Development Fund). It mandates financial transfers from developed to developing countries to promote GHG mitigation, in advance of targets being adopted in those countries. The CDM is the incentive for private investment in technology transfer to facilitate an accelerated decoupling of emissions growth from development.

The financial and technological transfers implied by the CDM can represent only a limited attempt to redress the developmental inequities between North and South. The provision of finance for investment in lower carbon development options cannot solve the developmental inequalities. At best it can mitigate global climate change - which benefits all particularly the vulnerable - modifying development paths and delivering local development benefits as a consequence of the energy and land use strategies it promotes.

The CDM represents a limited instrument for development because the incentives it creates are directly related to GHG mitigation:

1. The CDM provides resources to relatively developed or quickly developing countries, namely those countries where least-cost GHG mitigation potential already exists, in countries with significant emissions or significant projected emissions growth.
2. The CDM also offers an incentive to investment in limited development sectors: those which can yield a GHG benefit, principally through energy provision and belatedly and begrudgingly through forestry availability, which is not dependent on pre-existing levels of development.

1.1.3. Structure of the report

The central research question is whether the CDM can contribute to poverty reduction objectives in developing countries. This paper addresses this question in three sections:

1. In section 1.2 the paper reviews general relationships between poverty, development and emissions growth to provide some background to the impact of climate related investment on development. This section undertakes a short review of predictions on the size and shape of the CDM market.

2. In section 1.3 the paper reviews various approaches to defining and assessing poverty as background to the MEND project assessment. This section reviews sources of poverty-related material used in establishing the country poverty baselines and gives details of the poverty baseline against which the MEND projects were assessed.

[1] Intergovernmental Panel on Climate Change Third Assessment Report, 2001

3. Section 1.4 examines the projects in the MEND case countries: Colombia, Sri Lanka, Ghana and Bangladesh. The projects selected by the case partners are described and analysed in the light of the poverty baseline and country priorities identified. Some preliminary and strategies for maximising the developmental aspect of CDM for poor states and the poor within them are identified.

The paper concludes that, though the size of the CDM remains uncertain, it is clear that the distribution of investment will be such as to benefit larger countries with significant emissions and emissions growth. Nevertheless, the case studies, the CDM presents potentially significant investment opportunities that are crucially dependent on the development of an institutional capacity. Poverty and poverty reduction benefits is context-specific and crucially dependent on the location of the project and key features in the project design. The provision of supporting infrastructure and the technology to convert energy provision to useful services is crucial to reducing poverty.

1.2. Can the CDM lead to poverty reduction?

1.2.1. Scoping the relationship between poverty, poverty reduction and climate change

The CDM is an instrument to promote mitigation harnessing finance on the part of Annex I Parties to achieve least-cost emission reductions in growing developing economies. The CDM is a market instrument directing investment flows to least-cost mitigation options rather than to the poorest communities.

It is useful to look at a series of rather general relationships to put issues of climate, growth, poverty and development in context:

1. Climate and equity;
2. Poverty and environment;
3. Development and GHG emissions;
4. Growth and poverty;
5. Energy provision and development.

1.2.1.1. Climate and equity: North and South perceptions

There is a broad divide between the treatment of equity and associated concerns regarding poverty in the context of the UNFCCC and Kyoto Protocol negotiations. Climate change is the creation of industrialised and industrialising countries, the impacts of which are likely to be visited primarily on the poor and vulnerable in less and least developed countries.

In the developed North, equity in climate change has often concentrated on **the distribution of effort to achieve emissions reduction**. Common but differentiated responsibility for climate change has long been accepted leading to developed country commitments to limit and reduce emissions, allowing developing countries emissions growth in the meantime. A plethora of devices to extend participation in emission targets over time on a variety of "equitable bases" have been proposed including "contraction and convergence" based on a concentration target and the aim of distributing targets on a per capita emissions basis.

In the development community as well as among southern commentators much of the discussion relating to the interrelationship of climate change and poverty has addressed itself to **the distribution of the threats of climate change and the capacity to undertake adaptation**. Particular emphasis is given to issues of vulnerability and resilience, emphasizing the social components of poverty as well as the physical and economic components.[2]

1.2.1.2. Poverty and environment: positive or negative impacts

Sustainable development, which seeks to reconcile the need for environmental protection with the right to development, necessarily incorporates an analysis of the impact of environment on poverty and poverty on the environment.

Two approaches reflect conventional thinking on poverty and environment, both which assume a rather negative relationship between promoting environmental quality and development.

- First, many argue that poverty needs to be eradicated in developing countries before they can turn their attention to environmental protection;
- Second, it is common to assert that poverty and environment are linked in a "downward spiral" in which poor people are forced to overuse environmental resources for their daily survival and are further impoverished by the degradation of these resources. Population growth and economic change are also seen to contribute to this process.

The Brundtland Commission, which gave sustainable development its political impetus[3], emphasised the latter assumption about poverty emphasising the positive synergy between development and environmental quality. The report concluded that **poverty leads to overuse of resource uses and reinforces the underlying conditions of poverty.**

In terms of climate change it may be argued that lack of access to appropriate or adequate resources reinforces vulnerability to the adverse impacts of climate change leading to inadequate adaptation strategies and general environmental degradation through deforestation. Where economic development occurs it is through inappropriate agricultural and forestry practices leading to loss of carbon sinks and less efficient use of energy sources and fossil fuels.

While there is evidence to support this pattern there is also much evidence for the contradictory assertion:

- Poor people often manage their environment in environmentally friendly ways of necessity, and that poverty can limit impacts on the environment.
- increasing wealth can also lead to environmental degradation,[4] this not least through increased GHG emissions.

1.2.1.3. Growth and GHG emissions: breaking the link

Historically there has been an assumed nexus between levels of development and levels of GHG emissions. A review of GDP and energy consumption levels demonstrates a link between economic growth and increased energy consumption, accompanied by increased carbon dioxide emissions. The relationship is direct and positive for low and middle-income countries.

However, at high-income levels there are signs of lower per capita energy consumption and pollution despite economic growth. This occurs because energy use becomes more efficient, and environmentally cleaner technologies are introduced. In addition, a higher-income economy usually includes a proportionately larger service sector, which is less energy-intensive than industry.

China is one of the most spectacular examples of decoupling growth and emissions. The world's most populous country reduced its emissions in absolute terms 19 per cent between 1997 and 2000.

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[2] Rayner & Malone, 1999
[3] Brundtland Commission, 'Our Common Future', 1987
[4] Holmberg & Thomson, 1991

This is simply unprecedented as the economy grew by 15 per cent over the same period. The exact causes of the emissions decline are not certain but represent a decline of about 400 million tonnes per year (Zhang 1999).

The four case study partners demonstrate some of the relationship of increased growth, energy demand and emissions, see Table 1. Commercial energy use per capita has risen in all the countries except for Ghana between 1980 and 1994 and GDP per unit of energy used has improved in all countries save Bangladesh. Similarly CO_2 emissions per unit of GDP have stayed steady or declined save in Bangladesh. Despite these improvements in energy and emissions intensity, per capita CO_2 emissions have increased in all countries. UK and US figures which display the decoupling of emissions from growth rates in more developed economies are given for comparison.

Table 1 Link between economic growth and CO_2 emissions

	1980 Commercial Energy Use Per Capita Kg of Oil Equivalent	1994 Commercial Energy Use Per Capita Kg of Oil Equivalent	1980 GDP per Unit of Energy Use 1987 $ per kg of oil equivalent	1994 GDP per Unit of Energy Use 1987 $ per kg of oil equivalent	1980 CO_2 per capita Emissions Metric tonnes	1992 CO_2 per capita Emissions Metric tonnes	1980 CO_2 emissions kg per 1987 $ GDP	1994 CO_2 emissions kg per 1987 $ GDP
Colombia	501	622	2.08	2.14	1.4	1.8	1.4	1.4
Sri Lanka	96	97	3.42	5.09	.2	.3	.7	.6
Ghana	121	93	3.57	4.45	.2	.2	.5	.6
Bangladesh	32	64	4.46	3.06	.1	.2	.6	.8
UK	3572	3772	2.84	3.49	10.4	9.8	1	.8
US	7908	7819	2.07	2.62	20.3	19.1	1.2	1

1.2.1.4. Growth and poverty: a mixed picture

Economic growth does not of itself necessarily increase the gap between the rich and poor; neither does it necessarily reduce it. According to a recent World Bank study, in the 88 instances where a country achieved per capita GDP growth for a decade, inequality improved slightly in about half the cases and worsened slightly in the other half. Because the changes in inequality were quite small, growth almost always improved the incomes of the poor. Similarly state-level data from India spanning 40 years show that among the states that achieved economic growth, inequality declined in three quarters and increased in the remaining quarter.[5] *Although growth does not consistently affect inequality one way or the other, the level of inequality does affect growth.* The World Bank has found that while growth lead to poverty reduction there was also increasing inequality in Bangladesh between 1983-1996[6]

In general, developing countries with a more equal distribution of assets - specifically land - grew more rapidly than countries with a less equal distribution of assets. This presents a serious problem for Latin America where asset distribution is highly unequal and where few countries have achieved significant reductions in inequality.

1.2.1.5. Energy provision and development

Increased energy consumption using fossil fuels is the major contributor to GHG emission growth. This raises the question of the relationship between increased energy provision and the provision of alternative energies and poverty.

Cross-country data compared for 114 countries have established the linkages between energy consumption and the distribution of income. First, total energy consumption per capita, measured in kilograms of oil equivalent (koe), increases with the per capita GDP. Second, the mix of energy carriers varies with income and its distribution.[7] Reliance on biomass is greater among countries with lower incomes; among countries with more unequal income distributions; and among countries with relatively small urban populations.

According to Suarez (2000) energy has a determinant influence on the Human Development Index (HDI) particularly in the early stages of development. Reviewing the per capita energy consumption and HDI scores he concludes that the impact of per capita energy consumption on the HDI begins to decline somewhere between 1,000 and 3,000 koe per inhabitant. Once this level is reached, even with a tripling in energy consumption, the HDI does not increase. Additional increases in HDI are more closely correlated to the other variables chosen to define it (life expectancy, educational level, and per capita income).

In summary the level of energy provision can be shown to relate to levels of development where energy provision is relatively low but once provision approaches relatively modest levels this relationship breaks down.

[5] Dollar& Kraay, 2001
[6] Bangladesh: From Counting the Poor to Making the Poor Count April 29, 1998

[7] Leach, 1992

1.2.2. The likely shape of the CDM market

There are a vast number of economic assessments of international emissions trading which attempt to predict demand and supply of GHG reductions against a range of scenarios. These studies primarily date to before US withdrawal from the Protocol, (this reduces the demand for CERs), and do not factor in the agreement on sinks achieved in Bonn and Marrakech (this potentially increases the supply of CERs). Even where some attempt is made to factor in these elements the models are necessarily simplistic, based on a range of assumptions such as relative mitigation costs. The following presents some key findings from a limited range of studies, none of which reflect US withdrawal or the Marrakech outcome.

- **The United Nations Conference on Trade and Development (UNCTAD**) has estimated estimates that if the CDM captures 35 per cent of the market for greenhouse gases there is a potential for US$18 billion per year.
- **The Kirneas Study for the Asian Development Bank** estimates the potential global market for the CDM-based credits at between 400 million tonnes and 520 million tonnes or 10 per cent of GHG emissions by 2010[8]. The study is limited to potential investment in the energy sector in non-Annex I countries and should be considered a low estimate of market potential.
- A variety of models underline that only three countries are likely to take the lion's share of the total market in GHG credits. Other studies estimate the relative share of the market for China at around 60 per cent by 2010 **(ZhongXiang Zhang)**.
- The **Kirnaes Study** predicts a market price for CO_2 of $24 per tonne, assuming that there is no restriction on imports by Annex B parties and there is an ample supply of non-Annex B credits to meet demand.
- Non-Annex B regions are predicted to make $10 billion dollars in selling credits, with non-Annex B account for 77 per cent of total credits traded[9].
- Foreign Direct Investment (FDI) in 1999 to developing countries was estimated at $192 billion, up from an estimated $171 billion in 1998[10]. Importantly Africa compares relatively badly in securing overall FDI[11]
- It should also be noted that the gain to non-Annex B Parties is predicted to be less than the gain to Annex B parties under the same conditions. Gains to Annex B from unrestricted trading are estimated at $94 billion.
- According to Zhang, the bulk of total credit exports are accounted for by China (47 per cent), India (11 per cent) and Russia (23 per cent). Notably Russia finds itself worse off than where trading is restricted to Annex B Parties[12].
- If the supplementarity requirement (that Annex B achieves targets primarily domestically) is factored in, overall demand from Annex B drops. **Under the Kirnaes model**, a 33 per cent limit was imposed on emission purchases, resulting in a lower price of $6 per tonne. In these circumstances the market gain for all credit exporters, i.e. not merely CDM regions, is a mere 1.7 billion.

[8] Halnaes p36
[9] Ellerman p20
[10] Global Development Finance
[11] http://www.enda.sn/energie/cdmequity.htm
[12] p14 of Ellerman and Decaux

- In an international context institutional design is key to rebalancing CDM in developing countries' favour. If a cartel-like arrangement is made between CDM sellers (not including Russia), **Kirnae**s predicts a price of about $63 dollars per tonne and gains of some $22 billion dollars to developed country participants.[13]
- As is likely, prices are correspondingly higher where transaction costs and imperfect market conditions reduce the supply of credits. **Kirnaes** predicts these factors push the price to some $52 and $94 per tonne. 50 per cent and 75 per cent reductions in supply are factored in to take account for this[14]

In summary, despite some uncertainty over the potential size of the market, the shape of the market can be delineated relatively clearly:

- The simplest analysis of the relationship between CDM finance and poverty suggests that as **the greatest potential for least-cost emission reduction exists in sectors with high emissions growth** the boost to private finance is distributed according to emissions growth predictions rather than fundamental inequities.
- As a result of the inequality in negotiating capacities **developed countries are expected to recoup the largest part of the cost reductions** available through least-cost emission reduction in emission trading. It is a buyer's market where those with the money dictate the price.
- Most models agree that the supplier countries which benefit most from investment through the project mechanism (both CDM and JI) are those with growing emissions profiles, with **Russia, China and India benefiting most, and Africa least**.

Institutional capacity, or the lack of it, adds to transaction costs and acts further to exclude poorer, less able states from negotiating benefits or to benefit at all from the CDM. Within countries the transaction costs involved in project mechanisms are predicted to favour larger over smaller more community-oriented projects.

In short, the benefits to small and medium developing countries and more community-oriented projects are less than obvious. Nevertheless mitigation efforts with clear development benefits, and in particular those efforts which enhance adaptive capacity, are of interest to developing countries. The challenge is to devise strategies to lower transaction costs to encourage greater flows of CDM investment into small and medium developing countries.

The CDM executive board is mandated to consider the equitable distribution of projects and the provision of streamlined procedures for smaller scale projects. How this is to be operationalized in a viable way remains to be seen.

Some suggestions include:

- the establishment of regional quota for CDM implementation;

[13] Flerman p21
[14] Ellerman p22

- the establishment of regionally-based operational entities charged with the validation of projects and the verification of emissions;
- the development of unilateral and small-scale project facilities nationally;

However it seems clear that:

- heavy-handed efforts to manage the distribution of projects may be counter-productive, dissuading rather than encouraging investment;
- the provision of government assistance for projects in less favoured areas and to less favoured projects with higher developmental benefits is complicated by the requirement that ODA is not diverted through the CDM. That said, public support to the CDM is possible but limited by the requirement that support finance is additional.

The CDM market in the case study countries

Table 3 Case study comparisons foreign direct investment (FDI), exports, GDP and CO_2

		Colombia	**Sri Lanka**	**Ghana**	**Bangladesh**
ODA	Total ODA Received US $ Million 1999	301.3	251.4	607.5	1203
	Per Capita USD 1999	7.3	13.2	32.3	9.4
	% GDP 1999	0.3	1.6	7.8	2.6
FDI and Private Capital Flows	Net FDI Flows % GDP	1.2	1.1	.2	0.4
	Other private flows %GDP	2.9	-0.4	-.3	(.)
GHG Emissions	CO_2 emissions equivalent (1996) in m tonnes	65.3 m	7.07 m	4.04 m	22.95 m
	CO_2 Per Capita (1996) in kg	1,662	391	223	190
	Global Emissions % Total (1997)	0.3	(.)	(.)	0.1

Our four case studies contribute relatively small amounts to total emissions: less than ½ a per cent of global emission in 1997. This is consistent not only with their relative size but also with relatively low levels of development. Starting with a low emission level and with low predicted growth, the CDM can only be of relatively minor interest to small and medium developing countries in development terms, and relatively unattractive to major investors.

Nevertheless even with relative low market share the potential sums involved can be significant. Of our case studies only Colombia has been the subject of specific market analysis, and the World Bank-funded National Strategic Study has identified a potential market of $400 million per annum: more than official overseas development assistance in 1999, and roughly 10 to 40 per cent of FDI based on recent figures.

1.3. Assessing the links between the CDM and poverty reduction

1.3.1. Definition of poverty

"Poverty .. is a chronic, systematic exclusion of people from society, and its effects are cumulative" ***Rayner and Malone***

There are three basic approaches to identifying poverty and the poor, reflecting a changing appreciation of poverty and the condition of the poor. The following are three basic indicators of poverty and tools for identifying structural features of the poor:

1. measures of Household Income and Consumption;
2. measures based on indicators;
3. participatory Poverty Assessment.

1.3.1.1. Measurement of poverty

Measures of Income and Consumption

"The generally preferred indicator of household living standards is a suitably comprehensive measure of current consumption, given by a price weighted aggregate over all market commodities consumed by the household from all sources (purchases, gifts, and own production).[15]These are the most consistently used indicators of poverty, and though intuitively at the core of poverty assessment, can be both complicated and expensive to assess, and fail to take account of a wide range of other factors important to poverty. The international target of a dollar a day is a crude example of this sort of target.

Poverty Assessment Based on Indicators

The HDI establishes a broad range of indicators that are nationally comparable. These include general standards of health, education and wealth enabling a general assessment of development. The UNDP HDI provides a crude national level comparison but disguises the weighting of individual factors and disparities in access to services and goods in the aggregated form. The World Bank distinguishes four dimensions of poverty: the income poor, the security poor, the education poor and the health poor. HDI is often criticised in the way it tends to disguise or overlook the relative valuation of access to water and literacy.

Participatory Assessment

Both measures of consumption and developmental outcome are poor indicators of some aspects of deprivation including vulnerability, physical weakness, and political powerlessness. Participatory poverty assessments involve asking the poor about the nature of their poverty to obtain a more detailed explanation of the reason behind the poverty often reflected in broader indicators.

The livelihoods approach adopted by DFID identifies five capitals that enable to pursuit of a livelihood. (see also Scoones (1998), promoting a holistic rather than sectoral approach to the assessment of

poverty and poverty reduction. It has been praised as presenting a positive approach to development because it seeks to identify strengths rather than weaknesses.

1.3.2. Current literature on the relationship between CDM and poverty

There are two limitations to existing reviews of the development potential of GHG-related investment. Research has concentrated on the assessment of project benefits and projects have been scoped with reference to GHG potential. An exercise that remains to be done is a full scoping of the potential GHG mitigation benefits of development-oriented projects.

The scope of existing research is further limited. Experience with projects on all levels from the technical to the institutional has been concentrated on experience of CO_2 and on energy-related investments. Attempts to assess poverty reduction potential of the CDM have concentrated on the impacts and benefits of a limited range of potential GHG mitigation projects. It is important to note that CO_2 is not the only GHG governed by the protocol and that the development benefits of low carbon energy provision is not the sole field of benefit to developing countries and communities.

There is some literature on the connection between renewable energy provision and development benefits. Helio International[16] asserts that several studies show a positive relationship between increased investment in clean energy and employment - a greater influence than other more conventional energy investments.. However, TERI (Tata Energy Research Institute) identifies a clear trade off between low cost carbon abatement and high sustainable development benefits. In broad terms the cheapest abatement options have lower benefits.

A study funded by DFID and undertaken by the University of Surrey was limited to establishing clear benefits of particular project types and sizes. The DFID-funded CSEC and ETSU studies review a range of energy and sequestration projects and conclude that smaller scale projects, involving the provision of appropriate technology, lead to high development benefits if not to high emission reductions in all cases.[17]

Fundamental questions persist about the development benefits of CDM. These operate at a system design and macro-economic level. Will the level and pattern of likely CDM investment merely reflect existing investment patterns and concentrate on relatively better-developed countries and benefit relatively high-income groups within those countries?

1.3.3. Research methodology: MEND

The approach in this project has been to adopt a country indicator approach as a starting point to identify key national poverty priorities. Nevertheless the research team were conscious that the key criticisms of this aggregated target lead approach is that it fails to account for regional and geographical disparities in access to key public assets and it disguises social and cultural factors in national descriptions of poverty. An iterative, consultative process with the stakeholder steering groups and the project partners was therefore undertaken. National poverty strategies and other

[15] Lipton and Ravaillon Poverty and Policy, World Bank
[16] An NGO that assesses, monitors and publicises the contribution of energy systems to genuine sustainable development.
[17] University of Surrey, 1999; ETSU, 2000

national development strategies as well as DFID'S international development targets were considered[18].

After discussion the headings based on UNDP HDI indicators were adopted against which poverty priorities were established, each with a qualitative description of the nature of the problem and a list of agreed indicators. Using the headings, qualitative descriptions and indicators, steering groups rated the priorities high, medium and low. The priorities identified by the steering groups were cross-referred with a broad range of national strategy documents and UNDP development indicators. The results are presented in the next section.

The poverty baselines established by the partners outline poverty reduction priorities, and they formed the framework for assessing the potential developmental / poverty reduction benefits of selected projects. Poverty is different across our case studies, leading to different project selection and different poverty outcomes. This section identifies common features across countries and projects and highlights the need for country specific approaches.

[18] DFID's International Development Targets are:

- A reduction by half in the proportion of people living in extreme poverty by 2015
- Universal primary education in all countries by 2015.
- Gender disparities in primary and secondary education removed by 2005.
- A reduction by two-thirds in the mortality rates for infants and children under 5 and a reduction by three-quarters in maternal mortality by 2015.
- Access through the primary health care system to reproductive health services for all individuals of appropriate ages as soon as possible and no later than 2015.
- To implement national strategies for sustainable development in all countries by 2005, so as to ensure that current trends in the loss of environmental resources are effectively reversed at both global and national levels by 2015.

Table 3 National sources of information: poverty and climate-focused literature

Sri Lanka	
	Sri Lanka Capacity Building Needs FCCC/SB/2000/INF.6
	Poverty in Sri Lanka. Base document IPS Document. Relative or perceived poverty (Sri Lanka Country Study)
	World Bank: Sri Lanka Poverty Assessment January 11, 1995
Colombia	
	World Bank: Colombia Poverty Assessment Report (In Two Volumes) Volume l: The Main Report August 8, 1994
	GTZ, Opciones para la reduccion de emisiones de gases de efecto invernadero en Colombia
	Londoño, Juan Luis (1996). Cambios en la Distribución del Ingreso, la Pobreza y el Desarrollo Humano en las Ultimas Décadas. Bogotá.
Bangladesh	
	World Bank: From Counting the Poor to Making the Poor Count April 29, 1998
Ghana	
	World Bank: Ghana: Poverty Past, Present and Future June 29, 1995
	World Bank: 2000 and Beyond: Setting the Stage for Accelerated Growth and Poverty Reduction

1.3.3.1. Review of planning documents: country strategies and policies identified

The following is a review of available planning documents related to climate, sustainability and poverty. A wide variety of planning processes have been undertaken which cover the area of climate, sustainable development, economic development and poverty, many of which are internationally funded or assisted. There is little integration of these concerns in planning and there is a lack of transparency in implementation. Nevertheless the following formed the background to the poverty baseline assessment.

Climate Strategies

The UNFCCC mandates the production of national reports on climate change. Only Colombia and Sri Lanka have produced UNFCCC reports to date and these are the primary source of emissions inventories baselines and project potential. The World Bank has a programme of CDM-related National Strategy Studies (NSS). An NSS has been undertaken for Colombia, and is currently underway for Sri Lanka. National Strategies for Ghana and Bangladesh are proposed and a private research institution has undertaken an assessment of CDM potential in Bangladesh. Poverty alleviation is not a major focus of any of the reports or strategies to date.

Funds are available through the GEF and UN Programmes aiming to address capacity problems, and the national planning process and preparations for implementation of Kyoto Mechanisms have been supported in this way. These can be considered indirectly supportive of poverty reduction in that many states do not have the resources to commit to climate research and policy planning, which is essential to securing the benefits offered by the Kyoto protocol.

Sustainable Development Plans

Given the breath of the concept, a range of environmental, economic and other development plans can be considered within the ambit of a sustainable development plan or strategy. Broad plans are available as part of the Agenda 21 process. All the case partners have submitted national sustainable development reports to the Commission on Sustainable Development (CSD) in which poverty reduction forms a part, though information is perfunctory and even absent in some cases. The list of indicators proposed by the CSD is limited and though aspects of poverty assessment are included, the information required by these indicators is not focused on poverty and poverty alleviation, and neither is poverty reduction reflected in the reporting exercise. The national reports and indicators are referenced below.

To date, sustainable development within the context of the CDM has been interpreted in a limited way to include environmental and economic impacts of CDM-related investment.

Poverty Reduction Strategies

Social Development Goals: The World Summit on Social Development has committed governments to halving income poverty by 2015. [19] According to OXFAM, income poverty is declining far too slowly to meet this target, with the prospect of an increase in the number of poor in Africa, Latin America and South Asia. (OXFAM 2000[20]) Income poverty is defined as the proportion of people living on less than $1 a day and the target has been set using 1990 as a baseline. This is a crude target that fails to take account of purchasing power parities, and equally significantly fails to address all the dimensions of poverty but nevertheless forms the key poverty alleviation indicator at the international level.

Human Development Reports: The UNDP produces an annual human development report and commissions or supports national development reports internationally. The approach to poverty adopted is broad and forms the basis for the indicators adopted in the poverty baselines below.

[19] World Summit for Social Development in Copenhagen

[20] Oxfam Policy Papers - Oxfam International Policy Paper 6/00 Missing the Target, The price of empty promises

Table 4 Selected indicators from the UNDP World Development Indicators 2001

	Colombia	Sri Lanka	Ghana	Bangladesh	UK
Income (1999 PPS US$ GDP per Capita)	5749	3,279	1881	1483	22,093
Equality (Richest 20% to Poorest 20%)	20.3	5.3	7.8	4.9	6.5
Food security (underweight children under 5 % 1995-2000)	8	34	25	56	..
Water (population not using improved water resources 1999)	9	17	36	3	0
Sanitation (population with adequate sanitation facilities % 1999)	85	83	63	53	100
Energy (electricity consumption per capita (kw-hrs) 1998 (1980))	866 (561)	244 (96)	289 (424)	81 (16)	5,327 (4,160)
Traditional fuel consumption % total 1997 (1980)	17.7 (15.9)	46.5 (53.5)	78.1 (43.7)	46 (81.3)	0
Education/ Skills (adult literacy (15 and above %) 1999)	91.5	91.4	70.3	40.8	..
Health (population with access to essential drugs % 1999)	88	95	44	65	99
Social exclusion (share of income of poorest 10%)	1.1	3.5	2.4	3.9	2.6

World Bank Poverty Reduction Strategy Papers: The World Bank has adopted a far more comprehensive and participatory approach to poverty reduction that has formed the basis of Ghana's poverty reduction policy. The bank is promoting the adoption of Poverty Reduction Strategy Papers (PRSP) in cooperation with about 70 least developing countries. The intention is that the member countries prepare strategies in a participatory process involving domestic stakeholders.

A PRSP describes the country's macroeconomic, structural and social policies and programmes over a three-year or longer horizon to promote broad-based growth and to reduce poverty, as well as setting out associated external financing needs and major sources of financing. PRSPs should be updated every three years with annual progress reports. Interim PRSPs (I-PRSPs) summarise the current knowledge and analysis of a country's poverty situation; describe the existing poverty reduction strategy, and lay out the process for producing a fully developed PRSP in a participatory fashion.

The following are the summaries from the latest World Bank poverty assessments:

Colombian poverty profile. During the past few decades the living conditions of the average Colombian have improved substantially. Poverty has declined steadily from an estimated 50 per cent of the population in 1964 to 19 per cent in 1992. Since the early 1950's life expectancy at birth, now at 69 years, has risen by almost two decades, while infant mortality rates,now 30 per 1,000 live births, have been slashed by a factor of four. Indeed, Colombia has better social indicators than the average for countries at its level of development.

While Colombia's overall poverty picture has generally improved, striking disparities in income, wealth, and living standards remain among regions and socio-economic groups. The challenge in reducing poverty remains significant. It is estimated that in 1992 more than six million Colombians had incomes below a commonly accepted subsistence level, with three out of four of these poor people living in rural areas. Furthermore, the rural poor are poorer than the urban poor. On average their incomes are 43.3 per cent below the subsistence level. The same deficit is only 31.3 per cent for the urban poor.

Significantly child malnutrition and infant mortality remain high despite the fact that continuous progress has been made for several years. Regional differences in most indicators suggest that the efforts required in surmounting gaps in income and social well-being are enormous for some areas. Infant mortality rates in Chocó, the department with the worst social indicators, are similar to the national average 20 years ago. The incidence of child malnutrition is 50 per cent higher in households in which the mother has no education than in those in which she has primary education. Overall, the sustained improvement in the main social indicators of the last decades should not divert attention from those Colombians still experiencing conditions that the country, as a whole, left behind 10 or 20 years ago. The experience of other countries in Latin America suggests that faster rates of improvement in living conditions can be achieved.

Sri Lankan poverty profile. In the post-independence period Sri Lanka has made good progress in reducing consumption poverty. Real per capita GDP grew at an average annual rate of 2.5 per cent in the 1950 to 1993 period. The distribution of household income by decile towards the end of the period was similar to that in the early 1950,s although there were fluctuations in between. Thus levels of consumption at the end of this period must have been much lower than at the beginning, regardless of the particular poverty line chosen. Based on an analysis of household data using a poverty line close to the "one-dollar-a-day" poverty line (per person at 1985 purchasing power parity), the study found that the proportion of individuals with consumption expenditures below the poverty line was about 22 per cent in 1990/91 (24 per cent in rural areas and 18 per cent in urban areas). The study also found that: individuals are more likely to be poor if working members of the household are employed in agriculture; that households where poor individuals live are larger; that the poor are less educated than the non-poor through the differences are not pronounced; that the poor have somewhat lower labour force participation rates, which is partly explained by age composition; that there is a positive correlation between poverty and unemployment; that the poor devote a large proportion of their consumption expenditure to food, with rice alone accounting for 25 per cent of their total consumption; and that the incidence of poverty for female-headed households is about the same as for male-headed households.

Progress in reducing consumption poverty has been accompanied by excellent progress in increasing literacy and other basic education indicators, and mortality and fertility have both declined to the point where the country has almost completed its demographic transition. There are, however, some areas of Sri Lanka's human development performance that need attention. Data on morbidity suggest that the incidence of malaria has increased sharply in recent times, and evidence from a number of surveys indicates substantial under-nutrition in young children. Unlike in other developing countries, however, under-nutrition does not result in high levels of infant and child mortality, possibly because of good basic health services and the fact that most mothers have had a basic education.

Ghanain poverty profile. The poverty profile in the poverty assessment is drawn from the 1987/88 Ghana Living Standards Survey (GLSS1). If defines two poverty lines: households are considered to be poor if their expenditures fall below two thirds of mean per capita expenditures; and extremely poor if their expenditures fall below one third of mean per capita expenditures. According to this approach 35.9 per cent of the Ghanaian population fell below the first poverty line and 7.4 per cent of the population was in extreme poverty. When disaggregated between urban and rural, however, poverty was overwhelming a rural phenomenon: over 43 per cent of rural inhabitants were poor; and the incidence of poverty in rural areas was more than 13 times the incidence in Accra. In addition poverty incidence varied considerably by region with most of the poor concentrated in the savannah, Volta, and mid-coast regions. Poverty is primarily a problem of low productivity among the self-employed (mostly smallholder families) rather than one of open unemployment.

Bangladeshi poverty profile. The lack of access to primary data on poverty in Bangladesh has been a serious, long-standing hurdle to more detailed poverty analysis. Official poverty estimates have been shrouded in some controversy because independent analysts have never been able to fully replicate the estimates in order to examine the strengths and weaknesses of the official methodology, or suggest alternative estimates using primary data. Recognizing these problems, in 1994 World Bank staff undertook a collaborative capacity-building initiative with the Bangladesh Bureau of Statistics (BBS) to help enhance the 1995-96 Household Expenditure Survey (HES), train BBS staff, improve basic data analysis, and publish an abstract. This initiative has also led to a series of analytical papers using the 1995-96 and earlier HES data. Work is still underway to mainstream poverty analysis into public policy design, implementation, and evaluation. The Bank is now assisting BBS with the implementation of the 1999-2000 HES.

Comments on the level of integration

Overall, the level of integration at the planning level is not good. While there are some attempts to integrate environment and economic planning, or economic and poverty reduction strategies, poverty reduction is not an clear, integral element of economic planning in many cases, still less environmental and climate planning where this exists.

1.3.3.2. Development Priorities Ratings in the Case Studies

Table 4 represents the ranking given to the 12 indicators adopted by the partners and their national stakeholder groups. While national poverty and development data was considered, qualitative assessment of the panels informed the rankings. For example, the availability of household electricity is a perceived indicator of relative wealth in Sri Lanka and therefore this received a high ranking. In the absence of comprehensive national poverty assessments and strategies in most of the countries these rankings must be treated with some caution. Nevertheless they are indicative of the relative priority of key poverty indicators, based on international and national data, as perceived by the national steering and stakeholder committees which were made up of a variety of interested parties.

Table 4 Relative assessment of development priorities

	Colombia	Sri Lanka	Ghana	Bangladesh
Income	High	High	High	High
Food security	Low	High	High	Medium High
Water	Medium	High	High	Medium
Sanitation	Medium	Low	High	Medium
Housing	High	Medium	High	Low-Medium
Employment	High	High	High	High
Energy	Medium	High	High	High
Education/ Skills	High	High	High	High
Health	Low	Medium-High	Med-High	Medium
Transport	Low	High	Med-High	Medium
Crime & Security/Peace	High	Medium-Low	Med-Low	Low-Medium
Social Exclusion	Medium	Low	Low	Low

Some of the key points are that:

- income generation is rated highly in all countries. This commonality belies a wide disparity in income levels and income distribution between the case studies;
- employment is also rated a high priority in all the case studies, though reliable, comparable data on unemployment levels was not available for comparison;
- education is rated a high priority by all the case studies though there are substantial disparities in educational levels in each of the countries;
- energy, water and housing provision are rated relatively highly across the case studies;
- social exclusion is rated low in all countries, except for Colombia;
- Colombia is unique in that it ranks crime and the provision of security a high priority;

- the weighting given to some development aspects such as food security, health and energy provision depends on the level of development of the country.

Project partners selected ten projects, each in consultation with national steering groups, covering a range of sectors including electricity generation from a range of renewable sources, including cogeneration and waste; and the provision of alternative energy and energy services in the transport agriculture and industrial sectors.

The projects were assessed against the poverty priorities identified in each research country for conclusions on how the CDM might impact on poverty reduction.

1.4. Research results

1.4.1. Projects selected

The following table details the ten projects from each case study, further details of which can be found in the country papers located in the appendices. The table is colour coded to distinguish between technology types. The next section describes the projects in more detail with regards to the number of units involved, the cost, the GHG benefits, the population benefited, and finally their poverty impact rating overall.

Table 5 Project summaries and description

	Colombia	Sri Lanka	Ghana	Bangladesh
Project 1	Landfill gas recovery	1.5 MW mini-hydro plant/Irrigation project benefiting 1,500 farmers – Grid-connected	Wind power generation along the coastal belt - electrification of communities – Off-grid	Introduction of aero derivative turbines in place of conventional turbines for peak load generation –Grid-connected
Project 2	Efficient lighting in urban sectors. Provision of energy efficient light bulbs targeted at low income consumers benefiting 25000 households	5MW fuelwood- based electricity generation plant, based on local plantations on degraded land benefiting 1000 families - Grid-connected	Wood residues for co-generation – Grid-connected	Cogeneration in sugar mills – Grid-connected
Project 3	Solar electricity for small villages. Provision of 10000 PV - Off-grid	1MW sawdust-based co-generation Plant. Production of electricity from sawmill waste with employment for 100. - Grid-connected	Mini-hydro electrification projects package – Off-grid	Setting up a 20 MW power plant using municipal waste – Grid-connected
Project 4	Substitution of diesel fuel by vegetable oil in diesel generation plants	Package of village hydro plants (250 kW) providing electricity 1000 households – Off- Grid	Package of solar technologies (solar home systems, water heaters, water pumps, water treatment, dryers for agriculture) – Off-grid	Solar home system in remote rural areas - Grid-connected
Project 5	Integrated biogas systems for small farms-Off-grid	Package of solar PV systems (50kW) providing electricity to 1000 households– Off-grid	Energy efficient cooking stoves and lighting	Stand-alone solar power system for 5,000 health care centres - Off-grid
Project 6	Energy efficiency in coke production	Package of solar water pumping systems for c2000 households, integrating forestry activity– Off- grid	Reforestation and production of sustainably harvested biomass	Solar panel street lighting for one typical village in Bangladesh - Off-grid
Project 7	Energy efficiency in the raw sugar industry	Package of 50 biogas plants utilising animal and other waste, providing cooking energy and fertiliser to 50 households– Off-grid	Transition zone forestry regeneration	Installation of 500,000 efficient cooking stoves
Project 8	Small reforestation units - agro forestry combined with cattle growing	Efficient fuelwood stove programme: manufacture and provision of more efficient stoves to 50 households	Inter–city alcohol train//bus services	Cement manufacture (wet to dry process)
Project 9		Landfill gas recovery and power generation capacity of 1MW-Grid-connected	Intra–city electric trains	Conversion of four stroke vehicles to CNG

Project 10		Forest plantations totalling of 1000 Hectares	Production of liquid fuel from energy crop plantations (Jatropha, oil palm, castor oil, sugar cane)	Introduction of electric vehicles in urban areas

1.4.2. Cross-country project comparison

For ease of comparison, there are two numerical rankings at the bottom of each column. Assured benefits, those benefits that would occur through the implementation of the project itself, receive two XX. Potential benefits rely on collateral assets being supplied, for example, solar home systems in rural areas may lead to rural enterprise development if credit services are also provided, however credit services lie outside the project boundary. 1 X represents these benefits. Each benefit receives one point, which is multiplied by its developing ranking. Impacts are weighted according to development priority: those in a high priority are weighed by 5, medium priority by 3 and low priority by 1. Where the project partners have established medium-high and medium-low priorities the factors are 3.5 and 2.5 respectively. The first numerical ranking shows the value of the assured benefits, and the second ranking shows the value of potential benefits.

Poverty is generally a rural phenomenon in the MEND countries, and as such the highest-ranking projects are aimed at the rural communities. Projects aimed at providing electricity to unelectrified communities and at increasing the returns from agricultural and forestry activities tend to be the projects with the highest development benefits. Grid-connected electricity generation projects also tend to score highly if they are focused on the consumption of biomass (thereby providing added value to waste biomass or the production of biomass).

The projects with the highest direct benefits across the MEND countries are diverse and reflect the poverty baseline in those countries. In **Bangladesh** the stand-alone solar power systems for a group of health care centres and an energy efficient cooking stove project give the highest positive direct benefits, reflecting the erratic or non-existent supply of electricity to rural areas and the poor state of the forestry sector in Bangladesh. The key benefits to these projects are impacts on increased income or affordability levels and health. In **Colombia** the highest scoring project is a reforestation project that combines forestry activity with agricultural or livestock activity. The project impacts on income and, importantly, contributes to the peace-building process in Colombia. In **Ghana** the highest-ranking project is the production of liquid fuel from energy crop plantations. This impacts directly on income, employment, energy provision and skills development. It is particularly beneficial since it opens up the range of income-generating options for farmers, a key stakeholder group in Ghana. In **Sri Lanka** the highest-scoring project is a small-scale hydro project with irrigation services that enable the rehabilitation of an abandoned area of agricultural land. The project will allow the 1500 benefiting farming families to harvest two seasons, potentially doubling their income.

When potential benefits are added to the direct benefits from the scoped projects, all four MEND countries rank solar technologies among their highest scoring projects. This underlines the importance of designing projects so that a wide range of services are provided, thereby maximising the developmental value of the CDM projects.

1.4.2.1. Comparison of grid-connected electricity generation projects

Half the grid-connected electricity projects have direct income effects. The most common reason is an increased demand for natural resources such as biomass. In addition for one project in Bangladesh income effects were linked to spending fewer resources on fuel for small generators, which are used to plug power shortages. Other reasons for positive income effects were increases in agricultural productivity through improved irrigation (S2).

Direct impacts on reducing social exclusion seem to be linked to greater income and employment possibilities. In G1 (the wind project in Ghana) positive impacts on reducing social exclusion are also linked to freeing up of women's time looking for fuel wood.

The highest scoring grid-connected project is S1 (hydro electrification). S1 scores highly for the provision of water, transport, income and employment impacts (high priorities) and for social exclusion.

The lowest scoring projects are the landfill gas recovery projects (C1, S9, B3) which impact directly on development priorities deemed to be low and medium ranking (such as health) when compared to other development criteria.

Table 6 Comparison of poverty reduction benefits of grid-connected electricity projects

C1	S1	S2	S3	S9	B1	B2	B3	
			X					Crime & security
						X		Education
X	XX	XX	XX			X	X	Employment
XX	XX	XX	XX	XX	XX	XX	XX	Energy provision
	X	X						Food security
XX				XX	XX	X	XX	Health
								Housing
	XX	XX	XX		XX	XX	X	Income
XX				XX				Sanitation
	XX	XX	XX			XX		Social exclusion
	XX							Transport
	XX							Water
L	L	**H**	L		L	L	L	Replicability
7	26	16	16		8	11	8	Assured benefits score
5	5	0	2.5		0	8	10	Assured + potential benefits score

1.4.2.2. Comparison of off-grid electricity generation projects

Over half of the projects impact positively on income levels. C3 (solar electricity provision) and C5 (integrated biogas plants) lead to reductions in expenditure on kerosene, candles and batteries. C5 leads to lower expenditure on fertiliser. G4 (he provision of solar technologies for agricultural

processing) adds value to current agricultural activity. B5 (the provision of solar technologies for health centres) impacts positively on income by reducing the cost of the service to users. B6 (the provision of solar panels for street lighting) increases the possibility of working after dark.

All the projects except for S6 (a solar water-pumping project) offer the potential to increase employment and income. However, this benefit is dependent on collateral services being provided to enable business ideas to develop.

Over half of the projects lead to health benefits: improved sanitation: C5 and S7 (biogas production projects); reduced fire hazards from kerosene use for lighting purposes: S4 and S5; provision of electricity to health centres: G4 and B5; and improved water quality: G4 and S6.

All the projects directly reduce social exclusion by increasing the decision-making potential of the target population and by strengthening village community structures, for example by increasing community management of resources. Some of the projects specifically target the ability of women to make choices, and their quality of life: B5 (solar street lighting); B7, G5 and S8 (improved efficiency cooking stove projects); S6, G1, G3 and G4 (wind, hydro and solar electricity generation technologies which reduce drudgery); S4, S5, S7 (which all improve lighting in the home).

Table 7 Comparison of poverty reduction benefits of off-grid electricity projects

C3	C5	S4	S5	S6	S7	G1	G3	G4	B4	B5	B6	
	XX										XX	Crime & security/Peace
X		X	X		X	X	X	X	X			Education
X	X	X	X		X	X	X	X	X	X	X	Employment
XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	Energy provision
				X								Food security
X	XX	XX	XX	XX	XX	X	XX	XX	X	XX		Health
												Housing
XX	XX	X	X	X	XX	X	X	XX	X	XX	XX	Income
	XX			X	XX							Sanitation
XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	Social exclusion
												Transport
				XX				XX				Water
H	**H**	**H**	**H**	**H**	**H**	L	L	**H**	**H**	**H**	**H**	Replicability
11	21	9.5	9.5	14.5	10.5	6	9.5	19.5	6	19	13.5	Assured benefits score
11	5	15	15	11	10	18.5	15	10	18	5	5	Assured + potential benefits score

1.4.2.3. Comparison of industrial and domestic energy efficiency projects

These projects include both small-scale industrial (C6, C7 and S8) and domestic stove projects (G5 and B7). These projects tend to have high income and employment scores. For C6 and C7 (energy efficiency in small-scale manufacturing) income benefits are generated through improvements in productivity and increased demand for locally produced technologies. There are also reductions in expenditure on the fuel currently used. B8 (energy efficiency in cement manufacturing) yields income benefits because of the reduced costs of manufacturing cement. C2 (the introduction of energy efficiency lighting) impacts positively on income through the reduced cost of electricity but does not have corresponding impacts on employment.

Projects C6 and C7 could be important to the peace building process in Colombia by improving the returns to small-scale industrial activities thereby helping to reduce an increased involvement of the rural population in drug production.

Most of the projects reduce social exclusion. C6 and C7 strengthen producer associations and the energy efficiency cooking stove projects reduce drudgery for women, for example, in the collection of fuel wood. Positive health impacts for women from reduced pollution levels in the home (from using more efficient fuel stoves) translate into greater economic productivity of women.

Table 8 Comparison of poverty reduction benefits of industrial and domestic energy efficiency projects

Industrial			Domestic	Domestic Stoves			
C6	C7	B8	C2	S8	G5	B7	
XX	XX						Crime & security
					X		Education
XX	XX	XX		XX	XX	XX	Employment
				XX	XX	XX	Energy provision
							Food security
XX	XX	XX		X	XX	XX	Health
							Housing
XX	XX	X	XX	XX	XX	XX	Income
							Sanitation
XX	XX			XX	XX	XX	Social exclusion
							Transport
							Water
H	**H**	L	**H**	**H**	**H**	**H**	Replicability
17	17	8	5	16	16	19	Assured benefits score
5	5	10	0	8.5	5	0	Assured + potential benefits score

1.4.2.4. Comparison of transport projects

These projects display how context-specific impacts may be. Ghanaian projects are rated highly for transport impacts as these projects involve the provision of public transport between cities and they deal with specific structural problems in Ghana. Fuel switching projects in Bangladesh, though they provide transport, replace existing transport provision and therefore have fewer benefits.

G8 (intercity transport running on biodiesel) benefits farmers in Ghana - a key stakeholder group in Ghana, by enabling the farmer to come directly into contact with the markets for their produce. This project therefore increases returns to labour by cutting out the middlemen and allowing the farmer to extract higher prices for agricultural produce. Time spent travelling to market is also reduced.

Income and employment benefits are linked in the Bangladesh projects. They occur from the growth of supply chain businesses to support the new technologies. However, it is not clear whether the net impact would be positive since they could merely replace businesses that exist for servicing the current transport technologies used.

Transport projects located in the cities provide many health benefits by reducing transport emissions. This is a particularly important for Bangladesh where there are extreme pollution levels in the cities.

Transport projects in Ghana reduce social exclusion because they increase accessibility to work, schools and markets.

Table 9 Comparison of poverty reduction benefits of transport projects

G8	G9	B9	B10	
				Crime & security
X	X			Education
X	X	XX	XX	Employment
				Energy
				Food security
X	XX	XX	XX	Health
				Housing
XX	XX	XX	XX	Income
				Sanitation
XX	XX			Social exclusion
XX	XX			Transport
				Water
L	L	**H**	**H**	Replicability
9.5	13	13	13	Assured benefits score
8.5	10	0	0	Assured + potential benefits score

1.4.2.5. Comparison of agriculture and forestry projects

These projects are quite diverse and impact highly on employment, income and social exclusion in most cases.

C4 (the substitution of diesel fuel by vegetable oil) and C8 (a reforestation project with ancillary benefits such as livestock production) are important to reducing the involvement of the rural communities in the illicit drugs trade in Colombia. This is particularly important for Colombia where development, terrorism and drug production are intimately linked. The projects offer an alternative income strategy for the rural communities. C4 in addition impacts positively on food security.

G7 and S10 provide reforestation to degraded land. Sustainably harvested biomass and biofuels are two products that increase income and employment opportunities for the rural communities.

G10 is another biofuel project. Its benefits include providing farmers with the potential to diversify out of traditional agricultural production and the potential to add value to current agricultural activities.

There are strong links between income and employment provision and reduced social exclusion.

Table 10 Comparison of poverty reduction benefits of agriculture and forestry projects

G6	G7	G10	C4	C8	S10	
			XX	XX		Crime & security
X	X	XX				Education/skills
XX	XX	XX	X	XX		Employment
XX	XX	XX	XX			Energy provision
			XX		X	Food security
						Health
						Housing
XX	XX	XX	XX	XX	XX	Income
						Sanitation
XX	XX	XX	XX		XX	Social exclusion
		X				Transport
						Water
H	**H**	**H**	**H**	**H**	L	Replicability
16	16	21	17	18	6	Assured benefits score
0	5	3	5	0	5	Assured + potential benefits score

1.4.3. Competitiveness of the projects selected

Where information was available from the partner countries the mitigation cost for each project was calculated to give an idea of the range of competitiveness of development-focused projects. *It is important to note that revenues from other sources are not taken into account in the price analysis,* for example, the price paid by users for energy services for electricity. In many cases this additional revenue could turn unprofitable CDM projects into profitable ones. Table 11 sets out the calculation process.

The range of costs of different project types is summarised as follows:

Grid-connected electricity generation projects	\$6 - \$47 per tonne of CO_2
Off-grid electricity generation projects	\$65 - \$394 per tonne of CO_2
Industrial energy efficiency projects	\$19 - \$65 per tonne of CO_2
Domestic energy efficiency projects	\$1 - \$44 per tonne of CO_2
Agricultural and forestry projects	Negligible - \$61 per tonne of CO_2

The differences in mitigation costs of similar project types may be due to differences in baselines and also different system sizes assumed by the project partners. A 21-year crediting period was assumed for the projects (except for the energy efficient lighting where seven years was assumed) following one of the two schedules stipulated in the Marrakech Accords.

Table 11 Comparison of mitigation costs for scoped CDM projects

	Crediting Period	Annual CO2	Total CO2	Capital costs	Running cost per annum	$ per tonne CO2
Grid-connected electricity generation						
Bangladesh						
B2 Cogeneration in sugar sector	21	160,000	3,360,000	10,000,000	5,000,000	34
Colombia						
C1 Landfill gas recovery	21	10,000	210,000	1,500,000	150,000	22
Sri Lanka						
S1 Mini-hydro	21	32,990	692,790	2,000,000	100,000	6
S2 Electricity generated from fuelwood	21	15,715	330,015	2,000,000	300,000	25
S3 Electricity generated from sawdust	21	3,143	66,003	1,500,000	75,000	47
S9 :Landfill gas recovery	21	5,028	105,588	1,000,000	150,000	39
Off-grid electricity generation						
Bangladesh						
B4 Solar home systems	21	22,880	480,480	500,00,000	2,500,000	213
Colombia						
C3 Solar home systems	21	2,232	46,872	9,000,000	450,000	394
C5 Biogas generation	21	3,000	63,000	1,800,000	90,000	59
Sri Lanka						
S4 Off-grid hydro	21	746	15,666	500,000	25,000	65
S5 Solar home systems	21	746	15,666	500,000	25,000	65
S7 Biogas generation	21	746	15,666	1,500,000	75,000	196
Industrial and domestic energy efficiency						
Bangladesh						
B7 Fuelwood cooking stoves	21	458,333	9,624,993	2,500,000	125,000	1
B8 Cement sector	21	46,600	978,600	40,000,000	800,000	58
Colombia						
C2 Efficient lighting	7	4,420.8	30,946	1,000,000	50,000	44
C6 Energy efficient coke production	21	78,000	1,638,000	750,000	37,500	1
C7 Raw sugar furnaces	21	126,610	2,658,810	16,250,000	162,5000	19
Sri Lanka						
S8 Fuelwood cooking stoves	21	3,278	68,838	20,000	1,000	1
Agriculture and forestry						
Colombia						
C8 Reforestation	21	240,000	5,040,000	114,000,000	9,120,000	61
Sri Lanka						
S10 Reforestation	21	200,000	4,200,000	35,000	1,750	0

It is perhaps no surprise that grid-connected projects and energy efficiency projects are the most competitive project types from the scoped projects, and that off-grid electricity generation projects (and in particular solar electricity) are the most expensive. Carbon value over the 21 crediting period practically covers the entire costs of an improved cooking stove project and some types of forestry projects, and would certainty be competitive with greenhouse gas mitigation projects being transacted currently. On average, the costs of mitigation for development-focused CDM projects are much higher than the current

average price offered by international tendering programmes for emissions reduction projects (which pay around $3 per tonne of CO_2) and higher than any projected price of carbon within emission trading systems. Even with reductions in transaction costs (see the Capacity Building chapter) and taking into account other project revenue streams, these figures show that donor assistance may be required in the project design and implementation stages, and that dedicated purchasing programmes for development-focused projects will be necessary if the CDM is to benefit poverty reduction objectives.

1.4.4. Conclusions

1.4.4.1. CDM and Equity

The following are generic conclusions regarding the CDM market and its impact on small to medium developing countries.

- There are considerable uncertainties with respect to the size of CDM market.
- Investment will chase least-cost abatement potential and the majority of investment will go to a few larger and more developed countries.
- Nevertheless there are potentially significant investments to be had from CDM implementation.
- Those countries without substantial emissions or the prospect of emission growth will need to rely on sequestration projects, or fail to secure substantial benefits from the CDM, in the absence of dedicated purchasing programmes for smaller-scale projects.
- In the absence of institutional capacity many smaller countries will either fail to attract significant investment and/or because of a lack of capacity are likely to negotiate less favourable terms for CDM projects, leaving the majority of benefits to the investor.
- Smaller-scale projects producing lower GHG benefits are likely to have difficulty attracting international funding without special provision and dedicated financial assistance.

1.4.4.2. GHG mitigation and energy and service provision

The provision of energy services is not the only or necessary outcome of a GHG reduction project. While CO_2 is the principle GHG there are others, and while CO_2 is emitted primarily from fossil fuel consumption there are other sources. Most of the projects here are concerned with CO_2 abatement or sequestration and most are directly related to energy provision. The bias towards identifying the development benefits of energy provision criticised in other studies has been repeated somewhat here.

1.4.4.3. Energy and infrastructure

Previous studies and guidance are cautious about the poverty reduction benefit of energy provision. The poverty reduction potential of energy provision is circumscribed by two key conditionalities:

- the availability of key infrastructure that enables exploitation of productivity benefits; and
- the provision of equipment that enables energy provision to be converted to useful work and other benefits.

1.4.4.4. Country Conclusions

National poverty baselines were established in a crude way and probably fail to reflect regional and other disparities within the countries concerned. Full poverty assessments were not possible in the course of the project and assessment methods were subjective and subject to bias. Nevertheless some tentative conclusions can be made:

- National poverty baselines have made clear that poverty is context-specific.
- The ratings given by national steering committees to our chosen poverty priorities do not always closely correspond with the HDI indicators, indicating either a failure in our methodology, or the impact of perception factors (for example, in Sri Lanka lack of access to electricity is perceived to indicate poverty and social exclusion)
- Different projects fare differently between countries because of a mixture of factors including the relative ranking of key impacts and also variances in key features of the project design, for example: a landfill gas methane recovery project in Sri Lanka rates much more highly than a similar project in Colombia because of the relative state of waste collection in Sri Lanka and the perceived benefits of better urban waste collection systems in the Sri Lankan Scheme; the provision of efficient cooking stoves rates very highly in Bangladesh in contrast to Sri Lanka.

1.4.4.5. Project Conclusions

Subject to the same caution, given the uncertainties in our assessment methodology, the following conclusions are drawn at the level of projects:

- Most of the identified projects had some highly rated impact on a priority indicator demonstrating the potential for CDM to deliver real development benefits.
- Employment and income generation are marked features of many projects, concentrated somewhat in off-grid projects,
- Energy provision and reducing social exclusion are highly rated in electricity off-grid projects where both are at a premium.
- Forestry and agriculture projects impact highly on income and employment generation and on reducing social exclusion.
- Other development benefits are very much a feature of project design, for example, transport benefits derive from the provision of new transport services in rural areas but do not rate highly in fuel switching projects in urban areas where transport already exists and the benefits are focused therefore primarily on increased health benefits.
- Projects which provide energy without collateral benefits tend to impact on poverty relatively little (for example in G3: wind-power generation, and G2: mini-hydro provision). In contrast mini-hydro plans with irrigation benefits impacted on poverty indicators more significantly in Sri Lanka.
- Many projects were found to have considerable replicability suggesting these projects are susceptible to being treated in a programmatic fashion for the purposes of baseline selection, verification and monitoring. As transaction costs are a key barrier to investment in smaller scale

development projects the bundling of such projects and the development of common standards for their approval should be investigated.

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2. Capacity building needs for CDM project implementation

Summary

Developing countries' participation in the Clean Development Mechanism (CDM) is often hampered by a lack of development of human, institutional, policy and legal capacity needed to implement the mechanism. Capacity can be defined as the ability of individuals and institutions to make and implement decisions and perform functions in an effective, efficient and sustainable manner.

Capacity building needs for Bangladesh, Colombia, Ghana and Sri Lanka were assessed through a consultative process involving stakeholders in a range of government ministries, the business sector and development-focused organisations. Capacity needs have been assessed in the context of the CDM project development cycle and then organised according to different 'entry' levels for capacity building actions, as shown in Table E1.

Table E1 Scoped capacity building actions

Level of capacity	Capacity building activities
Skills/expertise/awareness	• Awareness raising • Technical training
Institutional	• CDM office • Small scale projects fund • Technology transfer strategy
Policy & legal	• Climate change strategy • Legal Framework and standardised legal contracts • Integration into sectoral policy areas • Streamlined approval procedures • Development of standardised approaches to the project design document • Sustainable evaluation tool

The research shows that there is a clear absence of any supporting policy and legal frameworks for the CDM in the research countries. The institutional base required for implementation of the CDM is also largely absent. Capacity at the level of individuals is focused on a limited number of actors and institutions. Much of the capacity needed to implement the CDM in developing countries is at the initiation stage of the project cycle.

The research highlighted that in each of the MEND partner countries:

- many of the CDM stakeholders are limited in their capacity to invest resources in the CDM. This is evident at various stages of the project cycle as well as across actors and institutions.

- there is little representation of poverty-focused actors and institutions in climate change issues. Awareness needs to be created among stakeholders such as developmental groups and NGOs, financial aid organisations and community groups. Across all the capacity needs indicators discussed in this paper there needs to be a targeted poverty alleviation focus, an area which is conventionally neglected in CDM investment strategies.

- there needs to be a two-pronged approach to capacity building, targeting government and non-government actors and institutions. A disconnect appears to exist between private sector project proponents and developers, and the macro institutions responsible for defining and implementing national policy; reviewing and approving project documents; and providing technical support. Linkages between these actors and institutions should be developed and strengthened.

- developing an enabling environment for the implementation of the CDM should be a significant focus of capacity building. Other capacity building actions reduce the transaction costs associated with developing the carbon value of CDM-type projects.

- even with lower transaction costs development-focused projects may need support such as: project development grants; risk mitigation mechanisms for under-performance or non-performance of the project; and cash advancements against equivalent future CER streams.

- delivery mechanisms identified range from 'learning by doing' strategies, workshops, institutional support, information exchange programmes and technical training programmes. Some of the capacity building actions target the various 'levels' of capacity required for successful participation in the CDM, while other capacity building actions equip developing country actors and institutions to drive the capacity building process themselves.

Donor assistance is required at the institutional and policy level to facilitate the participation of developing countries in the CDM. Donor assistance is also required at project level to reduce transaction costs and to promote development-focused CDM projects in the emissions trading market. For some technologies carbon emission mitigation costs are much higher than the current average price offered by international tendering programmes for emissions reduction projects (which pay around $3 per tonne of CO_2). Even with reductions in transaction costs, financial support and dedicated purchasing programmes may be needed.

Capacity building actions could focus on:

Strategy formulation;

- An assessment as to whether potential CDM flows are sufficiently significant to a developing country to merit involvement of the country in the CDM;
- Development of a comprehensive climate change strategy for mitigation, exploring the linkages with adaptation;
- Technology needs assessment.

Policy and institutional support

- Awareness raising and building of technical expertise;
- Development of regulatory frameworks;
- Development of institutional structures for CDM implementation;
- Development of standardised approaches to the baseline and monitoring protocols for CDM projects.

Direct project implementation assistance

- Support funds for preparation of development-focused projects;
- Risk mitigation tools and mechanisms for private sector investment in development-focused projects;
- Cash advancements lent against expected future CER streams;
- Dedicated carbon purchasing programmes for small-scale, development-focused projects.

Policy and institutional support can be delivered through:

- demonstration CDM projects with developmental benefits;
- workshops to: encourage national debate on CDM policy and supporting sectoral policies; feed into process of national strategy building; develop national technical capacity to develop and assess CDM projects; develop standardised data and approaches to baseline determination and monitoring for GHG mitigation projects;
- studies and assessments to contribute to and support the process to strategy building;
- developing information sharing and dissemination channels between North-South and South-South.

The participants emphasised that capacity building for the CDM should be developed within existing policy and institutional frameworks in the host country government.

2.1. Overview

The purpose of this paper is to define the capacity building required to operationalise the Clean Development Mechanism (CDM) in small to medium developing countries, focusing particularly on projects falling within national development and poverty alleviation strategies.

Capacity building needs for Bangladesh, Colombia, Ghana and Sri Lanka were assessed through a consultative process involving stakeholders in a range of government ministries, the business sector and development-focused organisations. Some targeted awareness-raising was carried out to enfranchise stakeholders in the CDM framework-setting process and to engage them in the consultation process.

2.1.1. Structure of the paper

This paper synthesises the research carried out by the partner countries, identifying the capacity built to date, the existing skills, resources and institutions currently involved in the CDM process, and the corresponding gaps in capacity. Finally this paper presents recommendations for a consolidated capacity building component to encourage the project development under the CDM.

The paper is structured as follows:

- *Section 1*: Introduction to the research;
- *Section 2, Capacity built to date*: Where has capacity been built in the partner countries?
- *Section 3, Capacity building needs*: What capacity is needed?
- *Section 4, Delivery mechanisms*: How could capacity be delivered?

2.1.2. Definition of capacity building

Capacity can be defined as the 'ability of individuals and institutions to make and implement decisions and perform functions in an effective, efficient and sustainable manner'.[21] To build capacity three components are strictly interrelated[22]. These components correspond to three levels:

1. **Skill/expertise** of the people involved in participating in the CDM. At this level capacity building refers to the process of changing attitudes and behaviour - imparting knowledge and developing skills while maximising the benefits of participation, knowledge exchange and ownership.

2. **Institutions** that mobilise and use the skills of individuals. This level of capacity building focuses on the overall organisational performance and functioning capabilities as well as the ability of an organisation to adapt to new policy agendas. Actions to strengthen institutions, such as the creation of focal points - for example a CDM office - maximise the effectiveness of the skills base;

[21] GEF – UNDP (2001)

[22] Ibid.

3. **Systemic** refers to the policy and legal regime in which actors and institutions operate.

This paper focuses on capacity building actions at all three levels, in other words, the framework needed to encourage a supply of development-focused CDM projects. We consider various 'entry' levels at which capacity building could take place. Capacity building at one entry level may be a prerequisite or it may enforce capacity building activities taken at another level.

2.1.3. UNFCCC guidance on capacity building

The Marrakech Accords, agreed at the seventh Conference of Parties, 2001, sets out the principles that should guide how capacity building programmes are developed. Capacity building activities should:

- build on work already undertaken in developing countries;
- be a continuous, progressive and iterative process;
- involve 'learning by doing'. Demonstration projects may be used in identifying and learning about the specific capabilities that need to be further developed in developing countries;
- utilise existing institutions and bodies and build on existing processes and endogenous capacities.

Broad categories of capacity building actions relevant to the implementation of the CDM include:

- Institutional capacity building, including the strengthening or establishment of national climate change secretariats or national focal points;
- Enhancement or creation of an enabling environment;
- National climate change programmes;
- Assessing the implementation of mitigation options;
- Development and transfer of technology;
- Improved decision-making;
- Education, training and public awareness;
- Information and networking, including the establishment of databases.

This guidance is used by the study to highlight the gaps in capacity building undertaken in the MEND countries to date, highlighted in Section 2, and as an input into scoping capacity building needs in Section 3.

2.1.4. Limitations to recommendations

The effectiveness of capacity building activities for implementation of climate change policies is likely to be at least partly dependent on there being a wider enabling political and economic environment. Key country characteristics that facilitate the effectiveness of capacity building activities, include:

- *Political, economic and social settings*: for example, sustained economic growth, with adequate wage levels and low inflation; open and participatory government; social consensus or a lack of social conflict;
- *Public sector institutional settings*: for example, salaries that are attractive to motivate people;
- *Task networks*: for example, interactive mechanisms for public and private organisations.

2.1.5. Why the conclusions of this paper should interest DFID

Annex 1 countries have a responsibility to support capacity building for implementation of mitigation and adaptation policies. Two funds, established in the Marrakech Accords at the seventh Conference of Parties, provide for capacity building activities: the Least Developed Countries' Fund and the Special Climate Change Fund (-/CP.7). In addition "*predictable and adequate levels of funding shall be made in countries not included in Annex I*" on a bilateral basis as well as on a multilateral basis.

The World Bank Prototype Carbon Fund (PCF), a major carbon-purchasing fund, highlights that experience in investing in CDM projects to date demonstrates that the development of an effective emission reduction market depends on two critical components:

- Host governments need to build their capacity to understand and meet the Kyoto Protocol's requirements and to facilitate CDM/JI transactions;
- The private sector, especially in the host countries, needs greater capacity to identify carbon-financing opportunities, to assist with project preparation and undertake validation, verification and certification of projects.[23]

The MEND research highlights that these critical components are typically entirely or partly missing from the MEND focus countries.

DFID highlights that “there is a potential for benefits from the Clean Development Mechanism to be inequitable due to lack of capacity in developing countries, with risk being a major factor. Capacity building should include institutional, human and technology transfer. The need to look at technical backup to the CDM process has been highlighted”[24].

It is worth funding capacity building for implementation of the CDM because:

- there can be good developmental benefits associated with CDM projects, depending on the design of the project;
- although the size of the CDM market is in some dispute, there is agreement that the market will be in terms of billions of US dollars, and this is likely to increase if greenhouse gas emission targets are set for the second compliance period;

[23] World Bank Prototype Carbon Fund, Annual Report 2001.

[24] EKAR Full Proposal (Part A), 2002-03, DFID Proposal Pack, 21 August 2001

- in the absence of capacity building many smaller developing countries will fail to attract significant investment through the CDM and/or likely to negotiate less favourable terms for CDM projects, leaving the majority of benefits to the investor, which in many cases will be a developed country entity;
- capacity building for mitigation will also go some way to strengthening capacity for adaptation, which some argue is more significant to poverty reduction than greenhouse gas mitigation.

2.2. Capacity built to date

2.2.1. Awareness and technical skills

Colombia has had the most capacity built in technical issues (relating to developing the carbon potential of CDM projects) while Bangladesh and Sri Lanka have had no technical capacity building. In addition Bangladesh has had the least awareness raised of the four MEND focus countries.

All MEND countries have had varying levels of inclusivity in workshops aimed at raising awareness, both in terms of the sectoral interests of different stakeholder groups (participation has included from stakeholders from areas other than environment and energy) and in terms of central and regionally based organisations. Despite the generally inclusive nature of the participants involved in awareness-raising activities to date, the MEND project partners felt that the level of involvement and awareness of the private sector and the development community in the CDM agenda is still poor, see Section 3.2.

Table 1 Awareness raising and technical training carried out in MEND partner countries

Bangladesh	**Action**	**Participants**
Dutch Foreign Affairs, 2000	Demonstration projects (a solar home system project and an electric vehicle project.): South South North capacity building project	
Asian Development Bank, 2000	2 awareness raising seminars	Ministry of Environment, Bangladesh University of Engineering and Technology, Bangladesh Centre for Advanced Studies, Bangladesh Unnayan Parishad, Bangladesh Institute of Development Studies, other university participants.
International Education's Energy Group, 1999	1 day workshop	Ministry of Environment, Bangladesh University of Engineering and Technology, Bangladesh Centre for Advanced Studies, Bangladesh Unnayan Parishad, Bangladesh Institute of Development Studies, other university participants.
Ghana		
GEF, UNDP, 1996 - 1998	National Conference on Climate Change	Ministry of Environment and Science, Environmental Protection Agency, Ministry of Trade & Industry, Metrological Department, Ministry of Agriculture, Ministry of Energy, Ministry of Transport, Ministry of Finance, Ministry of Local Gov't, Ministry of Forestry Association of Ghanaian Industries, Chamber of Commerce, NGOs in the environment sector and academics in the sectors of Natural Resources, Agriculture, Forestry, and Meteorology, District Assemblies.
UNEP Collaboration Centre for Energy and Environment (UCCEE), 1999	Developing sustainable development indicators for GHG mitigation projects; Identification of projects; Building capacity for participation in the CDM	Ministry of Environment and Science, Environmental Protection Agency, Ministry of Trade & industry, Metrological department, Ministry of Agriculture, Ministry of Energy, Ministry of Transport, Ministry of Finance, Ministry of Local Gov't, Ministry of Forestry, Ghana Railway Authority, Ghana Investment Promotion Centre, utility providers, industrial private sector, environmental NGOs , academics in the sectors of natural resources, agriculture, forestry & meteorology.
UNEP/UCCEE, 1998	African Regional Workshop on CDM	Country representatives.
GEF/UNDP, 1997	African Regional Workshop on GHG inventories	Country representatives.
Colombia		

World Bank/ Swiss Government, 2000	Methodological workshop: CDM – seminar on the methodology for the implementation, study and project design	Government: Environment, Energy, Planning Board; Regional environmental organizations; Industry associations; Forestry associations; Financial sector; Potential project developers; Academic sector (energy and environmental sectors); Consultants.
World Bank/ Swiss Government, 1999	Seminar on forest projects for CO_2 capture under CDM: basis and methodology for project formulation; Workshop on analyzing the Choco project; Seminar on the outlook for the *GHG* market.	Government: Environment, Energy, Planning Board; Regional environmental organizations; Forestry associations; Financial sector; Potential project developers; Academic sector (forestry and environmental sectors); Consultants.
Sri Lanka		
EAP1, 2001	Workshop for brainstorming on the development of a national CDM strategy	Min of Forestry and Environment, Min of Finance, Min of Industry, Min of Energy, Min of Science and Technology, Energy Forum, Universities, Meteorological Department, Agricultural Department, Forestry Department, Lanka International Forum on Environment and Sustainable Development (NGO), private consultants
UNEP, SACEP, 2000	Workshop on economic aspects of the UNFCCC and flexibility mechanisms	Min of Forestry and Environment, Min of Finance, Min of Industry, Min of Energy, Min of Science and Technology, Energy Forum, Universities, Meteorological Department, Agricultural Department, Forestry Department, Lanka International Forum on Environment and Sustainable Development (NGO), UNDP
UNEP, ADB, SACEP 2000	National workshop on the UNFCCC and the institutional design of the cooperative implementation mechanisms	Min of Forestry and Environment, Min of Finance, Min of Industry, Min of Energy, Min of Science and Technology, Energy Forum, Universities, National Planning Dept, Meteorological Department, Agricultural Department, Forestry Department, Lanka International Forum on Environment and Sustainable Development (NGO) , UNDP, private consultants

EA1P,2000	Workshop on Sri Lanka's position on the Kyoto Protocol	Min of Forestry and Environment, Min of Finance, Min of Industry, Min of Energy, Min of Science and Technology, Energy Forum, Universities, Meteorological Department, Agricultural Department, Forestry Department, Lanka International Forum on Environment and Sustainable Development (NGO)
Government Consolidated Fund, 2000	Workshop on the CDM and emission trading potential of Sri Lanka	Min of Forestry and Environment, Min of Finance, Min of Industry, Min of Energy, Min of Science and Technology, Energy Forum, Universities, Meteorological Department, Agricultural Department, Forestry Department, Lanka International Forum on Environment and Sustainable Development (NGO), private consultants, Solar Industries Association

2.2.2. Institutional capacity

This level of capacity building focuses on the overall organisational performance and functioning capabilities of institutions. Very little has been done in this respect in any of the MEND countries. Only Ghana has started assessing the technology needs in the country - the first step in formulating a technology transfer strategy.

Table 2 Institutional capacity building in the MEND countries

Ghana	Activity
UNDP/GEF, 2001 - ongoing	Technology needs assessment in energy and waste sectors. The assessment also focuses on the barriers to technology transfer and strategies to lower these barriers.

2.2.3. Systemic capacity

All the MEND countries have focused on various aspects of a climate change strategy, for example, the scoping of mitigation and adaptation options and the preparation of National Communications. National Communications set out the significance of national sectors to national greenhouse gas emissions, establish inventories of greenhouse gas emissions, and set out mitigation options and policies and measures to limit greenhouse gas emissions.

Bangladesh and Ghana have scoped some adaptation and mitigation options although mitigation options are generally focused on least-cost options. Colombia has implemented a series of sectoral workshops which explore mitigation options. In addition a National Strategy Study, supported by the Swiss government and the World Bank, formulated a least-cost mitigation strategy.

Sri Lanka has done relatively little in this area.

Table 3 Scoping/strategy building carried out in MEND partner countries

Sponsor	Activity
Bangladesh	
UNEP, Not yet initiated	Adaptation needs assessment
GEF, 2000 - on-going	Preparation of National Communications
Pembina Institute of Appropriate Development, 2001	Scoping of CDM opportunities in Bangladesh, according to cost, national sustainable development opportunities and ease of implementation.
UNDP/GEF, 1999	Asia Least Cost Greenhouse Gas Abatement Strategy. This study had 3 main components: greenhouse gas emission inventories for the energy; agriculture and forestry sectors; analysis of mitigation options in the energy sector and the formulation of a GHG mitigation strategy.
US government, 1995 1996	A country study which focused on greenhouse gas emission inventories, vulnerability and adaptation, mitigation options and information dissemination.
Ghana	
UNDP/GEF, 1998	Preparation of National Communications and national greenhouse gas inventories
Netherlands Climate Assistance Programme on Vulnerability and adaptation studies, 1996 - 1998	Vulnerability assessment of Ghana's water resources and coastal zone. Development of national climate change scenarios.
UNIDO Africa CDM Project Initiative, 1999- Phase 1	Identification of projects in the industrial sector; Identification of capacity building needs; Identification of barriers and removal strategies in relation to technology transfer in the industrial sector.
Colombia	
World Bank/ Swiss Government, 2000	National Strategy Study for implementation of the CDM in Colombia
World Bank/ Swiss Government, 1999	Workshops for analyzing alternatives for the cement sector
Ministry of Environment / Accefyn/GTZ, 1998	Seminar 01 on GHG emissions in Colombia and reduction options
Ministry of Environment / Accefyn/GTZ, 1998	Seminar 02 on GHG emissions reduction options – energy sector
Ministry of Environment / Accefyn/GTZ, 1998	Seminar 03 on GHG emissions reduction options – non-energy sector
Ministry of Environment / Accefyn/GTZ, 1998	Seminar 04 on GHG emissions reduction plan – final results presentation.
Sri Lanka	
UNDP/GEF, 1998- 2000	National communications
Ministry of Environment and Natural Resources, 1999	National Action Plan on climate change

2.3. Capacity building needs

The following section sets out the methodology used to scope capacity building needed to operationalise the CDM in the MEND focus countries, with a view to encouraging a supply of development-focused projects. The methodology is primarily based on stakeholder consultation in the MEND focus countries. We also integrate the research results from the UNFCCC on the barriers to technology transfer (Box 1) which provide ideas as to where and how capacity building can be used to lower these barriers. Section 2.1 outlined the guidance provided by the UNFCCC as to how capacity building should take place, and this is also fed into the assessment framework. Section 2.3 goes on to use a gap analysis to highlight areas where capacity is needed in the MEND countries. Finally, Sections 2.3.2 to 2.3.4 define the scope of the capacity building needs identified.

2.3.1. Assessment framework

An assessment framework was used to comprehensively identify capacity building needs in the MEND focus countries. The framework was provided by the CDM project cycle, as shown in Table 4. The principal form of information collection in the MEND focus countries was through stakeholder consultation, although research results by the UNFCCC on the broad barriers to technology transfer were also integrated, see Box 1.[25]

Capacity building indicators, common to all countries, have been identified for each stage of the project cycle and reported in Table 3. Each of the project cycle components is characterised by different capacity needs. It is interesting to note that many of the capacity building actions required are at the initiation stage of the CDM project cycle, highlighting the importance of developing an enabling environment for the operation of the CDM.

[25] FCCC/TP/1998/1 Technical Paper on Terms of Transfer of Technology and Know-How: Barriers and opportunities related to the transfer of technology, October 1998.

Table 4 Framework for assessing capacity building needs in partner countries

Indicators of capacity	***Comments***
Initiation: Promotion of host country as a partner for CDM investments overseas. Mobilisation of domestic resources for CDM implementation. Project identification and design, including a preliminary assessment of project eligibility.	
Awareness among potential participants of the CDM	▪ Who has been involved in awareness raising to date? ▪ Which other actors and institutions need to be involved?
County climate change strategy	▪ A formal strategy; ▪ It should assess how large CDM project opportunities are likely to be, as well as the potential impact on poverty reduction. Is it worth the country pursuing CDM project opportunities? ▪ It should scope mitigation options; ▪ It should assess the overlap between adaptation and mitigation ▪ It should assess linkages with poverty alleviation and country poverty reduction strategy
A regulatory framework	▪ Key aspects are legal recognition of CER transaction process and credit sharing rules and protection of intellectual property rights for technology development.
Technology transfer strategy	▪ What technology-related information exists, and which organisations collect it? ▪ How do you assess technology needs to encourage development-focused projects? ▪ How is technology-related information disseminated?
CDM focal point	▪ What should its functions be? ▪ How should the CDM focal point be financed?
Integration into other policy areas	▪ How are greenhouse gas mitigation aims integrated into sectoral policies? ▪ Are fiscal incentives a good way to lower barriers to investment? ▪ How can integration with other policy areas be improved?
Project design document: Carbon quantification through baseline determination, and the design of monitoring protocols.	
Baseline	▪ Develop standardised data for small-scale, development-focused CDM projects.
Monitoring	▪ Develop standardised approach for small-scale, development-focused CDM projects.
Approval: The approval process and criteria for CDM project proposals.	
Streamlined CDM approval process	▪ At government level, particularly for poverty focused CDM projects.
Positive lists	▪ Establish a list of technologies that are additional *a priori*.
Sustainable development evaluation tool	▪ Incorporate poverty reduction objectives.
CER sales/ Financing: Monetisation of the carbon asset through carbon purchase agreements. Integration of this carbon value into the financing structure of the project being considered.	

Small-scale projects bundling mechanism	▪ Bundle small-scale, development-focused projects centrally to reduce transaction costs and risk to investors.

Box 1 Barriers to technology transfer to developing countries

The UNFCCC summarised the broad barriers to the transfer of technology and know-how in a technical paper that collected relevant information from literature, meetings and workshops. The barriers identified have been organised according to the three levels of capacity outlined in Section 1.2 and are as follows:

- Institutional:
  - Technological: lack of infrastructure; lack of technical standards and institutions for supporting the standards; low technical capabilities of firms and lack of a technology knowledge base;
  - Information: lack of technical and financial information and of a demonstrated track record for many new technologies;
  - Financial: Lack of finance; terms of funding; inability to obtain international finances for dissemination of indigenous technologies.

- Systemic:
  - Lack of legal and regulatory frameworks; limited institutional capacity; and excessive bureaucratic procedures;
  - Lack of intellectual property protection and unclear arbitration procedures;
  - Cultural: consumer preferences and social biases.

Other barriers that relate to the wider enabling environment are as follows:

- Political: instability, interventions in domestic markets; corruption and lack of civil society.

Source: UNFCCC/TP/1 Oct 1998

Putting these scoped capacity needs into the UNDP capacity building framework it is possible to see that many of the capacity needs are required at the policy and legal level, as shown in Table 5.

Table 5 Categorisation of CDM capacity needs according to UNDP framework

Level of capacity	
Awareness/Skills/expertise	• Awareness raising • Technical expertise
Institutional	• CDM office • Small-scale project bundling mechanism • Technology transfer strategy
Policy & legal (systemic)	• Climate change strategy • Legal framework • Integration into sectoral policy areas • Development of standardised approaches to the project design document • Streamlined approval procedures • Sustainable evaluation tool

Based on the identified capacity indicators a gap assessment for each MEND country shows where capacity needs to be developed, as shown in Table 6.

Table 6 Gap analysis of capacity needs for CDM project implementation

Indicators of capacity	**Colombia**	**Ghana**	**Bangladesh**	**Sri Lanka**
Skills/expertise/awareness				
Awareness levels	✓	✓	✓	✓
Technical expertise	✓	✓	✓	✓
Institutional				
CDM focal point	✓	✓	**X**	✓
Small-scale projects bundling mechanism	**X**	**X**	**X**	**X**
Technology transfer strategy	**X**	**X**	**X**	**X**
Policy & Legal Context				
Country climate change strategy	✓✓	✓	**X**	✓
Legal framework	**X**	✓	**X**	**X**
Integration into other policy areas	**X**	✓	**X**	**X**
Development of standardised approaches to the project design document	**X**	**X**	**X**	**X**
Streamlined CDM approval procedures	**X**	**X**	**X**	**X**

(X=not available/poor, √=some/partly, √√=good.)

The gap analysis shows that, for the most part, there is a clear absence of supporting policy and legal frameworks for CDM operation in the research countries. The institutional base required for implementation of the CDM is also largely absent. Capacity at the level of individuals is focused on a limited number of actors and institutions in the public and private sectors, thereby restricting the typology of projects that are likely to be submitted as CDM projects.

The following sections 2.3.2 to 2.3.4 define the scope of each capacity building activity identified.

2.3.2. Awareness, skills and expertise

This section deals with the role of different stakeholder groups in the implementation of the CDM, highlighting the awareness, knowledge and technical expertise needed to respond to each of their potential roles effectively within the context of the CDM project cycle.

2.3.2.1. Awareness and participation among stakeholders of the CDM

The project identified four broad types of actors and institutions required for implementation of the CDM in the MEND countries, paying particular attention to development-focused projects:

- Government;
- Private sector: Business sector (project developers, consultancies); Financial institutions;
- Technical institutions;
- Development community (NGOs and government donor agencies).

These actors may be involved in more than one area of the CDM project cycle, as highlighted in Table 7.

Table 7 Actors involved at each stage of the CDM project cycle

CDM project stage	Actors involved
Initiation	Government Development community Technical institutions
Development of project design document	Business sector Technical institutions
Approval	Government
Project development, management and monitoring	Government Development community Project developers
CER Sales/financing	Government Project developers, Financial institutions Development community

Generally, over the four MEND countries the level of awareness of climate change issues and the CDM is limited to a small core of individuals in government, typically in the energy and environment sectors; some universities and research institutes; and a few private sector firms, mostly in the energy sector. The consequence of this limited awareness could be to restrict the typology of projects developed as CDM projects.

Government

In most countries, the government is a key player in developing and driving the capacity building process. Table 8 sets out the government's potential role at each stage of the CDM project cycle.

Table 8 Potential role of government in facilitating the implementation of the CDM

Role	Details
Create an enabling environment	• Set the wider macro-economic pre-requisites for private sector investment; • Promotion of joint venture partners would help mobilise the domestic business sector and NGO sector; • Set up mechanisms to mitigate political risks; • Establish and strengthen information dissemination channels from government to interested parties.
CDM initiation	• Awareness needs to be raised among all relevant stakeholders to: 1. engage a wide range of government stakeholders in the CDM process; 2. establish a strategy for greenhouse gas formulation; 3. formalise technology information collection and processing and establish and develop a clean technology transfer strategy. 4. establish simplified procedures for CDM activities, for example, positive lists; 5. establish a legal framework for CER transaction; 6. establish supporting policies to lower barriers to investment. • The host country government could establish partnerships with Annex 1 JI/CDM offices.
Project development, management & monitoring	• The government could underwrite financing or directly finance poverty-focused CDM projects. The government needs to understand whether and how CERs can be accrued, and sustainability issues with regards to CER generation.
Approval process	• Improve coordination between government departments. • Provide guidelines on approval criteria. Technical expertise needed on benefits of technology options, particularly with regards to development.
CER Sales	• Creation of a national bundling mechanism for poverty-focused projects to reduce transaction costs and risks.

The MEND research highlighted that a crucial first step in engaging government departments is raising awareness about why the CDM is relevant to their mandates, and the promotion of national dialogue among government stakeholders. Engaging a range of ministries would help in formulating strategies to maximise the effectiveness of the CDM in promoting national policy priorities. Simplified transparent approval procedures are particularly important to encourage CDM investment flows by provide confidence in the outcomes of the approval process, thus limiting some of the risk to investors.

The Private Sector

The private sector is important in developing CDM projects; financing CDM projects and providing technical services for CDM projects such as baseline development, validation and verification services. Use of the local private sector for technical services is an important way of driving down transaction costs

for development-focused projects. Expertise in the operation and maintenance of clean technologies is also crucial.[26]

Table 9 sets out the private sector's potential role in the CDM project cycle, highlighting the capacity needs required to mobilise this group of stakeholders.

Table 9 Potential role of the private sector in facilitating the implementation of the CDM

Role	Details
Development of project design document, validation and verification.	Technical expertise is required to development the baseline study and monitoring protocol, as well as to provide verification and validation services.
Project development	The private sector could develop GHG mitigation opportunities using technology options promoted by a national technology transfer strategy. The local private sector could develop these projects. Foreign investment could directly develop projects or purchase the CERs from projects developed domestically. The private sector needs to understand technology options, risks and benefits of investment. Support services are needed for a sustainable operation and maintenance of technologies.
CER sales/financing	Financing institutions could support clean technology projects. They need to understand the risks and opportunities inherent in the CDM.

The level of involvement and awareness within the private sector in the four MEND countries was not encouraging. In general, only the larger companies were aware of the carbon market, and very often these companies develop projects that do little to benefit poverty reduction directly. There is a lack of involvement of financing institutions such as commercial banks, development banks, micro-financing institutions and insurance companies. Given that many small developing countries have little or no access to private capital, local credit or multilateral foreign loans, it is crucial that the local and regional financing institutions are brought on board from the very first phases of the project cycle. By involving the finance sector new opportunities for innovative finance arrangements that include carbon revenues could be investigated and developed to facilitate the CDM process particularly for development-focused projects.

There is very little technical capability in baseline development, carbon quantification, validation or verification of projects, yet developing this capacity would significantly reduce the transaction costs associated with developing projects within the CDM. The cost of technical consultancy is the principal factor impacting on transaction costs in the CDM project cycle because international consultants mainly provide this expertise. For the accreditation of a company to provide validation and certification companies, the company must:

[26] A common problem slowing the deployment of renewable energy technologies is the lack of engineering procedures for testing, commissioning and supporting equipment purchases. This contributes to poor maintenance programmes and poorly operating equipment and, as a result, newly introduced technologies appear dysfunctional. FCCC/TP/1998/1.

- employ a sufficient number of people having the necessary competence to perform validation, verification and certification functions;
- have financial stability and insurance coverage;
- have sufficient arrangements to cover legal and financial liabilities;
- a management structure that has overall responsibility for performance and implementation of the entity's functions, including quality assurance procedures.

These standards of accreditation mean that national validation and certification services can be developed if there is already established companies that wish to diversify out of their current area of practice.

Development community

The development community could be important in providing a supply of development-focused projects, either by: inputting into strategy formulation at a national level; through information dissemination to different stakeholder groups supplying development-focused projects; by developing CDM projects or by financing CDM projects.

Table 10 highlights the potential role of the development community in encouraging a supply of development-focused CDM projects.

Table 10 Potential role of the development community in facilitating the implementation of the CDM

Role	Details
Initiation	▪ The development community could promote the CDM to stakeholder groups involved in CDM project supply. ▪ They could also provide input into the technology needs assessment, with particular reference to poverty reduction. ▪ Donors could provide capacity building to enable all actors and institutions to participate in the CDM.
Project development/ management & monitoring	NGOs could develop GHG reduction projects themselves. Donors could support the management aspects of project development.
CER sales/financing	The NGO community could be buyers of CERs.

In the MEND countries the development community is generally unaware of the relevance of the greenhouse gas mitigation process and the CDM to them in the development process. The research carried out by the MEND project partners highlighted the lack of capacity among this stakeholder group as a real constraint in the supply of development-focused projects.

Research organisations

All the MEND partners felt strongly about the need for involving training and research institutions in the implementation of the CDM. These institutions can play important roles in raising awareness,

implementing technology research and development programmes, disseminating information, and providing continuous upgrading of the national knowledge of climate change and the CDM.

Very often training offered to private companies and organisations has limited impact due to lack of diffusion, which could be addressed with a closer collaboration and follow-up with research institutions. Table 11 highlights the potential role of research organisations in encouraging a supply of development-focused CDM projects.

Table 11 Potential role of research organisations in facilitating the implementation of the CDM

Role	Details
Initiation	▪ Provide technical capacity to other stakeholder groups on meteorological aspects of climate change, impacts and risk analysis, policy, environmental engineering; ▪ Develop indigenous technologies, adapt transferred technologies to local context; ▪ Disseminate technology-related information.
Development of project design document	Offer technical services for baseline studies and monitoring protocols

2.3.3. Institutional capacity

This section deals with capacity building activities that improve institutional performance, improve the links between different stakeholder groups and maximise the effectiveness of the national skills base to promote implementation of the CDM. Three activities are considered: a CDM focal point or office, a national bundling mechanism for small-scale projects, and a technology information dissemination strategy.

2.3.3.1. CDM focal point

The main function for the CDM focal point is to provide a transparent point of contact for investors and project developers. It does not necessarily need to take the lead on policy development or coordination of technology-related information. However, it should have clear working lines of communication with the entities responsible for climate change policy formulation and technology focal points as well as to the entities responsible for general investment promotion. The CDM focal point should be integrated into existing institutional and policy frameworks to facilitate an integrated policy framework and development process.

Colombia and Ghana are in the process of setting up a CDM focal point. The other two partner countries have developed varying levels of institutional capacity to deal with climate change mitigation but feel that it is important to create a CDM focal point.

It is useful to assess the functions that the CDM focal point should have in order to assess capacity needs. Table 12 sets out the functions that a CDM focal point would, at a minimum, be expected to carry out, relating these to the CDM project cycle, as set out in Section 3.1.

Table 12 Role of a CDM focal point

Stages of the Project Cycle	CDM focal point role
Initiation	• Develop contacts with CDM/JI offices in Annex 1 and Non-Annex 1 countries. • Provide an advisory role to the project developers on national incentives for CDM projects and the policy and legal framework, including fast-track procedural options open to projects. • Pre-screening of project proposals, by use of tools such as standardised additionality tests.
Development of project design document	• Provide advice on baseline and monitoring methodologies
Approval	• Approve and register projects and validator's reports.
Project management and monitoring	• Receive and register verification reports. • Evaluate the performance of projects registered with the host country government.
Certified Emission Reductions (CER) sales/financing	• Provide advisory role on options for CER transaction. • Act as a focal point through which projects, particularly small-scale, development-focused projects, are submitted to Annex I tendering programmes for emissions reduction projects. • Maintain communication with the CDM Executive Board on CERs sold.

One important role for the CDM focal point will be to develop relationships with equivalent institutions in Annex 1 investor nations. Investment in many emerging markets represents genuine high levels of risk. However, this may be compounded by negative perceptions about a country, which represents an additional barrier to investment in emissions reduction projects. Targeted information dissemination to organisations and institutions in Annex I countries may help to increase buyer awareness and confidence in CERs generated in the host country. In the context of the UK, promotion of the host country government could happen through UK-based organisations such as the British African Business Association, and through government institutions such as Trade Partners UK, the Department of Trade and Industry, and related initiatives such as the international trade missions.

Another important role for the CDM focal point will be to establish and manage the host country approval and registration processes for CDM applications. These applications could be lodged by other government departments or by the private sector, overseas and in-country. The host country government should develop a registry to track CER transfer, preferably in electronic format following standards set by the COP/MOP. The design of the national registry, used to track CER trades, could reflect the registry developed by the CDM Executive Board. The registry could be tied to databases kept for project proposals submitted, project approvals, and validation and verification reports.

Other generic roles are:

- dissemination of information and awareness creation among different stakeholder groups;
- evaluation of the performance of CDM administrative procedures to ensure that there is a consistently high standard of project appraisal.

Box 2 provides an example of an operative CDM office, in Costa Rica, highlighting ways that the CDM office could lead in promoting sustainable development.

Box 2 The Costa Rican Office of Joint Implementation

The Costa Rican Office of Joint Implementation (Oficina Costa Ricence de Implementacion Conjunta - OCIC aims to sell offsets from a national programme of forest conservation and reforestation. These carbon offsets known as CTOs - Certified Tradable Offsets - are based on the amount of CO_2 fixed in forests. Costa Rica wil use a portion of the proceeds from CTOs to finance construction of the Earth Centre, which is envisioned as a research/demonstration project highlighting various aspects of sustainable development and environmenta values.

The Costa Rican Renewable Energy Export Program bundles geothermal, hydroelectric, biomass and wind electricity generation projects to export energy to neighbouring countries in Central America that would otherwise use electricity generated from fossil fuels. OCIC will certify that the GHG savings have occurred, using external verification, and bundle those savings into CTOs to be assigned to the external financing participants.

The sale of CTOs will compensate landowners to opt for forestry-related land uses by providing direct payment for environmental services such as CO_2 fixation, water quality, biodiversity, and landscape beauty. The resources for initiating the PFP programme were raised by a domestic 15 per cent tax on fossil fuels. It is hoped that future payments to farmers will be based upon successful sales of resultant CTOs.

Beyond CTOs, Costa Rica is also working on ways to charge the economic sectors which most benefit from forestry services. One example is the creation of a system to charge hydroelectric plants for the conservation o their water catchments, at a rate of US$10/ha/year. The institution co-ordinating the administration of the private sector incentives is called FONAFIFO (Fondo Nacional de Financiamento Forestal - Forestry Financing Fund) an office created by the MINAE (Ministerio del Ambiente y Energia - Ministry of Energy and Environment) FONAFIFO has the role of receiving and analysing applications, conducting field verifications, carrying out the payments, and monitoring field implementation of forestry projects.

The first-hand experience of the CDM focal point with regards to project implementation could feed into national policy evaluation and policy development processes.

The capacity requirements relate particularly to technical skills and expertise of the people staffing the CDM office, and the development of clear and strong lines of communication between the CDM office and other government and non-government institutions. At a minimum there should be at least one full time person staffing the office to provide accountability, with possible part-time involvement of other staff employed in other relevant ministries.

2.3.3.2. Small-scale projects bundling mechanism

Project 'bundling' in the context of carbon is a mechanism by which many individual carbon reduction projects are re-defined as one general pool of carbon reduction. The benefits of bundling small-scale projects may include:

- reduced costs associated with independent due diligence reviews of projects;
- reduced costs associated with monitoring of emissions reduced;
- reduced transaction costs with regards to negotiation and sales of CERs to investors;
- increasing the size of 'a project' to enable it to qualify for carbon purchasing funds;
- separating out the implementation and management of projects from the financing of projects, thereby increasing investment to projects that would not normally offer high enough internal rates of return to investors;
- the liability of performance risk could be with the owner or managing entity of the projects fund, not with the investor, thus lowering another risk to investors. The underperformance of one project is balanced against the average performance of the fund;
- increases the possibilities of cash advancements against future expected streams of CERs from small-scale projects thereby improving the affordability of projects to users.

A study supported by the Swiss Agency for Development and Coordination shows that bundles of 10 or more projects can turn several types of small-scale projects into viable CDM projects by reducing the transaction costs.[27]

Transaction costs such as baseline development, validation of the project design document, and monitoring and verification of emissions reductions can be significant costs and, as a result, some carbon purchasers require a minimum carbon value to justify these costs. For example, one of the main carbon purchasing programmes to date, the World Bank Prototype Carbon Fund, has minimum carbon purchase requirement of US$2 million to US$3 million to cover the transaction costs associated with the CDM project cycle. This is equivalent to a minimum of 61,000 solar home systems.[28] As the market develops

[27] However, increasing the bundle size from 10 to 100 did not lead to major changes in investment behaviour.

[28] This assumes a price of $20 per tonne of carbon. PCF Plus, "Could carbon financing appreciably accelerate the diffusion of solar home systems?", June 2001.

similar purchase requirements from other buyers may emerge. Bundling of small-scale, development-focused projects could do much to lower these transaction costs for individual projects, see Section 2.3.5 for details on how transaction costs could be lowered.

Bundling could open up possibilities of receiving up-front cash advancements. In the four MEND countries a common problem in the implementation of renewable energy projects is the lack of affordability among the end users. The relatively high front-end cost of photovoltaic technology and the low income of the intended end-users (rural communities) is a major barrier to the penetration of this technology. In schemes where there has been a greater flexibility of repayments, due to partial subsidy, there have been more successes.[29,30] Carbon financing is shown to be able to offset 15 per cent of total installed costs for an average solar home system, similar to the average direct financial support given to photovoltaic businesses in the GEF/IFC-supported Photovoltaic Market Transformation Initiative (PVMTI).[31] The impact could be greater if project developers could benefit from the financial resources expected from the sales of CERs, if these were paid up-front. However, the use of CERs before they are generated is not acceptable from an environmental point of view. To resolve this impasse financial mechanisms could be put in place to anticipate the capital required for investment in the project infrastructure or activities. Such “cash flow advancements” would also require risk mitigation instruments and guarantees beyond the reach of most small-scale projects. Financial mechanisms to address these points could be promoted as a parallel initiative to the simplification of rules and procedures for small-scale projects.

Insurance costs against performance risk could be also pooled, offering another way of reducing risks for investors.

2.3.3.3. Technology transfer strategy

Technology transfer can be defined as the capability to access, apply and adapt knowledge. There is evidence to suggest that investment in research and development has a higher impact on economic development than any other type of spending. [32] A technology transfer strategy should comprise an assessment of technology needs for the implementation of a country's sustainable development objectives, and a technology dissemination strategy, linking up the relevant stakeholders involved in the development and implementation of technology and disseminating the information to project developers and other interested parties. The purpose of capacity building in the context of technology transfer is *'to promote the widespread dissemination, application and development of environmentally sound technologies and know-how*'.

Only in Ghana has there been an initial assessment of technology needs. In the four MEND countries there is little or no systematic information collection on clean technologies used in-country, together with

[29] In some countries such as Kenya private companies have set up 'hire purchase' schemes with down payments of 40 per cent paid in monthly instalments, but the successes have been limited due to repayment problems.

[30] FCCC/TP/1998/1.

[31] PCF Plus, "Could carbon financing appreciably accelerate the diffusion of solar home systems?", June 2001.

[32] Royal Institute for International Affairs, March 2002

their technical, economic and environmental characteristics. Where there are organisations that collect technology-related information, these efforts may be diffuse and there is no formal consolidation of information.

In other studies, the poor technical information base in many African countries has been identified as an important barrier because it seriously affects their capacity for effective sourcing and selection of technologies. Many technically competent personnel in these countries lack access to global information, and this results in sub-optimal choices.[33]

Deciding what the technology needs are in context of national development priorities is the first step in formulating a technology transfer strategy. The performance of clean technologies can be significantly different when implemented in different countries. National capacity to develop and adapt technologies suited to the local context is important, as well as having the capacity to disseminate technology information and integrate feedback. Technology databases incorporating climate change adaptation technologies could also be used as an input to a country's climate change adaptation strategy and to highlight any overlaps between technologies for mitigation and adaptation.

Having technology-related information concentrated in a single focal point would serve to provide transparency to project developers and investors seeking information, and also to provide an easy link for information transfer from other national and regional technology focal points. Dissemination channels from this focal point to interested parties in the private sector and other areas of the government should be identified and strengthened.

It is useful to consider the UNFCCC proposal for a technology transfer information clearing house to begin to scope the capacity needs in setting up national efforts in parallel.[34] Indeed, the UNFCCC proposal expects to link into national and regional information technology information clearing houses. The proposed structure is:

- a set of databases:
    - Technology transfer projects database: storing data on technologies that are being developed, diffused and transferred as a result of climate change-related development assistance and cooperation projects;
    - Environmentally sound technology database: providing generic data on different technologies for mitigation and adaptation to climate change presently marketed or expected to come into operation in the next decade, including their technical performance; economic characteristics (total overnight costs, operation and maintenance costs, fuel and raw material costs, construction period and economic lifetime); and airborne emissions of greenhouse gases and other pollutants (sulphur dioxide and nitrogen oxides, non-methane hydrocarbons, particulate and volatile organic

[33] FCCC/TP.1998/1

[34] FCCC/TP/2001/2 Technical Paper: Technology transfer clearing house and international information network. Proposal for activities, October 2001.

compounds, water effluents and solid waste and well as more general environmental parameters such as land requirements, noise and visual intrusion).

- an internet information system;
- a set of tools for technology assessment and comparison;
- dissemination activities.

A database of information relating to different technologies used at research and development stage or at demonstration stage is particularly useful for:

- informing the process of strategy development for the penetration of clean technologies;
- promoting clean technologies in the private sector to encourage uptake;
- enable financing institutions to understand the risks involved in new technologies;
- providing clear signals to overseas private sector about which technologies would be formally endorsed as technologies for sustainable development;
- setting the basis for compiling a positive technology list for CDM;
- enabling CDM project formulation;
- enabling countries to negotiate better technology transfer contracts;
- setting the terms of reference for technology research, particularly for indigenous technologies, and adaptation of technologies for local conditions.

Box 3 On-going global efforts to collect technology-related information

There are over 400 websites dealing with technology-related information. The UNFCCC has developed a prototype of an electronic technology transfer information-clearing house that is able to access these many websites and whose functions include information dissemination, document retrieval, responding to queries and other functions.

The UNFCCC is also establishing a technology cooperation projects inventory, which currently contains some 1200 projects and programmes, focusing on technologies that are being developed, diffused and transferred as a result of climate change-related development assistance and cooperation. At present it includes GEF projects and programmes, projects cited in National Communications of Annex I and non-Annex I Parties, projects cited in consultative process submissions, AIJ projects, projects identified by the OECD and its Development Assistance Committee) DAC, and technology cooperation reports.

In parallel with this effort, the Climate Technology Initiative is working with the UNFCCC Secretariat on a pilot project on a climate technology web site, for possible use by the UNFCCC as well as to provide some near term assistance to Parties in improving access to information on climate friendly technologies. One of the most recent efforts is the design of an internet based registration system for technology transfer expert centres. A search engine has been developed to help users access quality information on environmentally sound technologies, know-how and practices. Advanced searches can be made by energy sector, technology and region.

2.3.4. Systemic capacity

This sections deals with the capacity required at the level of policy and legislation to support the skills base and institutional strengthening activities outlined in Table 5. Many of the capacity building activities scoped by the research partners enter into this framework level. The activities discussed are the:

- development of a climate change strategy;
- provision of the legal framework;
- integration of greenhouse gas mitigation objectives into sectoral policies;
- development of standardised approaches to the project design document;
- streamlined approval procedures.

2.3.4.1. Country climate change strategy

A national climate change strategy is important in setting the national policy and legal framework for activities in GHG mitigation and adaptation to climate change impacts. In general, country climate change strategies have to date been formulated on the basis of least-cost mitigation options. A marginal cost curve for mitigation options is calculated and the most competitive mitigation options are included in a national mitigation strategy. This methodology takes little account of projects that contribute to the development objectives of the host country. There has been scant regard to the linkages between greenhouse gas mitigation and poverty reduction. In many cases, development-focused projects will be less competitive under the CDM than projects that have high greenhouse gas benefits. The challenge is to design ways to increase the competitivity of these projects. This requires strategic decisions to be taken at the level of institutional procedures and policy incentives to encourage these projects.

Out of the four partner countries, only Colombia has a formal climate change strategy, formulated on the basis of least-cost mitigation.[35] A least-cost greenhouse gas mitigation analysis was also performed for Bangladesh by the Asian Development Bank using the MARKAL model, another least-cost model.[36] The study is restricted to energy options. Another study in Bangladesh assesses the mitigation options from the viewpoint of greenhouse gas reduction potential, national sustainable development objectives and ease of implementation. None of these studies assesses where the overlap lies between poverty reduction and the CDM and the measures needed to promote these projects.

The following figure shows what a comprehensive climate change strategy for a developing country might aim to capture with respect to the CDM: mitigation strategies that are cost effective in terms of their impact on poverty reduction, greenhouse gas mitigation and adaptation needs.

[35] Opciones para la Reduccion de Emisiones de Gases de Efecto Invernadero en Colombia, 2000. Funded by GTZ.
[36] MARKAL, developed by the International Energy Agency, is an energy model that contains information on performance and cost characteristics of different types of energy and emission control technologies. The model selects the combination of technologies that minimises total energy system cost to meet the required reduction in emissions.

An important question is whether it is worth some developing countries pursuing CDM project opportunities. A climate change strategy might seek to answer the following:

- How will the CDM impact on the country's development priorities?
- How competitive will CDM projects be in the international carbon emissions trading market?
- What is the likelihood of the developing country in question capturing CDM flows?
- Is it more cost effective to spend time and resources in alternative development strategies, for example, adaptation to climate change impacts?

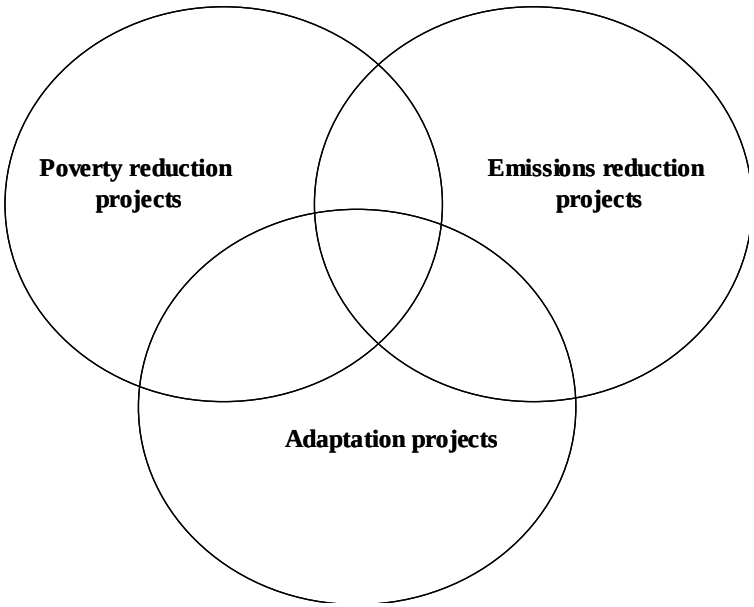

Figure 1 Maximising the development impact of greenhouse gas mitigation actions

A climate change strategy that seeks to provide a road map of cost effective climate change policy actions could include an assessment of:

- mitigation opportunities for each emissions sector;
- adaptation needs and opportunities for each economic sector;
- the interface between mitigation and adaptation;
- the interface between poverty reduction strategies and greenhouse gas mitigation options;
- the human, institutional and systemic capacity for climate-related action;
- technological options (i.e. detailed comparative evaluation of technical specifications, economic and technical feasibility, environmental benefits and other benefits and costs of technology options).

2.3.4.2. The legal framework

Legislation is needed to provide certainty of the national approval process for CDM projects, stipulating at which stages the government must be involved; property rights over the generation of CERs, particularly for projects funded or part-funded by government; and establishment of tracking systems for CERs generated and sold. This is to provide security to investors that the emissions reductions that have taken place are legally recognised by the host country. This is particularly important if the CERs are being used against some compliance target set in the country of origin of the investor.

Intellectual property rights protection for technology development and adaptation to local conditions will incentivise the private sector to focus on the clean technology sector. There are operative examples of developing country governments establishing and strengthening laws and regulations for the protection of intellectual property rights including patents, trademarks, industrial designs, copy rights and computer programmes to encourage the private sector to develop indigenous technologies and to participate in technology transfer.[37]

Standardising carbon purchase contracts is a way of reducing the transaction costs associated with developing the carbon value from projects. Carbon purchase contracts are required to set out and manage the key risks in CER delivery. Risks to CER delivery could include equipment failure, labour disputes, acts of God and terrorism. Parties that could take on the liability are the equipment suppliers, project operators, project financiers or the buyer of the CERs. A contract would establish all possible risks and establish where liability for these risks lies. Carbon purchase contracts could be standardised, so that project developers only need a minimal amount of legal assistance in reviewing and modifying the contracts to specific projects and circumstances.

There are no legal provisions in any of the MEND focus countries to lend certainty to the CER transaction process or to protect intellectual property with regards to technology development and adaptation.

2.3.4.3. Integration into other policy areas

Fiscal incentives are an important tool to reduce capital costs and transaction costs thereby providing additional incentives for clean technology transfer, particularly as carbon revenues may be too low to make a real difference to project returns for some project types. Fiscal incentives include tools such as grants (for example, for business start-ups); tax allowances; consumption or production levies, for example, on electricity production; credit risk support (for example, subsidised interest rates); subsidies and VAT exemptions.

In the MEND countries, there is little integration of climate change mitigation objectives and clean technology transfer objectives into general policy making, as highlighted in Table 13, which sets out whether the MEND countries have a sectoral strategy, and in the case of the energy sector, sub-sectoral strategies for renewable energy and energy efficiency. We assume that a strategy is a framework for policy making.

[37] FCCC/TP/1998/1

Overall, the policy picture in the countries studied is mixed across the different greenhouse gas mitigation sectors, but a general pattern can be observed. It can be noted that whilst three of the four MEND partner countries have poverty reduction strategies, none of them have policies that actively encourage such projects. There are hardly any sectoral strategies for clean technology penetration, although some fiscal incentives exist for renewable energy. Transport and waste are two sectors that have not been considered in a policy context, and there is nothing to encourage projects in these sectors. Forestry has traditionally been more linked to development, and there is a series of fiscal incentives to encourage these projects.

Table 13 Supporting policies for CDM project implementation in the MEND countries

	Strategy	Fiscal incentives for clean technology transfer	
		Postive	Negative
Poverty reduction			
Bangladesh	✓	-	-
Colombia	-	-	-
Ghana	✓✓	-	-
Sri Lanka	✓	-	-
Renewable Energy			
Bangladesh	-	-	
Colombia	-	✓	✓
Ghana	✓	✓	✓✓
Sri Lanka	-	✓	✓
Energy efficiency			
Bangladesh	-	-	
Colombia	-	-	-
Ghana	-	-	-
Sri Lanka	✓	✓	-
Forestry			
Colombia	✓	✓	-
Ghana	✓	✓	✓
Sri Lanka	✓	-	-
Agriculture			
Colombia	X	-	-
Ghana	✓	✓	-
Sri Lanka	✓	✓	-
Transport			
Bangladesh	-	-	
Ghana	-	-	✓
Waste			
Bangladesh	-	-	
Colombia	-	-	-
Sri Lanka	-	-	-
General investment			
Bangladesh	-	✓	-
Colombia	-	✓	-
Ghana	-	✓✓	-
Sri Lanka	-	✓✓	-

Note: The table reflects the sectors in which the MEND partners scoped greenhouse gas mitigation projects.
(- =not available, √=some/partly, √√=good.)

The literature points out that while promoters of clean technologies advocate the use of fiscal incentives government responses have been mixed due to the resultant loss of revenue, in the case of establishing tax breaks, and the danger of social unrest, in the case of removing subsidies on fossil fuels.[38]

It is clear that there needs to be dissemination of relevant research in this area and national dialogue focusing on:

- options for a strategy to encourage clean technology penetration - refining fiscal policy is one aspect of this ;
- whether refining fiscal policy might be one way of financing institutional development with regards to the CDM;
- whether refining fiscal policy might be one way of helping to finance CDM projects that would otherwise have inadequate rates of return, even with the integration of carbon revenues.

2.3.4.4. Development of standardised approaches to project design

The project design document is required for registration of the project with the CDM Executive Board to allow the carbon value from the project to be transacted. The project design document should contain the following information, as set out in the Marrakech Accords:

- a description of the project;
- baseline and emissions reduction analysis;
- environmental impacts of the project;
- information on sources of public funding from the involved Annex 1 parties;
- stakeholders comments' on the project;
- a monitoring plan.

A baseline analysis is a principle component of the project design document. A clearly defined, unbiased baseline can be difficult to establish as it involves a decision on what would have happened in the absence of CDM investment. There are also other issues in estimating emissions reductions such as deciding on system boundaries and estimating leakage in emissions reduction projects. Experience in the AIJ pilot phase highlights that determining project emission baselines has been time and resource-intensive, with a lack of consistency across projects. Typically baseline analyses have been performed on a case-by-case basis, requiring significant time and resources.[39]

Given the complexity of baseline setting and its cost in terms of data collection and analysis, all the MEND project partners agreed that standardised baselines or standardised approaches to baselines could be a useful tool to encourage development-focused projects. Furthermore, this will enable

[38] FCCC/TP/1998/1 Technical Paper on Terms of Transfer of Technology and Know-How: Barriers and opportunities related to the transfer of technology, October 1998.

[39] CICERO Working Paper 2001:08, Can the Clean Development Mechanism attain both cost-effectiveness and sustainable development objectives?

consistency and transparency of project design across project types and sectors and will enhance credibility of the projects with stakeholders. An example of a standardised baseline for solar energy projects is setting a fixed amount of emissions reduction per solar home system, based on current and expected fossil fuel displacement.[40]

For the standardisation of baselines technical, economic and environmental data is needed for the greenhouse mitigation sector being considered. Case study illustrations of baseline-setting methods for each type of development-oriented CDM project would be required along with a set of methodological guidelines on baseline setting for different categories of development-oriented projects. Software tools that incorporate standardised baselines may be useful in enabling project developers to perform financial and economic appraisal of CDM investment options.

A monitoring protocol monitors project performance and as such is specific to the technology being proposed. Monitoring of emissions reduction data requires selecting relevant parameters of concern, determining the method of collecting and processing the information and specifying a format for reporting the results. The approach to monitoring protocols can be standardised depending on the technology and its use.

The government should provide policy guidance on standardised procedures for baselines and monitoring protocols.

2.3.4.5. Streamlined approval procedures

There are significant transaction costs associated with the CDM approval process - a principle element of the CDM project cycle. These transaction costs may be generated through long approval times for projects and uncertainty regarding the approval outcomes.

For development-focused projects the government could significantly reduce transaction costs by cutting the number of steps in the approval process. Table 14 shows the typical length of approval processes in the MEND focus countries. Colombia, Ghana and Sri Lanka follow similar time-scales. Only Sri Lanka provides for a faster approval process for small-scale projects. The approval process in Bangladesh is time-consuming and lacks transparency which is an obvious raised transaction cost for investors in Bangladesh.

[40] Netherlands ECN, Workshop report: Facilitating Small-Scale Renewable Energy Projects in the CDM: Streamlining participation processes with an emphasis on solar home systems.

Table 14 Description of approval procedure in the MEND countries

	Approval time (months)	Fast-track for small-scale projects	Fast-track for poverty focused projects
Bangladesh	12-24	X	X
Colombia	6	X	X
Ghana	3	X	X
Sri Lanka	6	✓	X

One way of cutting the number of steps involved in the approval process is to make approval criteria transparent. The MEND research concluded that lists of technologies are *a priori* additional would be useful in encouraging investment in certain technologies because it gives investors certainty that the technology being considered is eligible to generate carbon value, increasing the incentive to spend resources on developing the project design document. It is likely that technologies considered *a priori* additional would include technologies that are typically associated with development objectives. These projects tend to be located in rural areas where the range of energy options is limited to kerosene and the unsustainable consumption of biomass. These projects are typically implemented at a disaggregated level: at household or village level, and the technologies typically implemented include solar, mini-hydro and fuelwood cooking stoves. The level of free riding under the CDM is likely to be limited for these types of small-scale projects because the range of alternative energy options is severely limited (Begg *et al*, 2000) and because there are many technological and financial barriers to development. This leads to relative certainty in setting the baseline and estimating CER values. 'Postive' lists could have a minimal impact on the environmental integrity of the CDM but could make a significant impact on the willingness to spend time and money developing the project design document.

Sustainable development evaluation tool

One of the two objectives that the CDM must fulfil is that of promoting sustainable development. Article 10 of the Kyoto Protocol states that host country government is responsible for deciding whether greenhouse gas mitigation projects conform to sustainable development objectives.

None of the MEND focus countries have developed sustainable development guidelines for CDM projects.

Most evaluations of CDM-type projects to date have concentrated on the greenhouse gas mitigation benefits and have focused little on sustainable development - even less so on the poverty reduction aspects of the mechanism. There is a general assumption that projects that are attractive in terms of greenhouse gas benefits also promote sustainable development. This may not be true for all projects.[41]

A distinction should be made between general sustainable development objectives and poverty reduction objectives. Some projects may be good for general development and may be sustainable in terms of not generating negative environmental impacts, but may have a neutral impact on poverty reduction. Other

[41] CICERO Working Paper 2001:08 Can the CDM attain both cost-effectiveness and sustainable development objectives?

projects may promote positive sustainable development but also have a neutral effect on poverty. Others still may promote poverty reduction but have negative environmental impacts. This has been highlighted in a report by CICERO who evaluated the sustainable development benefits of a number of projects in Brazil and China.[42]

The challenge for the governments of developing countries is to define sustainable development, particularly poverty reduction, in operational terms.

2.3.5. Impacts of capacity building actions on transaction costs

Some of the capacity building actions discussed in this paper could do much to help promote the competitivity of development-focused projects in the CDM market. Table 14 highlights typical costs at each stage of the project cycle, based on a previous study conducted by EcoSecurities (EcoSecurities, 2000). It should be noted that these costs reflect the use of external advisors and consultants (in many developing countries this capacity is absent). The use of local and internal resources would reduce costs considerably. Total known pre-operational direct costs that must be supported before any carbon transaction can take place are a minimum of £42,000 per project. [43]

An additional category of costs is associated with delays and uncertainty of outcomes of the CDM project cycle such as stakeholder consultation and approval of the project by the host country. We have not attempted to put a cost on these elements, but these 'hidden' costs could be significant in deterring investments.

[42] CICERO Working Paper 2001:08 Can the CDM attain both cost-effectiveness and sustainable development objectives?

[43] Upper bound estimates of transaction costs are provided by the World Bank PCF costs which range from $200,000 to $400,000: World Bank Prototype Carbon Fund, 2000, 'Learning from the implementation of the Prototype Carbon Fund', Occasional Papers Series, Number 1.

Table 15 Minimum transaction costs associated with the CDM project cycle**.**

	CDM project cycle stages where costs are incurred	Estimate of cost (£)
Pre-operational phase design	Baseline study	12,000 – 15,000
	Monitoring plan	5,000 – 10,000
	Environmental assessment	Time & uncertainty
	Stakeholder consultation	Time & uncertainty
	Approval	Time & uncertainty
	Validation	10,000 – 20,000
	Legal and contractual arrangements	15,000 – 25,000
Operational phase	Sale of CERS	5% -15% of CER value.
	Adaptation levy	2% of the CER value annually
	Risk mitigation	1% - 3% of CER value annually.
	Verification	5,000 per audit

Note: These costs assume the use of international consultants

Investors will typically not support transaction costs that are more than seven per cent of the CER revenue of the project. (EcoSecurities, 2000). For a minimum level of transaction costs of £42,000 this is equivalent to a total CER value of £600,000. Discounted by six per cent over ten years using a price of US$3 per tonne of CO_2 this is equivalent to some 26,000 tonnes of CO_2 emissions reductions per annum[44]. To put this into context, 100 solar home systems displace around seven tonnes of CO_2 per annum. Many development-focused projects will not be able to bear this level of transaction costs. The hiring of international consultants may require hard currency payments to international advisors, which may be difficult to access for some small-scale projects.

Three solutions are available:

1. Project bundling to facilitate multi-project monitoring and verification;
2. Lowering of other transaction costs, through standardisation of information and approaches to the project design document;
3. Financial support to cover the transaction costs.

Table 16 outlines some of the capacity building actions listed that could help to reduce the transaction costs of development-focused projects.

[44] Using a discount rate of 15 per cent this is equivalent to some 24,000 tonnes.

Table 16 Summary of capacity building actions that reduce the transaction costs associated with the CDM project cycle

Stage project cycle	Possible fast-track options for small-scale projects
1.	**Development of the project design document (PDD)** ▪ Standardise information used for baseline analysis and PDD ▪ Standardise approach to monitoring protocols
2.	**The approval process** ▪ Establish 'default' list of sustainable development evaluation criteria
3	**The validation process** ▪ Streamlined validation ▪ Facilitate accreditation of local consultants
6, 7.	**Verification and certification activities** ▪ Merge verification and monitoring activities ▪ Fast-track verification and certification ▪ Facilitate accreditation of local consultants ▪ Multi-project verification
8.	**CER sales** ▪ Small-scale bundling mechanism ▪ Standardised legal contracts

Capacity building actions to reduce transaction costs could decrease total known transaction costs to a minimum of £15,000 (by cutting down the time required to produce the project design document), a decrease of over two thirds of the lower bound estimate of transaction costs - more if there is a bundling mechanism to enable multi-project verification, or if local consultants were used for validation and verification activities.[45]

It is important to note that even with lower transaction costs development-focused projects may need support to encourage the investor to spend resources in developing the project design document such as: project development grants; risk mitigation mechanisms for under-performance or non-performance of the project; and financial measures to lend the cash equivalent of future CER streams. Alternatively some

[45] The accreditation requirements for companies to provide validation and verification services are high (see section 2.3.2.1, pg 63) which means that national validation and certification services can be developed if there is already an established private service sector. Least-developed countries may not be able to reduce transaction costs in this way.

guarantee that the project is eligible for trading may be required. The following sections summarise these arguments.

2.3.5.1. Project development grants

One problem frequently encountered by CDM project developers is the up-front nature of the costs, particularly in the face of still considerable uncertainty in finding a buyer for the carbon value. Reducing transaction costs goes some way towards encouraging a supply of development-focused projects. Assistance with payment of these pre-operational costs is likely to be required for development-focused CDM projects, at least while the carbon market develops, capacity is built in host government and trading experience is gathered.

2.3.5.2. Risk mitigation mechanisms

The level of buyer risk is an important factor in securing emission reduction value for small-scale projects. Technologies that supply services to the poor are aimed at users with limited affordability and are typically technologies that can be implemented at a disaggregated level, thereby increasing the transaction costs. In some cases, these technologies are at demonstration stage in the country in question. In many cases, the company developing the project in question will have no credit-rating, thereby reducing the project's credibility. The risk of under-performance or non-performance of the technology is therefore greatest for development-focused projects. Risk is one the largest contractual obstacles in the negotiations for CER transactions. Risk guarantee mechanisms would address this disadvantage that small-scale projects address.

2.3.5.3. Cash advancements

Financial mechanisms could be put in place to anticipate the capital required for investment in the project infrastructure or activities. Money would get paid back as the CERs are generated. Such “cash flow advancements” would also require risk mitigation instruments and guarantees beyond the reach of most small-scale projects.

2.4. Delivery strategies

The following section sets out delivery tools that could be used to provide the areas of capacity outlined in Section 3. It also provides recommendations on cost-effective capacity building strategies.

2.4.1. Delivery tools

2.4.1.1. Investment in technical research and development (R & D) programmes

Wide-reaching training and education programmes are needed if countries are to develop technologically. R & D capacity needs to be built in developing countries to help assess technology needs; to help identify

potential indigenous technologies, and to enable their development; and to adapt existing technologies from other countries.[46]

2.4.1.2. 'Learning by Doing' programmes & pilot programmes

Specific in-country demonstration projects may be used in identifying and learning about the project development cycle and particularly in taking real investment projects forward. Examples of this include the current projects under the Knowledge and Research fund of the UK government[47] as well as European Commission-funded projects under the 5th Framework programme (JOINT and BASE for JI, CDM Susac for CDM[48]), which are underpinned by actual project preparation activities. Demonstration projects are the best way to learn about what technologies work in a given cultural and geographical milieu and the specific capacity needs related to the implementation of these types of projects. Pilot projects can go some way to lower the perceived technological risk by creating experience in technology operation.

All MEND project partners scoped projects that use new technologies for which there may be little knowledge of the installation procedures and operation and maintenance requirements needed to ensure the project's sustainability.

From the poverty alleviation angle donors could usefully develop projects working primarily with poverty-focused organisations as a way of raising awareness and developing skills in-country.

2.4.1.3. In-country workshops, courses and promotion of national dialogue

Workshop and courses could raise awareness of general climate change issues and also provide technical training for the actors and institutions involved in project development, approval and monitoring. Other formats could include national roundtable meetings to promote dialogue about climate change policy and the wider policy framework, engaging multi-stakeholder groups. Such fora also offer the opportunity for local networking and exchange of ideas.

Experience in the MEND countries shows that workshops should be held in regional centres as well as capitals to widen awareness and encourage participation.

2.4.1.4. Training programmes

The training and skills transfer of know-how from international consultants, government institutions and NGOs to local counterparts is an important element of any capacity building strategy and would help to lower transaction costs for CDM projects considerably. Training programmes can a good way to facilitate the accreditation of local consultations for validation and verification activities.

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[46] Royal Institute of International Affairs, March 2002.

[47] www.dfid.gov.uk

[48] For both sites, visit www.energyprojects.net

2.4.1.5. Information sharing and dissemination

North-South and South-South mechanisms for sharing of information between climate change institutions can play an important role in strengthening institutions. The interaction between national and regional technology focal points will be important in disseminating information about new technologies at demonstration stage and at commercialisation stage in different national contexts. One way of achieving information sharing and dissemination might be through a “twinning” arrangement, commonly used in municipal institutional strengthening programmes to pool expertise and skills; and through exchange programmes or secondments for government staff.

Twinning of companies in the private sector might be another way of facilitating the accreditation of local consultants.

2.4.1.6. Development of a climate change strategy

Developing a national climate change strategy can raise awareness among relevant stakeholders in two ways:

- through involving the relevant stakeholders in the research;
- by disseminating results to relevant stakeholders.

Agreeing on the objectives of the climate change strategy is an important first step to ensuring that all relevant stakeholders are engaged in the process.

2.4.1.7. Development of project assessment procedures and tools

The development of standardised approaches to baselines, monitoring protocols and approval criteria for CDM projects can be a good way of building national technical expertise. The following project assessment procedures and tools could be developed:

- 'positive' lists for technologies;
- standardised approaches to baselines and monitoring protocols;
- case study illustrations of baseline setting method for each type of development-oriented CDM projects;
- software tools that will enable project developers to perform financial and economic appraisal of CDM investment options and estimation of project baselines and additionality;
- CDM project formulation guidelines.

2.4.2. Recommendations for capacity building strategies

Table 17 matches these capacity delivery tools to the capacity building activities identified in Section 2.3 to begin to scope out cost-effective capacity building delivery strategies.

Table 17 Matching capacity building delivery tools to the scoped capacity building activities

Level of capacity	Capacity building activities	Delivery tools
Skills/expertise/awareness	• Raise awareness	A, B, C, F
	• Develop technical expertise	A, B, C, D, E, F, G
Institutional	• Establish CDM focal point	D, E
	• Develop small-scale project bundling mechanism	B, E
	• Assess technology needs and disseminate information	A, C, E
Policy & legal	• Develop legal framework	B, E
	• Develop climate change strategy	A, C, E
	• Integrate climate change policy objectives into sectoral policy	C, E
	• Streamline approval procedures	B, C, E
	• Develop standardised approaches to the project design document	B, C, E, G
	• Develop sustainable evaluation tool	B, C, E

Delivery tool number	Delivery tool
A	Technological research and development programmes
B	'Learning by doing' and pilot programmes
C	In-country training, workshops and courses
D	'Training the trainer' programmes
E	Information sharing and dissemination
F	Development of climate change strategy
G	Development of project assessment procedures and tools

'Learning by doing' programmes and information sharing and dissemination are the two sets of actions that cut across the three levels of capacity. The first confirms the principles set out in the Marrakech Accords (Section 2.1.3). The second action encourages greater cooperation and information flows between North-South and South-South.

There is little experience in setting up bundling mechanisms for small-scale projects. One important exception is the Dutch ERU-pt programme in 2000 which approved a project that bundled 28 biomass projects. The projects had different baselines, involved different technologies and also varied in their level of development which highlights the fact that a bundling mechanism at national level could be possible providing the policy and legal framework are in place. 'Learning by doing' is the only possible way of testing this idea out, with the understanding that the fund will need to be adapted as experience is gained. Information sharing can help in the process of demonstration.

All capacity building actions will have a positive impact on the knowledge base and technical expertise in the host country.

Institutional capacity building activities would enable actors and institutions to further drive the capacity building process. For example, once an appropriate institution has been identified as a technology

clearing house and the necessary information has been collected this institution could then take responsibility for further dissemination of this technology information. Another example is establishing a CDM focal point, which can in turn drive the capacity building process with regards to, for example, information dissemination to the private sector, or strengthening linkages to the technology clearing house as an input into the formulation of national CDM policy.

Other areas of capacity building needs can in themselves develop capacity in other areas. For example, the process of developing of a climate change strategy can begin the process of awareness raising needed for national dialogue on wider sectoral strategies to encourage clean technology transfer.

2.5. Conclusions

This section highlights the key principles drawn from the research.

- Many of the CDM stakeholders are limited in their capacity to invest resources in the CDM. This is evident at various stages of the project cycle as well as across actors and institutions.

- There is little representation of poverty-focused actors and institutions in climate change issues. Awareness needs to be created among stakeholders such as developmental groups and NGOs, financial aid organisations and community groups. Across all the capacity needs indicators discussed in this paper there needs to be a targeted poverty alleviation focus, an area which is conventionally neglected in CDM investment strategies.

- There needs to be a two-pronged approach to capacity building, targeting government and non-government actors and institutions. A disconnect appears to exist between private sector project proponents and developers, and the macro institutions responsible for defining and implementing national policy; reviewing and approving project documents; and providing technical support. Linkages between these actors and institutions should be developed and strengthened.

- Developing an enabling environment for the implementation of the CDM should be a significant focus of capacity building. Other capacity building actions reduce the transaction costs associated with developing the carbon value of CDM-type projects.

- Even with lower transaction costs development-focused projects may need support such as: project development grants; risk mitigation mechanisms for under-performance or non-performance of the project; and cash advancements against equivalent future CER streams.

- Delivery mechanisms identified range from 'learning by doing' strategies, workshops, institutional support, information exchange programmes and technical training programmes. Some of the capacity building actions target the various 'levels' of capacity required for successful participation in

the CDM, while other capacity building actions equip developing country actors and institutions to drive the capacity building process themselves.

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3. Recommendations for a donor action plan

3.1. DFID's position with regards to climate change-related assistance

The donor action plan seeks to provide recommendations to DFID and other international donors on key elements of a donor plan.

DFID's current policy is set out in two white papers:

- Eliminating World Poverty: A Challenge for the 21st Century 1997.
- Elimination World Poverty: Making Globalisation Work for the Poor 2000

The 1997 white paper commits the government *"to assist least developed countries to benefit from the Clean Development Mechanism, and consider further ways of improving developing countries'[LDCs] access to clean and sustainable energy sources in light of the report of the G8 task force on Renewable Energy."* It also contains the commitment to increase assistance to least developed countries to help them participate more effectively in the negotiation of multilateral environmental agreements, and benefit from their implementation. There is little by way of policy elaboration of DFID's response to CDM.

In more general terms, UK Development Policy is now focused on the achievement of improvement in key target indicators, which include the environment. Each target has a strategy paper. The impact of climate on relatively short term policy objectives is likely to be minimal, though the establishment of least developed country-focused funding mechanisms, including those on adaptation for climate change, present the opportunity to promote development focusing on longer term sustainability. This said, there has been little in the way of comprehensive analysis of the relationship between climate change and poverty. Policy guidance can only be derived from some more general guidelines and principles established in the white paper and individual target papers. The target paper *Achieving sustainability: poverty elimination and the environment* makes several key points of relevance to this analysis. The target paper also makes it clear that environment is not a sector and mainstreaming environment is not primarily about allocating funds to it: it is about developing appropriate linkages with other poverty reduction initiatives. This is consistent with international approaches of mainstreaming environment and developmental objectives. A key finding in all of our case studies that poverty reduction and climate plans and planning are not well integrated.

DFID favours a multilateral effort over bilateral approaches of assistance. The DFID Environmental Guide, in particular Chapter 9: *Environmental issues in DFID programming* makes it clear that the priority for DFID expenditure on environmental management is at the local level. The 1997 White Paper specifically commits the UK to pressing for a 50 per cent increase in resources for the third replenishment of the Global Environment Facility from 2002 to 2006.

At the project level DFID's approach to climate change derives from other sectoral programmes, environment not being a separate sector. Support remains focused on the provision of energy and energy- related services.

Developing countries need energy. A major element of the UK's approach will be to help key developing countries improve the efficient generation, distribution and management of energy, particularly by building national capacity. We will, where appropriate, promote and encourage the use of renewable energy resources. We will also help developing countries to build expertise in climate change research and observation. From Consistency of Policies 1997[49]

Given that the CDM is a private finance-related initiative where the purchase of CERs can benefit the UK and the EU in meeting their Kyoto Commitments, it is arguable that a purely multilateral effort is not sufficient, save perhaps in the context of a joint EU approach to CDM. The promotion of the CDM involves the promotion of private investment through incentive mechanisms achieved in domestic and EU policy.

The partnership approach is exemplified by the commitment to work with business to increase their opportunities to be environmentally responsible.[50]

In this case the CDM presents an almost ideal model for partnership. DFID has a commitment to *put in place new ways of working with the UK private and voluntary sectors and the research community, towards the international development targets, including transforming the Commonwealth Development Corporation into a dynamic public/private partnership*.[51] The absence of a proactive engagement with CDM promotion and a clear strategy for the UK on CDM is a missed opportunity.

3.2. The focus for donor assistance

There is a clear role for donors in helping to scope out the potential benefits of the CDM for poverty reduction, and, where there are significant benefits, to help bridge the gap between private sector investor concerns and the development concerns of stakeholders within the host country government.

3.2.1. MEND research conclusions

Many of the capacity building actions required are at the initiation stage of the CDM project cycle, highlighting the importance of developing an enabling environment for the operation of the CDM. These areas span policy, legal and institutional capacity building. They are as follows:

[49] See Climate Change from 1997 Consistency of Policies in White Paper Annex II
[50] 1997 White Paper
[51] Ibid

- awareness raising among all relevant stakeholder groups, who may all be involved in more area of the CDM project cycle: government; the private sector; technical institutions; and the development community;
- development of country climate change strategy;
- development of regulatory frameworks;
- development of a technology transfer strategy;
- development of a CDM focal point;
- Integration into other policy areas.

Other areas of capacity building are policy and institutional level actions such as:

- standardisation of data and approaches to assessment for baselines and monitoring of GHG mitigation projects;
- streamlining processes and incorporating poverty reduction objectives in the national CDM approval process;
- designing a bundling mechanism to facilitate the financing of small-scale, development-focused CDM projects.

Some of the actions listed above will reduce the transaction costs associated with the development of a GHG mitigation project for trading. However, in many cases transaction costs will still be too high to encourage private sector investment into these projects. In these cases financial support can make the difference. A number of financial support tools can resolve this problem:

- Project development grants: assistance with payment of these pre-operational costs is likely to be required for development-focused CDM projects, at least while the carbon market develops, capacity is built in host government and trading experience is gathered.
- Risk mitigation mechanisms: the risk of under-performance or non-performance of the technology is greatest for development-focused projects. As risk is one the largest contractual obstacles in the negotiations for CER transactions, risk guarantee mechanisms would address this disadvantage that small-scale projects address.
- Cash advancements: financial mechanisms could be put in place to anticipate the capital required for investment in the project infrastructure or activities. Money would get paid back as the CERs are generated. Such “cash flow advancements” would also require risk mitigation instruments and guarantees beyond the reach of most small-scale projects.
- Dedicated carbon purchasing programmes: some types of development-focused projects are too expensive to be developed commercially and, given that the CDM is a commercial instrument, a premium price may need to be paid to reflect the ‘development’ value of these GHG mitigation projects.

Capacity building can be delivered through a number of mechanisms, including 'learning by doing' strategies including innovative demonstration programmes, workshops, strategy formulation, targeted technical assistance and information exchange programmes representing regional and north-south

interactions. The following conclusions can be drawn about the application of delivery mechanisms to the capacity building process:

- 'Learning by doing' programmes and information sharing and dissemination are the two sets of actions that cut across the three levels of capacity.
- All capacity building actions will have a positive impact on the knowledge base and technical expertise in the host country;
- Institutional capacity building activities would enable actors and institutions to further drive the capacity building process.

3.2.2. Feedback on workshop disseminating MEND research conclusions

A workshop was held in March 2002 to disseminate the project research findings. The key messages from the workshop were that donor assistance should focus on:

- the least-developed countries to achieve distributional equity and prevent capital flowing to a handful of countries, through prioritised funding;
- capacity building at the early stages of project development, for example in awareness building (including the private sector), and establishing a cohesive policy framework for clean technology transfer;
- support to governments in encouraging CDM participation which meet developmental and poverty reduction needs; stakeholders (typically NGOs) representing these interests should be incorporated into the CDM project design at an early stage.

3.2.3. Global capacity building initiatives

Table 18 gives details of capacity building programmes currently available with details about funding levels and priority focus areas, where information has been possible to find. The table shows that there are funds that support the start-up or implementation of energy-related enterprises, but that there is little consideration for forestry and agricultural initiatives. There is no integrated approach to capacity building and the coverage of sectors and user groups is patchy.

Donor activity could usefully focus on bridging the gap in current funding for capacity building for the implementation of the CDM by supporting:

- capacity building activities that do not only relate to project implementation but that focus on the creating an enabling environment;
- financial support for technologies (energy and non-energy) that specifically target the poorer user groups;
- demonstration projects for technologies (energy and non-energy) that have high development benefits;

- providing seed funding and supporting initiatives that provide equity financing to technologies that focus on the poorer user groups.

3.2.4. Recommendations for donor support for CDM implementation

Integrating these three sets of conclusions, the following recommendations for donor involvement:

Strategy formulation;

- An assessment as to whether potential CDM flows are sufficiently significant to a developing country to merit involvement of the country in the CDM;
- Development of a comprehensive climate change strategy for mitigation, exploring the linkages with adaptation;
- Technology needs assessment.

Policy and institutional support

- Awareness raising and building of technical expertise;
- Development of regulatory frameworks;
- Development of institutional structures for CDM implementation;
- Development of standardised approaches to the baseline and monitoring protocols for CDM projects.

Direct project implementation assistance

- Support funds for preparation of development-focused projects;
- Risk mitigation tools and mechanisms for private sector investment in development-focused projects;
- Cash advancements lent against expected future CER streams;
- Dedicated carbon purchasing programmes for small-scale, development-focused projects.

Policy and institutional support can be delivered through:

- demonstration CDM projects with developmental benefits;
- workshops to: encourage national debate on CDM policy and supporting sectoral policies, to feed into process of national strategy building; develop national technical capacity to develop and assess CDM projects; develop standardised data and approaches to baseline determination and monitoring for GHG mitigation projects;
- studies and assessments to contribute to and support the process to strategy building;
- developing information sharing and dissemination channels between North-South and South-South.

Table 18 Climate change-related capacity building programmes for CDM countries

Organisation	Title	Details
World Bank Support from France for core activities and bilateral projects. Likely support from Canada, Sweden and UK.	CDM Assist	Launched: 2001 There are 3 core activities: a) Start-up: capacity needs are identified. A programme is designed. b) Core activities: Review of energy investments and other CDM opportunities; project pipeline research; training courses; project planning, management and evaluation. c) Capacity building: Baseline interpretation and determination; implementation capacity for monitoring protocols; negotiation of price and risk-sharing of the carbon purchase agreement. Coverage: Africa. Initially PCF-supported Uganda Western Nile hydropower project. Other possible countries or projects where the CDM-assist will provide support are Kenya, Mauritius, Ghana, Senegal, Swaziland, Tanzania and Burkina Faso.
World Bank Support from governments of Switzerland, Germany, Australia, Finland, Austria & Canada.	National Strategic Studies	Launched: 1997 Building capacity and knowledge on GHG mitigation. Coverage: Global
World Bank - GEF	World Bank - GEF programme	Project preparation grants to develop GEF-co-financed projects. 3 tiers of grants are available for funding: a) Early stages of development/identification; b) Information gathering activities & stakeholder consultation; c) Technical design and feasibility work (for large projects) Coverage: Global

UNIDO	Knowledge Network for Industrial Technology Transfer (KNITT)	Launched 1999 Identifying, screening and implementing industrial projects under the CDM, thus facilitating technology transfer. Coverage: Africa & Asia
UNDP	Capacity 21	Launched 1992 Builds capacity at national and local levels to implement Agenda 21. With reference to climate change, it develops mechanisms to promote the conversion to sustainable energy. Coverage: global
UNDP Financed by government of Norway.	Pilot programme for CDM capacity building	Launched 1998 Main areas of work: Analyse possible areas for future CDM cooperation based on national development priorities; Identify and formulate possible CDM projects; Convene stakeholder consultations at the local level. Coverage: Peru, Philippines, South Africa.
UNEP	AREED (African Rural Energy Enterprise Development)	Seeks to develop new sustainable energy enterprises. Also works for financial organisations to assess rural energy business sectors and integrate it into their portfolios. A combination of enterprise development and start-up financing is provided. Provides loan and equity investments. Support ranges from US$5,000 to US$250,000.

UNEP; E & Co; UCCEE (Collaborating Centre on Energy & Environment)	DEERB (Brazil Rural Energy Enterprises Development)	Launched 1991 Seeks to develop new sustainable energy enterprises. Also works for financial organisations to assess rural energy business sectors and integrate it into their portfolios. A combination of enterprise development and start-up financing is provided. Provides loan and equity investments. Support ranges from US$15,000 to US$250,000.
E & Co (Rockefeller Foundation) & USAID	Financing renewable energy enterprises in Central America (FENERCA)	Launched 2000 Seeks to promote the development of renewable energy enterprises and projects while increasing the capacity of financial institutions, NGOs and local regulatory institutions to support the regions renewable energy sector. The programme provides: Business planning design; Direct investment; Training sessions in renewable energy financing; Introduction of regional and policy options to overcome renewable energy implementation barriers. Coverage: Central America :El Salvador, Guatemala, Honduras, Nicaragua and Panama
Shell Foundation	Southern Africa CDM capacity building programme	Launched in 2000 The objective is to build project design capacity among a variety of project developers and contribute to the creation of a CDM monitoring capacity. The programme is focused on government and industry. Coverage: Southern Africa.
Canadian International Development Agency	Canada Climate Change Development Fund (CCCDF)	$100 million allocated. The funds supports activities that promote, facilitate and/or finance the transfer of environmentally sound technologies to CDM countries. Capacity building is the focus of the CCCDF. Coverage: Global. Projects are currently located in Argentina, China, Caribbean, Nigeria, Chile and Honduras.

UK Foreign & Commonwealth Office	Climate Change Challenge Fund	A key objective is to help developing countries move towards less carbon-intensive economic growth through the use of small projects demonstrating the transfer of ideas and technologies leading to reduced emissions. Coverage: Global
French government	Fonds Francais pour l'Environnement Mondial (FF EM)	Launched 1994. FF EM is a bilateral mechanism, similar to the GEF in nature. The focus of the fund is supporting demonstration projects in the area of clean energy. It requires match funding. Applications must be made by the French government.
European Commission	Various: DG Development; Environment budget line; Synergy	The EU funds programmes that are relevant to the CDM. For example, one of the priority objectives of Synergy is a 'contribution to the implementation of the Kyoto Protocol'. Specific capacity building instruments have not been developed.