

Indexing CDM distribution: Leveling the playing field

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Central Message

The equitable distribution of Clean Development Mechanism projects has been a key concern since the inception of the mechanism through the Kyoto Protocol in 1997. Smaller and less developed developing countries have indeed been slow to pick up pace in applying the mechanism, but since the launch of the Nairobi Framework things have changed considerably. This article documents that if the traditional analysis of pure numbers of projects per country is replaced by more relative figures, there is in fact an increasing leveling of the employment of the mechanism. In fact it is becoming remarkably equal, even in Least Developed Countries.

Introduction

The Clean Development Mechanism (CDM) under the Kyoto Protocol is entering its 10th year of operation after the rulebook for the mechanism was elaborated through the Marrakech Accords in 2001. By devising not only the mechanism, but more importantly the regulatory principles supporting it, the regulatory bodies behind the mechanism – particularly the Conference of the Parties (COP) and the Subsidiary Body for Implementation (SBI), serviced by the Secretariat for the United Nations Framework Convention for Climate Change – launched probably the greatest global regulatory experiment of all history – and succeeded. Despite substantial uncertainties as to the specific modalities and equally substantial uncertainties as to the actual outcome of embarking on project development, the world has embraced the mechanism – with all its flaws and shortcomings – as an instrument for international cooperation on greenhouse gas emissions reduction. According to the UNEP Risoe Centre's CDM Pipeline¹ almost 3000 CDM projects have reached the level of registration with the UNFCCC Secretariat and another 3000+ projects are under development – each and every one of them having induced cross-border cooperation between a significant number of stakeholders, united by the emerging challenge of climate change.

While the regulator thus has reason to congratulate itself it has also acknowledged that the mechanism does have its challenges, in particular as to its geographical distribution. Projects have sprung up in Asia and Latin America from very early days of CDM operation, but particularly Africa was left behind. It has remained an established truth, based on simple numerical analysis, that Africa is still struggling to catch up and not least that Least Developed Countries have yet to experience the advantages of embarking decisively on CDM project development. This article suggests, however, that when correlating economic growth, carbon emissions and CDM project development Africa and particularly LDCs are no longer the 'lost world' in CDM terms – on the contrary.

The mechanism was designed as a bottom-up mechanism with little technical guidance from the regulator. In all probability this was in no small measure making a virtue out of necessity in the sense that the regulator was in uncharted territory, particularly in terms of interacting directly with the private sector. And after all, the mechanism essentially thrives on project developers and investors that carry on their business of building power plants, renovating distribution systems, disposing of waste, and harnessing renewable energy sources –

¹ The CDM Pipeline is published and updated monthly by UNEP/Risoe at <http://cdmpipeline.org/publications/CDMpipeline.xlsx>. All quantitative figures relating to CDM in this article are downloaded from the March 1 2011 version of the CDM Pipeline.

as they did also before the mechanism was invented. But with no particular insights into investment drivers the Secretariat left to the market to devise its own rules, pending ex-post approval by the Secretariat's executive body, the Executive Board for the CDM at the UNFCCC.

Historical Background

It is beyond discussion that negotiators back in the 1990s elaborating what became the Kyoto Protocol had no way of predicting the regulatory complexities that would evolve from establishing a 'Clean Development Mechanism'. Rather, the initial focus was on principles that for all means and purposes were inspired by the common but differentiated responsibilities of signatories to the UNFCCC. The CDM emerged as one compromise structure among several building blocks of the Kyoto Protocol that interpret this principle. But developing countries represented by G77² did not immediately see the CDM as a viable interpretation of a common but differentiated responsibility principle. In negotiations leading to the Kyoto Protocol, there were substantive debates over a range of issues involved in the adoption of JI (Joint Implementation) and emission trading in the negotiation texts. There were no immediate contours of a clean development mechanism, and during debates G77 basically called for the deletion of the whole draft article relating to the 'flexibility mechanisms'. They stated their view that Quantitative Emission Limitation and Reduction Obligations (called QELROs in negotiations) should be met "primarily through domestic action" thus coining the principle of supplementarity, fundamentally endorsed by the EU, but disputed by the Umbrella Group³. Essentially, G77 repeatedly expressed opposition to JI, *specifically JI between Annex I and non-Annex I Parties*. JI between Annex-I and non-Annex-I countries effectively corresponds to CDM. Thus, the G77 opposition was specifically directed against the fundamental principles upon which CDM is established!

How the 'Clean Development Mechanism' emerged as one of the important elements of the Kyoto Protocol despite this strong opposition from the developing countries is well described by Depledge⁴. The proceedings described seem at least indirectly to support the widely established perception that the fundamental differences between the 'Brazilian Proposal's' 'Clean Development Fund' (CDF)⁵, to which G77 had generally subscribed, and CDM was not spelled out in the process, nor in fact discovered by a number of non-Annex-I Parties.

This said, the principles underpinning the CDM were not as revolutionary as the above may indicate. Initial ideas for a mechanism resembling principles as reflected by the CDM were already introduced by Norway and Germany in 1991, introducing a proposal to meet the "Toronto targets" (20 per cent reduction of carbon dioxide emissions over 1990 levels by 2005) through 'joint implementation'. In this conception, joint implementation resembled present day CDM since it allowed industrialized countries to provide funds and better technology to cut emissions in developing countries in return for credits to increase emissions in their own country. Here, implicitly, it is understood that the financing for the actual project activities were thought to originate in developed countries.

² The formally correct name of G77 is 'G77 and China'. The short form 'G77' is used in this article

³ USA, Canada, Australia, New Zealand, Japan, Norway, Switzerland, Iceland, Russia, Ukraine, and Kazakhstan

⁴ Depledge, Joanna, "Tracing the origins of the Kyoto Protocol: An article-by-article textual history", FCCC/TP/2000/2, 25 November 2000

⁵ based on the principle of imposing financial penalties on Annex-I Parties failing to comply and channeling the revenues from the penalties to non-Annex-I Parties for the purpose of addressing climate change

Supposed to take the lead in investing to reduce GHG emissions, cost-efficiency was a cardinal issue to Annex-I countries. They called for full “where-flexibility” of actions to establish a cost-efficient compliance response based on project activities. As the assumption was, and remains, that many of the cheapest emissions reduction options are located in developing countries, it was essential that the non-Annex-I countries availed themselves as “where-options” for investments. This is precisely what CDM provides – a mechanism that defines the modalities for calculating the emissions reductions realized through a project established in a country that does not otherwise have any QELROs.

But as a compromise structure the CDM has flaws compared to the Brazilian CDF proposal. As it is a bottom-up flexibility mechanism it is also flexible in its application. Whereas the proceeds from a CDF could be distributed among the G77 members based on normative principles (which, however, were never elaborated), the CDM allows, but does not prescribe, any form of distributional fairness. It articulates the common but differentiated responsibilities principle, but it is a project specific mechanism to operate on market terms, supposed to rely predominantly on private sector initiative. Thus, only the practical experiences with the CDM would determine what kind of distributive fairness would be arrived at.

In the aftermath of COP3, where the Kyoto Protocol was drafted, the nature of the CDM slowly dawned particularly on G77. What they saw was not particularly close to their original expectations. Submissions of views and questions regarding the CDM pursuant to the agreement illustrate the concerns raised particularly by G77. The Group submitted a list of questions⁶ requesting clarifications on several issues. The Umbrella Group submitted language to respond to these questions, leaving no doubts about the unpredictability of the concrete project activities as to their extent and distribution.

The key questions in this respect raised by G77 are outlined below (both questions and answers in italics referring to the “1998/sb/misc01a5” document – see footnote below).

G77:

- *“What will be the criteria and processes for the CDM for arranging due funding”;*
- *“How to define: “a share of the proceeds”, and how will this share be apportioned for administrative expenses and adaptation”;*
- *“How will it be ensured that the financing for CDM projects shall be additional to ODA and other international funding, additional to and separate from the financial obligations under GEF and additional to the financial obligation of the Parties as provided in the Convention and the Protocol”, and*
- *“how will the additional economic benefits, if any, of a CDM project be shared equitably between the participating Parties.”*

Further, and crucially in this respect, G77 was worried *“how to ensure that CDM projects are equitably distributed so as to benefit all developing country parties, in particular the least developed country parties”*, stating that *“[the distribution of projects must] not exacerbate existing regional/sub-regional imbalances”*.

The response of the Umbrella Group did not leave much hope particularly for the LDCs: *“The CDM is a market-based mechanism, and investment decisions (particularly from the private sector) will influence the distribution of CDM projects. Developing countries can influence the distribution of CDM project activities by promoting an investment climate that will encourage the development of CDM projects within their borders.”* Naturally, LDCs have the ability to do so in the same manner and at the same level as for any other type of investment, i.e. quite insignificantly, at least in the

⁶ to the 8th session of the SBSTA, see <http://unfccc.int/resource/docs/1998/sb/misc01a5.pdf>

short term. Elaborating on the source of funding, the Umbrella Group expected that *“the bulk of CDM projects will be achieved through private investment. In some instances, Parties may participate. Investments will flow based on the availability of qualifying projects, the potential rate of return on investments, and the value of CERs if there is a market.”* Spelling it out *“it is expected that the bulk of CDM financing will come from the private sector, in which case the issue of ODA funding and financial obligations under the Framework Convention does not arise.”* The answers seem to justify the G77 concerns that the CDM would in fact contribute to an exacerbation of the differences among its members in terms of attracting foreign investment.

Realizing Realities

From early days of actual operationalization of the CDM a few well developed host countries have represented the bulk of CDM project development. Particularly India was among the early promoters of the mechanism and took the lead in project development in 2003-04. The first CDM project was registered in 2004 (and was in fact a Brazilian landfill project) and by the end of 2005, out of 63 registered projects, India hosted 17. At this time a total of 21 countries were hosting registered CDM projects, mainly in Asia and Latin America. 2006 saw the great breakthrough for the mechanism with 409 projects registered, Brazil hosting 83 of these, India 124, and a new-comer in the market, China, hosting 33. Now 38 countries were hosting projects.

At this time it was increasingly becoming apparent that the concerns expressed by G77 in the aftermath of COP3 were warranted – and that the answers provided by the Umbrella Group on essential investment drivers probably could have been applied in an ex-ante estimate of the likely distribution of CDM project activities. Interestingly, however, and contrary to expectations, the projects were not established on a platform of foreign investment. All projects were employing local equity and finance thus shifting an important project development driver from being one of FDI attractiveness to being one of national financial capability.⁷ If host countries were more aware of the fact that the market expects host country developers pay for the projects themselves and that the contribution from CERs in many cases is quite limited⁸, maybe the equitable distribution of projects would be less of an issue.

Table 1 illustrates the point that particularly African countries were making. When CDM broke through in 2006, there was an obvious shortfall of CDM project registrations in Africa compared to both Asia and Latin America – and particularly for Sub-Saharan Africa where only one project was registered by the end of 2006. And only one more project in Cote d'Ivoire was under validation, clearly indicating that not much was ongoing on African ground. As the CDM was seen as a compromise structure that was supposed to benefit not only the diverse G77 group of countries as a whole, but – probably unrealistically – each individual group member (as a CDF could have been designed to do by regulation and as the G77 was specifically asking for in their formulation of questions), there was a growing call to address the geographical distribution of projects.

⁷ see S.E.Lütken, “Developed Country Financing for Developed Country Commitments? in Perspectives 2008, UNEP/Risoe

⁸ it can easily be calculated from data available in the CDM pipeline that for most renewable energy projects the financial contribution from CERs is less than 3% of the investment per year

Asia		Africa		Middle East		Latin America		Eurasia	
Argentina	6	Egypt	2	Israel	1	Bolivia	1	Armenia	2
Bangladesh	2	Morocco	3			Brazil	88	Cyprus	2
Bhutan	1	Nigeria	1			Chile	14	Moldova	3
Cambodia	1	South Africa	5			Colombia	5		
China	36	Tunisia	2			Costa Rica	2		
India	141					Dominican Rep.	1		
Indonesia	8					Ecuador	8		
Malaysia	12					El Salvador	2		
Mongolia	1					Fiji	1		
Nepal	2					Guatemala	5		
Pakistan	1					Honduras	10		
Papua New Guinea	1					Jamaica	1		
Philippines	7					Mexico	72		
South Korea	7					Nicaragua	2		
Sri Lanka	4					Panama	4		
Vietnam	2					Peru	3		
TOTAL	232		13		1		219		7

Table 1: CDM project host countries by 2006. LDCs marked with black text. Figures from the UNEP Risoe Centre's CDM/JI Pipeline.

Adopted in 2006, The Nairobi Framework of Action became the answer, specifically having as its objective “to help developing countries, especially those in sub-Saharan Africa, to improve their level of participation in the Clean Development Mechanism (CDM) and enhance the CDM’s geographical scope”⁹. The instruments to achieve this objective are capacity building for the development of CDM project activities and the enhancement of capacities of CDM Designated National Authorities in CDM project host countries. Further, in a response to the concerns raised by G77 in terms of investment drivers, the Framework remains to promote investment opportunities in CDM projects in the targeted countries. Capacity building through technical assistance is being provided – not least by UN institutions like UNEP and UNDP, but also a number of bilateral donors – to targeted countries to build capacity in project identification and design, and workshops for project developers and other stakeholders are being organized amongst others on developing Project Design Documents for traditional CDM projects as well as for Programmes of Activities, PoAs.

The PoAs, while not being a direct spin-off of the Nairobi Framework, is another initiative equally devised to address the obvious shortfall of project development activities particularly in Least Developed Countries. It has the aim to facilitate carbon market access for micro scale activities, often at household level, as the opportunities for developing larger scale projects in LDCs is limited, mainly because the limited size of the

⁹ http://unfccc.int/files/press/backgrounders/application/pdf/fact_sheet__nairobi_framework.pdf

economy – or because the country emissions are so small that a country-wide or sector-wide activity is necessary to achieve a sufficiently large amount of reductions to justify the CDM-related administrative costs involved. While the intentions behind the instrument were appreciated its design was not immediately well-received at its appearance during the COP in 2005 and it was only after a revision in 2007 that this new instrument started generating projects¹⁰. Obviously, then, PoAs did not enter the statistics in 2007 (with the exception of two Bangladeshi projects in starting validation in December 2007), where the number of registered projects grew with another 427 registrations shared by 33 countries.

Another initiative to address the geographical distribution of activities is a loan scheme targeting CDM related documentation costs that was agreed by the COP in 2009 for countries with less than 10 project activities registered and which currently is being prepared by the UNFCCC Secretariat.

Lack of Statistical Nuance

When looking at the statistics that are driving these initiatives, there is an obvious lack of nuance, the loan scheme probably being the finest example¹¹. Table 1 is a simple count of projects, and the approach when illustrating a biased application of CDM – which is still on the official agenda¹² - remains the same. Even the obvious distinction based on sizes of host countries is lost, thus making such comparisons more or less meaningless. Naturally then, more in-depth studies of the background for the immediate acceleration of some countries on the development of CDM projects are not undertaken. One obvious explanation is that some more advanced countries were already having an on-going project development activity (like the Chinese hydro project development programme since the 1980s or the Indian wind energy project development due to tax exemption), that was immediately relevant for CDM. Such an on-going project development activity was generally absent (and remains more or less absent) in less developed countries and therefore a longer inception period should be expected. Even so, while Sub-Saharan Africa still in 2006 was absent in the CDM project statistics (with the exception of Nigeria), LDCs such as Bangladesh, Bhutan and Cambodia had already registered projects.

Region	KP parties	Parties with DNA	Parties with project experience	Parties with registered projects
Non-AI Africa	52	47 (90%)	27 (52%)	19 (37%)
Non-AI Asia/Pacific	52	40 (77%)	33 (63%)	27 (52%)
Non-AI Latin America/Caribbean	33	29 (88%)	20 (61%)	20 (61%)
Non-AI Eastern Europe	9	9 (100%)	8 (89%)	5 (56%)

Table 2. Potential host countries for CDM projects¹³

¹⁰ see Fenhann & Staun, Carbon Management, vol. 1, no. 1, October 2010

¹¹ while the loan scheme obviously is targeted at small and less developed countries, the simple numerical count of projects per host country means that it also applies to e.g. Qatar, U.A.E., Singapore and Malta

¹² The most recent example is the CDM 2-year Business Plan, published in Annex 16 to the minutes to EB59, in which section b) is an initiative to 'improve regional and sub regional distribution and capacity building. See http://cdm.unfccc.int/Reference/Notes/info_note13.pdf

¹³ see <http://cdm.unfccc.int/Statistics/dna/DNAByRegionBarChart.html>

G77 is a diverse group of countries also including members that obviously do not fall into the category of developing countries. 'Odd members out' in terms of economic performance and level of development are particularly South Korea, Israel, Singapore and a number of middle eastern oil states, which 'contaminates' the statistics when the focus is on performance in terms of ability to attract foreign direct investment or – as it stands – divert domestic capital towards CDM project development.

For the statistics in the following, a cut-off nominal GDP/capita of 12,000 USD is used to classify a developing country – as opposed to G77 membership. The figure is arbitrarily chosen, but has for instance 4 EU members figuring below this limit (Poland, Latvia, Lithuania and Romania) and thus could be said to represent a rather advanced level of development. Thus, excluded are Qatar, U.A.E., Singapore, Kuwait, Cyprus, Israel, Bahamas, Bahrain, Malta, Oman, Saudi Arabia, Trinidad & Tobago, Barbados and Uruguay, combined represent 155 projects in the CDM Pipeline.

Excluding these 14 countries reduces the list of relevant CDM host countries shortens to 132. Of these 48 are LDCs – and 84 are not. In 2007 alone 29 countries with a GDP/cap less than 12,000 US\$ registered projects, 3 of these LDCs, still revealing a significantly higher participation for well developed developing countries compared to LDCs. Accumulated from 2005 to 2007, 44 countries with less than 12,000 US\$ GDP/cap had participated, and among these 7 LDC. Hence the participation rate of more advanced developing countries was $37/84 = 44\%$, while it remained at $7/48 = 15\%$. But while there would be no obvious reasons for any of the economically more advanced developing countries not to participate, probably no one would expect LDCs such as Afghanistan and Somalia to be active participants in the carbon market. Other less obvious participants would be Mauritania that experienced a military coup in 2005; in Chad ethnic violence in 2006 may have been a discouraging factor for DNA establishment and CDM project generation; Sudan's Darfur conflicts were not helpful for project investments at this time either, and the armed rebellion in Haiti in 2004 followed by a provisional government the security of which was provided by United Nations Stabilization Mission was not an encouraging environment either. And finally East Timor that only became independent in 2002 probably did not start their state establishment with an immediate focus on CDM. Other LDCs are doubtful project hosts alone due to their size. Many island states have less population than an averagely sized town in a developed country, particularly island states like, Comoros with 700,000 inhabitants, Solomon Islands with 500,000, Samoa with 250,000, Vanuatu with 240,000, Sao Tomé and Principe with 165,000, Kiribati with 100,000 – and Tuvalu with 10,000 inhabitants spread on 9 islands.

If these 14 LDC were eliminated from the list of truly potential host countries the LDC participation rate would grow to $7/34 = 21\%$, still only at half the level of other developing countries, but on the other hand not as obviously left behind as some might have the COP believe. These were the figures in 2007 when the Nairobi Framework was put in place. The situation has changed since then. In the beginning of 2011 23 LDCs have been participating (still none of the 14 unlikely host countries) out of the total of 75 host countries with less than 12,000 GDP/cap. This means that the participation rate among the better developed developing countries was $52/84 = 62\%$, while it was $23/48 = 48\%$ for LDCs. The numbers are closing in. If again the 14 less likely host countries are excluded from the statistics, it becomes $23/34 = 68\%$ participation among LDC. Thus, even from an evidently less advantageous background, particularly in finance and investment terms, the LDCs are featuring quite as prominently in the statistics.

The numbers produced from this quite crude approach are in stark contrast not only to the meager level of activity among LDCs as presented in Table 1, but also compared to updated February 2011 statistics on the

geographical distribution of CDM projects in Table 3. The figures, of course, do not reveal the degree to which the LDCs participate, i.e. how many projects they are hosting – only that they have participated in CDM project generation, and it must also be emphasized that the figures represent all CDM projects in the pipeline¹⁴ without distinguishing between projects that are currently under development and projects that have already been registered. The point is, however, that the way in which the ‘equitable’ distribution of CDM project activities is normally approached does not include much relativity in the estimates, only that some countries are hosting less projects than others. The above is hinting that there is another way to approach the issue.

A nuanced approach to determining CDM participation

There are many ways to apply relativity and four different approaches, which are presented in the following, will shed a different light on CDM participation among countries and regions. The current level of participation in CDM for all potential host countries (i.e. also those with GDP above 12,000 US\$) is presented in Table 3. Compared to the figures from 2007 there are remarkable changes. Front-runners China and India, have established themselves in a league of their own, bringing Asia in the absolute forefront of project development dwarfing project development in all other host countries. Africa and particularly the Middle East still look left behind, but by any measure, even this crude numerical one, there are significant improvements for Africa in terms of number of countries participating in CDM. A more nuanced approach reveals that Africa and LDCs are faring even better.

Asia		Africa		Middle East		Latin America		Eurasia	
Bangladesh	4	Cameroon	4	Iran	9	Argentina	34	Albania	3
Bhutan	3	Cape Verde	1	Israel	32	Bahamas	1	Armenia	11
Cambodia	7	Congo DR	5	Jordan	5	Bolivia	6	Azerbaijan	7
China	2418	Côte d'Ivoire	3	Lebanon	1	Brazil	349	Cyprus	9
Fiji	3	Egypt	15	Libya	1	Chile	79	Georgia	5
India	1547	Equatorial Guinea	0	Qatar	2	Colombia	66	Kyrgyzstan	0
Indonesia	109	Ethiopia	1	Saudi Arabia	1	Costa Rica	10	Macedonia	4
Lao PDR	4	Ghana	1	Syria	4	Cuba	3	Malta	1
Malaysia	139	Kenya	18	U A E	9	Dominican Republic	11	Moldova	9
Mongolia	4	Lesotho	1	Yemen	1	Ecuador	24	Serbia	1
Myanmar	1	Liberia	1			El Salvador	6	Tajikistan	0
Nepal	6	Madagascar	3			Guatemala	18	Uzbekistan	15
Pakistan	27	Mali	1			Guyana	1		
Papua New Guinea	6	Mauritius	2			Honduras	28		
Philippines	78	Morocco	17			Jamaica	1		

¹⁴ with the exception of those that have been terminated during their development, i.e. registered in the CDM Pipeline as ‘validation terminated’, ‘validation negative’, ‘withdrawn’ or ‘rejected’.

Singapore	4	Mozambique	0		Mexico	181		
South Korea	84	Nigeria	10		Nicaragua	8		
Sri Lanka	20	Rwanda	4		Panama	20		
Thailand	129	Senegal	4		Paraguay	4		
Vietnam	155	South Africa	37		Peru	40		
		Sudan	2		Uruguay	13		
		Swaziland	2					
		Tanzania	5					
		Togo	0					
		Tunisia	4					
		Uganda	12					
		Zambia	1					
TOTAL	4748		154	65		903		65

Table 3. Countries and regions participating in CDM as per February 2011. LDC in black text. Togo and Mozambique have developed projects that were not successfully completed, hence the '0'.

One way to estimate a country's likely participation is to look at the national carbon emissions. These emissions were calculated in 2008 by the Carbon Dioxide Information Analysis Center (CDIAC) for the UN¹⁵. While these emission data are not complete, and specifically do not include methane emissions, they indicate the level of (industrial) activity in a given country and the emissions affiliated with it – and thus also both the level of current emissions that might be reduced or the level of future emissions that might be avoided. For most countries, and indeed for most CDM projects, the latter is the more common argument. Nevertheless, it is evident that a low level of current emissions under most circumstances will also indicate a limited quantitative emission increase in the near to medium term – particularly if the observation is only relative to other developing countries. To approach a finer tuning of the expected emission path of a given country, and thus the emissions reduction potential, particularly the current GDP growth (to indicate the expected growth in emissions) could be taken on board. The current rate of electrification and probably more factors could be included as well to justify expectations of more or less carbon intensive development paths. However, for most small developing economies such calculations would result in only trivial numerical adjustments compared to current emissions and the related emissions reduction potential. Consequently, this is not attempted here as the purpose is not to calculate any specific emissions reduction potential; only to illustrate the level of participation. Thus, an indicator that has the number of CDM projects relative to a host country's emissions is established:

¹⁵ carbon emissions estimated by CDIAC for UN in 2008, see http://en.wikipedia.org/wiki/List_of_countries_by_carbon_dioxide_emissions. Source: Tom Boden, Gregg Marland, and Bob Andres, Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory

Indicator 1:

Project generation ability (*number of projects / national carbon emissions*)

The number of projects relative to a host country's emissions is an indirect indicator of a country's ability to identify emissions reduction options and transform them into actual projects. This reveals the prominence of CDM relative to the actual opportunity for emissions reduction and may be a result of particular awareness raising. Or it may be the result of a high GDP carbon

Another obvious measure of relativity is based on the size of the economy of a given host country. While in an idealized scenario CDM projects would materialize on a basis of FDI, the size of which is not necessarily linked to the size of the economy but rather the investment climate (as was indicated by the Umbrella Group answers), the reality is that projects materialize predominantly on local finance¹⁶. Capturing both FDI and local finance, a host country's project financing capacity is expressed in the Gross Fixed Capital Formation (GFCF), consisting of outlays and additions to the fixed assets of the economy. But as GFCF figures fluctuate considerably¹⁷ they are unfit for single point observations. However, over time GFCF typically accounts for around 20% of GDP and thus GDP, while being an appropriation, may be used as a more consistent platform for providing an estimate of a country's project financing capacity.

Evaluations compared to GDP may be twofold: either in comparison to number of CDM projects in the pipeline or in comparison to the expected amount of CERs from all projects for a given host country. The former is thought to illustrate the project financing capability of a given host country regardless of the country's actual emissions (thus eliminating the emission intensity argument for indicator 1). One reservation here is that project options and thus project sizes vary between countries. Assuming comparable levels of GDP, country A may have 10 small scale project options and developers to exploit them, while country B may develop a single project that compares to the 10 in terms of investment¹⁸. While the two countries may perform equally well in terms of CER generation, country A with many projects being established reveals a higher level of economic activity related to CDM – more developers involved and more financing institutions active – thus indicating a relatively higher financing capacity, alternatively the ability to attract external (non-domestic) financing, independently of the actual emissions reduction options. The latter indicator is a direct indication of CDMs relative importance to the host country's economy. Such amounts in any event will be miniscule compared to the GDP; hence the actual value (based on an estimated price per CER) is not used. The indicator value, instead, is adjusted by a multiplication factor (10,000) for purposes of illustration convenience only.

¹⁶ see S.E.Lütken, "Developed Country Financing for Developed Country Commitments? in Perspectives 2008, UNEP/Risoe

¹⁷ For example Tanzania's GFCF fell from 1.8 billion USD in 1992 to 1.3 billion in 1998 and then rose to 2.4 billion in 2007, see <http://www.tradingeconomics.com/tanzania/gross-fixed-capital-formation-constant-2000-us-dollar-wb-data.html>

¹⁸ this is just another arguments that can be made against the simple comparison of number of projects per country

This then establishes another two indicators:

Indicator 2:

CDM contribution to the economy (CERs / GDP)

The amount of CERs generated from CDM projects relative to the GDP of a given host country is an immediate expression of the importance of CDM to the economy – and of the prominence of CDM compared to other economic activities.

Indicator 3:

Investment capability (number of projects / GDP)

The number of projects relative to GDP corresponds to indicator 1, but eliminates the emission intensity of a given host country. Thus, this indicator is focused on the financing capacity, alternatively the ability to attract external (non-domestic) financing, rather than the actual emissions reduction options.

The above indicators have been calculated for the five regions participating in the CDM – Asia, Africa, Latin America, Middle East and Eurasia – as well as for the group of LDCs. The basis for calculation is the countries that have actually participated in the CDM at any level of participation, meaning that just one project under validation is sufficient to enter the statistics. The group of countries – 38% for better developed developing countries and 52% of LDCs – that so far has *not* been participating in the CDM has not been analyzed. It should also be emphasized that the earlier exclusion of the 14 richest G77 members is not continued in these comparisons. Results are presented in Figure 1. It is emphasized that such calculations cannot provide any normative standards or achievements by any specific country or region, but only demonstrate *relative* achievements between the main host regions. And as mentioned, the indicator values have all been adjusted by multiplication factors (100 or 10,000) for illustration purposes only, to align them in one chart.

There are a number of correlations possible comparing the values of the indicators. For instance, if indicators 1 and 3 are compared, a high score on project development activity compared to actual emissions and a relatively small contribution from CERs relative to the GDP, reveals high costs of project development and low economic efficiency of emissions reduction activities under the CDM. If, on the other hand, there is a low score on project development and at the same time a high score on CERs relative to GDP, it means that CDM is an efficient response to address emissions reduction (few projects that generate large amounts of emissions reduction), and that there in all probability is scope for expanding activities.

Generally, the correlation between the indicators is estimated as follows (+ and – indicating high and low values; numbers representing indicator number):

- $1+ / 3-$ = *low emission intensity, hence economic efficiency unlikely*
- $1- / 3+$ = *high emission intensity, hence economic efficiency likely*

- $1+ / 2-$ = *inefficient CDM response: lots of activity but little revenue compared to GDP*
- $1- / 2+$ = *efficient CDM response, probably more options to be exploited*

- $2+ / 3-$ = *efficient CDM response: large scale CDM projects*
- $2- / 3+$ = *inefficient CDM response: small scale CDM projects*

- $1+ / 2- / 3+$ = *particularly inefficient CDM response*

The reader is invited to interpret the correlations in other ways, though caution should be made not to overinterpret these figures. The fact is that these three indicator values are relative only, i.e. in themselves they have no meaning. They serve only to compare the regions and/or countries and their performance in terms of CDM project development.

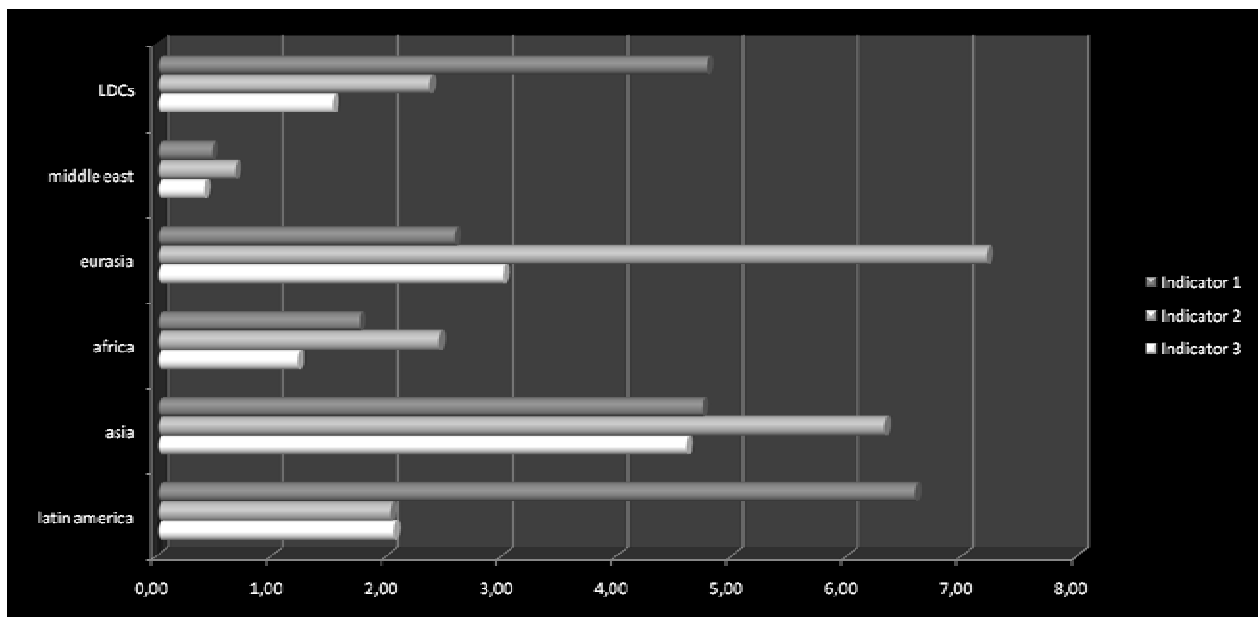


FIGURE 1

Each indicator seen in isolation paints a different picture of the regions' comparative performance. Indicator 1 representing project generation capability has the LDCs only surpassed by Latin America. They are at par with Asia, but surpass Africa, Eurasia, and particularly the Middle East, which comes out as the least performing region of all. Africa is not the least performing region as traditionally thought. This is in spite of the fact that the extra challenge that the average size of emissions reduction projects in LDCs and in Africa compared to the national emissions is much higher than in other regions, standing at 5 and 6% respectively (i.e. one single project reduces national emissions by 5 or 6%), while this figure is about 1% for other regions.

For Indicator 2, CDM's contribution to the economy, the LDCs and Africa are at par, both outperforming Latin America and the Middle East. Asia and Eurasia, however, are performing particularly well here. And on investment capability, LDCs and Africa are not performing too well, as would be expected, but on the other hand they are not completely off the charts, the LDCs arriving at 75% of Latin America's and 50% of Eurasia's performance.

Other observations derive from the correlated values. LDCs and Latin America have roughly equally inefficient CDM responses, i.e. the efforts put into CDM project development produce relatively poor results, when comparing indicators 1 and 3. This indicates a lack of economic efficiency of the CDM response and questions the pursuance of low cost emission reduction options. At a very low level there seems to be a better balance in the Middle East and, at a much higher level, in Asia and Eurasia. When comparing indicators 2 and 3, however, the picture changes. Here Africa comes out as particularly efficient, LDCs also, only surpassed by Eurasia. Latin America in this comparison comes out the least performing region. The significance of this difference should not be over-interpreted. The main message is that LDCs and Africa are not standing out as particularly under-performing in any of the comparisons, apart from the assumed economic efficiency of the emission reduction activities, which follows from the generally low level of emissions in the countries – and the particularly low level of emissions reductions from individual projects.

A 4th indicator, however, is factual. If emissions expected to be reduced through CDM projects in a given host country is compared to the national carbon emissions (only CO₂) a rough estimate of the country's domestic emissions reduction effort is established. Here it should be emphasized that these reductions for all

Indicator 4:

Actual emissions reductions (*Percentage of country emissions covered by CERs*)

The expected emissions reduction from CDM projects compared to a country's actual emissions gives a precise figure for the emissions reductions achieved through CDM compared to the actual emissions, i.e. to what extent CDM is supporting the emissions reduction efforts in a given host region or country.

means and purposes are established on a basis of domestic financing, i.e. these are actual project activities as compared to reductions achieved by Annex-I countries, where a significant share is achieved through off-sets, thus avoiding the investments.

As already observed from earlier indicators Africa, which generally is thought of as the 'lost continent in CDM', is not so lost after all. On all parameters Africa is faring better than the Middle East, which is coming out as the particularly 'lost' region.

When emissions reductions promoted by CDM are compared to host countries' emissions, the three regions Asia, Eurasia and Latin America are performing equally well. Surprisingly equal, all at just above 6%, and thus comparable to the actual domestic emission reduction project activity in developed countries. In this comparison Africa is not faring too well, probably reflecting drawbacks in financing capability and not least

significant challenges in the energy sector. It stands at a bit more than half of the performance of the other three regions, though still clearly outperforming the Middle East.

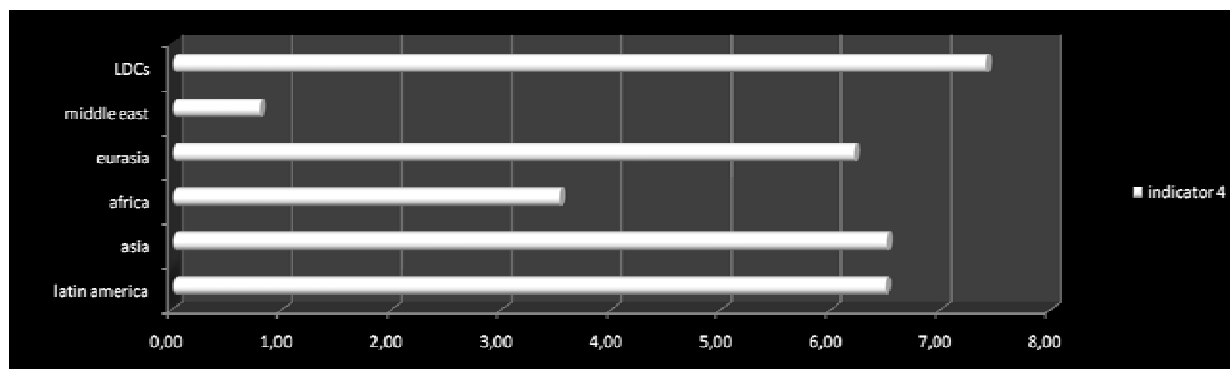


FIGURE 2

The probably most controversial finding from this analysis is that the LDCs outperform all others on the share of the national carbon emissions that are covered by the CDM. 7.4% of LDC carbon emissions are expected to be reduced through CDM project activities¹⁹, the highest rate of all groupings. The LDCs outperform the Middle East on all parameters, on indicators 1 and 4 almost at a factor 10, and a factor 4 on indicators 2 and 3. The LDCs also outperform Africa on project development activity, while they are at par on Indicator 2 and 3. They even outperform Latin America on the generation of CERs compared to GDP. These statistics are in no small measure attributable to Bhutan's hydro power project under validation, representing about a third of all emissions reductions expected to emerge from LDC's currently recorded project activities. But even if Bhutan is eliminated from the statistics, LDCs remain at 4.45% of national emissions reduced by CDM – not at all lost in the competition with the major regions. And they still outperform Eurasia and are at par with Asia on number of projects relative to country emissions – even without including the Programmes of Activities, where LDCs represent 12% of all projects and 7% of all emissions reductions to be achieved through PoAs.

Conclusion and further research

It is tempting then to conclude that the growth in LDC performance since 2007 up to the current status must be linked to the Nairobi Framework. The causality, however, between technical assistance provided and actual project generation on the ground has yet to be established. Among other tempting explanations is increased economic growth; increased technology influx from other developing countries, and increased incidence of extreme climate events, not least droughts, which has led to an increasing global awareness of climate change. The truth is probably that it is a combination of all and that the Nairobi Framework activities have played into an agenda that is also induced by other factors.

¹⁹ It should be noted, though, that only emissions from fossil-fuel burning, cement production and gas flaring are included in the estimates. Particularly for the LDCs this may generate a biased calculation platform as methane emissions are not included. Methane is estimated to constitute a relatively larger share of the total greenhouse gas emissions in LDCs compared to carbon dioxide due to the structure of the economies. On the other hand the benchmark is not developed countries' economic structure, but other developing countries, and the 14 unlikely host LDCs do not enter the statistics as they have not yet developed any CDM projects – and probably shouldn't.

But there may in fact be questions raised as to the ‘reasonability’ of the LDCs’ high level of participation. Particularly if indicator 1 and 2 are compared, there is a significant amount of project development going on compared to the national emissions, but there is relatively little economic benefit coming out of the efforts relative to the countries’ GDP. This is even in spite of the LDC outperforming all regions in terms of the share of emissions that is covered by CDM project activities. This raises questions as to the relative cost efficiency of CDM project implementation, where – probably of little surprise to practitioners – the development of projects in LDCs requires more effort for less CER generation. It is therefore a valid question, if the CDM is fundamentally driven by cost effectiveness as it was originally intended to be or if the attention to geographical distribution is fundamentally driven by a different agenda than was initially the motivation for the establishment of the mechanism – as if the possible virtues of a CDF in terms of a ‘fair’ distribution of compensation from Annex-I to non-Annex-I countries are being imposed on a mechanism that was supposed to function on market terms. A fact is that all costs involved in technical assistance as well as all other administrative costs in operating the mechanism is not counted as a cost in terms of determining least cost reduction options.

The problem is, however, that the question of geographical distribution lingers on, defying the nature of the mechanism that was already becoming clear to stakeholders in 1998, when the questions were raised by G77. It is, of course, not evident, nor indeed likely, that the cost efficient emissions reduction options are distributed geographically equal – and that the interest in exploiting them is congruent with their occurrence. Nevertheless, a consultative mechanism to support the Executive Board on regional and sub-regional distribution and capacity building was considered at the 59th EB meeting in February 2011. If such a mechanism is established it should as its purpose have to analyze, not a crude numeric comparison of countries’ score on CDM registration; not even a more qualitative estimate based on CDM projects relative to GDP or national emissions, but rather analyzing how LDCs have been able to achieve its relatively high level of CDM activity – and if the level of activity in LDCs is justifiable from an economic efficiency perspective.