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**CLIMATE FINANCING
APPROACHES AND SYSTEMS:
AN EMERGING COUNTRY PERSPECTIVE**

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Emerging countries like India, China and Russia who are under pressure to contribute to a mandatory mitigation regime in the forthcoming climate protocol also view the issue of financing as crucial to their future role in ensuring a low carbon pathway of growth. Whether they contribute to the process of mitigating climate change, both developing countries and emerging economies are vulnerable to global warming. The central proposition advanced in this paper is that any global climate financial architecture that recognizes the fact that mitigation and adaptation are inter-linked, the latter being conditioned by the former, has the best chance of success. The paper seeks to demonstrate that as investments on mitigation rises, risks on adaptation projects decrease, thus contributing to improved risk adjusted return from adaptation projects. With reference to coastal, water and degraded lands ecosystems in India, the paper demonstrates how higher levels of mitigation efforts reduce the capital costs of adaptation activities in developing countries. The paper also suggests that carbon markets need to be reformed through improved and varied functions that facilitate technology transfer, provide differential prices for different carbon products, facilitate enhanced access by developing country sellers and enable efficient carbon price discovery for sellers from developing world.

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Introduction

Climate financing and technology transfer issues are critical to the success of the Framework Convention on Climate Change (FCCC). Even if the Copenhagen Summit of the Conference of Parties to the FCCC succeeds in cobbling a successor to the Kyoto Protocol in December 2009, it is certain that the world community will continue to grapple with the financial issues relating to climate change for a few more years. Developing countries of the world consider financing as the important element that will determine the extent to which they would be involved in international action to reduce Greenhouse Gas Emissions (GHGs). Emerging countries like India, China and Russia who are under pressure to contribute to a mandatory mitigation regime in the forthcoming climate protocol also view the issue of financing as crucial to their future role in ensuring a low carbon pathway of growth. Whether they contribute to the process of mitigating climate change, both developing countries and emerging economies are vulnerable to global warming. Their capacities to adapt to global warming are not commensurate to the gravity of the problem they are likely to face in the event of global temperatures rising above the present levels by 2⁰ C. Thus for these countries adaptation and adaptation finances form greater priorities than mitigation. The lesser the capacity of these countries to adapt to climate change, the greater will be their inability to achieve economic growth and welfare. On the other hand, the higher the adaptation capabilities or lower their adaptation requirements, the greater will be the ability of these countries to contribute to reduction in global warming. The central proposition advanced in this paper is that any global climate financial architecture that recognizes the fact that mitigation and adaptation are inter-linked, the latter being conditioned by the former, has the best chance of success. This paper seeks to analyze its proposition at two levels. First at the conceptual level by looking at how far existing expert economic assessments on climate change cast light on the inter-linkage between mitigation and adaptation and the co-benefit possibilities of the former. At the second level we broadly survey the proposals on climate financing that have emanated in the world in the run up to the Copenhagen Summit on Climate Change slated for December 2009. We start the first level analysis with the more recent Stern Report on climate change (Stern, 2008).

Recent Perspectives on Climate Change and Economic Mechanisms

In his recent Report, Stern (2008) has cast light on what he considers to be the critical challenges for addressing the rise in global temperatures:

- (a) The action for preventing global warming must be effective, efficient and equitable. By effectiveness is meant cuts in GHG emissions on the required scale to keep risks at acceptable levels. By efficiency is meant implementation in the most cost-effective way and by equity is meant special focus on the needs of poor countries that are hardest hit and responsibilities by rich countries that have accounted for past emissions and demonstration by 2020 that they can deliver credible reductions without threatening growth and designing systems for transfer of funds and technologies.
- (b) Subject to the scenario above, 'a formal expectation that developing countries would also be expected to take on binding national targets of their own by 2020', meanwhile 'benefiting from one-sided selling of emissions credits in the interim';
- (c) Fast growing middle income developing countries or emerging economies 'with higher incomes will need to take immediate action in order to stabilize and reverse emissions growth, including sectoral targets and, possibly, earlier national targets
- (d) Given strong developed country targets for reductions, 'carbon prices can be maintained at levels which will provide incentives both for reductions at home and purchases from abroad'.
- (e) 'The cheapest mitigation options often reside in developing countries, which should take advantage of carbon markets from the outset'
- (f) By putting an appropriate price on carbon, policymakers will oblige consumers and producers to face up to the full social cost of their emissions'.
- (g) Economic efficiency points to the advantages of a 'broadly comparable global price and coordinated policy based on carbon trading', with openness to international trade 'so that emissions reductions take place wherever they are cheapest'. 'It is possible to put a price on carbon, explicitly through tax or trading or implicitly through regulation'.
- (h) By 2050, out of a total global population of nine billion, some eight billion will reside in what is currently the developing world. These numbers make clear that a reduction in global emissions of 50%

relative to 1990 levels by 2050 simply cannot be achieved without per-capita providing an incentive for the cheapest abatement opportunities to be exploited, while the source of the finance is driven by the location and stringency of the emissions caps’

- (i) Policies will need to be:
- dynamically efficient in linking the degree of support for technologies to their potential or actual performance in reducing carbon emissions;
 - market-based, encouraging competition between different technology suppliers;
 - catalytic in mobilizing private sector capital to make investments and take risks;
 - global, opening up and integrating low-carbon technology markets in a way that accelerates their scale-up;
 - equitable, by placing the bulk of the public funding requirements on richer nations; and
 - explicit, making transparent the ‘cost per tonne’ of delivered abatement of different technology options.
- (j) On adaptation challenges in developing countries, the following form (verbatim) the highlights of recommendations:
- Just as adaptation planning needs to be integrated into development plans and strategies, so should adaptation funding be integrated into development spending at regional, national and local levels
 - Money should be spent through national development plans, reflecting overall national priorities.
 - Making adaptation funding conditional on demonstrating an incremental (climate change specific) need would fail to address underlying vulnerabilities, may produce perverse incentives and prioritisation by discouraging investment in measures that are not clearly ‘adaptation’ or ‘development’ specific, and may not be cost-effective
- (k) Post-2015 the additional costs (induced by climate change) of pursuing goals of development and poverty reduction should be a key element in assessing the appropriate scale of development assistance.

Indeed the Major Economies Forum (MEF) in its meeting of October 18–19, 2009 at London reinforced the Stern point of view, when it highlighted the ‘potential role of carbon markets to deliver private sector

investment in developing countries, in addition to public finance’ and went on to state that ‘these flows could deliver significant benefits to developing countries in terms of both on the ground investment and environmental and energy security co-benefits’. The Stern Report’s emphasis on mitigation commitments by developing and emerging economies has also been echoed by the MEF as evident from the forum’s emphasis on ‘internationalization of mitigation targets’ and ‘report and review’ as the key building blocks of the mitigation architecture.

The Trade Angle

Apart from the above stated perspectives of the Stern Report and MEF, the emergence of the trade angle has been another issue worthy of note in recent times. For some time pressures have been mounting on India and China to take up mandatory mitigation commitments in the post 2012 phase. This has not met with success as both countries are resistant to the idea. Whether the trade angle is a negotiating ploy or a serious option to redress the problem is not clear. However the introduction of the trade angle, that seeks to discriminate commodities and manufactured goods with high carbon footprint through suitable adjustments in border taxes, virtually puts pressure on export intensive emerging countries like China on the defensive. Indeed the recent arguments that prohibitions on carbon footprint manufactured goods can be justified under Article XX of the GATT (Metcalf, 2009) if applied in consonance of the national treatment principle of the GATT/WTO would add to the pressures for acceding to mandatory mitigation commitments on the part of both countries. Even if border adjustments are replaced by pre – border mechanisms like surrender of permits in lieu of exports of high carbon goods is introduced, this will affect countries which have accumulated large stocks of hot air permits like Russia or large amount of Certified Emission Reductions (CERs) like China and India.

Implications for Climate and Adaptation Financing

The benchmark of an efficient and just system of financing global public goods centers on the following parameters viz ‘new and additional, predictable, adequate and equitable’. The principles of equity, efficiency and effectiveness have been defined in the context of the climate change deal by the Stern Report, can be applied to environmental financing systems as well.

Despite the importance accorded by the world community for financing activities that address climate change issues, nothing much has

been achieved in tangible terms. The concept of ‘adequacy’ of environmental financing can be judged by the supply of funds relative to needs. Alternatively it can be taken to mean flow of funds that are sufficient to cover relevant costs (Muller 2008, p. 24). Flow of funds for development and global environmental causes has not been encouraging even in years when the global economy was booming. In the year 2007, ODA flows through bilateral and multilateral channels was only of the order of US\$ 103.7 billion (UNFCCC, 2008, p. 91). This represented on an average 0.23% of the GDP of developed countries as against the Monterrey ODA Target of 0.7% of Gross National Income (ibid, 2008)¹.

While funds that are available for adaptation and mitigation are inadequate, in the case of adaptation the situation is worse as private funds do not have a propensity to investing in adaptation projects as compared to mitigation projects.

Nearly 60% of total global investment in environmental projects has been mobilized from domestic sources (p. 90). While FDI and debts account for 20% in EU, they account for 90% in Africa and Middle East (ibid, p. 90). Annual availability of adaptation funds has been less than \$500 million/year (ibid p. 92). By comparison, funds annual available for mitigation is pegged close to \$ 1 billion /year. These figures pale into insignificance when reckoned against the figures of revenue generation from CDM and JI projects (\$ 9billion) in 2007 (ibid, p. 92).

Estimates vary about the scale of funding required for adaptation. While the World Bank guesstimates current needs to be of the order of 9 to 41 billion US dollars (\$), UNDP estimates are higher at \$86 billion. The UNFCCC places adaptation funding requirements to be in the range of \$28–67 billion (Muller 2008, p. 6). The World Bank’s estimates are based on anticipated flows from ODA, FDI and domestic investment towards adaptation activities. It is reckoned by the Bank that 10 to 20% of the ODA and concessional flows amounting to \$4 billion to \$ 8 billion will flow for adaptation activities. The Bank likewise estimates that 10 to 20% of FDI flows amounting to \$2–\$4 billion will find its way to funding adaptation activities. Gross domestic investment is expected to contribute \$3billion to \$30 billion which works out to be 2–10% share of aggregate domestic investment (Muller 2008, p. 6).

The terms ‘new’ and ‘additional’, which form the other attributes of a sound environmental financing system, have more complex implications. By additional is meant ‘over and above ODA’ (Muller, op.cit, p. 21). In a deeper sense, from a developing country perspective, the term ‘new’ could mean a new source of financing that is different from existing ones. The

term ‘additional’ is related to the equity dimension of environmental financing.

Maxims of Delivery of Financial Resources and Governance Issues

Article 11 of the UNFCCC provides for a financial mechanism that functions under the aegis of the COP of the Convention. This proviso forms the basic principle underlying a financial mechanism that is set up to fund adaptation activities as envisaged by the Convention. Delivery of financial resources for adaptation will depend upon a combination of factors. The first factor involves the adoption of resource allocation criteria that is based on a mix of efficiency and equity principles. The second factor refers to the ease by which needy countries can access the financial mechanism.

Sagasti et al (2005) argue that the efficiency of a financial mechanism refers both to the total amount of development financing available and to the match between financial instruments and the needs of developing countries. Presently in the GEF scheme of things, allocation follows the principle of geographical and sectoral balances (UNFCCC, 2008, p. 96). The system seeks to follow transparency and cost effectiveness, based on a combination of global environmental benefits and country performance (GEF EO, 2008 as cited in UNFCCC, 2008). However the resource allocation framework of the GEF is considered to be complex (ibid). There are issues relating to effectiveness and efficiency, predictability (in project selection) and the length of the GEF project cycle (ibid,p. 90).

Currently adaptation financing focuses on global and national environmental benefits. The Strategic Priority on Adaptation (SPA) funds under the GET Trust fund requires generation of global environmental benefits. The LDCF (Least Developed Countries Fund) and the SCCF (Special Climate Change Fund) under the GEF apply only when climate change affects core sectors of development such as agriculture, water, health or infrastructure. It does not carry the requirement of generating global environmental benefits (UNFCCC 2008, p. 44). GEF considers costs of adaptation as costs imposed on vulnerable countries to meet their immediate adaptation needs, which in turn are understood to be the additional costs imposed by climate change to render development climate-resilient (ibid). Since ex ante calculation of additional costs of adaptation is complex, the GEF has developed a sliding scale for LDCF and SCCF funding which serves as a proxy for estimating additional costs. In terms of the sliding scale, smaller projects receive proportionately more GEF

funding than bigger ones, since they are assumed to have a higher adaptation component (GEF 2006). The scale provides an indication of the possible maximum amount of GEF funding for any given project size and its application is optional (UNFCCC, 2008, p. 44).

The allocation criterion given above has evolved over a period of time. However it is necessary to take into account certain other factors when planning for adaptation financing in the post 2012 phase. In the case of adaptation, given the intrinsic difficulties of estimating additional costs, or separating global environmental benefits from domestic benefits, a financing criterion that focuses on incremental cost allocation and cost effectiveness (based on the truism that Incremental Costs on Investment (IC) ought to be less than International Benefits (IB)) is not enough (King, 1993). The ideal allocation criteria should be based on outcomes and the incremental finance should focus on poorer or disadvantaged sections of communities. This can complement existing approaches based on a sliding scale to fund adaptation projects.

The accepted model of finance disbursement, as has been noticed in the case of the GEF, is that of an operational entity set up by the COP of the Convention to carry out all business functions. This includes pooling of received money resources for provision of grants, concessional loans, risk guarantees etc through a fiduciary arrangement based on a Trust Fund approach. The Trust Fund is administered by a fund managing Trustee such as the World Bank, which also provides for a mechanism for monitoring and evaluating utilization of all financial resources. (Reed et al, 2009, 8–11). The operating system routes its resources through an intermediary or an implementing agency (World Bank, UNDP, ADB etc.) which in turn provides technical advice to catalyze project preparation, design, execution and implementation. Delays in project cycles and funds disbursements, currently noted as affecting the efficiency of financial mechanisms such as the GEF Trust Fund, are largely attributed to the intermediation processes. The Adaptation Fund Board seeks to address this inadequacy by providing direct access to financial resources by the operating entity than its routing through an intermediary institution. China and G77 have proposed a like framework for future adaptation financing mechanisms (UNFCCC, 2008, p. 45).

In more than one sense, efficiency and equity go together. As stated earlier, efficiency refers both to the total amount of development financing and to the match between financial instruments and the needs of developing countries (Sagasti et al, 2005). The needs of developing countries as relevant to adaptation funding include both the ability to

access funds and ability to use these funds, in line with the country's adaptation (natural or directed) requirements. Thus flow of funds that are consistent with national action plans not only makes equity sense but also efficiency sense. The proposal to give up on intermediation is welcome insofar as it cuts down on delays in the project cycle. But given the fact that most of the intermediaries (or implementation agencies) carry out country programs in countries of action, it will be advisable to involve these agencies with project monitoring and evaluation in the post project approval phase. Countries that are short of capabilities in project design may find the role of intermediary institutions useful in the project cycle. (Reed et al 2009).

Dimensions of Equity in Adaptation Financing

There are four dimensions of 'equity' when it comes to climate change financing systems. The first dimension is adherence to the principle of common but differentiated responsibility specified in Article 3.1 of the UNFCCC. The second dimension relates to honoring the needs of the economically less advantaged members of the FCCC. Where the principle of equity underlies financing systems, the notion of returns on investment is not the most significant consideration in resource allocation and deployment. In the context of environmental financing of global public goods, equity connotes allocation of funds to nation states or local communities that require them most. This is also consistent with the Rawlsian 'difference principle' (Rawls, 1971). Nation states and poor local communities which are not in a position to bear the costs of conservation ought to be the focus of an equity driven environmental financing system rather than nation states or communities that are able to conserve resources at the least cost. Typically private capital tends to flow to projects that afford the highest risk adjusted returns while international and national public finances like ODA and related budget grants, would gravitate towards projects that are high in social returns.²

The third dimension of equity arises from climate financing being independent and supplementary to other forms of financing. The equity dimension of climate financing is not captured, if environmental financing is done at the cost of essential financial resources that a community requires for its developmental needs. Here the concept of equity comes closer to the notion of additionality. Indeed environmental financing could be at the expense of ODA flows. As mentioned, the Monterrey target on ODA remains to be realized. Therefore environmental financing of global public goods projects should not be at the expense of potential ODA flows.

This will weaken the development process in Least Developed Countries that have been dependent on ODA. New revenue raising instruments like auctioning of emission trading permits or new carbon taxes contribute to the mobilization of resources that are new and additional. As far as climate change is concerned, financing of adaptation measures, from new and additional sources that are ‘over and above the Monterrey target on ODA, would form the equity foundations of the post 2012 global environmental financing architecture.

The fourth dimension of equity relates to ‘appropriateness’ of financial flows. Following Muller (2009, p. 22–23), appropriateness refers to a financial measure which considers adaptation to be a historical debt of developed countries towards developing countries (ibid, p. 22). In terms of the paradigm that views historical debt as an equity issue, since costs of adaptation has been imposed by developed countries on developing countries over time, any effort to have an adaptation financing system as a loan or even a conditional grant is perverse and inappropriate. Thus loans and grants for adaptation are not appropriate even if they are concessional. Only unconditional transfer payments are appropriate. The full incremental costs of adaptation must be met by these transfer payments (Sethi, 2007)³. The concept of historical debt is thus philosophical and is fundamentally linked to ‘equity’ though this point is getting to be sidetracked. Indeed Schelling (2006) argues that the principle of historical obligations need to be built into a regime of allocation of CO₂/GHG emission rights even in a regime of allocation of CO₂ emission rights . For Schelling emission rights have to be allocated over decades, not just a decade at a time but cumulatively’(ibid). But as Friman and Linner (2008) explain, the take over of the ‘historical obligation debate’ by the ‘technology school’ (the STAP) in the UNFCCC has undermined the equity notion of the concept.

Assessing the Stern Report in relation to Climate and Adaptation Financing

As mentioned, the Stern Report (2008) clearly states that the task of preventing global warming must be effective, efficient and equitable. By effectiveness is meant cuts in GHG emissions on the required scale to keep risks at acceptable levels. But then this is best achieved by efficient financing systems that have intermediation systems that do not experience delays in project cycles, provide intermediation at low transaction costs and are compatible with the needs of developing countries. Let us now examine the concept of equity. The Stern Report considers equity to be where there is special focus on the needs of poor countries that are hardest

hit and undertaking of responsibilities by rich countries that have accounted for past emissions who demonstrate by 2020 that they can deliver credible reductions without threatening growth and designing systems for transfer of funds and technologies. The concept of equity in the context of a financial mechanism means the inception of a mechanism that is 'new' which implies the coming into effect of a source of financing that is different from existing ones, but is all the same premised on the basic obligations and rights enshrined in the FCCC. This implies a dedicated 'climate facility'. A new facility defined in this manner shall generate resources that are 'additional' to existing flow of development funds and funds projects or programmes that are consistent with national priorities, which are not necessarily the most cost-effective ones in terms of carbon emissions avoided. As mentioned earlier financial resources need to be allocated on a sliding scale as is done presently the case with the Adaptation Trust Fund where the emphasis should be based on end outcomes for the poorer or disadvantaged sections of communities than on the criteria of bankability.

The aspect of 'predictability' is crucial to the equity dimension of a climate financing facility as any process that is not predictable can derail adaptation process. Existing public sources of climate financing are not predictable as they depend on the aid policies of donors. Private flows are also not predictable as they are determined by the state of the economy and state of business cycles. The problem with a carbon market mechanism is that while it is 'new', and 'additional', it is not predictable in terms of its ability to yield a consistent flow of resources due to volatile carbon allowances or permits prices. If not properly designed carbon markets may not meet with the norm of equity for other reasons, as we will discuss later.

Given the inadequacies of all the three modes of financing, any reliance on one or the other instrument will not do justice to the goals of equity, efficiency and effectiveness set for the success of the FCCC. Consequently a climate financing mechanism should stand on the three pillars of public and private financing and carbon markets if the goal of an equitable climate pact is to be achieved. This is in spirit with the MEF recommendations and the position adopted by developing countries as well.

Co-benefits Approach to Adaptation Financing and Equity

An unexplored dimension of equity of adaptation financing is its inter-linkage to mitigation commitments by developed countries. As the IPCC Third Assessment Report states that until 2050, global mitigation efforts

that are designed to cap GHGs at 550 ppm would benefit developing countries significantly particularly when combined with enhanced adaptation (IPCC, 2007, p. 827). In other words the co-benefit potential of mitigation actions is enormous. Currently the special and differentiated responsibilities in the FCCC is interpreted in terms of differences in obligations to cut GHG and not in terms of obligations to take on adaptation burden in developing countries as well. The co-benefit principle if applied to mitigation action can generate resources that are new, additional, adequate and predictable, besides being equitable, efficient and effective. This dimension has not been captured in the Stern Report.

From the equity perspective, it is important that the co-benefits of adaptation and mitigation are premised on special and differentiated responsibilities. Fund flows for adaptation programmes are primarily driven by national resources and grants. Required as they are to quantitatively reduce CO₂ emissions below the 1990 baseline, it is important for developed countries to take up financial commitments for funding adaptation activities in developing countries that are commensurate to their own mitigation processes. Fall in mitigation targets have to be matched by rise in adaptation financing. Conversely the greater the mitigation efforts, the lesser will be the scale of adaptation funding as adaptation costs will come down. The lower the adaptation burden, it frees up resources for developing countries to take to low carbon pathways.

Adaptation is not an option for developing countries. It is a prime necessity to prevent their livelihood driven sectors from collapsing. India spends 2% of its GDP on adaptation and is expected to spend more as the worst impacts of climate change intensify (Saran, Shyam, 2009, p. 4). Agricultural systems in the developing world are already threatened by climate variability which increases their vulnerability to food insecurity (Bates Bryson et al (2008). The hydrological systems in the developing countries of Asia and Africa are threatened by climate change, resulting in serious imbalances in water budgets. Coastal areas in developing countries are also threatened by sea level rise.

Low levels of mitigation efforts by developed countries, besides being against the spirit of obligations enshrined in the Kyoto Protocol, would only serve to increase adaptation costs for developing countries further (Lewellyn and Chaix, 2007).

Table 1 brings out this fact in relation to the situation of coastal, semi-arid agriculture, degraded forests and the water resources sectors with reference to the State of Karnataka in India. Based on modal values of costs / benefits accruing to the various sectors in current prices , elicited

through field surveys conducted in 2008, the relative loss of benefits or relative incremental costs have been estimated in Columns 5 and 6. Amortized value of capital and operational costs have been taken to estimate the relative costs of various mitigation options, while as far as benefits are concerned, the same has been estimated in terms of damages avoided. It is evident that the softest adaptation measures are way below the most rigorous adaptation measures in terms of incremental costs or lost benefits.

Table 1

Relative Benefits Or Costs From Adaptation Projects For Different Mitigation Scenarios

Sl. No	Sector	Adaptation Activity	Mitigation Level	Modal values at current prices in INR	
				Benefit ²	Cost ³
1	2	3	4	5	6
1	Agriculture	Drought Resistant Plant Variety	Low	0.30	-
		Just in Time Sustainable Irrigation	Medium	0.60	-
		Business-as-usual ¹	High Status quo (irrigated crops)	1.00	-
2	Coastal Zone	Sea walls	Low	-	1.00
		Bio-shields (Mangrove plantations)	Medium	-	0.17
		Business-as-usual ¹ (Routine protection measures)	High	-	0.003
3	Degraded Land	Low transpiration	Low	-	1.00
		Medium transpiration	Medium	-	0.38
		Business-as-usual (High transpiration)	High	-	0.25
4	Water (groundwater)	Artificial recharge	Low	-	1.00
		Natural recharge	Medium	-	0.09
		Business-as-usual ¹	High	-	0.01

Notes:

Business-as-usual – Current level of utilization of the natural resource without any adaptation activity being undertaken.

Optimal yield of finger millets in Karnataka (probability) in dry land and irrigated conditions.

Cost of undertaking the adaptation activity.

The Economic Rationale of the Co-benefits from Mandatory CO2 Mitigation

Flexible mechanisms like CDM and JI are not substitutes for graduated and definitive tangible emission reductions by developed countries in their own soil. Rather they can weaken the foundations of efficient price discovery by carbon markets. This will be evident from Fig 1 where MC_{m1} is the marginal curve of mitigation while MC_a is the marginal cost of adaptation. It is evident from Fig 1 that the lower the abatement level, the higher the marginal cost of abatement and vice versa. At the point where MC_a intersects MC_{m1} curve, the carbon price is 'P', which corresponds to an abatement level Q. Let us assume that Q is equivalent to the QERLO targets to be met by Annexure 1 countries under the Kyoto Protocol. Beyond Q, if abatement is sought to be achieved through 'low cost or low quality and discounted' CDM and JI projects credits, the effect will be the creation of a kink in the MC_m curve. The new MC_{m3} curve which commences from Q along the MC_a curve represents a low cost abatement trajectory for increased abatement beyond the QERLO. As abatement increases to Q_2 the price of carbon falls to 'P₁' from 'P'. Ideally the carbon price should have risen if Annexure 1 countries had contributed to the increase in abatement level to Q_2 and this would have happened if allowances to emit were distinguished from voluntary mitigation units like CERs. At a carbon price of 'P₁' the gap between MC_m and MC_a is the maximum, with supply of mitigation action being OQ_1 as compared to the demand for adaptation action which is OQ_2 . This is clearly a non equilibrium situation that potentially creates a deadweight loss represented by the arc 'Q₁YQ₂'. Besides, low carbon prices pulls down CER prices arising from CDM projects which acts as a disincentive to non Annexure 1 countries to undertake 'one-sided selling of emissions credits' as the Stern Report states.

Mandatory CO2 reductions enable social cost of carbon to be better reflected in carbon marketplace, thus enabling the realization of a carbon market structure that recognizes the principle of 'equitable burden sharing'.

Thus apart from reasons of fulfilling the Kyoto obligations, developed countries need to undertake mitigation measures in the interests of developing countries that will have to bear the brunt of climate change. As a carbon saving asset, CERs need to realize revenue equal to MC_{m1} . Over a period as MC_{mi} shifts parallelly due to cost-effective technological solutions, mandatory mitigation costs lower, resulting in lower carbon prices that is achieved without market distortion.

However if the shadow costs of mitigation are incorporated that adjust upwards low nominal wages and capital costs of mitigation projects, the costs figures will be higher. Unless mitigation permits from developing countries are able to realize their 'real values', a carbon market cannot be considered equitable.

As mentioned by the Stern Report, integration of carbon markets is a pre-requisite for a well functioning carbon market. This is underscored by Tol (2009) when he refers to inter-carbon market arbitrages between the carbon markets in the US and Europe when it comes to carbon pricing. To a large extent, this has been conditioned by policies and the non integration of carbon markets in the world.

The term carbon market needs to be broadly defined. Ideally a carbon market should function not only should to trade in a variety of emission permits, but also function as a capital sourcing mechanism to facilitate investments in clean technologies and associated services. Environmental stocks, bonds and securities are as important to the carbon markets as are permits. The depth and range of the carbon markets need to be richer to enable carbon markets function as an ideal resource allocation system.

Apart from real time spot prices, a carbon market should promote price discovery mechanism that discovers futures markets of carbon permits. Over the Counter (OTC) transactions, as has been noticed in developing countries for CERs, do not promote a price discovery process that helps the sellers. To obviate OTC transactions it is important that sellers from developing countries have access at low transaction costs to organized exchanges that enable them meet a wide range of buyers. Consequently a carbon market that enables access and opportunities to both buyers and sellers would form an equitable system.

Further carbon markets should distinguish permits and AAUs from CERs through different quality parameters. While AAUs are permits to emit and need to be discouraged, CERS are certificates of voluntary mitigation efforts (Muller,op.cit, p17). Further, the principle of special and differentiated principle enshrined in the FCCC and the Kyoto Protocol requires voluntary mitigation products such as CERs originating from non Annexure 1 to be treated differently from AAUs. These categories of assets cannot be clubbed together and treated as homogenous assets when it comes to trading. Value differentials between the instruments need to be laid down in terms of differing quality parameters. Similarly the role of carbon markets in promoting environmental investment instruments such as bonds and stocks, needs to be recognized.

Finally carbon markets need to be carefully regulated to prevent violent fluctuations in traded asset prices, induced by speculation that is not in tune with the fundamentals of supply and demand.

Adaptation finances that source their requirements from revenues arising from mandatory mitigation activities are, in a more fundamentally more sense, more equitable and can be helpful to developing contribute to undertake voluntary mitigation activities besides helping them to cope with climate stresses. Therefore carbon markets that facilitate sourcing of adaptation funding from mandatory mitigation activities function should form an important segment in the post 2012 financing architecture for climate change. This can be achieved if Governments in developed countries can generate revenues by auctioning larger chunks of allowances than give it away for free, motivated by political considerations (Metcalf,op.cit).

Financing Based on the Co-Benefit Principle and implications for the Carbon Allowance Market

The implication of the point above regarding auctioning of allowance can be far-reaching for the realization of an equitable market when situated against the backdrop of the co-benefit principle of mitigation.

As already discussed at the outset, application of the co-benefit premise would link adaptation financing to mitigation activities. By nature, allowances afford certainty in quantitative reductions in CO₂ emissions, unlike carbon taxes. In general free allowances tend to over-compensate firms and would use up resources that could be put towards other uses, including compensating the consumers who bear much of the burden (Stavins, 2007, p. 25). By reducing grandfathering, and auctioning permits, implicit subsidies are avoided thereby increasing the probability of quantitative reductions in CO₂ emissions beyond targets. Auctioning a part of AAU involves the use of a new and additional finance instrument. Auctioning of permits causes revenue to accrue to the Government and is therefore available for redistribution amongst consumers or to investors in new technologies. Since AAUs allowances are allocated objectively (unlike EU-ETS allowances which suffered from excess allowance grants in the initial years) this ensures predictability for revenues generated by auctioning AAUs. Finally the proposal is workable.

Private Investments in Adaptation Projects: Risk - Return Issues

Adaptation by itself is an equity based term as it is related to livelihoods of poor people. It has an organic linkage to national action programmes on climate change in developing countries and hence enjoys greater national commitment. By contrast, the pro-poor credentials of mitigation enabling activities in developed countries (like CDM projects) is not high as they are on project modes than on programme mode. But then it is precisely the project mode of CDM that attracts targeted foreign private flow of funds. There are opportunities for private sector to contribute to adaptation funding. However they have to overcome what Grubb (2007) refers to as the 'risk of maladaptation' arising from uncertainty in regional climate predictions, masking of natural climate variability and capital intensive nature of projects. Capital intensity can be a severe constraint and have to be matched by returns. Coastal zone projects, water sources and agriculture R &D are three promising areas for adaptation action in the Indian situation.

However adaptation 'projects' associated with the coastal and water conservation have a high beta factor and risks of uncertainty about returns, when it comes to returns on investments. Breach of sea walls, non realization of anticipated property values on shore lands that are protected by expensive sea walls, decline in groundwater quality from artificial recharge projects etc are potential risks on returns from such projects. (Damodaran, 2005). This is more so when capital intensive adaptation projects are taken up to provide for slow progress on the mitigation front. Indeed the higher the levels of mitigation, the lower the risks from adaptation projects and hence higher the risk adjusted return on adaptation projects. Private capital flows on adaptation projects will be higher if risks are less in relation to mean returns.

Let 'Ω' be the optimal investment in mitigation projects and 'I' actual investments, given normal risks (σ), then

$$\sigma = \begin{cases} 0, & \text{if } I \geq \Omega \\ y, & \text{if } I \leq \Omega \\ x, & \text{if } 0 < I < \Omega \end{cases}$$

In Figure 2, the concave curve that represents the efficient frontier of investment As the curve shifts from P1 to P2 investments on mitigation projects rises since the risks on adaptation projects decreases from OX to OY. This contributes to improved risk adjusted return from adaptation projects.

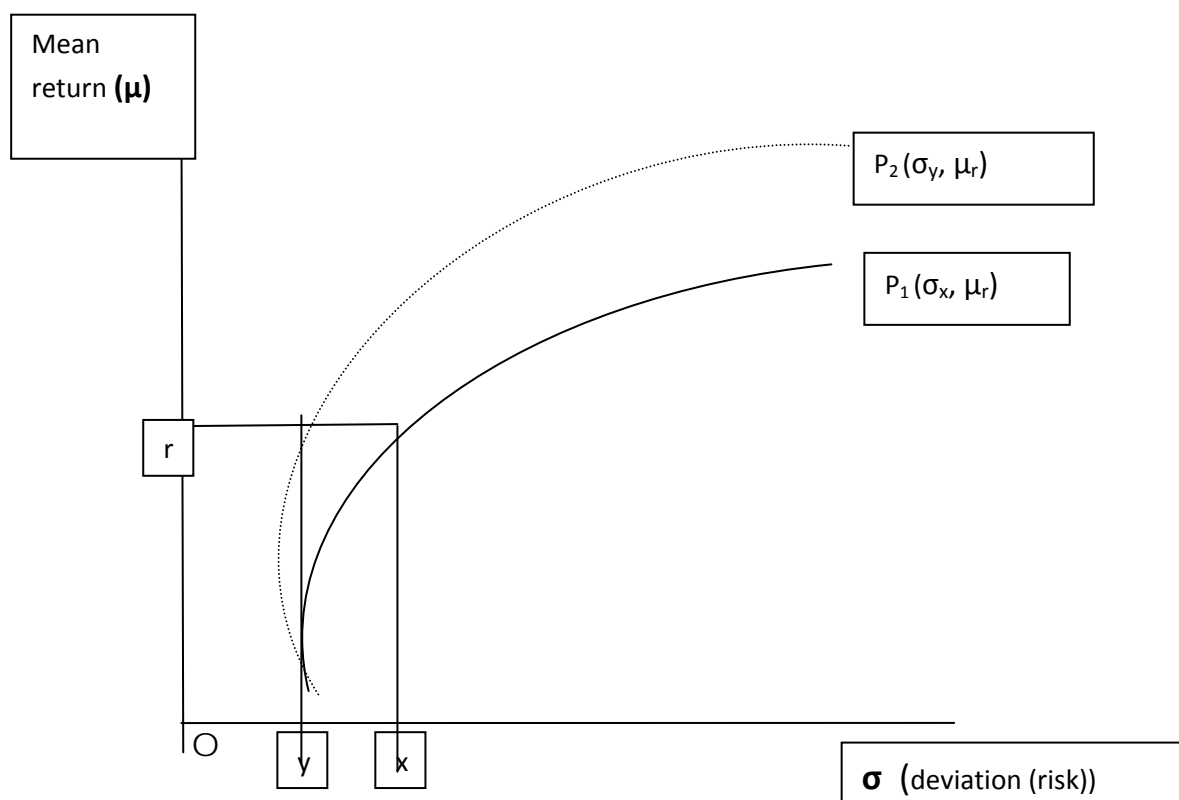


Fig. 2. Benefits of Mitigation on Risks Return Patterns from Adaptation Projects

An Alternative Approach towards Assessment of Adaptation Financing Proposals

The foregoing analysis calls for a different system of assessing the utility of various adaptation financing proposals. It is important that climate financing proposals in general and adaptation financing proposals in particular are based on the principle of co-benefits of mitigation and adaptation. Proposals that meet the co-benefit criteria can be further situated within the maxims of ‘new and additional’ predictability, adequacy and equity parameters that relate to special and differentiated responsibilities and appropriateness.

Various parties to the UNFCCC have submitted proposals for adaptation funding (UNFCCC 2008). Most of them have emanated during and after the Bali Summit of 2007. Of these five have been tabled by developing countries (or potential recipients) while three of them have emanated from the Annexure 1 countries/country blocs who are potential donors.

The UNFCCC classifies the proposals on adaptation financing into three — **One** which looks at maintaining or increasing the scale of

contribution from existing mechanisms. **Two** which calls for defined budgetary contributions from developed countries. **Three** which seeks to raise contributions from market based instruments (UNFCCC, 2008).

However in terms of the co-benefits criterion, the proposals can be categorized into two viz those that are linked to mandatory mitigation and those that are not. In the former category comes the Mexican, Swiss and the Norwegian proposals, the EU ETS proposal on levy on trading, carbon market levy, levy on aviation allowance auctions etc. In the latter category occur the proposals of China and G77, the EC, Bangladesh and Pakistan proposal on CDM levy and the GCSM.

Sum Up

The paper seeks to underline the philosophical significance of the maxims of environmental financing highlighted by the UNFCCC, in the light of the Stern Panel Report of 2008 and studies by other economists on the state of art on Climate economics. The major proposition advanced in this paper is that carbon financing in general and adaptation financing in particular need to be situated within the matrix of co-benefits approach that is premised on mandatory mitigation action. A co-benefits approach to the issue of adaptation financing is equitable and economically efficient. The economic efficiency rationale of the co-benefits approach and mandatory mitigation action is that it avoids deadweight loss and ensures optimal social price of carbon. The paper seeks to demonstrate that as investments on mitigation rises, risks on adaptation projects decrease, thus contributing to improved risk adjusted return from adaptation projects. With reference to coastal, water and degraded lands ecosystems in India, the paper demonstrates how higher levels of mitigation efforts reduce the capital costs of adaptation activities in developing countries. The paper argues that a co-benefit approach that sources revenues from mandatory mitigation action based adaptation financing is economically sensible. Indeed such an approach alters the concept of equity by enhancing its scope. It will also provide scope for compensating developing countries by enhanced adaptation assistance in the wake of fall in mitigation targets by developed countries. While most of the adaptation financing proposals tabled during and after the Bali Action Plan, fulfill the requirements of ‘new, additional, predictable and adequate as conventionally described, the altered criteria of equity when employed to assess the different proposals places the Norwegian proposal in a favourable position. The Norwegian proposal while not being desirably adequate as compared to the transfer payments advocated by the G77 and China proposal, is new and additional,

predictable and more fundamentally speaking equitable insofar as it seeks to raise financial resource from mandatory mitigation obligations to exclusively fund adaptation programmes in developing countries. At the same time, the paper also argues that carbon markets are an indispensable element in the environmental financial architecture. However its scope needs to be enlarged and improved. Carbon markets need to be reformed through improved and varied functions that facilitate technology transfer, provide differential prices for different carbon products, facilitate enhanced access by developing country sellers and enable efficient carbon price discovery for sellers from developing world. Such an integrated perspective can lead to the formation of a global environmental financial architecture that addresses climate change problems besides more effectively addressing the critical needs of adaptation financing in developing countries in the post 2012 phase.

(The views expressed in this paper are personal.)

Notes

1. ODA in particular, is stated to be unpredictable as it is subject to the will of legislatures in donor countries. (Muller, p. 21).

2. As Muller states at present, all international funding instruments except the recently operationalised Kyoto Protocol Adaptation Fund are replenished through ODA-type bilateral voluntary contributions/donations (Muller op. cit. p. 21). There are no predictable alternatives by way of private flows. International private flows like FDIs and FIIs are unpredictable and are dependent on macroeconomic variables (including interest rates), investment climate and capital market trends {UNFCCC (2008, p63) and Damodaran (2008, a)}.

3. Sethi, Surya, 2008 as cited by Khor, Martin (2008). “Developing Countries Ask For New UNFCCC Financial Architecture” in *South North Development Monitor* (SUNS) No. 6491, 9, June 2008. The criticism about the World Bank Pilot Programme for Climate Resilience was on the ground that being a loan package it was not appropriate.

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