

Multilateral Environmental Agreements and Issue Linkage

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Abstract

A Multilateral Environmental Agreement (MEA) can be best defined as being a manifestation of the collective effort required at an international level to address environmental problems of a trans-boundary nature. There exist over 500 treaties and protocols aimed mainly at the protection of the environment. However, many of these elaborately drafted agreements have failed on compliance and enforcement, rendering them ineffective. The major factors contributing to non-compliance and non-enforcement can be identified as i) the public good nature of environment that brings about the problem of free-riding by the participants/non participants, ii) the absence of any overarching international legislative or judiciary body with sufficient coercive powers to ensure compliance and enforcement, iii) the excess of costs over benefits in complying with environmental treaties, iv) the intrinsic loose (or non-binding) nature of the principle of common but differentiate responsibility, and v) the surge of MEA's since 1972, among others.

As a policy response to enhance the three aspects of effective MEA's –participation, compliance and enforcement, issue linkage has been suggested. It covers a range of issues such as climate coalition and international trade, linkage between R&D and climate cooperation, and technology diffusion and the stability of climate coalitions.

This study examines issue linkage as a way for enhancing compliance and enforcement of MEA's such as the Kyoto Protocol. It also explores how issue linkage could encourage non-signatory countries like the US to participate in the global climate change agreement and comply with the imperatives of such an agreement.

Keywords: Multilateral Environmental Agreements, Issue Linkage; Participation; Compliance; Enforcement

I. Introduction

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Environment belongs to the centre of many debates. It is directly related to our life support, agriculture, climate, health and finite raw materials. However the last two decades have been witness to the changing intensity and frequency of natural disasters across the world. The repeated string of hurricanes across the US (1980-88-98-04-05, devastating earthquakes at Mexico (1985), Latur, (India/1993), Kobe (1995), Taiwan (1999), Gujrat (India/2001), the tsunami in Japan (1983) and the more recent one in S.E. Asia (2004), have time and again reinforced the close link between the well being of the environment and the people. It is not surprising therefore that environmental governance has emerged as one of the topmost policy issues during the last decade or so. From being a 'matter of local concern' it is now increasingly an action item in the international policy domain. These and other similar events, have contributed to the development of an environmental scenario characterized by a wider set of more complex and interlinked environmental problems now than ever before. Individual national responses are not sufficient to address the challenges posed by such inter-linkages. Policy makers are increasingly looking at an international cooperative framework for finding solutions to the above. The primary means for advancing environmental cooperation and sustainable development is through negotiation of multilateral environmental agreements (MEA).

However, despite the plethora of international environmental agreements that exist today, environmental conditions continue to worsen. The questions that arise therefore are, firstly, are these multilateral agreements able to deliver effective solutions for resolving the crisis they are negotiated for? Secondly, what are the underlying reasons for the dismal compliance and enforcement record? And lastly are the large numbers of MEA's responsible for the poor performance on the compliance and enforcement front? Answers to these and others form the centre of our discussion.

The study of compliance with international agreements has gained momentum over the last few years. Much attention has been devoted to this area by academic researchers and policy makers alike. Although much of the compliance and enforcement problem falls within the domain of international environmental law yet at the same time, solutions to this are a synthesis of both law and economics. For example, the game theoretic approach has been often used to explain the stability of a coalition of countries that are part of an international agreement or have the potential of being so. There has been pioneering work in evaluating the inter-country cooperation issues using game theory. {Barrett 2003, Chander and Tulkens 2006}

While much ground has already been covered, the continuing stalemate with respect to participation of the US in the Kyoto Protocol and the time taken for inducing other countries, such as Russia, to join in, signifies that there still remains much work to be

done for designing effective environmental agreements. Newer solutions need to be looked at that have the ability to reduce the response time by proposing a ‘profitable for all’ deal. One such solution that has been proposed in the recent years is that of Issue Linkage. Simply put, it is the interlinking of two issues, one of which is beneficial for a particular group of countries while the other appeals to a different group. Our research at the Department of Economics, National University of Singapore examines the use of this specific policy response i.e., Issue Linkage, with respect to its feasibility for inducing the US to join the Kyoto Protocol. A hypothetical cooperative arrangement between the US, China, European Union, Japan and Russia is modeled with cooperation in the areas of climate change and research and development. This paper presents a synopsis of our research model.

As regards the paper, Section *One*, gives a background to the development of the present day global environmental scenario and highlights the reasons that necessitate such large scale cooperation. Section *Two* goes on to analyze the problem of non-compliance and un-enforcement by discussing the factors underlying the same. It also gives a brief account of some of the policy responses suggested to tackle the problem. Section *Three* gives a brief insight into our research model setup. Lastly, Section *Four* concludes the paper.

II. Setting the Context

A. Development of the Current Environmental Scenario

In the simplest of terms, a multilateral environmental agreement can be defined as an agreement between states to co-operate on global environmental issues such as climate change, marine pollution or protection of endangered species of flora and fauna. A more technical definition is provided by the UNEP’s ‘Manual on Compliance with and Enforcement of Multilateral Environmental Agreements’ (2006). It defines an MEA as a “....broad term that relates to any number of legally binding instruments through which national governments commit to achieving specific environmental goals”. Bilateral agreements usually play a secondary role since most trans-boundary environmental problems tend to affect more than two countries. The terms multilateral environmental agreement (MEA) and international environmental agreement will be used interchangeably in the paper. In addition, for the purpose of this paper, accords, protocols and treaties will also stand to mean the same.

Over the past 15-20 years, world Governments have been actively involved in developing a series of conventions aimed at managing environmental issues having transboundary

implication. These can be either regional in nature¹ or may assume a global character such as in the case of Convention on International Trade in Endangered Species (CITES), Convention on Biological Diversity (CBD) or the Montreal Protocol. With regard to regional agreements, UN Secretary General Kofi Annan points out that they also aid in softening the political tensions and offering opportunities for working on mutually advantageous goals for neighbouring countries. Infact regional MEAs are often looked upon for building the base to address global problems by redressing the same within the regional commons first. Together, both regional and global MEA's set out the principles that govern international co-operation on the environment and sustainable development. Some of the prominent global environmental accords are outlined in Table 1 below.

Table 1: Major Multilateral Environmental Agreements The UNEP broadly categorizes the international environmental agreements as being related to one of the following classifications: a) biodiversity b) atmosphere c) land d) the regional seas e) disposal of chemical / radioactive hazardous wastes.

	Name	No of Parties	Objective
1	Ramsar Convention on Wetlands / (1971)	153	Conservation and sustainable utilization of wetlands. To stem the progressive encroachment of wetlands.
2	World Heritage Convention / (1972)	170	Aims to promote cooperation among countries to protect heritage, from around the world, that is of such outstanding value that its conservation is important for current and future generations
3	Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) / 1973	169	Controls the international trade in threatened species of plants and animals to ensure their survival and continuance.

¹ One of the regional conventions is the The Caspian Convention (formally known as the Convention for the Protection of the Marine Environment of the Caspian Sea) aims at the sustainable development of the Caspian environment including living resources and water quality, protecting human health and ecological integrity for the sake of future generations. Some estimated 11 million people are distributed around the Caspian shoreline. The countries involved in this protocol include Azerbaijan, Russian Federation, Iran, Turkmenistan and Kazakhstan.

4	Montreal Protocol on Substances that Deplete the Ozone Layer / (1987)	172	Primary treaty providing exerting controls on the production and consumption of ODS such as CFC's, halons and methyl bromide that deplete the ozone layer.
5	Basel Convention on the Control of Transboundary Movement of Hazardous Waste and Their Disposal / (1989)	168	Regulates the transboundary movement of hazardous waste and obliges Parties to ensure that such wastes are managed and disposed off in an environmentally friendly manner. Specifically looks at preventing such transfers from the developed to the developing countries.
6	Convention on Biological Diversity (CBD) / (1992)	188	Targeted at a) conserving the planet's biological diversity, b) ensuring the sustainable use of its components c) promoting the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources.
7	UN Convention to Combat Desertification / (1994)	191	Agreement to combat desertification and lessen the effects of drought via national action programmes and international co-operation
8	Kyoto Protocol to the UNFCCC on Climate Change (1997)	164	Seeks to limit world greenhouse gas emissions, by assigning mandatory reduction targets of GHG's, to slow the progress of global warming
9	Rotterdam Convention on the Prior Informed Consent Principle for Certain Hazardous Chemicals and Pesticides in Intl trade (1998)	110	To help participating countries learn more about hazardous chemicals that may be shipped to them and decide on the future import
10	Stockholm Convention on Persistent Organic Pollutants	130	Eliminating / reducing releases of 12 persistently organic pollutants (POP's) and support transition to safer alternatives. POP's persist in the environment, accumulating in the food web, and pose a severe risk to human and environmental health

Global attention was first drawn to environmental issues in the early 70's during the UN Conference on the Human Environment in Stockholm. The Stockholm Action Plan laid down recommendations for managing the environment on an international level. After 1972, many countries formed their environmental ministries or national environmental agencies and this further resulted in a broad range of international treaties. However by

the mid-80's, the initial euphoria of the Stockholm conference had declined and little progress had been made with respect to achieving the environmental objectives. The next major milestone in global environmental governance was arrived at in 1992 at the Rio Earth Summit. For the first time, world leaders were willing to support the cause of a comprehensive action plan on environment and sustainable development as well as extend political commitment for a number of conventions directly related to the environment. Prior to 1992, most environmental treaties were centered on concerns for the depletion of natural resources and strategies for conservation. However, environmental protection and sustainable development were discussed parallelly, for the first time, at the United Nations Conference on Environment and Development at Rio. It was here that the United Nations Framework Convention on Climate Change (UNFCCC) and the Convention on Biological Diversity were opened for signature. Other conventions (some highlighted in the table above) followed soon after.¹

Today there exist several hundred international environmental agreements some focusing on geographically delineated areas, such as the Caspian environment, while others address functional concerns, such as combating desertification. Binding international conventions exist in the area of climate change, biological diversity and desertification, amongst others. Despite the plethora of agreements, there is much concern among the international community that most of these agreements are not able to achieve their objectives adequately, leading to a continuing worsening of the environment. Some of the questions being repeatedly debated are:

- i. In practice, are the laboriously negotiated MEA's complied with and effectively enforced?
- ii. Are these MEA's effectually able to represent the countries' priorities such that large scale participation is encouraged?
- iii. Is the multiplicity of MEA's responsible for their poor performance?
- iv. What sort of policy responses can the North and South work on to ensure a climate of compliance and enforcement within the MEA framework?

As stated before, our study seeks to answer these questions and present some recommendations for the same.

B. Arguments for a large-scale cooperative framework

When looking at the question above, one might be tempted to ask, why do we need to work towards such a large cooperative framework? If negotiating multilateral accords in

¹ These also included the Regional Agreement on the Transboundary Movement of Hazardous Wastes in Central America (1992), the Convention on Co-operation for the Protection and Sustainable Use of the Danube River (1994) and the Agreement on Cooperation for the Sustainable Development of the Mekong River Basin (1995)

a way that benefits all is indeed laborious and if despite such efforts, compliance and enforcement are inadequate, do we really need such a large-scale framework to work with? The answer in fact is *yes!* Countries might want to negotiate and participate in an international agreement for a variety of reasons. While some would be looking for an opportunity to enhance their position in the international fraternity, others might be looking for technical and financial assistance to tide over an existing environmental crisis. However, it is the global nature of the environment related problems that necessitates collective action in most cases. From an economist's perspective, environmental conundrums are akin to the market failure in the provision of public goods. In recent years, the concept of Global Public Goods, first developed by Joseph Stiglitz (1995), has gained increasing importance in the realm of international policy making. As reviewed in his paper, in addition to being non-rival and non-excludable, several public goods are not limited geographically because their benefits accrue to everyone in the world. The global environment falls under such category.

It is common knowledge that public goods need to be provided by a player not guided solely by profit motive, such as the Government or NGO's. In the domestic domain, national governments are able to perform this role effectually. When translated into the international sphere, states behave much the same as private actors, motivated by self interest, thus necessitating collective action for the optimal supply of the global public good. In some sense, this idea can also be used to interpret Garret Hardin's "Tragedy of the Commons", according to which rational self-interested actors will seek to maximize their gain at the expense of the common use areas. Collective action is also important since externalities are becoming more and more international in reach and policy making remains largely in the national domain.

Let us take the case of climate change as an example. Economic activities yield benefits on one hand and damages on the other in the form of pollution and associated environmental deterioration. Emissions of greenhouse gases, in one country, contribute towards global warming that also affects the countries other than the emitter. This problem is also discussed by Carraro and Siniscalco (1993), wherein they argue that although the benefits can be tied to domestic emissions only, the damage experienced by a country is caused by both domestic and foreign emissions. This gives rise to the problem of externalities, which according to them, can be solved only via *voluntarily* agreements among sovereign countries, keeping in view the present institutional setting.

To summarize, the global nature of the problem, the global public goods argument and the widening of the area covered by externalities all justify the use of a large-scale cooperative framework.

III. Understanding the Problem

A. *Compliance or Enforcement: Where are we lacking?*

It is not important as to how *many* environmental agreements are countries able to negotiate. What needs prime attention is how to ensure full participation in these agreements, effecting an allocation and enforcing the same. As has been mentioned before, a multitude of MEA's have emerged in the last two decades. Yet one of the concerns that repeatedly surfaces and with renewed anxiety every time, is that most of these MEA's are neither fully complied with nor are they being effectively implemented. Effective enforcement and compliance are the foundations for the success of any international accord. However these can only be as effective as the parties make them to be. Which is why, despite their growing numbers and importance, the implementation and enforcement is sharply curtailed by the inability, unwillingness or both of the Parties involved. The long drawn negotiations on climate change i.e., the Kyoto Protocol reinforce this fact.

A combination of factors has been encouraging an increasing climate of non-compliance and ineffective enforcement. We divide these constraining factors into those at the international level and those more dominant at the national level. But as an essential step to any analysis, we lay down the definitions for 'participation', 'compliance' and 'enforcement' and examine the interrelationship among the three whether these objectives can be implemented independently or jointly.

Participation refers to the formal expression of interest by a country to adhere to the principles and or requirements of an MEA. The ability of a treaty to attract a high participation rate depends on the nature of the problem and the number of states affected. Enforcement or Implementation refers to the measures that Parties take to make the international environmental agreement (IEA) effective. A more formal definition says that: "Implementation refers to, inter alia, all relevant laws, regulations, policies and other measures and initiatives, that contracting parties adopt and/or take to meet their obligations under a multilateral environmental agreement and its amendments if any." UNEP, 2006. While some IEAs have a self executing character and do not require any additional domestic legislation, some others might impose requirements for supporting enforcement measures at the domestic level. This could be in the form of legal regulations, tax incentives or trade sanctions amongst others. Compliance, is "...the fulfillment by the contracting parties of their obligations under a multilateral environmental agreement and any amendment to the multilateral environmental agreement". {as defined by the UNEP, 2006} It can assume different meanings

depending on the requirements of the particular treaty. While some may make only simple procedural demands, such as reporting requirements to the secretariat, others might have a more stringent compliance mechanism, such as cessation or control of an activity, incorporated within them.

According to Weiss & Jacobson (1998), compliance succeeds enforcement as it reveals whether countries have in fact adhered to the measures laid down for the effective implementation of the international agreements. Their discussion also highlights a critical point regarding the degree of compliance. They argue that treaty secretariats being fully aware of the varying levels of socio-economic development of the Parties, *do not expect a perfect compliance record for the MEA*. Only a 'high degree' or substantial compliance is expected of most Parties.

It is futile to study the three variables separately during the course of policy making. International law requires that participation in a treaty must also be followed by compliance. Yet there is no international law that can ensure participation in the first place. Therefore for a country to avoid compliance, avoiding participation would be a natural first response. According to Barrett and Stavins (2006), non-participation is the biggest credible threat that any country can carry out. If this can be avoided, then the smaller deviations can be taken care of at a lower cost. It is therefore only logical to conclude that solutions targeted at deterring non-participation, can also address the problem of non-compliance to some extent. At the same time, adequate enforcement is also an essential pre-condition for achieving the desired compliance levels required by the treaties. But more than often, these three complementary objectives are addressed in isolation leading to fragmented and incoherent policy responses.

Since the last two decades, a growing body of scholarship has focused on reviewing the compliance mechanisms of MEA's and their ensuing effectiveness. After an extensive literature review of this field we present some factors constraining compliance and enforcement in an MEA. We identify them to exist either at the national or the international level.

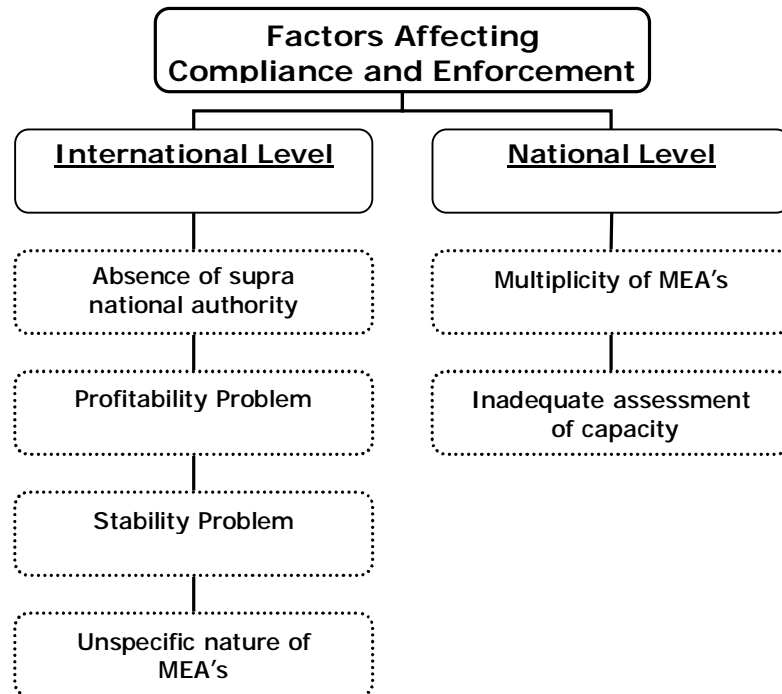


Fig 1: Summary of factors that promote non-compliance and un-enforcement of MEA's

B. Compliance & Enforcement at the International Level

1. **Absence of any supra national authority:** Most assessment reports of MEA attribute their inefficiency to the lack of an international authority having overarching powers to influence the enforcement of environmental policies and regulations on a global scale. While at the domestic front, the presence of a local government having complete enforcement powers ensures resolution of environmental problems, full national sovereignty implies that such coercive methods cannot work in the international domain. Instead, voluntary arrangements need to be looked at. Many mistakenly point out to the United Nations Environment Programme (UNEP) to be already performing this role. However the UNEP holds no executive authority, has limited resources and only advisory power. It has always relied on “soft law” instruments to build international consensus. All of its programs are financed by direct, voluntary contributions from its member states. Ultimately, it is the states’ own initiative to protect the global environment.

- 2. The Profitability Problem:** There exists a high degree of economic and environmental asymmetries across the world. This implies non-uniform cost implications for different countries, when an environmental policy needs to be globally enforced. A multilateral environmental agreement that disregards such imbalances and sets out a consistent commitment for all Parties will not be agreeable to all. In some sense, the question of profitability also translates itself into another concern: fairness. Taking the case of reduction of greenhouse gases (GHGs), one of the prime issues of contention has been the conflict of interest between the developing and developed nations and who should shoulder the burden of interest. Developing countries argue that majority of the current GHG accumulation can be attributed to the economic activities of the developed countries, which are now at a relatively high standard of living. Developing states therefore claim that they should not be held responsible to clean the mess they did not create in the first place. Their other supporting claim to this is the lack of economic or technological resources to execute such GHG reduction commitments. Very often the demands of the developed countries are viewed as an attempt to stifle their economic and industrial growth. At the other end, the developed states demand that, keeping in view the rates of population and future industrial growth of the developing countries, the latter should also be bound by emission reduction commitments. Infact, one of the arguments for the US withdrawal from the Kyoto Protocol was the lack of commitment by the developing nations. Profitability, in our context, refers to the construction of international environmental agreements in such a way that it is profitable for and acceptable by all countries. Put in another way, an MEA will be considered profitable by a country if they are better off and experience a higher welfare after being a part of the agreement in comparison with status quo.

- 3. The Stability Problem:** Redressing the profitability problem is not the end of the story for there still remain other incentives for countries to forfeit their obligations. Such incentives undermine the stability of the coalition. As has been discussed before, environment, being non-rival and non-excludable can be classified as a public good. And like every other public good, international environmental agreements are also subject to free-riding behaviour. Such behaviour usually manifests itself in the form of either non-participation or non-compliance. Taking the example of emission reduction once again, since one country can benefit from the emission reduction activities of another, it has incentive to let the other country sign the co-operative agreement. This is what is referred to as the stability problem. As explained by Carraro and Botteon (1993), the stability issue, unlike the profitability issue, is not linked to the asymmetry that exists between the

countries and would still persist even if all countries were similar. Countries might prefer non-cooperation to avoid an ‘unfair cost-sharing burden’ or simply to avoid the cost of moving to green policies. By doing so, not only do they benefit from lower costs, but also from a cleaner environment that occurs due to the ‘green investment’ by other countries. To avoid such instability, some constraining elements need to be incorporated at the time of designing the agreement.

4. **Unspecific Nature of MEA’s:** Most MEA’s are of a non-binding nature and are representative only of the *moral obligations* of the State to implement the same. In addition, many a times these agreements are also characterised by a generality and vagueness in defining targets such that Parties to it are unclear as to what is expected out of them. The non-compliance mechanisms are weak and MEA’s often rely on moral suasion to reprimand countries that deviate. With respect to compliance/ non-compliance mechanisms, Scott Barrett (2003) points out an important fact. He argues that credibility alone is not enough. It should also be public knowledge, that the threat is credible. Awareness of enforcement with real consequences can create a stronger desire to comply.

C. *Compliance & Enforcement at the National Level*

1. **Multiplicity of MEA’s:** The global environmental regime has witnessed an explosion in environmental treaties, especially post the Stockholm Conference in 1972. According to the European Environment Agency, the European Community countries are Parties to as many as 65 global and regional environmental conventions. This has led to fragmentation and duplication of objectives that undermines the efficacy of the global system. This multiplicity of MEA’s affects compliance and enforcement from both the international and the national perspective. At the international level, it has led to some MEAs to compete with one another for funds. However, its impact at the national level seems to be more severe. The prevalence of a large numbers of MEAs is exerting an increasing pressure on the Parties to meet their collective obligations and responsibilities. Constrained by lack of skilled personnel, Parties find it difficult to send expert representatives to each of these negotiations. Very often, the objectives under more than one convention tend to be overlapping with countries having to meet the elaborate research and reporting requirements of each. Proliferation of MEA’s has also led to existence of a number of new environmental treaty secretariats. Most often, they are unaware of the duplicity of objectives and end up sending contradictory messages to national governments, without consulting each other. Parties also find it hard to keep track of the growing number of such institutions

and the ensuing chain of responsibility and accountability. In addition to this, capacity constraints with respect to (*discussed below*) administrative, technical and human resources, implies that the limited resources are over-exhausted to meet the obligations of the numerous treaties. To elucidate the above, both the CBD and the Ramsar convention overlap on wetlands and the Ramsar and CITES also overlap on wetland species.

2. **Inadequate assessment of capacity:** Many developing countries are unable to meet their MEA obligations due to lack of capacity in the form of limited technical, financial, technological and personnel resources. In particular, many of the smaller nations suffer from a lack of scientific know-how and absence of skilled academicians, who can advise on a policy for effective participation in the international programmes. They are instead forced to rely on external advice that might not be fully representative of their priorities. In cases where although technological capacity might exist, developing nations might not have linkages with the international research community, which limits their knowledge of the latest findings.

Another side to this problem is the lack of vertical and/ or horizontal co-ordination between the ministries and departments within the country. Most often, the minister representing the country at the forum for negotiation of an MEA, belong to the Foreign Affairs Ministry or Department. There are little internal discussions prior to the opening of negotiations. As a result, these representatives are unaware of the existing capacity of the Environmental Ministry / Department to undertake the obligations of the MEA. This leads to an inadequate presentation of the country's constraints and need for technical or financial assistance to the negotiators.

In this context, the constraint of domestic legislation and political will also deserves a quick mention. These two play an important role for ensuring a nation's compliance with an international accord. However, it is not the number of legislations that measures the ability of the government to comply with an MEA. This is because both a weak legislation and strong but un-enforced legislation will produce the same result i.e., inadequate compliance and enforcement. Translating the suggestions of an international forum into the national sphere, for protecting the environment, remains contingent on the political will and legislative support that the policy makers have. In the absence of the above, the credibility of the country's commitment to an MEA remains under suspicion.

D. Resolving the Crisis: Suggested Policy Responses

Resolution of the compliance and enforcement problem can either be via a fragmented approach where each constraining factor is dealt with individually or via a collateral strategy. At the same time, the adopted strategy will also need to be consistent with the principle of common but differentiated responsibility. This is necessitated by the wealth disparity among nations and its consequences in determining the level of resources that each can devote to address an environmental issue. Whatever the solution is, it should facilitate the designing of any new agreements in a way such that the above mentioned concerns are minimized to the lowest possible extent.

Some of the policy responses that have been recommended and applied to some extent are discussed below.

The concept of regional or sub-regional agreements has been suggested as a potentially effective solution to deal with the capacity assessment issue. The small scale of membership allows for trying and testing a range of practical measures that are best suited to the participating countries' implementing capacity. These can then be translated into a global framework at a later stage. To some extent, regional MEA are also able to address the profitability problem by better assessing the nature of the issue at hand and identifying the countries for which it could be particularly relevant and profitable to cooperate.

Proliferation of MEA's, as discussed above, draw hugely on the limited resources of developing countries and are partially responsible for their non-compliant behaviour. Although treaty secretariats would often claim that MEAs have differing objectives and priorities, yet it is not too difficult to identify the common strands. For example, many environmental accords stress on the sustainable use of natural resources or their sustainable harvesting. A common requirement that MEAs often have is the provision for transfer of technology from the developed to the developing member states. Another crosscutting priority is the development of capacity via public education, awareness campaigns and advanced technical training of existing personnel. Recognizing such synergies explicitly can be critical for designing MEAs that can induce compliance with their non-burdening implementation mechanism. One way of doing so could be to allow for 'pooled reporting' for a cluster of treaties, rather than for each one individually. In addition to saving on scarce resources, pooled reporting allows for identifying and furthering cross-linkages between various environmental regimes. These linkages could be at various levels: across member states, between MEAs, or among institutions such as the WTO and UNEP. Such synergies are an effective way of addressing the capacity constraint issue.

With respect to the problem of capacity constraint, the role of NGO's and International Organizations is recognized to be highly crucial. These stakeholders are able to create the expectation that international action is necessary, that in turn forces the government to confront issues that would otherwise have not been addressed. The administrative and bureaucratic capacity depends on economic resources but also involves education and training. While the treaty secretariats can provide the Parties with a roadmap for effective implementation of the same, it is these other stakeholders who can help in the development of technical and personnel capacity to be able to ensure that implementation occurs. Additionally, more information supports a better understanding of the issue. International organizations and NGO's can play a decisive role by relaying scientific and technical information in a way that is easily understood by the various departments in the government. This also facilitates better horizontal and vertical coordination. At the international level, they facilitate exchange of knowledge within the scientific community and the civil society by coordinating information exchange forums.

A solution that environmental economists are now increasingly working with is the use of direct transfers as side payments to address the profitability concern. Direct transfers are simply 'compensations' made by countries that gain most to countries that stand to lose out by participating in the treaty. However, a persisting problem with the use of this positive incentive is the existence of free-riding behaviour among the Parties involved. While the gainers will want to understate their benefit to minimize the flow of payments from their end, the losers, on the other hand, tend to overstate their loss so as to maximize receipt of transfers. In response to this, a modified form of this positive incentive that has gained importance in the recent years is that of **issue linkage**. It is popularly being looked upon as an effective solution to address the profitability and stability concerns discussed above. Issue linkage forms the basis of our research model, discussed in the section three below.

E. Issue Linkage: The New-Age Solution

Issue linkage can be best described as being a systematic process of identifying the commonality between the key elements of the environmental regime with other regimes and synthesizing them to obtain higher benefits as compared with status quo. Buchner and Carraro (2002) define issue linkage as "...designing a negotiation framework in which countries do not negotiate on one, but negotiate on two joint issues" Put simply, some countries gain from one issue while another one might have higher benefits from a second issue. Interlinking the two and jointly executing them can provide a way in which the agreement can be profitable for both while at the same time accomplish dual objectives. Such inter-linkages also offer other benefits. Not only are the human, financial and technical resources used more effectively, it also brings about a situation

where institutions can respond more effectively to the issues at hand and balance out the environmental and economic interests. Economists point out that issue linkage facilitates the use of surplus enforcement power available in one domain to discipline cooperation in other domains.

IV. The Model

A. Modeling an issue linkage strategy

In a bid to design a strategy to address the compliance and enforcement problem, this study explores the plausibility of issue linkage as an effective solution for same, by testing its efficacy within the Kyoto Protocol.

The Kyoto Protocol is widely hailed as the first serious step towards slowing down global warming by setting target levels for emissions for the developed countries. These targets apply to the budget period 2008-2012. In the case of United States, the Protocol requires a 7% cut below 1990 levels.¹ However, in 2001, the US unilaterally withdrew from the climate change agreement. In addition to drastically undermining the effectiveness of the Protocol, it also dampened the enthusiasm for the participation of other countries that were now reluctant to commit without the involvement of the world's largest emitter of greenhouse gases. Business groups from these countries were apprehensive about their loss of competitiveness vis-à-vis the US who did not face any emission reduction targets now. Thus participation of the US is critical not only for the lowering of greenhouse gas emissions but also for setting precedence for the emerging, large scale energy-consuming economies in the South. The underlying objective is therefore to develop an issue linkage model that can provide sufficient incentives for the US to join the Kyoto Protocol. Trade and Research and Development are two areas that are being widely explored as possible linkage areas to induce a higher degree of enforcement and compliance.

B. The Model

The model makes an attempt to build on the existing body of knowledge on MEAs and the potential for an associated R&D Protocol. Much work has been done in this area by economists at FEEM² (Fondazione Eni Enrice Mattei) including Carlo Carraro, Barbara Buchner and Marzio Galeotti among others. In particular, they have developed the FEEM-RICE model, which is an extension of the Regional Integrated Model of Climate

¹ By the end of 1999, US emissions had risen about 12% above the 1990 levels and are expected to rise another 10% by 2008. If the US decides to ratify the Kyoto Protocol, it would imply a herculean task of a total reduction in emissions by 30%.

² FEEM is a premier research institution, in Italy, established to carry out research in the field of sustainable development.

and the Economy (RICE) designed by Nordhaus and Yang (1996). The FEEM-RICE Model incorporates the interaction between economic activities and the climate. It includes one such model for each of the six macro regions into which the world is divided. Technical change is not exogenous and is endogenised so as to influence factor productivity and emission-output ratio. They then go on to explore the linkage between cooperation on climate change control with cooperation on technological innovation and whether it constitutes sufficient incentive for the US to move back to the Kyoto Protocol. It is assumed that the European Union (EU), Japan and Russia are committed to climate cooperation. Incentives for the three regions and the US to join in the issue linkage strategy are then analyzed (Buchner et al, 2002).

This study goes on to build the model further. Under the Kyoto Protocol, the developing countries are not bound by any emission targets under its first commitment period. However, economies such as those of China and India are expected to be among the few largest greenhouse gas producers, in the coming future. As such, their presence in a climate change agreement can have a significant influence on GHG stabilization. Additionally, the non-involvement of the developing countries was one of the grounds for the US withdrawal from the Protocol.

Keeping the above in mind, the model allows for the inclusion of China in the issue linkage strategy. We are exploring the possibility of India's inclusion as well. China's inclusion in the issue linkage strategy is made under assumption that emission targets coincide with the business as usual emissions. This assumption goes on to support a scenario where China, by being part of such a cooperative arrangement, becomes a net supplier of permits. In contrast, under status quo, Russia enjoys this dominant permit-seller status. Thus under this new coalition structure that includes China, Russia stands to lose on profitability grounds by becoming a secondary permit seller, next to China. There is also a further loss in its profits due to lower permit prices now. To ensure that China's inclusion does not provide a disincentive for Russia's withdrawal, our model tries to incorporate a restriction on the supply of permits. This is done by experimenting with the assumption that a fixed percentage of permits retire after a fixed period of time. This also has another advantage. By retiring a fixed percentage of permits each year, the strategy allows for the R&D stimulus to be maintained. For if a large number of permits were available for meeting the emission targets obligations, Parties would prefer to buy the cheaply priced permits instead of investing in environmental friendly technologies.

In addition to this, we also need to check for the stability and profitability of such an agreement. The presence of a credible threat is also critical for the success of such a proposal. Using the FEEM-RICE model as the starting point, we are trying to model the

above discussed hypothetical scenario of having an associated R&D protocol attached to the Kyoto Protocol as our issue linkage strategy. Japan, EU, Former Soviet Union and China are assumed to be committed to climate cooperation. With the inclusion of China (under its BAU scenario) one can expect a rise in the number of permits available for purchase as well as a drop in their prices. This means that it is possible that the US can achieve its greenhouse gas reduction by being part of such a coalition and purchasing such permits at a lower cost in comparison with the expenditure on R&D. In other words, there exists a possibility that China's inclusion might induce the US to join the Kyoto Protocol.

V. Conclusion

The environmental challenge is truly a multidisciplinary one. There is no doubt about the fact that environmental stress can cause a decline in the quality of life by affecting human health directly or the economy at large, indirectly. As such negotiation of multilateral environmental agreements plays an important role in promoting the integration of environment and economic development objectives. However despite the plethora of conventions, we are still living in an implementation crisis. The withdrawal of US from the Kyoto Protocol is evidence of the same. Our study explores the use of issue-linkage to resolve the implementation crisis by testing its efficacy with respect to the Kyoto Protocol. A hypothetical cooperative arrangement is modeled for the US, China, Japan, EU and Russia, in the areas of climate change and research and development. The FEEM-RICE model is used as the starting point and is then being modified to allow for China's inclusion. By incorporating restrictions on the supply of permits, our model tries to ensure that the new coalition structure (including China) does not create any disincentive for Russia who was the dominant permit seller under status quo. China enjoys this position in the new coalition. This has important implications on the number of permits available for purchase by other countries and the permit price as well. There exists a possibility that the US might be able to achieve their GHG reductions at a lower cost by being part of such a coalition to gain access to cheaper permits. In other words, there exists the potential to build a new coalition structure for the Kyoto Protocol that can motivate the world's largest GHG emitter to join in as well. What remains to be seen and tested is that how this can be accomplished by causing minimal loss of profitability to the other members.

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