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Review of Initiatives in Valuation and Sustainability of Ecosystem Services: Some Issues for Convergence and Governance

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Abstract:

Earth's ecosystem provides various services, crucial for human well-being and economic development. Millennium Ecosystem Assessment (MEA) stated that the ecosystems have seriously been changed in the past century. Though these changes have raised human well-being and economic development in some parts of the world but there is a noticeable deterioration of the ecosystem services (ESS). ESS has been getting increasing attention of researchers and policy makers around the globe.

Amongst different dimensions of ESS, valuation, biodiversity and carbon sequestration have dominated the major funding initiatives and national/international deliberations, thereby facilitating research and policies at various level. Be it 'the economics of ecology and biodiversity (TEEB)' or the 'access and benefit sharing (ABS)', their ultimate aim is for resource conservation and benefit sharing amongst stakeholders. Many efforts like MEA, REDD, TEEB, BESS, IPCC, UNFCC, CBD, ABS, CDM, REDD, Watershed Development Projects etc. originating from different agencies and agreements have been mainly confined to the limited domain by involving preferred agencies in implementation. This results in incoherence, duplication of efforts, and confusion in extension of programmes at micro level. The paper tries to review evolution of major global initiatives in valuation and preservation of eco-system services and explore issues for better convergence and governance for the effective planning and programme execution at field level. It will not only help in bridging a gap between research and policy but also help in devising a simple roadmap for better synchronization and inclusiveness of programme implementation based on adequate capacities of the stakeholders at local level.

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1. Introduction

Amongst different dimensions of Eco-System Service (ESS), valuation, biodiversity and carbon sequestration have dominated the major funding initiatives and national/international deliberations, thereby facilitating research and policies at various level. Be it 'the economics of ecology and biodiversity (TEEB)' or the 'access and benefit sharing (ABS)', their ultimate aim is for resource conservation and benefit sharing amongst stakeholders. Though various international organizations and deliberations are coming out with numerous funding programmes, literature and studies, but efforts are mainly confined to academic and research activity having slightest policy implications and scheme implementation at local level. Many efforts like MEA, REDD, TEEB, BESS, IPCC, UNFCC, CBD, ABS, CDM, REDD, Watershed Development Projects etc. originating from different agencies and agreements have been mainly confined to the limited domain by involving preferred agencies in implementation. This results in incoherence, duplication of efforts, and confusion in extension of programmes at micro level. The paper tries to review evolution of major global initiatives in valuation and preservation of eco-system services and explore issues for the better convergence and governance for effective planning and programme execution at field level. It will not only help in bridging a gap between research and policy but also help in devising a simple roadmap for better synchronization and inclusiveness of programme implementation based on adequate capacities of the stakeholders at local level.

2. Review of efforts

The idea for monetization of ESS is attributed to Classical Economics through economic conception of nature's benefits as use values and then in terms of exchange values in Neo-Classical Economics (Gómez-Baggethun et al. 2010). The mainstreaming of ecosystem services in the literature was done in 90s (Costanza and Daly, 1992; Perrings et al., 1992; Daily, 1997), and more prominently with the well-known article of Costanza et al. (1997), who mapped global ESS and provided some methods to estimate its economic value. The number of publications mapping ESS values has grown exponentially, with almost 60% being published after 2007 (Sch¨agner et al., 2013). Focus on monetary valuation and payment schemes has not only attracted political support for conservation, but also the

concern to commodify ecosystem. The idea of Payment for ecosystem (PES) gained momentum worldwide with the release of the MEA Report (MEA, 2005).

Millennium Ecosystem Assessment (MEA) stated that the ecosystems have seriously been changed in the past century. Though these changes have raised human well-being and economic development in some parts of the world but there is a noticeable deterioration of the ESS. In contemporary national and international deliberations, ESS has been getting increasing attention of researchers and policy makers.

An understanding of all major initiatives and their historical evolution and objectives is needed so as to make convergence and coherence in environmental governance at macro as well as the micro level. Review of efforts in ecosystem assessment, valuation and conservation efforts can be further analyzed under three major heads, i.e., Assessment & Valuation, Biodiversity, The Economics of Ecology and Bio-diversity, and Climate Change and Carbon Sequestration.

2.1. Assessment and Valuation

Various initiatives for the assessment and valuation of ecosystem and bi-diversity have been taken worldwide and MEA and TEEB are prominent amongst them. TEEB can be seen in the tradition of scientific assessments like the United Nations Environment Programme (UNEP) Ozone Secretariat's Assessment, the Intergovernmental Panel on Climate Change (IPCC), the Millennium Ecosystem Assessment, the International Assessment of Agricultural Science and Technology for Development (IAASTD) and the Stern Review on the Economics of Climate Change for the United Kingdom (UK) Treasury (Kumar & Martinez-Alier, 2011). TEEB caters to the needs of policymakers in many ways so as to reach a conclusion accepted by society for choosing between different alternatives. TEEB gives a state-of-the-art account of the economic valuation of ecosystem services, rather than of a single species or of genetic variations. The ecosystem approach was strongly brought into conservation biology and ecological economics by the Millennium Ecosystem Assessment, involving over 1,300 natural and social scientists from all over the world.

The MEA was called for by the United Nations Secretary-General in 2000. Initiated in 2001, the objective of the MEA was to assess the consequences of ecosystem change for

human well-being and the scientific basis for action needed to enhance the conservation and sustainable use of those systems and their contribution to human well-being. The MEA involving more than 1,360 experts worldwide resulted in findings contained in five technical volumes and six synthesis reports, provide a state-of-the-art scientific appraisal of the condition and trends in the world's ecosystems and the services they provide (such as clean water, food, forest products, flood control, and natural resources) and the options to restore, conserve or enhance the sustainable use of ecosystems.

The MEA did not conduct new research, but it was the first assessment to focus on the impacts of ecosystem changes for human well-being. Both the MEA and Global Environment Outlook (GEO) are integral parts of the environmental assessment activities undertaken in connection with the UN system. The MEA serves a role similar to IPCC - it is designed to respond to the needs of a particular user audience (the ecosystem-related conventions) on a particular set of environmental issues. In contrast, GEO reports every two years on all aspects of the environment to a broad audience. Just as GEO would turn to the IPCC reports for the state of the science on climate, GEO is expected to be able to use the MEA findings as a means of enhancing the information that it is able to report on ecosystem-related issues (UNEP, 2013). Similarly, while Global International Waters Assessment (GIWA) includes an assessment of biodiversity in oceans and in trans-boundary freshwater systems, it is focused on a subset of the overall assessment needs related to ecosystems.

2.2 Biodiversity

United Nations Environment Programme (UNEP) convened the Ad Hoc Working Group of Experts on Biological Diversity in November 1988 to explore the need for an. international convention on biological diversity. The Convention was opened for signature on 5 June 1992 at the United Nations Conference on Environment and Development (the Rio "Earth Summit"). It remained open for signature until 4 June 1993, by which time it had received 168 signatures. The Convention on Biological Diversity was inspired by the world community's growing commitment to sustainable development (CBD, 2013). It represents a dramatic step forward in the conservation of biological diversity, the sustainable use of its

components, and the fair and equitable sharing of benefits arising from the use of genetic resources.

The Convention on Biological Diversity (CBD), known informally as the Biodiversity Convention, is an international legally binding treaty. The Convention has three main goals: conservation of biological diversity (or biodiversity), sustainable use of its components, and fair and equitable sharing of benefits arising from genetic resources. Its objective is therefore, to develop national strategies for the conservation and sustainable use of biological diversity. It is often seen as the key document regarding sustainable development. The Convention was opened for signature at the Earth Summit in Rio de Janeiro on 5 June 1992 and entered into force on 29 December 1993. The highest decision-making body of the CBD, known as the Conference of the Parties (COP), convenes every two years and in October 2012, India hosted the 11th Conference of the Parties (COP-11) in Hyderabad.

The United Nations 2010 was declared the International Year of Biodiversity. The Secretariat of the Convention on Biological Diversity is the focal point for the International Year of Biodiversity. At the 2010 10th Conference of Parties (COP) to the Convention on Biological Diversity in October in Nagoya, Japan, the Nagoya Protocol was adopted. 192 countries and the European Union are parties to the convention. All UN member states with the exception of the United States, Andorra, and South Sudan have ratified the treaty. The US has signed but not ratified the treaty, and is unlikely to do it for the time being as they have passed a law called as Monsanto Protection Act of 2013. The convention's governing body is the Conference of the Parties (COP), consisting of all governments (and regional economic integration organizations) that have ratified the treaty.

The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization (ABS) to the Convention on Biological Diversity is a supplementary agreement to the Convention on Biological Diversity. It provides a transparent legal framework for the effective implementation of one of the three objectives of the CBD: the fair and equitable sharing of benefits arising out of the utilization of genetic resources.

Many countries also initiated various programmes on same footings. Biodiversity & Ecosystem Service Sustainability (BESS) is UK's one such planned five year (2011-2015) research programme, which aims to contribute to our understanding of the functional role of biodiversity in key ecosystem processes (BESS, 2013). The BESS programme envisages undertaking research and activities in an integrated way and taking a holistic approach to exploring the functional role of biodiversity in UK ecosystems across a range of environmental gradients and scales.

2.3 The Economics of Ecology and Bio-Diversity

In March 2007, environment ministers from the G8+5 countries met in Potsdam, Germany and agreed to initiate the process of analyzing the global economic benefit of biological diversity, the costs of the loss of biodiversity and the failure to take protective measures versus the costs of effective conservation. A global study was initiated the same year by The German Federal Ministry for the Environment and the European Commission (EC), with the support of an Advisory Board. TEEB seeks to show that economics can be a powerful instrument in biodiversity policy, both by supporting decision processes and by forging discourses between science, economics and governing structures (Ring et al, 2010).

The results of this study was named as "*The Economics of Ecosystems and Biodiversity*" (TEEB) and the findings were presented in an Interim Report at a High-Level Segment of the Ninth Conference of the Parties to the Convention on Biological Diversity (CBD COP-9) in Bonn, Germany in May 2008. The TEEB Interim Report laid a broad foundation where evidence and examples of valuation were collated, elements of a biodiversity/ecosystem valuation framework identified, and long standing issues such as ethics in making choices regarding future values were re-emphasized.

Capitalizing on the momentum created from the TEEB Study reports and network of partners, the initiative has now moved into a phase of implementation at the country level. This shift responds to numerous requests and interest by governments to build national, regional and local government capacity to produce tailored economic assessments of ecosystems and biodiversity, and support to mainstream this information into policy-making (TEEB, 2013).

2.4 Climate Change and Carbon Sequestration

The Intergovernmental Panel on Climate Change (IPCC) is the leading international body for the assessment of climate change. It was established by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) in 1988 to provide the world with a clear scientific view on the current state of knowledge in climate change and its potential environmental and socio-economic impacts (IPCC, 2013). It reviews and assesses the most recent scientific, technical and socio-economic information produced worldwide relevant to the understanding of climate change. It does not conduct any research nor does it monitor climate related data or parameters. Thousands of scientists from all over the world contribute to the work of the IPCC on a voluntary basis. Review is an essential part of the IPCC process, to ensure an objective and complete assessment of current information. IPCC aims to reflect a range of views and expertise. The Secretariat at Geneva coordinates all the IPCC work and liaises with Governments. 195 countries are members of the IPCC. By endorsing the IPCC reports, governments acknowledge the authority of their scientific content. The work of the organization is therefore policy-relevant and yet policy-neutral, never policy-prescriptive.

The United Nations Framework Convention on Climate Change (UNFCCC or FCCC) is an international environmental treaty that was produced at the United Nations Conference on Environment and Development (UNCED) (informally known as the Earth Summit) in Rio de Janeiro, June, 1992. The treaty as originally framed set no mandatory limits on greenhouse gas emissions for individual nations and contained no enforcement provisions; it is therefore considered legally non-binding. Rather, the treaty included provisions for updates (called "protocols") that would set mandatory emission limits. The principal update is the Kyoto Protocol, which has become much better known than the UNFCCC itself.

Countries who sign up to the UNFCCC are known and as 'Parties' and currently, there are 195 Parties (194 States and 1 regional economic integration organization) (UNFCC, 2013). Since the UNFCCC entered into force, the parties have been meeting annually in Conferences of the Parties (COP) to assess progress in dealing with climate change, and

beginning in the mid-1990s, to negotiate the Kyoto Protocol to establish legally binding obligations for developed countries to reduce their greenhouse gas emissions.

The Kyoto Protocol treaty was negotiated in December 1997 at the city of Kyoto, Japan and came into force February 16th, 2005. It is a legally binding agreement under which industrialized countries will reduce their collective emissions of greenhouse gases by 5.2% compared to the year 1990. To help countries meet their emission targets, and to encourage the private sector and developing countries to contribute to emission reduction efforts, negotiators of the Protocol included three market-based mechanisms- Emissions Trading, CDM and Joint Implementation.

The Clean Development Mechanism (CDM) allows emission-reduction projects in developing countries to earn certified emission reduction (CER) credits, each equivalent to one tonne of CO2. These CERs can be traded and sold, and used by industrialized countries to a meet a part of their emission reduction targets under the Kyoto Protocol. The mechanism stimulates sustainable development and emission reductions, while giving industrialized countries some flexibility in how they meet their emission reduction limitation targets. The CDM is the main source of income for the UNFCCC Adaptation Fund, which was established to finance adaptation projects and programmes in developing country Parties to the Kyoto Protocol that are particularly vulnerable to the adverse effects of climate change. The Adaptation Fund is financed by a 2% levy on CERs issued by the CDM.

Reducing emissions from deforestation and forest degradation (REDD) is a set of steps designed to use market and financial incentives in order to reduce the emissions of greenhouse gases from deforestation and forest degradation. Development of a REDD mechanism has progressed significantly since 1995 with the set up of a UN programme and various capacity building and research activities. Projects are also being trialled through national government programmes and the private sector.

REDD is sometimes presented as an "offset" scheme of the carbon markets and thus, would produce carbon credits. Carbon offsets are “emissions-saving projects or programmes” that in theory would “compensate” for the polluters’ emissions. The “carbon credits” generated by these projects could then be used by industrialised governments and

corporations to meet their targets and/or to be traded within the carbon markets. However this perspective on REDD+ is contested and hotly debated among economists, scientists and negotiators. Recent studies indicate such an offset approach based on projects would significantly increase the transaction costs associated to REDD+ and would actually be the weakest alternative for a national REDD+ architecture as regards effectiveness, efficiency, its capacity to deliver co-benefits (like development, biodiversity or human rights) and its overall political legitimacy. REDD+ is increasingly likely to be included in a post-2012 international climate agreement, yet many challenges are still to be solved.

In the 1997 global climate agreement, the Kyoto Protocol, policies related to deforestation and degradation were excluded due to the complexity of measurements and monitoring for the diverse ecosystems and land use changes. This exclusion resulted in the formation of the Coalition for Rainforest Nations. Participant nations included Papua New Guinea, Costa Rica and other forest nations.

REDD activities are undertaken by national or local governments, NGOs, the private sector, or any combination of these. A number of NGOs, development agencies, research institutes and international organizations support developing countries that wish to engage in REDD activities. The World Bank's Forest Carbon Partnership Facility, the UN-REDD Programme, and Norway's International Climate and Forest Initiative are such examples. The genuine actors of REDD, however, will be the populations whose livelihoods derive from forests. The REDD+ is more than just avoided deforestation. It is tied to measurable and verifiable reduction of emissions from deforestation and forest degradation as well as sustainable management of forests, conservation of forest carbon stocks and enhancement of carbon stocks.

3. Issues for Governance and Convergence

Existing knowledge is insufficient to develop more effective governance institutions, including property rights regimes and regulatory structures when natives are unable to understand the policy provisions and terminology. All funding initiatives for extension works and inclusiveness end up with organization of seminars and workshops designed mainly for academicians, researchers or officials of different departments and sectors.

Various organizations and the treaties are focused to one of the aspect of eco-system services such as carbon sequestration, bio-diversity and valuation and payment mechanisms. Neither there is any cohesive effort for the entire eco-system at macro level nor is any such mechanism at micro levels where policies are to be implemented. This leaves everything doing their works in complete isolation without any inter-linkages and also results in duplication of efforts. Moreover, the local inhabitants also get confused over various efforts in environmental preservation and their provisions, terminology and processes. In India too, the efforts like Joint Forest Management (JFM), CAMPA, Watershed development, CER, REDD, ABS and TEEB have also made things difficult to implement at grassroots due to the complexity and duplicity.

Governance systems of common pool resources (Ostrom 2007, 2009) provide many lessons which are well understood in India, as many successful experiences of water harvesting and local forest management show. Once such mechanisms are established, their effectiveness can be enhanced by improving the quality of available information on the effects of conservation on ecosystem service provision. Forests cannot be protected unless the community has title over them and think of them as their own (e g, Gadgil and Guha 1992).

Empowering legislation like the Forest Rights Act (FRA) were passed in 2006 in order to set right the historic wrong done to poor village communities (especially tribal). Through the comprehensive programme of people's participation, there are some 1,18,000 joint forest management committees (JFMC) all over the country, looking after some 20 million hectares of forest (FRI 2011). The JFM villages have made signal contributions in controlling forest fires and other damages, improving the biological condition of the forests. Chances of successful CPR management are higher in communities that are ethnically more homogeneous, of small to medium size, having autonomy in decision-making, and highly dependent on the resource (Saxena 1997; Ravindranath and Sudha 2004). Though immediate economic returns, ethnic heterogeneity play the spoilsport for effective protection of common property resources. JFM approach of jointness and nested levels of authority, are

likely to be more lasting and resilient than a regime that depends on fortuitous circumstances, outside funding, or charismatic leadership (Kumar, 2013).

The Biological Diversity Act 2002 was born out of India's attempt to realise the objectives enshrined in the United Nations Convention on Biological Diversity (CBD) 1992 which recognizes the sovereign rights of states to use their own Biological Resources. The Act aims at the conservation of biological resources and associated knowledge as well as facilitating access to them in a sustainable manner and through a just process For purposes of implementing the objects of the Act it establishes the National Biodiversity Authority in Chennai. Implementing agencies are seeking to derive financial benefits from the extraction and commercial use of biological resources. Some panchayats and Biodiversity Management Committees (BMCs) being set up under the BD Act might also follow suit to increase their cash coffers. The real purpose of ABS even in its broadest definition and not the minimalistic view of cash compensation, will fail if it separates itself from a conservation ethic. In the absence of any guideline by the NBA for access and benefit sharing to the State Biodiversity Board, they are not able to implement third and most important objective of the Biological Diversity Act, 2002 and, i e, access and benefit sharing. It is very necessary that it should be clarified that what are the bio-resources and broader classification of industries covered under the purview of industries using biological resources for commercial utilization. ABS in the BD Act is applicable only to genetic material and not biological resources in general. While the BD Act uses the term “biological resources”, internationally, the CBD defines “biological resources” to include genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual or potential use or value for humanity (Kohli & Bhutani, 2013).

India’s Fourth National Report to the CBD paints a rather rosy picture of the way the CBD is implemented. However, there are concerns about the gap between the image portrayed and the reality on the ground. National Biodiversity Action Plan (NBAP) of 2008 documents India’s strategic response towards doing its bit to meet its global responsibility, the government’s sincerity can be measured against the speed with which state governments have signed contracts with Indian and multinational corporations (MNCs) for the sake of

what they call development-related projects, with no concern for biodiversity conservation and sustainability and little monitoring by the Ministry of Environment and Forests (MoEF). Project clearances take place with faulty or no implementation of mandated procedures like holding public hearings and conducting environmental impact assessments (EIAs) (Kohli and Menon 2005). In a country like India, with an entrenched and exclusionary conservation regime, it will take time to implement the new laws and programmes. Implementation of CBD-inspired laws will need to focus on changing the official mindset as well (Wani & Taraporevala, 2012).

For the projects converting forestland to non-forest activities as per the Forest Conservation Act, all of this money is collected in a central fund called Compensatory Afforestation Management and Planning Authority (CAMPA). THE Supreme Court has ordered that Rs 11,000 crore, collected for diversion of forestland for non-forest uses, be released to state governments (Narayanan, 2009). States in India have long fought the Centre to recover the money they gave to the compensatory afforestation fund. Now the ministry of environment and forests (MoEF) may look for private sector participation in the Rs 46,000-crore Green India Mission (GIM) and is set for operational convergence with other schemes such as the Compensatory Afforestation Fund Management and Planning Authority (CAMPA) and the rural job programme. The ambitious project plans to increase the country's forest cover by 10 million hectares (ha). GIM is one of the eight missions under the National Action Plan on Climate Change that aims to increase forest and tree cover on 5 million ha, improve quality of forest cover or create new forests on another 5 million ha by 2020. The convergence of GIM with other projects would help the government develop the scheme on a cluster basis. The proposal is set to come up for consideration of the expenditure finance committee within a month. The proposal seeks convergence worth Rs 4,000 crore with MGNREGA, Rs 6,000 crore with CAMPA. The Planning Commission has already provided an outlay of Rs 2,000 crore for 12th Plan. The post-Kyoto Reduced Emissions from Deforestation and Degradation (REDD) scheme aims to provide payment for reducing deforestation is lying unused in this fund.

State level efforts for environmental preservation are still unrecognized for any compensatory payments for eco-system services. This is needed everywhere in the system if

we want to forgo any alternate uses of land and the environmental service. The 12th Finance Commission for the first time recognized the need to invest in resources and earmarked Rs. 1000 crores for 5 years to be given to states for preserving forests. Himachal Pradesh's annual share was Rs 20 crores, a pittance compared to the standing value of its forests which was estimated Rs. 106888 crores (Verma, 2000). Given the money they can earn by selling forest resources, this is obviously not enough incentive to preserve forests.

4. The Way Forward

Though many countries and local bodies are implementing various conservation schemes globally but the efforts in our country are rather unplanned. Central, State and Local Governments' efforts are mostly uncoordinated especially when programme percolate to field level. Assessment and research initiatives by different organizations and individuals have their focus on either aspect of eco-system service. Studies on coherence and comparative inter-relation analysis are however missing even at the level of big international agencies. Such isolated efforts are also seen in policy and programme implementation under various project initiatives. Therefore, the stakeholders are confused with duplication of efforts and the mismanagement of funds. All deliberations initiated with the international funding or GOI or state government funding are fast becoming academic exercises having a round of presentations by the experts in their specific domain. Neither there is any coherence in the entirety of ecosystem valuation and benefit sharing mechanisms nor is the exact roadmap for policy making so that the efforts are sustainable at local level through administrative and management interventions. Extension programmes at community level are either missing or unplanned for effective organization and communication lags. This limits the very aim of every planning effort flowing from top level.

For effective environmental governance, typical top-down official approaches are proving ineffective due to wider attitudinal and communication gaps. The situation is becoming more complicated when the efforts are scattered between various agencies that have almost no coordination at all and departmental egos. Therefore, for all initiatives towards eco-system services, benefits and externality sharing a single umbrella agency can prove an effective mode for micro environmental governance. Such a specialized agency can

only work exclusively (not secondarily) for the environmental sustainability, local livelihoods and benefit sharing from ecosystem services.

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