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POSSIBILITIES OF GOING ON GREEN ECONOMIC PATH

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ABSTRACT:

The much awaited Rio+20 World Summit on Sustainable Development was held in June 2012. What is the outcome? A sleek 53 page declaration reaffirming of what all to be done in the years to come was released. The same was said in 1992 at Rio. The only thing added is the concept of Green Economy to reduce the impact of Brown Economic Model of Growth world over.

Green economy model is portrayed as an opportunity to enhance the ecosystem services, enable growth and sustainable livelihood for the poor people. But this well intended vision document lacked both the design to enable green investments to replace high carbon linked investments, and framework on creating global PES market opportunities. The paper reveals a total disjoint in the Rio+20 document between the vision and operational feasibilities on Green Economy.

1. Long march but on a new path on Sustainable Development

The Rio+20 Conference on Sustainable Development is over in June 2012. As many as 57 heads of states and 490 ministers, 1,200 UN staff, 12,000 intergovernmental organisations, 10,000 NGOs and 63,000 delegates representing around 195 countries met and deliberated on a sleek 53 page final report called ***The Future We want*** (UN, 2012). The future is declared as a promising Green Economy. Section III of the Annex (paragraphs 56 to 74) talks all about Green Economy and Section IV (paragraphs 75 to 103) goes in to governance and institutional issues. Apart from the long standing question from developing countries on the lines 'Who will bell the cat', this document opens up further questions on operationalising Green Economy model itself.

Starting from the 1972 Earth Summit at Stockholm and 1992 summit on Sustainable Development, to the just completed Rio+20 conference, there has been a gradual evolution in global thinking about dealing with the human, environmental and ecological problems. The major strategies so evolved are on: dealing with degrading and depleting natural resources; building resilience power and empowerment of poor people; a three pronged global approach- (a) the developed countries to change production and consumption patterns (away from brown economic models of growth), (b) developing countries to maintain to take on sustainable development paths, and (c) developed countries to enable and support the developing countries' sustainable development through strategies and polices on finance and technology transfer to address specifically on poverty, deprivation, and equity issues.

Many steps have been evolved by multi-lateral agencies such as UNFCCC, UNCCD, UNDP and several multi-lateral protocols such as CBD, and national initiatives such as MGNREGS, CDM, MDG, CAMPA, and such other missions and schemes.

By way of scientific studies and reports, there has not been any vacuum in identifying and proposing rectifications and policy directives (Barbier and Markandya,2012; GoI-Planning Commission, 2011; MEA, 2005, 2006; UNEP, 2008, 2011; IPCC, 2007; Stern, 2006; Kumar, 2010).

The AR4 2007 report of IPCC (2007) presented the grave picture about the future of the world which continues with Brown Economic Models of development leading to disastrous climate change and green house gas impacts; the reports of *Millennium Ecosystem Assessment* (2006) emphasized on ecosystem approach as an alternative to development; the report of *The Economics of Ecosystems and Biodiversity* (Kumar, 2010) sets out the tools to measure and recognize the ecosystem values and creating markets for ecosystem services. Stern's report (2006) has categorically emphasized about (a) moving from high carbon to low carbon economic management aiming at putting a cap on CO_{2e} emissions to 550 ppm by 2050, (b) advantages of low carbon economies to pursue green economy models, and (c) promotion of low carbon technologies, as strategies for Sustainable Development and climate change abatement. He even estimated with an elaborate model that the cost of planning such a Green Economy is just about 1% o world GDP.

With all these rounds, the '**Green Economy Path to Sustainable Development and Poverty Eradication'** was made a new theme in Rio+20 to find ways for Low Carbon Economic model of Sustainable Development. Why this new refreshment?

2. What is new in Green Economy model ?

The term 'green economy' was first coined in a book, entitled *Blueprint for a Green Economy* by David Pearce, Anil Markandya and Edward Barbier in 1989, but not elaborated then [2]. There has been an evolution in the thinking, as and when different types of problems and issues were faced by the world, such as persistent poverty, food insecurity, climate change, high depletion of natural resources and so on.

In the past, the developing countries have gone through the motions of- capital intensive growth, inwards looking growth, closed economic development, globalization, and open economic models of development- all these over the latter half of the 20th century (Balakrishnan, 2010; Chakravarty, 1987). During the 10th and 11th Five Plan period, Indian NNP growth rates at 2004-05 prices have been 7.5 and 7.7 respectively[3]. Outside of the macro-

economic policies, one common thread among these successive strategies has been intensification of fossil oil based energy development, commonly known as '*brown economic strategy*'. At the global level, of all energy requirements fossil fuel based energy consumptions have dominated by over 81% in 2008 (84% in 1971-2; World Bank, 2010). The same is about 50% in India in 2010 (GoI, 2011).

Brown economic development aims at development but not on Sustainable Development- resulting in increasing land, water and atmospheric exploitations and resultant pollutions (e.g., world level CO_2 emissions per capita being 4.63 tons per year in 2007; being inequitably responsible between the High Income, Middle Income and Low Income countries with about 12, 3.3 and 0.28 tons per capita per year respectively (See Figure 1), and exponentially increasing threats from climate change). One may be complacent to note that the CO_2 emission from Indian subcontinent is just about 1.18 tons per capita (GoI, 2011). IPCC (2007) noted the global temperature rise-100-year linear trend (1906-2005) being 0.74^0C (ranging from 0.56 to 0.92°C); global average sea level rise at an average rate of 1.8 mm (ranging from 1.3 to 2.3mm) per year over 1961 to 2003; substantial precipitation changes, and occurrence of extreme events such as snow melting, floods and droughts. The total ecological footprint (according to WWF,2010) for high income countries is of the order of 6.4 global hectares per capita, as against 0.9 for India (see Table1).

Well-being also requires Growth. But what should be the route[4]? Answer to this question can come only when one takes cognizance of the impediments and lessons learnt and implications from various growth and development approaches in developing and developed countries over the decades. Some major ones are:

- **Irreversibility, risk of the crises and shocks**: Inherent in the models of development in the past are irreversibility of capital intensive modes, irreversibility of loss of natural capital, persistent fossil resource intensity in energy, inability of small (and high altitude) economies to compete under globalization and open economic development. The fuel price shock since 2008 and a related flare up in food and commodity prices (World level

consumer price index rose from 45 in 1991 to 123 in 2009), both indicating structural weaknesses and risks.

- **Unrecognized values of ecosystem services** and non-existence of markets for them, leading to over exploitation of natural resources. According to Costanza et al. (1997) the global value of all ecosystem services is of the order of US$ 33 trillion against the world GDP of US$ 18 trillion, just about half.
- **Scarcity of food and water:** It was recognized that the world is running low on drinking water (e.g., annual fresh water for domestic use as % of total fresh water declined from 31.5% in 2001 to 10.0% in 2007) and productive land (arable land in ha per person declined from 0.339 in 1961 to 0.207 in 2008) and hence threat of food security (world level depth of hunger or shortage from minimum food requirement in 2007: 203 kilocalories per person per day), faced with the backdrop of climate change, extreme weather events due to climate change and rising natural resource scarcities (fossil resource apart)[5].
- **Multiple crises coming together:** As an *envelope***,** with climate change, energy and food insecurity, financial meltdown (specifically since 2008) and increase in disasters, and social, political and ethnic conflicts etc., coming together making the poor people more vulnerable and less resilient.
- **Institutional change:** Increasing pressure on a competitive demand-supply system rather than cooperative system is being made. Institutions of cooperative banking, community forestry, fishery, weaving, dairying etc. are fast vanishing.
- **Of capital intensity:** Much capital was poured into real estate and property, fossil fuels and structured financial assets with embedded derivatives, but relatively little in comparison, was invested on renewable energy, energy efficiency, public transportation, sustainable agriculture, ecosystem and biodiversity protection, and land and water conservation- may not call it misallocation, but certainly not socially justifiable.
- **Excessive depletion and degradation** of natural capital, which includes endowment of forest biodiversity, natural resources and ecosystems (UNEP, 2011).

A dig at the root causes for these, and many such emerging issues suggest of 'the world not being able to appreciate the gains from balancing between a desirable growth and sustainable use of natural resources'. Here balancing does not mean the arithmetic of 50:50.[6] Using the language of Daly and Cobb (1989) there is a need to deconstructs neoclassical economic theory and create a more 'holistic' model that pulls together the idea of the individual, the community and the natural world.

The Rio+20 document recognized these and declared that 'We emphasize that it *[i.e.Green Economy]* should contribute to eradicating poverty as well as sustained economic growth, enhancing social inclusion, improving human welfare and creating opportunities for employment and decent work for all, while maintaining the healthy functioning of the Earth's ecosystems.'(paragraph 56, pp.10).

With the history of development at the back of our mind, several new ***Drivers under a Green Economy model*** may have to be designed. A new strategy on investment may have to be evolved that reduces carbon emissions and pollution, enhance energy and resource efficiency, and prevent the loss of biodiversity and ecosystem services. A new avenue of creating market for ecosystem services has to be designed. Third, institutions to empower people on their rights to development, employment and governance are to be ensured.

Unfortunately the Rio+20 declaration of *The Future We Want*, did not elaborate on any of these drivers. One would have thought of instituting a stronger institutional framework to promote Green Economy model. But the Institutional framework for Sustainable Development referred in paragraphs 75 to 102 of the Rio+20 document does not mention about Green Economy model at all! Secondly, the only set of institutional instruments agreed are on strengthening the UN Agencies such as Economic and Social Council (paragraphs 82-86), UNEP, and international financial institutions (paragraphs 91-96). However, some of the precise drivers are discussed in various preparatory documents to the Summit (UNEP, 2010; UNEP-UNCTAD, 2011). Summarily they are:

- ***Specifics in policies*** such as: Reducing or eliminating environmentally harmful or perverse subsidies (e.g., at the global level, around $235 billion per year in 1992); creating markets for ecosystem goods and services; providing market-based incentives, opportunities and enabling institutions through appropriate regulatory framework.
- Green public procurement and balance between the ***public and private investments***, also sharing social responsibilities on environmental governance and regulations.
- Design of ***compelling/committing global interest***, in investing atleast two per cent of global GDP in greening the economy (Stern's 2006 report talks of 1%), in order to shift development and unleash public and private capital flows onto a ***low-carbon resource-efficient path.***

In the absence of precise drivers agreed upon, one has only to guess about the outcome of Green Economy Model.

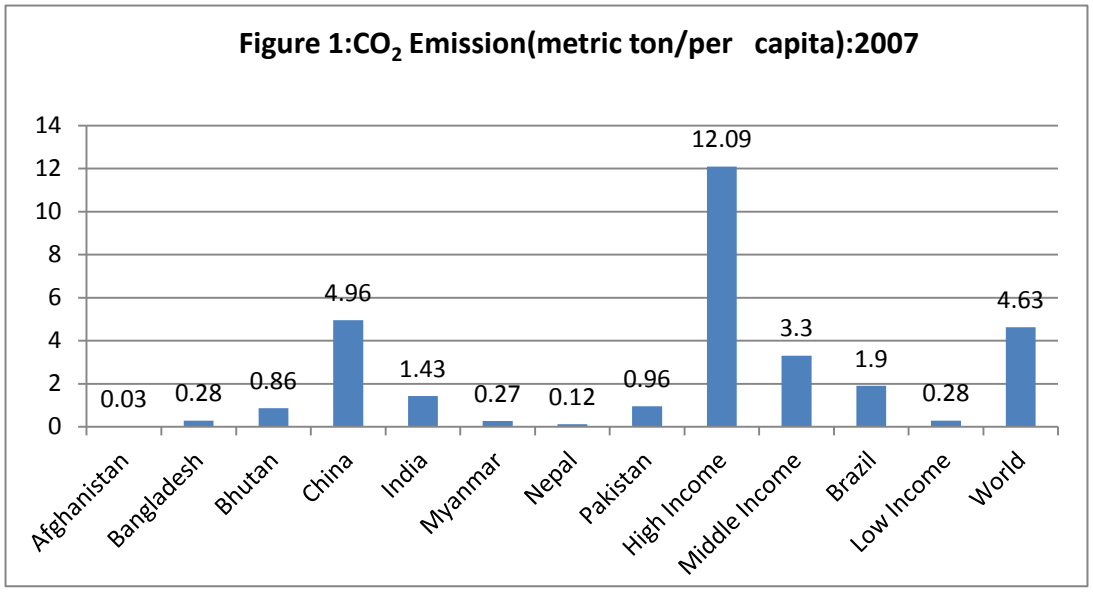
3. Challenges on Green Economy Path in Developing Countries

In order to enable any fruitful discussion on the UN resolution of *The Future We Want,* the fundamental question to be posed is whether the Green Economy model as a panacea or 'win-win' solution for the Brown economy crisis talked so far? Second, what is it in offer for developing countries?

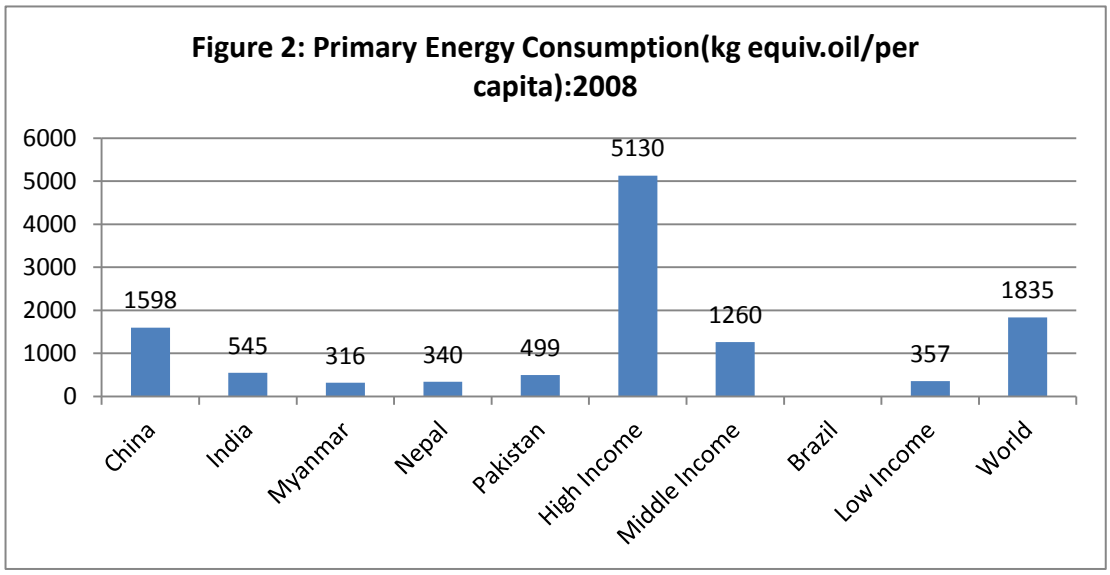
It may be easy to agree on a low carbon strategy and global partnership in public and private investments on relevant renewable energy and low carbon technologies. It may also be easy to agree to institute global markets for ecosystem services, so that no country (more specifically rich in ecosystem services) is exploited on this score. But the question that will arise is about these as opportunities for developing countries.

First is the issue of attracting green investments. Being substantially green already, is there a scope for developing countries such as India to attract any more green investments? The answer is 'yes' if potential investors are committed; 'no', otherwise. As can be seen from Figures 1-2, India and similar developing countries are already low in carbon intensities and brown energy consumptions. Keeping 'reduction of carbon emissions' in mind, would the potential investors look for investment opportunities in renewable and low carbon energy in developing countries?

There is every possibility that potential investors under the banner of corporate social responsibility may find the best options to undertake green investments only in such countries which are (a) very high in carbon and suffering from Brown Economic Growth models, (b) which have all the essential infrastructures such as transport, communication and markets to invest (c) where the returns or turnover on investments are higher. One is not sure if developing countries like India, Nepal or Brazil will become their first candidates, or will have the bargaining power.



Source: http://data.worldbank.org/indicator/EN.ATM.CO2E.PC/countries



Source: http://data.worldbank.org/indicator/EN.ATM.CO2E.PC/countries

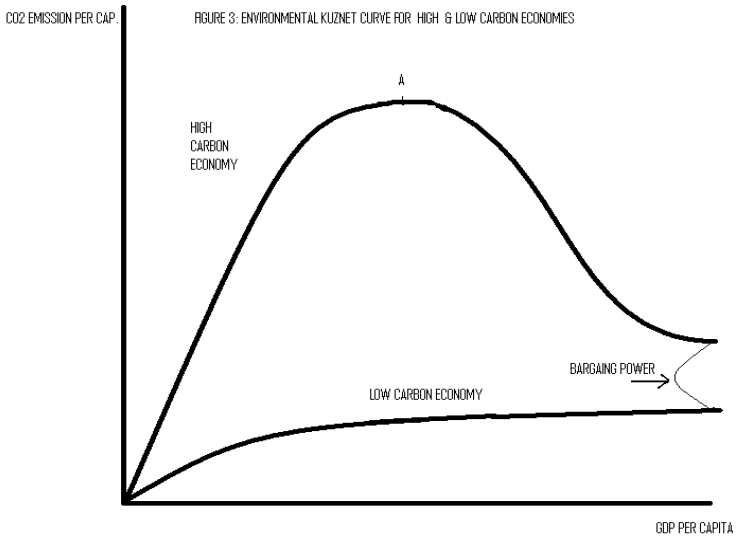
Second, one is not sure how to go about instituting a global system of Payment for Ecosystem Services (PES), as a 'Right to Development'. This is not only an economic question, but also is a battle on global political and international relations arena. Even though the value of global ecosystem services and goods is nearly twice that of global GNP (Costanza et al. 1997) neither they are considered as a near 'welfare indicator' like the GDP or GNP, nor their precise estimates available. Moreover, there has not been any major breakthrough, either under CDM or GEF to promote value systems for ecosystem services and goods.

Third, one is not sure, how the pressure from 'demographic dividend' that countries like India, China or Brazil are having, can be usefully internalized for sustainable Development? That is a matter of designing renewable energy development and providing ecosystem services that can enhance employment and empower local communities, on which the UN Resolution in Rio is totally silent. All these three issues are examined here with some theoretical basis.

4 Some theoretical underpinnings

The first issue is about the opportunities for developing countries to go Green. The starting point is the much known Environmental Kuznet's Inverted U curve. Without indulging in the controversy on existence or non-existence of such a relationship between an environmental bad good such as CO_2 emission and development (Kadekodi and Agarwal, 2001), one can, in the least, agree that the relationship between emission rates and status of development are quite different for a typical high carbon economy (such as USA) and a typical low carbon economy (such as India), as shown in Figure 3. Carbon emission rates in 2007 were about 12 metric tons per capita per year in High Carbon Economies, as against 1.43 for India (Figure 1). While, (as per IPCC 2007 recommendations) a High Carbon Economy is expected to reduce its CO_2e emission to a long run lower stable range by the year 2050 from its peak at A (Figure 1)[7], there is no such peak among majority of developing countries, as they are already green and very low in carbon emissions. Given the landscape contours, culture and population size one does not foresee any drastic upward shift in their behavior. Therefore, this diverse situation itself clearly makes a case for cooperative bargaining (as was used in designing the CDM instruments on carbon trading) but in a different way (Carfì and Schilirò:2011). Under the Green Economy model, bilateral and multilateral global agreements are needed not only on trading CERs for reducing carbon emissions, but more specifically on (a) for sequestered carbon (using new instruments such as REDD++), and (b) directly for agreeing to reduce GHG emissions with enhanced green investments on ecosystem services. What is needed is a new market reform and not just enhancing access to markets. Apart from creating market for ecosystems services with instruments such as REDD++, the Rio+20 document should have talked about creating Global PES Certification system, a PES Trading Organization (on the lines of WTO) and PES Settlement Court System; hence just the generality on creating access to market (ref.,paragraphs 109, 110, 174-175 of the Rio+20 document) are only statements of well wishing and nothing more.

Figure 3: Environment-Kuznets Curve for High and Low Carbon Economies.

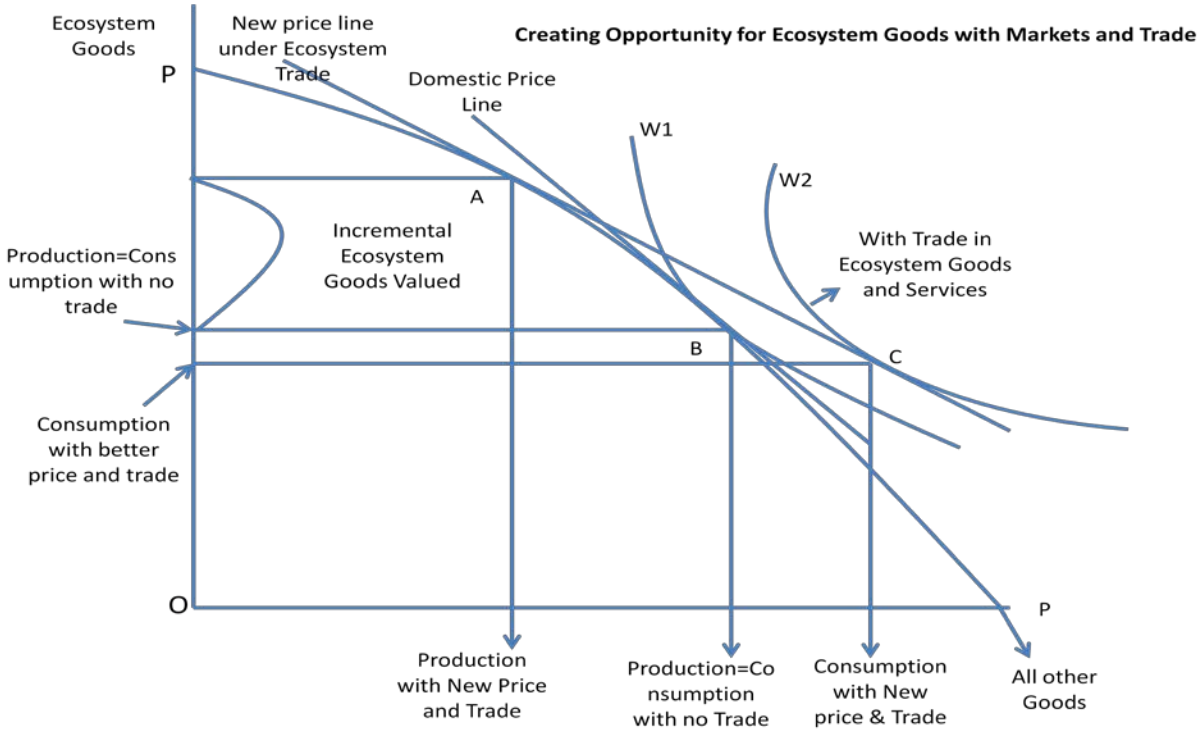


The second issue is on recognizing value of ecosystem services and trading opportunities for developing countries. As far as ecosystem services are concerned, **valuing ecosystem services** is one thing, but **enhancing the flow** of such services is another thing. This is a matter of 'just price' and recognition of the true contribution of ecosystem services in exchange. A large number of ecosystem goods and services are either not valued or undervalued (Kumar, 2010). This is a serious matter of exploitation of natural resources; and Green Economy mentioned in Rio+20 document should have addressed this. A new institutional framework is required to ensure 'just prices' with no hardship to traditional users for enhancing the flow of ecosystem services for the benefit of using countries, in turn enhancing the employment and livelihood status of the ecosystem people (and not the usual market systems such as mentioned in paragraph 175 of Rio document for increasing access to markets for poor fisher folks). Therefore there is a need for both creation of value as well as trade mechanism for ecosystem services. Such an empowerment linked pricing policy is missing in the Rio+20 resolutions on 'Valuing ecosystem services'. Rather this is put too simplistically as good intentions (Ref. paragraph 23, 147-157 of Rio+20 document).

Therefore, one is left with a conceptual puzzle in the Rio+20 document about its stand on valuing ecosystem services. This is elaborated with a theoretical economic model on production and trade on ecosystem services and goods (see Figure 4). Consider a low carbon economy with potential to produce ecosystem services (such as water, biodiversity linked services, forest services and so on). The economy is assumed to produce only two goods, to be named as 'Ecosystem goods and services', and 'All other goods'. All other goods include substantially goods and services produced using fossil and such other non-ecosystem inputs. Curve PP in Figure 4 represents a production possibility frontier. It shows the possibilities of producing various combinations of the two goods (and services) using all the available resources such as land, man-made capital, labour, technology etc. Let the curve W1 represent the welfare or utility function showing the possibility of a welfare level *w1* for various combinations of the two productions. Assuming the normal convexity behaviours, the economy attains an equilibrium level at B, where the welfare is maximum and all the best combinations of production are reached. With no trade at B, the economy's productions are synonymous with consumptions of the two goods; and with 'no' or undervaluation of ecosystem services, the relative price of Ecosystem services vis-à-vis prices of Brown economic goods are obviously quite low. However, there may be pressures from illegal domestic consumption (with some stealing) and or external demands (as visible from smuggling, unfair trade practices etc.).

As argued earlier, with a bargaining power (as dealt in the first issue), the low carbon economies have two options. Either they should be asking for better price for their contribution of ecosystem services or for more trade in ecosystem goods and services or both.

Figure 4: Case of Enhanced Ecosystem Values



If the ecosystem providers are to accept only a better price for the ecosystem services (after proper valuation), their relative price would go up. Then, the new equilibrium of production would be at the point A, and the economy can attain a higher welfare W2. However, because of revealed higher values of ecosystem services now, their domestic consumptions itself would decline, and that of 'All other goods' would increase.

The economy will have a tradable surplus in hand (defined as production minus domestic consumption demand, as shown in Figure 4). But, under the existing exchange system, there is no in-built market mechanism, as the value of ecosystem services is still to be negotiated. Imposition of a fair trade or regulatory mechanism is the only option then. This requires instituting Trade Federations, PES Trade Organizations or Regulatory Boards on Ecosystem goods and services, requiring a major reform in the existing ecosystem institutions. Green Economy policy will have to ensure the existence of both trading partners with enhanced ecosystem values and prices. Only then, as shown in Figure 4, with the production of

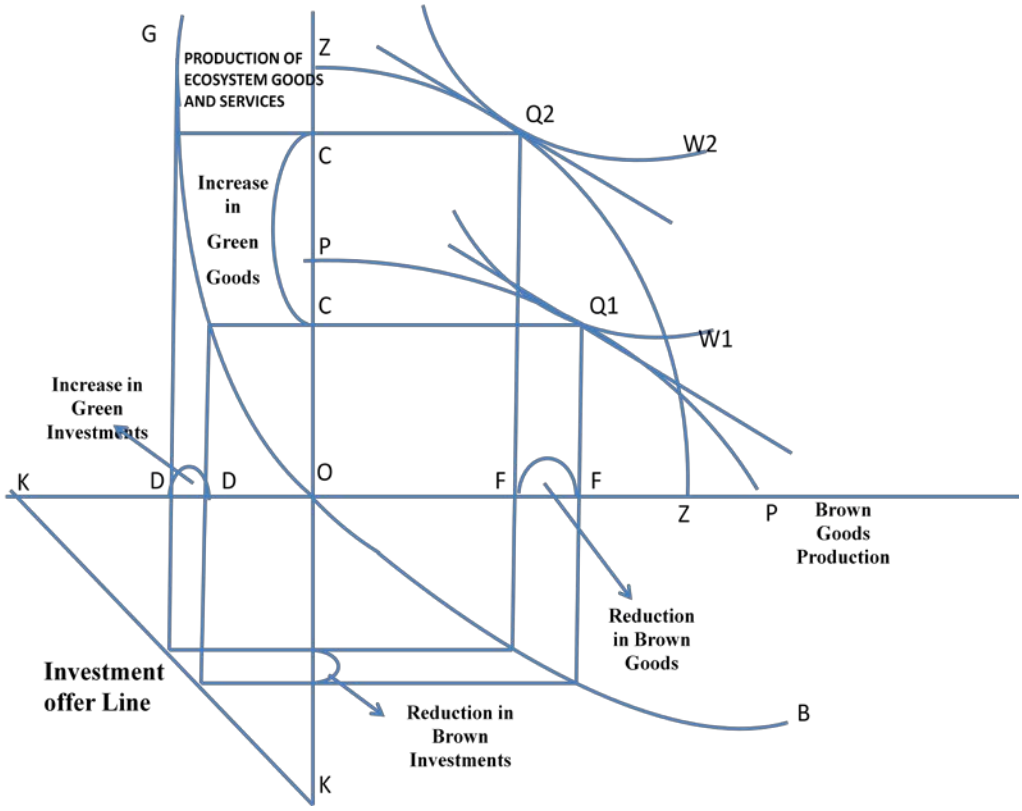
incremental ecosystem services and goods the low carbon economies can actually attain a higher welfare (W2 in Figure 4).

Finally, is the issue of the impasse about inviting green investors. As in the earlier case, consider a low carbon economy with potentials for Green Investments, as depicted in Figure 5. Once again, let PP curve represent the production possibility between the two sets of outputs, namely 'Ecosystem Goods and Services', and all other or 'Brown Goods'. Let OB stand for the investment demand curve for Brown Goods, corresponding to the productions on the production possibility frontier PP. Once again, Q1 stands for the equilibrating production and consumption point between the two goods, namely 'Ecosystem goods and services', and 'All other Brown Goods', without any trade. The associated welfare is depicted by the curve W1. By inviting Green investment for the enhancement of ecosystem goods and services, the production possibility frontier shifts as ZZ. There are better prospects for ecosystem services with Green investments. Then, Q2 stands for an equilibrating point with such a possibility, and also with a higher welfare at W2. Between the two equilibrating situations is the creation of additional ecosystem goods and services, enabled by the Green investment (represented by CC). Assuming equal opportunity between Green Investment and Brown Investment (as shown by the line KK), the necessary and sufficient condition then is to attract Green Investment to the tune of DD, by way of reducing Brown Investments to the tune of FF. The moot question that remains is in designing proper strategies and policies of 'tying up green investment to trade in ecosystem and green goods'[8].

While Rio+20 recommendations stop there, the solution seems to be in treating green investment as a one-to one trade-off with a 'buy back on ecosystem service goods and services' and to reduce brown investments in low carbon economies. Examples of China and India moving from fossil oil/gas based power production to hydropower, solar, wind, biofuels and or other alternative energy systems can be given (GOI, 2011). Then, there has also to be an agreement on buy back of excess green products by the investing partners, which is never a problem as they are generally short of them. In the event, the low carbon economies are able to bargain and get better prices for their ecosystem green goods and services, it is all the more

welfare improving (not shown in Figure 5). No such major policy models were talked about in the Rio+20 document.

Figure 5: Investing on Green Goods and Ecosystem Services



5. Rio+20 Resolutions to be revisited: Conclusions

The foregoing analytical discussion demonstrate that, as argued in the Rio+20 resolutions, while it is possible to place Green Economy model as a Sustainable Development path for the low carbon economies, it is not an easy 'Win-Win' solution. It calls for very specific strategies and policies to be attached as a rider. Without these, 'there is no free lunch' ,as stated by the well known Green Philosopher Epicurus, about 300 BC ago.

Secondly, the low carbon economies should have a level playing bargaining platform to claim (a) right prices for ecosystem services, (b) to establish compensatory systems with Green Trade or PES Trading System or Organizations, and (c) stronger case for Green investments.

These are the major policy agreements and decisions, that smoothly escaped from Rio+20 document.

Table 1: DIMENSIONS OF GLOBAL ECOLOGICAL, CARBON AND WATER FOOTPRINTS

COUNTRY/REGION	TOTAL ECOLOGICAL FOOTPRINT(global hectares per person):2005	CARBON FOOTPRINT (global hectares per person): 2005	INTERNAL WATER FOOTPRINT OF CONSUMPTION (m^3 per person per year):1997-2001
World	2.7	1.41	1043
High Income Countries	6.4	4.04	-
Middle Income Countries	2.2	1.00	-
Low Income Countries	1.0	0.26	-
Asia-Pacific	1.6	0.78	-
Afghanistan	0.5	0.00	642
Bangladesh	0.6	0.13	865
Bhutan	1.0	0.00	920
China	2.1	1.13	657
India	0.9	0.33	964
Myanmar	1.4	0.66	1568
Nepal	0.8	0.03	819
Pakistan	0.8	0.80	1153

Definitions: **Total Ecological Footprint** (Global hectares per person): This measures humanity's demand on biosphere in terms of the area biologically productive land and sea required to provide the resource we use and to dispose the waste. A country's footprint is the sum of all the cropland, grazing land, forest and fishing grounds required to produce the food, fiber and timber it consumes and to absorb the waste emitted when it uses energy, and to provide space for its infrastructure. **Carbon Footprint** (Global hectares per person): This includes a country's consumption of direct carbon dioxide emissions from fossil fuels, as well as indirect emissions for products manufactured abroad. World carbon footprint also includes consumption-related emissions not allocated to individual countries, such as from flaring of oil, cement production, and tropical forest fires. **Internal Water Footprint of Consumption**: The Internal Water Footprint of a country is the total volume of water used within the country to produce the goods and services consumed by its inhabitants.

Source: WWF, Gland, Switzerland: LIVING PLANET REPORT-2008

Notes:

[1] An earlier version was presented as Kamath Helekar Memorial lecture at Goa University, 2012.

[2] The book has gone into three revision, the latest being in 2012 after the Rio+20 conference, which goes into the concept of Green economy in detail and operationalzing policies.

[3] One can even safely say that India has established a new Hindu Growth rate, much above 6.5%.

[4] This question was also raised by P. Balakrishnan in his writings (2010) and much earlier by Chakravarty (1987).

[5] See UNEP (2011) for many such estimated natural resource related threats.

[6] As argued by Jairam Ramesh (2011) both high GDP growth and the conservation at all costs are hedgehogs'

[7] According to IPCC (AR4,2007), the current levels are at 379 ppm in 2005

[8] Rio+20 document does not talk about Green investment directly. But there are references to public and private investment initiatives for agriculture, infrastructure etc , in paragraphs 127 and 149.

REFERENCES

Pulapre Balakrishnan (2010): *Economic Growth in India: History and Prospect,*, Oxford University Press, New Delhi.
Barbier, E.B. (2010): *A Global Green New Deal: Rethinking the Economic Recovery.* Cambridge University Press and UNEP (2010), Cambridge, UK

Barbier, Edward and Anil Markadya (2012): *A New Blue Print for Green Economy*, Taylor & Francis, London; also their 1989, 1991 and 1994 editions

Carfì, David and Schilirò, Daniele (2011): *Coopetitive games and global green economy (unpublished)* :*http://mpra.ub.uni-muenchen.de/32035/*

Chakravarty, S. (1987):*Development Planning: The Indian Experience*, Oxford University Press, New Delhi.

Costanza, Robert, Ralph d'Arge, Rudolf de Groot, Stephen Farberk, Monica Grasso, Bruce Hannon, Karin Limburg, Shahid Naeem, Robert V. O'Neill, Jose Paruelo, Robert G. Raskin, Paul Suttonk and Marjan van den Belt (1997):'The value of the world's ecosystem services and natural capital', *Nature* ,Vol 387 | 15 May

Daly , H.E., and J. Cobb (1989). *For the Common Good: redirecting the Economy toward Community, the Environment, and a Sustainable Future*. Beacon Press, Boston, MA

Government of India (2011): *Low Carbon Strategies for Inclusive Growth*, An Interim Report, Planning Commission

IMF(2006):*World Economic Outlook Database*, IMF: Washington D.C. ,September: http://www.imf.org/external/pubs/ft/weo/2006/02/data/download.aspx.

IPCC (2007a): *Climate Change: Synthesis* Report (AR4)

IPCC (2007b): *Mitigation of Climate Change:* Working Group III contribution to the Intergovernmental Panel on Climate Change, Fourth Assessment Report: Summary for Policymakers

Kadekodi, Gopal K and M M Agarwal (2001):' Why an inverted U-shaped environmental Kuznets curve may not exist', in Munasinghe, M, Osvaldo Sunkel and Carlos de Miguel (Eds.): *The Sustainability of Long-Term Growth: Socioeconomic and ecological perspectives*, Edward Elgar Publ. Cheltenham, UK, p.274-286.

Kumar, Pushpam (ed) (2010): *The Economics of Ecosystem and Biodiversity: Ecological and Economic Foundations*, TEEB, Earthscan Publication, London.

Kumar, Pushpam (2012) 'A promising pathway', *Down to Earth*, August 15, 2012

MEA (2005): *Ecosystem and Human Well-being: Synthesis. Millennium Ecosystem Assessment*
MEA (2006): *Ecosystems and Human Well-being: Current State and Trends,* (www.maweb.org/documents/document.293.aspx.pdf)

Jairam Ramesh (2011):' T*he hedgehog and the fox revisited*: *some further reflections on the growth-environment debate in India,* Lawrence Dana Pinkham memorial lecture delivered on the occasion of World Press Freedom Day and convocation of the Asian College of Journalism, Chennai, may 3rd, 2011

Sanwal, Mukul (2012) : 'Global Sustainable Development Goals The Unresolved Questions for Rio+20' , *Economic and Political Weekly*, February 18, 2012 vol xlvii, no 7

Stern, Nicholas (2006): *The Economics of Climate Change*: The Stern Review, Cambridge University Press, Cambridge, online at http://www.hm-Treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm

United Nations, General Assembly (September 2012), Sixty-sixth session, Agenda item 19, Resolution adopted by the General Assembly 66/288.Annex: *The future we want*

UNEP (2009): Global Green New Deal: Policy Brief _____ (2010b): Green Economy: Developing Countries Success Stories

UNEP (2011): Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication, and also Summary Report, *www.unep.org/greeneconomy*

UNEP and International Energy Agency (2002): *Reforming Energy Subsidy*, Nairobi

UNEP, ILO, IOE, ITUC (2008): Green Jobs: Towards Decent Work in a Sustainable, Low-carbon World., Nairobi.

UNEP, UNCTAD, UNDESA (2011) *Transition to a Green Economy: Benefits, Challenges and Risks from a Sustainable Development Perspective*, UN, July 2011; UNCTAD's *Road to Rio+20* series of publications;

UNEP, UNCTAD, UN-OHRLLS (2011) *Why a Green Economy Matters for the Least Developed Countries*; and papers prepared by UNCSD Secretariat for the Rio+20 Conference including A/CONF.216/PC/6 and A/CONF.216/PC/1.
World Bank (2010): *World Development Indicators*, Washington, D C, 2010

World Wildlife Fund for Nature(WWF) 2008,2010*: LIVING PLANET REPORT- Gland, Switzerland*

Web sources:

http://www.unep.org/greeneconomy,

http://www.imf.org/external/pubs/ft/weo/2006/02/data/download.aspx,

www.maweb.org/documents/document.293.aspx.pdf,

http://www.uncsd2012.org/rio20/,

http://www.un.org/millenniumgoals/

http://www.ICIMOD.org

http://indigodev.com/Circular1.html

http://www.iges.or.jp/en/cdm/report.html