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**WORKING PAPER 107/2015**

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**PUBLIC ECONOMICS AND SUSTAINABLE  
DEVELOPMENTS POLICY**

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**June 2015**

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# Public Economics and Sustainable Developments Policy

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## **Abstract**

*The domain of public economics is increasing as governments' policy goal is shifting from economic development to sustainable development. Government has to act as a trustee representing future generations, and public policies must balance and integrate the three pillars (economic, social and environmental) of sustainable development, recognizing the ecological limits to growth. As per the UN development Agenda, sustainable development goals (SDGs) are meant for the period 2015-2030. This paper reviews the global concerns about ecological limits and the need for global partnership and considers the preparatory steps for adoption of SDGs and the means of implementation.*

**Keywords:** *Public economics, General, Public Goods, Environment and Development, Sustainability, Ecological Economics, Ecosystem Services, Government Policy*

**JEL Codes:** *H10, H41, Q56, Q57, Q58*

## ACKNOWLEDGEMENT

*This paper was presented at National Institute of Public Finance and Policy, New Delhi, Annual Conference on Papers in Public Economics and Policy, March 12-13, 2015. The author is grateful to Dr M.Govinda Rao, Chair , Dr Rathin Roy, Discussant and Dr P.R Bhanumurthy , Professor for suggestions.*

## INTRODUCTION

Musgrave (1959), in his treatise *The Theory of Public Finance*, visualizes three branches of public finance, viz, allocation, stabilization and redistribution. An important role of the state is provision of public goods, which because of the properties of non-rivalry and non-excludability, are not provided by the market, (Samuelson, 1954). Musgrave (1979) sees the need for government ensuring the provision of merit goods, which are in the nature of private goods, but the market may not provide the extent the community would need. He makes a distinction between "self-interest based choice" and "communal choice". Individuals as members of community may support (vote for) provision of certain goods as a matter of communal preference.

Externality is a source of market failure. Pigou (1920) views externality as a divergence between marginal social net product and marginal private net product. The Pigouvian solution, in case of a negative externality like pollution in a competitive market, is to make the polluter liable for the negative externality in the form of a pollution tax. Coase (1960) says, 'market type of solution to externality is possible when property rights are appropriately assigned, legal entitlements embrace not merely the right to use but also the right to compensation and the right to enforcement of contracts'.<sup>1</sup>

Apart from state's role in finding solutions to market failures in the presence of economies of scale in production, public goods and externalities, Stiglitz (1996) outlines special role for state in developing countries in adequate provision of infrastructures (physical, social,

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<sup>1</sup> Coase says "in order to carry out a market transaction it is necessary to discover who it is that one wishes to deal with, to inform people that one wishes to deal and on what terms, to conduct negotiations leading up to a bargain, to draw up the contract, to undertake the inspection to make sure that the terms of the contract are observed, and so on. These operations are often extremely sufficiently costly at any rate to prevent many transactions that would be carried out in a world in which the pricing system would work without cost".

financial and organizational), market interventions to deal with information problems, use of incentives and the dynamic nature of government's role as the economy changes. For an insightful discussion on different perspectives of government's role, see Bagchi (2005).

The World Commission on Environment and Development (1987) put forward the concept of sustainable development as an alternative approach to one simply based on economic growth. It defines sustainable development as meeting the needs of the present generation without compromising the needs of the future generations. Solow (1991) interprets the concept as 'an obligation to conduct ourselves so that we leave to the future the option or capacity to be as well off as we are'. He says 'this goal cannot be left entirely to the market as the future is not adequately represented in the market and, in principle, government could serve as a trustee, as a representative of future interests'.

Economists prescribe non-declining capital stock as a condition for sustainable development.<sup>2</sup> The operational rules are: (i) for exhaustible resources, invest profits or rents in reproducible capital or/and knowledge (Hartwick rule); (ii) for renewable resources, Daly (1990) suggests that (a) harvest rates should equal regeneration rates (sustained yield) and (b) that waste emission rates should equal the natural assimilative capacities of the ecosystems into which the wastes are emitted.

The UN Conference on Environment and Development (known as the Earth Summit), held at Rio de Janeiro in 1992, adopted three major agreements aimed at changing the traditional approach to development: (a) Agenda 21 , a comprehensive programme of action for global action

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<sup>2</sup> This assumes that physical capital and natural capital are perfectly substitutable. Ecologists believe that natural capital and man-made capital are basically complementary and only very marginally substitutable. Capital can substitute for resources in the limited area of minimizing and recycling waste pieces of materials into products. Also some types of natural capital are irreplaceable.

in all areas of sustainable development with the aim of preparing the world for the challenges of the 21st century; (b) the Rio Declaration on Environment and Development — a series of principles defining the rights and responsibilities of States; and (c) the Statement of Forest Principles — a set of principles to underlie the sustainable management of forests worldwide. In addition, two legally binding Conventions -- the United Nations Framework Convention on Climate Change and the Convention on Biological Diversity- were approved. Agenda 21 notes that 'the major cause of the continued deterioration of the global environment is the unsustainable pattern of consumption and production, particularly in industrialized countries, which is a matter of grave concern, aggravating poverty and imbalances' [Chapter 4 Para 3] .

In the UN Millennium Declaration of September 2000, leaders from 189 nations embraced a vision for the world in which developed and developing countries would work together in partnership, particularly the most disadvantaged. Of the 8 Millennium Development Goals (MDGs) , eradication of extreme poverty and hunger, achieving universal primary education, promoting gender equality and empowering women, reducing child mortality , improving maternal health, and combating HIV/AIDS malaria and other diseases are merit/social goods, while the remaining two -- ensure environmental sustainability and develop a global partnership for development -- are environmental good/public good. Desai (2003) says that even though most of the goals aim at provision of private/merit goods the international community has put them in the public domain viz., global public goods.

In 2002, the Johannesburg Plan of Implementation, encourages and promotes the development of a 10-year framework of programmes (10YFP) in support of regional and national initiatives to accelerate the shift towards sustainable consumption and production (SCP). The aim is to promote social and economic development within the carrying capacity of ecosystems by addressing and, where appropriate, delinking

economic growth and environmental degradation through improving efficiency and sustainability in the use of resources and production processes and reducing resource degradation, pollution and wastes. The 10YFP on SCP pattern was adopted at the UN Conference on Sustainable Development, held at Rio de Janeiro ((Rio + 20) in June 2012 Conference [A CONF 216/5]).

The Rio +20 Conference recognizes the importance and utility of sustainable development goals (SDGs). A 30 member Open Working Group (OWG) of the General Assembly was tasked with preparing a proposal on the SDGs. The OWG was established on 22 January 2013 by Decision 67/555 (A/67/L.48/rev.D) of the General Assembly. The OWG held 13 sessions, the 13<sup>th</sup> during 14-18 July 2014. The OWG's proposal released on 19 July 2014 contains 17 goals with 169 targets covering a broad range of sustainable development issues. Of the 17 goals, goal 12 deals with SCP. The OWG's proposals on SDGs will be considered by the General Assembly as part of the broader post-2015 development agenda that the world leaders are expected to adopt at a Summit in September 2015.

Unlike the MDGs the SDGs are broad-based and they are meant for both developed and developing countries. Design of SDG targets and indicators, implementation and monitoring require (i) economic, social and environmental data ,often at disaggregated level; (ii) internalization of all externalities, (iii) recognition of planetary boundaries and ecological limits, (iv) integration and balancing economic , social and environmental concerns, (v) access to environmentally sound technologies, (vi) active participation of all stakeholders , (vii) international cooperation, and (vi) mobilization of resources on a large scale.

The plan of this paper is as follows. The next section articulates the need for shifting development policy from one focused primarily on economic growth to sustainable development. It stresses the ecological limits to growth and advocates a precautionary approach. Then, the

subsequent sections consider (i) an alternative approach to define global public goods and assesses the effectiveness of the existing institutional architecture for international cooperation; (ii) the 17 SDGs proposed by the OWG and attempts prioritization based on India's national circumstances and policy priorities, and (iii) the means of implementation, particularly the need for innovative methods of financing. The final section contains concluding remarks.

## **ECOLOGICAL LIMITS TO GROWTH**

We review a few major contributions on the status of Mother Earth which triggered public attention on the need for collective action at the UN level for adoption of sustainable development goals.

### **Millennium Ecosystems Assessment**

The four major findings of the Millennium Ecosystems Assessment (2005) are:

- (1) Over the past 50 years, humans have changed ecosystems more rapidly and extensively .... This has resulted in a substantial and largely irreversible loss in the diversity of life on Earth;
- (2) The changes that have been made to ecosystems have contributed to substantial net gains to human well-being and economic development, but these gains have been achieved at growing costs in the form of degradation of many ecosystem services, increased risks of nonlinear changes , and the exacerbation of poverty of some groups of people;
- (3) The degradation of ecosystem services could grow significantly during the first half of this century; and 4. The challenges of reversing the degradation of ecosystems while meeting increasing demands for their services can be partially met under some scenarios that Millennium Assessment has considered, but these involve significant changes in policies, institutions, and practices that are not currently under way.

The MEA classified ecosystems services under four categories: food, fresh water, wood and fiber, fuel Supporting: Nutrient cycling, soil formation, primary production Regulating: climate regulation, flood regulation, disease regulation, water purification Cultural: aesthetic, spiritual, educational, and recreational Of these four categories, some services under the provisioning category are private goods and are marketable. For some provisioning goods like non-timber forest products the markets are either imperfect or underdeveloped. For a few cultural services like recreation, markets are developing. For the other cultural services, supporting and regulating services markets do not exist and these services are viewed as "free goods". As a result there is a gross underestimation of the ecosystem services in national accounts and budgetary allocation for ecosystems. It is well-known that the poor are worse affected by the degradation of the ecosystems because of their dependence for livelihoods.

### **Ecological Footprint**

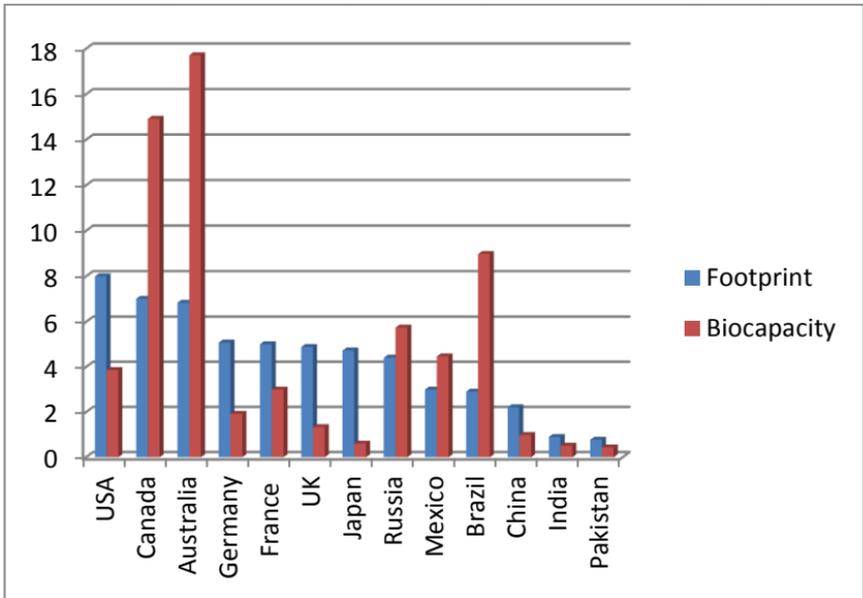
The ecological footprint measures the amount of biologically productive land and sea area humanity requires producing the resources it consumes and absorb the emissions, compares this measurement to how much land and sea area is available. According to the Global Footprint, biological capacity or biocapacity refers to the capacity of ecosystems to produce useful biological materials and to absorb waste materials generated by humans, using current management schemes and extracting technologies. It is measured in global hectares (ghca). For the world, the ecological footprint of consumption is 2.7 global hec but the available biocapacity is only 1.8 global hec. For the high income countries the consumption footprint is almost twice the available capacity; for the middle income countries, the consumption footprint is nearly 18 percent above the capacity and for the low income countries, the consumption footprint is 9 percent above the available capacity. See Table 1 and Figure 1.

**Table 1: Ecological Footprint of Countries 2007**

<b>Country</b>	<b>Population (million)</b>	<b>Ecological Footprint (gha/person)</b>	<b>Biocapacity (gha/person)</b>
USA	310	8	3.87
Canada	32.95	7.01	14.92
Australia	23.07	6.84	17.71
Germany	82.34	5.08	1.92
France	61.71	5.01	3
U.K	61.13	4.89	1.34
Japan	127.4	4.73	0.6
Russia	141.94	4.41	5.75
Mexico	107.49	3	4.47
Brazil	190.12	2.91	8.98
China	1336.55	2.21	0.98
Indonesia	224.67	1.21	1.35
India	1164.67	0.9	0.51
Sri Lanka	19.9	1.2	0.4
Pakistan	177.18	0.77	0.43
Bangladesh	157.8	0.6	0.4

**Source:** Global Footprint Network (2010).

**Figure 1: Ecological Footprint and Biocapacity**



### **Planetary Boundaries**

Rockstrom *et. al.* (2009) report that anthropogenic pressures on the Earth System have reached a scale where abrupt global environmental change can no longer be excluded. They define planetary boundaries for seven items within which humanity can operate safely. These are:

- Climate change ( $\text{CO}_2$  concentration in the atmosphere  $< 350$  ppm and or a maximum charge of  $+ 1 \text{ W m}^{-2}$  in radiative forcing) Mean ocean acidification (mean surface water saturation state with respect to aragonite greater than or equal to 80 percent of pre-industrial levels).
- Stratospheric ozone ( $< 6$  percent reduction in  $\text{O}_3$  concentration from pre-industrial level of 290 Dobson units)
- Biochemical nitrogen (N) cycle (limit industrial age fixation of  $\text{N}_2$  to  $35\text{Tg N Yr}^{-1}$ ) and Phosphorous (P) cycle (annual P inflow to

oceans not to exceed 10 times the natural background weathering on P)

- Global fresh water use ( $< 4000 \text{ km}^3 \text{ yr}^{-1}$  of consumption use of runoff resources, land system change ( $< 15$  percent of the ice – free land surface under crops, and the rate at which biological diversity is lost at annual rate of  $< 10$  extinction per million species).

The two additional boundaries for which they could not determine boundary levels are chemical pollution and atmospheric aerosol loading. They estimate that humanity has already transgressed the planetary boundaries for climate change, rate of biodiversity loss, and changes in the global nitrogen cycle.

Rockstrom and Sachs (2011) note that the nine boundaries come in three main forms: (a) boundaries defining a global *level of depleting non-renewable fossil resources* such as energy and fossil ground water; (b) boundaries defining a global *level of the living biosphere*, including exploitation of ecosystems, protection of biodiversity and consuming renewable resources such as land; and (c) boundaries providing a safe global *level of Earth's capacity to absorb and dissipate human waste flows*, including carbon, nitrogen, phosphorous and toxic materials such as pesticides. They say that BAU path will lead to a highly unequal world that is also unstable and violence.<sup>3</sup> For a comprehensive analysis of various ecological limits to economic development and means of overcoming the limits, see Sengupta (2013).

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<sup>3</sup> Stern (2007) says climate change is 'the greatest and widest ranging market failure ever seen'. Weitzman ( 2007) says 'The issue of global climate change and what to do about it has put economics to a severe test in which economists have been challenged to think afresh about how to model ( or at least how to conceptualize ) such fundamental notions as risk, uncertainty, and discounting'.

International organizations, particularly the UN system, and scientific institutions must monitor how far we are near the thresholds, create early warning systems and prepare mitigation and adaptation plans to deal with these crises. As developed countries are mainly responsible for the boundaries problems because of their unsustainable consumption patterns in the past and in the present, and as they have the capacities and resources, as part of international cooperation, they must initiate steps to overcome the adverse effects of crossing the planetary boundaries. Sustainable development strategy requires achieving resource efficiency for all countries, but it has to be different for developed and developing countries. For developed countries, absolute decoupling of economic growth and environmental degradation, in the sense of getting more output without increase in resource use, is desirable and feasible. In developing countries where accessible resources to meet basic needs like food, water, sanitation and energy, are insufficient, economic growth is essential and only relative decoupling in the sense of reducing resource intensity per unit of economic activity is desirable.

## **ARCHITECTURE FOR GLOBAL GOVERNANCE**

Rapid developments in transport, communication and information technologies during the last four decades have accelerated the process of globalization and made nations interconnected and interdependent. Global concerns about environmental degradation and the need for multilateral solutions to solve common problems facing mankind resulted in a number of international agreements. Kaul *et. al.* (2003) note that the existing institutional architecture for global governance exhibits sign of adaptive inefficiency, with institutional changes lagging behind rapidly evolving realities. The International Task Force on Global Public Goods (2006) notes that ours is a world of shared risks and common opportunities, grounded in the world of mutual dependence and growing interconnection.

Kaul *et. al.* provide the following definition of public goods:

- (1) Goods have special potential for being public if they have non-excludable benefits, non-rival benefits, or both.
- (2) Goods are de facto public if they are non-exclusive and available for all to consume.

These definitions weaken Samuelson's definition of pure public good. They introduce the concept of "triangle of publicness", that is publicness in consumption, publicness in decision making and publicness in distribution of net benefit. Most of MDGs are merit goods but come under global public goods (GPGs) by global public choice. Rio principles for global governance like equity, historical responsibility, and common but differentiated responsibilities of developed and developing countries are not taken seriously in global negotiations. Sankar's (2011) assessment of the existing architecture for global governance for global trading, climate change and biological diversity shows that (a) there are no built-in measures for achieving dynamic efficiency, and (b) development concerns get low priority in the implementation of these agreements. The factors hindering international cooperation are: governments' unwillingness to accept binding commitments because they restrict their policy spaces; political myopia; scientific uncertainty about extent of environmental disasters; and lack of adequate funding

## **SUSTAINABLE DEVELOPMENT GOALS**

Rio + 20 document states that the SDGs should be limited in number, aspirational and easy to understand and that the goals should address in a balanced way all three dimensions of sustainable development and be coherent and integrated into the UN Development agenda beyond 2015. The OWG of the UN assembly, in its 25<sup>th</sup> July 2014 draft, recommended 17 goals and 169 targets as part of the post 2015 development agenda. The indicators are being developed. Each country

has to prioritize its SDG goals, targets and indicators based on its national circumstances, policy priorities, and capacity to implement them. Table 2 lists the 17 SDGs, identifies the primary pillar and the nature of good/service. Of the 17 goals, goals 1-5, 10 and 16 are primarily social; goals 6, 7 and 11 are social and environmental; goal 9 economic and environmental; and goals 8, 12 and 17 have all the three pillars. The goals are not mutually exclusive; they are interrelated. For example, goal 12-sustainable consumption and production- is a cross –cutting goal having strong linkages with other goals.

### **India's National Circumstances and Policy Priorities**

Since the 11<sup>th</sup> Five year Plan the focus of planning in India has shifted from economic growth to inclusive growth, the second pillar of sustainable development. The Approach Paper to the 11<sup>th</sup> Plan says: 'inclusiveness is a multi-dimensional concept. Inclusive growth should result in lower incidence of poverty, broad based and significant improvement in health outcomes, universal access for children to school, increased access to higher education and improved standards of education, including skill development. It should also be reflected in better opportunities for both wage employment and livelihoods and in improvement in provision of basic amenities like water, electricity, roads, sanitation and housing' [Faster Sustainable and More Inclusive Growth, An Approach to the 12<sup>th</sup> Five Year Plan, Planning Commission, p.4].

12<sup>th</sup> Plan Chapter 4 on Sustainable Development notes that 'Economic growth and development have to be guided by the consideration of sustainability, because none of us has the luxury, any longer, of ignoring the economic as well as the environmental threat that a fast –deteriorating economic system poses to our fragile environment' (p.112). Economic Survey (2013-14) contains a chapter on Sustainable Development and Climate Policy.

**Table 2: Sustainable Development Goals**

<b>Goal</b>	<b>SDG</b>	<b>Pillars</b>	<b>Nature of Good/Service</b>
1.	End poverty in all its forms everywhere Social	Social	Merit good, GPA via global public choice
2.	End hunger, achieve food security and improved nutrition, and promote sustainable agriculture	Social, envl	Merit good
3.	Ensure healthy lives and promote well-being for all at all ages.	Social	Merit good
4.	Ensure inclusive and equitable quality education and promote life-long learning opportunity for all	Social	Merit good
5.	Achieve gender equality and empower all women and girls	Social	Merit good
6.	Ensure availability and sustainable management of water and sanitation for all	Social, envtl	Merit good
7.	Ensure access to affordable, reliable, sustainable, and modern energy for all	Social, envtl	Merit good
8.	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	Economic, social environmental	
9.	Build resilient infrastructure, promote inclusive and sustainable industrialization and innovation	Economic, envtl	
10.	Reduce inequality within and among countries	Social	Merit good
11.	Make cities and human settlements inclusive, safe, resilient and sustainable	Social, envtl	
12.	Ensure sustainable consumption and production	Economic, social Env'tl	GPG via global public choice

Contd.. Table 2

13.	Take urgent action to combat climate change and its impacts	Envntl	GPG via global public choice
14.	Conserve and sustainably use the oceans, seas and marine resources for sustainable development	Envntl	GPG via global public choice
15.	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	Envntl	GPG via global public choice
16.	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels	Social	GPG via global public choice
17.	Strengthen the means of implementation and revitalize the global partnership for sustainable development	Economic, social envtl	GPG via global public choice

A recent World Bank study notes that `economic expansion is also often accompanied by rising demands on the already scarce and often degraded natural resources (soils, fossil fuels, water and forests) and the increasing pollution footprint will negatively impact human health and growth prospects. In India's case, a remarkable growth record has been clouded by a degrading environment and growing scarcity of natural resources.... Environmental sustainability could become the next major economic challenge as India surges along its growth trajectory (Mani, M., *et. al.*, 2012). This study provides estimates of social and financial costs of environmental damage in India from three pollution damage categories: (i) urban air pollution, (ii) inadequate water supply, poor sanitation and hygiene, (iii) indoor air pollution; and three natural resource damage categories: (a) agricultural damage from soil salinity, water logging and soil erosion, (b) rangeland degradation, and (c)

deforestation. The estimated annual cost of environmental degradation for 2012 is Rs. 3,751 billion or 5.7 percent of GDP. Thus there is a need for integrating and balancing environmental concerns both at national level and regional level and ensure that India's natural capital does not decline, pollution and emissions are within the assimilative capacities of the ecosystems and future policies recognize ecological limits to growth. Sankar (2014) reviews activities already initiated in India in achieving sustainable development. Briefly, the initiatives have been programmes for poverty eradication, partial conferment of forest rights to forest dwellers and joint forest management, universal primary education, first steps towards organic farming, renewable energy programmes, and increasing access to clean energy to all. As for climate change mitigation and adaptation, India has set up 8 national missions focusing on capacity building and development of technical and other policy options. See Government of India (Prime Minister's Council on Climate Change), 2009. The Missions include energy efficiency, water, ecosystems, sustainable agriculture, green economy and strategic knowledge. India has announced 20-25 percent reduction in emission intensity compared with the 2005 level. The report of the Expert Group on Low Carbon Strategies for Inclusive Growth was released in 2014. See Government of India (Planning commission), 2014.

India has initiated a framework for green accounting. See Government of India (Ministry of Statistics and Programme Evaluation-National Statistical Commission), 2013. An attempt is being made to value ecosystems services and capturing their values via The Economics of Ecosystems Benefits (TEEB) project. In India the Ministry of Environment , Forests and Climate Change and GIZ initiated a study for the valuation of three ecosystems viz., forests, wetlands, and coastal and marine. Valuation is the first step; the challenge is how to capture the values via policy and institutional options.

Swachh Bharat Abhyan (national clean mission) , launched on 2<sup>nd</sup> October 2014, aims at construction of individual sanitary latrines for

households below the poverty line with 80 percent subsidy, conversion of dry latrines into low-cost sanitary latrines, construction of exclusive village sanitary complexes for women, total sanitation villages, awareness and health education. 2015 -16 budget proposes 100 percent deduction for donations to Swachh Bharat Mission and Clean Ganga Fund and cess on all or selected services at rates up to 2 percent for the programme. This mission involves celebrities, gets political support and has awareness campaigns.

In case of India, there is need to accord high priority to those targets which would enable the country to achieve poverty eradication, employment generation, creation of livelihood opportunities, and enhancement of resilience of ecosystem opportunities. Therefore, sustainable natural resource management gets top priority. Reduction of food waste, and waste generation, recycling and reuse reduce the demand for natural resources while increase ecoefficiency and hence gets high priority.

As “relative decoupling” of economic growth and environmental degradation is recommended for developing countries, it is necessary to aim at sustainable management of natural resources, investing rents from exhaustible resources in physical capital and knowledge, achieve resource efficiency (land, water, energy, materials) and ensure waste disposal within the assimilative capacity of ecosystems.

## **MEANS OF IMPLEMENTATION**

### **(a) Capacity Building**

Capacity building at all levels – central government, state government, local bodies, various stakeholders –is necessary for formulation and implementation of SDG policies. The reasons are: (i) the necessary knowledge is available with different layers of governments, NGOs and residents in ecosystems (indigenous/ traditional knowledge); (ii) in case

of many environmental goods like green house gas emission reduction, improvement in biodiversity, improvement in wetlands quality, individual motivations, behavior and actions do affect the supply of public goods; (iii) implementation will be smoother if all stakeholders are involved in the decision making process.

Even at the government level, the policy making process must change. As stressed in Rio+20 Outcome Document there is need for integrating and balancing the three pillars – economic, social and environmental – of sustainable development.<sup>4</sup> This means more data and more analysis. As for the data, even for large public limited companies, who endorse sustainability and corporate social responsibility, there is no disaggregated information on investments, operating costs and benefits under the three pillars.<sup>5</sup> This information is necessary for analysis of trade-offs among the three pillars, signal producers and consumers about social and environmental costs of subsidies, and determination of optimal levels of subsidies. Life cycle assessment (LCA) of products requires information on resource use and waste discharge in the entire supply chain as well as at the consumption stage (cradle to grave approach). It is desirable to initiate LCA studies for selected resource- intensive and pollution intensive products. Science-based policy becomes imperative in case of natural resource management.

There is ample scope for improvement in the design of environment policies. For example, in pollution control, the water cess is not based on either the damage value or the opportunity of cost of water; further the rate fixed many years back, has not been revised. In the case of cess on coal, Chelliah, Appasamy, Sankar and Pandey (2007) recommend a cess based on ash and moisture content of coal and cost of

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<sup>4</sup> Some recent UN documents add a fourth pillar—governance.

<sup>5</sup> Recently the Expert Appraisal Committee for environmental clearances of thermal power projects require social cost benefit analysis (ex ante) and the project costs and benefits classified under economic, social and environmental heads.

benefication, and earmarking the cess revenue for coal washing and development of improved coal technologies, but the cess is levied at a flat rate of Rs. 200 per tonne now; the revenues are not effectively used for lowering pollution from coal.

From public economic perspective, it is desirable to classify project outcomes under

- private goods sold in competitive markets
- private goods sold in regulated markets
- private goods marketable but markets are imperfect because of information asymmetries or weak supply chain
- private goods marketable but markets do not exist due to high transaction costs or/and lack of well- defined property rights
- merit goods
- public goods- local
- public goods -national
- public goods –global

This classification will be useful for design of appropriate policies in forecasting expected revenue streams and on decisions such as who should bear the cost of supply and to what extent.

India has signed many multilateral agreements relating to trade, investment and environment, but India's role in agenda setting stage and in articulating her concerns and assessing the likely impacts has been poor. On many occasions in UN negotiations India is a member of G-77. A major handicap in the negotiation has been non-availability of information. For example, in WTO negotiations on trade liberalization in environmental goods and services, we have no way of assessing the impacts of different proposals on imports, customs revenue, domestic production and employment, as the trade, production and employment data come under different classifications and so far there is no

concordance among the classifications.. There is also need for ascertaining the behavioural reactions of the affected parties.

### **(b) Access to Environmentally Sound Technologies (ESTs)**

Technology plays a pivotal role as means of implementation in efforts to move towards sustainable development. Dano, Wetter and Ribeiro (2013) note that unprecedented technological development is massively transforming the planet and impacting people’s daily lives. These include information and communications technologies (ICTs); molecular biology resulting in genetically modified organisms (GMOs); synthetic biology making it possible to move beyond transferring single genes from one species to another allowing the construction of novel microorganisms that aim to mimic “factories” for transforming almost any biomass into almost any bio-product; new hyper-spectral imaging technologies facilitating the extraction/exploitation of biomass by making it practically and financially possible to map and measure unique biodiversity across the globe; nanotechnology transforming the material properties of conventional substances by manipulating them on the scale of atoms and molecules; and geoen지니어ing – the deliberate large-scale manipulation of earth systems as a technological “quick fix” to the climate crisis.

Agenda 21, Chapter 34 says ESTs ‘protect the environment, are less polluting, use all resources in a more sustainable manner, recycle most of their wastes and products, and handle residual wastes in a more acceptable manner than the technologies for which they were close substitutes’. It suggests the following options for the types of ESTs coming under the IPR regime: (a) compulsory purchase of ESTs from IPR holders and their transfer to developing countries for specified purposes on non-exclusive basis to meet their obligations under multilateral environmental agreements; (b) government purchases at market prices from IPR holders and transfer them to developing countries on concessional terms to meet the common but differentiated responsibility and other obligations; (c) prevention of monopoly and restrictive

practices of patent holders; and (d) financial assistance on concessional terms by governments directly through UN agencies.

The Rio+20 Outcome Document emphasizes the importance of technology transfer to developing countries, and in particular the development, transfer and diffusion of ESTs and corresponding know-how. It calls upon relevant UN agencies to identify options for a facilitation mechanism that promotes the development, transfer and dissemination of clean and environmentally sound technologies by, inter alia, assessing the technology needs of developing countries, options to address them, and capacity building. Despite discussions in different multilateral fora for access to “green”, “climate friendly” technologies on concessional terms to developing countries, the prospects of accessing ESTs on favourable terms appear dim.

### **(c) Financing SDGs**

UNCTAD (2014) estimates the investments required for basic infrastructures (roads, rails, ports, power stations, water and sanitation), food safety, climate change and education and health in developing countries during 2015-2030 is in the range US\$ 3.3 -4.5 trillion per year.

### **(i) External Financial Support**

Net ODA assistance stood at 0.3 percent of gross national income against the UN target of 0.7 percent. Only 5 OECD countries met the target of 0.7 percent of gross national income. Developed countries pledged US\$100 billion for Global Climate Fund in 2010. By end of 2014 November, the amount received was only US\$ 9 billion. Global Environment Facility provides grants for projects in areas such as climate change, biodiversity conservation, and persistent organic pollutants. Under Kyoto Protocol, developing countries can get certified emission reduction credits which can be sold. Due to non-participation of the United States and the global recession, the sale price of the credits has fallen drastically.

The capital costs for long-term investments are low (in real terms) compared with many developing countries. Investments in developing countries earn high returns, but the risks are high because of delays in government approvals, problems in land acquisition, and various uncertainties during production. The government must examine these problems and find means of overcoming them. The UN organizations must come forward to play an intermediary role in linking lenders and borrowers and by developing risk-pooling and risk mitigation schemes.

Foreign direct investment is an alternative source of external finance. It should be encouraged when it comes with ESTs.

Two new sources of funds for long –term investments are discussed. According to Sovereign Wealth Fund Institute, the fund value is US\$ 7,110 billion of which US\$ 4,293 billion is oil and gas related and US\$ 2,819 from other sources like balance of payments surpluses and privatization proceeds .Gelb,Tordo and Holland (2014) note the link between the long term goals of the Sovereign Wealth Funds (SWF) and the long-term investment needs of developing countries and explore a conceptual framework to create a system of checks and balances and establishment of appropriate benchmarks and safeguards to ensure the integrity of the investment decisions. The other source is Financial Transaction tax .The EU is considering taxes on financial transactions between financial institutions at the rates of 0.1 percent for exchanges of shares and bonds and at 0.01 percent across derivatives.

The global community has put MDGs and many SDGs under GPGs. The developed countries have an obligation to provide financial assistance to developing countries, because of their cumulative contributions to environmental degradation, they have the ESTs and resources to solve the environment problems, but the Rio principles of historical responsibility, equity and common but differentiated

responsibilities of developed and developing countries are not adhered to. Under these circumstances, the developing countries must focus on those SDGs which provide net benefits in the forms of national and local public goods and other benefits consistent with their national priorities. When an activity yields both local and global benefits, the international community must bear at least the incremental cost of producing GPGs to incentivize developing countries to scale up their programmes.

## **(ii) Domestic Financial Support**

The conventional sources of finance are not adequate even to carry out regular plan and non-plan programmes and often governments rely on deficit financing to cover the deficits. It is true that some existing programmes in India address sustainable development issues, especially in the social sector. But the scale of investment under SDGs during 2015-2030 is so large that new funding sources must be tapped.

There is scope for eliminating environmentally perverse subsidies in petroleum, chemical fertilizers, and irrigation water. Due to steep fall in crude oil prices abroad and the government's decision to fix the prices of petrol and diesel by the oil marketing companies, subsidies for petrol and diesel are eliminated. Economic Survey 2014-15 claims that India has moved from a carbon subsidization regime to one of significant carbon taxation regime. The actions since 2014 have an implicit carbon tax of nearly US\$ of 60 per ton of CO<sub>2</sub> in the case of petrol and nearly US\$ 42 per ton in the case of diesel. There is a strong case for reducing subsidy for urea. In case of irrigation water, irrigation revenues in most states do not cover even the operating costs. It is desirable to levy irrigation charges which vary with the crop and also the season to reflect water scarcity. Government can reduce the financial burden by transferring management of irrigation water to farmers' organizations.

Economic Survey (2014 -15) reports that price subsidies for a range of products- rice , wheat, pulses, sugar, kerosene, LPG, electricity,

iron ore, railways account for Rs. 3,78,000 crore or 4.24 percent of GDP. It finds that most price subsidies are regressive, distort markets and encourages leakages. It recommends phasing out the subsidies and targeting the subsidies to the deserving poor using Jan Dhan Yojana, Aadhar and mobile phones.

National Environment Policy notes that 'present approach to dealing with environmentally unacceptable behavior in India has been largely based on criminal processes and sanctions. Although criminal sanctions, if successful, may create a deterrent impact, in reality they are rarely fruitful for a number of reasons. On the other hand, giving unfettered powers to enforcement authorities may lead to rent-seeking. Civil law, on the other hand, offers flexibility, and its sanctions can be more effectively tailored to particular situations. The evidentiary burdens of civil proceedings are less daunting than those of criminal law. It also allows for preventive policing through orders and injunctions', (Government of India, Ministry of Environment and Forests, 2006). A civil law will permit application of polluter pays principle by levying tax/charge on pollution; it will also generate revenue to government. This constitutional amendment will pay the way for introduction of pollution taxes/ charges, tradable pollution permit schemes with an option of auctioning initial rights.

There is ample scope for raising user charges for publicly provided goods and services. At present, drinking water and sanitation service charges are linked to property taxes and the charge revisions occur infrequently. It is time that these user charges are fixed on the basis of the volume of water consumed and the quantity and quality of wastes generated and these charges are revised annually.

As for ecosystem services, government support is necessary in the forms of institutional measures such as well-defined and enforced property rights to incentivize the beneficiaries to invest, to conserve and

to encourage sustainable use; creation of local community based management organizations/ marketing bodies/ co-operatives/ self-help groups to improve the supply chain and increase value addition; and technical and financial support for sustainable management. Pilot studies are needed to design payment for ecosystem services between the service providers and the beneficiaries for services such as augmenting supply of water, improvement in quality of water, pollination services etc.

Achievement of sustainable consumption warrants some proactive measures to reduce the rate of growth of consumption of luxury/resource intensive/pollution intensive/ waste generating goods via higher tax rates on these goods. A mix of regulatory, information-based and incentive-based instruments are needed to discourage conspicuous consumption.

Infrastructural investments are long-term investments. In some cases, e.g, roads, railways, power, ecorestoration of degraded lands, cleaning of rivers, the initial investments are large and the returns are uncertain and accrue over long time. In case of solar power, hydro power and wind energy, the initial costs are very high but the operating costs are very low. Very often the investment is of putty-clay type and in the presence of sunk costs the markets are not contestable. Also, the private investors face regulatory uncertainty in dealing with rupee depreciation, increase in prices of imported inputs, and also populist pressures to prevent price increases. A transparent policy with contingency clauses to overcome the barriers and time-bound solutions to problems faced by the investors would attract private investment.

At present, pension and insurance funds are not tapped for long term investments due to regulations. Sengupta, Mukherjee and Gupta (2015) suggest a credit enhancement scheme as one of the options, by pooling risks associated with infrastructure projects, to tap insurance and pension funds.

## CONCLUDING REMARKS

The SDGs are meant for both developed and developing countries and have to be operationalized and implemented during 2015-2030. The OWG of the UN Assembly suggests 17 goals and 169 targets; the indicators are being developed. Each country has the flexibility to choose/prioritize the goals based on her national circumstances, policy priorities, and domestic capabilities. As the international architecture for global partnership exhibits signs of dynamic inefficiency and there are uncertainties about developed countries' commitments to financial assistance and terms of access to ESTs to developing countries, developing countries need to prioritize the goals based on their national circumstances and capabilities. In case of India, it is desirable to focus on poverty eradication, providing access to basic needs, sustainable natural resource management, and development of economic, social and environmental infrastructure to ensure sustainable development. If the global community is willing to bear the incremental cost of production of GPGs, India can scale up her activity in this regard.

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