‘Green Economy’ In the Context of Indian Economy

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Abstract

Across the world, Green Economy concept has been gaining ground and India is no exception. Green Economy is a development strategy which harmonises both economic development and ecological sustainability. Stated objectives of environment-friendly sustainable measures have, so far, largely not been met in developing countries due to overpowering need of basic development priorities, lack of fund flow from the developed world for mitigation and adaptation purposes, etc. India is facing the problem of co-existence of the conventional economic growth strategy and piecemeal efforts to make the economy ready to mitigate and adapt to the climate change issues. The present paper found that the existing production and consumption system can not make the development a really sustained and sustainable one. Adopting the multi-dimensional Green concept is going to have ripple effects on employment, trade, agriculture, domestic industries, business pattern, which, accordingly, require extensive fiscal reforms, vigilance on changing international trade relations and trade patterns, skill development, indigenous research and development for resource efficiency, political stewardship, public awareness, etc. Judicious inclusion of sustainability factor into the ongoing economic decisions for boosting infrastructure and manufacturing can set things rolling for putting the Indian economy on the Green Economy path. The paper is a descriptive analysis based on the available facts and figures, dotted with comparisons with other emerging countries to highlight the present status of India. While acknowledging the importance of development of strategies to adopt the principles of Green Economy in tune with stage of economic development, the paper points out the critical gaps and problems faced by India as well as their possible solutions.

Key Words: Green economy, ecological sustainability, economic development, climate change, resource efficiency

JEL Classification: O10, O13, Q54, Q56
1. Introduction

Sustainability of economic growth in a finite resource environment has long been questioned and acknowledged as a complex issue. Complexity arises because of potential non-linearities in the relationships among economic and ecological variables. Rate of depletion of resources over the years becomes faster than the regeneration and thereafter the economy runs the risk of lesser resources, raising the cost of extraction and pushing the economy towards its limits to growth. Such severe resource depletion and ultimate resource exhaustion consequently lead to economic contraction or sustained economic depression. The slow feedback from decline in non-renewable natural resources to the production of goods in the economy hides the perils of unsustainable economic practice. Therefore, proactive economic policies maintaining a sustainable stock of resources are needed. If a dynamic equilibrium between the resources and economy is to be achieved then the natural resource consumption rates will have to be moderated through economic policies.

After the Global Financial Crisis, the world has decided to adopt GLOBAL GREEN ECONOMY Concept with the objective of reviving the world economy, saving and creating jobs, and protecting vulnerable groups, promoting sustainable and inclusive growth, reducing risks from carbon dependency and ecosystem degradation and the achievement of the Millennium Development Goals (MDGs), 2000. As governments started devising a new international financial architecture to prevent such crises in future of this scale and ways to jump start economic recovery, they began to recognise and address the risks emanating from climate change. Green Economy is based on a set of transformative actions - ambitious and far-reaching. The transition to a Green Economy in the context of sustainable development and poverty eradication must be underpinned by an ethical framework of shared values and principles that extend beyond the traditional technology-based economic system.

The new concept of Green Economy is neither to replace the holistic and inclusive idea of Sustainable Development, nor can it be considered independent of that guiding principle, rather the Green Economy needs to be understood as a means to the end of achieving the goals and principles that have been set out within the concept of Sustainable Development. The Green Economy implies poverty eradication and social justice as the main purposes of an ecologically sound economic system. The concept of a Green Economy is a shift in paradigms and it should not remain anchored in the present capitalist production-consumption model and holds on to economic growth as the decisive indicator for development, progress and human wellbeing. The growing inequalities and power imbalances of our economic systems makes equity as the corner stone of a Green Economy which needs to address the eradication of poverty to achieve social and economic justice.
2. Literature Review

Prior to begin the main research discussion, here I present reviews of some of the available literatures which give the glimpses of the present unsustainable economic issues, concept of Green Economy and its various aspects.

In an ICRIER Working Paper, ‘Low Carbon Pathways’, Himanshu Gupta observed that global emissions of CO\textsubscript{2} if allowed unabatedly lead towards the irreversible path to rise in temperatures. He prescribed low carbon alternatives which can generate electricity at a sustainable rate. For an energy-secure future, the country should focus on phasing out of fossil fuels, by electrification and supply of electricity from domestically developed clean sources of energy, which might be expensive and involve risky investment decisions but will be beneficial in the long run and can generate electricity at a comparable rate. Alternatively, energy efficiency measures in all energy demand sectors such as agriculture, industry, and transport can secure sustainable energy future by cutting down energy consumption significantly.

Shoibal Chakravarty in his article ‘Cheap Oil, Climate Change Mitigation and India’ finds link between oil price crash and China’s economic slowdown and mentions gain in terms of rise in real income and reduction in subsidies which opens up opportunities to better targeting and cash transfer. In the long run, growth in alternative fuel sources during previous prolonged period of high oil prices and rapid decrease in the price level of these alternative energy sources can reduce heavy dependence on oil in public transport. A number of policies have already been initiated by India. The author has cautioned about India’s climate change prospects in view of fall in global coal prices.

Martin Khor in the article, ‘Risks and uses of the green economy concept in the context of sustainable development poverty and equity’, has mentioned in details about the risks of misuse of Green Economy concept as one dimensional manner where stress has more been given to environmental aspects rather than the developmental and equity dimensions, Disregard of the principle of common but differentiated responsibilities, Inappropriate use of environment for trade protectionist purposes against the developing countries, Provisions of subsidies for research and development of environmentally sound technologies may put the developing countries at a disadvantage, Concerns of developing countries against the attempt of the developed counterparts for gaining access to their markets in the name of trade in environment goods, Problems of reconciliation of two principles of allowing price signals to better continuous flows of ecological services, while depletion of stocks imply reduced services in future with adverse effects on human well-being. He identified recognition of economic and social values of environmental resources among others as the important measures.

The Green Economy Approach has become necessary in view of the need for abundant non-polluting energy sources. This Approach consists of increased device efficiency, fuel
switching, decreasing energy intensity in the production process and transport sector. As stated in B. Sudhakara Reddy’s article, ‘India’s Energy System Transition – Survival of the Greenest’, for rapid dissemination of green technology, technological dynamism and innovative complementarities are necessary. It stated that the Govt. has the role of designing policies, helping scaling up of new technologies and encouraging entrepreneurial activities. Green Economy approach delivers more social benefits than costs but needs supportive policies to determine the appropriate technology and incidence of costs and benefits.

Francesco Tubiello, et.al. in ‘Climate Change Response Strategies for Agriculture: Challenges and Opportunities for the 21st Century’, points out the climate change challenges like elevated CO₂ concentration, precipitation changes, increased weeds and pests, the agriculture sector is going to face in view of soil and water scarcity and the need to increase food supply. The paper gives mention about the synergies between mitigation and adaptation measures.

In the article, ‘The Green Economy in the G-20, Post-Mexico: Implications for India’, Lydia Powell has mentioned that India can be a testing ground for green Economy because in spite of economic strength it is still a poor country. India’s economic strategy is in line with knowledge–based economy which provides a mean for green growth which avoids environmental impact without compromising the job creation and economic growth. Despite various Green initiatives of the Govt., India’s contribution to GHGs emissions during 2002-12 has been second to China. India’s position on this issue like rejection of prescriptive policies and unilateral measures associates it with the poorer nations which seek financial assistance. India’s concern of slower growth has been alleviated by the World Bank study 2012. The author has pointed out to the important dilemma – living at a lower level of income or living with high inequality that the world faces through the example of India where it tries to overlay green growth onto the finance-driven model of economic globalisation would be self-defeating. The author concludes with the opinion that new green growth discourse could make a difference between those who can control power, finance, and technology and those who cannot.

Greenstone Michael, Janhavi Nilekani, Rohini Pande, Nicholas Ryan, Anant Sudarshan, Anish Sugathan in their article ‘Lower Pollution, Longer Lives - Life Expectancy Gains if India Reduced Particulate Matter Pollution’ pointed out severe air pollution in India – WHO estimates that 13 of the 20 cities in the world with the worst fine particulate (PM2.5) air pollution are in India which has the highest rate of death caused by chronic respiratory diseases anywhere in the world. Cleaner air is not incompatible with India’s quest for high economic growth as it causes substantial benefits in terms of longer lives contributing to India’s economic productivity for many years. He mentioned the need for restructure of environmental law and regulations and implementation of market-based environmental regulation, such as emissions trading systems (ETS).
The UNCTAD paper ‘Are there downsides to a Green Economy’, mentioned the Green Economy measures to be taken up by the Government and their probable impacts on trade and competitiveness. The paper found that while most such measures in domestic front do not have significant impact on external trade. Some measures like border carbon adjustments may have negative effects and thus related environmental taxes should be designed in a way which is non-discriminatory, yet maintains minimum environmental disciplines. The paper also pointed out about the possible legal disputes covering environmental goods in the absence of adequate World Trade Organisation (WTO) regulations.

‘Trade and Green Economy: A Handbook’ of International Institute for Sustainable Development mentioned about the importance of trade, an important global economic activity, as a driver of environmental change. It observes that there are specific interactions between the designs of environmental laws and the trade laws.

The existing literatures are heavily against the present production and overall economic system due to different negative externalities retracting the growth process itself and jeopardising the sustainability of the economic structure. The new Green Economy concept has advantages which far outweigh its limitations.

3. Methodology

3.1 Research Questions

Given India’s imperative to attain higher economic growth, my first research question is whether India can sustain its high growth prospect and societal improvements if it continues to adopt the business –as – usual strategy.

If the answer of my first research question is in the negative, then my second research question is how the new Green Economy concept can be useful in making India able to achieve its goals stated in the first research question.

In the course of my research, I tried to find answers of these questions viewing India in the context of global economy, especially the developing countries.

3.2 Data

In order to derive all the research answers, secondary data, policies, facts and figures from various UN publications, Government publications, and independent research articles have been consulted and results have been examined and used suitably.

4. Results and Discussion

Global growth patterns, the degradation of environmental capital and the distribution of wealth and risk – within and between countries – are strongly intertwined. The key question the developing countries are facing is how to reconcile the environmental goals with growth, poverty reduction and other serious problems like water and food supply crises, volatility in
energy and food prices, rising greenhouse gases (GHGs) emissions, income disparity, chronic fiscal imbalances and terrorism.

4.1 Downside risks of present growth system

Although economic development over the past 30 years has managed to lift millions out of poverty and expand the number of countries reaching middle income status, it has also been accompanied by a wide array of negative environmental and social impacts which threaten to undermine, or even reverse, the economic development that has been achieved to date. Despite recent progress in poverty reduction more than 2.2 billion people (15 per cent) live in multidimensional poverty, and about 842 million (12 per cent) people suffer from chronic hunger. Moreover, achievement of nearing the MDGs hides the problem of gap in achievement in developing countries and Least Developed Countries. Growing global and local ecological constraints are compounded by a combination of economic crises, natural disasters, social conflict and the anthropogenic activity-caused global climate change and consequent scarcities of natural wealth in a finite world.

4.2 India’s case

Estimates show that at least 40 per cent of all violent conflicts in the world in the last 60 years have been linked to natural resources; thus India may also face similar situations in various parts of the country. Ecological services of forests, an important carbon sink, account for 7.3 per cent of India’s overall GDP, but also account for 57 per cent of the GDP of the poor or the effective household income of those living below the poverty line and relying on activities like subsistence farming and the gathering of non-timber forest produce. Unmindful commercial activities cause deterioration of the natural environment having an almost immediate and drastic impact on the living conditions and livelihoods of poor people due to loss of natural assets on which they are more dependent. According to a World Bank report, ‘Diagnostic Assessment of Select Environmental Challenges in India’, the annual cost of environmental degradation in India is at about Rs.3.75 trillion (US$80 billion) equivalent to 5.7 per cent of GDP.

i) India’s remarkable growth record under liberalisation, particularly in the last 10 years, has been ahead of the global curve, however, it has been clouded by a degrading environment and growing scarcity of natural resources. In a recent survey of 178 countries, India's environmental quality is far below all BRICS countries [China (118), Brazil (77), Russia (73), and South Africa (72)]. Studies and estimates by economists find India's growth rate to be 2.5-3 per cent lower than the reported Gross Domestic Product (GDP) of 7-8 per cent when environmental factors and human well-being are taken into account.

ii) According to another recent World Health Organisations (WHO) survey, across the G-20 economies, 13 of the 20 most polluted cities are in India.
iii) India’s poverty reduction through economic growth compares poorly with that of China and Brazil. During 1981 to 2001, the population living below the poverty line (US$1.25 per person per day benchmark) fell from a staggering 84 per cent to 16 per cent in China and from 17 per cent to 8 per cent in Brazil, while for India it was from 60 per cent to 42 per cent. In the period 1981–2001, average economic growth rates were above 5 per cent for India, while it was above 10 per cent in China. Brazil’s case demonstrated that with stagnant or low growth rates during the same period (1981–2001), higher levels of poverty reduction was achievable primarily by lowering levels of inequality. India’s rate of poverty reduction (1.5 per cent per year during the period 1981–2001) was lower than that of Brazil or China. In India, in spite of progress on poverty reduction, almost 400 million people continued to live below the US$1.25 a day poverty line – the largest number of absolute poor in any country.

4.3 Adverse Effects of Climate Change

India having huge development priorities will be adversely affected by climate change, in terms of availability of fresh water, low ground water recharge, food production, ocean acidification, increased vector born and water borne diseases with impact on human health, agriculture, water resources, natural ecosystems, and biodiversity. The future of agriculture, which provides livelihood of 58 per cent Indian population, is threatened by loss of biodiversity and ecosystem services, depletion and erosion of top soil nutrients, scarcity of freshwater, aggravated water pollution caused by poor nutrient management, hazardous chemical release, rising greenhouse gases (GHGs) emissions and disposal of waste, under the business-as-usual scenario. In this interconnected world even a drought or flood caused by climate change in one part of the globe can soon challenge supply chains or move commodity markets in another country with profound implications for the poor and the vulnerable groups.

4.3.1 Climatic Effects on agriculture production

Agricultural productivity growth has generally been modest and the sector remains hampered by weak technical capacity, numerous sources of inefficiency and growing pressure on environmental sustainability, in particular the water and land resources on which the sector depends.

Table 2: Share of Sector-wise Employment Trends (UPS)

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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>61.1</td>
<td>58.5</td>
<td>54.5</td>
<td>51.6</td>
<td>47.1</td>
</tr>
<tr>
<td>Industry</td>
<td>16.0</td>
<td>16.8</td>
<td>19.5</td>
<td>21.8</td>
<td>24.4</td>
</tr>
<tr>
<td>Services</td>
<td>22.9</td>
<td>24.7</td>
<td>26.0</td>
<td>26.6</td>
<td>28.5</td>
</tr>
</tbody>
</table>

Source: Economic Survey, 2014-15

Agriculture retains the major share of employment (47.1 per cent in 2011-12) (Table-2), while share of service sector has not increased much over the years. But growth in GDP in
agriculture & allied sectors deceased: 1.2 per cent in 2012-13, 3.7 per cent in 2013-14, 1.1 per cent in 2014-15.

In India, every 1°C rise in temperature could reduce 4-5 million tons of wheat production and badly affect fruits, vegetables, tea, coffee, medicinal plants, and rice production. On the other hand, demand for food is likely to both grow more rapidly and become more diverse with rising living standards, urbanisation and population growth, placing more pressure on agricultural supply capacity. Experiences of monsoonal variations in different parts of the country – 10 to 12 per cent increased monsoon seasonal rainfall along the west coast, northern Andhra Pradesh and north western India and on the other hand, decrease in seasonal rainfall by 6 to 8 per cent in eastern Madhya Pradesh, north-eastern India and parts of Gujarat and Kerala, the chief grain producing regions of India. Due to climate change the rivers may get more water from melting of snow in the lean season but in the long run are likely to be adversely affected by decrease in the snow cover. These, in turn, will impact India's food security problems and water security. India could experience a 40 per cent decline in agricultural productivity by 2080s and face chronic hunger. Gross per capita fresh water availability in India is estimated to decline from 1820 m³ per year in 2001 to as low as 1140 m³ per year in 2050. As per the Second National Communication submitted by India to the UNFCCC, it is projected that the annual mean surface air temperature rise by the end of the century ranges from 3.5°C to 4.3°C whereas the sea level along the Indian coast has been rising at the rate of about 1.3 mm/year on an average. Fresh water sources near the coastal regions may be affected due to salt intrusion for estimated rise in sea level.

4.3.2 Problems of Rapid Urbanisation

India has been experiencing fast urbanisation with the share of urban population increasing from 17.3 per cent in 1951 to 31.2 per cent in 2011 and the population is slated to increase to 590 million by 2030. High employment opportunities and higher per capita income attract large number of migrants from surrounding rural areas resulting in an increased number of slums. Such growth in city population has increased the necessity of urban basic services like water supply, sewage collection and disposal, solid waste management, public healthcare, sanitation, etc. Slum dwellers’ lack of durable housing, secure tenure and access to basic services – including health services, adequate food, education and employment opportunities, decent transport, credit and the rule of law – often further entrench them in poverty.

4.3.3 Problems of Waste Management

Due to rise in economic growth, India’s per capita waste generation rate increased from 440 gm/person/day in 2001 to 500 gm/person/day in 2011. India still being in a stage of transition to developed nation, its waste collection is largely inefficient due to lack of infrastructure to handle such a huge quantity of waste. Open dumping is a major method of waste disposal and burning of garbage causes significant air pollution. Moreover, solid waste
management in India has a predominant involvement of child labour which deprives many children their basic rights like education, food, nutrition and chains them into vicious circle of poverty.

4.3.4 Problems of CO₂ Emissions

According to the International Energy Agency (IEA) estimates, India will account for 14.2 per cent of the world’s energy-induced CO₂ emissions which will increase by 57.4 per cent during 2005–30. But India’s share in incremental world energy demand during the same period will be about 6 per cent only. India’s high share in pollution can be attributed to India’s heavy reliance on coal with high ash content (low calorific value), only 1 per cent share of zero-carbon fuels, in total primary energy demand and biofuels which meet 90 per cent of all rural energy needs, but emits black carbon in the process. Similarly, 90 per cent of rural and 33 per cent of urban households do not use clean cooking fuels. India’s CO₂ emission growth rate accelerated to an estimated 7 per cent a year in the recent period 2006–13, from 4 per cent a year in 2000–06 and that was caused mainly by a slowdown in the pace of reduction in the energy to GDP intensity (leading to faster growth in total energy demand), and faster growth in the CO₂ to energy intensity. The energy intensity (amount of energy consumed for generating one unit of Gross Domestic Product) (at 2004-05 prices) decreased slowly from 0.4656 Mega Joules per Rupee in 2005-06 to 0.4192 Mega Joules per Rupee in 2013-14.

4.3.5 Gap in Power Supply & Associated Health Issues

With the increase of incomes, as households climb the energy ladder, electricity becomes the most preferred carrier for lighting. The share of gas/electricity has gone up from 7.7 per cent to 27.2 per cent (Table-1). In spite of economic improvement, bio-fuels (fuel wood, charcoal/coal, dung, etc.) retained a major share in energy use by the households. Nearly 0.4 billion people in India (45.1 per cent rural and 7.8 per cent urban households) do not have access to electricity. This inadequacy in access to modern energy services leads to loss of employment opportunities, negative health effects, negative effect on vulnerable groups of women and children, slum dwellers, rural poor people. Climate change, ozone layer depletion and air pollution, all pose significant threats to human health, both individually and combined.

<table>
<thead>
<tr>
<th>Year</th>
<th>Biofuels</th>
<th>Coal/Charcoal</th>
<th>Kerosene</th>
<th>Gas/electricity</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950</td>
<td>97.0</td>
<td>1.10</td>
<td>1.8</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td>1990</td>
<td>81.2</td>
<td>4.1</td>
<td>5.3</td>
<td>7.7</td>
<td>1.7</td>
</tr>
<tr>
<td>2010</td>
<td>66.1</td>
<td>1.2</td>
<td>2.7</td>
<td>27.2</td>
<td>4.8</td>
</tr>
</tbody>
</table>

Source: India Development Report, 2012-13

Electrical power subsidies do little to increase agricultural productivity, while they encourage excessive use of well pumps and groundwater consumption, as well as stimulating
CO₂ and methane emissions through various channels. India’s rural electrification programme has in many cases faced failures due to unaffordability to the villagers compelling them to continue to use kerosene and bio-fuels causing health problems and indoor air pollution.

**4.3.6 Diseases Caused by Development Process**

A significant portion of diseases caused by poor water supply, sanitation and hygiene is borne by children under 5. About 23 per cent of child mortality in the country could be attributed to environmental degradation. New communicable diseases, such as Ebola, SARS, and Avian flu and the health impacts from environmental pollution and ecosystem degradation are borne to the largest extent by disadvantaged and vulnerable populations, including children and women and perpetuate poverty by directly impacting the economic productivity, at both the household (micro) and national levels (macro). Health risk from mining and industry-induced contamination of land and water is one of the most common sources of local grievances, bearing the potential to ignite social conflict.

**4.3.7 Unsustainable International Trade**

Trade between developing countries, or ‘South-South’ trade, has recently been most dynamic, increasing from 39.2 per cent of total developing country exports in 2002, to 50 per cent in 2010. The increasing volumes of trade and resultant unsustainable levels of resource consumption have also put additional stress on natural resources and increased GHGs emissions. Hence there is a need for both the developing and developed countries to move towards more diversified and sustainable economic practices.

**4.3.8 Improper Sanitation Measures**

Although, in India, the number of people with access to basic sanitation grew by half from 1990 to 2004, the number without sanitation remained essentially the same, because of population growth. Urban water supply is marked by inadequate coverage, intermittency, low pressure and poor quality. In 2011, only 71 per cent of urban households had access to tap water.

From the above discussion, it can be concluded that growth has not being trickled down to the bottom of the income pyramid to remove inequality, as anticipated by the planners, and if India continues ‘business-as-usual’ strategy with the continuing loss of ecosystems and biodiversity that it entails, will exacerbate the multi-dimensional persistent problems of job losses, socio-economic insecurity and poverty which threaten social stability in India and delay the progress towards achievement of Millennium Development Goals (MDGs), 2000 and the newly-accepted Sustainable Development Goals (SDGs), 2030. Now I proceed to find the answer of the second research question.

The Green Economy is defined as economy that results in reducing environmental risks and ecological scarcities, and that aims for sustainable development without degrading the environment. Though it is closely related with ecological economics, but has a more politically
applied focus. UNEP Green Economy Report (2011) opines that a Green Economy should be efficient and fair, which recognises global and country level equity dimensions, particularly assuring a just transition to an economy that is low-carbon, resource efficient, and socially inclusive.

### 4.4 India & Green Economy

Both developed and developing countries have realised that keeping within global ecological limits is possible by the ability to shape collective action through a rule-based approach and accordingly, the environment concern has been increasingly incorporated in the manufacturing and infrastructure sector. Thus it has become imperative for India to switch to more resource efficient Green Economy where business and industry will be the key driving forces.

#### 4.4.1 Benefits at a Minimum Cost

For an environmentally sustainable future, India needs to value its natural resources, and ecosystem services to better inform policy and decision-making. Environmental sustainability is becoming a growing challenge along the India’s projected growth trajectory, and thus, a low-emission, resource-efficient greening of the economic strategy is needed. While it may come at a slightly higher price tag for the economy but it promises to deliver greater benefits with decrease in carbon emissions rates, poverty levels and greater local environmental protection. World Bank report estimated that with a minimal cost of 0.02 per cent to 0.04 per cent of average annual GDP growth rate, India can make green growth a reality by putting in place strategies to reduce environmental degradation.

#### 4.4.2 Employment Generation

As India is on its path of high growth, it will create more infrastructures, services and jobs and thus the choices of Indian business will determine the level of sustainable outlook of the country. A more sustainable and cleaner environment in India will see generation of hundreds and thousands of downstream jobs to make it a low-carbon Green Economy, increasing the growth of global carbon markets which will further increase jobs like carbon financial consultants, analysts, financiers, carbon accountants, business risk analysts, etc. Buildings already account for more than 30 per cent of India’s electricity use, and two-thirds of the buildings that will exist in India by 2030 have yet to be built. Rise in green and energy efficient buildings will increase the demand for architects, engineers, technicians, plumbers, construction workers, etc.

#### 4.4.3 Sustainable Consumption and Production

In the era of global supply chains, negative externalities of production and consumption patterns in anyone country can have effect on the biophysical and social environment in neighbouring countries. The Sustainable Consumption and Production (SCP) with the fundamental objective to decouple economic growth from environmental degradation, is one
of the Green Economy strategies to achieve three objectives of sustainable development – social, economic and environmental development. Shifting of consumption without slowing down sustainable growth shifts savings to sustainable production, investment for restoration of natural capital, long-lasting infrastructure, stimulate jobs in new innovation, and create new markets. SCP policies and actions are not anchored in coherent policy frameworks, hence, it calls for a combination of supporting policies like procurement, economic instruments in areas of agriculture, water, energy, etc., technological innovations and important lifestyle changes.

4.4.4 Proliferation of Green Economy via international trade and benefits –

The interaction between trade and the transition to a greener economy is bidirectional. Sustainable trade can facilitate the transition to a Green Economy by fostering the exchange of environmentally friendly goods and services, sound technologies, resource efficiency, employment, and poverty eradication. It will provide further impetus to green investments and contribute to greening of international supply chain and will secure long-term competitiveness in international markets, dissemination of research and development (R&D) and transfer of environmentally sound technologies, thereby, benefitting a large number of producers and consumers and simultaneously ensure natural resource protection. On the flipside, further specialisation in the production of more energy- and resource-efficient goods and services due to technological advancements and spillovers from international trade, make a greater variety of environmental goods and services accessible at a lower cost, shifting demand for various low-carbon technologies.

4.4.5 Sustainable Agricultural Practices

Sustainable farming practices lead to greening of the small farms which is the most effective way to increase food availability and food security, reduce poverty, increase carbon sequestration and water efficiency, building natural capital stocks and link marginalised farmers with international supply chains. Theoretically, restoring the 2 billion hectares of degraded agricultural land could boost food production by up to 79 per cent. Sustainable agriculture offers opportunities to achieve economic development, save and create jobs, reduce poverty, cut down GHGs emissions, ensure food safety of consumers and offer trade opportunities for developing countries.

4.4.6 Potential Benefits of Green Energy Measures

Severe shortages of electricity supply and high urbanisation rates demand more energy efficient public transportation systems in cities of India. Energy has become central to the country’s chronic trade imbalance, and India’s external trade deficit for fuels averaged an annual 6.4 per cent of GDP over 2008–12. Due to recent fall in world oil prices, current account deficit has been lowered recently, even though the country’s external position nevertheless remains vulnerable to volatility in energy prices which underlines the importance of alternative
green energy sources and reforms to reduce unnecessary existing inefficiencies and waste in energy use.

As in the rest of the world, the cost of renewable energy has seen rapid decline in recent years. The price of imported coal could be 30–50 per cent higher than the cost of wind and solar by 2020. Replacement of the marginal unit of energy supply from imported coal with a marginal unit from financially competitive renewable energy would allow India to secure substantial additional social benefits, such as greater energy security and a cleaner environment. Globally, projected investments of US$630 billion in the renewable energy sector by 2030 would translate into at least 20 million additional jobs – 2.1 million in wind energy, 6.3 million in solar photovoltaic (PV), and 12 million in biofuels-related agriculture and industry. Renewable energy can create higher direct job potential as well as in downstream industries and in the long run, can make the final products competitive. With proper Government intervention for internalisation of external costs for waste management and the recycling sector can make it a highly profitable and labour-intensive business sector.

4.4.7 Green Reform and Poverty Reduction

Researchers have found important complementarities between green reform and poverty reduction in areas of efficient water, energy and transport infrastructure, alleviation of poor health issues, efficient cost reducing technologies, increasing productivity and easing environmental pressure which can help the emerging countries like India to achieve the Millennium Development Goals (MDGs), 2000. The recently adopted 2030 Agenda for Sustainable Development Goals which is to improve upon the achievements of the MDGs and also outlined 17 goals to wipe out poverty, reduction of inequality, ensure availability and sustainable management of water and sanitation, sustainable energy, sustainable consumption and production, etc.

4.4.8 Growing Green Markets & its Benefits

Globally, the market for water supply, sanitation, and water efficiency is estimated at US$253 billion and is expected to grow to US$658 billion by 2020. Estimates show that US$15 billion per year towards meeting the MDGs of halving by 2015 the proportion of people (counted in 1990) without sustainable access to safe water and basic sanitation could generate global economic benefits worth US$38 billion annually. The global market for organic food and beverages is projected to grow to US$105 billion by 2015 from US$62.9 billion in 2011. There has been an increased demand for organic products with sales increasing by over US$5 billion a year across the world. The countries with the most organic producers are Uganda, followed by India, Ethiopia and Mexico. Organic agriculture based on sustainable agriculture practice, use of local resources and traditional knowledge, thus offers a real trade and poverty reduction opportunity for India and developing countries.
Therefore, while, over the long-term, the unviable business-as-usual approach in all sectors of production, particularly those heavily dependent on the natural resources is to be discarded, a significant green reform can achieve rise in income of the poor, rise in food security, strengthened resilience to climate change and abatement of GHGs emissions. India needs to value its natural resources and ecosystem services to better inform policy and decision-making. Green Economy is, therefore, desirable for an environmentally sustainable future of India, a hotspot of unique biodiversity and ecosystems.

5. Conclusions and Recommendations

5.1 Conclusions

At the UN Conference on Sustainable Development, 2012 (Rio+20 Conference), the Green Economy approach was endorsed as an important tool for sustainable development and poverty eradication where these two goals would permeate all three pillars of sustainable development. The new concept sets aside the common misconception of trade-off between economic development and environmental stewardship, because all human activity depends on the existence of a responsible framework for using environmental assets, which is more true about the poorest populations as they depend disproportionately on the ecological commons both for livelihoods and for consumption.

Governments should recognise the futility of the one-size-fits-all model or sectoral approaches rather develop solutions that embrace the complexity and interconnectedness of the global economic system, achieving the national priorities in line with the sustainable development. Though the present international discussions on sustainability have been dominated by the imperative to reduce our collective carbon footprint, they are in themselves insufficient as they do not address more underlying root causes. The unsustainable way in which our natural resources are valued, used and managed is the most fundamental problem and there is need to operate within the ‘planetary boundaries’. However, these national pathways can be informed and assisted by an international framework of rules, best practices and actors.

The Green Economy responds to global economic, social and financial crises by reallocating natural, social and financial capital into creating benefits for economic development, social equity and environmental protection. Reconciliation of short-term versus long-term priorities by adopting resource-efficient and less polluting pathway enable the countries to leapfrog the usual development trajectory avoiding future costs. Countries like Japan, South Korea, China and Germany have already positioned themselves as green technology leaders and India should not be the perennial technology buyer.

Due to the higher vulnerability to potential economic and social impacts of environmental degradation, if the developing countries continue to follow the same path to economic
prosperity as did by the developed countries, their increasing emissions will cause serious climate problems even though they presently have minor shares in global GHGs emissions.

There are miles to go to achieve all the targets of MDGs evenly across the world. India’s remarkable growth under liberalisation, privatisation and globalisation process has been clouded by a degrading quality of environment, growing scarcity of natural resources and inequality –

i. The future of agriculture, which provides livelihood of 58 per cent of Indian population, is threatened by loss of biodiversity and ecosystem services, depletion and erosion of top soil nutrients, scarcity of freshwater, aggravated water pollution caused by poor nutrient management, hazardous chemical release, rising greenhouse gases (GHGs) emissions and disposal of waste, under the business-as-usual scenario;

ii. Indian cities are plagued by poor basic services for growing urban population and consequent problems of waste management;

iii. India’s high CO₂ emissions growth despite its low share in world energy demand;

iv. Inadequacy in access to modern energy services leads to loss of employment opportunities, negative health effects, negative effect on vulnerable groups of society;

v. Increased volumes of trade and resultant unsustainable levels of resources and increased GHGs emissions.

vi. A more sustainable and cleaner environment in India will see generation of downstream jobs to make it a low-carbon Green Economy.

vii. Reaping positive externalities in production of energy and resource efficient for international green trade for India.

viii. Sustainable farming practices increase food availability and food security, reduce poverty.

ix. Middle class consumers will grow significantly by 2030, which would put pressure on resources and points to the need of shift to better consumption pattern with sustainable production and resource utilisation.

x. Waste management and recycling may be proved to be difficult for the developing countries like India to handle this in the initial stage as they lack comparative advantages and need capacity building in this area.

xi. The composition of goods and services produced depend on environmentally efficient consumption patterns which are, in turn, highly influenced by the distribution of incomes worldwide and within countries. The core problem of income inequality in India has not been resolved, so it requires equitable distribution of income for meeting the sustainable development objectives.

xii. There are ample evidences of misallocation of capital in the unsustainable sectors in India – property, fossil fuels, and structured financial assets but low investment in
renewable energy, energy efficiency, public transportation, sustainable agriculture, and land and water conservation) causing reproduction of risks and perpetuation of the same.

xiii. Due to technological innovation, low-priced manufacturing and services, and traditional knowledge and processes, large pool of scientists and engineers, significant achievements in information technology, professional services and communications in the past decade, India is increasingly being looked at as a hub for research and development (R&D) for green solutions with increasing amounts of venture capital flowing in. The Indian companies and MNCs have been prioritising on corporate environmental impact, due to profitable opportunities, business risk avoidance, international investment pressure and corporate social responsibility.

xiv. The global market for environmental services is substantial and growing, driven partly by increasing environmental regulation and by changing consumer preferences. Transparent technical and financial support for developing countries, including India, will play a key role in helping them to capture opportunities arising from a Green Economy and to increase trade in environmental goods relative to conventional merchandise trade.

Thus, environmental sustainability is becoming a growing challenge along the India’s projected growth trajectory, and thus, a low-emission, resource-efficient greening of the economic strategy is needed. While it may come at a slightly higher price tag for the economy but it promises to deliver greater benefits with decrease in carbon emissions rates, poverty levels and greater local environmental protection. The basic equity issue that is needed to be addressed eventually is the fair allocation of rights to the scarce resources from global commons, in the face of limited yields of common renewable resources and limited absorptive capacity of global ecosystems for pollution.

The first research answer indicates the perils of following India’s growth-led development strategy. The second research answer gives details of opportunities in following the Green Economy path in order to meet India’s goal of achieving inclusive and sustainable development.

It can, therefore, be concluded that given the majority share of unsustainable production and associated technological characteristics, there is urgent need for a policy shift for green reforms to enable India to achieve sustained and sustainable development. There are, of course, discernible concerns like lack of aid flow and restrictive environmental trade measures for developing countries like India while treading the path towards Green Economy. However, rule-based multilateral policies and observance of differentiated responsibilities at the international level by all countries can mitigate most of these problems. Thus efforts in both the national and international fronts are needed in true spirit.
5.2 Recommendations

In view of the conclusions in the preceding section, the following policies are suggested to put India in the Green Economy path to solve the existing and upcoming social, economic and environmental problems.

5.2.1 Green Economy in True Spirit

India should ensure that the implementation and monitoring of Green Economy schemes are democratically controlled, transparent, and inclusive. Furthermore, the capacity for good governance affects the trustworthiness of a country and is thus an important factor influencing decisions concerning the access to financial support and international funds. Achieving the necessary paradigm shift towards a sustainable development model through Green Economy measures will require active civil society participation. Banks and financial institutions are required to factor in potential environmental risks as well as environmental gains into the standard asset valuation and credit rating procedures. India can provide interest incentive for the green industries or some of the existing loan mechanism can be tagged with green initiatives.

5.2.2 Change in Transport Mode

Increases in market share of rail, which use less energy and emits less GHGs can be a good solution for India. Though the efficiency gains depend on the mix between diesel and electric traction for freight trains and the fuel used to generate electric power, freight transport by efficient rail system in long distances will significantly lower CO₂ emissions than road haulage. Other complementary measures include raising the fuel efficiency and carbon emission standards for vehicles, capping and auctioning the issuance of the number of licences for vehicles each year. Biogas being a renewable and environment-friendly source of energy, building a national gas grid to feed bio-methane into the grid makes significant contribution to India’s energy needs and also a shift to a low-carbon energy system.

5.2.3 Fiscal Incentive for Alternative Energy Sources

In view of the anticipation of rise in car fleet in India due to rising income and growing middle class, Government can provide tax incentives for less polluting transport modes and infrastructure, greener vehicles and new modes public transportation, which are cost effective and with low carbon intensity. As road transport use about 50 per cent of petroleum product and is responsible for 25 per cent of carbon emissions, effective strategy to shift to a low-carbon economy through biofuels like Jatropha blending with diesel, use of electric cars, are some of the possible solutions. But a cautious approach is needed as substantial increases in bio-fuel production and consequent increased water and land use lead to increased water stress and anthropogenic interference with phosphorus and nitrogen flows. Nuclear power is to be developed with caution against radioactive negativities.
5.2.4 Intermediate Measures in Energy Sector

But as there is very little possibility that India can attain full reliance on the renewable energy sources in the short-to-medium run, hence to meet its growing demand of fossil fuel, it has to make necessary improvement of import infrastructure. On the other hand, it has to make the necessary improvements through transfer of high-end technology and result-oriented research for technological development to make gradual transition towards Green Economy. Rapid mass transit systems and alternative fuels like Compressed Natural Gas (CNG) and biofuels are needed for transportation. Governments can also directly invest in public transport and public transport infrastructure, for bus and train transit systems, especially for non-fuel-based transport system.

5.2.5 Change in Agricultural Subsidy Structure

The agricultural subsidies has benefitted the wealthier farmers who garner disproportionately from the subsidy regime and thus reorientation of subsidies towards agricultural R&D, extension services, rural infrastructure and education would have substantial benefits for agricultural productivity while conserving precious groundwater and mitigating GHGs emissions. At the same time, potential adverse impacts of subsidy removal on the rural poor should be addressed through a modern, nationwide system of social protection. A level playing field for sustainable agricultural production, through increased public investment in infrastructure, increased production of organic food is vital.

5.2.6 Sustainable Manufacturing Sector

As India has embarked upon ‘Make in India’ to increase the share of the manufacturing (around 15 per cent) sector in the GDP to 25 per cent in next few years as well as increase employment, this sector needs implementation of sustainability measures as it is responsible for use of a major share of electricity, primary resource extraction.

5.2.7 Proper WTO Provisions

Proper WTO provisions for environmental goods trade is most needed to provide a breathing time space for the development of renewable energy industry in the developing countries. The ongoing WTO negotiations can ensure prevention of arbitrary or unjustifiable discrimination or disguised restriction on international trade or unilateral actions on environmental goods and services.

5.2.8 Caution against New Investment Avenues of Multinational Financial Institutions

Moreover, India has become members of two newly-formed multinational financial institutions – New Development Bank (NDB or BRICS Bank) and Asian Infrastructure and Investment Bank (AIIB). In both of these banks, India has significant presence. It has plans to borrow fund from these institutions mainly to meet its infrastructure gap. Therefore, it would be prudent for India with other stakeholders to include the green conditions in sectors, with high environmental impact, to be developed with financial assistance from these institutions.
5.2.9 Differentiated Time Path for Environmental Standards

Developed countries should remove trade barriers and provide training and capacity building to facilitate the access to, and diffusion of clean energy technologies in developing countries. A differentiated time path of setting up of environmental standards is needed for the developing countries, like India to avoid or reduce any negative environmental, social, and economic impacts.

5.3 Proper Govt. Policies

a) Public policy interventions like regulatory and pricing policies, taxes and subsidies to limit pollution and over-exploitation of natural resources are required for improvement of income distribution, as the market forces left alone would continue to produce according to the existing demand pattern which in turn is shaped by the existing income distribution with unsustainable consequences. Large-scale investments in skill development and capacity building are needed to achieve a wide adoption of these technologies and materials in new construction and renovation.

b) The government should adopt important roles in making prices better reflect environmental values, veering all the sectors towards a sustainable development pathway, whilst protecting the access of the poor to essential goods and services to promote a green and more inclusive economy.

c) Since inclusive economic growth is an imperative for India, it will require a high level international investment, support and solidarity to boost finance, technology and institutional capacity for lowering the carbon content of economic activity and build resilience to unavoidable climate changes. In order to develop a more balanced and equitable economic system, national level measures like land reforms, wage reforms, and fiscal measures for improvement of livelihoods of rural and urban poor communities are needed.

5.4 Regional Cooperation

South-South cooperation, research and development networks, an increasing mobile and skilled workforce, regional integration are important for progress in technology transfer and resultant technological progress in clean technologies. Elimination of trade-distorting subsidies and trade in environmental goods and services, are important for enabling environment for development, adaptation, dissemination, and transfer of environmentally-sound technologies.

5.5 Financing Issues in Renewable Technologies

a) Because 85–95 per cent of the total discounted lifetime cost of the renewable energy projects are upfront capital costs, these are sensitive to financing costs, risks from unexpected policy changes, technology failures can significantly affect and at the same time, debt costs in fast-growing developing countries like India tend to be much higher in relation to developed countries because of several causes like strong competing demand for
investible funds, higher risks, higher inflation and immature financial markets. To tackle the problem of high financing costs in renewable energy projects in India, government may consider several options to increase the flow of concessional domestic debt to renewable projects, fiscal supports for renewable energy projects, for example feed-in tariffs, tax credits, accelerated depreciation benefits and direct subsidies, etc.

b) But still more clarity in investment in R&D out of the National Clean Energy Fund (NCEF) is needed and so also the need for strengthening of local patents regimes for improved transfer of technologies on a commercial basis.

5.6 Other Important Supplementary Measures

Among other supplementary measures are redefinition of poverty which encompasses the lack of sustainability rather than the narrowly focused income-based poverty measures, proper land use policy and town planning as part of low-carbon intensity planning, tax incentives for installing energy and resource efficient appliances in offices and residential buildings, promotion of eco-tourism, reduction in protection period for the IPRs for transfer of technologies to the developing countries, sustainable forest management, secured legislation for property rights for the poor, improvement in energy and resource efficiency of the construction sector, operationalise the ‘polluter pays’ principle for promotion of internalisation of environmental costs, adoption of industrial ecological practices, eco-based production, agrobiodiversity, water-use efficiency, stipulating rules and regulations on recycling and use of recycled materials in particular production processes, labeling green farm produce, etc.

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