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Significance of unearthing sustainability issues in India

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Abstract

Sustainability issues including ecological, economic, social, political and personal are getting maximum attention from the people of all the walks of like. As per Brundtland Commission [1], sustainability focuses on using resources today in a way that ensures there'll be resources to meet the needs of future generations. Concerns regarding sustainable environment has thrown focus on reducing green house gas emissions, countries like: China and India are the focal point apart from developed countries like: US due to the enhanced energy consumption to fuel their development.

Unsustainable development results in such climatic changes resulting in scarcity of water and food resources, which may cause political instability.

The rising attention to sustainability is presenting opportunities for entrepreneurs to look for sustainable options. For a developing economy like India which is blessed with one of the largest manpower in the world, addressing sustainability issues in-particular in meeting its energy needs, will ensure the over all sustainable development in the longer run. This work attempts to interlink all of the above-mentioned issues in a meaningful manner to prove their relevance in Indian scenario.

Present study shows that every identified sustainability issue ends up or closely interlinked with the demand of energy or meeting the demand of energy in sustainable way.

***Key words**: Sustainability; Climate; Environment; Energy; Food.*

Introduction

India was regarded as "Golden Bird" a longtime ago. Mainly on account of trading activities there was huge inflow of revenue in India. On account of poor industrial set up and political instability, abundant natural resources were not utilized efficiently till the eighteenth century. The industrial revolution, which began about the middle of eighteenth century, had lead to increased labor productivity coupled with

rapid Industrialization. The benefits of industrialization were a shift from a rural and agrarian economy to an urban and industry-based economy. Adoption of the mass production techniques supplied goods at cheaper price and hence luxuries became necessities for the society. The increased demand for goods along with improved standard of living and increased population lead to the natural resources depletion on one hand and the environmental degradation by enhanced pollutants on the other.

Rising environmental concerns and perceptions of increased risk to health and safety of human beings, flora and fauna from increased industrial activities have led to a significant increase in interest in research at the interface of environmental management along with sustainable operations of industries [2]. Since late nineteenth century, the concept of sustainable development had gained significant attention from the researchers through out the world. During the year 1987, the Brundtland Report [1] aimed to introduce environmental protection by defining the most accepted definition of sustainable development as “Development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs”.

India is a front-runner amongst the developing nations, yet it is still grappling with serious issues like: poverty, food scarcity, poor rural infrastructure, poor employment, gender disparity and high population growth rate.

First green revolution transformed India in to a self-reliant nation for meeting out the basic food needs. But the nation is still highly dependent on crude imports for meeting its major energy needs.

As per International Energy Agency (IEA), it is important for all the nations to spend 1% of annual economic output on new technologies to halve carbon dioxide emissions by 2050. Failure in doing so may lead to phenomenal rise in CO_2 emissions by 130% and rise in crude oil demand by 70%. The much required green energy revolution would provide India an opportunity to change its standing from a fuel-importing nation to one that provides the rest of the world with clean and affordable energy.

Green energy supplied by biofuels has significant advantages like: it can replace the fossil fuel supply, open new economic opportunities, and is carbon neutral, which may help mitigate the climate change, associated with fossil fuels. Bio-fuels can be viable substitutes in transport for petroleum products, which account for sizable fraction of India’s imports. Rising demand for petroleum fuels as evident from Figure 1 below, when compounded by their high prices portrays an ominous scenario.

Global initiatives related to mitigating climate change, like Kyoto Protocol mechanisms and Asia Pacific Partnership on Clean Development and Climate Change to which India is a party, could give a thrust to biofuels energy technologies, which are still in the infancy stage. In the future, however, the sustained requirement for bioenergy will have to come from a competitive global energy market, which must implement fair pricing mechanism in fossil fuel prices and the value of carbon emissions is accounted for in energy prices. Thus ensuring a level playing field for bio-fuel vis-à-vis petroleum products.

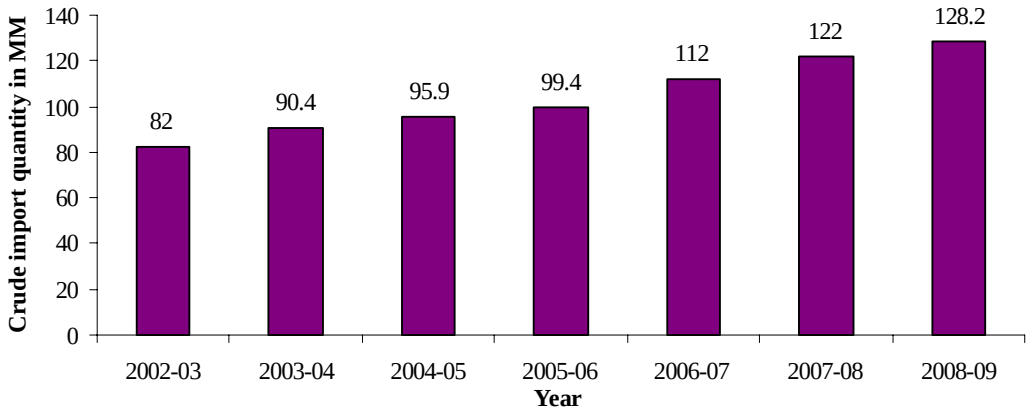

Figure 1: Year-wise crude imports in India

The process of development needs resources and one major developmental resource is energy. Meeting the energy needs maintaining the all interrelated aspects such as our eco system, food security, employment generation and meeting all the physical needs with out creating any social tension is of utmost importance for a developing economy like India.

Why focusing on sustainable development?

A global prosperity requires bridging the gap between developed and developing nations. To achieve this goal, economic growth rate of 5 to 10 per cent per annum is needed for developing nations. To maintain such growth rate, over exploitation of environment and resources cannot be over ruled. It is required to adopt a sincere and practical approach while utilising the resources available on the earth for the forthcoming generations.

A new techno-economic paradigm, pushing technology towards sustainability, could be rooted in: a fundamental (economic) shift of relative costs of dominant production factors; and a gradual but fundamental cultural shift of public attitude with respect to future and environmental interests.

Figure 2 shows close inter-linkage between economy, environment and society. Sustainability ensures maintaining a balance between these aspects.

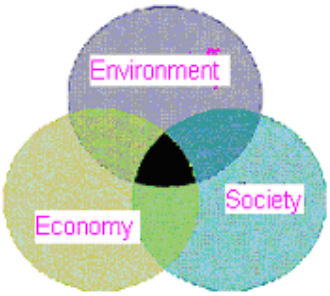

Figure 2: Overlapping between Economy, Environment & Society [3]

Figure 3 indicates nested nature of inter-linkages between economy, society and environment. Environment encompasses society and society encompasses economy. It may be said that good economy leads to better society which in turn helps in having a better environment.

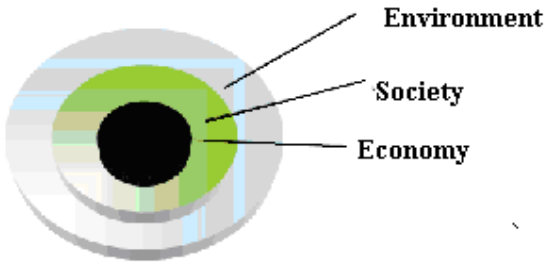

Figure 3: Nesting of Economy, Environment & Society [3]

Identified sustainability issues in India

Food security issues

Evolution of the society has resulted in a shift in eating habits and thus with a regional bias depending on the availability a change can be seen in the demand of different food commodities. Since a long time, the ever-growing world population consumed large parts of the global resources and frequently doubts were voiced about the earth's carrying capacity and limits to the human population [4 & 5]. The resulting increase in the numbers of human beings both enabled and demanded agricultural expansion and intensification. But present and future population growth is related to economic development, and therefore seemingly independent of the capacity of food production: first comes the fact of population growth and afterwards the question of how to feed those people. This situation seems inherently unsustainable [6].

In building up of a prosperous society, food security and poverty eradication are the two major objectives. The Food and Agriculture Organization of the United Nations reported in 2008-09 that 854 million people were undernourished in the world. Important fact needing consideration is that a great majority is residing in developing countries. Currently one-fifth of India's population is labeled undernourished making it the nation with the greatest number of underfed, most of whom live in rural areas. India has not only to check its exponential population growth, but also the effects of low levels of literacy in rural areas, social equity, and rapid urbanization among others. Agriculture still contributes to nearly 20 percent of India's Gross Domestic Product (GDP) and around a third of its people depend on agriculture for their livelihood.

Recent fear of failure of monsoon in India in the year 2009 up to the tune of 20-30% has resulted in a forecasted drop in the yield of sugar cane, pulses and rice from 30-40% percent. Just forecasting and fear of scarcity of such important commodities leads to hoarding of such commodities and that results in artificial rise in prices to such an uncomfortable level which may result either in political instabilities or social unrest. Social awareness is needed on much hyped use of biofuels as an alternative to petroleum based fuels. A debate has already started on meeting the

energy needs without altering the required space for meeting the demand of food. Some recent news has alleged the use of biofuels as the cause of rising prices of certain commodities. Apprehensions have been expressed that the cultivators may willingly opt for such crops, which may be used for producing biofuels and may be more remunerative in shorter terms. This apprehension has substance in the absence of clear policy in case of biofuels.

Meeting the food needs

The global demand for food is determined by population growth and minimum physiological requirements. In June 2009 the food grain stock was over 535 lakh tones against the government's annual requirement of 496 lakh tones. Indian government is claiming that it has sufficient food stock to negate the impact of poor rainfall. But this claim seems to be totally wrong one as already prices of pulses and sugar are spiraling to new heights due to poor monsoon. Rainfall in India is around 25-30% below the par. Agriculture still contributes around 17-18% of India's GDP hence making it a very important sector for India's growth. Around sixty percent of India's population is dependent on agriculture for earning their livelihood. In India average calorie intake for people living in rural areas and 2100 for people living in urban areas. Almost 80% of rural people and 64% of urban people in India are below poverty line. For a balanced diet 55 per cent of the energy must be provided by carbohydrates, 35 per cent by lipids and 10 per cent by proteins [7]. In India the primary rural diet is wheat in the west and rice in the east and south; cereals compose 73 percent of total calorie intake in rural areas [8]. Richer states such as Punjab and Haryana have a cereal share (percent of household income spent on food) of about 15 percent, whereas in poorer states such as Bihar and Manipur the cereal share is around 40 percent [9].

Skyrocketing prices of cereals in India itself poses threat of hunger and malnutrition. For poor rural people it would be really impossible to procure costly cereals at current market prices. Improper diet intake will lead to poor health of people living in rural areas.

In order to feed 1.2 billion people in the India with cereals either of the two options may be preferred: to expand production area or to intensify production practices. But agriculture is already utilising significant amounts of available natural resources. Additional pressure of agriculture will make ecosystem unsustainable. Two options have been suggested in order to attain enhanced food availability, which in turn may also be used to reduce trade-offs between food demand and the environment. The first option is to redistribute calories from high-calorie diets to low-calorie diets. The second option is to reduce the environmental impact per calorie food product and the transformation of resource intensive meat-based diets to a more grain-based diet [10]. To elaborate on the latter: vegetarian diets compare favorably to present diets on important environmental issues such as land use [7, 11 & 12]. Furthermore, it is estimated that, on a national scale, about a quarter of the world population consumes high amount of animal proteins [13] where as animals consumes very large amount of cereals for their growth. In theory, a reduction of animal proteins in the diet would reduce the cereal demand. The resources spared in the production of animal feeds could then be used for the production of food for the growing population as well as the conservation of natural resources.

Farming process itself is an energy intensive activity requiring power for irrigation, ploughing and processing of farming produce. Use of manure is also nothing but feeding of energy to plants. Certain crops have positive energy balance and certain crops have negative energy balance. Sustainable food production will require keeping this issue in mind that such crops should be preferred which have positive energy balance. A recent initiative of Indian Government to promote the plantations of Jatropha saplings under National Rural Employment Guarantee Scheme (NREGS) is a welcome step.

Land holdings

In India the average farm size in Bihar and Orissa is about 0.70 ha, whereas it is 1.25 ha in Punjab and 1.41 ha in Haryana. Furthermore, there is an inverse relationship between the poverty rate and the size of land holdings [14]. The overall average holding is under 2.0 ha, often fragmented by legal and family disputes. The main crops grown on these farms are rice, bajra, jowar, and maize followed by ragi and small millets. Alternative crops include groundnut, sugarcane, and pulses [15]. To improve agricultural productivity and farm income, following issues must be taken up on priority basis such as- irrigation technology, primary education, social equity, market access, available land, and the use of efficient and modern farming practices. The most pressing to food security are rapid urbanization and population growth. In India most of the rural poor own small pieces of land that prevent them from transitioning to high-value agriculture crops using modern technologies.

Gender disparity

Indian women normally invest between 25 to 50 percent of the total family income, on nutrition and health of her family. The alleviation of chronic food insecurity can be tackled by empowering the women. South Asia's farming culture prohibits women from acquiring a tenure for land and thus gaining right of ownership to land. This is a key problem as more than 80 percent of agricultural land is held privately in India. Without legal ownership of land, they do not have the necessary collateral to acquire credit or social status. Ownership of land will allow women to have a greater contribution to the food security of their families by controlling crop output, availability of fodder, fuel, trees, and garden.

Urbanization and population growth

In 2008, the world reached an astonishing milestone: For the first time in history, more than half its human population, 3.3 billion people, was living in urban areas. By 2030, this is expected to swell to almost 5 billion. Most of the new urbanites will be poor. The next few decades are likely to observe an unprecedented level of urban growth in the Africa and Asia.

Rapid urbanization and population growth are important factor linked to the agricultural productivity and food security. Most of the population growth in India in the coming century will happen in dense urban areas, transforming India from a nation that lives in villages to one that lives in over-crowded metropolitans.

Due to the market diversification and shift in demand, farmers in India are also looking to market-oriented production in the hope of greater returns on land and labor. The poor farmers prefer cash crops, as the demand for most other traditional agricultural products is declining. As more farmers switch production from cereals and staple products to strictly cash crops, the availability of these products in India will decline, leading to increase in the prices. The other problem is that market-oriented production is a high-risk activity as it involves mono cropping practice. If the one crop fails for that year, the family will have no money to buy food. Even if the farmer has a good harvest, the majority of the money from the sale of crops often goes to moneylenders and intermediaries due to lack of proper market and credit mechanisms in rural areas.

The Sustainability issues for Rural Development

The distribution of population, income and energy consumption between urban areas of developed countries and rural areas of developing countries is uneven. The urban population of developed countries comprises 14% of the world's population, but uses 58% of the commercial energy. In contrast, rural areas of developing countries have 47% of the world's population with only 10% of the world's commercial energy consumption. Extremely rapid economic growth has been accompanied by environmental destruction, depletion of resources that are otherwise renewable, and loss of habitats of endemic species. Rapid urbanization and unequal development in rural areas encourage immigration, add stress to existing physical and social infrastructures, and compound the environmental problems [16].

Energy consumption in rural and urban sector

Average per capita household energy requirements are 20% less in rural areas as compared to urban areas [17]. India's average energy consumption is almost 20% of world's average energy consumption per person per year. It is obvious that significant increase in energy requirements is expected to meet the improved standard of living of increasing population of India [18].

India is facing electricity shortage of the order of 50% of the demand. Indian electricity supply system is badly affected by extra-ordinarily high transmission losses and most of that is due to theft or illegal tapping of the same. In present scenario most of the state electricity boards in India are incurring heavy financial losses and the fact more the power is generated more are the financial losses. High transmission losses including thefts indicate inefficient usage of available energy. A crude estimate suggest that an efficient energy system may result in energy saving of the order of 20% that in turn can meet extra 20% demand or in meeting the energy demand for sustaining 7-8% GDP growth rate.

Despite a recent drop in economic growth rate, India's energy demand continues to increase. Energy demand in the transport sector is increasing almost 15% annually due to high growth of demand of vehicles due to high economic growth rate resulting in growing income levels fueling the demand. India is fifth largest CO_2 emitting country in the world and deteriorating urban environment of larger cities is a very serious issue of concern with regard to a sustainable ecosystem.

Indian rural credit system

Strengthening agriculture is critical for facing the challenges of rural poverty, food insecurity, unemployment and sustainability of natural resources. Agricultural development strategy must address not only farmers but also those in marketing, trade, processing, and agri-business. In this context, efficient marketing and rural credit systems assume added importance. It is assumed that due to poor handling at the farm gate or village level, about 7% of grains, 30% of fruits and vegetables and 10% of seed species are lost before reaching the market. The rural credit system assumes importance because most Indian rural families have inadequate savings to finance farming and other economic activities. This results in forcing the farmers to sell their produce on prevailing prices or sometimes even lower than the market prices in order to realize the much-needed cash to repay the money borrowed from local money-lenders at very rate of interest. Looking at the scenario there is a need to focus on small/marginal farmers for meeting their credit requirements through institutional financing, marginalizing the role of money-lenders. Banks should take the help of micro-financers and local formal institutions in their credit extending system with a low lending rate with efficient use of prevailing credit pattern.

Low Level of literacy

Prevailing low level of literacy in India and particularly in certain states is a major cause of concern in achieving the desired level of development, health and participatioon in the growth process. Iliteracy acts as a catalyst in spreading the poverty, unhygenic conditions resulting in numerous health related problems. As per UNESCO, literacy in India is an indispensable means for effective social and economic participation, contributing to human development and poverty reduction. The right to education is also a fundamental human right and it has been aimed to provide education for all by 2015 [19]. India is one of the countries (along with the Arab states and sub-Saharan Africa) where the literacy levels are still below the threshold level of 75% but gigantic efforts are on to achieve that level, efforts which have been relatively successful after India's literacy rate grew from 42% in 1981 to 66% in 2001.

Literate India – a recast literacy programme under the National Literacy Mission Authority – is likely to be launched in the year 2009 in 365 districts across the country with a special focus on educating women and improving India's female literacy level. The mission will be launched in those districts where female literacy levels are below 50 per cent. There will be a structural change in implementation as the new scheme will be run with the help of with the help of Panchayati Raj institutions. The present aim is to bring the country's literacy level to 80 per cent by 2017 [20].

Shifting to New Rural Energy Regime

Development and utilisation of alternative renewable energy may be in India’s long-term economic and environmental interest for its overall sustainable development. Developing renewable energy alternatives can help India’s rural development without further depleting its limited natural resources or harming the environment. New and renewable energy development in rural areas, especially conversion to high quality and clean energy, would strengthen the local economy,

stimulate economic growth, create new jobs and harmonize rural economic growth and ecological systems.

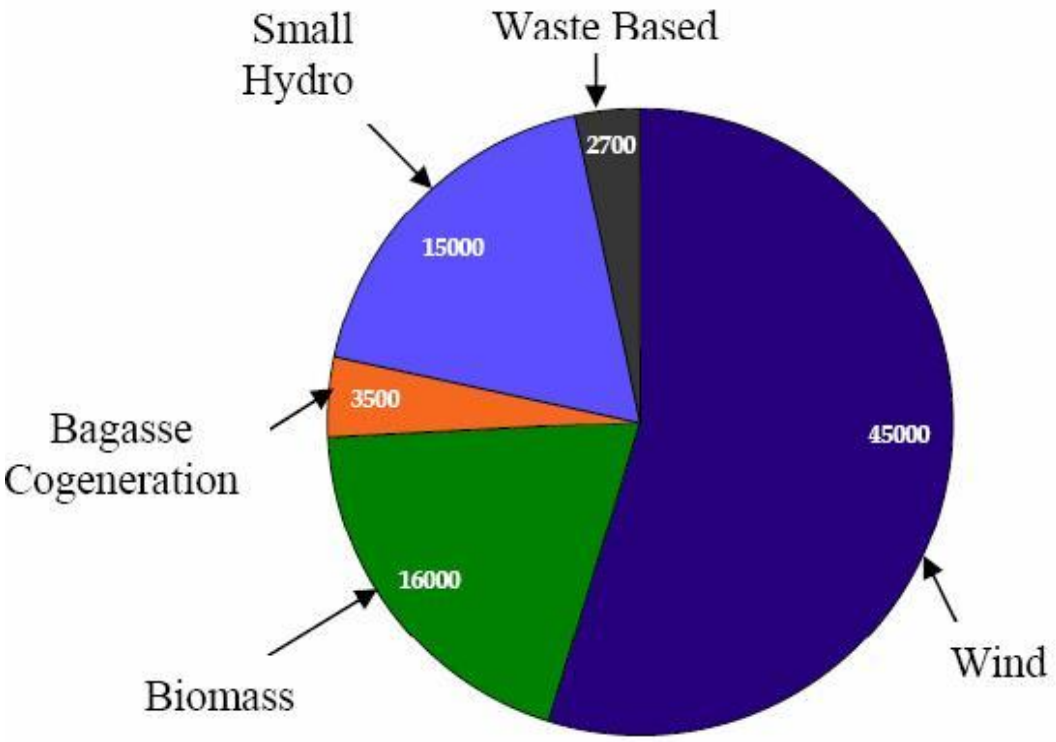

Figure 4: India's Technical Potential of Renewable Power in MW [21]

Figure 4 shows the technical installable capacity of renewable energy in India. The Figure 5 shows total renewable energy installed in India as on 31st March 2009 [21]. Data clearly indicates that there is huge potential for renewable energy in India. For renewable energy in India to give the required sustainability for meeting the Indian energy needs.

Biofuels have great potential in remote areas with a non-uniform topography where it is uneconomical to build power plants or to transport fuels. Biofuel production in India will undoubtedly influence the current conditions of gender disparity and contribute to the factors caused by urbanization and population growth.

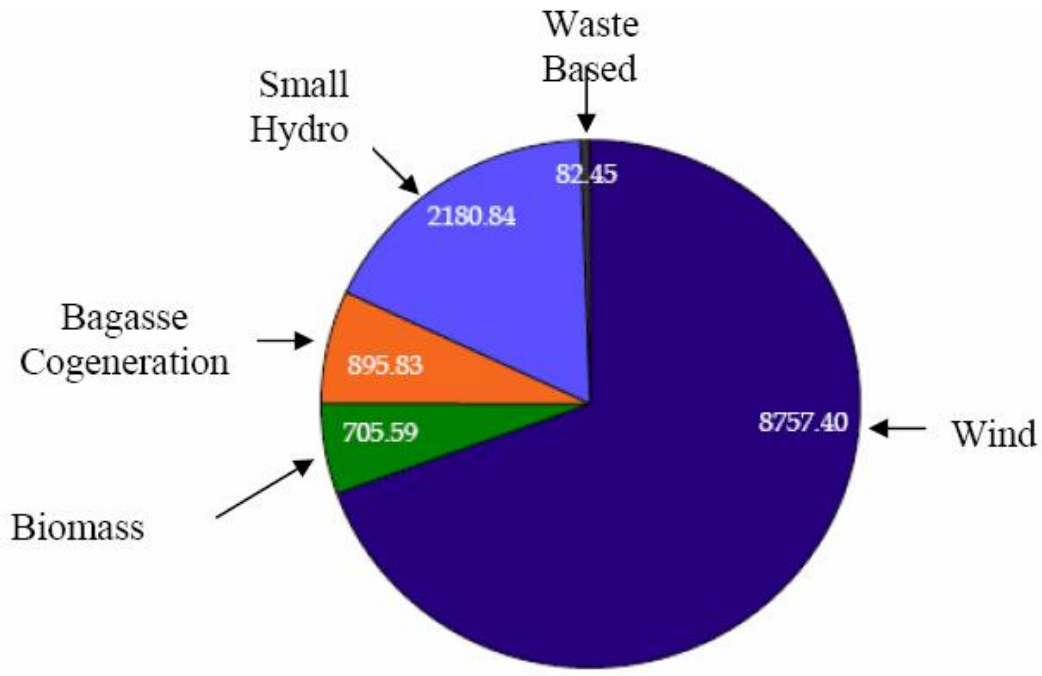

Figure 5: India's Installed Capacity of Renewable Power in MW as on March 31, 2008 [21]

In Brazil, sugarcane production for biofuels has created numerous unskilled jobs in rural areas. Furthermore, most of the production of biofuels has been handed to small farmers who now produce 30 percent of all the sugarcane designated for biofuels [22]. With such widespread availability of jobs, men would not be forced to migrate to urban areas in search of jobs. By removing a primary impetus for rural exodus and rapid urbanization, the rate of urbanization in India could be decelerated to a certain extent. Furthermore, rural jobs could earn a supplementary income for rural families. Such income could buffer against lean months or provide security from market-oriented mono cropping practices.

Conclusions

Sustainability of the desired growth rate for becoming a developed nation from a developing nation is an ultimate goal to look for. The above discussion draws the attention towards the fragile status of Indian economy where basic issues such as: scarcity of energy, food scarcity, low level of literacy, gender disparity associated with poverty looms large and acts as hindrance in becoming a developed nation. A sustainable development approach requires such a policy, which can address these identified issues in a sustainable manner preserving our ecosystem and giving an environment, which provides equal opportunity of growth for all concerned.

Food security is among the most important issue needing proper attention from policy makers of India. Proper care is necessary to ensure ample availability of food grains at an affordable price to all people.

Currently majority of rural poor people are deprived of energy. These people have to rely on biomass, or biodegradable waste products such as wood and dung, for meeting out the daily energy needs. Development of biofuel can prove to be supplementary income source for rural people including woman. Involvement of

woman in providing as well controlling the finances will help in eradicating social evils like Gender disparity.

In India the greatest impediment to development is positive rate of urbanization and population growth. These issues can make urban infrastructure unsustainable.

One of the most important aspects is ensuring rural development in order to reduce urban rural divide and avoiding unnecessary burden on urban infrastructure to meet the demand of rural people also.

It has been shown that availability of energy has certain correlation with the pace of development. There is serious shortfall of energy in India to meet the increasing demands of people as well as Industries. More importantly energy security issue should be addressed seriously by the policy makers in India to avoid prevailing illegal practices of power theft etc.

Proper credit mechanism needs to be developed to help small farmers to cultivate and sell crop profitably.

Literacy improvement should be a most important agenda in order to provide quality education to our people. As evident from success in IT sector India stands second to none in the world as far intelligence and hard work is concerned.

Last but not the least localized development and utilisation of renewable energy resources can prove to be boon for India. Problems like transmission losses and power thefts can be minimized by involvement of people themselves as a part of energy generation system.

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