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A Study on Importance of Sustainability in Human Development Index (HDI)

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Abstract— Economic growth and development being familiar terms yet describes far different phenomenon. Economic growth refers to an increase in the total output or Gross Domestic Product (GDP), whereas, economic development signifies an increase in the quality of citizens life i.e. socio- economic development. According to IMF India's Real GDP rate is 7.3% but still it ranks at 130 in Human Development Index (HDI) among 189 countries. This is because growth only sees the total GDP while development sees at human welfare. Sustainability in an economy can be measured using aggregate or specific indicators (per capita CO2, per capita fresh water withdrawals, percentage of extinct species over total and percentage of land with permanent crops), and then can be combined with HDI. Another alternative that exist are replacing GDP in HDI, pollution sensitive HDI or Environment sensitive HDI. Furthermore, these measures can be an efficient tool to calculate the amount of sustainability in a nation and hence formation of SDG's and policies like NITI Aayog, can be initiated in all the countries across the world for a sustainable world. HDI shall not be just a rank to be achieved by every country in the hunger of appreciation and power but also a effective way to analyze ones natural reserve and the rate at which sustainability is being conducted in that nation, so that it can work to improve its sustainable policies in order for a better human being welfare without ignoring environment.

Keywords- HDI, Sustainability, SDGs, COP24.

I. INTRODUCTION

1.1 Human Development Index

Human Development Index is one of the means to determine a countries economic development and comparison throughout the world's development. It is used to define the current status of the human welfare in a country. First HDI report was published in the year 1990 by United Nations Development Programme (UNDP), ever since then a yearly report is published for analyses of 189 countries growth in terms of human well-being. Human Development has been outlined as "widening people choices and improvement within the quality of life". To measure HDI three parameters are considered.

a) Life expectancy @birth(year)
b) Per capita gross national income
c) Literacy rate.

Following are the formulas used by UNDP to calculate current HDI of any country.

1. **Life Expectancy Index**, (LEI) = (LE-20)/(80-20)

   Where, LEI is 1 when Life expectancy at birth is 85 and 0 when Life expectancy at birth is 20.
   LE: Life expectancy at birth

2. **Education Index**, (EI) = (MYSI+EYSI)/2

   Where, Mean Year of Schooling Index, (MYSI) = MYS/2

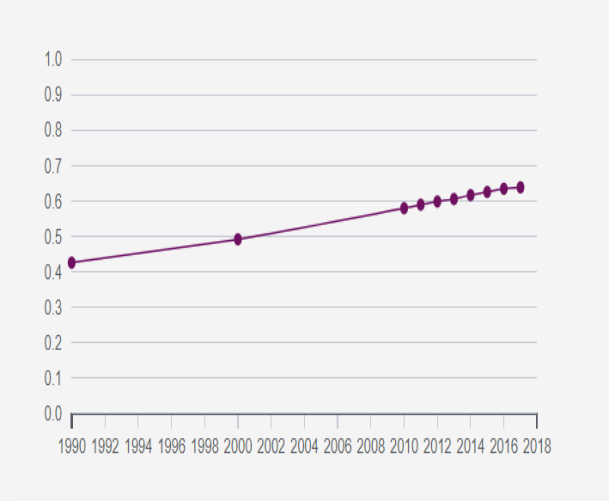
MYS: Mean years of schooling (i.e. years that a person aged 25 or older has spent in formal education)
Expected Year of Schooling Index, (EYSI) = EYS/2
EYS: Expected years of schooling (i.e. total expected years of schooling for children under 18 years of age)

3. **Income Index**,

(II) = ln(GNIpc)-ln(100)/ln(7500)-ln(100)

Where, II is 1 when GNI per capita is $75,000 and 0 when GNI per capita is $100.
GNIpc: Gross national income at purchasing power parity per capita

Thus, HDI can be calculated using the formula,
HDI = $\sqrt[3]{}$LEI.EI.II



Source: undp.org
Figure 2. HDI Trends 1990-2017

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The HDI sets a minimum and a maximum value for each dimension and then shows where each country stands in relation to these values, expressed as a number between 0 and 1. The higher a country's HDI score, the upper its level of human development (and vice versa).
An index of human development, however, measures the progress of an entire society. But progress may occur with continual improvements in the lives of those already enjoying high levels of human development, while neglecting the lives of those actually needing improvement which means ***richer are getting more richer and poorer are getting poorer*** thus creating a large gap between them.
Therefore, to measure human development more comprehensively, the Human Development Report presents four other composite indices. The Inequality-adjusted HDI discounts the in line with extent of difference. The Gender Development Index compares HDI values (male and female). The Gender Inequality Index highlights women's empowerment. And the Multidimensional Poverty Index measures no income dimensions of poverty.

1.2 India's HDI Current Scenario

India is having diverse states which have different cultures, ethics, caste etc. India ranks 130 in HDI among 189 countries. And if we look within India of various states of HDI then we will know that in our country some states are better while some are extremely poverty stricken.
In this Kerala ranks no.1 state in achieving highest HDI followed by Chandigarh, Goa, Lakshadweep and Delhi. While bottom five are Bihar, Uttar Pradesh, Jharkhand, Madhya Pradesh and Odisha. The main reason behind some states be in bottom is because of poverty and illiteracy.
But if we talk about the sustainability and the SDGs and COP24 India is considered as one of the top five emitters of carbon and its emissions grew at estimated 6.3% in 2018.

1.3 Changes in HDI Ranking Due To Other Reasons

Progress since 1990 has not always been steady. Some countries suffered turnaround due to conflicts, epidemics or economic catastrophe. Example, Sub-Saharan Africa had losses in the 1990s, when conflict and the HIV/AIDS epidemic caused life expectancy to drop. Between 2012 and 2017 Libya, the Syrian Arab Republic and Yemen had falling HDI values and ranks due to the direct effect of violent conflict over there.

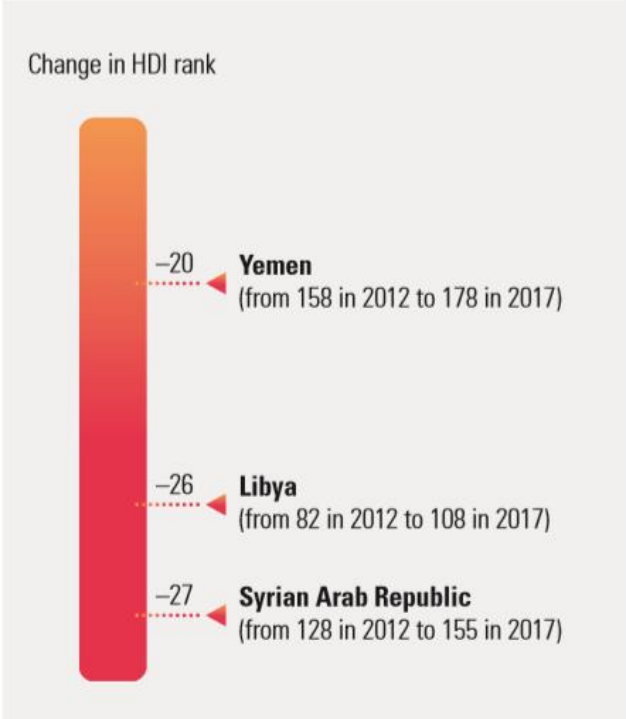

Figure 3. Change in Human Development Index rank in conflict-affected countries, 2012–2017
Source: Human Development indices and indicators, 2018 statistical update

II. CONCEPT OF SUSTAINABILITY

2.1 What is Sustainability?

Sustainability is that method of maintaining change in a balanced fashion, in which the exploitation of resources, the direction of investments, the orientation of technological development and institutional change are all in harmony and enhance each current and future potential to meet human desires and aspirations. Hence, now it's been a very inevitable situation which the countries need to know and address to it. To maintain a balance and keep the environment also safe and sound, sustainability is the goal.

2.2 Attributes of Sustainability

According to Nobel Laureate Robert Solow's work, two concept of sustainability are introduced in environmental economics, Weak and Strong Sustainability,
Weak sustainability has been defined using ideas like human capital and natural capital. It is basically an idea in which Natural capital can be substituted by Human capital. While weak sustainability focuses on maintaining a combined stock of produced, natural, human and social capital intact, strong sustainability deals with specific environmental functions that ought not to be undermined by economic activity and possible ecological limits to growth (Nourry, 2008).This implements a positive effect on the various aspects of sustainability except environmental.
Strong Sustainability on the other hand held the idea that Human capital and Natural capital can be complementary but is essentially non-substitutable to produced, human and social capitals, i.e. Natural capital cannot be replaced by Human capitals and are critical.

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2.3 Importance of Sustainability in Human Development

HDI measures at Health, Wealth and Education and as every country is craving to achieve a high rank in HDI so as to represent themselves as a developing nation amongst the super powers of the worlds. HDI has become a trademark to signify a countries position in the race of achieving tag of developed country Therefore, in the goal of improving HDI, countries forget about the effectively and efficiently using of resources and it's need in the future. Very high human development countries are the biggest contributors to climate change, with average carbon dioxide emissions per capita of 10.7 tons, compared with 0.3 tons in low human development countries. Qatar had the highest carbon dioxide emissions per capita in 2014, releasing more than 45 tons per person, while Uruguay, also a very high human development country, released only 2 tons per person. Countries with lower levels of human development, especially small island developing states, generally have the lowest emissions but are often the most vulnerable to climate change.

HDI did tells us that which country's human development is good, which one's better and which one's poor. It's tells us that which country hold which rank in the race of human development. But what it is not able to tells us is that while having a good human development or say while having a good life expectancy rate definitely does it means that that country's persons has lived his life happily not stressed or with any disease. As developed countries want to be in top 5 rank of HDI and developing nations wants to get developed and improve their HDI rank they all just neglects the fact that they are either over utilizing the resources or underutilizing it. And due to this greed need to improve HDI all countries are polluting the earth and which has led to emerging of many human problems or illness, scarcity of resources for using of present as well as future generation and etc. HDI just tells the outcome but not the impact of degraded environment on the human health, natural resources and what all loss it has done to the country therefore there is need of including sustainability while calculating HDI.

Facts: - *1) Linked to climate change and biodiversity loss, deforestation also degrades land and reduces the quantity and quality of freshwater. The overall pace of forest loss has slowed in recent years, however the earth still lost 3.2 percent of its forests between 1990 and 2015. And low human development countries, several of them reservoirs of global biodiversity, lost 14.5 percent.*
2) Freshwater withdrawals stand at 7.2 percent of the global supply, with vast differences across countries and regions. In South Asia annual withdrawals stand at 23.8 percent of total renewable contributes. Unsustainable water withdrawals and inadequate treatment of waste contaminate drinking water, with cascading impacts on health, employment and gender inequality.

Climate change is not the only one development concern, there are still many other issues which need to be addressed speedily for the betterment of human welfare. The other issues include degradation of the environment and atmosphere, which significantly declines in biodiversity, declining of food and water supplies to losses of livelihood and to losses of life from extreme weather events. This extremely serious crisis threatens the human development of current and future generations.

To achieve this sustainability goal Sustainable Development Goals (SDGs) have been introduced. The Sustainable Development Goals (SDGs), otherwise referred to as the Global Goals, are a universal decision to action to terminate poverty, protect the planet and make sure that all people relish peace and prosperity.

These were born at the United Nations Conference on Sustainable Development in Rio de Janeiro in 2012. The objective was to make a type of universal goals that meet the imperative environmental, political and economic challenges facing our world.

The SDGs merged with another historic agreement reached in 2015 at the COP21 Paris Climate Conference. And recently COP24 was held and these agreements provide a set of common standards and achievable targets to reduce carbon emissions, manage the risks of climate change and natural disasters, and to erect back higher after a crisis.

UNDP helps the UN to achieve those 17 SDGs goals. These goals are:

1) No Poverty
2) Zero Hunger
3) Good Health and Well Being
4) Quality Education
5) Gender Equality
6) Clean Water and Sanitation
7) Affordable and Clean Energy
8) Decent Work and Economic Growth
9) Industry, Innovation and Infrastructure
10) Required Inequalities
11) Sustainable Cities and Communities
12) Responsible Consumption and Production
13) Climate Action
14) Life Below Water
15) Life on Land
16) Peace, Justice and Strong Institutions
17) Partnerships for the Goals.

III. AGGREGATE MEASURES OF SUSTAINABILITY

Number of methods to measure sustainability of a country have been developed ever since the introduction of the "sustainability", these are grouped basically within the category of weak and strong sustainability. Some of the aggregate measures are discussed for understanding the methods to define sustainability.

3.1 Weak Sustainability Framework

3.1.1 Green National Accounting: This system is performed under System of Environmental-Economic Accounts (SEEA), it is used to adjust well-implemented measures like gross domestic product that ignores the

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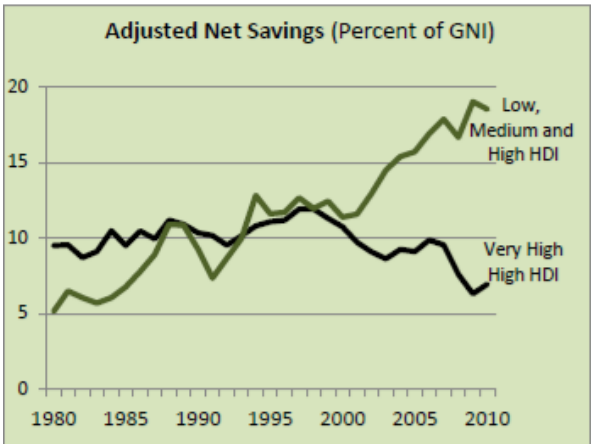
environment. It attempts to factor environmental cost into financial results of operations like GDP. It incorporates savings for environmental degradation and resource depletion. It is a disputable practice however, since depletion may be already factored into accounting for the extraction industries and the accounting for externalities may be arbitrary. Depletion isn't the total of environmental accounting however, with pollution being but one factor of business that is almost never accounted for specifically.

3.1.2 Adjusted Net Savings : It is a worlds banks used concept, also known as Genuine Savings, in which the depletion of energy, minerals and forests as well as for damage from carbon dioxide emissions and pollution is subtracted from the rate of savings, adds education spending's. The ANS shows the representation of the actual rate of savings of a countries economy with taking into consideration the way of economy investment and consumption of all its assets including human, natural and man-made, hence aiming for measuring the changes in present and future well-being. GS shows the capital or wealth of a nation. The consumption possible in the future can be described using this measure. If decrease or less GS means less wealth which means less resources for the future generation and vice versa. It shows country's strong sustainability or weak sustainability.

Method to calculate GS:-
Gross domestic saving = gross domestic investment - net foreign borrowing + official transfers
Then one subtracts the net depreciation of the country's manufactured capital stock in
Order to arrive at net saving:
Net saving = gross saving - depreciation of manufactured capital
Finally, net depreciation of a country's natural capital stock is subtracted to arrive at
'Genuine saving':
Genuine saving = net saving depreciation of natural capita



Source: MPRA Paper No. 42636, posted 15 November 2012 15:23 UTC
Figure 4. Aggregate measures of sustainability Adjusted net savings

In the above figure, the Adjusted Net Savings is positive for all the countries which implies a weak sustainability. However, for low medium and high HDI countries sustainability is improving on the other hand for Very high HDI countries its declining.
However, this measure has suffered numerous critics like Neumayer (2004, 2010, 2011),and Dasgupta (2007), as they objected that human capital investment is being described overestimated and inadequate because human capital is lost when an individual dies and health is not taken under consideration in the calculus in this measure.

3.1.3 Measure introduced by El Serafy (1981), is an alternative of ANS suggested by many authors to calculate the natural resource rents. It focuses on the countries natural reserves, so that a given extraction volume has different implications for sustainability depending on the total stock available. When valuing the natural resources that are exhaustible it includes future capital gains. For example, the economy can be overestimated when the natural resources are valued at market price as the resources is getting depleted and expensive.

But critics were also faced by this method, as it leads to overestimation of welfare or high ANS due to artificial low value asset therefore to low values for the depletion of the assets.

3.2 Strong Sustainability Framework

3.2.1 Ecological Footprint (EFP) : The **Ecological Footprint** measures the ecological assets that a given population requires to produce the natural resources it consumes (including plant-based food and fiber products, livestock and fish products, timber and different forest products, space for urban infrastructure) and to soak up its waste, particularly carbon emissions. The Ecological Footprint concept provides an intuitive framework for understanding the ecological bottom-line

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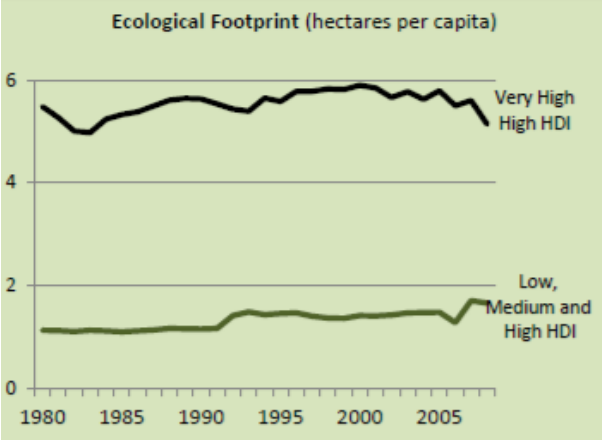
of sustainability. It is an indicator expressing the ecological impact of human activities in terms of (hypothetically) required land areas to sustain these activities.



Source: MPRA Paper No. 42636, posted 15 November 2012 15:23 UTC

Figure 5. Aggregate measures of ecological footprint

Here the above figures shows that the world is increasingly exceeding its global capacity to provide resources and to absorb wastes. Given the calculations given within the 2011 HDR, if everyone in the world had the same consumption level as people in very high HDI countries, with the current technologies, we would need more than three Earths to resist the pressure on the environment. Also the situation is worsening in the very high HDI countries.

Many authors objected and criticized this method like Van den Berth and Verbruggen (1999), argue that the conversion of consumption categories into land area is incomplete and that it uses a set of weights which do not necessarily correspond to social weights because they do not reflect scarcity changes.[1] Other critic suffered was that this method includes use of hypothetical land which results in a serious danger of misinterpretation of real land within public as well as academic researchers. Also it is unable to distinguish between sustainable and unsustainable use of land. To calculate the extent of unsustainability in an economy one must focus on unsustainable resources rather than just hypothetical land measure. Thus indicators need to reflect both the quality and the quantity of renewable resource use.

3.2.2 Environmental Performance Index: The EPI measures environmental performance using a set of policy targets, which are based on international treaties and agreements, standard developed by international organizations and national governments, the scientific literature and expert opinion. This composite index uses 25 indicators to establish how close countries are to established environmental policy goals — a useful policy tool, built from a rich set of indicators and providing a broad definition of sustainability.[3] One of the limitations of this method is its data intensity i.e. 25 indicators for 160 countries, also some of its data is modeled.

IV. INCORPORATING SUSTAINABILITY IN HDI

UNDP's Human Development Index is one of the most crucial tool to analyses the well- being of a nation, but as discussed above it needs to include sustainability as one of the dimensions so to come up with an actual human well-being stats. Therefore following are the alternative methods to incorporate sustainability in HDI:

- As proposed by Shreyasi Jha (2009), a modification in the income dimension of the HDI can be held to include natural capital. This can be done either by the three ways

  -by replacing GDP with Net National Production as NNP has featured prominently as a measure in environmental economics such as within models accounting for the depletion of natural and environmental resources or as an indicator of sustainability.
  -Using World Bank's Total Wealth indicator, "A country's comprehensive wealth includes all produced capital such as factories and roads; natural capital like forests and water; human capital, which leads to earnings; and net foreign assets. Only by having a unambiguous understanding of our world's wealth—including all types of capital—can we ploy for a more sustainable future." The Changing Wealth of World, World Bank.
  -Replacing GDP with Green net national product allocating the omitted environmental features
- De la Vega and Urrutia (2001), proposed that an additional environmental factor (pollution-sensitive human development index) should be developed that measure in terms of CO2 emissions from industrial processes per capita with the optimum measurement of human development. An environmental cost will apply an adverse effect on the income component of HDI.
- An Environmental sensitive HDI is proposed by Morse (2003), in which HDI is added with an environment indicator. Here is the average of an indicator of the environmental state of country and an indicator of the environmental evaluation of human activities. Here the basic HDI remains unmodified.
- Constantini (2005) proposes to calculate a combine Sustainable Human Development Index as the simple average of the four development components: education attainment, social stability, sustainable access to resources (Green Net National Product), and environmental quality.[2]

Thus above are some of the alternatives suggested by various authors in order to involve sustainability in HDI for a better understanding of the Human welfare in all the countries across the world?

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V. INDIA'S ROLE IN SUSTAINABILITY AND IMPROVING HDI

India as being one of the major developing country in the world requires to present a huge course of action in terms of sustainability in front of other great powers of the world to maintain its status as the top developing nation. Therefore it is required for India to achieve its 17 Sustainability Development Goals (SDG) determined by the United Nations India.

NITI Aayog (National Institution for Transforming India), Government of India has been established which is mandated to monitor, coordinate and ensure implementation of the Sustainable Development Goals. NITI Aayog undertook the extensive exercise of measuring India and its States' progress towards the SDGs for 2030.The task at hand for NITI Aayog is not merely to periodically collect information on SDGs however to act proactively fructify the goals and targets not solely on quantity but also maintaining high standards of quality. Ministry of Statistics and Programme Implementation (MoSPI) has already undertaken a parallel exercise of interaction with the ministries to evolve indicators reflecting the SDG goals and targets.

With these new initiatives taken by the Indian government there have been a huge impact and awareness amongst the citizens about health, education and sustainable development. Therefore hoping to create a positive change in the HDI ranking of India with sustainability.

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