Managed Sustainable Development: Classification Of Resources And Goods & Services, Calculating Sustainable Growth Rate And The Sustainable Development Index

Shubham Saxena

Abstract: Macro-level manmade problems can often be best solved by understanding and manipulating the economics behind it. The world today is facing genuine problems of scarcity of resources and environmental & ecological issues in view of intergenerational equity. The paper proposes a new approach of identification and classification of (i) Resources and (ii) Goods and services in the context of sustainable development. Every economy has ambitious economic growth aspirations which are often found conflicting with the commitments on natural resource conservation and climate change obligations. The proposed methodology is a reconciliation of the aspired economic growth of a region and the conservation of the resources and nature. The paper employs contribution of different types of goods and services in the gross domestic product (GDP) of a region to analyze sustainability of development. The important parameters that the paper establishes are Sustainability Ratio (R), Sustainable Growth Rate (SG) and the Sustainable Development Index (SI). These parameters can be used to compare the sustainable development level of different regions. Ensuring natural resource and environmental sustainability will eventually ensure economic sustainability. The paper considers resource depletion concerns as well as the environmental pollutants, biological risks, carbon footprint, warhead proliferation et cetera, thereby ensuring all round sustainability from survival to economic end. The sustainability analysis is done for long periods such as 50 years, 100 years et cetera. The index shows how sustainable the development of an economy is and how sustainability it is growing. The presently much revered GDP growth numbers are directionless, it does not tell the type of growth an economy essentially has. The direction should be sustainability, which the paper stresses upon. An illustration of sustainability analysis of India is also done. Such indices can help identifying sustainably developing economies and could help attracting green investments. If these indices are given priority globally then it can shore up positive sentiments in the green economies. **JEL Codes**: C43, C54, I15, O44, Q32, Q01

Index Terms: Managed Sustainable Development, Disquiet resources, Quieten resources, From Thin Air goods and services (FTA), Disquiet goods and services (DQ), Sustainability Ratio (R), Sustainable Growth Rate (SG), Sustainable Development Index (SI), Classification, GDP, Climate Change, Green Investment

1 Introduction

IT has been around 250 years since the industrial revolution, this era has been witnessing unprecedented growth in the consumption levels of natural resources and disquieting damage to the ecology and environment, touching new heights in almost every following decade. The ambitious economic development aspirations of the global economies and continuous efforts of raising the standard of living essentially by utilitarianism approach is an unstoppable reality. The consequential depletion of resources and substantial harm to the environment is resulting in a growing disturbance in the ecological balance and hence put forth a profound question over the sufficient availability of resources and a healthy nature for our future generation— intergenerational equity. These 250 years were rapid in the sense that the human-induced disturbance outpaced the natural time required by the nature to adjust and stabilize herself. Sustainability issue has now become a hot issue, becoming as vital as the economic development ambitions of the nations. Both these issues are ultimately interdependent but often found clashing and therefore, countries should make long-term plans to optimize and balance the aspired long-term economic growth and the environmental sustainability.

Ensuring environmental sustainability will eventually ensure economic sustainability. Not caring enough for the climate change and unwise resource utilization management is very likely to compromise future growth prospects in a longer run. Climate change is likely to harm developing economies that generate major portion of their GDP from climate sensitive sectors [1]. Today, we see the countries thriving hard to maintain high positive growth rates, positive outlook, and attractive developmental figures but this kind of race for development is seriously lacking direction. Perhaps, the mad race for GDP numbers is making this world a dangerous place. The direction of development should be sustainability. The list of once-obscure metals and minerals that are becoming "strategic" seems to be growing daily. The sustainability, at best, can be studied under market-based approach because market functioning is the underlying mechanism that reflects and guides the consumer behavior and hence the consumption patterns. These issues can be effectively addressed by manipulating the behavioral economics behind it by using incentive-disincentive policy tools. The need of establishing such indices is that with a relative index, we can rank countries, and countries can set real targets, this eventually compels countries to compete to improve their rankings. Such indices can help identifying sustainably developing economies and could help attracting green investments. If these indices are given priority globally then it can shore up positive sentiments in the green economies.

- *Shubham Saxena is a graduate from IIT ISM Dhanbad*
- *+91-8826153629 E-mail: shubhamsaxena329@gmail.com*

2 IDENTIFICATION OF VULNERABLE AND THREATENING RESOURCES

Our first approach is to identify resources which are vulnerable to depletion and threatening to environment and ecology. It would include the resources which are vulnerable to depletion mainly due to their high rate of consumption levels and/or low availability. The threatening elements are essentially the resources which are undesirable for the sustainability of environment and ecology in the developmental process. It can be the pollutants causing climate change or resources posing danger to the health of the ecology including that of the humans et cetera. But, as a matter of fact, almost every resource poses some degree of danger. However, here, we are concerned only with the resources which pose serious threats in the given time period of the analysis. We are using the term “resource” to refer primarily the basic components such as raw materials or primary commodities which are further used to produce complex goods and services. Some examples of resources are coal, uranium, wood, graphite, crude oil, chemicals, lithium et cetera. Different resources can have a different life expectancy that is the availability in nature for utilization and different degree of adverse impact on the ecology. This identification process is not rigid, the sole purpose of this identification and the subsequent classification of resources is to get a better idea for classification of goods and services. The scheme for analyzing sustainable development in our following discussion is shown in figure 1.

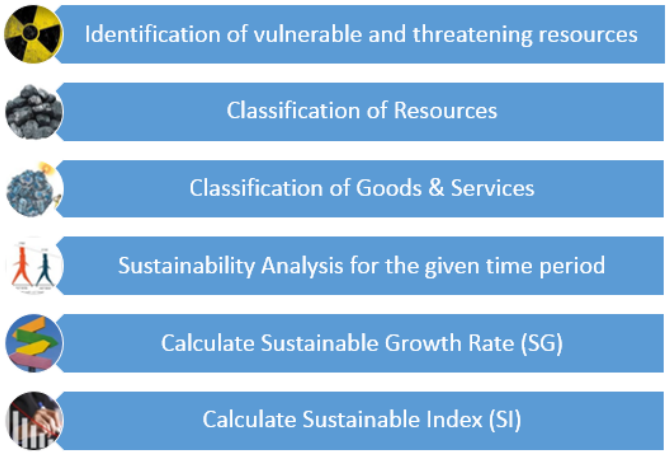

Figure 1: *Scheme for sustainable development analysis.*

2.1 Projected lifecycle function of a resource

The projection of lifecycle of a resource is an approach that can be used for identification of vulnerable resources. This approach is useful to identify the vulnerable resource during the given time frame of sustainability analysis. The projected lifecycle of a resource can be visualized in three ways – (i) the *projected consumption rate* of a resource in the economy with time, (ii) the remaining amount (amount available for future exploitation) and (iii) cumulative harmful impact on environment and ecology— degree of adversity. The projection (extrapolation) can be done using the historical data of consumption rates, and the leftover amount of the resource. With the assumption that the present trend continues indefinitely, we try to analyze the future situation and its impact on the economy and ecology over time. The projection or the extrapolation should be done in the way which seems more legitimate for a resource. For instance, some resources can be better projected with last five year of historical data while some other can be inferred using last 50 years of data. It also depends on the quality of the data available for different resources. Here we don't need to know the exact function of the life cycle of a resource. We are only interested in finding the type of the function. More precisely, we aim to find if the consumption or the availability function of the resource is critically diverging over the given period of time which might make it scarce in future. The remaining amount and consumption function lifecycle of resource can roughly be linear, steep-linear, parabolic, exponential, haphazard et cetera.

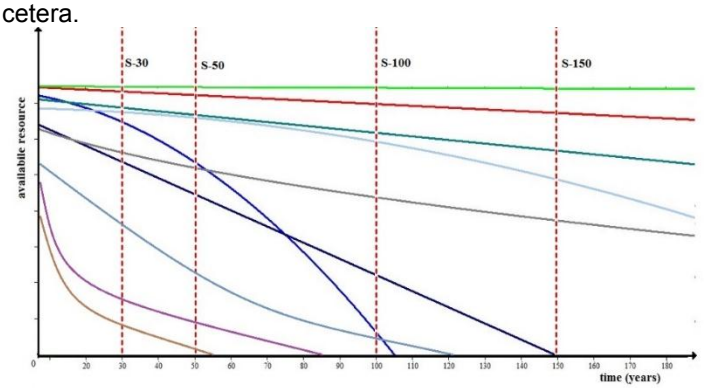

Figure 2: *availability of resources vs time; Sustainability analysis: Different lines represents different resources. The trajectory of each resource shows its availability over time. The critical resources are identified by their availability for a given time period of sustainability analysis. The figure marks S-30, S-50, S-100 and S-200 period of sustainability analysis.*

Figure (2) shows various possible projections of availability of different resources with the given sustainable time period analysis. Here, S-30 means analysing sustainability for 30 years. Similarly, we can have a long period of analysis like S-50, S-100, S-150, S-200 et cetera. While estimating the sustainability of a resource for a given time period we can infer the criticality of that resource after comparing it with the availability of the resource and trend of consumption-production of the resource in recent history. A resource with a very high consumption rate say with an upward parabolic consumption projection while its availability is limited might make it scarce quickly in a recent future if the present trend continues in future. Also, it is possible that a resource may tend to become scarce in upcoming 100 years but it may not become scarce in 30 years. For instance, a recent study shows that graphite will become vulnerable in next few decades due to its increasing consumption and decreasing availability, thus it must be checked. Similarly, resources which are hazardous to ecology to a concerning degree, which can be inferred from various studies, needs to be identified. Some resources have a cumulative impact over time such as increasing level of greenhouse gases, pollution from burning of fossil fuels, accumulation of non-biodegradable, electronic wastes et cetera. The life cycle functions which are usually parabolic, exponential, very steep or alike are more likely to become scarce and hence are disquiet as their availability for future erodes very quickly. We need to identify such vulnerable resources and check their rapid consumption which is threatening its sustainability. This can be done by checking the goods and services which employ these resources. Therefore, at first, we have to classify the resources and then use it

further to classify the goods and services.

2.2 Classification of Resource and Goods and Services

Our next aim is to classifying the various resources used and the goods and services produced in an economy on the basis of sustainability consideration. Informally, we can call it as classifying them as good and bad. The steps for classification of resources and goods & services is given below. We are already done with steps 1-3.

Step 1: Choose a time period (in years) for sustainability analysis. Broadly, we can have S-30, S-50, S-100, S-200 and so on (see figure 2). Here S-30 would mean analysing sustainability for 30 years.

Step 2: Identify the region that is the economy (country, state, bloc et cetera) for sustainability analysis. Quite evidently, the life function of consumption can be different for different regions. The coal consumption in the selected regions of the world is shown in figure 3. It can be observed that the consumption rate is different for different regions [2]. It will be same with respect to other resources as well.

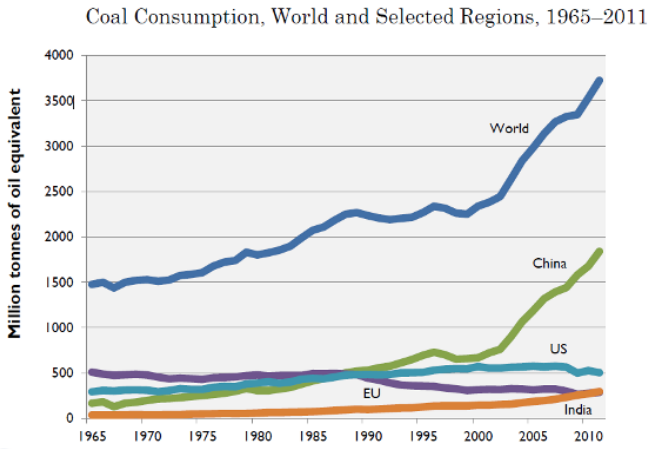

Figure 3: *Coal consumption of the world and selected regions (1965-2011)*

Step 3: Identify the projected function of the lifecycle of the resources used in the production of various goods and services with respect to the consumption, leftover availability, the degree of adverse impact on environment & ecology (main concerns are listed in part I of resource classification below). Usually the exponential, upward parabolic, linear but steep and alike functions likely to be critical. We will call such resources disquiet resources from here onwards. Other resources which are normally abundant and friendly to health and environment are called quieten resource.

Step 4: Basis of classification of resources and goods and services and terminology of the classification are as discussed as follows:-

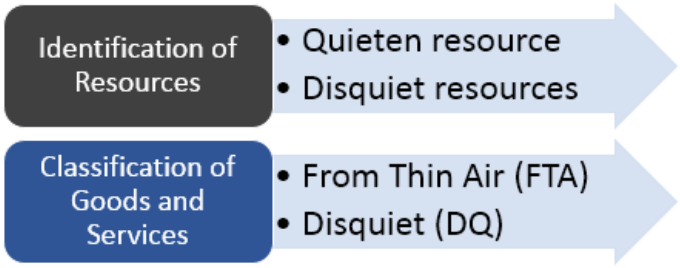

Figure 4: *Nomenclature of classification of resources and goods & services*

I. Resource classification

a. Disquiet resource: These are the generally the resources which are vulnerable to become scarce within the given time period of sustainability analysis and/or are threatening to the environment and ecology. We aim to control the consumption of such disquiet resources by controlling the goods and services employing them. Their presence and availability are worrisome, hence the name- disquiet. Disquiet resources normally are:-

(i) Precious and exhaustible limited resources
Few examples are lithium, semiconductors.

(ii) Limited and strategic resources
Few examples are certain metals which are limited and hard to recover and recycle.

(iii) Carbon footprint and greenhouse gases
Few examples are coal, petroleum, and certain chemicals (like coolants).

(iv) Other Pollutants including electronic wastes, radioactive waste, particulate matter, genetically threatening resource.
Few examples are plastics, very less or unrecyclable resources, non-biodegradables like certain polymers.

b. Quieten resource: These are the resources which are normally not a big concern with respect to the future availability and don't have an adverse impact on environment & ecology during the given time period of sustainability analysis. These are:-

(i). Environmental friendly to less polluting resources (in an admissible range)
(ii). Abundant resources (when compared to the consumption demand)
(iii). Easily and quickly replenishable resources
(iv). Sufficiently recyclable and recoverable resources
(v). Easily substitutable

Some examples are agriculture produce, biogas, gas hydrate, paper, wood, iron, renewable resources, manual labor et cetera.

II Goods and Services classification

a. Disquiet gods and services (DQ)

These are normally the goods and services which employ a significant amount of disquiet resources as compared to the value they add to the economy. The latter part of value addition is not so rigid, for example producing warheads and

exporting them might add up huge value in the GDP of a country but since they are sincerely threatening to the sustainability of environment and ecology, therefore, they should be classified as disquiet goods. Disquiet goods and services are harmful to the environment, poses danger to human lives, employs critically identified disquiet resources, have a harmful effect on health, leaves carbon footprint, thus, threatening the sustainability. We will try to keep sticking to our aim that we intend to evaluate the current pressure on the resources especially the vulnerable ones. Certain goods and services may be required to be classified as DQ goods and services even if they create huge value output for the economy. For instance, a mobile has a huge utility reflected in its cost but it employs certain precious resources and also generates electronic waste, so it is a DQ good. Warheads like missiles, nuclear bombs, television set, refrigerator, arm dealing services et cetera are some of the examples of DQ goods and services.

b. From Thin Air goods and services (FTA)

These are normally the goods and services which mainly employs quieten resources and might also sometimes employ a small amount of disquiet resources but in return, they are creating enormous value output addition in the economy. For example- banking, IT sector, teaching, tourist guide, a device consuming electricity produced from biogas and not from coal et cetera. Quite evidently most of the services are FTA in nature. They sound as if they are creating value out of the thin air, hence the name. FTA should be encouraged and the more it contributes to the GDP growth the better it is for sustainability.

Thus, we have first classified the resources on the basis of their life cycles as disquiet resources and quieten resources and then use this to classify the goods and services produced in the economy as disquiet goods and services (DQ) and From Thin Air goods and services (FTA). These good and services will be required later while calculating their contribution to Gross Domestic Product (GDP) for Sustainable Development Index (SI) calculation. The basis of classification of goods and services is the quantum of disquiet resources that a good or a service employs in view of the value created (contribution in GDP). It is always desirable to add value as much as possible from a given amount of the resource and create maximum output in the economy. We want to reconcile the economic growth aspiration of the region and the conservation of the natural resources and health of the ecology for future generation. Thus it can be said that the present hunger for economic growth is often a trade off with the future health of the ecology and the future economic development.

Step 5: Calculate Sustainable Growth Rate (SG) and the Sustainable Development Index (SI) The Sustainable Development Index (SI) is calculated for a given time period of sustainability analysis represented by ts. For instance, SI corresponding to 30 years of sustainability analysis (S-30) is represented as SI-30 and so on for SI-50, SI-100 et cetera.

3. SUSTAINABILITY ANALYSIS

The Gross Domestic Product (GDP) of a country will comprise of FTA goods and services and DQ goods and services such that,

$$\text{GDP} = \sum \mathbf{FTA} + \sum \mathbf{DQ}$$

3.1 Sustainability Ratio (R)

For sustainable development, a country should increase the share of FTA goods and services in the economy and for environmental & ecological sustainability including the preservation of vulnerable resources, the country should keep the share of DQ goods and services limited and low in the GDP of the economy. We define Sustainability Ratio, R as the ratio of the sum of all the FTA goods and services and the sum of all the DQ goods and services produced in the economy.

$$R = \frac{\sum \text{FTA}}{\sum \text{DQ}}$$

Dividing both numerator and denominator by GDP, we have Sustainability Ratio expressed as

$$R = \frac{\text{share of FTA goods and services in GDP}}{share\ of\ DQ\ goods\ and\ services\ in\ GDP}$$

The greater the sustainability ratio is, the more is the all-round sustainable development of the economy. We can obtain sustainability ratio for any year of an economy, given the data. We have assumed that current year is the 0th year. Similarly, R_{-10}, R_{-6}, R_{-3}, and R_{-1} are the sustainability ratios corresponding to years -10 years ago, six years ago, three years ago and one year ago respectively. The coordinates (t, R) for above years (t) can be represented as (0, R_0), (-1, R_{-1}), (-3, R_{-3}), (-6, R_{-6}) and (-10, R_{-10}).

3.2 Sustainable Growth Rate (SG)

We define Sustainable Growth Rate, SG as the slope of the regression (best fit) line of five points (0, R_0), (-1, R_{-1}), (-3, R_{-3}), (-6, R_{-6}) and (-10, R_{-10}) on R vs t plot. We choose these particular years so as to depict where the economy is heading with the developments in the last one decade. Evidently, we have chosen (t, R) coordinates more of the recent years as the recent developments better reflect the future projection of the economy. The best-fit line associated with the n points (t1, R_1), (t_2, R_2) to (t_n, R_n) has the form R=mt + c Where m is the slope that is the Sustainable Growth Rate and c is the intercept.

$$Slope = SG = \frac{n\sum(Rt) - (\sum R)(\sum t)}{n\sum t^2 - (\sum t)^2}$$

Therefore for (0, R_0), (-1, R_{-1}), (-3, R_{-3}), (-6, R_{-6}) and (-10, R_{-10}). We have Sustainability Growth Rate represented as

$$SG = \frac{5\sum(Rt) - (\sum R)(\sum t)}{5\sum t^2 - (\sum t)^2}$$

$$SG = \frac{5[0R_0 - R_{-1} - 3R_{-3} - 6R_{-6} - 10R_{-10}] - (R_0 + R_{-1} + R_{-3} + R_{-6} + R_{-10})(-20)}{5(0+1+9+36+100) - (-20)^2}$$

$$SG = \frac{-5[R_{-1} + 3R_{-3} + 6R_{-6} + 10R_{-10}] + 20(R_0 + R_{-1} + R_{-3} + R_{-6} + R_{-10})}{330}$$

$$\boldsymbol{SG = \frac{-[R_{-1} + 3R_{-3} + 6R_{-6} + 10R_{-10}] + 4(R_0 + R_{-1} + R_{-3} + R_{-6} + R_{-10})}{66}}$$

The Sustainable Growth Rate represents how sustainable the economy is moving in course of its development. An economy should always try to maintain positive SG which would mean that the economy is growing by increasing the contribution of FTA goods and services in the economy over time and also it

is keeping the undesirable DQ goods and services limited or low at the same time. That means the direction of growth is both economically and environmentally sustainable.

3.3 Sustainable Development Index (SI)

Now Sustainable Development Index for S-t_s (SI-t_s) is defined as the sum of product of the sustainable growth rate (SG) and sustainable time (t_s) and the current ratio of FTA goods and services to DQ goods and services (R_0),

$$SI = R_0 + SG * t_s$$

Thus,

$$\boldsymbol{SI = R_0 + \frac{-[R_{-1}+3R_{-3}+6R_{-6}+10R_{-10}]+4(R_0+R_{-1}+R_{-3}+R_{-6}+R_{-10})}{66} * t_s}$$

Sustainable Development Index comprises of two important factors- the present sustainable development position of the economy (R_0) - *inertia* and where and at what pace the economy is heading (SG) - *direction*. Let's say, we want to analyse the SI-66 that is sustainability analysis for upcoming two-third of a century, therefore,

$$SI\ (66) = R_0 + \frac{-[R_{-1}+3R_{-3}+6R_{-6}+10R_{-10}]+4(R_0+R_{-1}+R_{-3}+R_{-6}+R_{-10})}{66} * 66$$

$$SI(66) = R_0 - [R_{-1} + 3R_{-3} + 6R_{-6} + 10R_{-10}] + 4(R_0 + R_{-1} + R_{-3} + R_{-6} + R_{-10})$$

5. Suggestions

1. Accounting only the prime goods and services- Instead of using all the goods and services produced in the economy that is the GDP, we can make the index in such a way that we take into account only the main FTA goods and services which an economy should promote in view of economic and environmental sustainability such as renewable energy plants, recycled products, repairing services et cetera. Similarly, instead of accounting all the DQ goods and services we can take into account only the prime disquiet goods and services like electronic gadgets, refrigerators, conventional automobiles (less efficient and polluting).

2. **Assigning weight-** The formula for sustainability ratio can be made more strengthen by assigning appropriate weight to the sectors and particular goods and services according to their intensity of impact on the sustainability. This can be done by introducing few categories to further classify both the FTA and DQ goods and services. A simpler approach would be to make, say four, categories in both the FTA and DQ goods and services and a rough arbitrary fixed appropriate weight be assigned to each category in proportion of the impact on their sustainability. For example, under DQ goods, produce of a weapon industry should be put in a category with more weightage than diesel cars as the former is seemingly more harmful to the environment and ecology.

3. One may argue that why aren't we accounting the amount of basic resources that is the raw materials themselves as they might give a better picture of the vulnerable and threatening goods and services. The reason why we are, instead, accounting the market prices of the (final) goods & services is that the consumption in the real world is ultimately driven by the market-based prices which are driven by and drives the consumer behaviour, thence consumption patterns. Further, we are also interested in seeing the economic development aspect along with the resource sustainability.

6. Illustration

We take here a case of India. We will be considering only a few sectors of the Indian economy. We will calculate the sustainability ratio, sustainable growth rate and the sustainability development index using the relevant data from FY2005 to FY2015. For the sake of simplicity, we are assuming that India has only few sectors- defence, automobile, finance, insurance and real estate, agriculture and allied industries and information technology (IT) industry contributing in its gross domestic product. The contribution of these sectors is shown in table1.

Table 1

Sr. no	Sector	FY2005	FY2009	FY2012	FY2014	FY2015
1	Defence Expenditure	760	1142	1709	2037	2290
2	Automobile	940	1430	3114	3313	3593
3	Finance, Insurance and Real estate	4372	7036	9488	11,880	13,246
4	Agriculture and Allied industries	5625	6096	7558	7963	7803
5	IT Industry	1278	2967	4747	7080	8906

All figures in billion Indian rupees (figures are rounded off to integers)

The country is seemingly growing with all the sectors, showing positive growth rate. But some of the sectors are threatening to the sustainability and some sectors are contributing a large value to the economy as compared to the resources used. The five sectors in the economy are defence, automobile, finance, insurance and real estate, agriculture and allied industries and information industry (IT) sector. Here, defence and automobile sector are disquiet in nature that is undesirable for sustainability as the defence sector which includes arms, artilleries, and various other warheads are not only environment unfriendly and threatening to human lives but also they don't make any sizable productive growth in the economy. Similarly, automobile industry which mainly involves conventional vehicles uses polluting petroleum gasoline and diesel is also a disquiet good. Agriculture and allied sector are important for food security and raw material for various industries but in turn, it is heavily degrading the soil fertility, intoxicating rivers, lakes and depleting underground water reservoirs. It is one of the major reason for deforestation in India. The methane production during paddy farming and burning of waste agriculture products are also major contributors to air pollution. Agriculture relatively makes use of a large area of land and produces much less value output into the economy as compared to the other sectors. Further, the inorganic farming practices which make use of a high amount of chemical fertilizers visibly has an adverse long-term effect on human health and the ecology. The agriculture sector with the current state must fall into DQ category. For the nation to re-classify agriculture as FTA it must bring in environmentally and ecologically friendly practices in agriculture. The IT industry, finance, insurance and real estate services although makes use of some hardware such as computers that

generates electronic waste but in return, they are creating a huge amount of value out of the thin air by exploiting a very limited amount of resources. Real estate serves one of the basic needs of humans that is shelter. Thus these are FTA services. Using table 1 we calculate total FTA and DQ goods and services and sustainability ratio for each financial year.

Table 2

	FY2005	FY2009	FY2012	FY2014	FY2015
∑FTA (3+5)	5650	10,003	14,235	19,843	22,152
∑DQ (1+2+4)	7325	8668	12,381	13,313	13,686
R (∑FTA/∑DQ)	0.771 (R_{-10})	1.154 (R_{-6})	1.150 (R_{-3})	1.490 (R_{-1})	1.619 (R_0)

Sustainable growth rate (SG) will be calculated as,

$$SG = \frac{-[R_{-1}+3R_{-3}+6R_{-6}+10R_{-10}]+4(R_0+R_{-1}+R_{-3}+R_{-6}+R_{-10})}{66}$$

$$SG = \frac{-[1.49+3*1.15+6*1.154+10*0.771]+4(1.619+1.49+1.15+1.154+0.771)}{66}$$

$$SG = +0.07498$$

Thus, the present sustainability growth rate of India is 7.498 per cent which is positive. (Figure 5) shows the trend line (line of best fit) for the sustainability ratio vs time (using table 2).

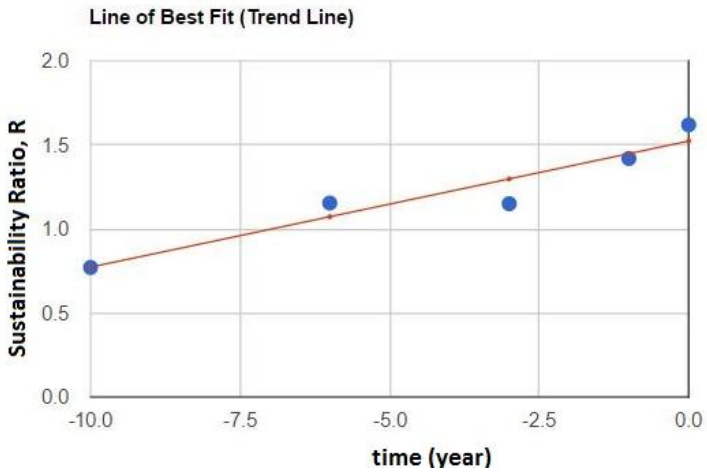

Figure 5: *trend line for Sustainability Ratio (R) vs time: The figure shows the points of sustainability ratio of five particular years. The slope of the trend line depicts the growth rate of sustainability ratio of the country.*

Now we will calculate the sustainability index of India for sustainable analysis for, say, 50 years that is S-50 and two-third of a century that is S-66.

$$SI(50) = R_0 + SG * 50$$
$$SI(50) = 1.619 + 0.07498 * 50$$
$$SI(50) = 5.368$$

Similarly,

$$SI(66) = 1.619 + 0.07498 * 66$$
$$SI(66) = 6.568$$

Thus, SI-50 and SI-66 of India is *5.368* and *6.568* respectively.

The plot for S-50 and S-66 is shown in figure 6.

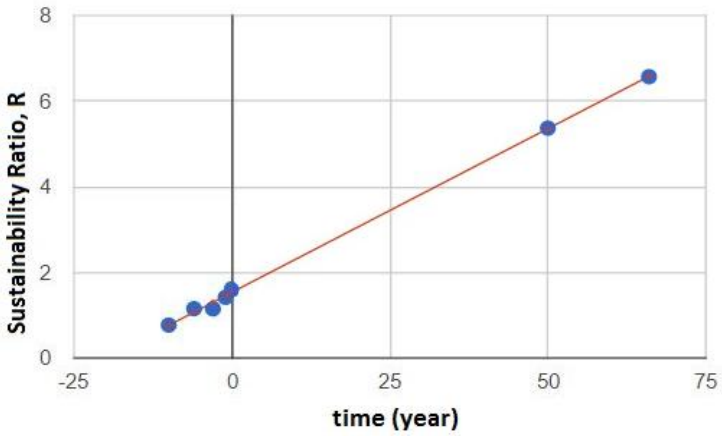

Figure 6: *Sustainable Index, SI-50, and SI-66*

7. Conclusion

The climate change negotiations in Paris in December 2015 (COP-21) trigger and enhance climate action across the globe. The mitigation policies by the countries implied by the Intended Nationally Determined Contributions (INDCs) put forward in the run-up to COP21 by individual member states is pushing the global economies in the direction of sustainable development [3]. The advantage of having such indices is that nations can fix targets for sustainable development and government along with the various institutions and the people can work towards realizing the targets. Governments should constantly put effort to improve their sustainable growth rate. Some international organization can also overview and set required targets to ensure all-round sustainable globally. Further, it would ensure that with limited resources on earth, exploitation should not turn into a greedy rat race. Many global economies are slowing down in terms of GDP growth rate and are desperate for investments in promising sectors to overhaul the economy. This decade, green technology has emerged as the undisputed promising sector that is attracting investments. Some of the European countries and Japan are seemingly struggling hard with the low economic growth and low sentiments. The sentiments of investors in the present scenario is majorly guided by the GDP growth rate and certain other alike figures. But the GDP and growth rate numbers perfectly lacks the direction. Neither the GDP figures tells what type of development the country is having nor the GDP growth rate tells where the economy is heading. I believe the direction should be sustainability. Institutions like World Bank [4] which prioritize the funds in green technology gives an edge to the countries which are growing more sustainably. One can expect the proactive policy measures by the governments and consequential influence on investments in wake of such sustainable development indices similar to that of the World Bank's Ease of Doing Business. However, an empirical study [5] showed that World Bank's Ease of Doing Business had an insignificant, albeit positive, influence on attracting foreign direct inflows. Nevertheless, it does not follow that it would be futile in purpose. At present, the world is lacking credible relative indices to quantify and identify economies who are fast green going that is seeking green investments. Sustainable growth rate is likely to reflect the go-green investment hunger

of an economy. Most of the developed countries supposedly have an appreciable sustainability growth rate and likely to have a high sustainable development index. Many advanced economies are genuinely striving hard to make their development sustainable thereby making their presence felt. The green bond market has grown exponentially and is pegged at over $180 billion in cumulative issuance (as of end 2016). If these indices are given global preference then the advanced economies which are performing better with respect to the sustainable growth rate and with high Sustainable Index can be captured well. This will also give investors a positive long-term vision of such economies. As it has been the case with Human Development Index (HDI), Ease of Doing Business Index et cetera wherein countries put genuine effort to improve their global rankings, sustainable indices can induce nations to compete over rankings and carry out sustainable development. Further with market-based approach government and institutions using provisions of incentive and disincentive policies can helm the economy in a sustainable way. Many of the leading institutional investors see good growth prospects in economies which are welcoming to the investments in green technology projects — renewable energy projects, low carbon transport sector, low carbon buildings et cetera. Economies with higher positive sustainable growth rate and higher sustainable index can garner positive sentiments as green technology is likely to carry forward the next wave of growth in the world.

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