

## Monitoring Economic Growth and Assessing Sustainability

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**Abstract.** Achieving higher levels of economic growth is necessary to make the development process inclusive and sustainable. However, economic growth alone cannot help in achieving sustainability in the development process. A large number of attempts have been made to identify the indicators of sustainable development at the national and international levels which, have resulted in the existence of a very large number of the lists of sustainable development indicators. The most recent attempt made in this regard has been that by the United Nations. It has suggested a set of seventeen Sustainable Development Goals which, every country of the world should yearn to achieve by the end of the year 2030. It has also suggested a set of one hundred and sixty nine indicators with the help of which the progress made in the achievement of Sustainable Development Goals can be monitored. However, the countries across the globe are still struggling to finalize the monitoring framework and also the sustainable development indicators which are required to be monitored. The paper is an attempt to establish that the selection of the monitorable sustainable development indicators may best be left to the individual countries or the constituent provinces. The indicators can be finalized keeping in view the stage of development through which a particular economy is passing and also the context in which the sustainability of development process is being assessed. It is not easy to simultaneously monitor and compare the progress made in achieving the sustainability with the help of such a large number of indicators with different units and scales of measurement. The paper suggests that standardizing the data values of different selected sustainable development indicators can make these indicators independent of any measurement unit and scale to make them comparable and capable of undergoing further arithmetical and algebraic operations.

**Key words:** Economic Growth, sustainability, Sustainable Development Goals, monitorable indicators, measurability, scale, standardization, trend line

### 1 Introduction

The socio-cultural and the economic aspects of the achievements made in the history of development that the State of Himachal Pradesh has experienced over a period of about last five decades can best be used as an insight to understand the dynamics of its economy as they stand today (Government of India, 2005). The success made by Himachal Pradesh in social sector has been outstanding and has also been praised nationally and internationally alike. Though, the fiscal indicators of the State, barring during a few years, have shown revenue and fiscal deficits at the uncomfortable levels indicating the vulnerability of its fiscal health to unexpected internal and external shocks, the remarkable performance in the social sector cannot give even a slightest

hint of the weak fiscal structure of the State. The efforts in the direction of conservation of its environment made by Himachal Pradesh have also been acknowledged internationally.

In fact, Himachal Pradesh is one of the few progressive States of the Union of India which have proactively taken initiatives to preserve their natural resources. Complete ban on commercial felling of green trees, on the use of polythene bags, and on smoking in public places with the punitive provisions for offences committed etc. have been the examples of some of the initiatives taken by the State and which are probably the first efforts made by any State in India to provide a clean and healthy environment to the people living in it.

The decennial growth rate of population during the decade between 2001 and 2011 remained 12.81% in Himachal Pradesh against the national figure of 17.54%. Overall literacy rate is 83.78% whereas for males it is 90.83% and the females, catching up fast with the males, have literacy rate of 76.60%. Scheduled Caste population accounts for 25.19% of the total population whereas, the Scheduled Tribes account for 5.71% of the total population of the State (Population Census, 2011). The State economy had grown at an average annual growth rate of less than 5% during the first six Five Year Plans. In fact, it has registered a negative growth rate during the Annual Plan periods of 1978-79 and 1979-80 (Government of Himachal Pradesh, 2013). It was during the Seventh Five Year Plan that it had registered a growth rate higher than the national average and the State has never looked back ever since. Seventh Plan onwards the average annual growth of the State economy has been perpetually higher than the national average. During 2013-14, the percentage contribution of primary sector to the GSDP of the State stood at 19.28 per cent; that of secondary sector it was 37.87%; and, the tertiary sector contributed 42.85% to the GSDP of Himachal Pradesh (Government of Himachal Pradesh, 2015).

The available literature on sustainable development has established with sufficient evidence that the development path trodden by an economy can be termed as sustainable only if the growth trends in all the three pillars of the economy i.e. economic, social and environmental are of correspondingly matching similarities. Himachal's performance in social sector development and environmental initiatives have been well established and documented by various national and international agencies. The annual economic growth rate has also been above the national average during the past more than a decade. However, it will be of academic

interest to explore into the quality of public expenditure and other fiscal indicators which have a direct bearing on the growth trends observed in various sectors of the economy. This has been attempted with the help of three indicators in the present paper. However, it would be of great relevance to explore into the relation between economic growth and sustainable development before doing so. The following text contains a brief account of important and available literature on the issue.

## **2. Relation between economic growth and sustainable development**

A considerable amount of discussion in the literature pertaining to sustainable development has been dedicated to the debate on the relationship between the economic growth and the sustainable development. Mitlin (1992) very clearly divided those debates into two categories i.e. those which advocated an incompatibility between the two and those which firmly believed that economic growth is essential for achieving sustainable development. She further noted that some of the differences between two positions can be explained by the geographic focus of authors i.e. those who focus on the North tend to stress the limits to growth; those who look to the south, tend to stress the need for growth.

The foundation of the modern growth theory was laid by Robert Solow in 1956 when he put forward a formal model suggesting that the growth in the output i.e. GDP is possible with the increase in physical capital, labour and productivity (World Bank, 2012). However, the model missed an important fact that the economic production is a direct function of natural resources and quality of environment. This notion has been around at least since Malthus [1798 (1965)], but it was not until the early 1970's that classical growth theory was modified to embrace the environment – referred to as “natural capital” as a factor of production (Dasgupta and Heal, 1974; Nordhaus, 1974). Later efforts to explicitly model economic growth with sustainable development include the works by Smulders (1994) and Bovenberg and Smulders (1996).

The World Commission on Environment and Development (1987) stressed upon the need of economic growth with a caution to avoid any conflict between economic development and environmental considerations. Pezzey (1989) argued that with the application of high technical progress and by following appropriate resource conservation policies, it is possible to attain high per capita output without limits. Daly (1989) took a contrary position by arguing that

the growth can continue only if the ecosystem can grow indefinitely. Rees (1989) took a similar position and argued that a much deeper understanding of limits to the economic growth is required which can help in framing economic policies to achieve sustainable development. Conway (1987) and Barbier (1987) observed a trade-off between global economic efficiency and national sustainability and equity between and within the states. Trainer (1990) gave an alternative perspective arguing that the position held by Conway and Barbier is not relevant in the context of the poor of the world as economic growth has not helped them.

Many researchers argued that environmental issues will be resolved on their own with the economic development. These arguments are based on the idea that the environmental quality first deteriorates with the economic development and then starts improving with the higher levels of economic development. However, this theory has been rejected. (Andreoni and Levinson, 2001'; Barbier, 1997; Brock and Taylor, 2010). The World Bank (2012) listed five flaws in this argument. First, for development to be sustainable, a distinction needs to be made between environmental impacts that affect welfare through income and consumption and those which affect welfare through the amenity value of environmental assets. Second, even when the poor communities care about the environment, their voice generally goes unheard. Third, preference about collective goods is difficult to infer from the individual behaviour. Fourth, people may not be able to link environmental issues to the health problems they confront as the impact of environmental quality with the welfare is generally indirect. Fifth, some dimensions of environmental quality may improve with economic development, all of them do not without an intervention.

Notwithstanding the debate on the conflict between economic growth and sustainable development, the World Bank (2012) elaborated a real-world framework for sustainable development. It suggested modifications in the sustainable development strategies to account for the market failures and other such sub-optimalties such as : (a) knowledge spill overs and economies of scale that lead to underinvestment in Research and Development; (b) Underutilization of physical capital or labour due to temporary or structural reasons; (c) behavioural biases, such as inability to make decisions about low-probability events (Camerer and Kunreuther, 1989); Tversky and Shafir, 1992); and other market failures such as principal-agent issues, information asymmetry in capital markets, and coordination failures.

Actual economic output depends on two things viz. (a) the maximum production level possible with the available technology, physical capital, labour and environment assessing maximum efficiency level and (b) how close the real world production system is actually to the (a). The former is termed as 'production frontier' and the latter is called as 'efficiency'. Hence, the policy aimed at taking away the economy from sub-optimalities, increasing efficiency, contributing to economic growth in the short run while protecting environment can be termed as sustainable development strategy. Sub-optimalities often offer resistance as it requires large investment to remove or at least mitigate them. An assessment of the institutional and political obstacles, transaction costs and other causes of market failure is required to find out possible ways of removing these sub-optimalities.

It follows from the above text that there exists a close and intricate relationship between economic growth and sustainable development. It is also amply clear that environmental conservation alone cannot mean sustainable development. It is the inclusiveness of the economic growth that contributes in achieving sustainable development. While making an assessment of the sustainable development, a single sector or aspect cannot be examined in isolation, rather, a comprehensive assessment of various aspects of the economy is required to be made. This paper is an attempt to assess the fiscal sustainability of Himachal Pradesh with the help of three indicators and also to illustrate that the same methodology can be used in determining sustainability of other aspects of development. It needs to be emphasized here that the used methodology, does in no way, suggest that the sustainable development is a quantifiable and hence, a measurable entity. The indices developed are only indicative of the progress made in the achievement of a particular sustainable development goal with the help of one or more indicators. The very fact that the standardized index is independent of any unit and scale of measurement itself suggests that the Sustainable Development is not a measurable and quantifiable term.

### **3. Indicator Selection and Analysis**

Three indicators of economic growth have been used in the present paper. These have been selected on the assumption that the economic development enhances the welfare as a result of an increase in income levels through the channels of increasing the impact of factors of production, accelerated innovation and enhanced efficiency. The indicators selected are at

variance with the conventional indicator of economic growth. However, selection of indicators has been circumscribed with the limitation of availability of relevant and reliable data for the reference period. Hence, only those indicators related to the economic growth have been selected for which reliable information was available. Three indicators shortlisted are i) State's own Tax Revenue as a percentage of Gross State Domestic Product; ii) Net State Borrowings as percentage of Gross State Domestic Product; and, iii) capital expenditure as percentage of total expenditure. The selected indicators have been assumed to have a direct bearing not only on the economic growth but also in achieving the inclusiveness and sustainability in the growth process.

Data on the above listed three indicators have been used for the period starting from 2001 to 2013-14. The reason for selecting the mentioned period of reference for the study is that it was around late 1990s and first decade of the twenty first century that the achievements in the field of education, health, and infrastructure made by Himachal Pradesh were documented and were praised not only at the national level but also internationally. (Please refer De, A. and Dreze, J.) Also, it was around this period only that most of the initiatives on the environmental front were taken by the State Government. It is, hence, of relevance to assess the sustainability of the gains already made by Himachal Pradesh in its development after 1999. Also, the information on most of the indicators available up till 2013-14 is based on actuals rather than on the estimates. It is because of this reason that the period under reference for the present study has been selected between 2001 to 2013-14.

After having selected three indicators of economic growth and acquiring their values for the years between 2001 and 2013-14 next step followed is to standardize the values of all these indicators to make them comparable. The three indicators selected though, have values measured in percentages yet, they have different scales. Also, for attaining sustainability, lower values of borrowings are desirable whereas higher value of other two variables are desirable and are perceived as contributing more towards economic sustainability. Thus, it is not possible to compare different indicators which have values measurable on different scales. In order to make indicators comparable and facilitate more meaningful analysis, the data values of each of them are standardized on a 0 to 1 scale where 0 represents the least desirable value of indicators and 1 indicates to their most desirable value. The maximum and minimum values selected are

based on the existing expert knowledge and also based on the insight gained after repeated discussions held by the authors with experts. However, these values have been finalized on extremely conservative assumption that value of any of the selected indicators less than the best value recorded in Himachal Pradesh during the period under reference would indicate to the deterioration in the measure of sustainability.

The standardization of the time series data has been obtained with the help of the following formula using maximum and minimum values (Table 1):

If  $T(x_i)$  corresponds to maximum

$$(i) N(x_i) = \frac{x_i - x_{min}}{T(x_i) - x_{min}} \text{ for } x_i \leq T(x_i)$$

If  $T(x_i)$  corresponds to minimum

$$(ii) N(x_i) = \frac{x_{max} - x_i}{x_{max} - T(x_i)} \text{ for } x_i \geq T(x_i)$$

Where  $x_{min}$  is the most undesirable value,  $x_{max}$  is the most desirable value and  $(x_i)$  is the target value for indicator  $x_i$ .  $N(x_i)$  is the standardized value and  $T(x_i)$  is the target value for the indicator  $x_i$ .

Since, the standardized values are without any unit of measurement and are measured along the same scale from 0 to 1, they need to be interpreted with great deal of caution. Since uniform scale of measurement is being used, decline in percentage of net borrowings as percentage of Gross State Domestic Product would actually be represented by a corresponding increase in its standardized value. All the three indicators selected and maximum and minimum values used for obtaining standardized values have been discussed briefly in the following text.

State's own Tax Revenue taken as the percentage of the Gross State Domestic Product is one of the important indicators of the financial resource base of the State Government. In a way, it also has a bearing on the level of economic growth as the GSDP has been used as the denominator in working out the indicator. Otherwise also, the total tax revenue collections have been taken as indicator of the total transactions during a financial year which has a strong linkage with the economic growth. Since this indicator also has GSDP intrinsic to it, the economic growth rate has not been considered as a separate indicator for analysis in the present paper. The maximum value of the State's own Tax Revenue (SOTR) as percentage of GSDP

used for standardization of data has been taken as 11.13 per cent. Although, the highest proportion of the SOTR for the year 2013-14 has been 10.2 per cent for Karnataka (RBI, 2015) yet, the maximum value has been taken as 11.13 per cent which was observed for Himachal Pradesh during the year 2007-08. Anything below this has been viewed as a deterioration in the resource mobilization efforts. The minimum value of the SOTR as percentage of GSDP has been taken as 1.9 per cent as observed for Nagaland during 2013-14 (RBI, 2015). The figures for SOTR as percentage of GSDP for Himachal Pradesh for the period of reference have been calculated from the Annual Finance Accounts of Himachal Pradesh for various years.

The second indicator selected is the net state borrowings as percentage of the GSDP. This indicator has been assumed to be reflecting the measure of fiscal stress the State of Himachal Pradesh has been through. The maximum value for the indicator for the purpose of standardization of data has been taken as 70 per cent which, was the actual figure for Himachal Pradesh during 2003-04 (69.67 per cent). Any debt burden defined as debt liabilities (net) as percentage of GSDP beyond this level would obviously not be an indication towards economic sustainability. The minimum value for this indicator has been taken as 13.00 per cent which is for Chhattisgarh during 2013-14. Third indicator used has been capital expenditure as percentage of total expenditure which has been assumed as the one indicating to the quality of expenditure incurred by the State Government. Higher proportion of the capital expenditure in the total expenditure has been taken as an indicator of sustainability in the long run due to the contribution it makes in creation of physical infrastructure that, in turn, leads to economic and social development.

The highest and lowest proportions of the capital expenditure out of the total expenditure have been determined after analyzing the expenditure statements of various states as contained in RBI (2015) and Annual Finance statements of Himachal Pradesh for various years. The highest value has been taken as 23% per cent as this is the maximum that any state has been able to reach during the reference period and 10 per cent has been taken as the minimum value for this indicator. The minimum value is based on the actual value during 2004-05 observed in case of Himachal Pradesh (10.41 per cent).



**Table 1: Maximum and Minimum values of indicators used for standardization**

S. No.	Indicators	Maximum Value	Minimum Value
1	State's Own Tax Revenue as percentage of GSDP	11.13	1.90
2	Net State borrowings as percentage of GSDP	70.00	13.00
3	Capital expenditure as percentage of total expenditure	23.00	10.00

Note: Row 1. The maximum value of 11.13 was the highest in Himachal Pradesh in 2007-08. Lowest for Nagaland in 2013-14 as in State Finances: A study of budgets of 2014-15, RBI, Mumbai.  
 Row 2. Maximum for Himachal Pradesh in 2003-04 and minimum for Chhattisgarh in 2013-14 as in State Finances: A study of budgets of 2014-15, RBI, Mumbai.  
 Row 3. Maximum value is based on the values of all states during reference period (RBI, various years) and minimum is that observed for Himachal in 2004-05.

**Table 2: Economic Indicators (Observed Data)**

Year	State's own Resources as Percentage of GSDP	Net State Borrowings as percentage of GSDP	Capital Expenditure as Percentage of total Expenditure
1	2	3	4
2001-02	6.35	60.94	12.44
2002-03	5.65	65.55	14.33
2003-04	6.16	69.67	12.32
2004-05	7.69	68.67	10.14
2005-06	8.05	64.26	11.27
2006-07	9.88	65.38	12.68
2007-08	11.13	62.46	14.56
2008-09	9.64	55.81	17.84
2009-10	9.04	48.07	14.84
2010-11	9.36	43.81	11.9
2011-12	9.27	40.79	11.73
2012-13	8.14	38.95	21.92
2013-14	8.36	38.07	19.08

Source: Calculated from Annual Finance Accounts (various years). Himachal Pradesh Government, Shimla

Maximum and minimum values used for each of the three selected indicators to arrive at their standardized values/indices have been shown in the Table 1. The Table 2 contains actually observed values of the selected indicators for the period under reference. The Table 3 exhibits standardized indices for the observed values of State's Own Tax Revenue as percentage of the GSDP, Net State Borrowings as percentage of the GSDP and Capital Expenditure as percentage of the Total Expenditure.

Looking at the column 2 of the Table 3, it is evident that the standardized index for the State's Own Tax Revenue as percentage of the GSDP increased gradually uptill the year 2007-08

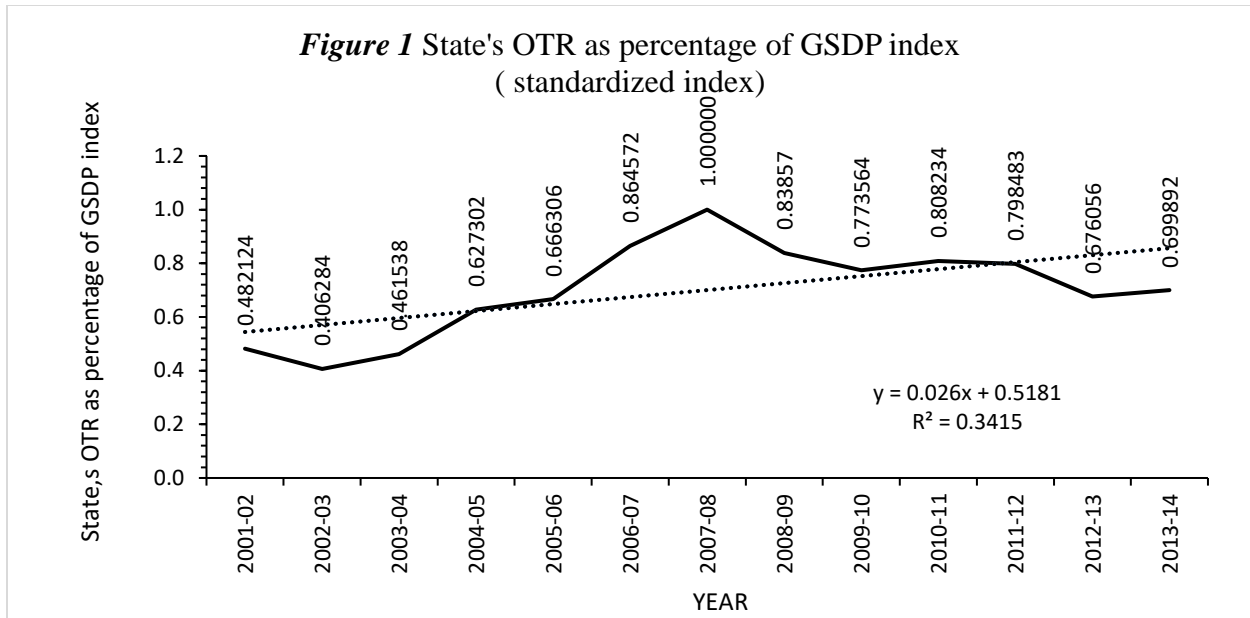
during the period under reference when it had a value of 1.0. Thereafter, it has registered a decline in its value. This movement in the standardized value of the State's Own Tax Revenue as percentage of the GSDP in the column 2 of the Table 3 corresponds to the movement in the actually observed values of the State's Own Tax Revenue as percentage of the GSDP as contained in the column 2 of the Table 2. Hence, the observed values and the standardized indices of the State's Own Tax Revenue as percentage of the GSDP have one to one correspondence between them. The movement in the standardized values of State's Own Tax Revenue as percentage of the GSDP during the period under reference has been depicted graphically along with the trend line and its equation in the Figure 1. The trend line on the standardized values of the State's Own Tax Revenue as percentage of the GSDP is explained

**Table 3: Standardized Values of Economic Indicators**

Year	State's own Resources as Percentage of GSDP	Net State Borrowings as percentage of GSDP	Capital Expenditure as Percentage of total Expenditure
1	2	3	4
2001-02	0.482124	0.158947	0.187692
2002-03	0.406284	0.078070	0.333077
2003-04	0.461538	0.005789	0.178462
2004-05	0.627302	0.023333	0.010769
2005-06	0.666306	0.100702	0.097692
2006-07	0.864572	0.081053	0.206154
2007-08	1.000000	0.132281	0.350769
2008-09	0.838570	0.248947	0.603077
2009-10	0.773564	0.384737	0.372308
2010-11	0.808234	0.459474	0.146154
2011-12	0.798483	0.512456	0.133077
2012-13	0.676056	0.544737	0.916923
2013-14	0.699892	0.560175	0.698462

Source: Author: Calculated from Tables 1 and 2

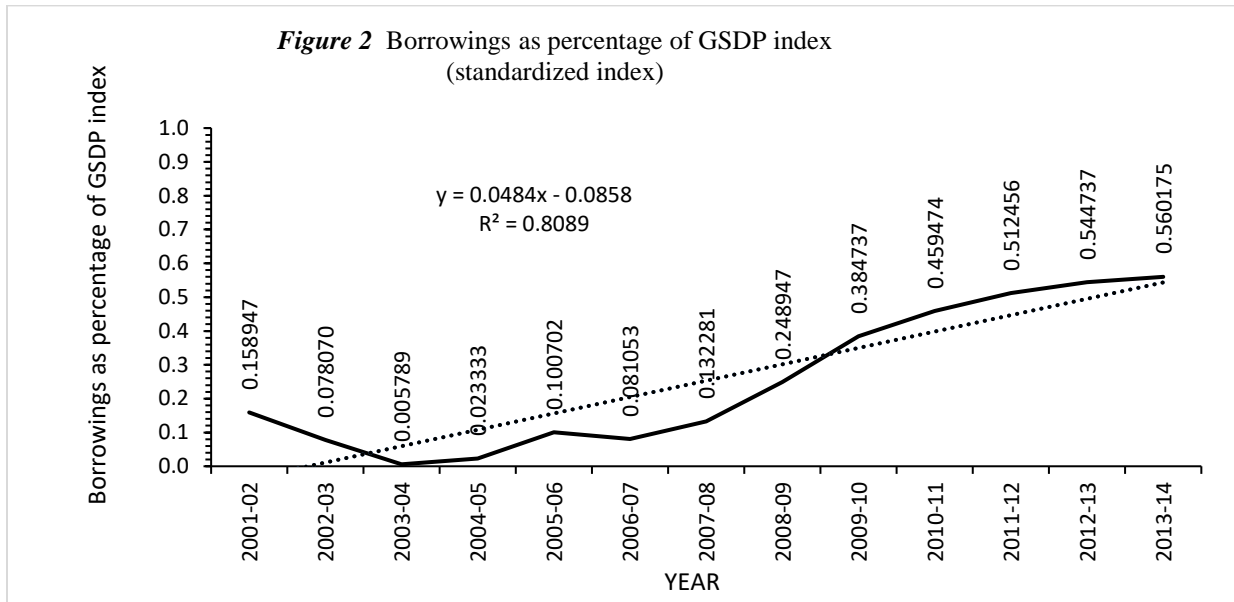
with the help of the equation  $y = 0.026x + 0.5181$  and about 34 percent of the variation ( $R^2 = 0.3415$ ) in the standardized values of the State's Own Tax Revenue as percentage of the GSDP around the trend line has been explained by the equation.



The following can be inferred with regard to the standardized indices of the State's Own Tax Revenue as percentage of the GSDP for the reference period:

- i. The standardized indices of the State's Own Tax Revenue as percentage of the GSDP has increased at an annual rate of 2.6 per cent (by 0.026) during the period under reference. It implied that the period under reference had a potential for growth in State's Own Tax Revenue as percentage of the GSDP of at least 2.6 per cent per annum, which, was actually realized during this period. Thus, for the years after 2013-14, any annual increase in the standardized value of State's Own Tax Revenue as percentage of the GSDP less than the rate of 2.6 per cent is unacceptable and hence cannot be termed as sustainable.
- ii. The maximum value of the standardized index of the State's Own Tax Revenue as percentage of the GSDP was for the year 2007-08 at 1.0 and it corresponds to 11.13 per cent in the column 2 of the Table 2. The maximum was achieved during 2007-08 in Himachal Pradesh because it has a potential of achieving it. Hence, the target for the subsequent years can be to achieve the value of at least 11.13 per cent for State's Own Tax Revenue as percentage of the GSDP and any value equal to or more than 11.13 per cent can only be termed as sustainable for future. Thus, above analysis has been able to quantify the minimum annual increment required and the most desired value of the standardized index of State's Own Tax Revenue as percentage of the GSDP after the

achievement of which only, the growth in this particular indicator can be termed as sustainable.

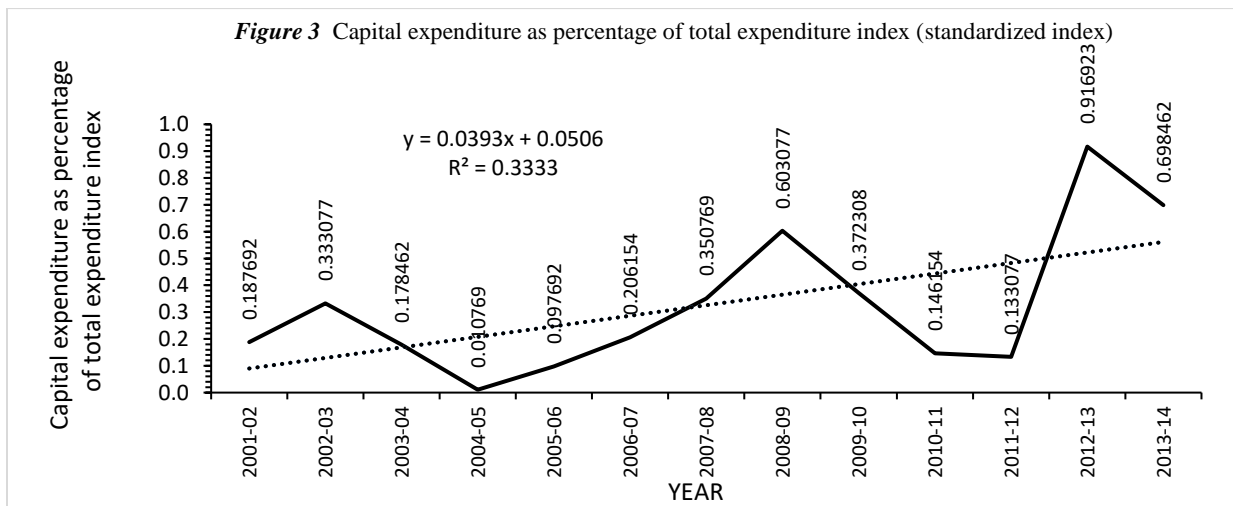


Similarly, the movement in the standardized indices for the Net State Borrowings as percentage of GSDP and Capital Expenditure as percentage of Total Expenditure have been exhibited in the Figures 2 and 3, respectively. Corresponding trend lines and the equations have also been shown in these two figures. Using the same analogy, the following can be inferred with respect to the sustainability of the Net State Borrowings as percentage of GSDP and Capital Expenditure as percentage of Total Expenditure:

- a) Any annual growth rate in the standardized index for the Net State Borrowings as percentage of GSDP less than 8.58 per cent cannot be termed as sustainable. A little caution is required to be used while inferring about the desired increment in the standardized index of Net State Borrowings as percentage of GSDP as an increment in the standardized index would actually mean a corresponding reduction in the Net State Borrowings as percentage of GSDP. Thus actual reduction in Net State Borrowings as percentage of GSDP would be desired and be reflected by the corresponding increase in the standardized index. Column 3 of the both the Table 2 and the Table 3 are when compared, it becomes evident that any decline in the Net State Borrowings as percentage of GSDP corresponds to the increment in the standardized index of the Net State Borrowings as percentage of GSDP. Similarly, the minimum desired Net State

Borrowings as percentage of GSDP would be 38.07 per cent (the minimum in the column 3 of the Table 2 during the period under reference) that corresponds to the maximum standardized index of Net State Borrowings as percentage of GSDP at 0.560175 (the maximum in the column 2 of the Table 3 during the period under reference). Thus, the minimum required increment per annum in the standardized index of the Net State Borrowings as percentage of GSDP is 8.58 per cent and the minimum value that it should attain is equal to or greater than 0.560175 for attaining the sustainable levels of the Net State Borrowings as percentage of GSDP in Himachal Pradesh. This would be reflected by actual decline in the borrowings.

- b) An increase in the Capital Expenditure as percentage of the Total Expenditure has been assumed to be a healthy sign for an economy as any expenditure on creation of physical infrastructure has established ramifications on the long term sustainability of the economic growth. Hence, movement in the observed value of the Capital Expenditure as percentage of the Total Expenditure has one to one correspondence with that of its standardized indices. Changes in the column 3 of the Table 2 and those in the column 3 of the Table 3 do correspond with each other. Also, any annual increment less than 3.93 per cent (trend line equation in Figure 3) in the Capital Expenditure as percentage of the Total Expenditure during the period after 2013-14 cannot be termed as sustainable. 0.916923 or higher is the minimum standardized index for Capital Expenditure as percentage of the Total Expenditure that is required to be achieved for attaining its sustainability.



#### 4. Conclusions

Analysis in the preceding text shows that it is possible to set targets and monitoring them quantitatively for achieving the Sustainable Development goals. The ability to achieve a particular target depends on the past performance in that aspect. This ability, in turn, depends on the availability of financial, manpower and resources with an economy. Hence, the monitorable targets vary not only across the countries but also within the countries. Not only the targets, but also the indicators to be monitored will largely depend on at least two factors. One, the stage of development through which an economy is passing through and second, the context in which the selected indicators are being monitored.

The global Sustainable Development Goals, Targets and Indicators as defined by the United Nations can at best be used as the guiding principles for individual countries in the pursuance of Sustainable Development Goals. Their selection can be left to individual countries and the constituent provinces. The methodology suggested has an in-built flexibility as it can be applied to any indicators and also to any number of indicators in a single analysis. The maximum and minimum values of the indicator can also be adjusted to suit the context in which the sustainability is being assessed while developing standardized indices. Since, the standardized indices calculated hence are independent of any unit and scale of measurement, they are further capable of being considered for arithmetical and algebraically operations.

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