

Towards Inclusion of Environment Performance Index 2020 scores in Gross State Domestic Product, constructing an Index (E+GDP) to enable disbursement of central assistance to States in India.

Indrani Chandrasekharan , Bhagyam Chandrasekharan** and Shweta Srinivasan#*

Effective and balanced utilization of the country's resources is at the Core of our development strategy. An attempt has been made to improve and make GDP more meaningful by including Environmental Performance and evolve an Index (E+GDP) to recognize the efforts made by the states to arrest degradation of the environment while pursuing efforts to increase States contribution to GDP and per capita GSDP. This article details a methodology for constructing an E+ GDP index for India and based on the E+ GDP scores, rank the States , suggest options for devolving Central funds to States and enable meeting international commitment relating to Sustainable Development Goals. (SDG).

Keywords: Gross State Domestic product, Environment, Performance index 2020, Sustainable Development Goals, E+GDP index, Scores and ranks.

Gross State Domestic Product (GSDP)

Traditionally, official statistics use indicators such as **Gross Domestic Product (GDP)** to describe economic developments. However, GDP on its own says nothing about how people and our environment are faring. That's why we also need **indicators that monitor social and environmental progress**. The point of this broader perspective is to measure whether, and, if so, how we are progressing towards inclusiveness and ensuring wellbeing.

As a result of this new approach to measuring broader aspects of our societies, new collections of statistical data are being established within the **European Statistical System (ESS)**¹. Many of these are being used, or will be used, to construct indicators that measure progress and sustainable development in a comprehensive way.

Many opine that Economic growth is 'destroying more than it is creating' and others – feel that our current GDP metric offers no indication of whether a country is becoming richer or poorer in terms of its natural resources. Some countries, argue that neglect and degradation comes from a failure to value 'natural capital' and include that within existing gross domestic product (GDP) calculations. The UN TEEB report² attempted to put a value on ecosystems services like forests, lakes, soils, water quality and fisheries.

There is however an environmental index being developed by the EU Commission as a result of its report, 'Beyond GDP'², published in 2009. The Commission plans to run a pilot of the index and publish the results alongside standard GDP figure

Dr Indrani Chandrasekharan is Former Adviser , Planning Commission, C-9, Vasant Kunj, New Delhi 110 070, India.

** Dr Bhagyam Chandrasekharan, Content Manager and Information Architect Officer, IFC , World Bank Group, Chennai, India and # Dr Shweta Srinivasan, Asst Prof of Finance , Rutgers University , Camden, NY. For Correspondence (e-mail indusekh@gmail.com)

. The Beyond GDP initiative is about developing indicators that are as clear and appealing as GDP, but more inclusive of environmental and social aspects of progress. A first regulation adopted in 2011 contains three modules: air emissions, environmentally related taxes and material flow account, while a second regulation due for adoption_would include physical energy flow, environmental goods and services and environmental protection expenditures.

A study led by the University of Adelaide's Environment³ in Australia has ranked most of the world's countries for their environmental impact. The research uses seven indicators of environmental degradation to form two rankings -- a proportional environmental impact index, where impact is measured against total resource availability, and an absolute environmental impact index measuring total environmental degradation at a global scale

Based on the United States Central Intelligence Agency , The World Fact Book⁴ , 2018 GDP data of countries , an evaluation process has been evolved⁵ in 2018 to gauge 28 countries regulatory effectiveness which includes 7 criteria with several attributes as detailed below:-

- 1.appropriate environmental regulations for air ,water, land
- 2.appropriately implemented and enforced environmental regulations
3. appropriate infrastructure to support the implementation and enforcement of environmental regulations.
- 4.Has the economic and financial resources to support continued pollution controls.
- 5.has other social issues that impede or override environmental concerns such as poverty, population etc.
- 6.Sustainability initiatives including pollution prevention,recycling and waste reduction , and
7. Geographical,geological,climate factors and other natural cnditions like natural disasters that impede environmental performance.

Each Criterion has been assigned values 0-3 and a ratio of per capita GDP of the country to the total score has been worked out. The countries that have high scores have a ratio number less than 2.5. Egypt and India are the only two countries evaluated that have a ratio number 21 and 22. The results of evaluation of Indian 29 States and 8 UTs based on this evaluation process⁵ for the years 2013, 2016 and 2020 , criteria scores and PC GSDP were worked out and ratio scores less than 10 were considered as good. Manipur,Tirupura,Haryana,Kerala and Chandigarh(1.62-8.73) for 2013, Maharastra,Tamil Nadu,Rajasthan, Uttar Pradesh and Karnataka (2.60-8.27) for 2016 and Maharastra, , Uttar Pradesh, Tamil Nadu, Karnataka and Gujarat (2,75-8.64) for 2020 were the highest ranked.

It is felt that for India an attempt could be made to improve and make GDP more meaningful by including Environmental Performance; including conservation efforts while recognizing development made by the states i.e states contribution to GDP and efforts made towards managing and conserving their natural resources.

Environmental Performance Index 2020 (EPI-2020)

The adverse impact of development is felt due to, natural resource depletion and the health consequences of air, soil and water pollution and inadequate waste management. Recognising the influence of natural resources depletion and unabated pollution on many sectors of the economy and well being of the citizens, in 2013 an Environment Performance Index (PC-EPI) was evolved⁵ and suggestion made to recognize environmental performance by states and devolve central funds. To make EPI-2013 comprehensive, Biodiversity, Agriculture, Fisheries and Disaster Management as criteria with 4 indicators each have now been added. In the existing criteria, Air Pollution, SPM has been split into PM 2.5 and PM10 as indicators, in water quality and waste management criteria one indicator each and two indicators in Climate Change have been added and **EPI-2020⁶** evolved. **EPI-2020 (Table-1 & Fig-1) now comprises, 9 criteria and 37 indicators.**

To recognize the efforts made by the states to arrest degradation of the environment including Climate change effect, while pursuing efforts to increase per capita GSDP a methodology to construct EPI 2020 +GDP index is being evolved and based on scores states have been ranked. The EPI 2020 and EPI 2020+GDP index now evolved will not only enable better understanding of the efforts made by the states in Environmental health and Ecosystem Vitality(2018 EPI framework)⁷ but also gauge the relationship between GSDP and sustainable development.

Table-1:- Category

S. No	Criteria	Indicators	No. of variables
1	Air Pollution	1. NOx, 2. SOx, 3. PM2.5, 4. PM10	4
2	Forests	1. TFC as % of state GA and Contribution to national FC, 2. Change in forest cover, 3. Growing Stock and 4. Afforestation efforts.	4
3	Water quality	1. % Dom. Waste water treated, and 2. Surface water quality(.DO, BOD & TFC) . 3. Ground water extraction % and 4. % of 17 Cat.of Ind.complying with WWT Standards.	4
4	Waste Management	1. MSW, 2.Bio-med.,3.Hazardous Wastes and 4.E- waste.	4
5	Climate Change	1. Preparation of SAPCCs, 2. % RE Gen Capacity, 3.CO2 Saved from LED, 4. % Grid connected Solar Power,5. Lives lost per Crore population.	5
6	Biodiversity	1.Indigenous livestock population change, 2. change in wetland 3. change in Protected Area Network and 4. % desertification .	4
7	Agriculture	1.Change in land under Agriculture,2. Vuln. Agri .Dist, 3. %' share in total GVA 17-18, 4. Land under Micro irrigation.	4
8	Fisheries	1. Fish Stock change, 2. Marine and Biodiversity Protected Area, 3. Funds for dev.of fisheries and 4. Valuation(Cr) of marine fish landing, 2017 +2018 and Share % of landing.	4
9	Disaster management	1. Status of State and District DM plan, 2. Inst.Setup 3. Budget and 4. Avg. Forest fire incidence ,2016+17.	4
TOTAL	9		37

Fig-1:-EPI 2020 Criteria and Indicators

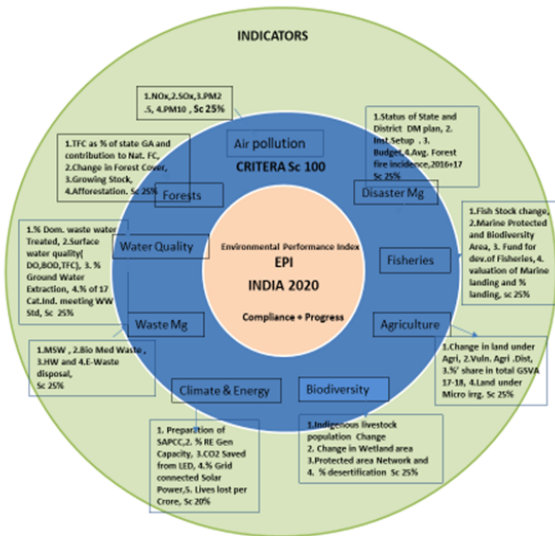


Table-2 and **Fig-2** presents EPI 2020 scores and ranking of the states and UT's as of 2020 for the 9 categories separately, based on arithmetic mean of scores of all the indicators covered under each category and Ranking of the states, based on mean cumulative Scores. Data used are all the latest available in Government publications.

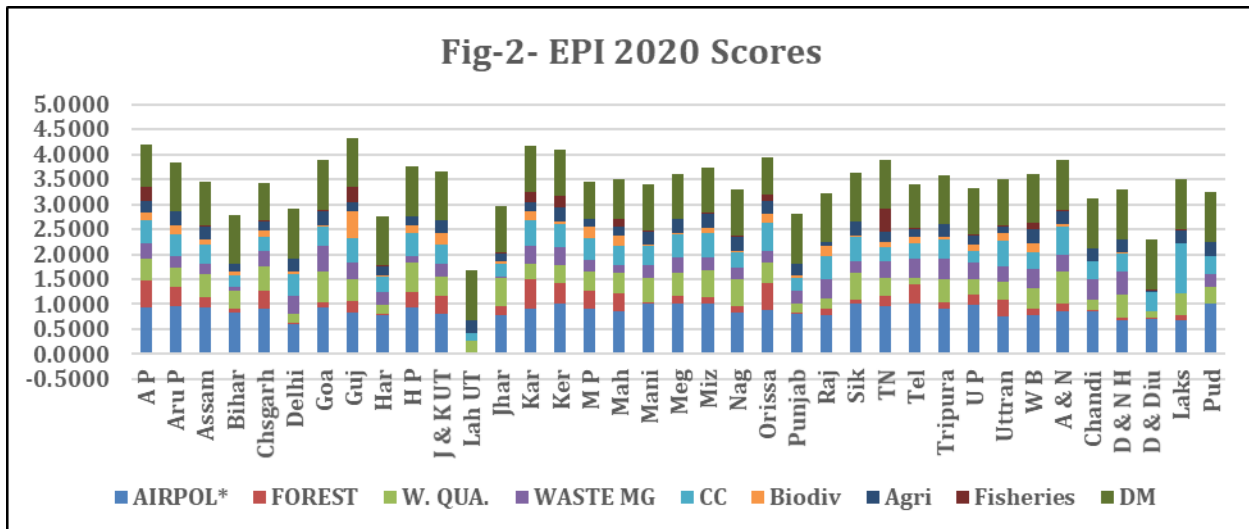


Table-2 EPI 2020 Scores and Ranking of States 3/4/2020

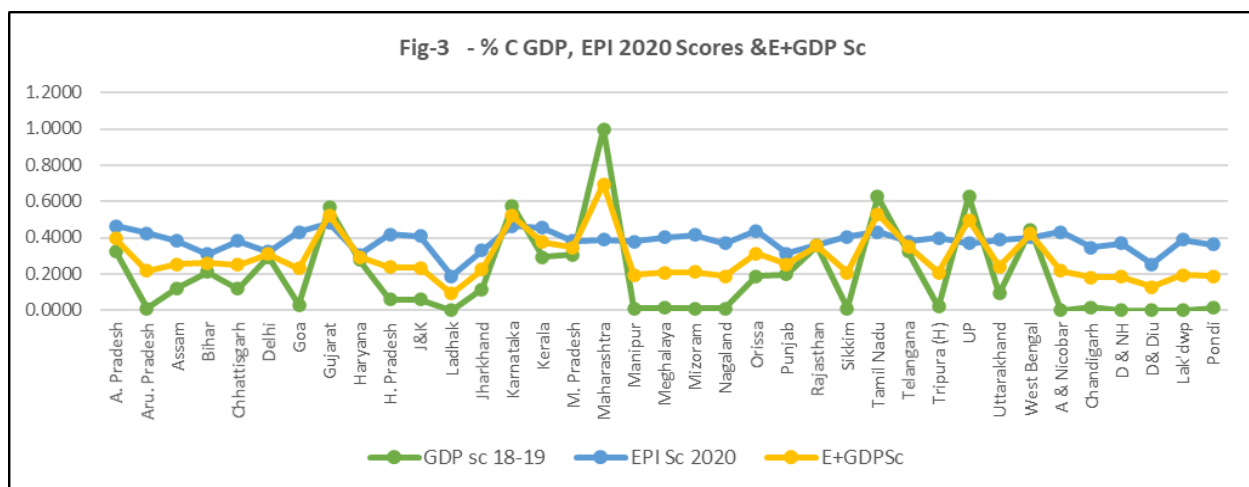
S.No	States /Uts	AIRPOL*		FOREST		WATER QUALITY		WASTE MG		CLIMATE CHANGE		BIODIVERSITY		AGRICULTURE		FISHERIES		DISASTER MG		FINAL SC & RK	
		Avg.Sc *	Rk	Avg.Sc	RK	Avg.Sc	RK	Avg.Sc	RK	Avg.Sc	RK	Avg.Sc	RK	Avg.Sc	RK	Avg.Sc	RK	Avg.Sc	RK	Score	Rank
1	Andhra Pradesh	0.9333	12	0.5370	3	0.4352	14	0.3018	18	0.4855	9	0.1466	11	0.2299	21	0.2697	3	0.8538	33	0.4659	2
2	Arunachal Pradesh	0.9565	9	0.3840	6	0.3817	20	0.2502	25	0.4227	16	0.1816	6	0.2825	2	0.0049	28	0.9609	21	0.4250	9
3	Assam	0.9231	13	0.2296	14	0.4485	13	0.1955	30	0.3904	19	0.1113	18	0.2553	17	0.0219	14	0.8677	32	0.3826	21
4	Bihar	0.8391	24	0.0744	28	0.3666	23	0.0599	33	0.2386	35	0.0802	19	0.1470	33	0.0105	23	0.9794	15	0.3106	34
5	Chhatisgarh	0.9020	17	0.3759	7	0.4840	8	0.3069	17	0.2735	31	0.1326	13	0.1767	29	0.0388	10	0.7452	35	0.3817	22
6	Delhi	0.6124	36	0.0202	35	0.1764	33	0.3622	8	0.4414	14	0.0325	27	0.2593	15	0.0030	32	0.9998	6	0.3230	32
7	Goa	0.9444	11	0.0957	26	0.6066	2	0.5344	1	0.3722	22	0.0279	29	0.2693	9	0.0422	9	0.9985	9	0.4324	7
8	Gujarat	0.8437	23	0.2304	13	0.4349	15	0.3326	13	0.4903	7	0.5263	1	0.1715	30	0.3316	2	0.9613	20	0.4803	1
9	Haryana	0.7901	28	0.0299	32	0.1570	35	0.2731	19	0.2904	30	0.0291	28	0.1831	26	0.0260	12	0.9886	11	0.3075	35
10	Himachal Pradesh	0.9231	13	0.3150	12	0.5882	3	0.1408	31	0.4664	11	0.1406	12	0.1828	27	0.0127	20	0.9801	14	0.4166	10
11	J & K UT	0.8009	27	0.3648	8	0.3803	21	0.2729	20	0.3674	24	0.2381	2	0.2504	19	0.0090	25	0.9831	12	0.4074	14
12	Ladakh UT			0.0117	37	0.2500	30	0.0000	36	0.1537	37	0.0137	35	0.2500	20	0.0000	35	1.0000	1	0.1866	37
13	Jharkhand	0.7790	31	0.1935	17	0.5515	5	0.0299	34	0.2615	33	0.0542	23	0.1553	32	0.0112	22	0.9307	24	0.3297	31
14	Karnataka	0.9198	15	0.5757	1	0.3199	28	0.3527	10	0.5166	4	0.1779	8	0.1779	28	0.2179	5	0.9104	29	0.4632	3
15	Kerala	1.0000	1	0.4270	4	0.3602	24	0.3603	9	0.4479	12	0.0586	21	0.2751	5	0.2416	4	0.9122	28	0.4536	4
16	Madhya Pradesh	0.9076	16	0.3636	9	0.3756	22	0.2506	23	0.4343	15	0.2244	3	0.1440	34	0.0185	17	0.7307	37	0.3833	20
17	Maharashtra	0.8608	20	0.3511	10	0.4265	16	0.1370	32	0.3988	17	0.1895	5	0.1852	25	0.1543	6	0.7969	34	0.3889	19
18	Manipur	1.0000	1	0.0430	30	0.4831	9	0.2504	24	0.3938	18	0.0212	31	0.2708	8	0.0102	24	0.9232	26	0.3773	23
19	Meghalaya	1.0000	1	0.1554	18	0.4767	11	0.3164	15	0.4454	13	0.0269	30	0.2784	4	0.0032	31	0.9155	27	0.4020	15
20	Mizoram	1.0000	1	0.1357	21	0.5404	6	0.2501	27	0.5013	6	0.1128	17	0.2796	3	0.0059	27	0.8987	30	0.4138	11
21	Nagaland	0.8254	25	0.1472	20	0.5197	7	0.2502	25	0.2924	29	0.0384	26	0.2865	1	0.0049	28	0.9396	22	0.3672	27
22	Orissa	0.8772	19	0.5571	2	0.4006	18	0.2403	28	0.5682	3	0.1570	9	0.2721	6	0.1227	8	0.7334	36	0.4365	5
23	Punjab	0.8075	26	0.0306	31	0.1690	34	0.2612	21	0.2486	34	0.0688	20	0.2233	22	0.0124	21	0.9804	13	0.3113	33
24	Rajasthan	0.7894	29	0.1126	25	0.2063	32	0.3887	5	0.4727	10	0.1897	4	0.0925	36	0.0033	30	0.9764	17	0.3591	28
25	Sikkim	1.0000	1	0.0841	27	0.5549	4	0.2118	29	0.4866	8	0.0466	25	0.2623	12	0.0000	35	0.9985	9	0.4050	13
26	Tamilnadu	0.9565	9	0.2026	15	0.3553	25	0.3488	11	0.2688	32	0.1190	16	0.1937	23	0.4614	1	0.9705	19	0.4307	8
27	Telangana	1.0000	1	0.3973	5	0.1188	37	0.3884	6	0.3122	28	0.1291	15	0.1578	31	0.0149	19	0.8941	31	0.3792	24
28	Tripura	0.9020	17	0.1307	22	0.4795	10	0.3977	4	0.3767	21	0.0515	24	0.2565	16	0.0085	26	0.9726	18	0.3973	17
29	Uttar Pradesh	0.9892	8	0.1992	16	0.3003	29	0.3374	12	0.2346	36	0.1313	14	0.1865	24	0.0212	15	0.9277	25	0.3697	26
30	Uttarakhand	0.7682	32	0.3291	11	0.3423	26	0.3296	14	0.5060	5	0.1480	10	0.1307	35	0.0165	18	0.9317	23	0.3891	18
31	West Bengal	0.7857	30	0.1285	23	0.3970	19	0.3861	7	0.3545	26	0.1782	7	0.2721	6	0.1339	7	0.9766	16	0.4014	16
32	Andaman & Nicobar	0.8571	21	0.1522	19	0.6541	1	0.3135	16	0.5716	2	0.0547	22	0.2614	14	0.0232	13	0.9989	8	0.4319	6
33	Chandigarh	0.8502	22	0.0272	33	0.2067	31	0.4195	3	0.3443	27	0.0141	33	0.2526	18	0.0000	35	1.0000	1	0.3460	30
34	Dadra & Nagar Haveli	0.6802	34	0.0601	29	0.4546	12	0.4626	2	0.3678	23	0.0151	32	0.2622	13	0.0011	34	1.0000	1	0.3671	25
35	Daman & Diu	0.7047	33	0.0256	34	0.1294	36	0.0001	35	0.3807	20	0.0137	35	0.0067	37	0.0303	11	1.0000	1	0.2546	36
36	Lakshadweep	0.6667	35	0.1251	24	0.4184	17	0.0000	36	1.0000	1	0.0137	35	0.2656	11	0.0018	33	1.0000	1	0.3879	12
37	Pondicherry	1	1	0.0148	36	0.3284	27	0.2509	22	0.3615	25	0.0138	34	0.2689	10	0.0188	16	0.9997	7	0.3619	29

As per EPI Scores 2020, **Gujarat, Andhra Pradesh, Karnataka, Kerala and Orissa** are the five **top** ranking states in environmental performance. 6 states namely ;Telangana, kerala, Manipur, Meghalaya, Mizoram, Sikkim and puduchery meet the air quality standards. The top ranking states for the remaining 8 categories are; Karnataka(Forestry), Andaman & Nicobar(water Quality),Goa (Waste Mg), Lakshadweep (Climate Change), Biodiversity (Gujarat), Agriculture (Nagaland), Fisheries (Tamil Nadu), and in respect of Disaster Management except for Delhi and all the UTs

C. Environmental Performance + Gross Domestic Product (E+GSDP) Index

After deliberations with regard to possible integration of the cumulative EPI 2020 scores with that of GSDP to evolve the Environment Performance + Gross Domestic Product index , it was resolved that scores be assigned to the % contribution of states to the National GDP and it be integrated with EPI 2020 scores ,averaged to arrive at Environment + Gross Domestic Product Scores –E+GSDP for each state and states ranked. **Table -3** details the % contribution to GDP 18-19 Scores, EPI 2020 scores and E+GSDP scores and Ranking of States.

Fig-3 depicts **percent contribution of GSDP to GDP states wise scores 18-19, EPI 2020 scores and E-GSDP scores** based on the Environmental Performance Index (EPI) 2020. The E+GSDP index now evolved integrates both environmental performance and developmental efforts of the states. Fig -3 presents the status state wise in 2020.



Considering the availability of EPI 2016 scores based on EPI 2013 index and EPI 2020 scores now and GSDP data for 2015-16 to 2018-19 it was felt that if a comparison is made ,the relationship between GSDP and Environmental performance of the states could also be highlighted (Fig -3)

Fig-3. Relationship between GSDP and Environmental performance of the states

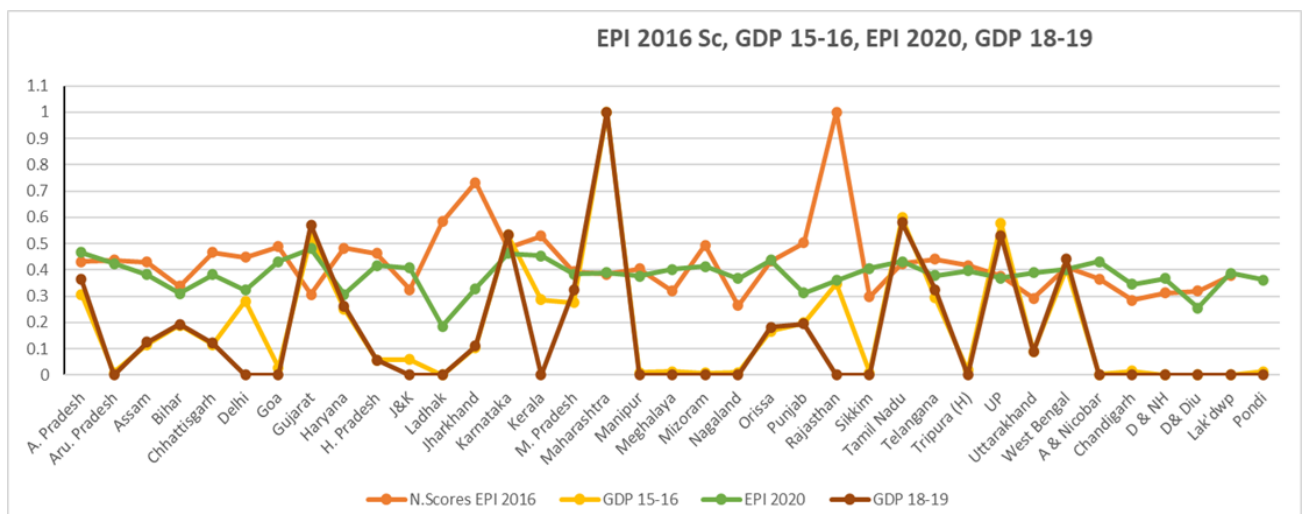


Table-3:-Percent contribution of States to GDP18-19,EPI 2020 and E+GSDP Scores and Ranking

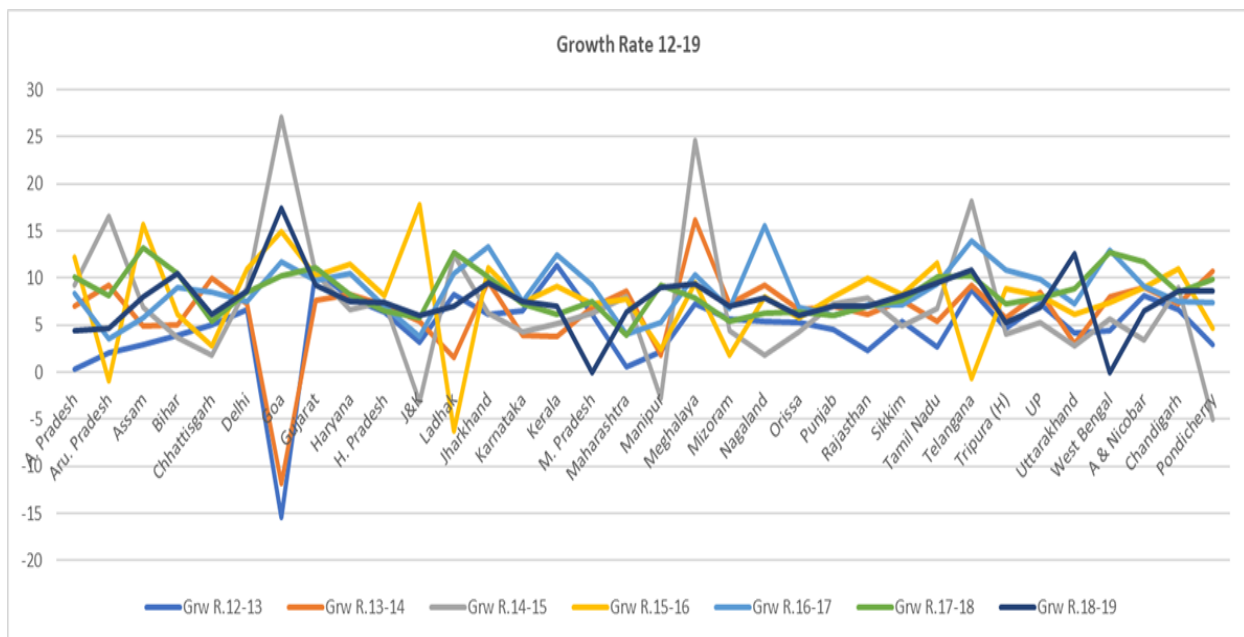
States	FINAL				EPI 2020		GSDP+EPI	
	GSDP 18-19	% C GDP	score	rank	Score	Rank	Score	Rank
A. Pradesh	862957	4.4434	0.3248	8	0.4659	2	0.3954	7
Aru. Pradesh	24603	0.1267	0.0093	31	0.4250	9	0.2171	24
Assam	324038	1.6685	0.1220	17	0.3826	21	0.2523	17
Bihar	557490	2.8705	0.2099	14	0.3106	34	0.2602	15
Chhattisgarh	311660	1.6047	0.1173	18	0.3817	22	0.2495	18
Delhi	779652	4.0144	0.2935	12	0.3230	32	0.3082	13
Goa	77126	0.3971	0.0290	23	0.4324	7	0.2307	22
Gujarat	1501944	7.7335	0.5654	5	0.4803	1	0.5228	3
Haryana	734163	3.7802	0.2764	13	0.3075	35	0.2919	14
H. Pradesh	153181	0.7887	0.0577	22	0.4166	10	0.2372	20
J&K	154380	0.7949	0.0581	21	0.4074	14	0.2328	21
Ladhak		0.0000	0.0000		0.1866	37	0.0933	37
Jharkhand	307581	1.5837	0.1158	19	0.3297	31	0.2227	23
Karnataka	1535224	7.9049	0.5779	4	0.4632	3	0.5205	4
Kerala	781653	4.0247	0.2942	11	0.4536	4	0.3739	8
M. Pradesh	809327	4.1672	0.3047	10	0.3833	20	0.3440	11
Maharashtra	2656551	13.6786	1.0000	1	0.3889	19	0.6944	1
Manipur	26249	0.1352	0.0099	30	0.3773	23	0.1936	31
Meghalaya	34389	0.1771	0.0129	27	0.4020	15	0.2075	29
Mizoram	22241	0.1145	0.0084	32	0.4138	11	0.2111	26
Nagaland	27283	0.1405	0.0103	28	0.3672	27	0.1887	32
Orissa	495840	2.5531	0.1866	16	0.4365	5	0.3116	12
Punjab	527120	2.7141	0.1984	15	0.3113	33	0.2549	16
Rajasthan	942586	4.8534	0.3548	7	0.3591	28	0.3569	9
Sikkim	26786	0.1379	0.0101	29	0.4050	13	0.2075	28
Tamil Nadu	1664159	8.5688	0.6264	3	0.4307	8	0.5286	2
Telangana	861031	4.4335	0.3241	9	0.3792	24	0.3516	10
Tripura (H)	50398	0.2595	0.0190	24	0.3973	17	0.2081	27
UP	1668229	8.5897	0.6280	2	0.3697	26	0.4988	5
Uttarakhand	245895	1.2661	0.0926	20	0.3891	18	0.2408	19
West Bengal	1177586	6.0634	0.4433	6	0.4014	16	0.4223	6
A & Nicobar	–		0.0000		0.4319	6	0.2159	25
Chandigarh	43227	0.2226	0.0163	25	0.3460	30	0.1812	35
D & NH		0.0000	0.0000		0.3671	25	0.1835	34
D& Diu		0.0000	0.0000		0.2546	36	0.1273	36
Lak'dwp		0.0000	0.0000		0.3879	12	0.1940	30
Pondi	36656	0.1887	0.0138	26	0.3619	29	0.1878	33

The EPI 2020+ GSDP scores (Table-3) however ranks Maharashtra , Tamil Nadu, Gujarat, Karnataka, and Uttar Pradesh as the top 5 states in that order and Manipur and Nagaland as the lowest scoring states including all UTs except Puducherry. As is highlighted Gujarat is the only state which recorded higher growth rate and also topped the EPI 2020 ranking. Maharashtra however is a state which recorded lower growth rate was ranked 19th in the EPI ranking but managed to top the GSDP+ EPI ranking. While Telangana, Jharkhand and Haryana managed to retain highest Growth rate they were ranked as 24th, 31st and 35th state in EPI ranking.

Fig-4 highlights the growth rate change of the states during the period 2012 to 2019. The avg growth rate during the period was 7.34 , lowest in the year 12-13 (5.50) and highest in 16-17 (8.3). The five states that recorded the highest Avg, Growth rate are ; Meghalaya(12.14), **Telangana (10.08),Gujarat(9.88), Jharkhand (9.43) and Haryana(8.36)** and highest growth rate ranging from 27.08 to 11.05. The lowest Avg. Growth rate was recorded by Manipur(3.89),Mizoram(5.46), J&K (5.53) ,Maharastra(5.61) and Puducherry (5.60). in that order.

The 7 states of Goa, Puducherry, Manipur, J&K, Ladhak, Telangana and Arunachal Pradesh recorded negative growth rate ranging from -15.38 (Goa) to -0.66(Telangana)

Fig 4. Growth rate change of the states during the period 2012 to 2019



Sustainable Development Goals (SDGs)

The 2030 Agenda for Sustainable Development (3), adopted by world leaders at the United Nations on 25 September 2015, has at its core 17 Sustainable Development Goals (SDGs) comprising 169 targets. The global indicator framework developed by the UN Inter-Agency and Expert Group on SDG Indicators and adopted by the UN Statistical Commission (4) in March 2017 **agreed upon 232 indicators** to measure the 169 targets. As per SDG National Indicator Framework (NIF) 297 indicators have been identified by MoSPI, india. Information currently is available for 236 Indicators.

Out of the 17 SDGs and 169 targets, 8 SDGs and 12 Targets are directly related to Economy and GDP. SDG 7, Target 7.3 and indicator 7.3.1, SDG 8, Target 8.1 ,8.2, and 8.4 and indicator 8.1.1,8.2.1 8.4.1 and 8.4.2, SDG 10,Target10.3 and 10.4 and indicators 10.3.1 ,10.4.1 and 10.4.2, SDG 11 , target 11.5 and indicator11.5.2, SDG 12, target 12.1 , 12.2 and 12c with 12.1.1,12.2.2 and 12C.1 as indicators , SDG14, target 14.7 and 14.7.1 indicator,SDG 16, target 16.6 and 16.6.1 as indicator and finally SDG

17, target 17.1 and indicators 17.1 and 17.1.2 comprise SDGs and targets to be achieved and are directly linked to GDP.

EPI 2020 has been constructed based on 9 Category and 37 indicators. These relate to **12 SDG targets and 31 indicators**. Table -6 indicates the SDG targets and corresponding indicators for each of the EPI 2020 Category and indicators. Thus EPI 2020 enables yearly assessing the progress made under the 31 indicators related to 12 SDG targets and E+GDP index 8SDGs and 12 targets.

GROSS BUDGETARY SUPPORT TO STATES

GADGIL MUKERJEE FORMULA

Two options for devolving funds, one 2% of gross budgetary support based on EPI ranking and second, as a longterm option addition of a weightage point of 2% to the performance indicator 3(c) of the Gadgil formula were(3) and are suggested.

Option 1: Two per cent of GBS to be devolved based on EPI ranking of the states. Based on the year 18-19 (Rs 2,442,213 crores), 2% works out to Rs 48,844.26 crores for non-special and special category states.

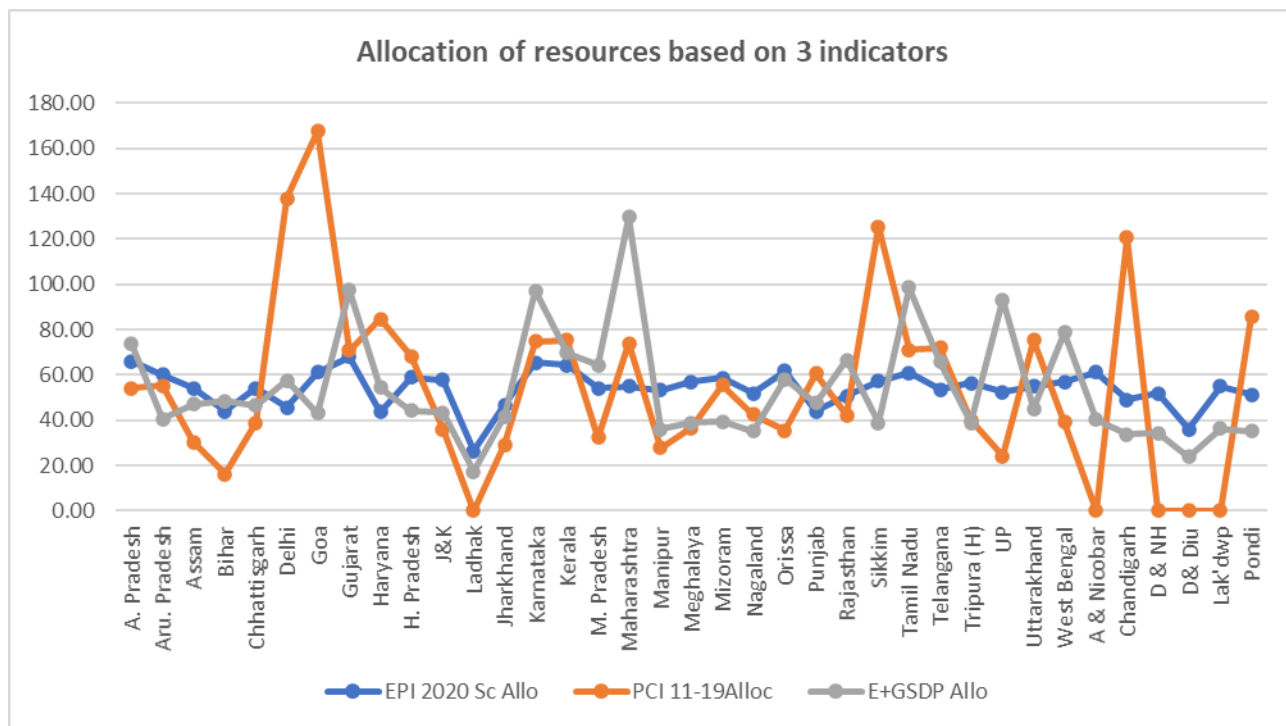
Option 2: Addition of a weightage point of 2% to the performance indicator 3(c) of the Gadgil formula for environmental performance and monies also devolved based on EPI ranking of the states. The weightage allocated be adjusted in the weightage assigned to population of 60%.

DEVOLVE FUNDS BASED ON E-GDP RANKING OF THE STATE.

Table-6 and Fig-5 indicates resource allocation of Rs 2000 Crores based on cumulative E-GDP Scores and ranking of the states in 2020. An attempt has also been, made to evaluate the difference brought about by the EPI-2020, on the E-GDP scores and allocation. As can be seen, inclusion of Biodiversity, Agriculture , Fisheries and Disaster Management as criteria with 4 indicators each have now been added. In the existing criteria, Air Pollution, SPM has been split into PM 2.5 and PM10 as indicators, in water quality and waste management criteria one indicator each and two indicators in Climate Change have been added and **EPI, 2020** evolved. EPI 2020 (Table-1) now comprises , 9 criteria and 37 indicators.

The top five states in resource allocated based on E-GDP Scores(Table-5) are , Maharashtra, Tamil Nadu ,**Gujarat**, Karnataka, and Uttar Pradesh and States like Andhra Pradesh, kerala ,Uttarakhand, Himachal Pradesh, Assam, Jharkhand and UT's such as Puducherry, Chandigarh, etc see a drop in allocation.

Devolving of funds based on Epi2020+GSDP Scores , percapita income avg. (2011-19) score and EPI 2020 score (fig-5 below) also indicates that allocation based on **EPI 2020 scores** will benefit states with higher efforts made to protect environment.

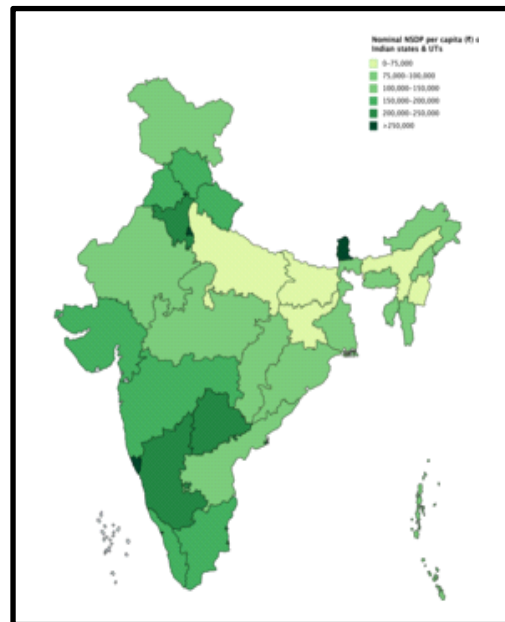


Per Capita income even averaged out does not seem to be a good indicator for resource allocation and Environmental Performance.

The results of evaluation of 29 States and 8 UTs on India based on the evaluation process discussed in page 2 for the years 2013, 2016 and 2020 , criteria scores and Per Capita GSDP were worked out and ratio scores less than 10 were considered as good. Manipur, Tirupura, Haryana, Kerala and Chandigarh (1.62-8.73) for 2013, Maharashtra, Tamil Nadu, Rajasthan, Uttar Pradesh and Karnataka (2.60-8.27) for 2016 and Maharashtra, Uttar Pradesh, Tamil Nadu, Karnataka and Gujarat (2.75-8.64) for 2020 were the highest ranked. However the ratio of GSDP Ranking and EPI scores did not highlight the environmental performance of the states and enabled resource allocation to states.

Table-5:- Resource allocation based on EPI 2020 , PC incomeScores 2011-19 and EPI2020+GDP Scores and ranking of States. Budget Rs 2000 crores.

States	EPI 2020 S	Rank	PCI 11-19All	RK	E+GSDP Allo	Rank
A. Pradesh	65.96	2	54.23	18	73.77	7
Aru. Prade	60.17	9	55.28	17	40.51	24
Assam	54.16	21	30.46	28	47.07	17
Bihar	43.97	34	16.07	32	48.56	15
Chhattisga	54.04	22	38.80	23	46.56	18
Delhi	45.73	32	138.02	2	57.51	13
Goa	61.21	6	167.59	1	43.04	22
Gujarat	67.99	1	70.79	13	97.55	3
Haryana	43.53	35	84.58	6	54.47	14
H. Pradesh	58.98	10	68.23	14	44.25	20
J&K	57.68	12	35.97	25	43.43	21
Ladhak	26.41	37	0.00	0	17.40	37
Jharkhand	46.67	31	29.31	29	41.56	23
Karnataka	65.58	3	74.77	9	97.13	4
Kerala	64.22	4	75.47	7	69.77	8
M. Prades	54.26	20	32.47	27	64.18	11
Maharash	55.06	18	73.94	10	129.57	1
Manipur	53.41	24	27.84	30	36.12	31
Meghalay	56.91	14	36.57	24	38.71	29
Mizoram	58.58	11	55.51	16	39.39	26
Nagaland	51.98	26	42.64	19	35.21	32
Orissa	61.80	5	35.40	26	58.14	12
Punjab	44.07	33	60.54	15	47.55	16
Rajasthan	50.83	29	42.10	20	66.60	9
Sikkim	57.33	13	125.45	3	38.72	28
Tamil Nad	60.98	8	71.18	12	98.63	2
Telangana	53.68	23	71.89	11	65.61	10
Tripura (H	56.25	16	39.94	21	38.84	27
UP	52.34	25	24.24	31	93.08	5
Uttarakha	55.09	17	75.27	8	44.94	19
West Beng	56.83	15	39.12	22	78.80	6
A & Nicob	61.14	7	0.00	0	40.29	25
Chandigar	48.99	30	120.49	4	33.80	35
D & NH	51.97	27	0.00	0	34.25	34
D& Diu	36.04	36	0.00	0	23.75	36
Lak'dwp	54.92	19	0.00	0	36.19	30
Pondi	51.23	28	85.82	5	35.05	33



Recommendation

Traditionally, official statistics use indicators such as Gross Domestic Product (GDP) to describe economic developments. However, GDP on its own says nothing about how people and our environment are faring. That's why we also need indicators that monitor social and environmental progress.

The outcome of the Efforts to evaluate the PCIncome + GSDP scores and Ratio of GSDP Rank/EPI Scores methodology did not enable the relationship and provide the assessment needed.

The Growth rate analysis also did not highlight the relationship between Environmental Performance and GSDP of the states.

The EPI-2020 and EPI+GDP index now evolved will not only enable better understanding and efforts made by the states in pollution abatement, biodiversity conservation, Agriculture, Fisheries and Disaster Management but also gauge the relationship between GSDP and sustainable environmental development.

The EPI-2020 index and E+GDP index can also serve as a tool to monitor Sustainable Development Goals and facilitate annual reporting as data availability and analysis can be ensured as the indicators are backed by legislations which require annual reporting by the states.

References.

1. **www.** <https://ec.europa.eu/eurostat/web/gdp-and-beyond>, European Commission, 2009
2. **TEEB-The Economics of Ecosystems and Biodiversity for local and Regional Policy makers (2010) a UNEP publication.**
3. **United States Central Intelligence Agency, 2018. The World Fact Book.**[www.cia.gov/library/publications/the-world-factbook.gos/NA.html](http://www.cia.gov/library/publications/the-world-factbook/gos/NA.html)
4. **Environmental Compliance and Sustainability; Global Challenges and Perspective. By Daniel .T.Rogers.**
5. **Indrani Chandrasekharan, R.Sendhil Kumar, Seena Raghunathan and Shweta Chandrasekaran, Current Science, Vol., 104,no.4. 25th FEBRUARY 2013**
6. **Indrani Chandrasekharan Bhagyam Chandrasekharan and Dr Shweta Srinivasan, Environmental Performance Index 2020 and ranking states of India. (Paper submitted to IJEPDM)**
7. **Yale Center for Environmental Law and Policy, and Columbia Center for International Earth Science Information Network. (2012 & 2016). EPI - Environmental Performance Index. Available at <http://epi.yale.edu/>**
8. **Indicators and a Monitoring Framework for the Sustainable Development Goals, a Report to the UN Secretary General by LCSDS Network**
9. **SDG Index and Dashboards - Global Report, Sustainable Development Solutions**

10. University of Adelaide's Environment Institute.
11. MOSPINet State Domestic Product, Ministry of Statistics and Programme Implementation, Government of India". Retrieved 7 April 2020.
12. [Handbook of Statistics, Reserve Bank of India - Publications](http://www.rbi.org.in)". www.rbi.org.in. Retrieved 7 April 2020
13. "IMF PPP Conversion rate". IMF.
14. *Economic Survey of Maharashtra 2019-20, Directorate of Economics and Statistics, Planning Department, Government of Maharashtra" (PDF)*. Retrieved 7 April 2020.
15. *Economic Survey of HP 2019-20, Economics and Statistics Department, Government of Himachal Pradesh" (PDF)*. Retrieved 7 April 2020.
16. *SECOND ADVANCE ESTIMATES OF NATIONAL INCOME, 2019-20 AND QUARTERLY ESTIMATES (Q4) OF GROSS DOMESTIC PRODUCT FOR THE THIRD QUARTER (OCT-DEC), 2019-20" (PDF)*.
17. *Ministry of Statistics and Programme Implementation*. Retrieved 7 April 2020

Indrani Chandrasekharan* and Bhagyam Chandrasekharan** and Dr Shweta Srinivasan
Contact Details of Authors

1. Dr. Indrani Chandrasekharan

Former Adviser Planning
Commission 9048, C-9, Vasant
Kunj, New Delhi Telefax: 91-11-
26125129,
Mail: indusekh@gmail.com

2. Dr Bhagyam Chandrasekharan

IFC , Knowledge Management Analyst,
World Bank Group, Chennai, India
Telefax: 91-44-24446193
Mail : bchandrasekharan@worldbank.com

3. Dr Shweta Srinivasan,

Asst Prof of Finance , Rutgers School of Business
Rutgers University , Camden
(856)225-2732
Shweta.srinivasan@rutgers.edu

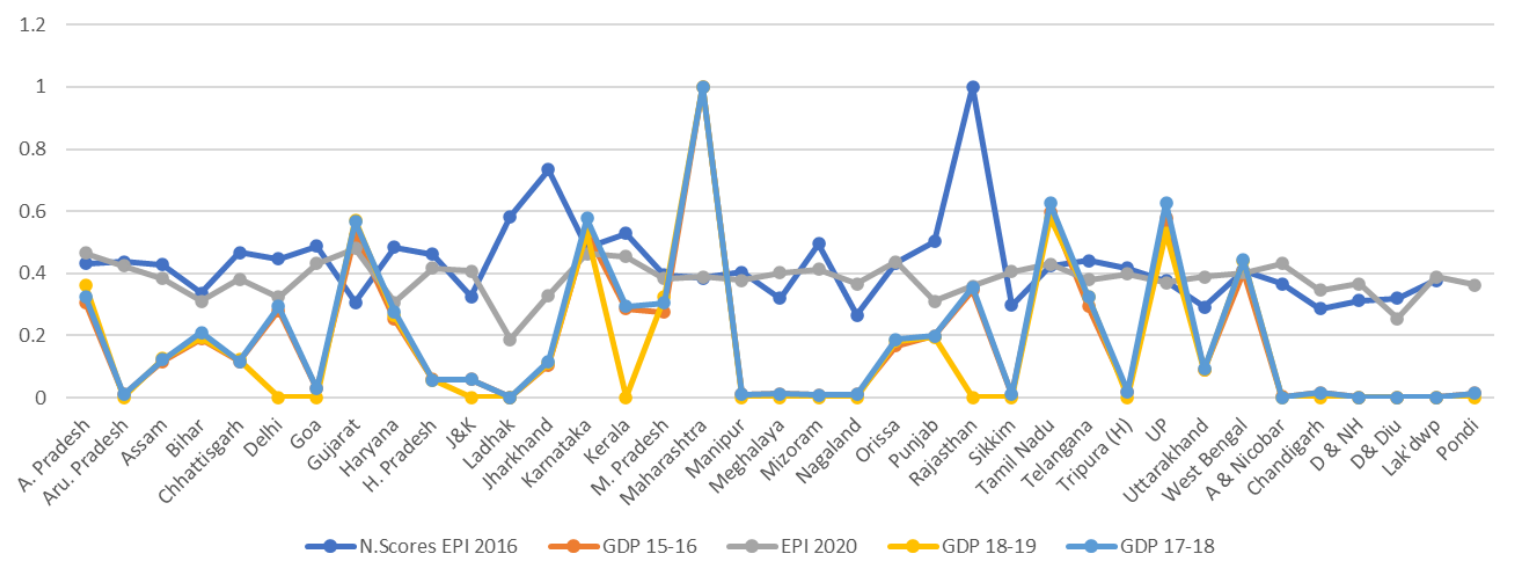
(Indrani Chandrasekharan)
011-26125129

Tables

States	GSDP 19-20				EPI 2020		EPI+GDP	
			score	rank	Score	Rank	Score	Rank
A. Pradesh	1,080,657	6.0445	0.3627	7	0.4659	2	0.4143	7
Aru. Pradesh		0.0000	0.0000		0.4250	9	0.2125	22
Assam	374,096	2.0925	0.1256	14	0.3826	21	0.2541	12
Bihar	572,827	3.2040	0.1923	12	0.3106	34	0.2514	15
Chhattisgarh	363,900	2.0354	0.1221	15	0.3817	22	0.2519	14
Delhi		0.0000	0.0000		0.3230	32	0.1615	35
Goa		0.0000	0.0000		0.4324	7	0.2162	20
Gujarat	1,701,495	9.5171	0.5711	3	0.4803	1	0.5257	2
Haryana	784,910	4.3903	0.2634	10	0.3075	35	0.2855	11
H. Pradesh	168,972	0.9451	0.0567	18	0.4166	10	0.2367	17
J&K		0.0000	0.0000		0.4074	14	0.2037	24
Ladhak		0.0000	0.0000		0.1866	37	0.0933	37
Jharkhand	329,726	1.8443	0.1107	16	0.3297	31	0.2202	19
Karnataka	1,588,303	8.8840	0.5331	4	0.4632	3	0.4981	4
Kerala		0.0000	0.0000		0.4536	4	0.2268	18
M. Pradesh	962,430	5.3832	0.3230	9	0.3833	20	0.3531	8
Maharashtra	2,979,556	16.6657	1.0000	1	0.3889	19	0.6944	1
Manipur		0.0000	0.0000		0.3773	23	0.1886	29
Meghalaya		0.0000	0.0000		0.4020	15	0.2010	26
Mizoram		0.0000	0.0000		0.4138	11	0.2069	23
Nagaland		0.0000	0.0000		0.3672	27	0.1836	30
Orissa	540,812	3.0250	0.1815	13	0.4365	5	0.3090	10
Punjab	577,829	3.2320	0.1939	11	0.3113	33	0.2526	13
Rajasthan		0.0000	0.0000		0.3591	28	0.1795	33
Sikkim		0.0000	0.0000		0.4050	13	0.2025	25
Tamil Nadu	1,725,639	9.6521	0.5792	2	0.4307	8	0.5049	3
Telangana	969,604	5.4233	0.3254	8	0.3792	24	0.3523	9
Tripura (H)		0.0000	0.0000		0.3973	17	0.1986	27
UP	1,579,807	8.8364	0.5302	5	0.3697	26	0.4500	5
Uttarakhand	263,233	1.4724	0.0883	17	0.3891	18	0.2387	16
West Bengal	1,314,529	7.3526	0.4412	6	0.4014	16	0.4213	6
A & Nicobar		0.0000	0.0000		0.4319	6	0.2159	21
Chandigarh		0.0000	0.0000		0.3460	30	0.1730	34
D & NH		0.0000	0.0000		0.3671	25	0.1835	31
D & Diu		0.0000	0.0000		0.2546	36	0.1273	36
Lak'dwp		0.0000	0.0000		0.3879	12	0.1940	28
Pondi		0.0000	0.0000		0.3619	29	0.1809	32

States	N.Scores EPI 2016	GDP 15-16	EPI 2020	GDP 18-19	GDP 17-18
A. Pradesh	0.4313	0.3073	0.4659	0.3627	0.3248
Aru. Pradesh	0.4369	0.0094	0.4250	0.0000	0.0093
Assam	0.4288	0.1159	0.3826	0.1256	0.1220
Bihar	0.3375	0.1890	0.3106	0.1923	0.2099
Chhattisgarh	0.4662	0.1156	0.3817	0.1221	0.1173
Delhi	0.4472	0.2801	0.3230	0.0000	0.2935
Goa	0.4885	0.0280	0.4324	0.0000	0.0290
Gujarat	0.307	0.5234	0.4803	0.5711	0.5654
Haryana	0.4833	0.2520	0.3075	0.2634	0.2764
H. Pradesh	0.4622	0.0581	0.4166	0.0567	0.0577
J&K	0.3257	0.0596	0.4074	0.0000	0.0581
Ladhak	0.5835	0.0000	0.1866	0.0000	0.0000
Jharkhand	0.7329	0.1051	0.3297	0.1107	0.1158
Karnataka	0.4836	0.5316	0.4632	0.5331	0.5779
Kerala	0.5281	0.2858	0.4536	0.0000	0.2942
M. Pradesh	0.3938	0.2753	0.3833	0.3230	0.3047
Maharash	0.3845	1.0000	0.3889	1.0000	1.0000
Manipur	0.4035	0.0099	0.3773	0.0000	0.0099
Meghalaya	0.3201	0.0128	0.4020	0.0000	0.0129
Mizoram	0.4944	0.0077	0.4138	0.0000	0.0084
Nagaland	0.2651	0.0099	0.3672	0.0000	0.0103
Orissa	0.4329	0.1671	0.4365	0.1815	0.1866
Punjab	0.5028	0.1984	0.3113	0.1939	0.1984
Rajasthan	1	0.3466	0.3591	0.0000	0.3548
Sikkim	0.2982	0.0092	0.4050	0.0000	0.0101
Tamil Nadu	0.4239	0.5984	0.4307	0.5792	0.6264
Telangana	0.4413	0.2939	0.3792	0.3254	0.3241
Tripura (H)	0.417	0.0183	0.3973	0.0000	0.0190
UP	0.3762	0.5787	0.3697	0.5302	0.6280
Uttarakhand	0.2918	0.0901	0.3891	0.0883	0.0926
West Bengal	0.4094	0.4055	0.4014	0.4412	0.4433
A & Nicobar	0.3659	0.0031	0.4319	0.0000	0.0000
Chandigarh	0.2856	0.0149	0.3460	0.0000	0.0163
D & NH	0.3127	0.0000	0.3671	0.0000	0.0000
D& Diu	0.3198	0.0000	0.2546	0.0000	0.0000
Lak'dwp	0.3782	0.0000	0.3879	0.0000	0.0000
Pondi		0.0135	0.3619	0.0000	0.0138

Chart Title



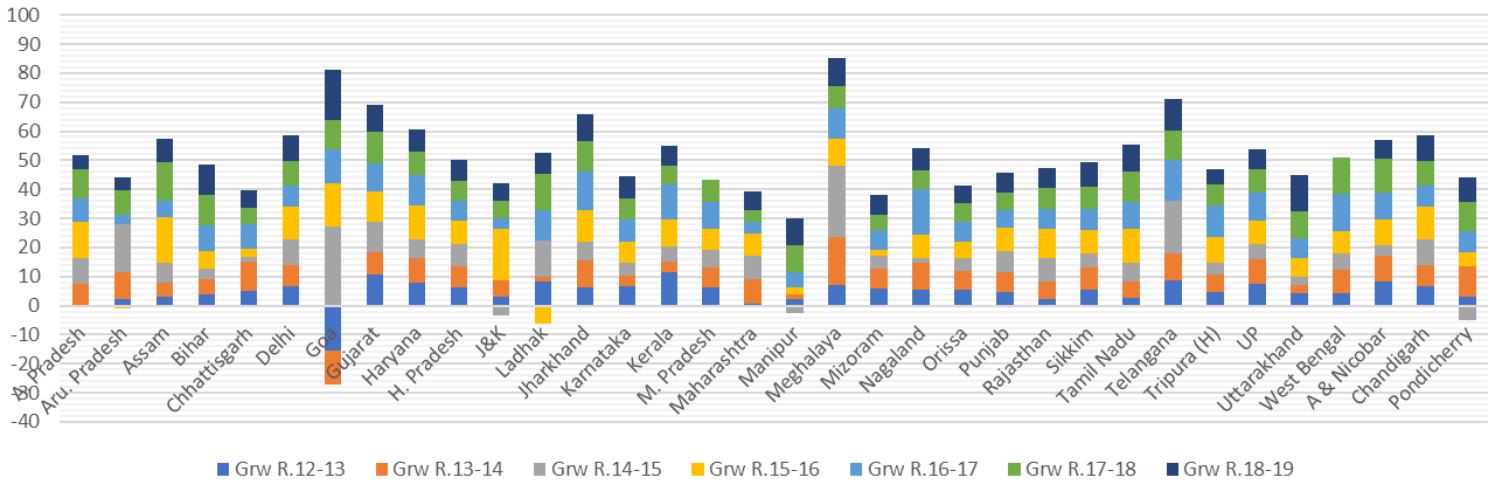
States	GSDP 17-18				EPI 2020		GSDP+EPI	
	GSDP17-18	% C GDP	score	rank	Score	Rank	Score	Rank
A. Pradesh	793,186	4.6224	0.3289	8	0.4659	2	0.3974	7
Aru. Pradesh	22432	0.1307	0.0093	31	0.4250	9	0.2171	25
Assam	288,691	1.6824	0.1197	17	0.3826	21	0.2511	17
Bihar	484,740	2.8249	0.2010	14	0.3106	34	0.2558	15
Chhattisgar	284,194	1.6562	0.1178	18	0.3817	22	0.2498	18
Delhi	690,098	4.0216	0.2862	12	0.3230	32	0.3046	13
Goa	70494	0.4108	0.0292	23	0.4324	7	0.2308	22
Gujarat	1,238,068	7.2150	0.5134	5	0.4803	1	0.4968	4
Haryana	649,592	3.7856	0.2694	13	0.3075	35	0.2884	14
H. Pradesh	140,613	0.8194	0.0583	21	0.4166	10	0.2375	20
J&K	137,427	0.8009	0.0570	22	0.4074	14	0.2322	21
Ladhak		0.0000	0.0000		0.1866	37	0.0933	37
Jharkhand	276,243	1.6098	0.1145	19	0.3297	31	0.2221	23
Karnataka	1,350,257	7.8688	0.5599	4	0.4632	3	0.5115	3
Kerala	701,577	4.0885	0.2909	11	0.4536	4	0.3723	8
M. Pradesh	728,242	4.2439	0.3020	10	0.3833	20	0.3426	11
Maharashtra	2,411,600	14.0539	1.0000	1	0.3889	19	0.6944	1
Manipur	23835	0.1389	0.0099	29	0.3773	23	0.1936	31
Meghalaya	30790	0.1794	0.0128	27	0.4020	15	0.20737	29
Mizoram	19329	0.1126	0.0080	32	0.4138	11	0.2109	26
Nagaland	24492	0.1427	0.0102	28	0.3672	27	0.1887	32
Orissa	434,769	2.5337	0.1803	16	0.4365	5	0.3084	12
Punjab	478,636	2.7893	0.1985	15	0.3113	33	0.2549	16
Rajasthan	835,170	4.8671	0.3463	7	0.3591	28	0.3527	9
Sikkim	23495	0.1369	0.0097	30	0.4050	13	0.20736	28
Tamil Nadu	1,461,841	8.5191	0.6062	2	0.4307	8	0.5185	2
Telangana	753,127	4.3890	0.3123	9	0.3792	24	0.3457	10
Tripura (H)	44219	0.2577	0.0183	24	0.3973	17	0.2078	27
UP	1,460,443	8.5109	0.6056	3	0.3697	26	0.4877	5
Uttarakhan	222,836	1.2986	0.0924	20	0.3891	18	0.2408	19
West Bengal	999,585	5.8252	0.4145	6	0.4014	16	0.4079	6
A & Nicobar	7871	0.0459	0.0033	33	0.4319	6	0.2176	24
Chandigarh	38760	0.2259	0.0161	25	0.3460	30	0.1811	35
D & NH		0.0000	0.0000		0.3671	25	0.1835	34
D& Diu		0.0000	0.0000		0.2546	36	0.1273	36
Lak'dwp		0.0000	0.0000		0.3879	12	0.1940	30
Pondi	32962	0.1921	0.0137	26	0.3619	29	0.1878	33

States	GSDP 16-17				EPI 2020		EPI+GDP	
	GSDP 16-17	% C GDP	score	rank	Score	Rank	Score	Rank
A. Pradesh	684,416	4.4648	0.3127	8	0.4659	2	0.3893	7
Aru. Pradesh	19845	0.1295	0.0091	31	0.4250	9	0.2170	25
Assam	254,382	1.6594	0.1162	18	0.3826	21	0.2494	17
Bihar	422,316	2.7550	0.1930	15	0.3106	34	0.2518	16
Chhattisgarh	254,722	1.6617	0.1164	17	0.3817	22	0.2491	18
Delhi	615,605	4.0159	0.2813	12	0.3230	32	0.3021	13
Goa	63460	0.4140	0.0290	23	0.4324	7	0.2307	22
Gujarat	1,167,156	7.6139	0.5333	5	0.4803	1	0.5068	4
Haryana	561,610	3.6636	0.2566	13	0.3075	35	0.2820	14
H. Pradesh	125,634	0.8196	0.0574	21	0.4166	10	0.2370	20
J&K	125,379	0.8179	0.0573	22	0.4074	14	0.2324	21
Ladhak		0.0000	0.0000		0.1866	37	0.0933	37
Jharkhand	236,250	1.5412	0.1079	19	0.3297	31	0.2188	23
Karnataka	1,209,136	7.8877	0.5525	4	0.4632	3	0.5078	3
Kerala	634,871	4.1415	0.2901	11	0.4536	4	0.3719	8
M. Pradesh	648,849	4.2327	0.2965	10	0.3833	20	0.3399	11
Maharashtra	2,188,532	14.2768	1.0000	1	0.3889	19	0.6944	1
Manipur	21294	0.1389	0.0097	29	0.3773	23	0.1935	31
Meghalaya	27439	0.1790	0.0125	27	0.4020	15	0.2073	28
Mizoram	17192	0.1122	0.0079	32	0.4138	11	0.2108	26
Nagaland	21722	0.1417	0.0099	28	0.3672	27	0.1885	32
Orissa	393,562	2.5674	0.1798	16	0.4365	5	0.3082	12
Punjab	426,988	2.7854	0.1951	14	0.3113	33	0.2532	15
Rajasthan	760,750	4.9627	0.3476	7	0.3591	28	0.3533	9
Sikkim	20687	0.1350	0.0095	30	0.4050	13	0.2072	29
Tamil Nadu	1,302,639	8.4977	0.5952	2	0.4307	8	0.5130	2
Telangana	658,325	4.2945	0.3008	9	0.3792	24	0.3400	10
Tripura (H)	39479	0.2575	0.0180	24	0.3973	17	0.2077	27
UP	1,290,289	8.4171	0.5896	3	0.3697	26	0.4796	5
Uttarakhand	195,125	1.2729	0.0892	20	0.3891	18	0.2391	19
West Bengal	872,527	5.6919	0.3987	6	0.4014	16	0.4000	6
A & Nicobar	6836	0.0446	0.0031	33	0.4319	6	0.2175	24
Chandigarh	32734	0.2135	0.0150	25	0.3460	30	0.1805	35
D & NH		0.0000	0.0000		0.3671	25	0.1835	34
D& Diu		0.0000	0.0000		0.2546	36	0.1273	36
Lak'dwp		0.0000	0.0000		0.3879	12	0.1940	30
Pondi	29573	0.1929	0.0135	26	0.3619	29	0.1877	33

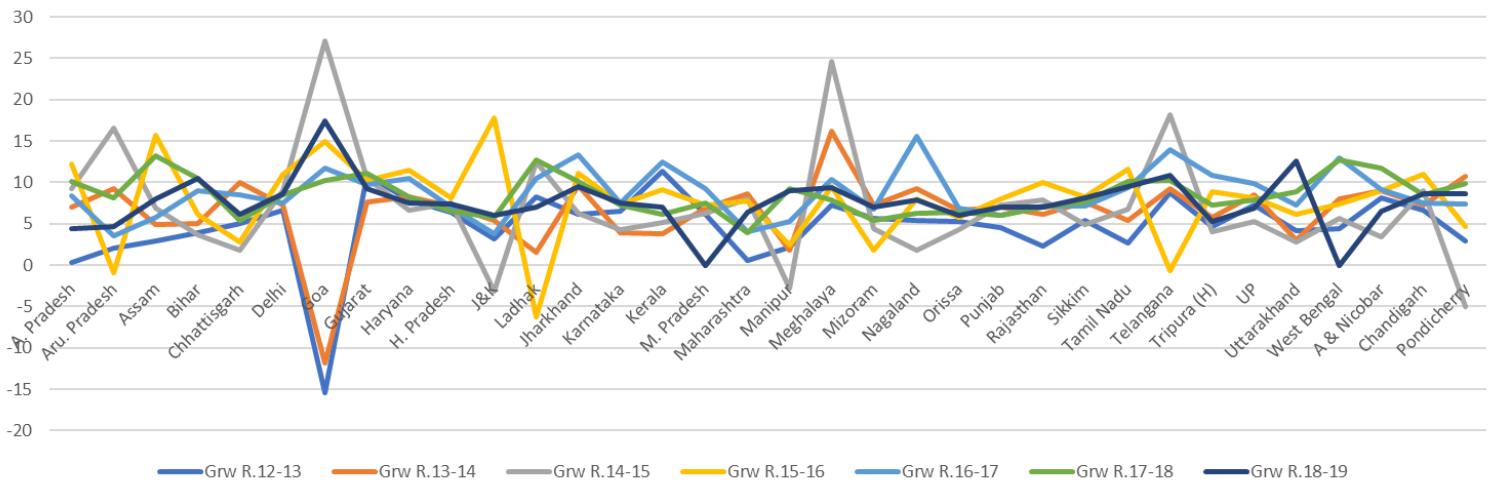
States	GSDP 15-16				EPI-2020		GSDP+EPI 15-16	
States	GSDP 15-16	%C GDP	Score	Rank	Score	Rank	Score	Rank
A. Pradesh	604,229	37.8929	0.3073	8	0.4659	2	0.3866	7
Aru. Pradesh	18509	1.1608	0.0094	30	0.4250	9	0.2172	25
Assam	227,959	14.2959	0.1159	17	0.3826	21	0.2493	17
Bihar	371,602	23.3042	0.1890	15	0.3106	34	0.2498	16
Chhattisgarh	227,383	14.2598	0.1156	18	0.3817	22	0.2487	18
Delhi	550,804	34.5425	0.2801	11	0.3230	32	0.3016	13
Goa	55054	3.4526	0.0280	23	0.4324	7	0.2302	22
Gujarat	1,029,010	64.5321	0.5234	5	0.4803	1	0.5018	3
Haryana	495,504	31.0744	0.2520	13	0.3075	35	0.2797	14
H. Pradesh	114,239	7.1642	0.0581	22	0.4166	10	0.2374	20
J&K	117,168	7.3479	0.0596	21	0.4074	14	0.2335	21
Ladhak		0.0000	0.0000		0.1866	37	0.0933	37
Jharkhand	206,613	12.9573	0.1051	19	0.3297	31	0.2174	24
Karnataka	1,045,168	65.5454	0.5316	4	0.4632	3	0.4974	4
Kerala	561,994	35.2442	0.2858	10	0.4536	4	0.3697	8
M. Pradesh	541,189	33.9395	0.2753	12	0.3833	20	0.3293	11
Maharashtra	1,966,147	123.3026	1.0000	1	0.3889	19	0.6944	1
Manipur	19531	1.2248	0.00993	28	0.3773	23	0.1936	31
Meghalaya	25117	1.5752	0.0128	27	0.4020	15	0.2074	28
Mizoram	15139	0.9494	0.0077	32	0.4138	11	0.2108	26
Nagaland	19524	1.2244	0.0099	29	0.3672	27	0.1885	32
Orissa	328,550	20.6043	0.1671	16	0.4365	5	0.3018	12
Punjab	390,087	24.4634	0.1984	14	0.3113	33	0.2549	15
Rajasthan	681,482	42.7376	0.3466	7	0.3591	28	0.3528	9
Sikkim	18034	1.1310	0.0092	31	0.4050	13	0.2071	29
Tamil Nadu	1,176,500	73.7816	0.5984	2	0.4307	8	0.5146	2
Telangana	577,902	36.2418	0.2939	9	0.3792	24	0.3366	10
Tripura (H)	35938	2.2538	0.0183	24	0.3973	17	0.2078	27
UP	1,137,808	71.3551	0.5787	3	0.3697	26	0.4742	5
Uttarakhand	177,163	11.1104	0.0901	20	0.3891	18	0.2396	19
West Bengal	797,300	50.0009	0.4055	6	0.4014	16	0.4035	6
A & Nicobar	6032	0.3783	0.0031	33	0.4319	6	0.2175	23
Chandigarh	29275	1.8359	0.0149	25	0.3460	30	0.1805	35
D & NH		0.0000	0.0000		0.3671	25	0.1835	34
D& Diu		0.0000	0.0000		0.2546	36	0.1273	36
Lak'dwp		0.0000	0.0000		0.3879	12	0.1940	30
Pondi	26617	1.6692	0.0135	26	0.3619	29	0.1877	33

States	GSDP 14-15				EPI-2020		GSDP+EPI 14-15	
States	GSDP 14-15	%C GDP	Score	Rank	Score	Rank	Score	Rank
A. Pradesh	524,976	4.2897	0.2951	8	0.4659	2	0.3805	7
Aru. Pradesh	17959	0.1467	0.0101	30	0.4250	9	0.21754	24
Assam	195,723	1.5993	0.1100	19	0.3826	21	0.2463	18
Bihar	342,951	2.8023	0.1928	15	0.3106	34	0.2517	17
Chhattisgarh	221,118	1.8068	0.1243	17	0.3817	22	0.2530	16
Delhi	494,803	4.0431	0.2781	11	0.3230	32	0.3006	13
Goa	47814	0.3907	0.0269	23	0.4324	7	0.2296	22
Gujarat	921,773	7.5320	0.5181	4	0.4803	1	0.4992	3
Haryana	437,145	3.5720	0.2457	13	0.3075	35	0.2766	14
H. Pradesh	103,772	0.8479	0.0583	21	0.4166	10	0.2375	20
J&K	98367	0.8038	0.0553	22	0.4074	14	0.2314	21
Ladhak		0.0000	0.0000		0.1866	37	0.0933	37
Jharkhand	218,525	1.7856	0.1228	18	0.3297	31	0.2262	23
Karnataka	913,923	7.4678	0.5137	5	0.4632	3	0.4884	4
Kerala	512,564	4.1883	0.2881	9	0.4536	4	0.3709	8
M. Pradesh	479,939	3.9217	0.2698	12	0.3833	20	0.3265	11
Maharashtra	1,779,138	14.5377	1.0000	1	0.3889	19	0.6944	1
Manipur	18129	0.1481	0.0102	29	0.3773	23	0.1937	31
Meghalaya	23235	0.1899	0.0131	26	0.4020	15	0.2075	27
Mizoram	13509	0.1104	0.0076	32	0.4138	11	0.21070	26
Nagaland	18401	0.1504	0.0103	28	0.3672	27	0.1887	32
Orissa	314,250	2.5678	0.1766	16	0.4365	5	0.3066	12
Punjab	355,102	2.9016	0.1996	14	0.3113	33	0.2555	15
Rajasthan	615,642	5.0305	0.3460	7	0.3591	28	0.3525	9
Sikkim	15407	0.1259	0.0087	31	0.4050	13	0.2068	29
Tamil Nadu	1,072,678	8.7650	0.6029	2	0.4307	8	0.5168	2
Telangana	505,849	4.1334	0.2843	10	0.3792	24	0.3317	10
Tripura (H)	29533	0.2413	0.0166	24	0.3973	17	0.2069	28
UP	1,011,790	8.2675	0.5687	3	0.3697	26	0.4692	5
Uttarakhand	161,439	1.3191	0.0907	20	0.3891	18	0.2399	19
West Bengal	718,082	5.8676	0.4036	6	0.4014	16	0.4025	6
A & Nicobar	5477	0.0448	0.0031	33	0.4319	6	0.21747	25
Chandigarh	26549	0.2169	0.0149	25	0.3460	30	0.1805	35
D & NH		0.0000	0.0000		0.3671	25	0.1835	34
D& Diu		0.0000	0.0000		0.2546	36	0.1273	36
Lak'dwp		0.0000	0.0000		0.3879	12	0.1940	30
Pondi	22574	0.1845	0.0127	27	0.3619	29	0.1873	33

Growth Rate 2012-19



Growth Rate 12-19



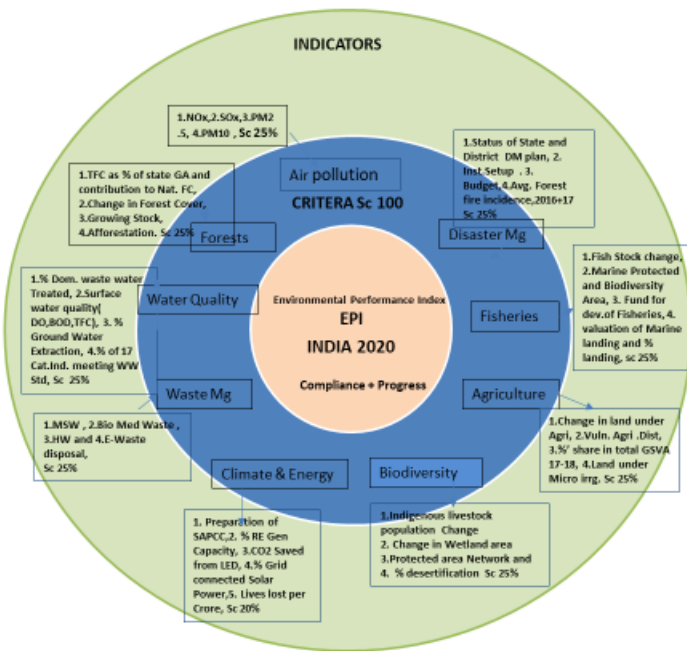
States & UTs	Grw R.12-13	Grw R.13-14	Grw R.14-15	Grw R.15-16	Grw R.16-17	Grw R.17-18	Grw R.18-19	Avg GwR
A. Pradesh	0.3	7	9.2	12.16	8.34	10.11	4.45	7.37
Aru. Pradesh	2.1	9.2	16.57	-0.99	3.55	8.12	4.59	6.16
Assam	2.91	4.9	6.92	15.67	5.74	13.18	7.97	8.18
Bihar	3.9	5	3.65	6.08	8.94	10.45	10.53	6.94
Chhattisgarh	5	10	1.77	2.8	8.54	5.41	6.08	5.66
Delhi	6.6	7.2	9.02	11.03	7.54	8.49	8.61	8.36
Goa	-15.38	-11.9	27.08	14.89	11.7	10.22	17.39	7.71
Gujarat	10.89	7.6	10.51	10.23	9.71	11.05	9.2	9.88
Haryana	7.86	8.29	6.63	11.51	10.46	8.19	7.49	8.63
H. Pradesh	6.41	7.1	7.5	8.1	7.04	6.55	7.34	7.15
J&K	3.2	5.4	-3.22	17.76	3.84	5.73	5.99	5.53
Ladhak	8.2	1.6	12.49	-6.25	10.46	12.65	6.99	6.59
Jharkhand	6.11	9.55	6.24	11.08	13.34	10.13	9.53	9.43
Karnataka	6.5	3.9	4.26	7.44	7.56	7.27	7.46	6.34
Kerala	11.38	3.8	5.15	9.09	12.45	6.19	7.04	7.87
M. Pradesh	6.1	6.9	6.31	7.2	9.21	7.54	NA	7.21
Maharashtra	0.6	8.6	8	7.73	4.01	3.88	6.44	5.61
Manipur	2.2	1.8	-2.74	2.38	5.29	9.26	9.05	3.89
Meghalaya	7.2	16.2	24.59	9.44	10.32	7.9	9.32	12.14
Mizoram	5.7	7.2	4.39	1.82	6.75	5.34	7.05	5.46
Nagaland	5.4	9.3	1.8	7.97	15.56	6.32	7.9	7.75
Orissa	5.32	6.63	4.23	5.74	6.87	6.38	5.98	5.88
Punjab	4.5	7	7.26	8.02	6.02	6.03	6.97	6.54
Rajasthan	2.3	6.1	7.9	9.93	7.15	6.95	7.05	6.77
Sikkim	5.4	7.6	4.92	8.24	7.15	7.68	8.17	7.02
Tamil Nadu	2.7	5.4	6.76	11.58	9.34	10.15	9.53	7.92
Telangana	8.7	9.3	18.17	-0.66	14	10.17	10.85	10.08
Tripura (H)	4.7	5.8	4.03	8.85	10.87	7.24	5.33	6.69
UP	7.3	8.5	5.29	8.08	9.83	7.84	6.87	7.67
Uttarakhand	4.2	3	2.84	6.13	7.2	8.88	12.58	6.40
West Bengal	4.45	8	5.64	7.39	12.96	12.7	NA	8.52
A & Nicobar	8.1	9	3.46	9.04	9.15	11.72	6.57	8.15
Chandigarh	6.6	7.2	9.02	11.03	7.54	8.49	8.61	8.36
Pondicherry	2.93	10.7	-5.03	4.69	7.44	9.82	8.68	5.60
	5.5	6.4	7.4	8	8.3	7	6.1	7.34

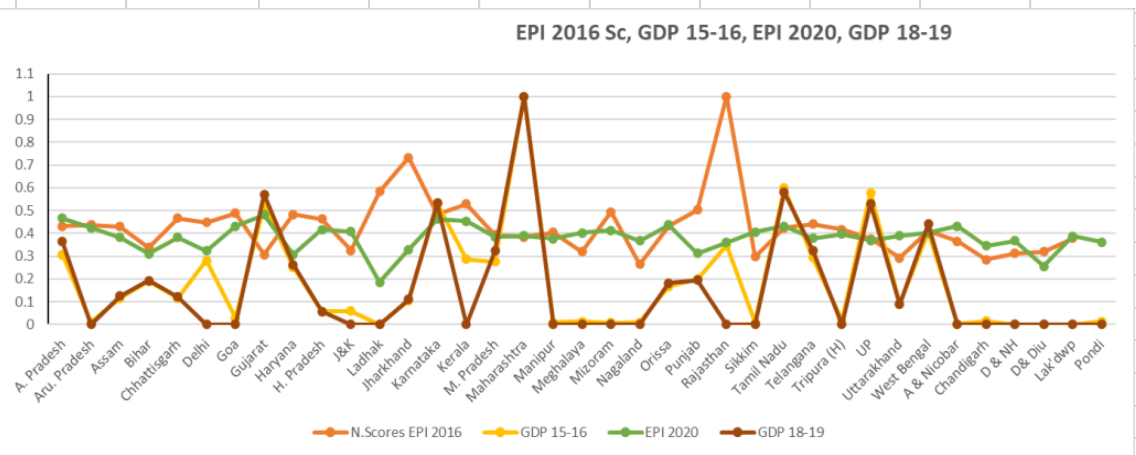
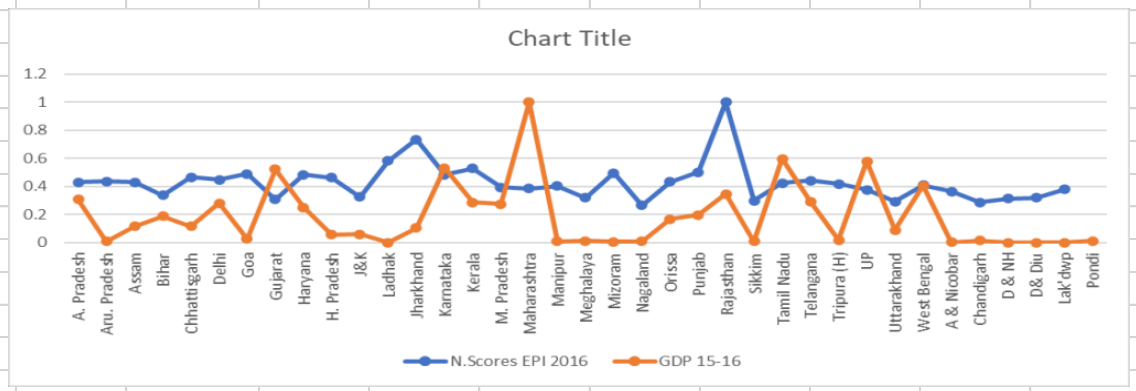
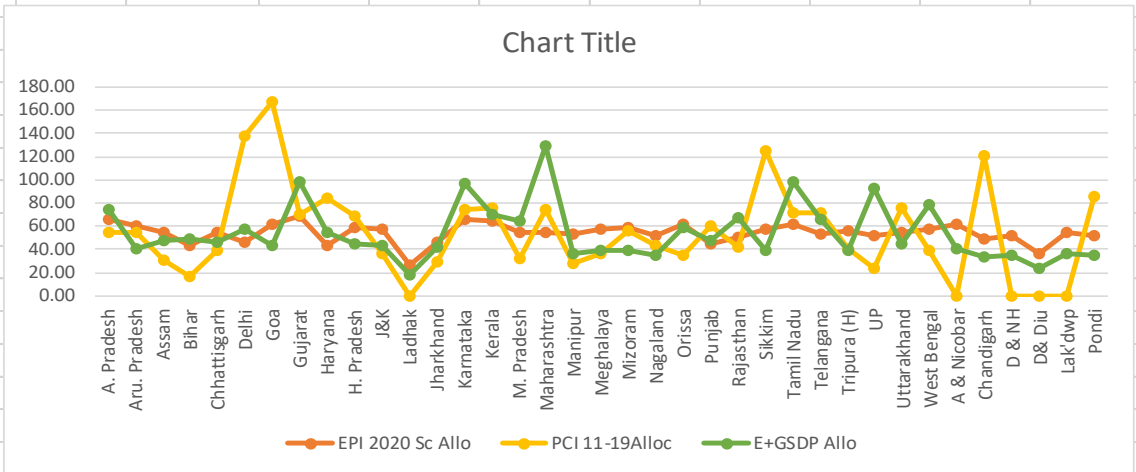
No	STATE / UTs	EPI 20+GDP17-18			
		EPI2016+Gdp16	EPI 20+GDP17	EPI GDP18-19	EPI+GDP19-20
1	A. Pradesh	0.3508	0.4008	0.4086	0.4143
2	Aru. Pradesh	0.2083	0.2171	0.2125	0.2125
3	Assam	0.2591	0.2511	0.1913	0.2541
4	Bihar	0.2545	0.2558	0.2602	0.2514
5	Chhattisgarh	0.2837	0.2498	0.2495	0.2519
6	Goa	0.3468	0.3046	0.3082	0.1615
7	Gujarat	0.2323	0.2308	0.2307	0.2162
8	Haryana	0.4134	0.5127	0.5223	0.5257
9	H. Pradesh	0.3557	0.2835	0.2868	0.2855
10	J&K	0.2472	0.2375	0.2372	0.2367
11	Ladakh	0.0286	0.2324	0.2037	0.2037
12	Jharkhand	0.1566	0.0933	0.0933	0.0933
13	Karnataka	0.3360	0.2221	0.2227	0.2202
14	Kerala	0.6421	0.5115	0.5205	0.4981
15	M. Pradesh	0.3742	0.3721	0.3916	0.2268
16	Maharashtra	0.4012	0.3426	0.3440	0.3531
17	Manipur	0.6942	0.6944	0.6944	0.6944
18	Meghalaya	0.1938	0.1936	0.1886	0.1886
19	Mizoram	0.2026	0.2074	0.2010	0.2010
20	Nagaland	0.1596	0.2109	0.2069	0.2069
21	Orissa	0.2442	0.1886	0.1836	0.1836
22	Punjab	0.2178	0.3087	0.3096	0.3090
23	Rajasthan	0.2990	0.2550	0.2539	0.2526
24	Sikkim	0.4017	0.3528	0.3544	0.1795
25	Tamil Nadu	0.5047	0.2074	0.2075	0.2025
26	Telangana	0.4193	0.5185	0.5286	0.5049
27	Tripura	0.3565	0.3459	0.3525	0.3523
28	UP	0.2235	0.2082	0.1986	0.1986
29	Uttarakand	0.4800	0.4702	0.4752	0.4500
30	West Bengal	0.2264	0.2408	0.2408	0.2387
31	A & Nicobar	0.3258	0.4079	0.4223	0.4213
32	Chandigarh	0.1870	0.2176	0.2159	0.2159
33	D & NH	0.1775	0.1811	0.1730	0.1730
34	D& Diu	0.1234	0.1835	0.1835	0.1835
35	Lak'dwp	0.1409	0.1273	0.1273	0.1273
36	Delhi	0.1640	0.1940	0.1940	0.1940
37	Pondi	0.1927	0.1878	0.1878	0.1809

Table-2 EPI 2020 Scores and Ranking of States 3/4/2020

S.No	States /Uts	AIRPOL*		FOREST		WATER QUALITY		WASTE MG		CLIMATE CHANGE		BIODIVERSITY		AGRICULTURE		FISHERIES		ENVIRONMENTAL QUALITY
		Avg Sc *	Rk	Avg.Sc		Avg.Sc	RK	Avg.Sc	RK	Avg.Sc	RK	Avg.Sc	RK	Avg.Sc	RK	Avg.Sc	RK	
1	Andhra Pradesh	0.9333	12	0.5370	3	0.4352	14	0.3018	18	0.4855	9	0.1466	11	0.2299	21	0.2697	3	0.0000
2	Arunachal Pradesh	0.9565	9	0.3840	6	0.3817	20	0.2502	25	0.4227	16	0.1816	6	0.2825	2	0.0049	28	0.0000
3	Assam	0.9231	13	0.2296	14	0.4485	13	0.1955	30	0.3904	19	0.1113	18	0.2553	17	0.0219	14	0.0000
4	Bihar	0.8391	24	0.0744	28	0.3666	23	0.0599	33	0.2386	35	0.0802	19	0.1470	33	0.0105	23	0.0000
5	Chhatisgarh	0.9020	17	0.3759	7	0.4840	8	0.3069	17	0.2735	31	0.1326	13	0.1767	29	0.0388	10	0.0000
6	Delhi	0.6124	36	0.0202	35	0.1764	33	0.3622	8	0.4414	14	0.0325	27	0.2593	15	0.0030	32	0.0000
7	Goa	0.9444	11	0.0957	26	0.6066	2	0.5344	1	0.3722	22	0.0279	29	0.2693	9	0.0422	9	0.0000
8	Gujarat	0.8437	23	0.2304	13	0.4349	15	0.3326	13	0.4903	7	0.5263	1	0.1715	30	0.3316	2	0.0000
9	Haryana	0.7901	28	0.0299	32	0.1570	35	0.2731	19	0.2904	30	0.0291	28	0.1831	26	0.0260	12	0.0000
10	Himachal Pradesh	0.9231	13	0.3150	12	0.5882	3	0.1408	31	0.4664	11	0.1406	12	0.1828	27	0.0127	20	0.0000
11	J & K UT	0.8009	27	0.3648	8	0.3803	21	0.2729	20	0.3674	24	0.2381	2	0.2504	19	0.0090	25	0.0000
12	Ladakh UT			0.0117	37	0.2500	30	0.0000	36	0.1537	37	0.0137	35	0.2500	20	0.0000	35	1.0000
13	Jharkhand	0.7790	31	0.1935	17	0.5515	5	0.0299	34	0.2615	33	0.0542	23	0.1553	32	0.0112	22	0.0000
14	Karnataka	0.9198	15	0.5757	1	0.3199	28	0.3527	10	0.5166	4	0.1779	8	0.1779	28	0.2179	5	0.0000
15	Kerala	1.0000	1	0.4270	4	0.3602	24	0.3603	9	0.4479	12	0.0586	21	0.2751	5	0.2416	4	0.0000
16	Madhya Pradesh	0.9076	16	0.3636	9	0.3756	22	0.2506	23	0.4343	15	0.2244	3	0.1440	34	0.0185	17	0.0000
17	Maharashtra	0.8608	20	0.3511	10	0.4265	16	0.1370	32	0.3988	17	0.1895	5	0.1852	25	0.1543	6	0.0000
18	Manipur	1.0000	1	0.0430	30	0.4831	9	0.2504	24	0.3938	18	0.0212	31	0.2708	8	0.0102	24	0.0000
19	Meghalaya	1.0000	1	0.1554	18	0.4767	11	0.3164	15	0.4454	13	0.0269	30	0.2784	4	0.0032	31	0.0000
20	Mizoram	1.0000	1	0.1357	21	0.5404	6	0.2501	27	0.5013	6	0.1128	17	0.2796	3	0.0059	27	0.0000
21	Nagaland	0.8254	25	0.1472	20	0.5197	7	0.2502	25	0.2924	29	0.0384	26	0.2865	1	0.0049	28	0.0000
22	Orissa	0.8772	19	0.5571	2	0.4006	18	0.2403	28	0.5682	3	0.1570	9	0.2721	6	0.1227	8	0.0000
23	Punjab	0.8075	26	0.0306	31	0.1690	34	0.2612	21	0.2486	34	0.0688	20	0.2233	22	0.0124	21	0.0000
24	Rajasthan	0.7894	29	0.1126	25	0.2063	32	0.3887	5	0.4727	10	0.1897	4	0.0925	36	0.0033	30	0.0000
25	Sikkim	1.0000	1	0.0841	27	0.5549	4	0.2118	29	0.4866	8	0.0466	25	0.2623	12	0.0000	35	0.0000
26	Tamilnadu	0.9565	9	0.2026	15	0.3553	25	0.3488	11	0.2688	32	0.1190	16	0.1937	23	0.4614	1	0.0000
27	Telangana	1.0000	1	0.3973	5	0.1188	37	0.3884	6	0.3122	28	0.1291	15	0.1578	31	0.0149	19	0.0000
28	Tripura	0.9020	17	0.1307	22	0.4795	10	0.3977	4	0.3767	21	0.0515	24	0.2565	16	0.0085	26	0.0000
29	Uttar Pradesh	0.9892	8	0.1992	16	0.3003	29	0.3374	12	0.2346	36	0.1313	14	0.1865	24	0.0212	15	0.0000
30	Uttaranchal	0.7682	32	0.3291	11	0.3423	26	0.3296	14	0.5060	5	0.1480	10	0.1307	35	0.0165	18	0.0000
31	West Bengal	0.7857	30	0.1285	23	0.3970	19	0.3861	7	0.3545	26	0.1782	7	0.2721	6	0.1339	7	0.0000
32	Andaman & Nicobar	0.8571	21	0.1522	19	0.6541	1	0.3135	16	0.5716	2	0.0547	22	0.2614	14	0.0232	13	0.0000
33	Chandigarh	0.8502	22	0.0272	33	0.2067	31	0.4195	3	0.3443	27	0.0141	33	0.2526	18	0.0000	35	1.0000
34	Dadra & Nagar Haveli	0.6802	34	0.0601	29	0.4546	12	0.4626	2	0.3678	23	0.0151	32	0.2622	13	0.0011	34	1.0000
35	Daman & Diu	0.7047	33	0.0256	34	0.1294	36	0.0001	35	0.3807	20	0.0137	35	0.0067	37	0.0303	11	1.0000
36	Lakshadweep	0.6667	35	0.1251	24	0.4184	17	0.0000	36	1.0000	1	0.0137	35	0.2656	11	0.0018	33	1.0000
37	Pondicherry	1	1	0.0148	36	0.3284	27	0.2509	22	0.3615	25	0.0138	34	0.2689	10	0.0188	16	0.0000

Replace Table -1 with.

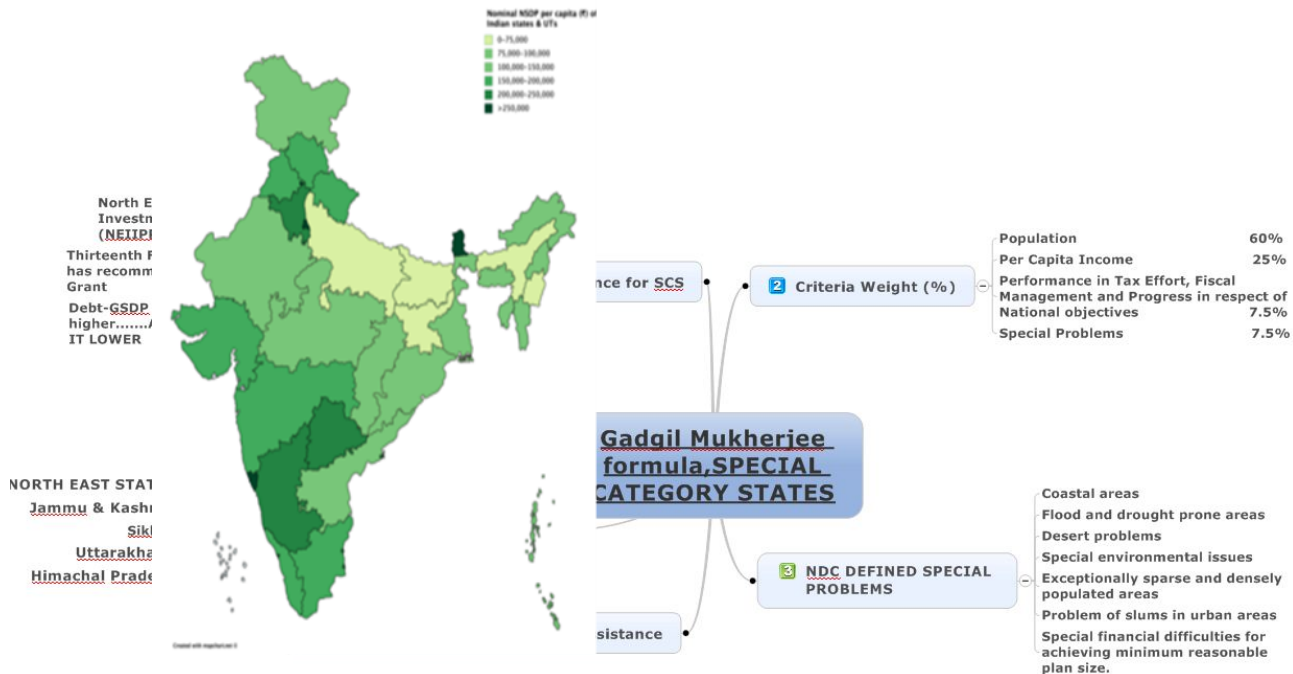






Variable	Weights accorded	
	13th	14th
Population (1971)	25	17.5
Population (2011)	0	10
Fiscal capacity/Income distance (See box-1)	47.5	50
Area	10	15
Forest Cover	0	7.5
Fiscal discipline (See box-1)	17.5	0
Total	100	100

Gadgil Formula		Mukherjee Formula	
Criteria	Weight (per cent)	Criteria	Weight (per cent)
Population (1971)	60	Population	55
Per Capita Income	10	Per-Capita Income	25
Tax Effort	10		
Continuing Commitments on Major and Medium Integrated Multi-purpose Projects (IMP)	10	Special Development Problems	15
Special Problems	10	Progress in Fiscal Management	5
IV, V, VI, and VII Five Year Plan and 1990-91 Annual Plans.		VIII, IX, X, and XI Five Year Plans.	



“Gadgil formula”

The Gadgil formula was formulated with the formulation of the fourth five year plan for the distribution of plan transfers amongst the states. It was named after the then deputy chairman of the Planning Commission Dr. D.R. Gadgil. The central assistance provided for in the first three plans and annual plans of 1966-1969 lacked objectivity in its formulation and did not lead to equal and balanced growth in the states. The National Development Council (NDC) approved the following formula:

1. Special Category states like Assam, Jammu and Kashmir and Nagaland were given preference. Their needs should first be met out of the total pool of Central assistance.
2. The remaining balance of the Central assistance should be distributed among the remaining States on the basis of the following criteria: (i) 60 per cent on the basis of population; (ii) 10 per cent on the basis of tax effort, determined on the basis of individual State's per capita tax receipts as percentage of the State's per capita income; (iii) 10 per cent on the basis of per capita State income, assistance going only to States whose per capita incomes are below the national average; (iv) 10 per cent on the basis of spill-over into the Fourth plan of major continuing irrigation and power projects; (v) 10 per cent for special problems of individual States.

Gadgil-Mukherjee

Criteria for inter-state allocation of Plan Assistance

CRITERIA WEIGHTAGE (%)

POPULATION 55 ; PER CAPITA INCOME 25 ; FISCAL MANAGEMENT 5 ; SPECIAL PROBLEMS 15; TOTAL 100