

Attaining SDG 15 Through Forest Cover

A Case of Selected States in India

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Abstract—Out of 17 Sustainable Development Goals(SDGs), 15th one covers, ‘Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss’. It refers to all those efforts taken to combat the climate change and its impacts in the long run and preserving it for the future generation. The known terms are, ‘Climate mitigation’ and climate adaptation’. Efforts towards reduction in greenhouse gas emissions and taking actions to prepare for and adjust to both the current and the future challenges of climate change, is what is expected. In practice, it comprises of the simplest actions like riding a bicycle to move towards the low carbon economy up to the toughest job of deliberate policy prescriptions/ reforms to build resilience and adaptation or even to adhere to the Paris agreement’s terms and conditions. Everyone has a role to play in the climate action. There are multiple, feasible and effective ways to reduce the severity and adapt to the humanly-caused climate change.

Forests work magically to stabilize the climate. It is needless to say that the forest has a vital role to play in the carbon cycle. Regulation of ecosystem, protecting biodiversity, livelihood support, reduction in rising temperatures and regularizing the season’s cycle, all of these have one single and ultimate solution and that is, ‘Forest Cover’. It is probably with this unique character of the forest resources and the commitment of India towards the sustainable development agenda of the United Nations (UN), the Finance Commissions (FCs) have recently included Forest cover of state as one of the criteria (with 7.5%-10% weightage) for the central transfers to the states. 14th and 15th Finance Commission, along with the conventional criteria like area, population, fiscal capacity, etc., have very mindfully incorporated Forest Cover/

Forest and Ecology as one of the criteria for the central transfers to the states.

A case of horizontal fiscal devolution has been put up for selected four states referring to the 14 finance commission. Based on the forest cover, Forestry and Logging (one of the Agriculture and allied sectors) activity’s spread, its output values are expected to differ. Forestry and Logging activity patterns are also expected to differ based on the State’s/ Region’s Industrial Progress, Rural-Urban and even Tribal population composition of the State. Poverty levels within the states would also be affecting the usage of fuelwoods and extraction of other forest resources and their overall growth.

In order to review and analyse the State wise Indian Forest cover scenario, this research paper has shortlisted four States on the basis of their geographical area (area-wise first four States in India), namely Madhya Pradesh, Maharashtra, Rajasthan and Uttar Pradesh. First section of the paper explores the performance of the selected states referring to the forest cover and other related variables. Second section of the paper comments on the financing part of promoting the forest cover among Indian states, with special reference to the Ecological Fiscal Transfers (EFTs) from the centre to the states based on Forest Cover.

State wise cases clearly exhibit the heterogeneous nature of the States along many attributes. There is also unequal distribution of the incentives that States are receiving in the form of EFTs. States which are doing well in terms of Forest Cover are receiving the least amount of funding, with one exception (Maharashtra). The top 5 performers with reference to Forest Cover as a percentage of the total area are Arunachal

Pradesh, Manipur, Meghalaya, Mizoram, and Nagaland.

Keywords— forest cover; climate change; fiscal transfer; states; forestry

INTRODUCTION

Climate crisis across the World at different times, Russia-Ukraine War, lingering side-effects of Covid-19 pandemic, and the sluggish global economy, all of these are weakening and hindering the progress towards the achievement of the Sustainable Development Goals. The Sustainable Development Goals Report (SDGs). July 2023, calls for a powerful action and assessment of the SDGs based on the latest data. As per the report, in the description of 15th SDG goal, it has been clearly stated that, 'A fundamental shift in Humanity's relationship with Nature is essential: escalating Forest losses, land degradation, species extinction pose severe threats to people and the planet.'

Out of 17 Sustainable Development Goals(SDGs), 15th one's agenda is to, 'Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss'. It refers to all those efforts taken to combat the climate change and its impacts in the long run and preserving it for the future generation. The known terms are, 'Climate mitigation' and climate adaptation'. Efforts towards reduction in greenhouse gas emissions and taking actions to prepare for and adjust to both the current and the future challenges of climate change, as the above terms would interpret respectively. Everyone has a role to play in the climate action. There are multiple, feasible and effective ways to reduce the severity and adapt to the humanly-caused climate change.

In practice, climate action comprises of the simplest action like riding a bicycle to move towards the low carbon economy up to the toughest job of deliberate policy prescriptions to build resilience and adaptation or toughest of all would even mean to adhere to the Paris agreement's terms and conditions¹. Taking baby steps and analysing the micro picture of the issue would always be helpful in programme planning, designing and in execution of it. Referring to the 15th SDG goal, and further separating the various facets of this goal, we realise that the existence of forests on the mother earth, is at the core of this theme and has a very inevitable role to play.

¹ Nationally Determined Contributions (NDC) represents the commitment of each country to reduce greenhouse gas emissions for climate change impact mitigation and adaptation. Countries agreed to this during the Conference of the Parties (COP 21) held in Paris 2015.

Forests work magically to stabilize the climate. It is needless to say that the forest has a vital role to play in the carbon cycle. Regulation of ecosystem, protecting biodiversity, livelihood support, reduction in rising temperatures and regularizing the season's cycle, all of these have one single and ultimate solution and that is, 'Forest Cover'. The United Nations Organization has proclaimed its theme for 2021 as "Forest Restoration: a path to recovery and well-being." This is because, the services provided by the forests cover a wide range of ecological, economic, social and cultural considerations by providing a multitude of benefits at local, national and global levels too.

It is probably with this unique character of the forest resources and the commitment of India towards the sustainable development agenda of the United Nations (UN), the Indian Finance Commissions (FCs) have recently included Forest cover of the State as one of the criteria (with 7.5%-10% weightage) for the central transfers to the states, 14th and 15th Finance Commission, along with its usual, conventional criteria like area, population, fiscal capacity, etc., have very mindfully incorporated Forest Cover/ Forest and Ecology as one of the criteria for the central transfers to the states.

Based on the forest cover, Forestry and Logging (one of the Agriculture and allied sectors) activity's spread, its output values are expected to differ. Forestry and Logging activity patterns are also expected to differ based on the State's/ Region's Industrial Progress, Rural-Urban and even Tribal population composition of the State. Poverty levels within the states would also be affecting the usage of fuelwoods and extraction of other forest resources and their overall growth. Here, we confront the question of financing part of this SDG, namely Climate action – narrowing it down to the forest cover referring to the case of India and Indian States for the same.

In order to review and analyse the State wise Indian Forest Cover scenario, this research paper has shortlisted four States on the basis of their geographical area (area-wise first four States in India), namely Madhya Pradesh, Maharashtra, Rajasthan and Uttar Pradesh. First section of the paper explores the relationship between the states' performance on forest cover creation and their Ecological Fiscal Transfers (EFT). Second section of the paper comments on the financing part of promoting the forest cover among Indian states, with special reference to the Finance Commissions and the fiscal transfer from the centre to the states based on Forest cover.

METHODOLOGY AND DATA SOURCES

Selection of four states is based on the geographical area of the state. Researchers have taken 'area' because as per the Finance Commission criteria for

the Centre to State finance, geographical area of the State is one of the oldest criteria and when we take the forest cover of the state in to consideration, geographical area of the State matters. (Covering all states/ UTs in India is beyond the scope of this paper due to the word limit.) Theoretically, one might assume that more the geographical area of the State, more is going to be the forest cover, though in reality we do not get to see that for number of reasons. The agricultural statistical system in India is vast as well as complex. Collection of data for the agriculture and allied sectors is done from diverse sources like Central and state

TABLE-1 TOP TEN COUNTRIES FOR FOREST AREA (2020)

Sr. no.	Country	Forest Area (000 ha)	% of World Forest Area	% of Country area
1.	Russian Federation	8,15,312	20	49.8
2.	Brazil	4,96,620	12	59.4
3.	Canada	3,46,928	9	38.7
4.	USA	3,09,795	8	33.9
5.	China	2,19,978	5	23.3
6.	Australia	1,34,005	3	17.4
7.	Democratic Republic of Congo	1,26,155	3	55.6
8.	Indonesia	92,133	2	49.1
9.	Peru	72,330	2	56.5
10.	India	72,160	2	24.3

Source: *The Global Forest Resource Assessment (GFRA) Report 2020*

Apart from this, the 14th and 15th Finance Commission data, reports have been taken up to assess the finance part of the Forest Cover. The term that has been coined for these transfers, is, 'Ecological Fiscal Transfers' (EFTs). While comprising all these data sheets and draw the relevant

STATE OF INDIA'S FOREST COVER

The forest resources of almost all countries at five-year intervals are facilitated by the Global Forest Resource Assessment (GFRA) by FAO. The latest report of the GFRA 2020, has published top ten countries in respect of forest area and the change in forest area². (it differs from the forest cover³)

² The Recorded Forest Area or Forest Area refers to all the geographical area recorded as forests in govt. records irrespective of the actual trees growing on such land.

³ Forest Cover refers to all the patches that have canopy density of more than 10% and area of one hectare or more in size, irrespective of land use, legal status, and ownership.

governments, local bodies, autonomous bodies, etc. which is very challenging and time consuming. For the analyses of the State wise Forest Cover and then its resource utilization, the study has used the data published by the National Statistical Office (NSO), Ministry of Statistics and Programme Implementation, Govt. of India., with base year 2011-12. State wise the value of output data is taken from 2011-12 onwards up to 2019-20. Forest Survey of India (FSI) data has been extensively used in the study to observe and analyses the forest based changes over a period in the said regions. Along with this, the RBI statistical data, NITI Aayog's reports have been utilised to analyse other relevant variable to the Forest Cover like the State Gross Domestic Products (SGDP) or even the State's ranking based on the Multidimensional Poverty Index (MPI), etc.

TABLE 2 ANNUAL FOREST GAIN TOP TEN COUNTRIES

Sr. no.	Country	Annual Forest Gain	
		Area (000 ha)	% of 2010 forest area
1.	China	1,937	0.93
2.	Australia	446	0.34
3.	India	266	0.38
4.	Chile	149	0.85
5.	Vietnam	126	0.90
6.	Turkey	114	0.53
7.	USA	108	0.03
8.	France	83	0.50
9.	Italy	54	0.58
10.	Romania	41	0.62

Source: *The Global Forest Resource Assessment (GFRA) Report 2020*

inferences, basic statistical techniques are utilised for the same. Intention here is to brain storm on the research idea and generate more discussions that drive better policy prescriptions and would lead to the favourable practices by the stakeholders.

The above table clearly shows that though in percentage terms, the Indian forest cover increases marginally by 0.38% of the forest area in 2010, the absolute forest gain in terms of the forest cover is 266000 hectares for the whole country. It is then interesting to see how this increased forest cover is spread across the Indian states.

Knowledge of growing stock or the volume of all living tress is very important to understand dynamics of forests, their productive capacities and their sustainable management. It is very crucial to determine the quantum of biomass existing in the forests, the estimation of emissions based on that, or even measuring existence of the habitat in the forests, etc. This information is assessed through the National Forest Inventory (NFI) exercise, and other major periodic forest resource assessment activity of Forest Survey of India (FSI), are worth noting.

Forestry in India is a significant rural industry and a major environmental resource. According to the Economic Survey 2021-22, India is the tenth most forest-rich countries of the world. Together, India and 9 other countries account for 67 percent of total forest area of the world. Forestry is a unique sector which along with the commercial products, generates public goods such as biodiversity, water regulation, landscape, erosion control, resilience to floods and climate change mitigation that create positive

externalities for the whole country. It is probably with this unique character of the forest resources and the commitment of India towards the sustainable development agenda of the United Nations (UN), the Finance Commissions (FCs) have recently included Forest cover of state as one of the criteria (with 7.5%-10% weightage) for the central transfers to the states.

TABLE-3 SELECTED STATES DATA

States	Geographical Area (GA) in sq. km	Recorded Forest Areas % of GA	State's total moderate and very dense forest (%)
Madhya Pradesh	3,08,252	30.72	10.5
Maharashtra	3,07,713	20.13	7.45
Rajasthan	3,42,239	9.6	1.14
Uttar Pradesh	2,40,928	7.22	1.56

Source: India State of Forest Report 2021

In its Report, titled India: Unlocking Opportunities for Forest-Dependant People (2020), the World Bank has estimated India's total forest income to increase at 2 billion dollars annually. The Forests are the second largest land use in India after agriculture and around 275 million people in rural areas depend on the forests for their livelihood, who mainly are the tribal people and they account for the poorest and vulnerable communities in India.

If we go by the sectoral bifurcations in India, the first and very crucial '**Agriculture and allied sectors**' consist of four sub-sectors, namely:

1. Crop;
2. Livestock;
3. Forestry and logging and
4. Fishing and aquaculture.

Forestry And Logging Sector (forestry, in short) further includes: Forestry; logging and transportation of forest

products to the sale depots/assembly centres; and farmyard wood (industrial wood and fuelwood collected by the primary producers from trees outside regular forests).

The forest products are classified into two broad groups, namely

(a) major products comprising Industrial Wood (timber, round wood, match and pulpwood) and Fuelwood (firewood and charcoal wood) and

(b) Non-Timber Forest Products (NTFP)

Agriculture and allied sectors including its four sub-sectors (i.e. Crop; Livestock; Forestry and logging; and Fishing and aquaculture) play a vital role in Indian economy. It contributes around 18% of the country's Gross Value Added at basic prices and employs nearly half of the workforce in the country. A large section of Indian population depends on agriculture and allied activities for their livelihood. The State wise value of output of these sub-sectors assume considerable importance in the economy.

TABLE 4: STATE WISE VALUE OF OUTPUT (AT 2011-12 PRICES) FORESTRY AND LOGGING (RS. LAKHS)

States	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Madhya Pradesh	1121960	1129180	1276903	1314802	1328020	1309766	1314000	1437501	1429792
Maharashtra	1809188	1774913	2025902	1991535	2047890	2007615	2520959	2835361	2820884
Rajasthan	1693704	1680346	1983243	2054285	2097451	2240586	2231265	2240007	2230114
Uttar Pradesh	1493606	1471884	1457250	1465515	1483042	1638347	1611884	1707237	1708770

Source: NSO, Ministry of Statistics and Program Implementation, GOI 2021-22

STATE WISE FORESTRY AND LOGGING TRENDS

In order to observe and analyse the state wise Indian Forest Cover scenario, and to study the spread of the Forestry and Logging activities (as a part of Agriculture and Allied Activities), the study has shortlisted four States on the basis of their geographical area (area-wise first four States in India), namely Madhya Pradesh, Maharashtra, Rajasthan and Uttar Pradesh.

Table No. 3 shows that, Rajasthan has go the highest Geographical Area (GA) (3,42,239 Sq. Km), but the recorded forest area is just 9.6 % of its GA and the total moderate and very dense forest number is very low, i.e. 1.14 % of the recorded Forest Area. The ideal situation prevails in Madhya Pradesh, where GA is 3,08,252 Sq. Km. and recorded Forest Area is 30.72 % of GA and the total moderate and very dense forest number is 10.5 % of the recorded Forest Area⁴.

Forestry And Logging Sector (forestry, in short) includes: Forestry; logging and transportation of forest products to the sale depots/assembly centres; and farmyard wood (industrial wood and fuelwood collected by the primary producers from trees outside regular forests).

The forest products are classified into two broad groups, namely

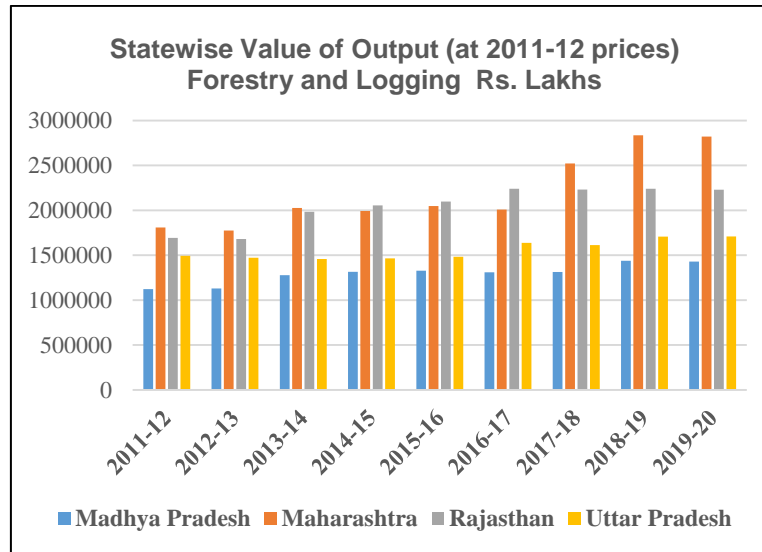
(a) major products comprising industrial wood (timber, round wood, match and pulpwood) and fuelwood (firewood and charcoal wood) and

b) Non-timber forest product.

State wise value of output of Forestry and Logging is not in sync with the Forest Cover percentage of GA assessed it 2019 by ISFR 2021. Forest cover is highest in Madhya Pradesh (25.14%), but the Value of Output of forestry and logging is the lowest in the State. Rajasthan has the lowest forest cover among the selected four states (4.87%), in contrast the Value of Output of Forestry and Logging is the second largest in the given years. In year 2016-17 Rajasthan's Value of Output in the sector is the highest as compared to other

⁴ The Recorded Forest Area or Forest Area refers to all the geographical area recorded as forests in govt. records irrespective of the actual trees growing on such land. Forest Cover refers to all the patches that have canopy density of more than 10% and area of one hectare or more in size, irrespective of land use, legal status, and ownership. (as per ISFR 2021). For the SDGs targets achievements, the Forest Cover based analyses is very important.

FIGURE 1



Source: NSO, Ministry of Statistics and Program Implementation, GOI 2021-22

TABLE 5: STATE WISE VALUE OF OUTPUT (AT 2011-12 PRICES) INDUSTRIAL WOOD (FOREST AND OUTSIDE FOREST) RS. LAKHS

States	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Madhya Pradesh	540282	536804	689752	734518	750062	734573	718373	838264	815149
Maharashtra	850117	823185	1073976	1161716	1207881	1227894	1655891	2102375	2127339
Rajasthan	915515	897423	1201731	1253381	1288945	1424286	1436651	1457356	1473604
Uttar Pradesh	887054	875861	877040	892103	923751	1080618	1089460	1205358	1220134

Source: NSO, Ministry of Statistics and Program Implementation, GOI 2021-22

States. Along with Rajasthan, Maharashtra is also showing direct correlation between the Forest Cover and the Value of Output. In spite of having low Forest Cover (6.15%, 3rd lowest in the category), Uttar Pradesh's Value of Output is quite moderate, higher than Madhya Pradesh.

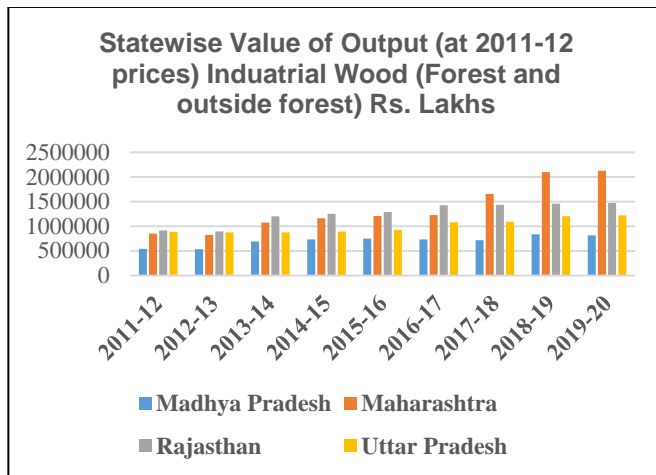
(a)Industrial Wood: Industrial wood means forest products used to sustain a sawmill, plywood mill, pulp mill or other forest industry related manufacturing facility. Though Industrial wood is associated with the Forest resource extraction, it also shows the direct correlation with the Industrial growth of the State. Industrial wood being a part of Forest Resource extraction can only be replaced by the plantation of new trees, which is long-term phenomena.

Fuelwood/Firewood -Fuelwood constitutes an important basic need for a large segment of the population in India. The quantity/output of fuelwood is estimated through consumption approach, as reliable estimates on production of fuelwood are not directly available. The estimated production of fuelwood is based on three components, namely (i) household

fuelwood consumption, (ii) agricultural by-products i.e. straw and sticks used as fuelwood (this amount is to be subtracted from the total consumption of fuelwood by the households, as it is already accounted for in the

agriculture sector as by-products) and (iii) fuelwood consumed by industries, religious and other social rituals. Fuelwood is also a big chunk of forest resource extraction.

FIGURE 2



Source: NSO, Ministry of Statistics and Program Implementation, GOI 2021-22

Fig (1) clearly shows that Maharashtra State is showing a steady growth in Value of Output of Industrial Wood. After 2016-17, in Maharashtra, rise in Value of Output of Industrial wood is happening at a higher rate. Next to Maharashtra, is Rajasthan, in fact from year 2011-12 up to 2016-17, Rajasthan is showing slightly higher Value of Output of Industrial Wood as compared to Maharashtra. The lowest Industrial Wood output value gets generated in Madhya Pradesh. Uttar Pradesh was at par with Maharashtra and Rajasthan in year 2011-12 and 2012-13, then later years show more or less steady trends there. Rajasthan records the lowest Value of Output of Firewood throughout the decade. Maximum higher trends are observed in case of Uttar Pradesh and that too in the first half of the decade. In the second half, Uttar Pradesh shows the slight reduction

in the Value of Output of Firewood. Maharashtra and Rajasthan are almost going parallelly in the first three years of decade and then Rajasthan is going ahead of Maharashtra with respect to Value of Output of Firewood and Maharashtra shows the marginal decline in the Value of Output of Firewood.

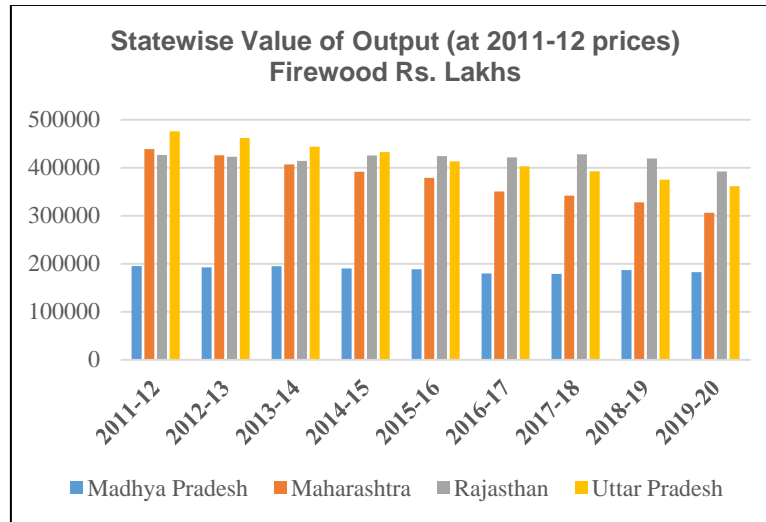
(b) Non-Timber Forest Products (NTFP): NTFP comprising a large number of wild growing forest material such as bamboo, fodder, lac, sandalwood, honey, resin, gum, tendu leaves, cork, balsams, vegetable hair, eelgrass, acorns, horse chestnuts, mosses, lichens etc. In the Value of Output of Non-Timber Forest Products, the above graph clearly exhibits good, consistent chunk of Value of Output of Non-Timber Forest Products in case of Madhya Pradesh. Forestry and Logging is a broad activity and Industrial Wood, Firewood and Non-Timber Forest Products are sub-components of it. Madhya Pradesh, even though has the highest Forest Cover % of GA, records lowest Value of Output of Industrial wood and Firewood, both. In the overall Forestry and Logging sector, the Value of Output of Non-Timber Forest Products are contributing majorly in case of Madhya Pradesh. Maharashtra is showing the highest Value of Output for first seven years of the decade and then it is showing a slight decline in the Value of Output. Rajasthan, similar to Madhya Pradesh, exhibits almost the same Value of Output of Non-Timber Forest Products throughout the decade. In fact, there is slight decline in the Value towards the last three years in the mentioned period for Rajasthan. Uttar Pradesh is the lowest one in the tagged list of the States and Value of the Output has remained more or less same or even declined slightly towards the last three years of the decadal trends.

TABLE 6: STATE WISE VALUE OF OUTPUT (AT 2011-12 PRICES) FIREWOOD RS. LAKHS

States	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Madhya Pradesh	195208	192716	194937	190475	188733	180094	178935	187096	182740
Maharashtra	438765	426004	406917	391700	378802	350731	341946	327843	306176
Rajasthan	426670	422986	414408	425671	424284	421537	428006	419157	392288
Uttar Pradesh	475947	461816	443884	432503	413320	403074	392502	375326	361468

Source: NSO, Ministry of Statistics and Program Implementation, GOI 2021-22

FIGURE 3



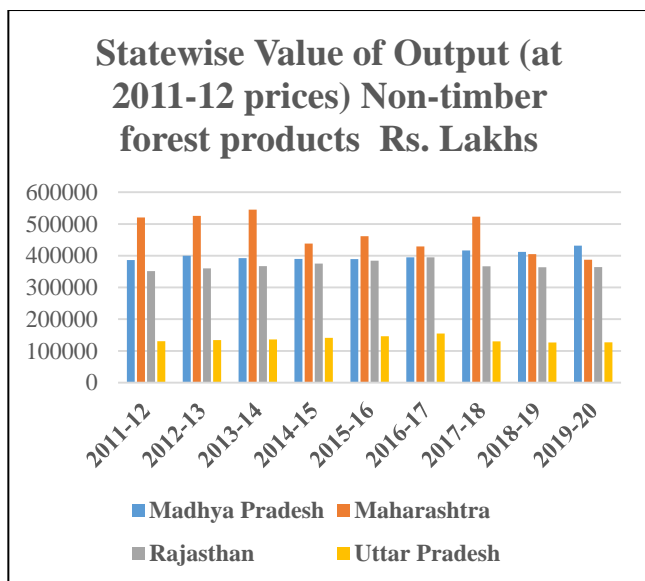
Source: NSO, Ministry of Statistics and Program Implementation, GOI 2021-22

TABLE 7: STATE WISE VALUE OF OUTPUT (AT 2011-12 PRICES) NON-TIMBER FOREST PRODUCTS (RS. LAKHS)

States	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Madhya Pradesh	386470	399660	392213	389809	389224	395099	416692	412141	431903
Maharashtra	520307	525724	545009	438119	461207	428990	523123	405143	387369
Rajasthan	351519	359937	367104	375233	384222	394766	366609	363493	364221
Uttar Pradesh	130605	134207	136326	140909	145970	154654	129922	126553	127169

Source: NSO, Ministry of Statistics and Program Implementation, GOI 2021-22

FIGURE 4



Source: NSO, Ministry of Statistics and Program Implementation, GOI 2021-22

Other than the Forestry and Logging sub-sector based data, the study would like to exhibit some of the population composition based features of the State and its Multidimensional Poverty headcount ratio based on Niti Aayog's Multidimensional Poverty Index Calculations.

- A state's population and its forest cover have an inherent negative correlation. The more populous a state is, the more land is required for human activities and settlement, which results in deforestation and a lower forest cover. According to data collected by the Unique Identification Authority of India, in 2019, the states with the highest forest cover were all in the bottom 6 in terms of population. Thus, states that have a high forest cover are at a disadvantage as they will have a relatively small population and will receive lower funds according to the horizontal devolution formula.
- Existence of tribal population in the states reflects in the value of Output of Non-Timber Forest products. This is very prominent in case of Madhya Pradesh.

- Population size and Multidimensional Poverty headcount ratio in Uttar Pradesh gets reflected in its trends of Value of Output of Fuelwood. Maharashtra, even though is second largest in case of population size, the MPI headcount is the lowest and therefore, high trends in Value of Output of fuelwoods can be justified by the Industrial performance of the State. (Annual Survey of Industries

2019-20 top five States in terms of their percentage shares in the value of overall aggregates - Maharashtra and Uttar Pradesh performing on different parameters, Rajasthan and Madhya Pradesh are nowhere close to this list.)

We understand that Indian states are highly heterogeneous along many attributes, whether its

TABLE 8: STATES' POPULATION COMPOSITION ALONG WITH MPI

State	Population (mn)	Forest Cover % of GA in 2019	Rural Population (mn)	Urban Population (mn)	Tribal Population (mn)	MPI headcount ratio 2019-21
Madhya Pradesh	72.63	25.14	52.56 (72.37%)	20.07 (27.63%)	15.32 (21.09%)	20.63%
Maharashtra	112.37	16.51	61.55 (54.78%)	50.82 (45.22%)	10.51 (9.35%)	7.81%
Rajasthan	68.55	4.87	51.50 (75.13%)	17.05 (24.87%)	9.24 (13.48%)	15.31%
Uttar Pradesh	119.81	6.17	55.31 (77.73%)	44.50 (22.27%)	1.13 (0.57%)	22.93%

Source: National-Multidimensional- Poverty-Index-2023, Niti Aayog

population composition, health or education parameter, the state's industrial and overall economic growth and development, including current levels of forest cover and many more such attributes. All of them are interlinked with each other and to come up with some concrete inferences on their strong and weak interlinkages, we need to analyse them in isolation for future research.

ECOLOGICAL FISCAL TRANSFERS

In 2007, the annual Conference of the Parties (COP) of the UN Framework Convention on Climate Change (UNFCCC), decided to fully integrate forests in developing countries into the negotiations on a new climate agreement. Under the heading of REDD (Reducing Emissions from Deforestation and Forest Degradation) or REDD+ (also including carbon stock enhancements), forest conservation is seen as critical to limit global warming to two degrees Celsius. (Arild Angelsen, December 2013). REDD+ was originally an idea about payment to countries and projects for reduced emissions, with funding primarily from carbon markets, but then focus moved to multi-objective, with livelihoods/poverty, biodiversity, adaptation, indigenous rights, good governance, etc. being added as worthy objectives. The baseline objective here was to raise funds or to make financial arrangements to restore forests and reduce carbon emission. REDD+ evolved over a period, and many

rounds of discussions, expert opinions contributed to it. Country wise cases are differing here.

In February 2015, India's 14th Finance Commission included, 'Forest Cover' to the formula that determines the amount of tax revenue the Central Government distributes annually Indian States (tax devolution). Along with conventional parameters like historical population, recent population, area, fiscal capabilities, etc., Forest Cover was added from fiscal years 2015-16 through 2019-20. The Central Government would distribute 7.5% of the divisible Central tax revenue (an estimated \$ 6.9-12 billion each year; Busch, Oct. 2019) in proportion to States' area of very dense and moderately dense Forest Cover as measured by the Indian State of Forest Report (2013).

Adding Forest Cover to the tax revenue devolution formula is mainly to compensate states for the fiscal disability of foregone economic opportunities caused by maintaining forests and promoting the ecological benefits that forests provide (Government of India, 2014).

In 2019, India's 15th Finance Commission decided to continue with this Ecological Fiscal Transfers (EFTs; Ring 2008) and increased formula weightage from 7.5% to 10% for Forest Cover/ Ecological priorities for fiscal years 2020-21 through 2024-25.

FIGURE: 5

Source: 14th Finance Commission Report

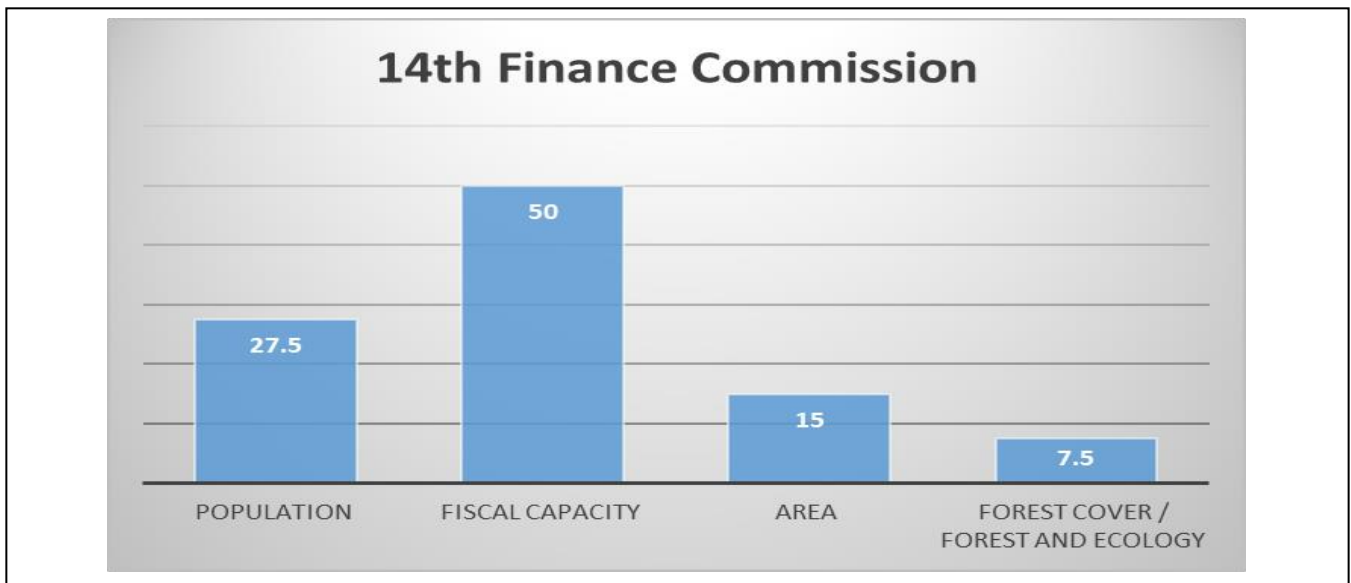


TABLE 9: STATE-WISE EFT AS PER THE 14TH FC WEIGHTAGE OF 7.5% FOR FOREST COVER (RS. CR.)

Year/State	Madhya Pradesh	Maharashtra	Rajasthan	Uttar Pradesh	Total
2015-16	2866	2096	2278	6814	37964
2016-17	3230	2224	2554	7682	42775
2017-18	3811	2786	3013	9065	50475
2018-19	4463	3262	3528	10615	59107
2019-20	4782	3496	3781	11376	63345
2020-21	3642	2833	2762	8282	46188

Source: Budget Receipts from Budget documents

TABLE 10: FOREST COVER (SQ. KM)

Year/State	Madhya Pradesh	Maharashtra	Rajasthan	Uttar Pradesh	Total
2015-16	41531	29459	4502	6255	4,01,278
2016-17	NA	NA	NA	NA	NA
2017-18	41134	29388	4418	6686	4,06,476
2018-19	NA	NA	NA	NA	NA
2019-20	41017	29293	4420	6697	4,07,750
2020-21	40874	29323	4447	6656	4,06,669

Source: India State of Forest Report 2021

The above data clearly shows that the four states are enjoying almost one third share of the total EFT coming collectively for all states to enhance their forest cover.

It is interesting to look into the data on forest cover of these states as per the India State of Forest Report 2021 publishing the data every alternate year.

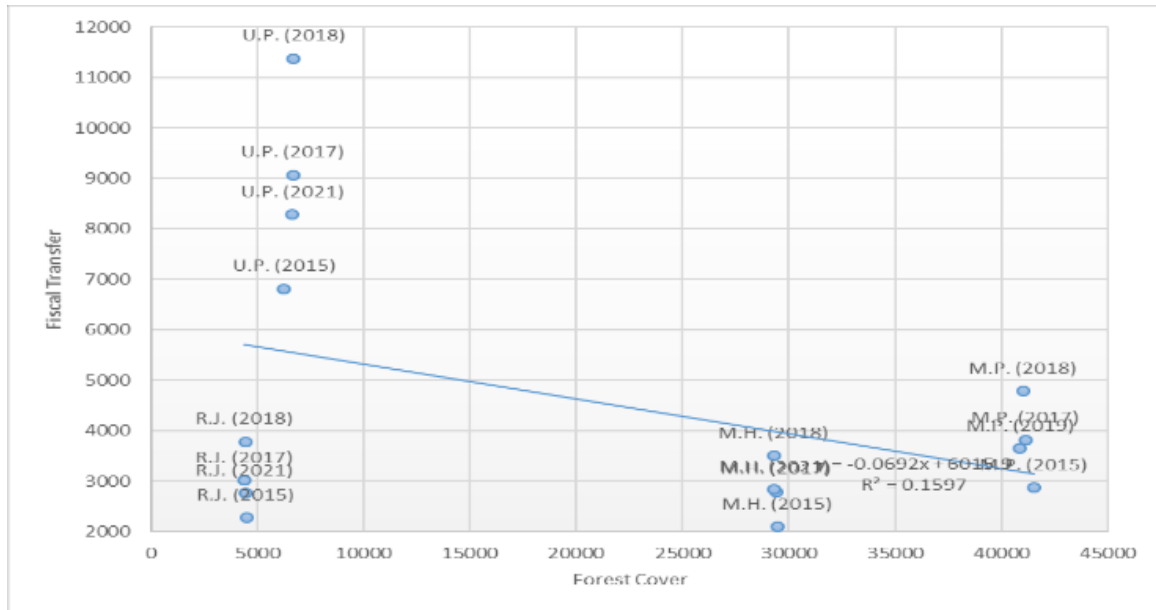
With the data for 2015-16, 2017-18, 2019-20 and 2020-21 for two variables namely Ecological Fiscal Transfers (EFTs) as dependent variable and the

Forest Cover in the state as the independent variable, we found negative correlation between the two variables with a small value of R^2 (coefficient as 0.1651). In this scatterplot, UP and Rajasthan were seen as the outliers with two different cases. Despite very small positive change (even less than 1) in the forest cover, UP had marginally reduced its EFTs (Rs. 8282 crores), but they were the maximum among all the states. In case of Rajasthan, there was slight increase in actual forest cover, and it got the least EFTs (Rs. 2762 crores) of all the states. This can be observed from the scatterplot that the variation for UP

and Rajasthan being the maximum as compared to Maharashtra and MP. This is evident from Fig 7.

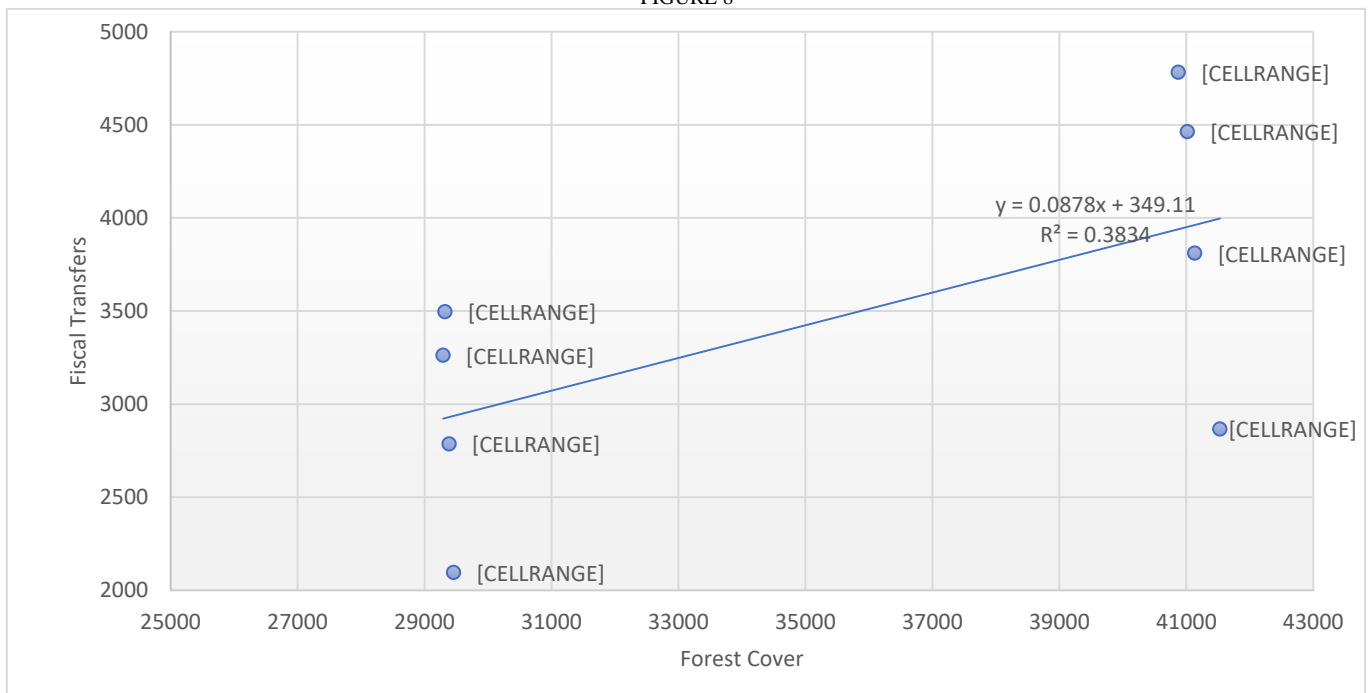
Therefore, eliminating UP and Rajasthan (outliers), we found relatively strong correlation with R^2 at 0.3834 as compared to the earlier one. Here in case of Maharashtra, the forest cover has marginally increased as compared to MP (it has reduced in absolute numbers). But, EFTs to MP are greater than Maharashtra (Rs. 3642 crores against Rs. 2833 crores).

FIGURE 6



Source: Basic data Budget Receipts from Budget documents and India State of Forest Report 2021

FIGURE 8



Source: basic data Budget Receipts from Budget documents and India State of Forest Report 2021

These coefficients along with the scatterplot initiate few interesting inferences:

Does the EFTs serve as an incentive to enhance the forest cover in a given state in the light of SDG 15?

The positive correlation between the forest cover and the EFTs is not seen collectively for all states in India.

Are other criteria like area of the state, SGDP overpowering the EFTs? India's forest-proportional tax revenue devolution represents the World's first "Ecological Fiscal Transfers" (EFTs) for Forest Cover. India's this move towards the EFTs contributes roughly \$ 1 billion in annual international funding, for reducing emissions from deforestation and forest degradation (REDD+) (Busch, Oct. 2019). There were incentive grants for forest cover provided by the 13th Finance Commission, which amounted around \$ 5 billion over five years, came with pre-conditions and was earmarked for spending on forest-related budgets lines (Government of India, 2010). Whereas, the EFTs are untied to Forestry budgets and can be spent in any sectors (for example: health, education, infrastructure) at the discretion of state governments. Here, the point of interlinkages of number of variables and States' attributes would come in to the discussion again. State's population composition and health and education based features of population composition would certainly have the greatest impact on the Forest Cover.

When it comes to Forestry based budget allocation, it includes direction and administration, education and training, research, survey, statistical database creation and utilization of forest resources, Forest conservation, development and regeneration, wild life preservation, expenditure on management of forest estates and many more important heads. (Ministry of Finance, 2017b)

In policy brief, Jonah Busch and others, Centre for Global Development Policy paper 159, October 2019, examined whether states are responding to this EFTs policy reform by increasing their budgets for Forestry, as an investment in increased revenue for future transfers. The compiled data for 25 states by the same policy paper, showed that the state-level Forestry budgets were 19 % higher in the three fiscal years after the introduction of EFTs relative to the three years prior to the reforms. 21 states increased their forestry budgets, led by a maximum increase of 65% in Maharashtra (Busch, Oct. 2019).

However, it is probably too soon to evaluate the EFTs and its effects on the Forest Cover. As mentioned by Jonah Busch and others, Centre for Global Development Policy paper 159, October 2019, this could reasonably take between 5-10 years or even more to lags in passing and implementing policies, planting trees and all.

SUGGESTIONS / CONCLUSION

As presented in the first section of the paper, State wise cases clearly exhibit the heterogeneous nature of the States along many attributes. All those attributes are interlinked with each other either positively or negatively and this also would vary from State to State. Second section of the paper shows that India's EFTs are potentially a large and innovative financial mechanism for helping India, i.e., States achieve its international climate goals and Sustainable Development Goal 15 provided through preservation and restoration of forests such as those related to clean water, clean air, energy, biodiversity.

However, considering all Indian states, there is unequal distribution of the incentives that States are receiving in the form of EFTs. States which are doing well in terms of Forest Cover are receiving the least amount of funding, with one exception (Maharashtra). The top 5 performers with reference to Forest Cover as a percentage of the total area are Arunachal Pradesh, Manipur, Meghalaya, Mizoram, and Nagaland. If the Centre wants to give due importance to the forest Cover extension and conservation, it will have to make some portion of EFTs as tied funds. Here the EFTs would act as performance linked incentives for the states.

Another way to incentivise states is to increase the percentage of funds allocated to states through grants-in-aid. This will give the Centre greater control over the flow of funds, which will allow it to divert funds towards States that are performing well in terms of the Forest Cover.

Rise in the Forest Cover of States is a long term process. It needs State wise deliberate policy prescription to attain the desirable goals. Political leadership, administrative set-up and the given institutional framework with the States and even at the local level will have to take the lead and will have to act mindfully for the same. With an extended help from the Centre, how each state is trying to build its resilience against climate change, could be an extension of this research paper.

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