

Composite Score/Ranking of District with respect to Goal wise District Indicator Framework

Methodology

District Indicator Framework (DIF) based on the framework of 16 Goals and 176 Indicators all with respect to all 75 districts of Uttar Pradesh. The Index estimation is based on data on 176 indicators for the 16 Goals.

1. The first Step, Indicators were identified and mapped with the targets. DIF was constructed using 176 indicators across 16 Goals. In the case of indicators for which data are not available for all Districts, the missing cells were marked as “null”. These were not assigned any weightage in index estimation.

2. The second step was the target setting for each indicator, once the required raw data were ready.

3. The third step was normalization of raw indicator values to arrive at normalised scores. The normalisation of indicator value into a standard scale of 0 to 100 was required to ensure comparability as different indicators had different ranges of values.

We have total 176 indicators with all Target and Achivement for all 75 Districts

Indicator (I_i : – $I_1, I_2, I_3 \dots \dots \dots I_{176}$), $i=1,2,3,\dots,176$

Target (T_i : – $T_1, T_2, T_3 \dots \dots \dots T_{176}$), $i=1,2,3,\dots,176$

Achivement (A_i : – $A_1, A_2, A_3 \dots \dots \dots A_{176}$), $i=1,2,3,\dots,176$

District (D_j : – $D_1, D_2, D_3 \dots \dots \dots D_{75}$), $j=1,2,3,\dots,75$

Goal (G_k : – $G_1, G_2, G_3 \dots \dots \dots G_{16}$), $k=1,2,3,\dots,16$

Since the set value of the targets are different with respect to the Indicators. We have the values of Target and Achivement for all Indicators and for all Districts.

First we calculate Score of particular Indicator I_i with the respect of Target T_i and Achivement A_i .

Score

$$\left(S_1 = \left(\frac{A_1}{T_1} \right) \times 100, S_2 = \left(\frac{A_2}{T_2} \right) \times 100, S_3 = \left(\frac{A_3}{T_3} \right) \times 100, \dots \dots \dots, S_i = \left(\frac{A_i}{T_i} \right) \times 100 \right)$$

$i=1,2,3,\dots,176$

For Indicators where increasing value S_i means **better performance** for the particular district, for example, Water Quality Index, for calculation is that (**D_{ij} - District Score on Particular Indicator**)

$$D_{ij} = \left(\frac{S_i - \min(S_i)}{\max(S_i) - \min(S_i)} \right) \times 100$$

For Indicators where increasing value S_i means **Lower performance** for the particular district, for example, increase in usage of nitrogen fertilizers, for calculation is that (D_{ij} - District Score on Particular Indicator)

$$D_{ij} = \left[1 - \left(\frac{S_i - \min(S_i)}{\max(S_i) - \min(S_i)} \right) \right] \times 100$$

4. Computation of District-wise score for each goal followed normalisation. This will be estimated as the arithmetic mean of the normalised values of all indicators D_{ij} under the goal, for each district. Equal weight was assigned to each indicator.

$$I_{ij}(N_{ij}, D_{ij}) = \sum_{i=1}^{N_{ij}} \frac{1}{N_{ij}} D_{ij}$$

Where I_{ij} = District-wise score for each goal.

Where N_{ij} = number of non-null indicators for District.

D_{ij} - District Score on Particular Indicator.

6. Computation of Composite score for every district. The composite score is the arithmetic mean of the goal score for 16 goals, for each district, assigning equal weight to each goal. This will be estimated as the arithmetic mean of the normalised values of all goal-wise scores through all indicators D_{ij} for each district. Equal weight was assigned to each Goal.

This score is an indication of the overall position of the districts in their journey towards achieving the SDGs.

$$CS_j(G_k, D_{ij}) = \sum_{k=1}^{16} \frac{1}{G_k} I_{ij}$$

Where I_{ij} = District-wise score for each goal.

Where G_k = number of non-null District-wise score for each goal.

D_{ij} - District Score on Particular Indicator.

7. Computation of Rank for every district. If the value of R_j of the particular district is more to the other district means it is upper hand to other.

$$R_j = \left(\frac{CS_j - \min(CS_j)}{\max(CS_j) - \min(CS_j)} \right) \times 100$$

8. Computation of Goal-wise score on overall district followed normalization. This will be estimated as the arithmetic mean of the normalised values of all indicators D_{ij} under the district, for each goal. Equal weight was assigned to each indicator.

$$G_k(N_{ij}, D_{ij}) = \sum_{j=1}^{75} \sum_{i=1}^{N_{ij}} \frac{1}{D_j} D_{ij}$$

Where

D_j = number of non-null values for District.

D_{ij} - District Score on Particular Indicator.

Data Structure

	Goal 1	Goal 2	Goal 3	.	.	G_k
District 1	Indicator 1, I_{111}	Indicator 1, I_{121}	Indicator 1, I_{131}	.	.	Indicator 1, I_{1k1}
	Indicator 2, I_{112}	Indicator 2, I_{122}	Indicator 2, I_{132}	.	.	Indicator 2, I_{1k2}
	Indicator 3, I_{113}	Indicator 3, I_{123}	Indicator 3, I_{133}	.	.	Indicator 3, I_{1k3}

	Indicator l, I_{11l}	Indicator m, I_{11m}	Indicator n, I_{11n}			Indicator z, I_{1kz}
	D_{ij}	D_{ij}	D_{ij}	.	.	D_{ij}
	I_{ij}	I_{ij}	I_{ij}			I_{ij}
Score of District 1	$CS_j(G_k, D_{ij}) = \sum_{k=1}^{16} \frac{1}{G_k} I_{ij}$					
District 2	Indicator 1, I_{211}	Indicator 1, I_{221}	Indicator 1, I_{231}	.	.	Indicator 1, I_{2k1}
	Indicator 2, I_{212}	Indicator 2, I_{222}	Indicator 2, I_{232}	.	.	Indicator 2, I_{2k2}
	Indicator 3, I_{213}	Indicator 3, I_{223}	Indicator 3, I_{233}	.	.	Indicator 3, I_{2k3}

	Indicator p, I_{11p}	Indicator q, I_{11q}	Indicator r, I_{11r}	.	.	Indicator s, I_{1ks}
	D_{ij}	D_{ij}	D_{ij}	.	.	D_{ij}
	I_{ij}	I_{ij}	I_{ij}	.	.	I_{ij}
.
.
Score of District 2	$CS_j(G_k, D_{ij}) = \sum_{k=1}^{16} \frac{1}{G_k} I_{ij}$					
District j	Indicator t, I_{11t}	Indicator u, I_{11u}	Indicator v, I_{11v}	.	.	Indicator w, I_{1kw}
	D_{ij}	D_{ij}	D_{ij}	.	.	D_{ij}
	I_{ij}	I_{ij}	I_{ij}	.	.	I_{ij}
Score of District j	$CS_j(G_k, D_{ij}) = \sum_{k=1}^{16} \frac{1}{G_k} I_{ij}$					