

A Glance at

Formula





- Preface
- Objectives
- High Level Flow
- Data Entry
- Formula
- <u>Summary</u>
- View Data at Intermediate Levels
- <u>Visualization</u>
- Exception Handling

01 PREFACE

Preface



The **Government of India** had decided that to measure and monitor India's performance on various social, economic and other parameters through internationally recognized **Global Indices**.

The goal of this exercise is to use these Indices as tools for self-improvements and bring about reforms in the policies and processes of Government agencies and bring about reforms in the policies and processes of Government agencies while creating a conducive ecosystem for foreign and domestic investment flow.

Goals

- Driving reforms at the National and State level by ranking of States
- Promoting cooperative and competitive federalism
- Enhancing citizen service delivery, ease of living and ease of doing business

About the dashboard:

The dashboard is created to support the Government's decision to leverage the monitoring mechanism of select global indices to drive reforms and growth. The dashboard allows for monitoring of the parameters as per official data as well as the data source used by the publishing agency. The dashboard also allows for monitoring of performance of states and it also inculcates healthy competition among States/UTs through their scoring and ranking on these Indices and Reform Actions.

02 OBJECTIVE





- Objective of this presentation is to explain the functionality of Definition of Formula and its application
 - Data Entry at Lowest Parameter Level
 - To Define Formulae at Intermediate Levels
 - View scores (as per the defined formula) at Intermediate Levels
 - Data Approvals
 - Visualization

03 HIGH LEVEL FLOW





Index Tree

Formula-Flow

04 DATA ENTRY





Note:

Formulae are defined for India Indices of type Formula base.

India Indices, the lowest parameter will be mapped to Data Entry users at Nodal, Line/State Levels.

Data is populated at the lowest level of Parameters under specific Index.



| Ind | ia Index Proç | gress Data Entry - Formula | | | | | | | ٩ |
|--|---------------|-------------------------------|---|----------------|----------------|----------------------|--------|------|--------|
| India Index Progress Data Entry - Formula Display Range 10 To Download India Index Progress Data Entry - Formula Year 2021 India Index Progress Data Entry - Formula Year 2021 SI No. India Index * Nodal Ministry/Department Start Date End Date Last Updated Year Action 1 Gender Inequality Index_india Ministry of Women and Child Developme 2021-02-0 2021-02-25 Active 2021 © 2 Global Gender Gap Index_india Ministry of Women and Child Developme 2021-02-0 2021-03-04 Active 2021 © 2 | Download | | | | | | | | |
| India Index Progress Data Entry - Formula | • | | | | | | | | |
| | SI No. | India Index + | Nodal Ministry/Department | Start Date | End Date | Last Updated Date | Status | Year | Action |
| | 1 | Gender Inequality Index_india | Ministry of Women and Child Developme nt | 2021-02-0 3 | 2021-09-0 3 | 2021-02-25 | Active | 2021 | 2 |
| | 2 | Global Gender Gap Index_india | Ministry of Women and Child Developme nt | 2021-02-0 2 | 2022-02-0 2 | 2021-03-04 | Active | 2021 | ۲ |



Adolescent Birth Rate (ABR) : Progress Data for 2021

| Year Progress (Pending Approval) | Upload Document(PDF/DOCX | - 5 |
|----------------------------------|--------------------------|--------|
| 220 | | Update |
| | Browse No file selected. | |

05 ADD FORMULA

12

Add Formula

Steps to defined Formula:

- 1. Login with Nodal Admin Credentials
- 2. Select Formula >> Scoring



Users:

Nodal admin defines Formula at all intermediate levels including Index level.

Click Index Link to View Themes defined for Index.

Note: Year Based definitions stored in the system. Select year and define the formulae at all intermediate levels.

| Index Details | Formula is invalid. Please update | Click India Inde to drill down to Themes and Parameters | ex b | Index Title | × 2 | elect /ear |
|---------------|-----------------------------------|--|---------|--|-------------------------|---------------|
| S.No. | Index Title | | Year | Formula | Last Re-colculated Date | Action |
| 1 | Gender Inequality Index_india | -r | 2022 | Add Formula | | |
| 2 | Global Gender Gap Index_indi | • | 2022 | Add Formula | | |
| з | Global Hunger Index_india | | 2022 | Add Formula | | |
| 4 | Global Innovation Index_india | | 2022 | THMHC1_weight + THMSALE15_weight + THMI3_weight + THMKW13_weight/THM BE14_weight + THMKO18_weight + THMK D17_weight | 2021-04-08 12:15:08 | • / 0 |





Click Themes Link to View Parameters defined under Theme.

| Theme List | | | | | |
|---------------|----------------------|------------------|-------------|-------------------|--------|
| Scoring | Gender Inequality Ir | ndex_india | | | |
| | | Colort Thomas to | | | |
| View Theme/Pi | illar | view Parameters | | Theme/Pillar Name | |
| S.No. | Theme/Pillor | | Formula | | Action |
| L. | Empowerment | | Add Formula | | |
| 2. | Labour Market (LF | FPR) | Add Formula | | |
| а. | Reproductive Hea | alth | Add Formula | | |
| | | | | | |
| + Bock | | | | | |
| | | | | | |

Users:

Nodal admin defines Formula at all intermediate levels including Index level.



Start defining formula the immediate level above the lowest parameter.





Start defining formula the immediate level above the lowest parameter.

| Theme List | Gender Inequality Index_india | Click "Add Formula" to define formula at Parameter Level | | | | | |
|-------------------|-------------------------------|---|--------|--|--|--|--|
| View Theme/P | illar | Theme/Pillar Name | | | | | |
| S.No. | Theme/Pillar | Formula | Action | | | | |
| L. | Empowerment | Add Formula | | | | | |
| 2. | Labour Market (LFPR) | Add Formula | | | | | |
| а. | Reproductive Health | Add Formula | | | | | |
| ¢ Bock | | | | | | | |

Click Add Formula to define formula at Parameter Level. Formula screen will be displayed.



| a. of Operand* | | Browse | Document(PDF | (bocx/boc) | 2 | Year 2022 | | | | |
|-------------------|-------------|---------------------|--------------|------------|-----|---------------------|---|---|------------------|---|
| perand 1* 4 | 3 | | | | | | | | | |
| | | | | | | | | | Insert 12 + | |
| log ₁₀ | In | log _{base} | Absolute | Modulus | 1 | 2 | 3 | | Select Parameter | |
| Percentile | Mean | Median | Mode | Average | + | 4 | 5 | | | • |
| Min | Max | Round | Ceil | Floor | 6 | - | 7 | Ĵ | | 9 |
| N! | √N | cos | sin | tan | 8 | 9 | * |] | | |
| Const e | Const pi | If Else | Standard [| Deviation | 0 | 100 | | 6 | | |
| Geometric | Mean Ha | rmonic Mea | an Weighte | ed Mean | - 1 | % | (| | | |
| Weighted G | Geometric N | Mean Wei | ghted Harm | onic Mean |) | ٨ | , |] | | |
| 🗲 Backspa | ceClear | Formula | | | [|] | = |] | | |
| | | | 5 | | ? | : | < |] | | |
| | | | | | > | | | | | |
| Immidiate Lov | ver Child 🔘 | All Lower Chik | 4 | | | | | | | |
| last Docometer | | | | | | | | | | |

<u>Methodology Document</u>: Browse, you can upload Methodology Document designed by Publishing Agency, to enable the Nodal Administrators to refer, before defining formula.

<u>Year</u>: Year for which you are defining the formula in disabled mode.

Final Formula Box: where defined Formula appears.

Operand: Call the parameters (or other index tree nodes like themes etc. along with functions to define formula. You can add more than one Operand by selecting

operand in Final formula box.

Contd.¹⁶





Contd...

Functions: You can use these functions to define the formula. On mouse hover, the function displays the syntax for the function as shown below:

| log ₁₀ | In | log _{base} | Absolute | Modulus | | | | | | |
|-------------------|---|------------------------------------|------------|-----------|--|--|--|--|--|--|
| Percentile | Mean | Median | Mode | Average | | | | | | |
| Min | In Mean Max sy √N Const pi Mean Ha Geometric I | syntax: mean(Para1, Para2,, Para n | | | | | | | | |
| N! | In Mean Max sy √N Const pi Mean Ha Geometric I ace Clear | COS | sin | tan | | | | | | |
| Const e | Const pi | If Else | Standard [| Deviation | | | | | | |
| Geometric | Mean Ha | rmonic Mea | n Weighte | ed Mean | | | | | | |
| Weighted | Geometric N | lean Wei | ghted Harm | onic Mean | | | | | | |
| + Backspa | aceClear | Formula | | | | | | | | |

<u>6</u> <u>N</u>

Number Pad and Arithmetic

Operations: Allows you to select the operations and numbers.

Add Formula -Functions





Select Intermediate Child or All

Lower Child: You can select the parameter, either single or multiple parameters. Prior to that select Immediate Lower Child OR

All Lower Child.

8

Immidiate Lower Child

Immediate lower child will show all the immediate childs for selection. All lower child will show all the lower child till the lowest level coming under that particular node.

If included **Weight then the** weighted value (Value * Weight) as per the weight defined for that par/sub-par in the Index definition will be considered.

Contd...



Add Formula- Statistical Functions

| d Formula - | Empower | ment | | | | | | | | |
|-------------------|-------------|---------------------|---------------|------------|---|------|---|---|--|-----------|
| Parameter | Add Form | | | | | | | | | |
| o. of Operand* | | Methodology I | Document(PDF | (DOCX/DOC) | | Year | | | | |
| 1 | 1 | Browse | No file selec | cted. | 6 | 2022 | | | | |
| al Formula* | 3 | | | | | | | | | |
| verand 1* 🚺 | | | | | | | | | | |
| | | | | | | | | | Insert 12 | • 1 |
| log ₁₀ | In | log _{base} | Absolute | Modulus | 1 | 2 | 3 |] | Statistical Functions Select Parameter | • |
| Percentile | Mean | Median | Mode | Average | + | 4 | 5 | j | | |
| Min | Max | Round | Ceil | Floor | 6 | - | 7 |] | | 9 |
| N! | √N | COS | sin | tan | 8 | 9 | * |] | | |
| Const e | Const pi | If Else | Standard [| Deviation | 0 | 100 | | 6 | | |
| Geometric | Mean Ha | rmonic Mea | Weighte | ed Mean | 1 | % | (| | | |
| Weighted (| Geometric I | Mean Wei | ghted Harm | onic Mean |) | • | , |] | | |
| 🗲 Backspa | ace Clear | Formula | | | [|] | = |] | | |
| | | | 5 | | ? | : | < |] | | |
| | | | | | > | | | | | |
| | | | | | | | | | | |
| Immidiate Lov | wer Child 🤍 | All Lower Chik | d | | | | | | _ | |
| None selecte | d | 7 | | | | | | | Include Weight | Insert 10 |
| € Bock | Submit | | | | | | | | Ø | |
| | | | | | | | | | | |

9 **Statistical Functions:** Statistical

Functions displayed on right side, can be used to derive statistical equations on the selected lowest child . This will take values for all states mapped to the parameter and entered by data entry user at the lowest parameter level.

| Statistical Functions | |
|--------------------------------------|---|
| Female shares of Parliamentary Seats | • |
| Mean | • |
| Insert | |

- To insert defined Operand into Final Formula Box
- To insert more Operands
- To insert the parameter(s) selected from dropdown list into Operand.
 - To Submit Formula.

06 SUMMARY

Summary of Add Formula



- 1) Select "Add Formula" at all intermediate level of the Index at Scoring tab under Formula Module
- 2) Select the Parameter/sub-parameter(Select immediate or all Childs and click "Insert" to add the parameters to Operand Box. You can tick "Include Weight" checkbox to include the substitute weight and value defined at the Parameter level while creating the index. If included **Weight**, Substitute Weight, Substitute Value, defined at Index Node will be taken as sub weight and sub value where the data values are not populated at specific parameter level.
- 3) Now select the function to apply at selected level, user Functions/Number Pad and operations
- 4) Click "+ sign" to add more Operands
- 5) You can Add or Delete Operands
- 6) In case if you want to apply operation for all state levels select the statistical function on right hand side
- 7) Click "Insert" displayed next to Operand to insert the formula in Final Formula Box
- 8) Click "Submit" to submit the formula

View Scores



| Index Details | | | | Click to view score | s | Global Gender Gap | Index_india |
|-----------------|-------------------------------|------|--|---|------------|-------------------|--|
| Display Range (| 10 | | Defined | based on the data ent at Lowest Parameter Formula defined | ered an | Formula: (THMEA | 50_weight+THMHAS51_weight+THM State Name Andamon and Nicobar Islands |
| Index List | | | Index Title | Q 2021 | · | 2 3 4 | Andhra Pradesh Assam Chhattisgarh |
| S.No. | Index Title + | Year | Formula | Last Re-colculated Date | Action | 5 | Gujarat |
| 1 | Gender Inequality Index_india | 2021 | 1 - (harmean ((power (((./(10/MMR118) *(1/ABR119))) * (./(FSOPS217*FPWALSE21 9)) * LF215), (1/3))), (power (((./(MSOPS 218*MPWALSE220)) * LM218), (1/3))))/ge omean (THMRH53, THME57, THMLM61)) | 2021-02-0218:52:06 | • / 0 | 7 8 | Karnataka Manipur Madhya Pradesh Mizoram |
| 2 | Global Gender Gap Index_india | 2021 | (THMEA50_weight+THMHAS51_weight+ THMPE52_weight)/3 | 2021-04-19 15:31:31 | | 11 12 13 | Odisha Rajasthan Tamil Nadu |
| з | Global Hunger Index_india | 2021 | (THMPOUPI54+THMCUN55+THMCM56)/3 | 2021-02-02 13:37:40 | . / 3 | 14 | Tripura |
| 4 | Human Development Index_india | 2021 | THME32_weight + THMH34_weight + std dev (THME32, EYOS85, A88, AP87, NP308, THMH34, M89) | 2021-03-12 15:19:58 | . / 0 | 15 18 | Uttar Prodesh National Score |

It will give you state wise scores and national scores based on the state weights uploaded in the system:

National Score can be defined as:

- Weighted average of all states 1)
- Aggregate values of all states (Default) 2)

/PE52_weight)/3

| S.No. | State Name | Calculated Value |
|-------|-----------------------------|------------------|
| 1 | Andaman and Nicobar Islands | 0.857 |
| 2 | Andhra Pradesh | 0.813 |
| з | Assam | 0.841 |
| 4 | Chhattisgarh | 0.904 |
| 5 | Gujarat | 0.841 |
| 8 | Himachal Pradesh | 0.810 |
| 7 | Karnataka | 0.839 |
| 8 | Manipur | 0.875 |
| - | Madhya Pradesh | 0.809 |
| | Mizoram | 808.0 |
| n | Odisha | 0.870 |
| 12 | Rajasthan | 808.0 |
| 13 | Tamil Nadu | 0.803 |
| 14 | Tripura | 0.837 |
| 15 | Uttar Pradesh | 0.959 |
| 16 | National Score | 0.837 |
| | | |

Ministry can choose, the National Score formula. If they choose weightage average then they have to upload weights for all mapped states from here

Master Data Definition \rightarrow State Weights for National Score See, Next Slide. 22

State Weight For National Score



Login with DMEO credentials:

Select Master Data Definitions >> State Weight For National Score

| Image | | | | | | | | |
|---|---|---|------------|------------|-------------------------|--------|------|--------|
| | | Dov | vnload | | | | | |
| State | Weight For National Score y Range 10 T District Weight For National Score India Index * Nodal Ministry/Department a India Index * Nodal Ministry/Department a Test Formula Revalidate_i Ministry of Women and Child velopment a Progress Tracking Approv of Versen and Child velopment a Gender Inequality Index_i Ministry of Women and Child velopment a Global Hunger Index_indi a Ministry of Women and Child velopment | | | Year | 2021 | | • | |
| SI No. | India Index 🔶 | Nodal Ministry/Department 🗘 | Start Date | End Date | Last Updated Date \$ | Status | Year | Action |
| 1 | Test Formula Revalidate_i ndia | Ministry of Women and Child De velopment | 25/12/2020 | 24/12/2021 | 07/04/2021 | Active | 2021 | ® + |
| 2 | Progress Tracking Approv al Test_india | Ministry of Women and Child De velopment | 01/01/2021 | 31/12/2021 | 07/04/2021 | Active | 2021 | ® + |
| 3 | Gender Inequality Index_i ndia | Ministry of Women and Child De velopment | 03/02/2021 | 03/09/2021 | 25/02/2021 | Active | 2021 | ® + |
| 4 | Global Hunger Index_indi a | Ministry of Women and Child De velopment | 02/02/2021 | 01/02/2022 | 08/03/2021 | Active | 2021 | ® + |

| State Weight For Nationa | | | aare_mara | |
|--------------------------|--------|---|---------------|----------------|
| Year* | | s | ummation Type | e |
| 2021 | | | Normal Sum | Weighted Means |
| Download sample Ten | nplate | | | |

Click * to define state weight for National Scores

State Weight For National Score



| ownlo |
|-------|
| |

to Download Template

| State Weight For National Score - Progress Tracking Approval Test_india | | | | | |
|---|---------------------------------------|-------------------|--------|----------------|----------------|
| State Weig | ht For National Score Progress Tracki | ng Approval Test; | _india | | |
| Note: Upload c | vs file only(Max size 5MB) | | | | |
| Uplood File* | | Year | | Summation Type | • |
| Browse | No file selected. | 2021 | | Normal Sum | Weighted Means |
| Download : | sample Template Import State Data | | Weight | | |
| 1 | Andaman and Nicobar Islands | T | 0.4 | 8 | |
| 2 | Andhra Pradesh | T | 0.1 | 8 | |
| 3 | Arunachal Pradesh | - | 0.1 | 8 | |
| 4 | Assam | - | 0.4 | 8 | |
| the Back | + Update | | | | |

Select summation type

•

| Summation Type* |
|--|
| Normal Sum () Weighted Means |
| |
| Click Import State Data to import state weight |
| for national score |

Click Browse... to upload document.

Uploaded data will be populated for the States

07 VIEW DATA AT INTERMEDIATE LEVELS

State Wise Score



In formula based Index, depending on the geographic applicability (if States/UT), states are mapped at the lowest parameter (lowest node in the Index Tree).

For all intermediate levels above that, number of states mapped for a level will be defined as the union list of states mapped to all its parents.

| 💓 NITI Aayog | | = | | Gibbal Indices for Country Constration DMEO Administrator |
|------------------------|---|--|---|---|
| | | Gender Inequality Index (GII)_india Empower | rment Female population with at least Secondary | y Education (SEf) |
| Dashboard | | Edit Female population with at least Secondary Edu | cation (SEf) | |
| Master Data Definition | > | Has Sub-Parameter | | |
| Index Definition | > | No | | |
| 0 | | Parameter Name* | Parameter Description* | |
| User Management | > | Female population with at least Secondc | Percentage of women having Secondary a | nd above Education (25 year and Older) |
| Progress Data Entry | > | Data Source* | | 10 |
| Reform | > | NSS 75th (Unit level data) | | |
| Approval Request | > | Parameter Weight* | Substitute Weight | Substitute Value |
| j Formula | > | 1 | 0.00 | 0.00 |
| <u> </u> | | Geographic Applicability | Select State/UT/City* | |
| Keports | > | State / UT 🗸 🗸 🗸 | Andaman and Nicobar Islands | ~ |
| User Manual | | Measurement Type* | Frequency* | Increasing/ Decreasing |
| FAQ | | Cummulative ~ | Yearly | Increasing ~ |
| Contact Support | | Qualitative/Quantitative * | Unit* | Activa Range indows |
| | | Quantitative ~ | Percentage ~ | Max* 800 ^{Go} to Settingin to activate Windows. |

View Data at Intermediate Levels



- Example : If a formula is defined to calculate the values at theme level. And there are two parameters defined below the Theme. (Parameter 1 and Parameter 2).
- The parameter 1 mapped with 2 states (S1, S2) and the parameter 2 is mapped with 3 States (S3,S4,S5).
 Then if we run the formula defined at the Theme level then it will show scores for 5 states (S1,S2,S3,S4,S5)

- If the formula defined at the Theme level is simple summation (Parameter 1 + Parameter 2)
- Then in the formula, Parameter 1 values will be directly taken for S1 and S2 from the values entered by the Data Entry users. However for S3,S4,S5, since these states are not mapped to parameter 1, values will not be entered by data entry user but Substitute weight * Substitute Value will be taken. For all nodes in the Index Tree, Substitute weight (Default value 0)and Substitute values (Default value 1) are defined in the definition page.

8 VISUALIZATION



Visualization

• After Approval you can view the scores as per defined formula under Visualization

| MITI Aayog | Ξ | GIRG Clobal Indices for Beforms & Growth DMEO Administrator |
|----------------------------|-------------------------|---|
| Dashboard | Welcome to Dashboard!! | 🕑 GI Dashbaord |
| 🚳 Master Data Definition 🦻 | ECONOMY | INDUSTRY |
| Index Definition > | TEST FORMULA REVALIDATE | GLOBAL INNOVATION INDEX |
| 🖉 User Management > | | |
| 🖉 Progress Data Entry > | | |
| Reform > | | |

Select **G** GI Doshboord button on Logged-in screen. Visualization window will be displayed as shown in next slide;

Visualization





The visualisation screen shows dummy data entered for testing purpose and is not reflective of real scores ³⁰

9 EXCEPTION HANDLING



Exception Handling

There would be scenarios when value not entered by user or approved by user, so system handles such exceptions wisely as stated below:

Treatment of Data Not Reported:

- If no entry has been made in the entire year, OR if entry has been made but not approved, apply the worst value as follows:
 - Quantitative increasing assign Range Min.
 - Quantitative decreasing assign Range Max.
 - Qualitative increasing assign Lowest score
 - Qualitative decreasing assign highest score

• If partial entry with approvals have been made, whatever captured so far will be considered

- After end of the year (after the index period end date), assign worst values for blank fields in progress data entry and update scores accordingly
- Data not entered will be captured in the compliance reports
- Once year has ended, i.e. last date has been crossed, a notification can be sent to admin users that since progress data entry has not been updated, the worst score has been assigned



Normalization

• Treatment of Denominator becoming zero or negative:

If in the denominator, Target => min (for increasing), or target => max (for decreasing) then by default set normalized value to 100.

• Treatment States overachieving targets:

Set normalized value to default value 100, i.e. if normalized value exceeds 100, cap it at 100

• Treatment of National Geographic Applicability:

National vs. state parameters: National normalization – Progress/Target Data Definition <u>E.g. P1, P2, P3 geographic applicability</u> P1 – State (S1, S2); substitute weight = 0, substitute value = 0 P2 – State (S1, S2); substitute weight = 0, substitute value = 0 P3 – National; substitute weight = 0, substitute value = 0



Calculation of National Scores

- There are two options to calculate the national score:
 - Sum of state scores This is the default option on the dashboard
 - Weighted average of state scores State-wise weights need to the uploaded on the dashboard for this functionality to work.

Example: If a M/D selects "Weighted Average" and uploads weights for each state, the following would be how National progress values would be calculated for lowest Childs that are mapped to States/UTs/Cities

P1N = Wt. Avg (P1S1, P1S2)





- Data Entry at various Lowest Parameter level
- Define Formula at All Nodes except the Lowest Parameter
- Scores are calculated based on the Data populated at lowest level and the formula defined at node level
- Approve the date by Nodal Admin
- After Approvals the data is available under Visualization

THANK YOU



ABOUT THE GIRG DASHBOARD

The dashboard is created to support the Government's decision to leverage the monitoring mechanism of select global indices to drive reforms and growth. The dashboard allows for monitoring of the parameters as per official data as well as the data source used by the publishing agency. The dashboard also allows for monitoring of performance of states and it also inculcates healthy competition among States/UTs through their scoring and ranking on these Indices and Reform Actions.

Login at www.girg.gov.in