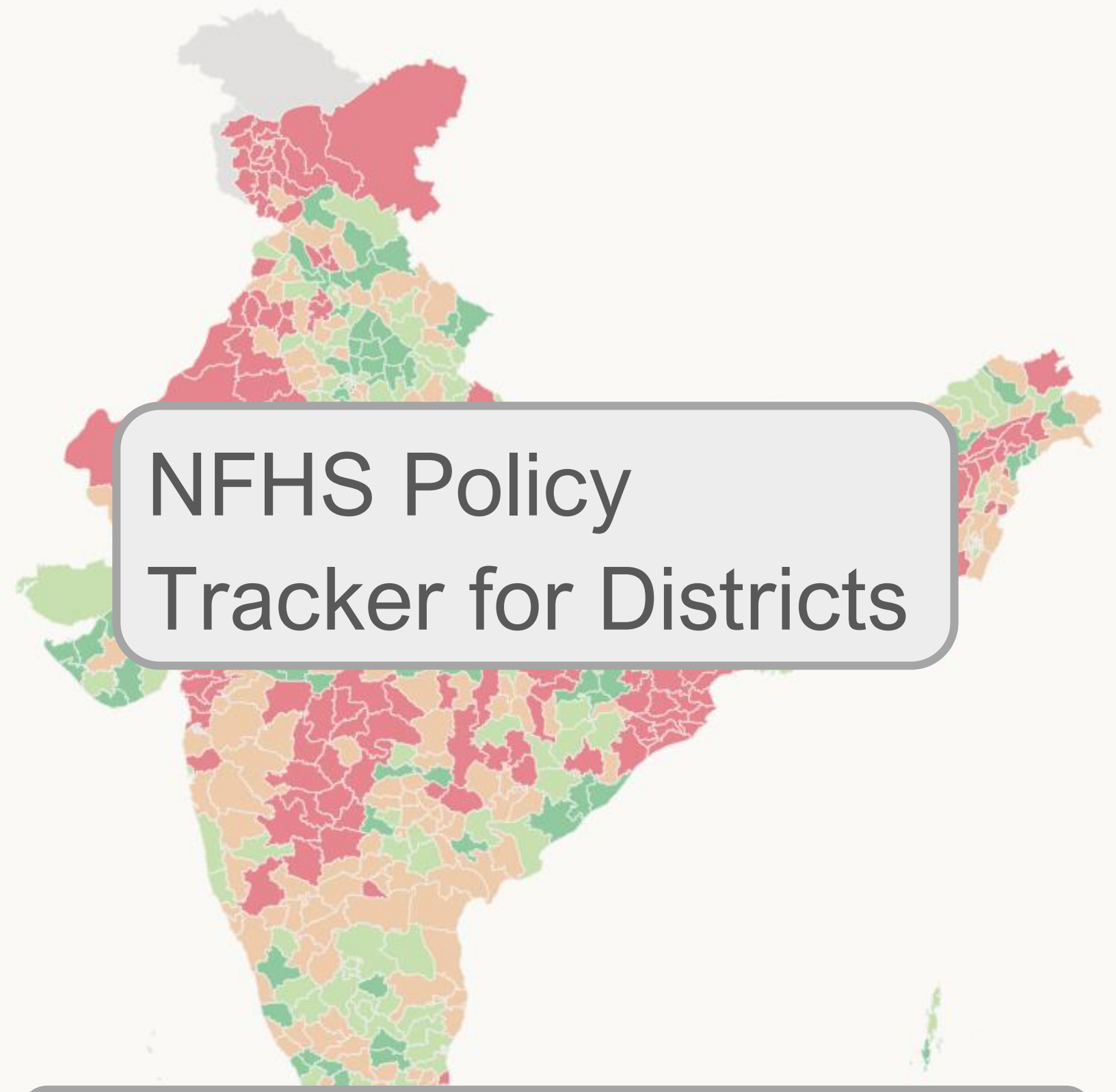
GEOGRAPHIC INSIGHTS
POPULATION ▪ PRECISION ▪ POLICY

INDIA POLICY insights



NFHS Policy Tracker for Districts

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Introduction

Using the district factsheets from the National Family Health Surveys (NFHS-4 and NFHS-5), we present an interactive dashboard to visualize health, nutrition, and population indicators across India.

Through this dashboard, users can visualize and analyze NFHS-5 (2019-21) and change between NFHS-4 (2015-16) and NFHS-5 for the districts of India. Users can further filter by:

- Aspirational Districts
- Survey Phases of NFHS-5
- States/Districts

Tracking these indicators at the district level can inform the design of policies and enable prioritization of districts for intervention. Further, a district level assessment of the NFHS-5 factsheets could also inform setting agendas for the future.

This dashboard was created in collaboration with National Institution for Transforming India (NITI) Aayog and the International Institute for Population Sciences (IIPS).

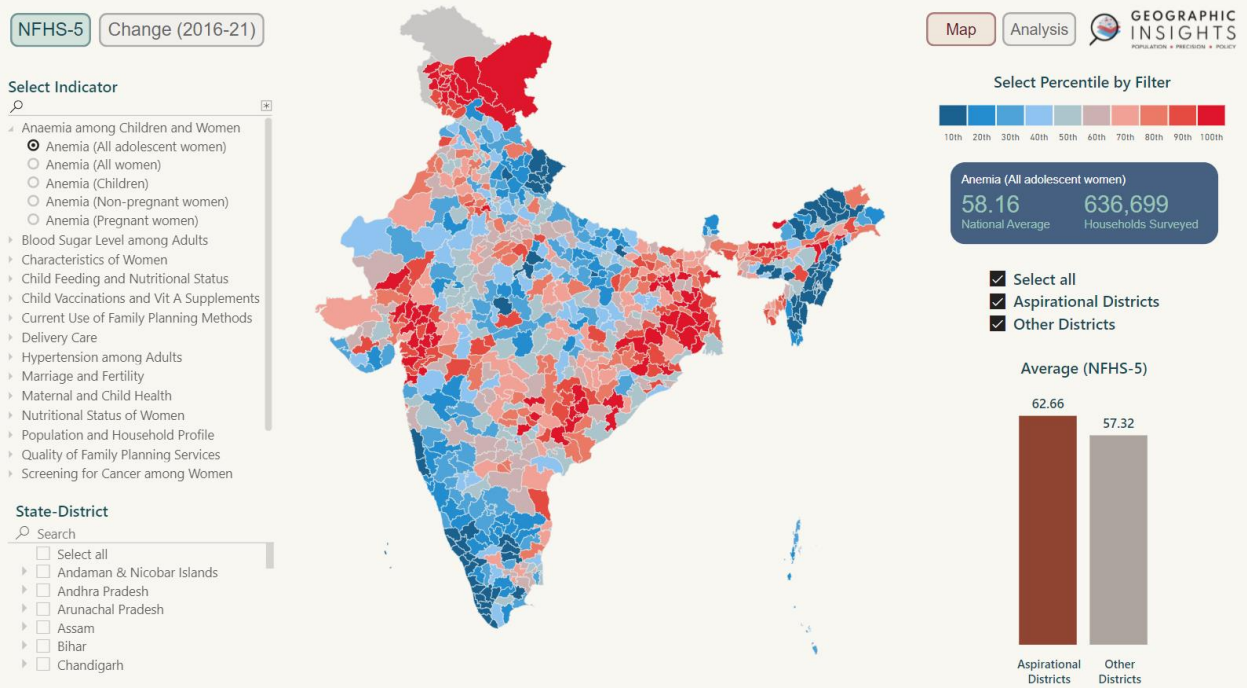


Image of the NFHS-5 Page

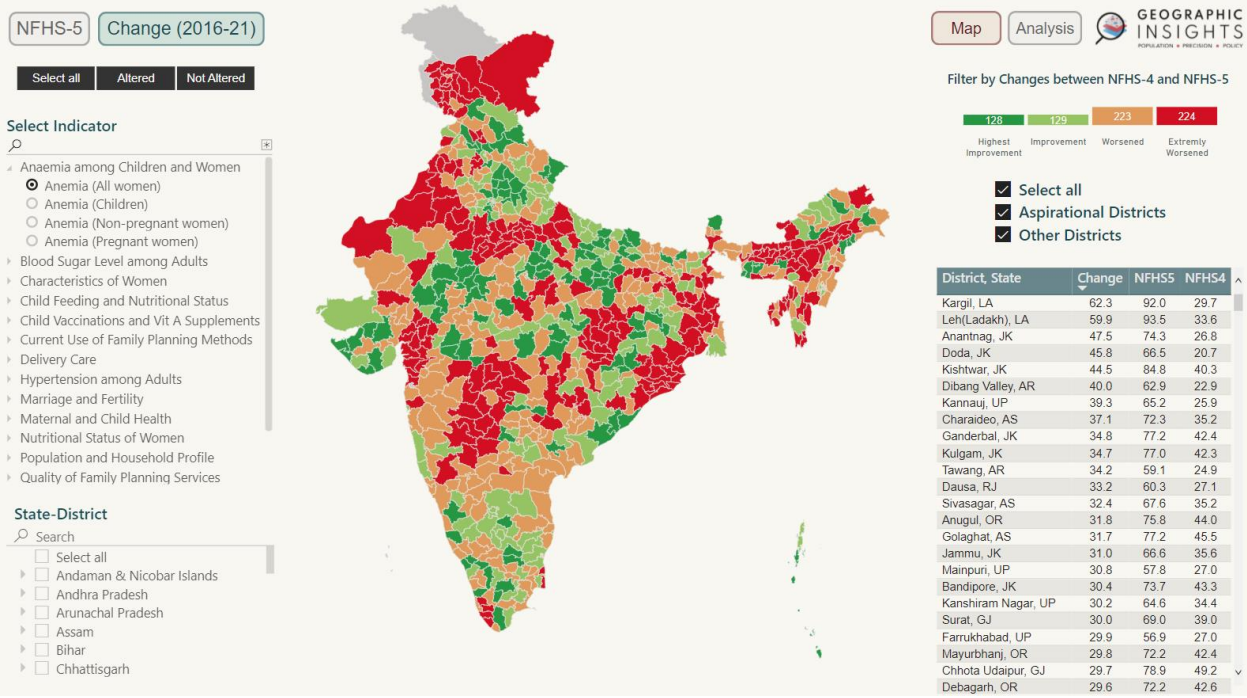


Image of the NFHS-4 and NFHS-5 Change Page

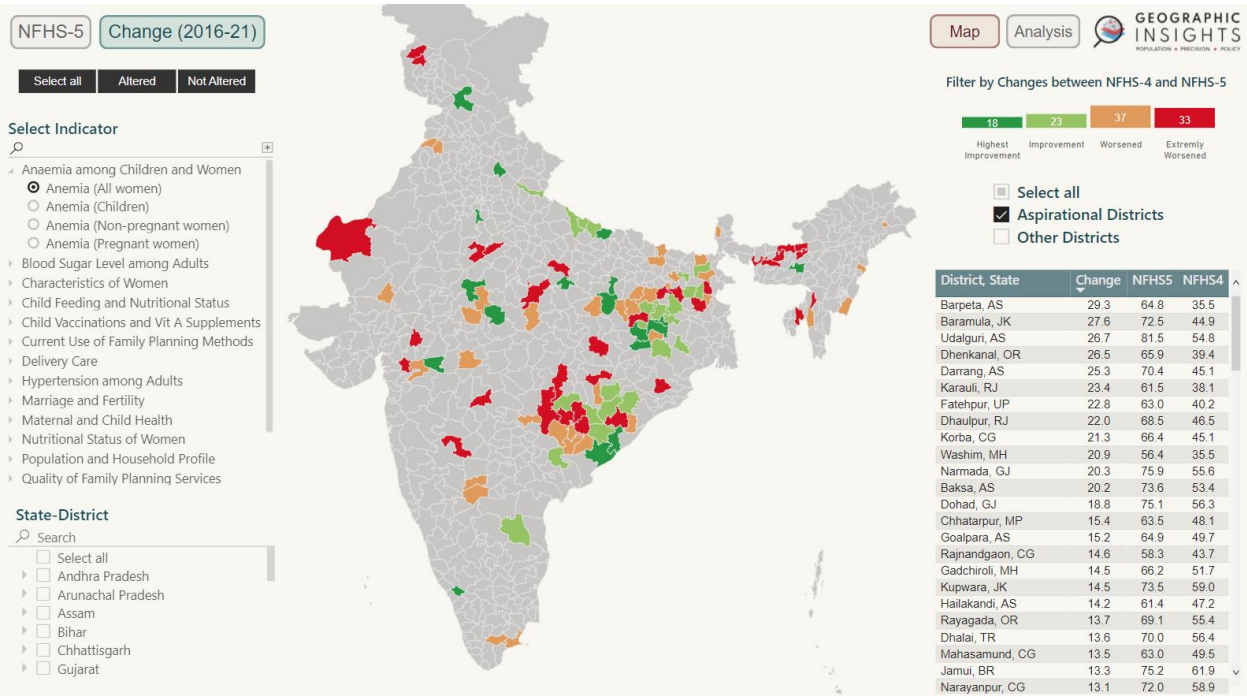


Image of the NFHS-4 and NFHS-5 Change Page for Aspirational Districts

Document Outline

In this document, we outline:

Data Sources

The data source for NFHS-4 district factsheet data was the Hindustan Times Lab's GitHub: https://github.com/HindustanTimesLabs/nfhs-data.

The data source for the NFHS-5 district factsheet data was IIPS's district and state factsheet compendiums: http://rchiips.org/nfhs/Factsheet_Compendium_NFHS-5.shtml.

The shapefile was taken from IIPS, and the 112 aspirational district list was given to us by NITI Aayog.

Indicators in NFHS-5 and NFHS-4

NFHS-5 Category Name	NFHS-5 Indicator Name	NFHS-4 Indicator	Indicator Name in Dashboard	Direction
Population and Household Profile	Female population age 6 years and above who ever attended school (%)	Yes	Female school attendance	Positive
Population and Household Profile	Population below age 15 years (%)	Yes	Population below 15 years	Positive
Population and Household Profile	Sex ratio of the total population (females per 1,000 males)	Yes	Sex ratio	Positive
Population and Household Profile	Sex ratio at birth for children born in the last five years (females per 1,000 males)	Yes	Sex ratio at birth	Positive
Population and Household Profile	Children under age 5 years whose birth was registered with the civil authority (%)	Yes	Birth registration	Positive
Population and Household Profile	Deaths in the last 3 years registered with the civil authority (%)	No	Death registration	Positive
Population and Household Profile	Population living in households with electricity (%)	Yes	Population in household with electricity	Positive
Population and Household Profile	Population living in households with an improved drinking-water source1 (%)	Yes	Improved water	Positive
Population and Household Profile	Population living in households that use an improved sanitation facility2 (%)	Yes	Improved sanitation	Positive
Population and Household Profile	Households using clean fuel for cooking3 (%)	Yes	Clean fuel for cooking	Positive
Population and Household Profile	Households using iodized salt (%)	Yes	Iodized salt	Positive
Population and Household Profile	Households with any usual member covered under a health insurance/financing scheme (%)	Yes	Health insurance coverage	Positive
Population and Household Profile	Children age 5 years who attended pre-primary school during the school year 2019-20 (%)	No	Child attendance of pre-primary school	Positive
Characteristics of Women	Women who are literate4 (%)	Yes	Literate women	Positive
Characteristics of Women	Women with 10 or more years of schooling (%)	Yes	10 or more years of schooling (Women)	Positive
Marriage and Fertility	Women age 20-24 years married before age 18 years (%)	Yes	Child marriage (Women)	Negative
Marriage and Fertility	Births in the 5 years preceding the survey that are third or higher order (%)	No	Third or higher order birth	Negative
Marriage and Fertility	Women age 15-19 years who were already mothers or pregnant at the time of the survey (%)	Yes	Adolescent pregnancy	Negative
Marriage and Fertility	Women age 15-24 years who use hygienic methods of protection during their menstrual period5 (%)	No	Menstrual hygience	Positive
Current Use of Family Planning Methods	Any method6 (%)	Yes	Any contraceptive method	Positive

NFHS-5 Category Name	NFHS-5 Indicator Name	NFHS-4 Indicator	Indicator Name in Dashboard	Direction
Current Use of Family Planning Methods	Any modern method6 (%)	Yes	Any modern method6	Positive
Current Use of Family Planning Methods	Female sterilization (%)	Yes	Female sterilization	Positive
Current Use of Family Planning Methods	Male sterilization (%)	Yes	Male sterilization	Positive
Current Use of Family Planning Methods	IUD/PPIUD (%)	Yes	IUD/PPIUD	Positive
Current Use of Family Planning Methods	Pill (%)	Yes	Pill	Positive
Current Use of Family Planning Methods	Condom (%)	Yes	Condom	Positive
Current Use of Family Planning Methods	Injectables (%)	No	Injectables	Positive
Unmet Need for Family Planning	Total unmet need7 (%)	Yes	Total unmet need	Negative
Unmet Need for Family Planning	Unmet need for spacing7 (%)	Yes	Unmet need for spacing	Negative
Quality of Family Planning Services	Health worker ever talked to female non-users about family planning (%)	Yes	Interaction of health worker	Positive
Quality of Family Planning Services	Current users ever told about side effects of current method8 (%)	Yes	Current users ever told about side effects	Positive
Maternal and Child Health	Mothers who had an antenatal check-up in the first trimester (%)	Yes	Antenatal check-up in the first trimester	Positive
Maternal and Child Health	Mothers who had at least 4 antenatal care visits (%)	Yes	At least 4 antenatal care visits	Positive
Maternal and Child Health	Mothers whose last birth was protected against neonatal tetanus9 (%)	Yes	Last birth protected against neonatal tetanus	Positive
Maternal and Child Health	Mothers who consumed iron folic acid for 100 days or more when they were pregnant (%)	Yes	Iron folic acid for 100 days	Positive
Maternal and Child Health	Mothers who consumed iron folic acid for 180 days or more when they were pregnant (%)	No	Iron folic acid for 180 days	Positive
Maternal and Child Health	Registered pregnancies for which the mother received a Mother and Child Protection (MCP) card (%)	Yes	Mother and Child Protection card received	Positive
Maternal and Child Health	Mothers who received postnatal care from a doctor/nurse/LHV/ANM/midwife/other health personnel within 2 days of delivery (%)	Yes	Mothers received postnatal care	Positive
Maternal and Child Health	Average out-of-pocket expenditure per delivery in a public health facility (Rs.)	Yes	OOP expenditure per delivery	Negative
Maternal and Child Health	Children born at home who were taken to a health facility for a check-up within 24 hours of birth (%)	No	Postnatal check after home delivery	Positive

NFHS-5 Category Name	NFHS-5 Indicator Name	NFHS-4 Indicator	Indicator Name in Dashboard	Direction
Maternal and Child Health	Children who received postnatal care from a doctor/nurse/LHV/ANM/midwife/other health personnel within 2 days of delivery (%)	Yes	Postnatal check by skilled health workers	Positive
Delivery Care	Institutional births (%)	Yes	Institutional births	Positive
Delivery Care	Institutional births in public facility (%)	Yes	In public facility	Positive
Delivery Care	Home births that were conducted by skilled health personnel10 (%)	Yes	Home delivery by skilled health personnel	Positive
Delivery Care	Births attended by skilled health personnel10 (%)	Yes	Births by skilled health personnel	Positive
Delivery Care	Births delivered by caesarean section (%)	Yes	Caesarean section delivery	Positive
Delivery Care	Births in a private health facility that were delivered by caesarean section (%)	Yes	Caesarean section in private sector	Positive
Delivery Care	Births in a public health facility that were delivered by caesarean section (%)	Yes	Caesarean section in public sector	Positive
Child Vaccinations and Vit A Supplements	Children age 12-23 months fully vaccinated based on information from either vaccination card or mother's recall11 (%)	Yes	Full vaccination	Positive
Child Vaccinations and Vit A Supplements	Children age 12-23 months fully vaccinated based on information from vaccination card only12 (%)	No	Full vaccination (Source from card only)	Positive
Child Vaccinations and Vit A Supplements	Children age 12-23 months who have received BCG (%)	Yes	BCG	Positive
Child Vaccinations and Vit A Supplements	Children age 12-23 months who have received 3 doses of polio vaccine13 (%)	Yes	3 doses of polio vaccine	Positive
Child Vaccinations and Vit A Supplements	Children age 12-23 months who have received 3 doses of penta or DPT vaccine (%)	Yes	3 doses of penta or DPT vaccine	Positive
Child Vaccinations and Vit A Supplements	Children age 12-23 months who have received the first dose of measles-containing vaccine (MCV) (%)	Yes	First dose of measles-containing vaccine	Positive
Child Vaccinations and Vit A Supplements	Children age 24-35 months who have received a second dose of measles-containing vaccine (MCV) (%)	No	Second dose of measles-containing vaccine	Positive
Child Vaccinations and Vit A Supplements	Children age 12-23 months who have received 3 doses of rotavirus vaccine14 (%)	No	3 doses of rotavirus vaccine	Positive
Child Vaccinations and Vit A Supplements	Children age 12-23 months who have received 3 doses of penta or hepatitis B vaccine (%)	Yes	3 doses of penta or hepatitis B vaccine	Positive
Child Vaccinations and Vit A Supplements	Children age 9-35 months who received a vitamin A dose in the last 6 months (%)	Yes	Vitamin A dose in the last 6 months	Positive
Child Vaccinations and Vit A Supplements	Children age 12-23 months who received most of their vaccinations in a public health facility (%)	Yes	Vaccinations in a public health facility	Positive

NFHS-5 Category Name	NFHS-5 Indicator Name	NFHS-4 Indicator	Indicator Name in Dashboard	Direction
Child Vaccinations and Vit A Supplements	Children age 12-23 months who received most of their vaccinations in a private health facility (%)	Yes	Vaccinations in a private health facility	Positive
Treatment of Childhood Diseases	Prevalence of diarrhoea in the 2 weeks preceding the survey (%)	Yes	Prevalence of diarrhoea	Negative
Treatment of Childhood Diseases	Children with diarrhoea in the 2 weeks preceding the survey who received oral rehydration salts (ORS) (%)	Yes	Children with diarrhoea who received ORS	Positive
Treatment of Childhood Diseases	Children with diarrhoea in the 2 weeks preceding the survey who received zinc (%)	Yes	Children with diarrhoea who received zinc	Positive
Treatment of Childhood Diseases	Children with diarrhoea in the 2 weeks preceding the survey taken to a health facility or health provider (%)	Yes	Children with diarrhoea taken to health facility	Positive
Treatment of Childhood Diseases	Prevalence of symptoms of acute respiratory infection (ARI) in the 2 weeks preceding the survey (%)	Yes	Prevalence of ARI	Negative
Treatment of Childhood Diseases	Children with fever or symptoms of ARI in the 2 weeks preceding the survey taken to a health facility or health provider (%)	Yes	Children with fever or ARI taken to health facility	Positive
Child Feeding and Nutritional Status	Children under age 3 years breastfed within one hour of birth15 (%)	Yes	Breastfed within one hour of birth	Positive
Child Feeding and Nutritional Status	Children under age 6 months exclusively breastfed16 (%)	Yes	Exclusive breastfeding (within 6 months)	Positive
Child Feeding and Nutritional Status	Children age 6-8 months receiving solid or semi-solid food and breastmilk16 (%)	Yes	Receiving solid/semi-solid food (6-8 months)	Positive
Child Feeding and Nutritional Status	Breastfeeding children age 6-23 months receiving an adequate diet16, 17 (%)	Yes	Adequate diet (Breastfeeding - 6-23 months)	Positive
Child Feeding and Nutritional Status	Non-breastfeeding children age 6-23 months receiving an adequate diet16, 17 (%)	Yes	Adequate diet (Non-breastfeeding - 6-23 months)	Positive
Child Feeding and Nutritional Status	Total children age 6-23 months receiving an adequate diet16, 17 (%)	Yes	Adequate diet (All children - 6-23 months)	Positive
Child Feeding and Nutritional Status	Children under 5 years who are stunted (height-for-age)18 (%)	Yes	Stunting	Negative
Child Feeding and Nutritional Status	Children under 5 years who are wasted (weight-for-height)18 (%)	Yes	Wasting	Negative
Child Feeding and Nutritional Status	Children under 5 years who are severely wasted (weight-for-height)19 (%)	Yes	Severe wasting	Negative
Child Feeding and Nutritional Status	Children under 5 years who are underweight (weight-for-age)18 (%)	Yes	Underweight	Negative
Child Feeding and Nutritional Status	Children under 5 years who are overweight (weight-for-height)20 (%)	No	Overweight	Negative

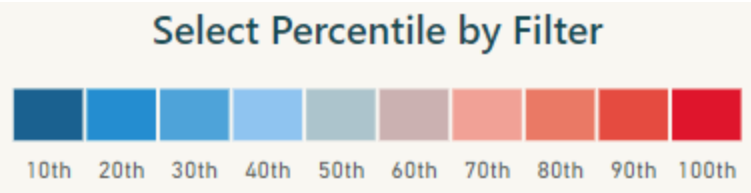
NFHS-5 Category Name	NFHS-5 Indicator Name	NFHS-4 Indicator	Indicator Name in Dashboard	Direction
Nutritional Status of Women	Women whose Body Mass Index (BMI) is below normal (BMI <18.5 kg/m2)21 (%)	Yes	BMI below normal (Women)	Negative
Nutritional Status of Women	Women who are overweight or obese (BMI ≥25.0 kg/m2)21 (%)	Yes	Overweight or obese (Women)	Negative
Nutritional Status of Women	Women who have high risk waist-to-hip ratio (≥0.85) (%)	No	Risky waist-to-hip ratio (Women)	Negative
Anaemia among Children and Women	Children age 6-59 months who are anaemic (<11.0 g/dl)22 (%)	Yes	Anemia (Children)	Negative
Anaemia among Children and Women	Non-pregnant women age 15-49 years who are anaemic (<12.0 g/dl)22 (%)	Yes	Anemia (Non-pregnant women)	Negative
Anaemia among Children and Women	Pregnant women age 15-49 years who are anaemic (<11.0 g/dl)22 (%)	Yes	Anemia (Pregnant women)	Negative
Anaemia among Children and Women	All women age 15-49 years who are anaemic22 (%)	Yes	Anemia (All women)	Negative
Anaemia among Children and Women	All women age 15-19 years who are anaemic22 (%)	No	Anemia (All adolescent women)	Negative
Blood Sugar Level among Adults	Blood sugar level - high (141-160 mg/dl)23 (%)	No	High (141-160 mg/dl) (Women)	Negative
Blood Sugar Level among Adults	Blood sugar level - very high (>160 mg/dl)23 (%)	Yes	Very high (>160 mg/dl) (Women)	Negative
Blood Sugar Level among Adults	Blood sugar level - high or very high (>140 mg/dl) or taking medicine to control blood sugar level23 (%)	Yes	High or very high or taking medicine (Women)	Negative
Blood Sugar Level among Adults	Blood sugar level - high (141-160 mg/dl)23 (%)	No	High (141-160 mg/dl) (Men)	Negative
Blood Sugar Level among Adults	Blood sugar level - very high (>160 mg/dl)23 (%)	Yes	Very high (>160 mg/dl) (Men)	Negative
Blood Sugar Level among Adults	Blood sugar level - high or very high (>140 mg/dl) or taking medicine to control blood sugar level23 (%)	Yes	High or very high or taking medicine (Men)	Negative
Hypertension among Adults	Mildly elevated blood pressure (Systolic 140-159 mm of Hg and/or Diastolic 90-99 mm of Hg) (%)	Yes	Mild blood pressure (Women)	Negative
Hypertension among Adults	Moderately or severely elevated blood pressure (Systolic ≥160mm of Hg and/or Diastolic ≥100mm of Hg) (%)	Yes	Moderate or severe blood pressure (Women)	Negative
Hypertension among Adults	Elevated blood pressure (Systolic ≥140 mm of Hg and/or Diastolic ≥90 mm of Hg) or taking medicine to control blood pressure (%)	Yes	Blood pressure (Women)	Negative
Hypertension among Adults	Mildly elevated blood pressure (Systolic 140-159 mm of Hg and/or Diastolic 90-99 mm of Hg) (%)	Yes	Mild blood pressure (Men)	Negative

NFHS-5 Category Name	NFHS-5 Indicator Name	NFHS-4 Indicator	Indicator Name in Dashboard	Direction
Hypertension among Adults	Moderately or severely elevated blood pressure (Systolic ≥160mm of Hg and/or Diastolic ≥100mm of Hg) (%)	Yes	Moderate or severe blood pressure (Men)	Negative
Hypertension among Adults	Elevated blood pressure (Systolic ≥140 mm of Hg and/or Diastolic ≥90 mm of Hg) or taking medicine to control blood pressure (%)	Yes	Blood pressure (Men)	Negative
Screening for Cancer among Women	Ever undergone a screening test for cervical cancer (%)	Yes	Screening for cervical cancer (Women)	Negative
Screening for Cancer among Women	Ever undergone a breast examination for breast cancer (%)	Yes	Examination for breast cancer (Women)	Negative
Screening for Cancer among Women	Ever undergone an oral cavity examination for oral cancer (%)	Yes	Examination for oral cancer (Women)	Negative
Tobacco and Alcohol Use among Adults	Women age 15 years and above who use any kind of tobacco (%)	No	Tobacco use (Women)	Negative
Tobacco and Alcohol Use among Adults	Men age 15 years and above who use any kind of tobacco (%)	No	Tobacco use (Men)	Negative
Tobacco and Alcohol Use among Adults	Women age 15 years and above who consume alcohol (%)	No	Alcohol consumption (Women)	Negative
Tobacco and Alcohol Use among Adults	Men age 15 years and above who consume alcohol (%)	No	Alcohol consumption (Men)	Negative

Note on Aspirational Districts

The 112 current aspirational districts from NITI Aayog were matched to the 707 districts surveyed in NFHS-5. There are only 111 aspirational districts identified on our dashboard because we were unable to discern the equivalent district to “Bhoopalapalli (Warangal)” in the 112 aspirational district list to the 707-district list.

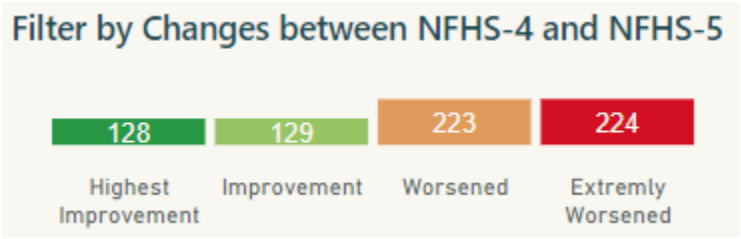
Interpreting the Color Legend for NFHS-5



Percentile Filter shown for all Indicators

In deciding the color scheme, we wanted to standardize across all indicators. To do this, we had to decide whether higher values indicate a positive value or a negative value. This exercise is in column 5 in the table above and is labelled as “Direction”. For example, for literacy rates a higher value indicates a positive but for stunting a higher value indicates a negative. The divergent color legend going from red to blue in the NFHS-5 page is divided up into 10 percentiles with 10 being the worst (>90th percentile), and 1 being the best (<10th percentile). Additionally, the higher number of each percentile category is displayed on the dashboard. For example, the 30th percentile displays values falling between the 20th and 30th percentiles. Percentiles 10 to 50 are colored in shades of blue and percentiles 60 to 100 are colored in shades of red.

Interpreting the Color Legend for the Change between NFHS-4 and 5



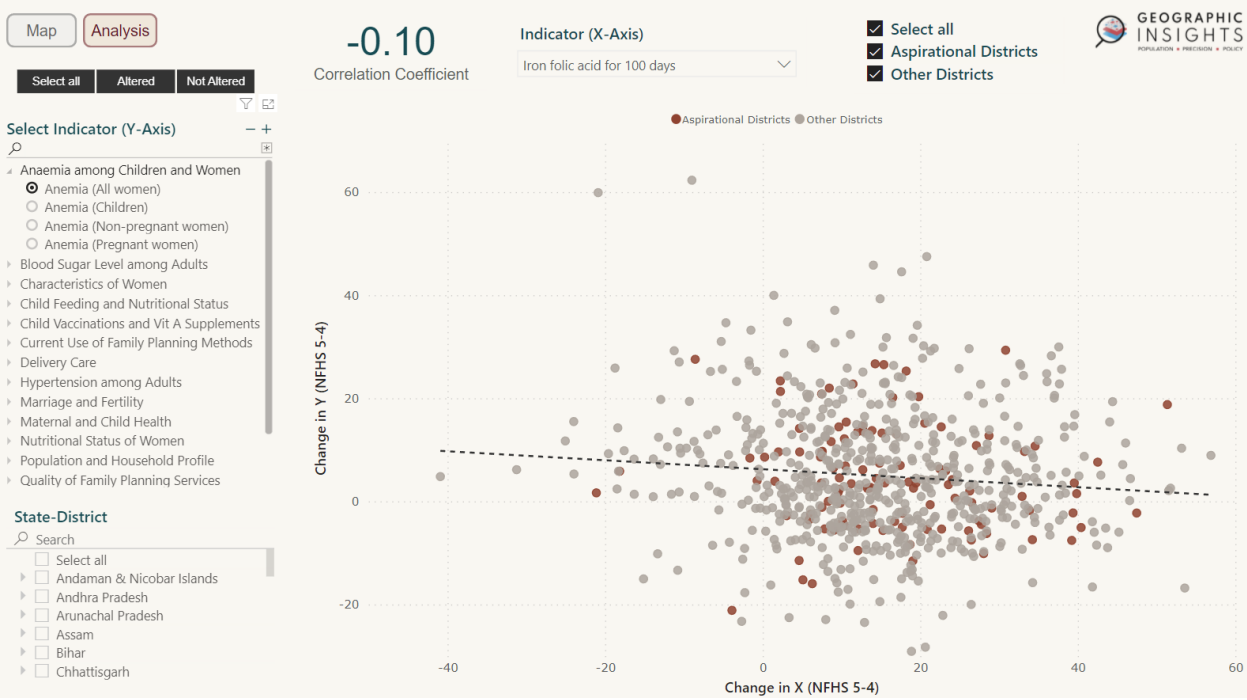
Change Filter for “Anemia (All women)”

For the change page, we divided it up into 2 groups first based on whether the district experienced improvement or worsened. This was done by subtracting the NFHS-4 value from the NFHS-5 value. After that, using the “Direction” column from the table above we knew whether a positive difference or a negative difference was better for each indicator.

For example, if a district had 50% literate population in NFHS-4 and 60% literate population in NFHS-5, the difference was +10% (60-50). This would be labelled as a positive contrary to if a district had 50% stunting in NFHS-4 and 60% stunting in NFHS-5, the difference would be +10% (60-50) but this would be labelled as a negative.

Following this, we divided each group (improved and worsened) of districts for each indicator into 2 more additional sub-groups. This was done using the 50th percentile of the improved and worsened groups separately to assign a district a group value of 1 to 4, with 1 being highest improvement, and 4 being extremely worsened. For about 0.8% of district-indicator pairings, there is 0 change between NFHS-4 and NFHS-5 and those districts are colored as “Improvement” or “Worsened” depending on the indicator direction. We also added the number of districts that fall into each category as shown in the image above for “Anemia (All women)”.

Interpreting the Analysis Page



Analysis Page of the Dashboard

In the analysis page, we show a scatter plot of the change for 2 user selected indicators for NFHS-5 minus NFHS-4. The correlation coefficient is calculated by the DAX code found in Appendix B. In the figure above, the correlation between the change in Iron Folic Acid for 100 days and change in Anemia (All women) is -0.10. This represents the strength of the trend line shown in the scatter plot.

Methodology for Comparing NFHS-4 and NFHS-5 Districts

There were 707 districts that were surveyed in the NFHS-5 survey, compared to only 640 in the NFHS-4 survey. The NFHS-4 survey used Census 2011's 640 districts, with the exception that 3 districts (Chandigarh, Lakshadweep, and Dadra and Nagar Haveli) did not have NFHS-4 district factsheet data. We developed a novel methodological approach to assign values from the 637 NFHS-4 districts to the 707 NFHS-5 districts. This approach keeps the saliency of the NFHS-5 data and does not make any alternations to the NFHS-5 data that is reported at the district level.

While there are other methods for distributing the parent district values to the new districts such as using population weights, the data required for this are not available in an appropriate way. Therefore, for the comparison of the 130 altered districts, we note that this represents an approximation of what could have been possible.

Key terminology used in our Method

Key Term	Definition
Unchanged District	Districts that had the same geographic boundary in the NFHS-4 and NFHS-5 surveys.
New District	Districts that had ANY boundary alternation between the NFHS-4 and NFHS-5 surveys. These include a brand-new district forming, a district being changed by either removing or adding parts of it, or any other form of alteration.
Parent District	NFHS-4 districts that new NFHS-5 districts were formed from.
Brand New District	Districts that are not found in the NFHS-4 surveys and are a set of completely new geographic units in NFHS-5 formed by 1, 2, or 3 parent(s) districts.
Parent-Altered Districts	Defined as districts that existed in both the NFHS-4 and NFHS-5 surveys but in the NFHS-5 survey had parts of the district that were either removed or added.

Using this, we went through official district websites and state notification documents to determine how to estimate the NFHS-4 values for all the 707 districts. Below we provide an overview of how many districts fell into each calculation category.

Unchanged Districts	Calculation 1	Calculation 2
N=577	N=115	N=15

The examples below use "Children age 6-59 months who are anaemic (<11.0 g/dl) (%)" to showcase how each calculation was formed. The values in red are the "estimated"

NFHS-4 values that our team assigned to each district. The full list of districts that used Calculation 1 and Calculation 2 can be found in Appendix A.

Calculation 1: One (1) NFHS-4 parent district becoming one (1) brand-new NFHS-5 district and one (1) parent-altered NFHS-5 district.

In this calculation, the NFHS-4 value for the brand-new and parent-altered districts is going to be the same as what the parent district had in the NFHS-4 district factsheet. This can be seen illustrated with the example below:

District	NFHS-4 Value	NFHS-5 Value
Thane	54.1	N/A
Palghar	54.1	70.3
*Thane	54.1	67.9

*Thane is the parent-altered version of Thane from NFHS-4 (its parent district) after Palghar was carved out from it. N/A = Not Applicable, only *Thane appears not Thane in NFHS-5.

Calculation 2: Two (2) NFHS-4 parent districts forming one (1) brand-new NFHS-5 districts and two (2) parent-altered NFHS-5 districts.

In this calculation, the NFHS-4 values for the parent-altered districts remain the same as their respective parent district. The NFHS-4 value for the brand-new district is the mean of the two or three parent district values.

District	NFHS-4 Value	NFHS-5 Value
Ahmadabad 768	76	N/A
Bhavnagar 926	69.2	N/A
Botad 1032	72.6	75.5
*Ahmadabad 1010	76	72
*Bhavnagar 950	69.2	71.5

*Ahmadabad and *Bhavnagar are the parent-altered version of their respective parent districts after forming Botad, a new district that was created from some parts of both districts. N/A = Not Applicable, only *Ahmadabad and *Bhavnagar appears in NFHS-5.

Appendix A

State Name	District Name	Example Calculation
Arunachal Pradesh	East Siang	Example 1
Arunachal Pradesh	Kra Daadi	Example 1
Arunachal Pradesh	Kurung Kumey	Example 1
Arunachal Pradesh	Lohit	Example 1
Arunachal Pradesh	Namsai	Example 1
Arunachal Pradesh	Langding	Example 1
Arunachal Pradesh	Tirap	Example 1
Arunachal Pradesh	West Siang	Example 1
Arunachal Pradesh	Siang	Example 2
Assam	Dhubri	Example 1
Assam	South Salmara-Mankachar	Example 1
Assam	Jorhat	Example 1
Assam	Majuli	Example 1
Assam	Karbi Anglong	Example 1
Assam	Karbi Anglong West	Example 1
Assam	Hojai	Example 1
Assam	Nagaon	Example 1
Assam	Charaideo	Example 1
Assam	Sivasagar	Example 1
Assam	Biswanath	Example 1
Assam	Sonitpur	Example 1
Chhattisgarh	Balrampur	Example 1
Chhattisgarh	Bastar	Example 1
Chhattisgarh	Dantewada	Example 1
Chhattisgarh	Kodagaon	Example 1
Chhattisgarh	Bilaspur	Example 1
Chhattisgarh	Mungeli	Example 1
Chhattisgarh	Sukma	Example 1
Chhattisgarh	Balod	Example 1
Chhattisgarh	Bemetara	Example 1
Chhattisgarh	Durg	Example 1
Chhattisgarh	Baloda Bazar	Example 1
Chhattisgarh	Gariaband	Example 1
Chhattisgarh	Raipur	Example 1

State Name	District Name	Example Calculation
Chhattisgarh	Surajpur	Example 1
Chhattisgarh	Surguja	Example 1
Gujarat	Ahmadabad	Example 1
Gujarat	Botad	Example 2
Gujarat	Bhavnagar	Example 1
Gujarat	Devbhoomi Dwarka	Example 1
Gujarat	Jamnagar	Example 1
Gujarat	Gir Somnath	Example 1
Gujarat	Junagadh	Example 1
Gujarat	Kheda	Example 1
Gujarat	Panch Mahals	Example 1
Gujarat	Mahisagar	Example 2
Gujarat	Rajkot	Example 1
Gujarat	Morbi	Example 2
Gujarat	Aravali	Example 1
Gujarat	Sabar Kantha	Example 1
Gujarat	Surendranagar	Example 1
Gujarat	Chhota Udaipur	Example 1
Gujarat	Vadodara	Example 1
Haryana	Bhiwani	Example 1
Haryana	Dadri	Example 1
Madhya Pradesh	Agar Malwa	Example 1
Madhya Pradesh	Shajapur	Example 1
Maharashtra	Palghar	Example 1
Maharashtra	Thane	Example 1
Meghalaya	North Garo Hills	Example 1
Meghalaya	East Garo Hills	Example 1
Meghalaya	East Jaintia Hills	Example 1
Meghalaya	West Jaintia Hills	Example 1
Meghalaya	West Garo Hills	Example 1
Meghalaya	South West Garo Hills	Example 1
Meghalaya	West Khasi Hills	Example 1
Meghalaya	South West Khasi Hills	Example 1
NCT of Delhi	Central	Example 2
NCT of Delhi	East	Example 1
NCT of Delhi	South East	Example 1

State Name	District Name	Example Calculation
NCT of Delhi	Shahdara	Example 2
NCT of Delhi	New Delhi	Example 2
NCT of Delhi	North	Example 2
NCT of Delhi	North East	Example 1
NCT of Delhi	North West	Example 1
NCT of Delhi	South	Example 1
NCT of Delhi	South West	Example 1
Punjab	Fazilka	Example 1
Punjab	Firozpur	Example 1
Punjab	Pathankot	Example 1
Punjab	Gurdaspur	Example 1
Telangana	Adilabad	Example 1
Telangana	Kumuram Bheem (Asifabad)	Example 1
Telangana	Mancherial	Example 1
Telangana	Nirmal	Example 1
Telangana	Jagtial	Example 1
Telangana	Karimnagar	Example 1
Telangana	Peddapalle	Example 1
Telangana	Rajanna Sircilla	Example 1
Telangana	Bhadradri Kothagudem	Example 1
Telangana	Khammam	Example 1
Telangana	Jogulambha Gadwal	Example 1
Telangana	Mahbubnagar	Example 1
Telangana	Nagarkurnool	Example 1
Telangana	Wanaparthy	Example 1
Telangana	Medak	Example 1
Telangana	Sangareddy	Example 1
Telangana	Siddipet	Example 2
Telangana	Nalgonda	Example 1
Telangana	Suryapet	Example 1
Telangana	Yadadri Bhuvanagiri	Example 1
Telangana	Kamareddy	Example 1
Telangana	Nizamabad	Example 1
Telangana	Ranga Reddy	Example 1
Telangana	Medchal-Malkajgiri	Example 1
Telangana	Vikarabad	Example 2

State Name	District Name	Example Calculation
Telangana	Mahabubabad	Example 1
Telangana	Warangal Rural	Example 1
Telangana	Jayashankar Bhupalapally	Example 2
Telangana	Warangal Urban	Example 2
Telangana	Jangaon	Example 2
Tripura	North Tripura	Example 1
Tripura	Unakoti	Example 1
Tripura	Gomati	Example 1
Tripura	South Tripura	Example 1
Tripura	Khowai	Example 1
Tripura	Sepahijala	Example 1
Tripura	West Tripura	Example 1
Uttar Pradesh	Budaun	Example 1
Uttar Pradesh	Ghaziabad	Example 1
Uttar Pradesh	Hapur	Example 1
Uttar Pradesh	Moradabad	Example 1
Uttar Pradesh	Sambhal	Example 2
Uttar Pradesh	Muzaffarnagar	Example 1
Uttar Pradesh	Shamli	Example 1
Uttar Pradesh	Rae Bareli	Example 1
Uttar Pradesh	Sultanpur	Example 1
Uttar Pradesh	Amethi	Example 2
West Bengal	Paschim Barddhaman	Example 1
West Bengal	Purba Barddhaman	Example 1

Appendix B

Correlation Coefficient =

```
VAR __CORRELATION_TABLE = VALUES('ALL Scatter (X-Axis)'[NFHS-5 District, State])
VAR __COUNT =
    COUNTX(
        KEEPFILTERS(__CORRELATION_TABLE),
        CALCULATE(
            SUM('ALL Scatter (X-Axis)'[Final Change (5-4) Value])
                * SUM('ALL Scatter (Y-Axis)'[Final Change (5-4) Value])
        )
    )
VAR __SUM_X =
    SUMX(
        KEEPFILTERS(__CORRELATION_TABLE),
        CALCULATE(SUM('ALL Scatter (X-Axis)'[Final Change (5-4) Value]))
    )
VAR __SUM_Y =
    SUMX(
        KEEPFILTERS(__CORRELATION_TABLE),
        CALCULATE(SUM('ALL Scatter (Y-Axis)'[Final Change (5-4) Value]))
    )
VAR __SUM_XY =
    SUMX(
        KEEPFILTERS(__CORRELATION_TABLE),
        CALCULATE(
            SUM('ALL Scatter (X-Axis)'[Final Change (5-4) Value])
                * SUM('ALL Scatter (Y-Axis)'[Final Change (5-4) Value]) * 1.
        )
    )
VAR __SUM_X2 =
    SUMX(
        KEEPFILTERS(__CORRELATION_TABLE),
        CALCULATE(SUM('ALL Scatter (X-Axis)'[Final Change (5-4) Value]) ^ 2)
    )
VAR __SUM_Y2 =
    SUMX(
        KEEPFILTERS(__CORRELATION_TABLE),
        CALCULATE(SUM('ALL Scatter (Y-Axis)'[Final Change (5-4) Value]) ^ 2)
    )
RETURN
    DIVIDE(
        __COUNT * __SUM_XY - __SUM_X * __SUM_Y * 1.,
        SQRT(
            (__COUNT * __SUM_X2 - __SUM_X ^ 2)
                * (__COUNT * __SUM_Y2 - __SUM_Y ^ 2)
        )    )
```