POSHAN
Led by IFPRI
Partnerships and Opportunities to Strengthen and Harmonize Actions for Nutrition in India
Data Note
No. 93 | JANUARY 2023

Tracking anemia and its determinants from 2015-16 to 2019-21 in India

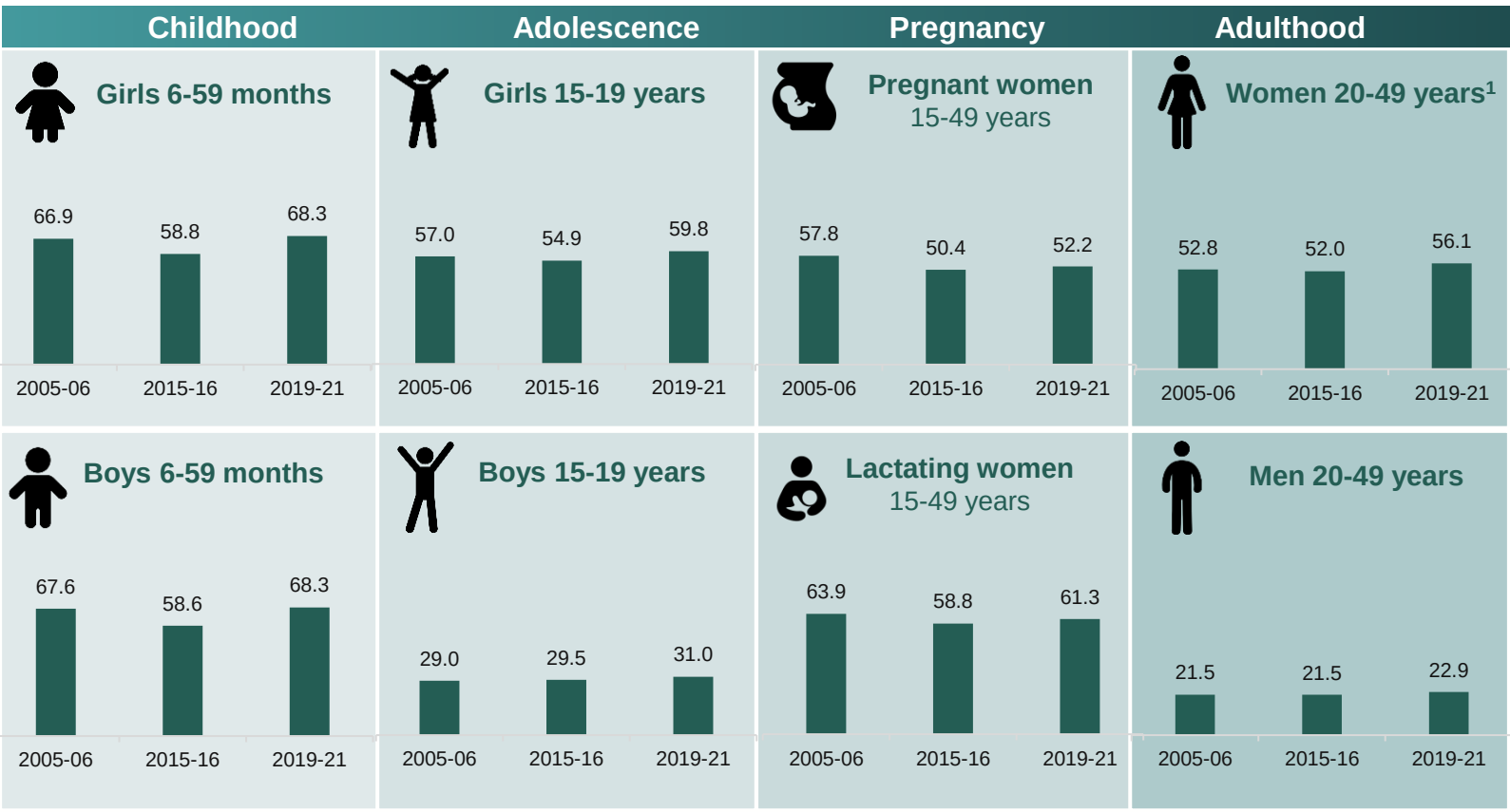
About this data note | This *Data Note* provides an update on the prevalence of anemia-and its determinants in India at state and districts levels, as well as coverage of a nutrition-specific and nutrition-sensitive interventions. Data were from the National Family Health Surveys in 2005-06, 2015-2016 and 2019-21. We first report national trends for 8 population groups (Figure 1 below). For each population group, we show anemia prevalence by severity category and at state and district levels using the two latest rounds of data. Lastly, we show recent trends in determinants of anemia and, nutrition and health interventions.

Causes and consequences of anemia | Anemia is a condition defined by low hemoglobin (Hb) levels in the blood, which results in inadequacies to meet the body's physiological needs of oxygen. Anemia is caused by nutritional and non-nutritional factors, which include deficiencies in micronutrients (iron, folate, and B12), infection and disease, genetic abnormalities, and blood loss. Anemia has been associated with losses in productivity and suboptimal cognition, thus has consequences for human capital and the economy.

India's strategy to reduce anemia | India has an evidence-based strategy to reduce anemia, *Anemia Mukt Bharat* (AMB, or Anemia Free India), launched in 2018. Part of the National Health Mission of the Government of India, AMB includes six interventions including:

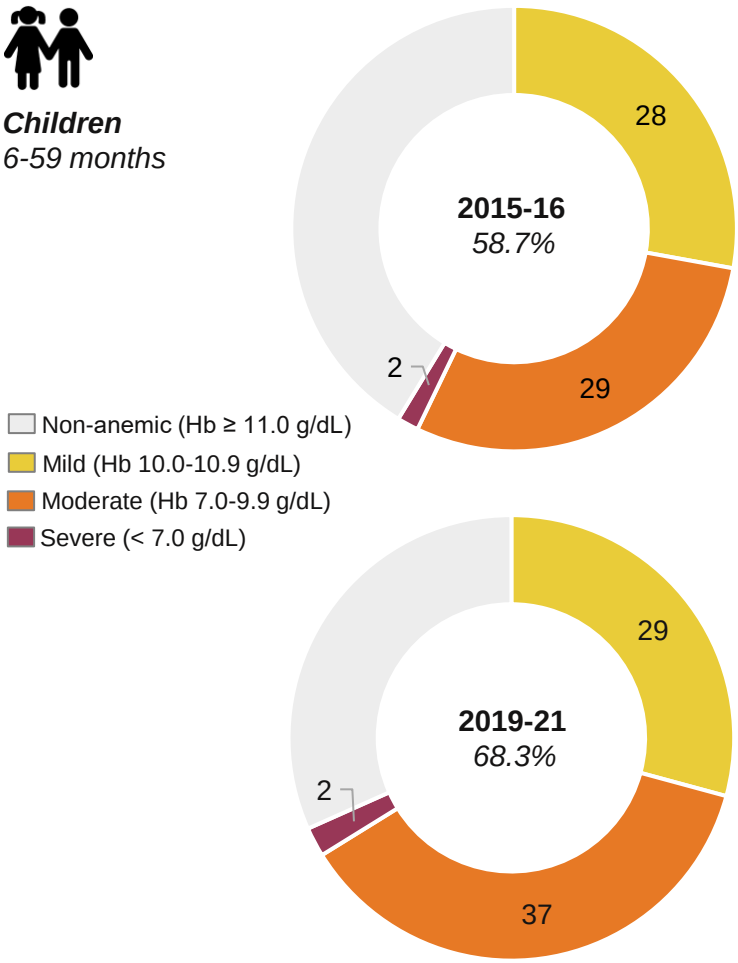
1) iron and folic acid supplementation,
2) deworming,
3) behaviour change communication,
4) testing and treating anemia,
5) provision of fortified foods through public health programmes,
6) addressing non-nutritional causes such as malaria, hemoglobinopathies, and fluorosis.

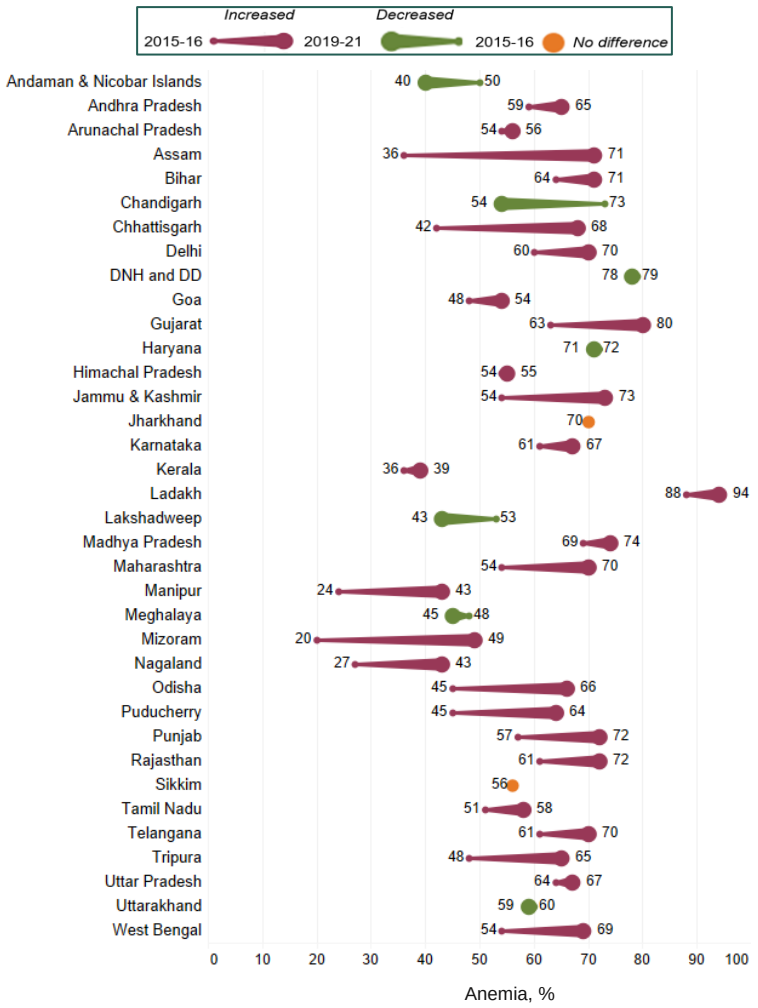
FIGURE 1: Anemia prevalence (%) in India, across the lifespan, 2005-6 to 2019-21



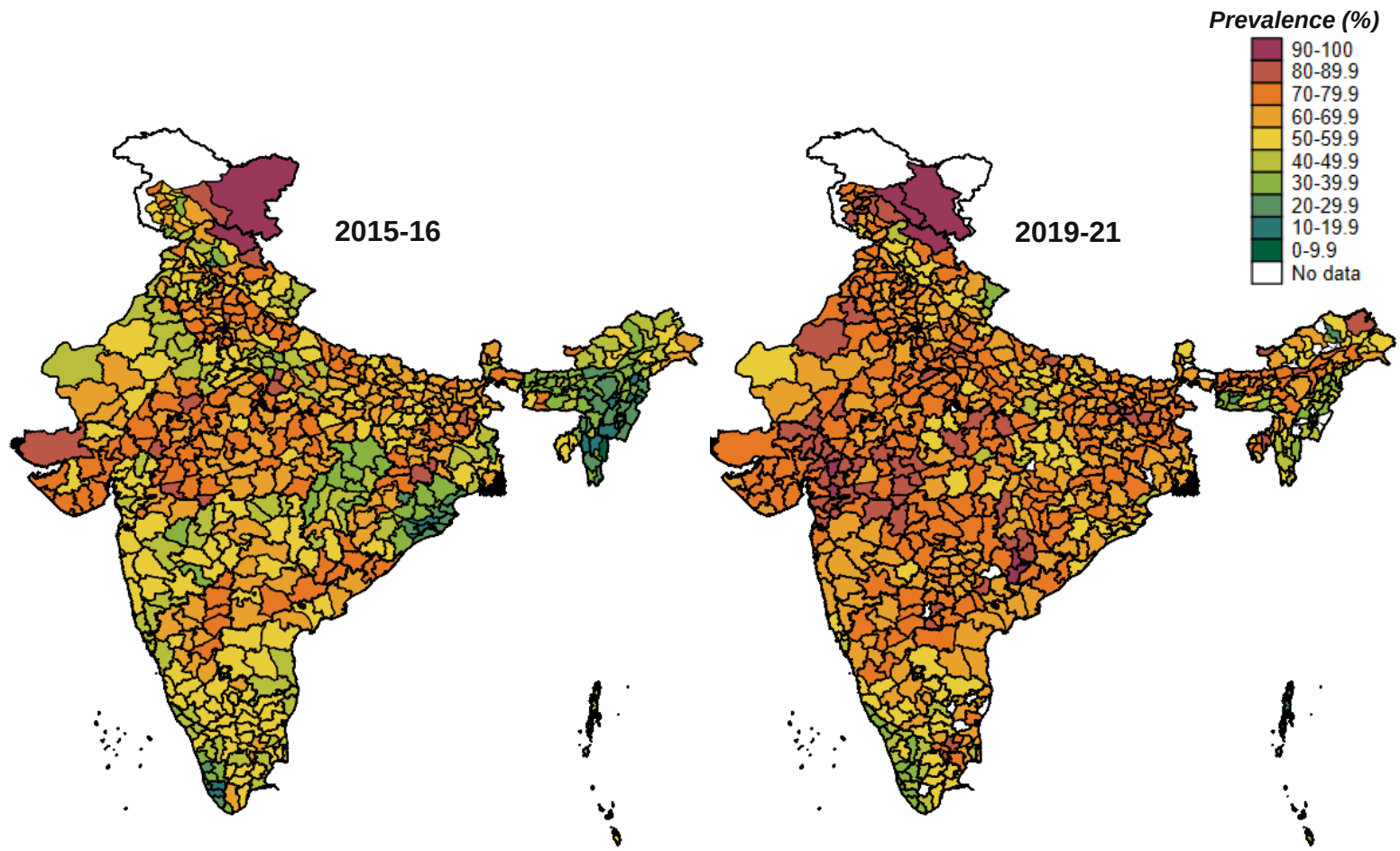
Source: NFHS-3 (2005-06), NFHS-4 (2015-16), and NFHS-5 (2019-21) unit-level data [IFPRI estimates] [1]Women 20-49 years here refers to non-pregnant and non-lactating women.

FIGURE 2 & 3: Anemia among children, 6-59 months national (left) and state (right) levels, 2015-16 and 2019-21





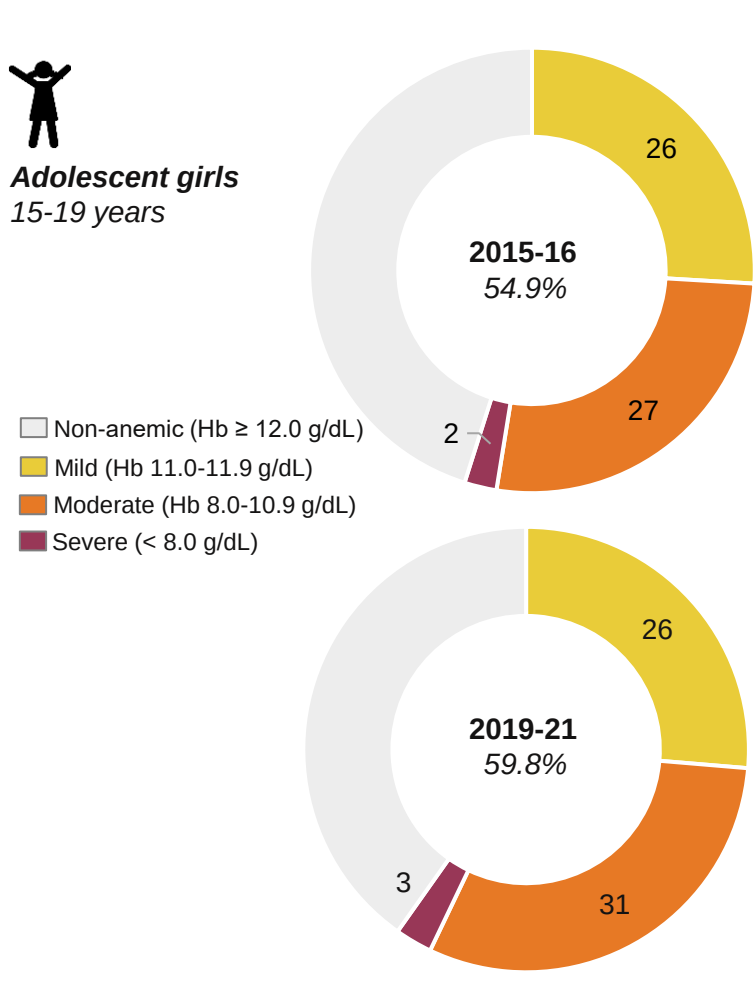
MAP 1: Anemia among children 6-59 months by districts, 2015-16 and 2019-21

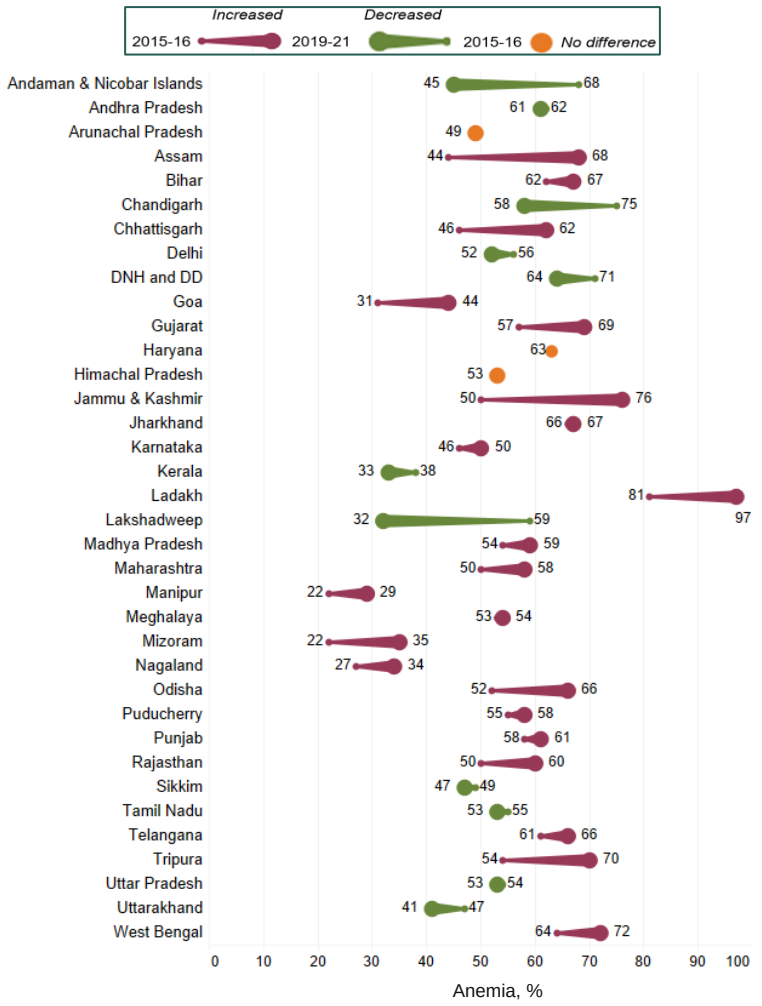


Source: NFHS-4 and NFHS-5 unit level data [IFPRI estimates] Note: DNH and DD- Dadra and Nagar Havel and Daman and Diu

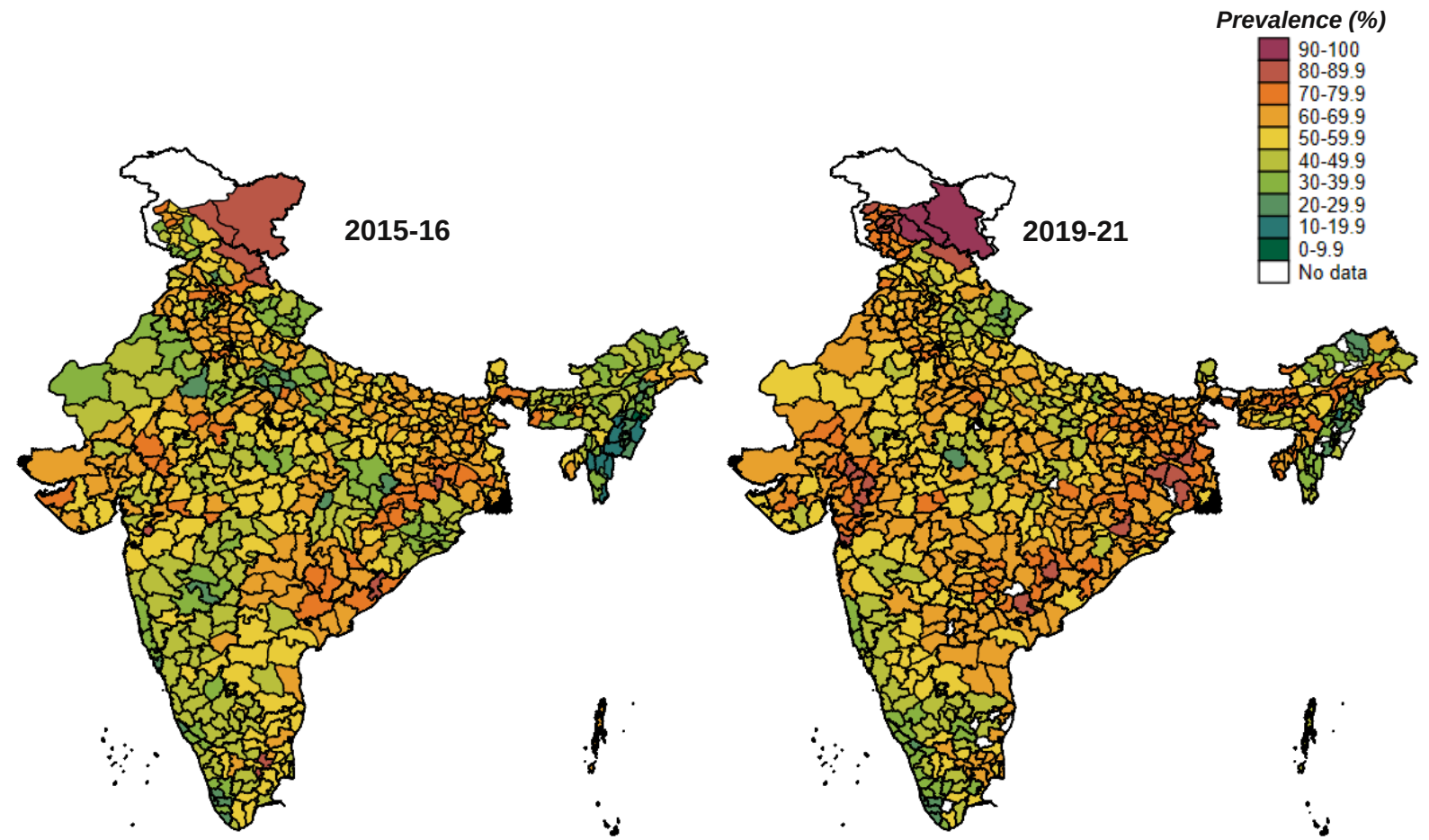
[1]WHO. 2011. Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity. Vitamin and Mineral Nutrition Information System. Geneva, World Health Organization, (http://www.who.int/vmnis/indicators/haemoglobin.pdf).

FIGURE 4 & 5: Anemia among adolescent girls 15-19 years, national (left) and state (right) levels, 2015-16 and 2019-21





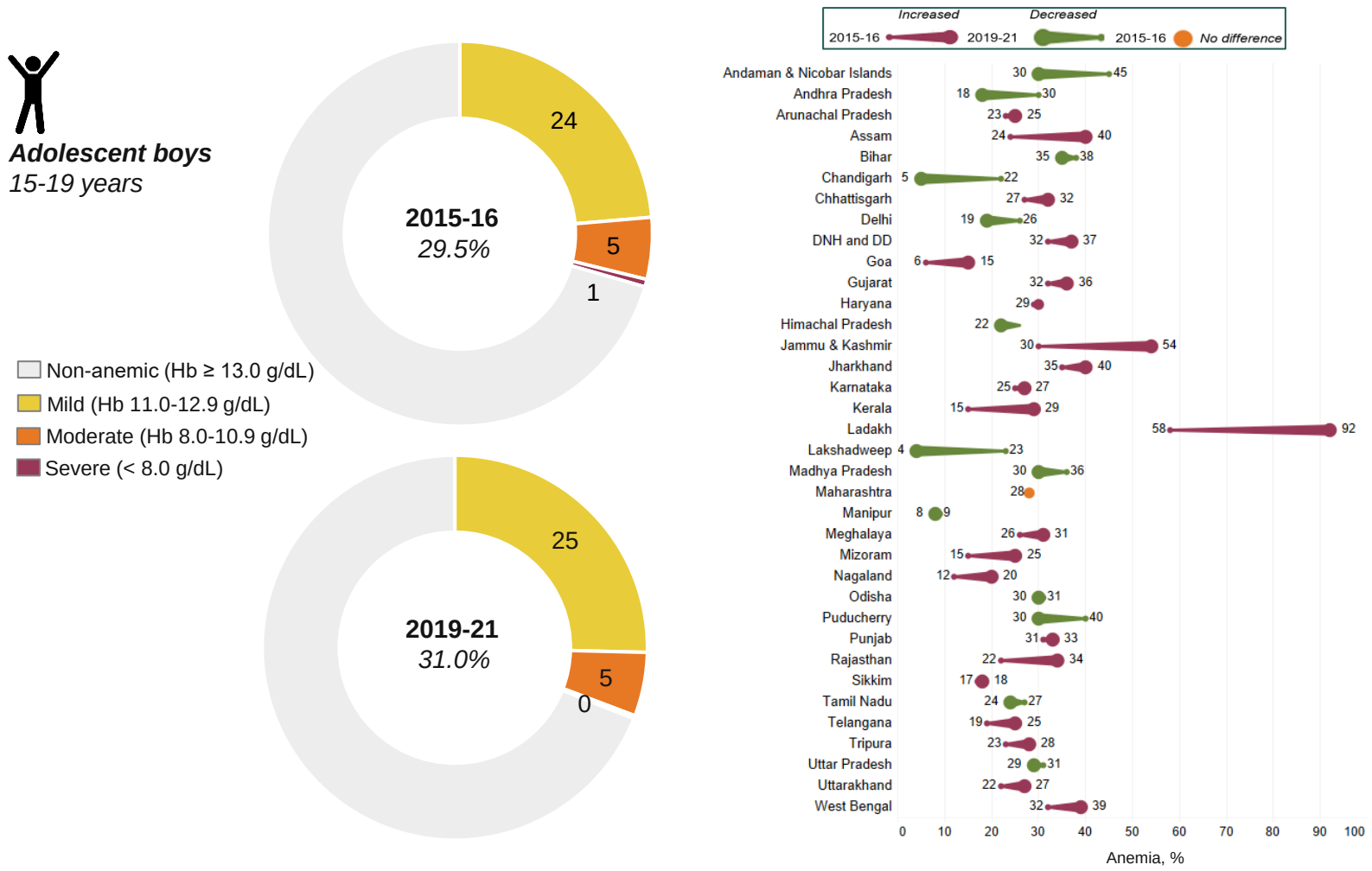
MAP 2: Anemia among adolescent girls 15-19 years by districts, 2015-16 and 2019-21



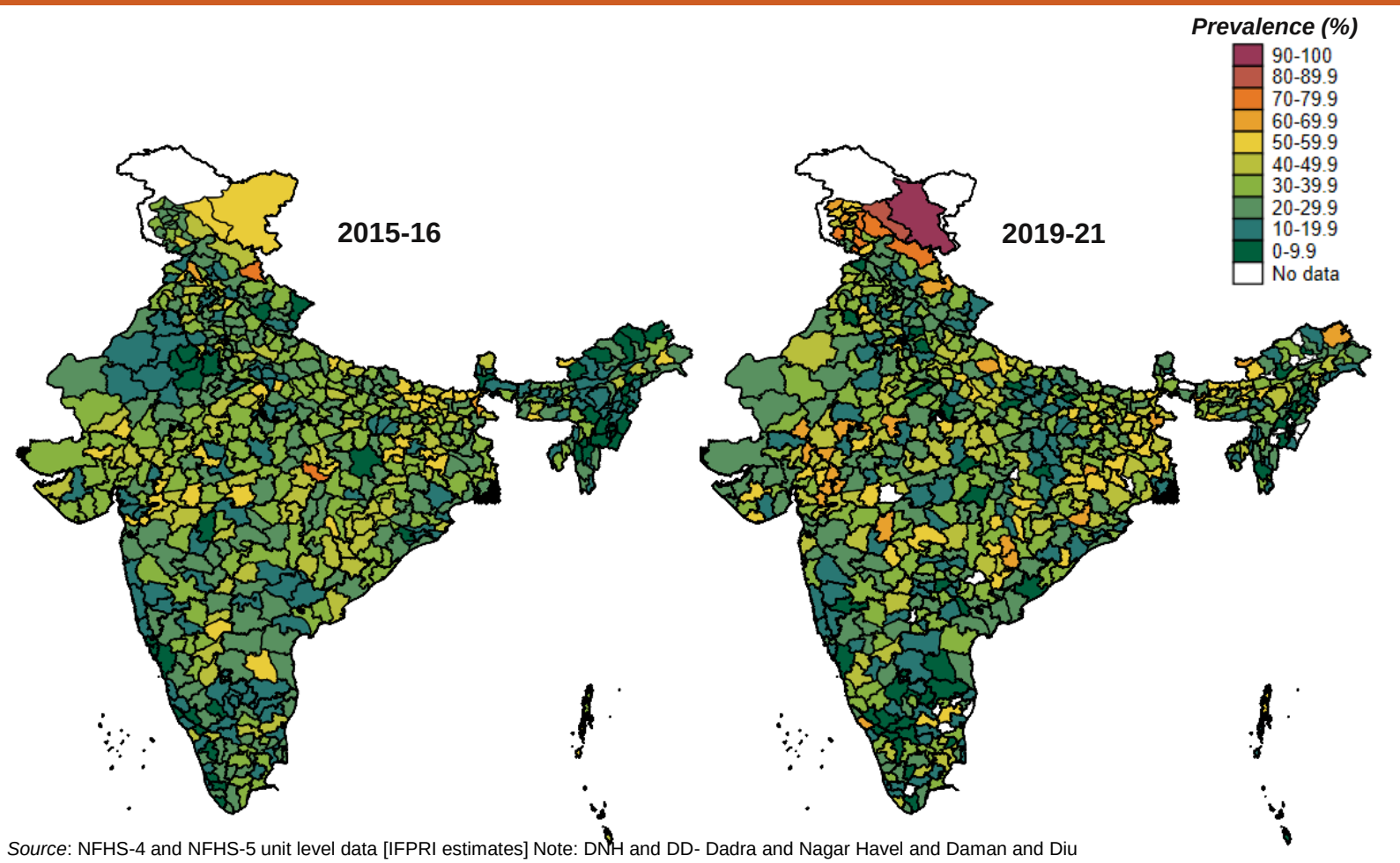
Source: NFHS-4 and NFHS-5 unit level data [IFPRI estimates] Note: DNH and DD- Dadra and Nagar Havel and Daman and Diu

[1]WHO. 2011. Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity. Vitamin and Mineral Nutrition Information System. Geneva, World Health Organization, (http://www.who.int/vmnis/indicators/haemoglobin.pdf).

FIGURE 6 & 7: Anemia among adolescent boys 15-19 years, national (left) and state (right) levels, 2015-16 and 2019-21



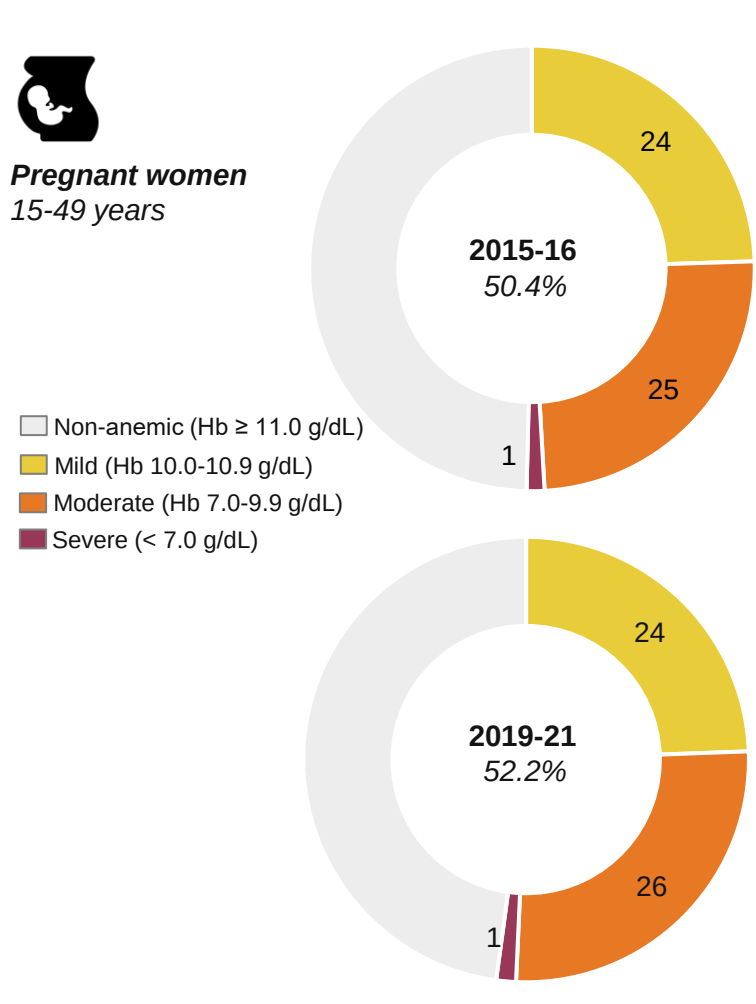
MAP 3: Anemia among adolescent boys 15-19 years by districts, 2015-16 and 2019-21

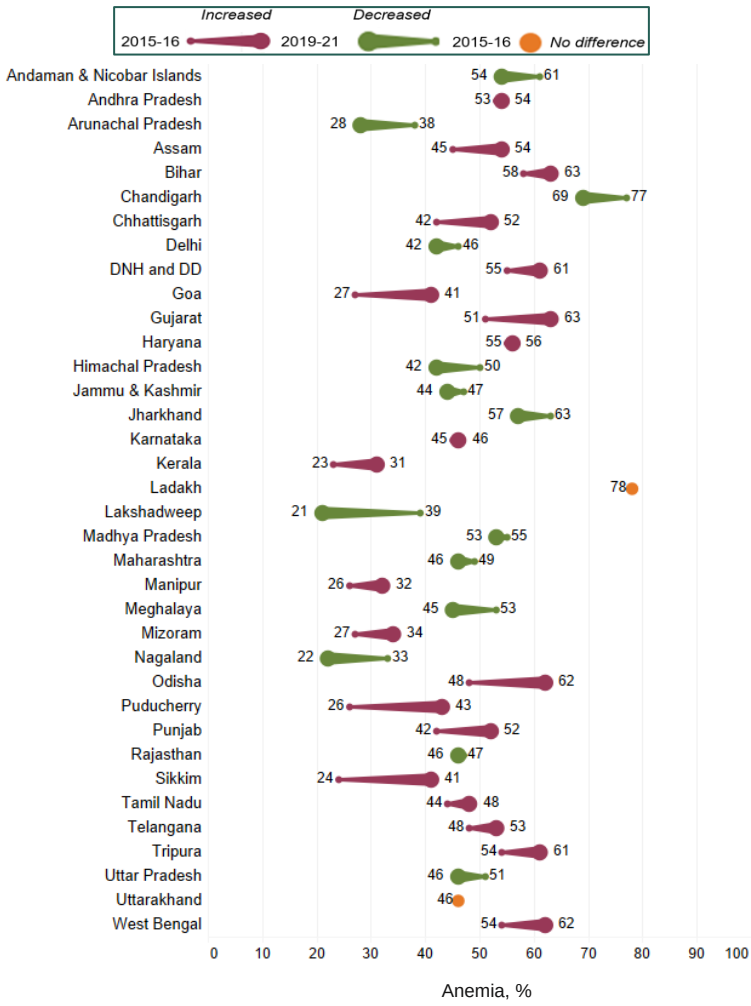


Source: NFHS-4 and NFHS-5 unit level data [IFPRI estimates] Note: DNH and DD- Dadra and Nagar Havel and Daman and Diu

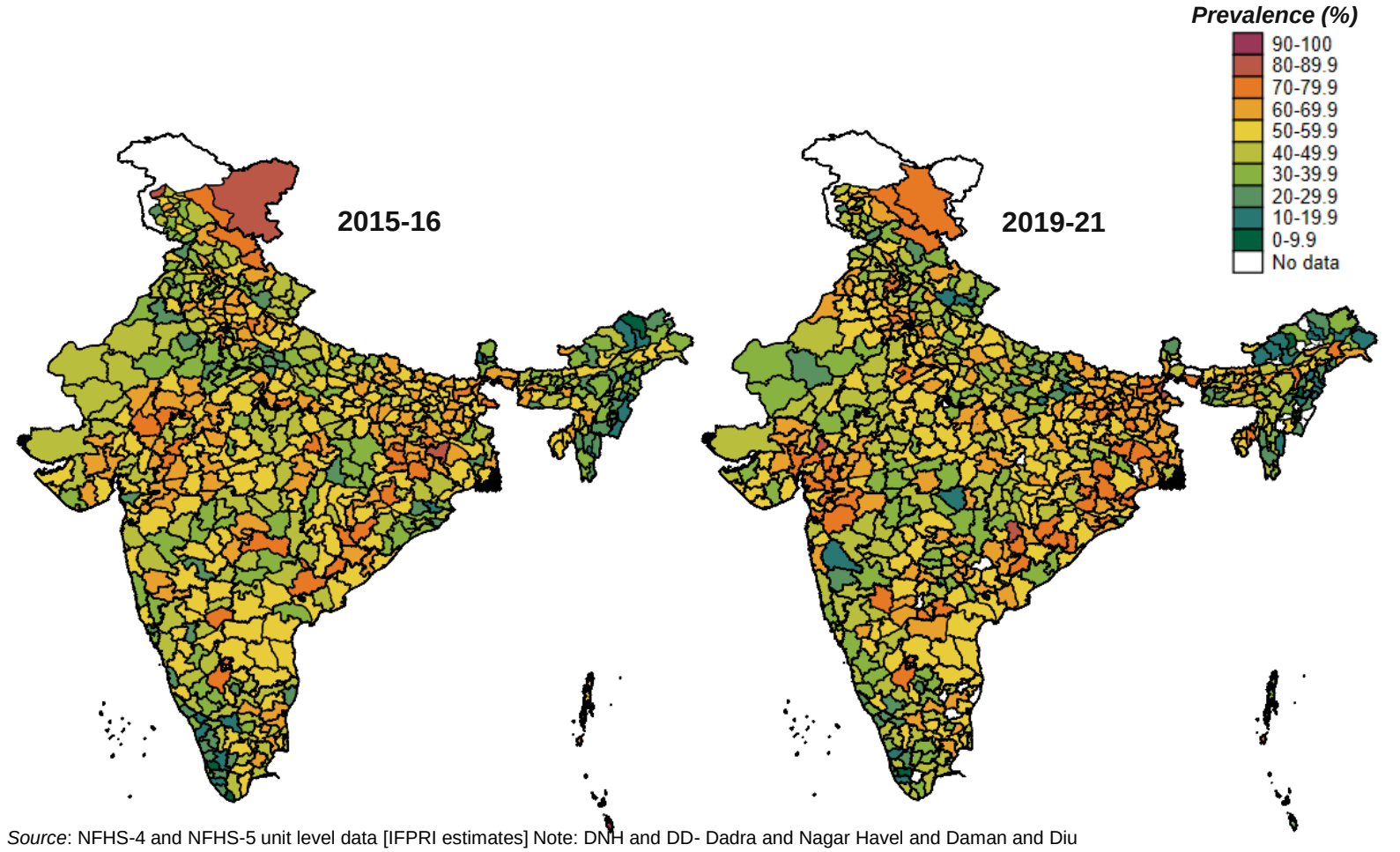
[1]WHO. 2011. Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity. Vitamin and Mineral Nutrition Information System. Geneva, World Health Organization, (http://www.who.int/vmnis/indicators/haemoglobin.pdf).

FIGURE 8 & 9: Anemia among pregnant women 15-49 years, national (left) and state (right) levels, 2015-16 and 2019-21





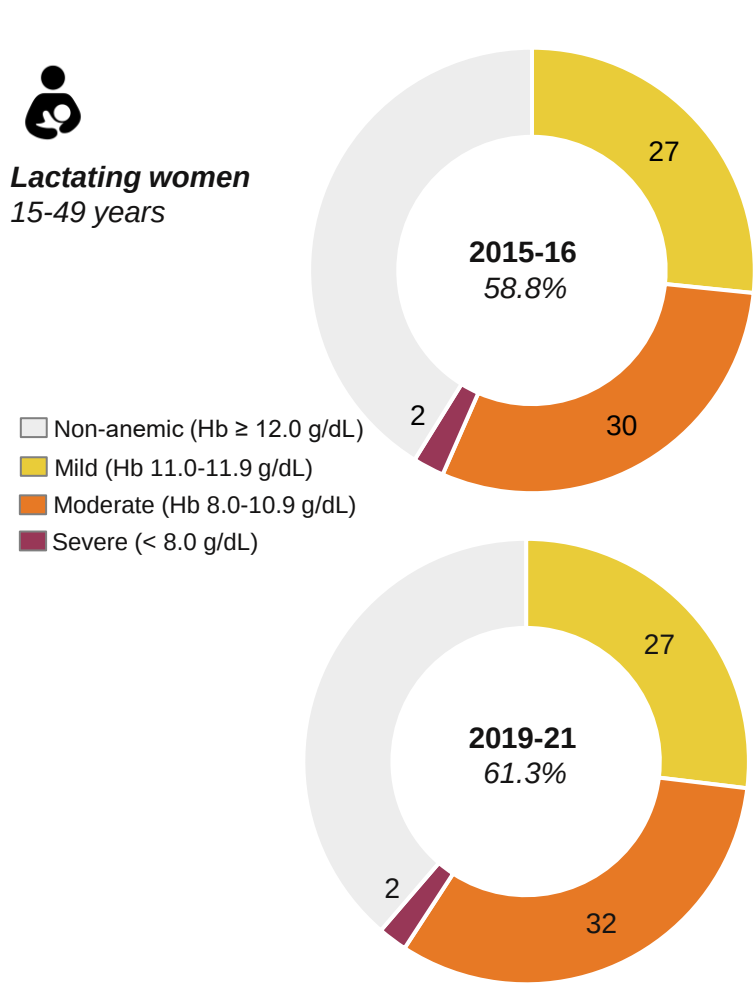
MAP 4: Anemia among pregnant women 15-49 years by districts, 2015-16 and 2019-21

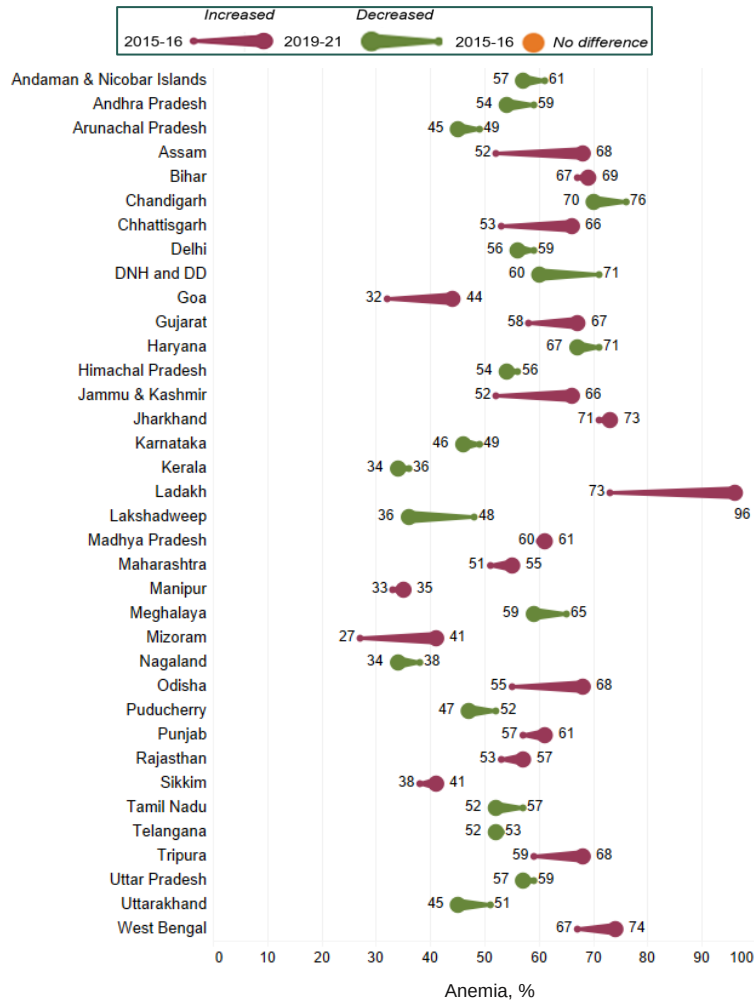


Source: NFHS-4 and NFHS-5 unit level data [IFPRI estimates] Note: DNH and DD- Dadra and Nagar Havel and Daman and Diu

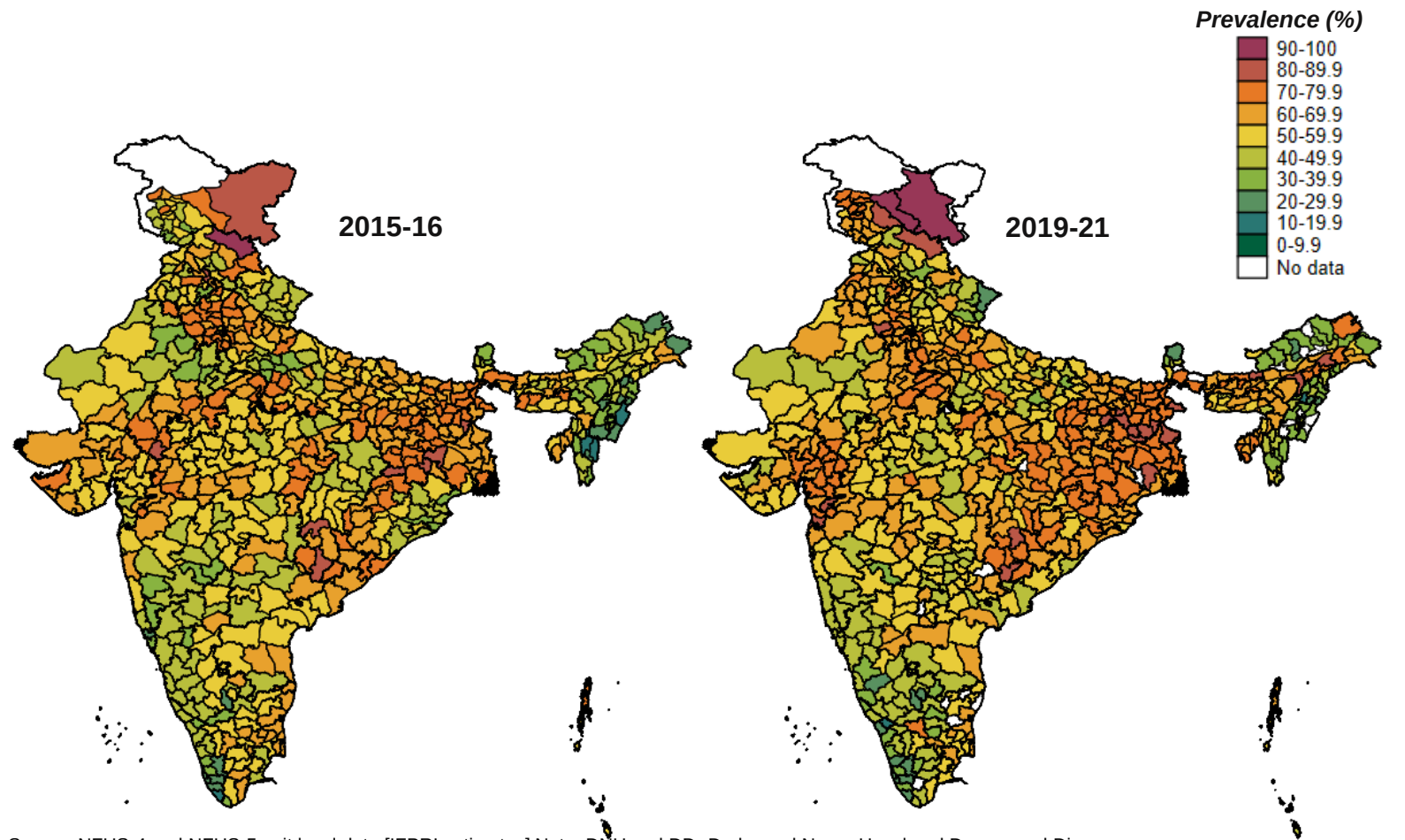
[1]WHO. 2011. Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity. Vitamin and Mineral Nutrition Information System. Geneva, World Health Organization, (http://www.who.int/vmnis/indicators/haemoglobin.pdf).

FIGURE 10 & 11: Anemia among lactating women 15-49 years, national (left) and state (right) levels, 2015-16 and 2019-21





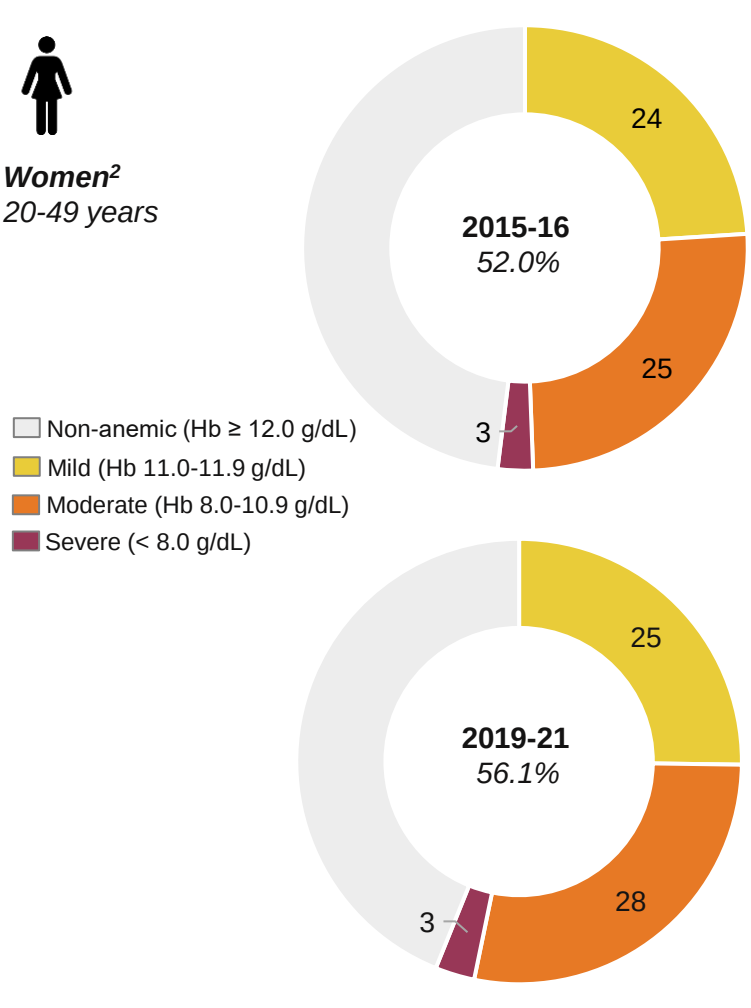
MAP 5: Anemia among lactating women 15-49 years by districts, 2015-16 and 2019-21

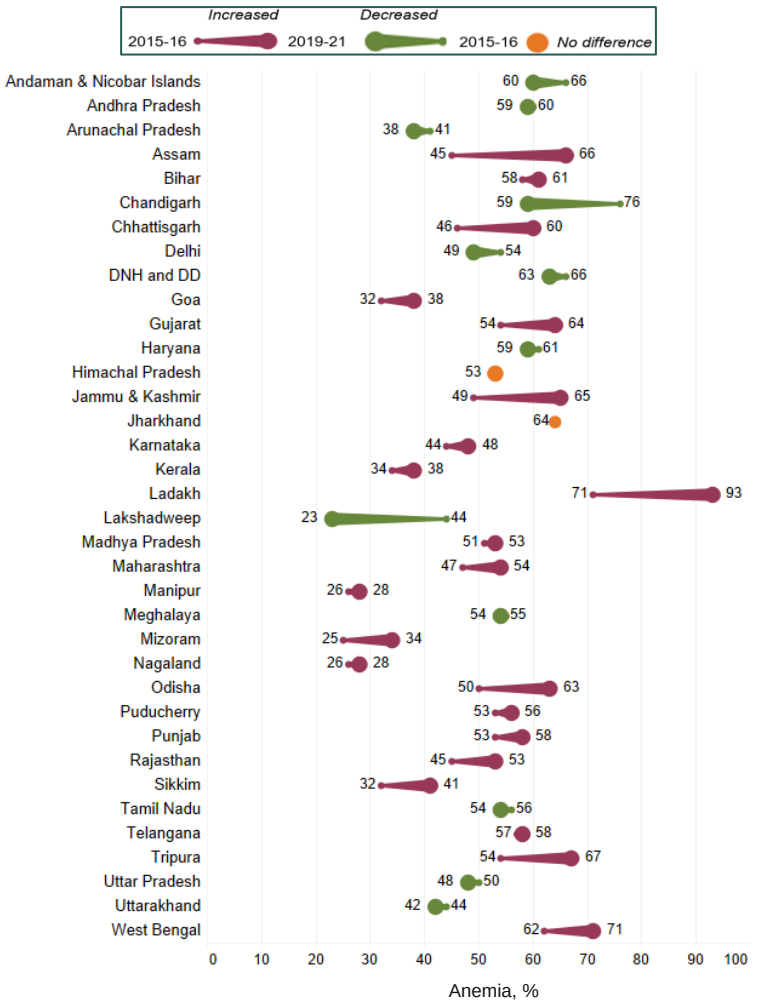


Source: NFHS-4 and NFHS-5 unit level data [IFPRI estimates] Note: DNH and DD- Dadra and Nagar Havel and Daman and Diu

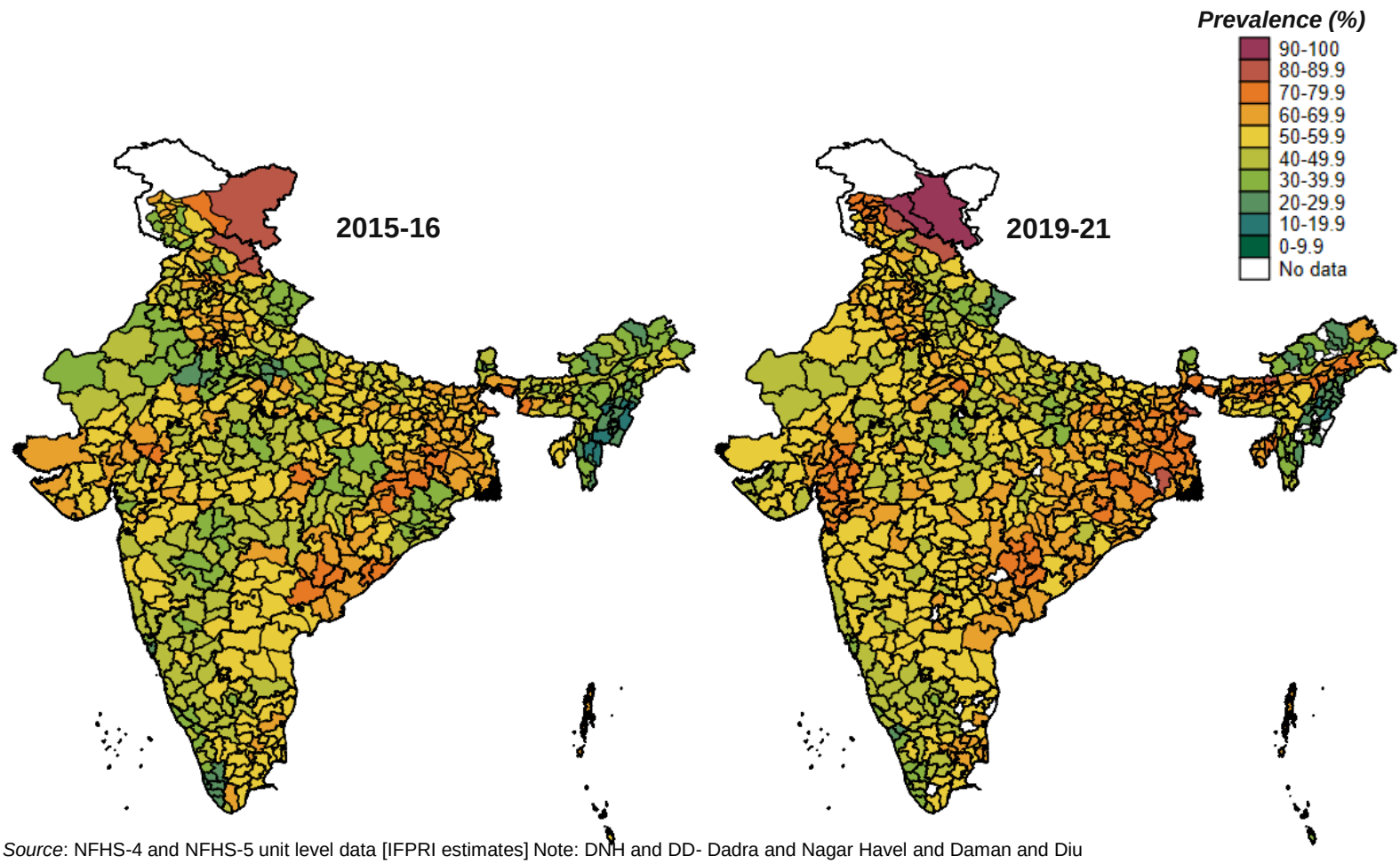
[1]WHO. 2011. Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity. Vitamin and Mineral Nutrition Information System. Geneva, World Health Organization, (http://www.who.int/vmnis/indicators/haemoglobin.pdf).

FIGURE 12 & 13: Anemia among women[2] 20-49 years, national (left) and state (right) levels, 2015-16 and 2019-21





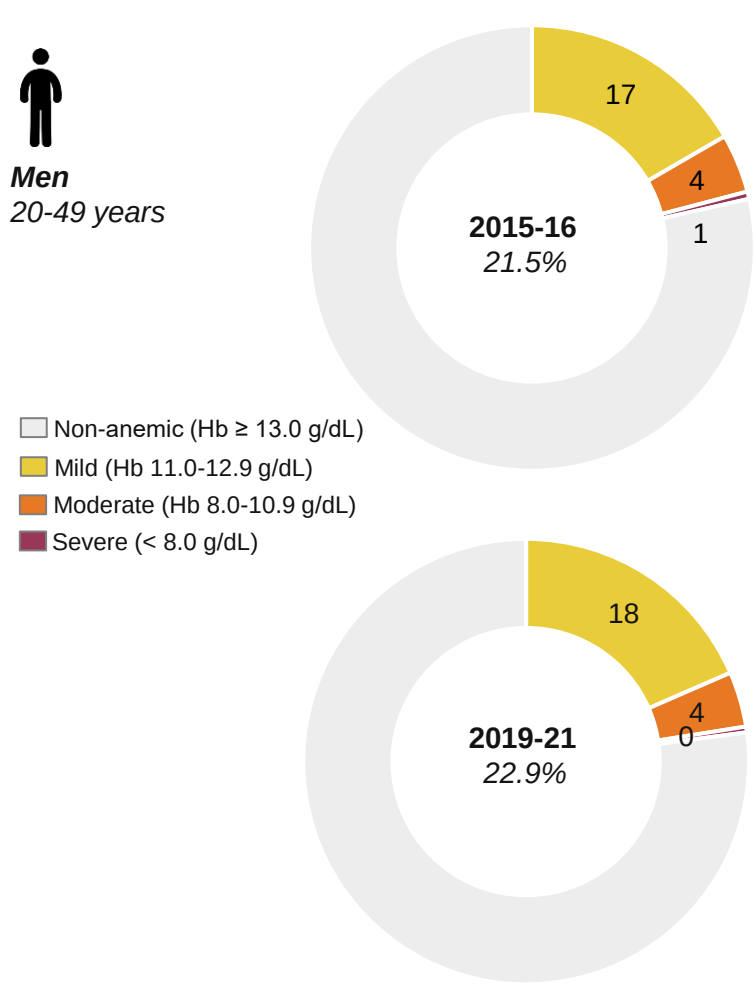
MAP 6: Anemia among women 20-49 years by districts, 2015-16 and 2019-21

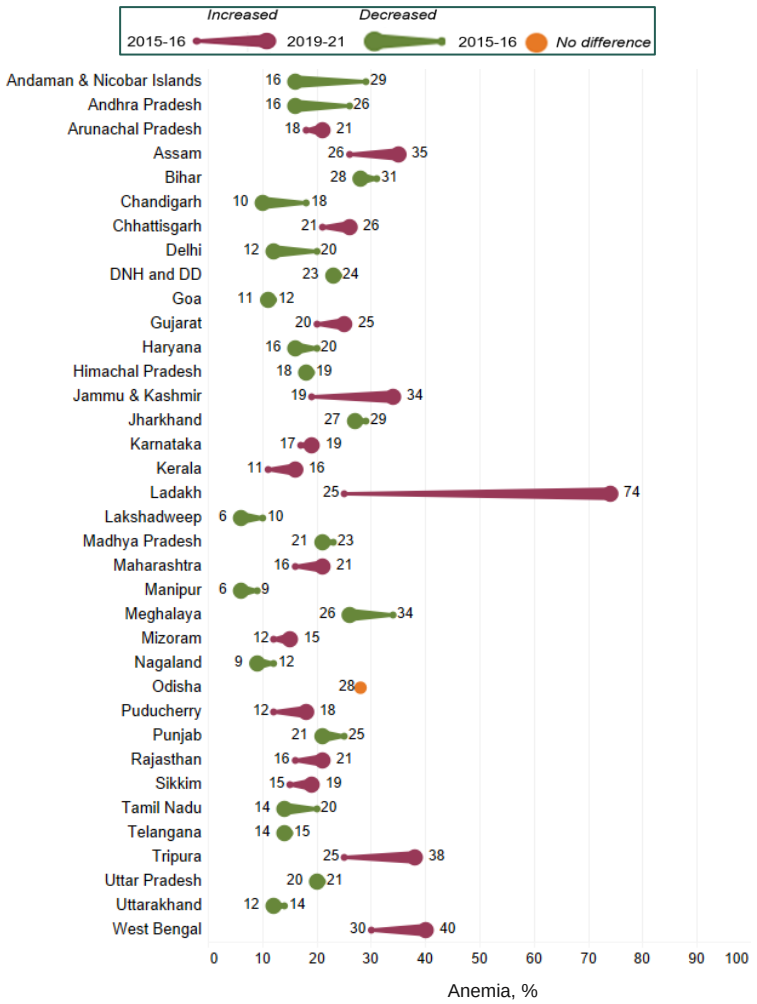


Source: NFHS-4 and NFHS-5 unit level data [IFPRI estimates] Note: DNH and DD- Dadra and Nagar Havel and Daman and Diu

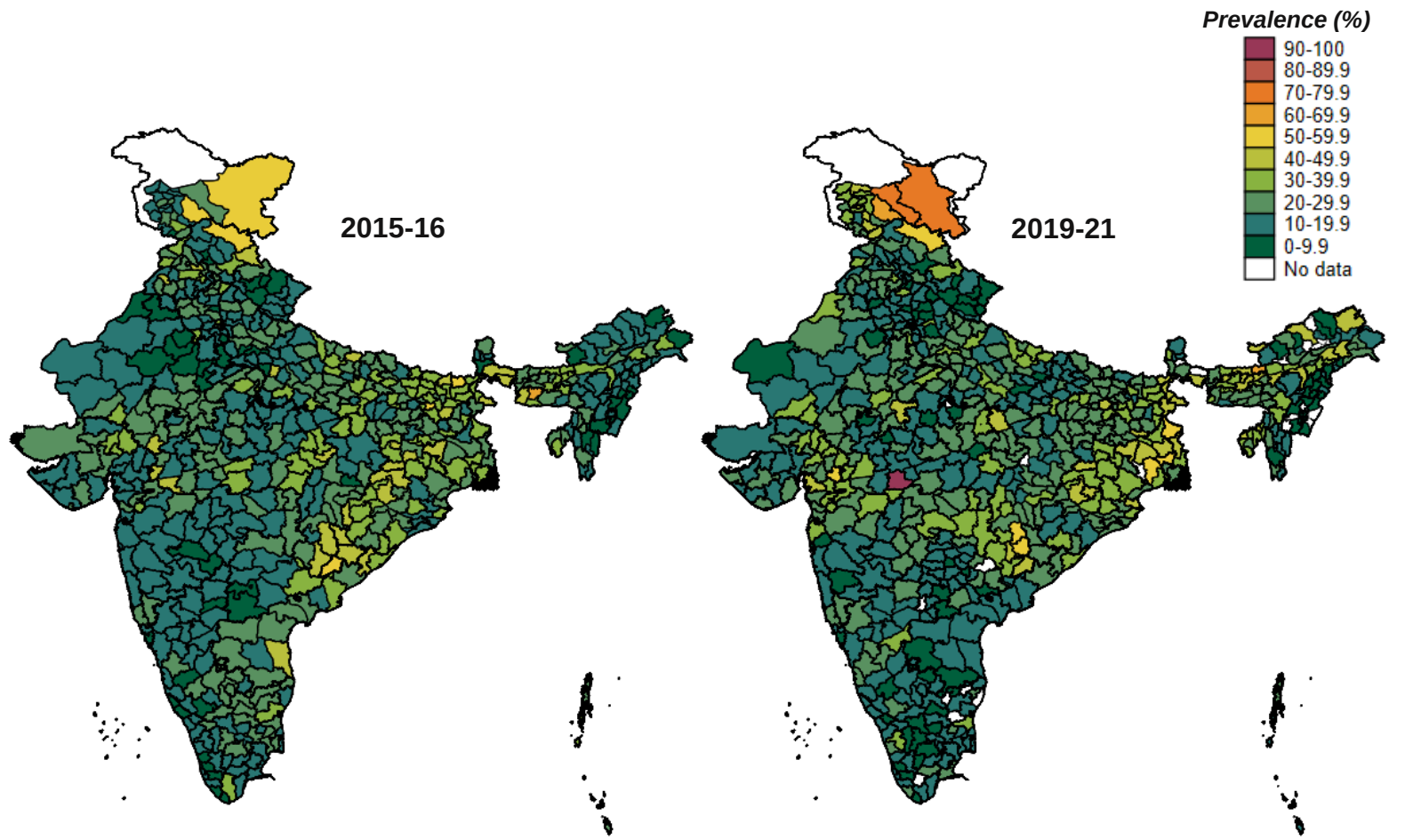
[1]WHO. 2011. Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity. Vitamin and Mineral Nutrition Information System. Geneva, World Health Organization, (http://www.who.int/vmnis/indicators/haemoglobin.pdf). [2]Women 20-49 years here refers to non-pregnant and non-lactating women.

FIGURE 14 & 15: Anemia among men 20-49 years, national (left) and state (right) levels, 2015-16 and 2019-21





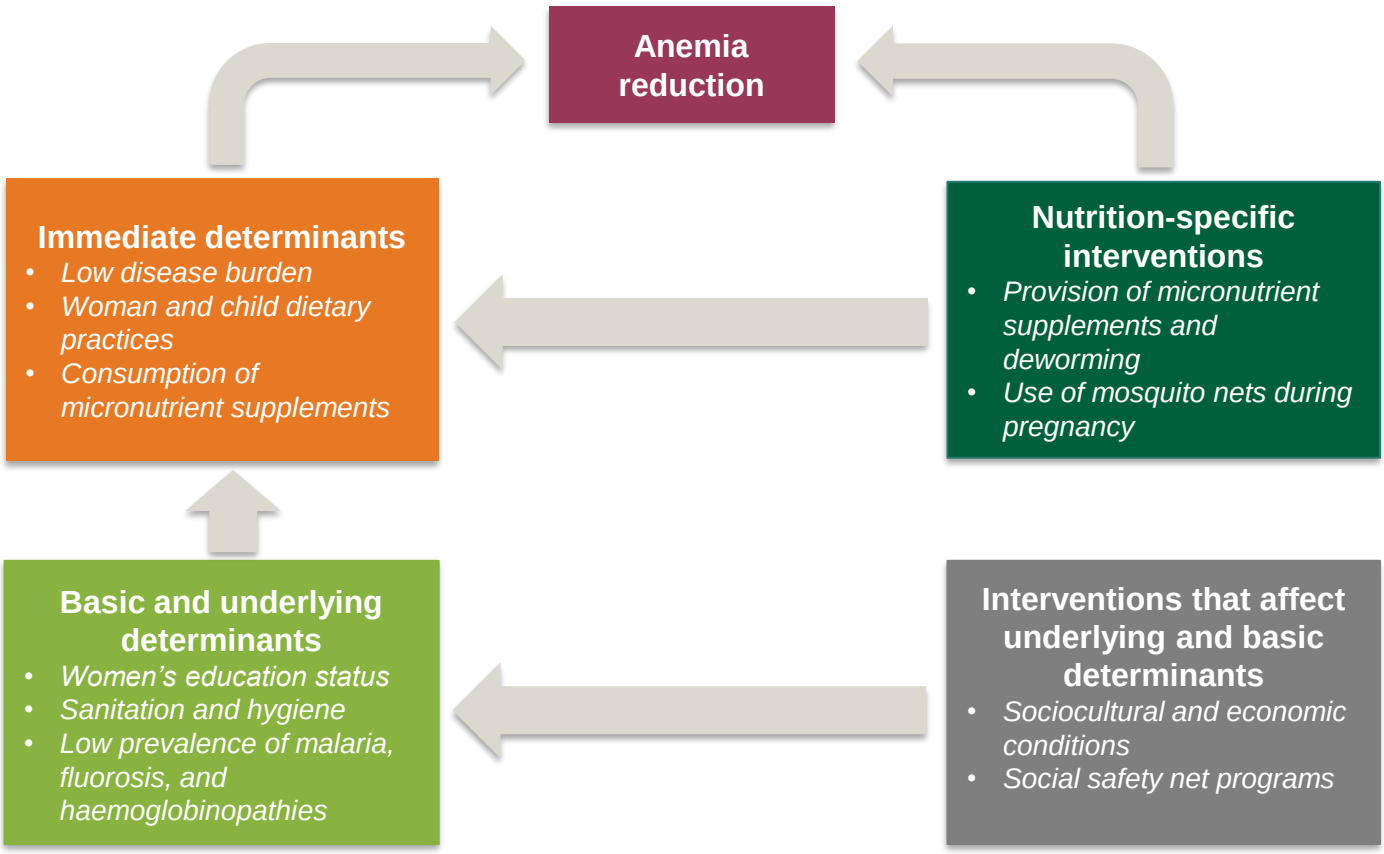
MAP 7: Anemia among men 20-49 years by districts, 2015-16 and 2019-21



Source: NFHS-4 and NFHS-5 unit level data [IFPRI estimates] Note: DNH and DD- Dadra and Nagar Havel and Daman and Diu

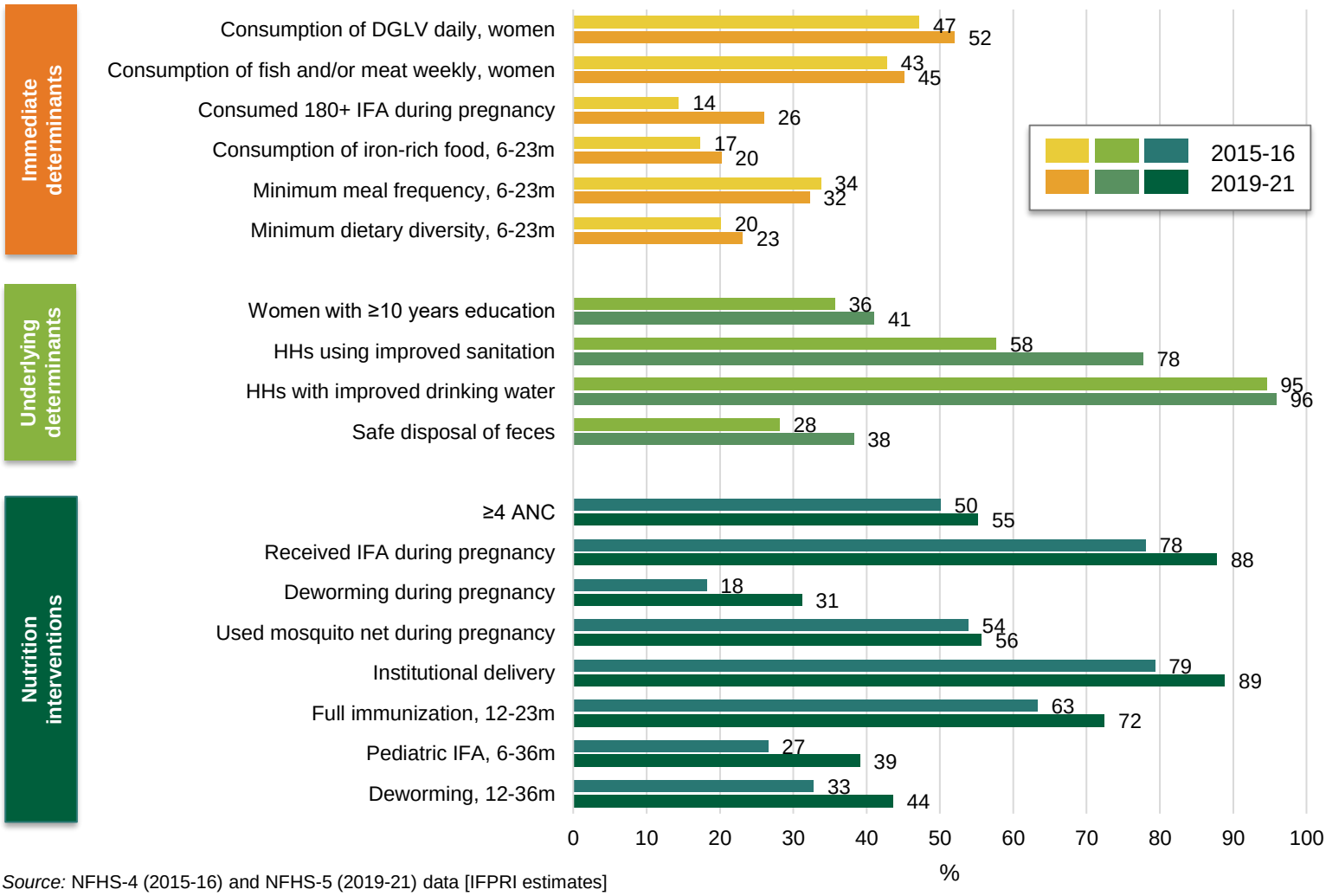
[1]WHO. 2011. Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity. Vitamin and Mineral Nutrition Information System. Geneva, World Health Organization, (http://www.who.int/vmnis/indicators/haemoglobin.pdf).

FIGURE 16: Framework of drivers of anemia reduction



Adapted from *Keats et al. (2021)*[1]

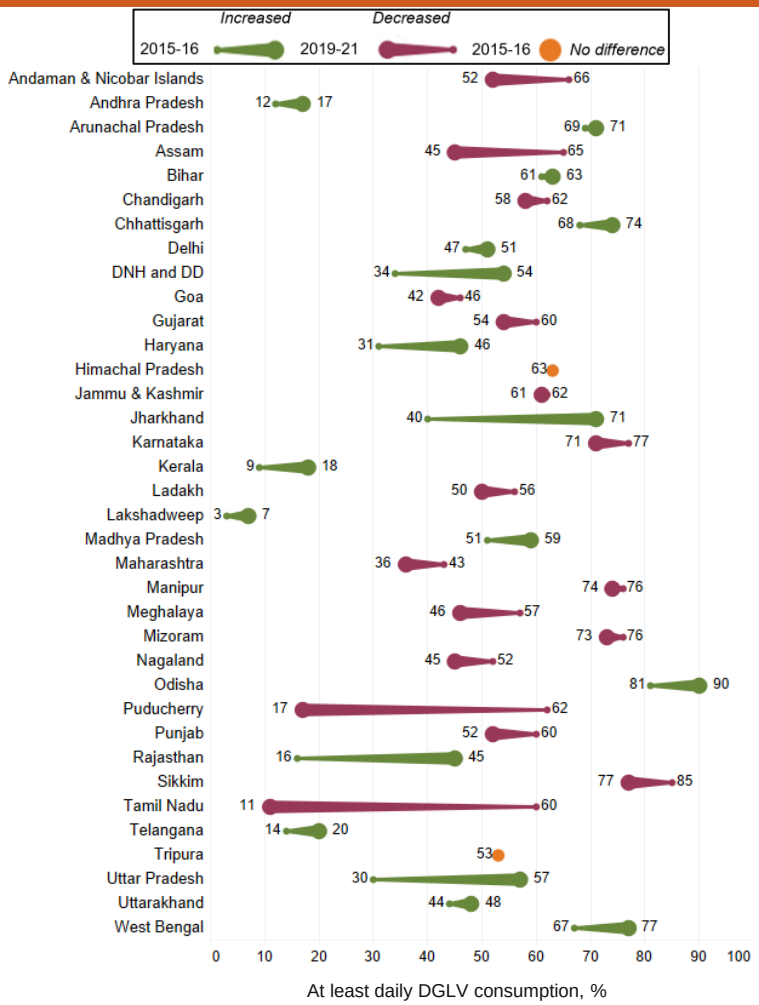
FIGURE 17: National trends in key drivers of anemia reduction, 2015-16 and 2019-21



Source: NFHS-4 (2015-16) and NFHS-5 (2019-21) data [IFPRI estimates]

[1]Keats, E. C., Das, J. K., Salam, R. A., Lassi, Z. S., Imdad, A., Black, R. E., & Bhutta, Z. A. 2021. Effective interventions to address maternal and child malnutrition: an update of the evidence. The Lancet Child & Adolescent Health, 5(5), 367-384.

FIGURE 18 & MAP 8: At least daily DGLV consumption among women by state (left) and district (right), 2015-16 and 2019-21



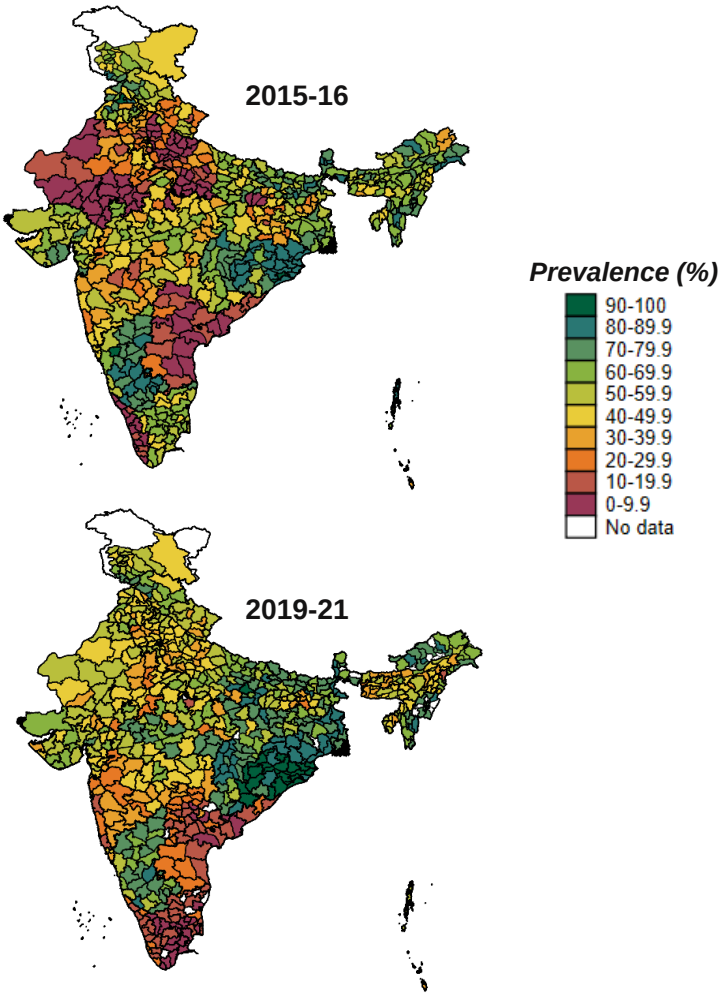
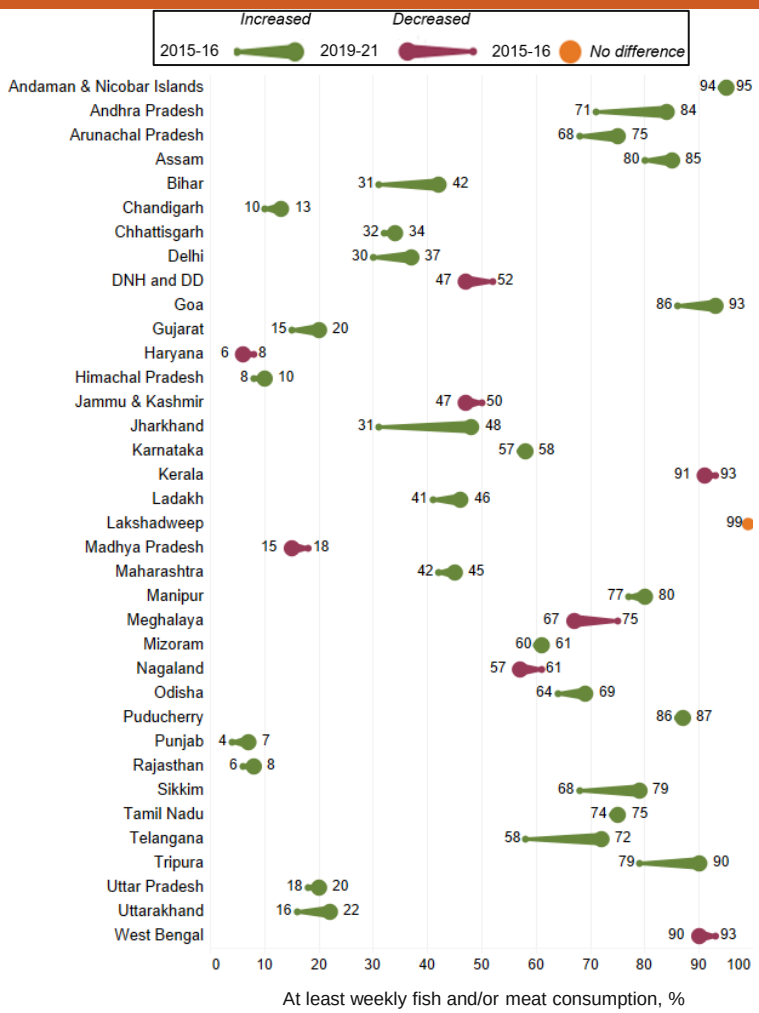
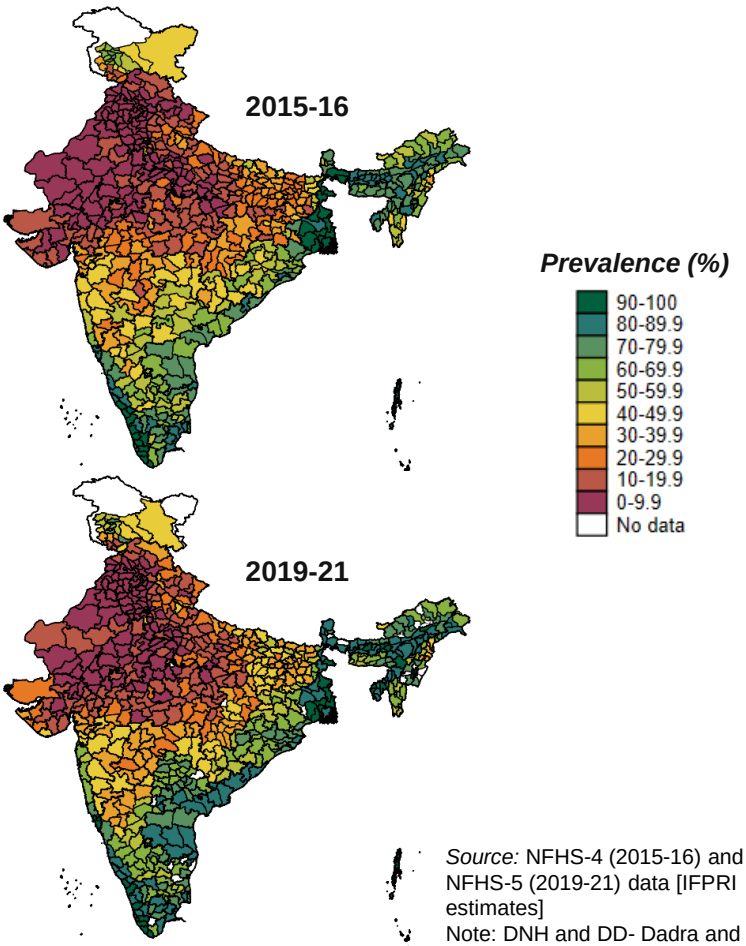


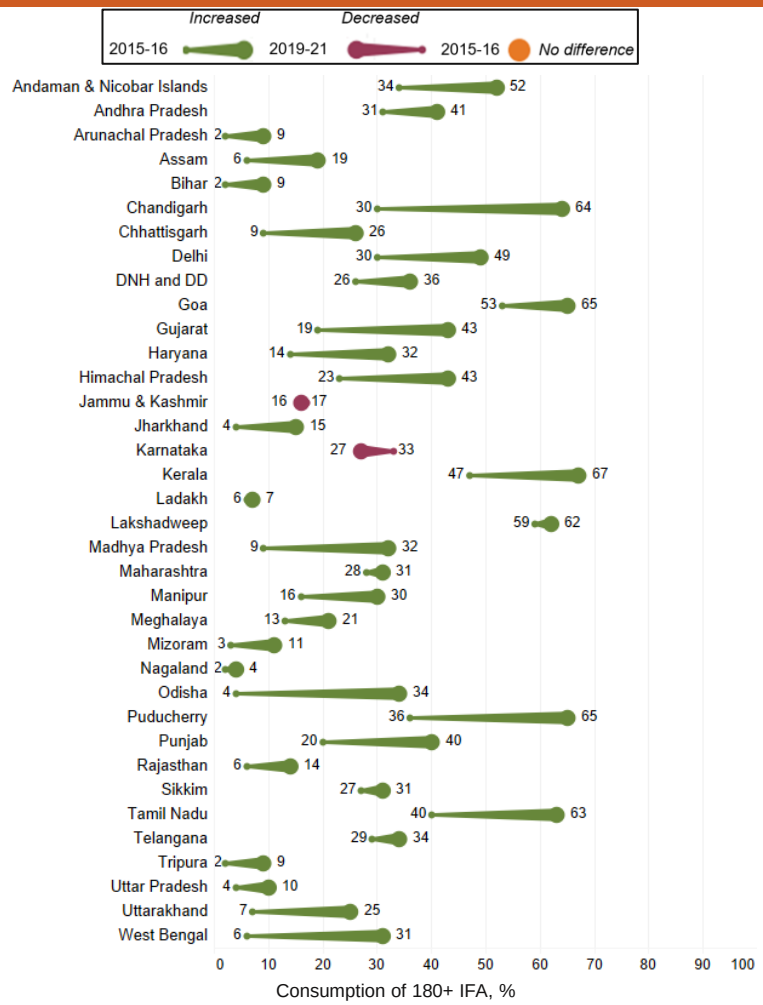
FIGURE 19 & MAP 9: At least weekly fish and/or meat consumption among women by state (left) and district (right), 2015-16 and 2019-21





Source: NFHS-4 (2015-16) and NFHS-5 (2019-21) data [IFPRI estimates]
Note: DNH and DD- Dadra and Nagar Havel and Daman and Diu

FIGURE 20 & MAP 10: Consumption of 180+IFA among women during pregnancy by state (left) and district (right), 2015-16 and 2019-21



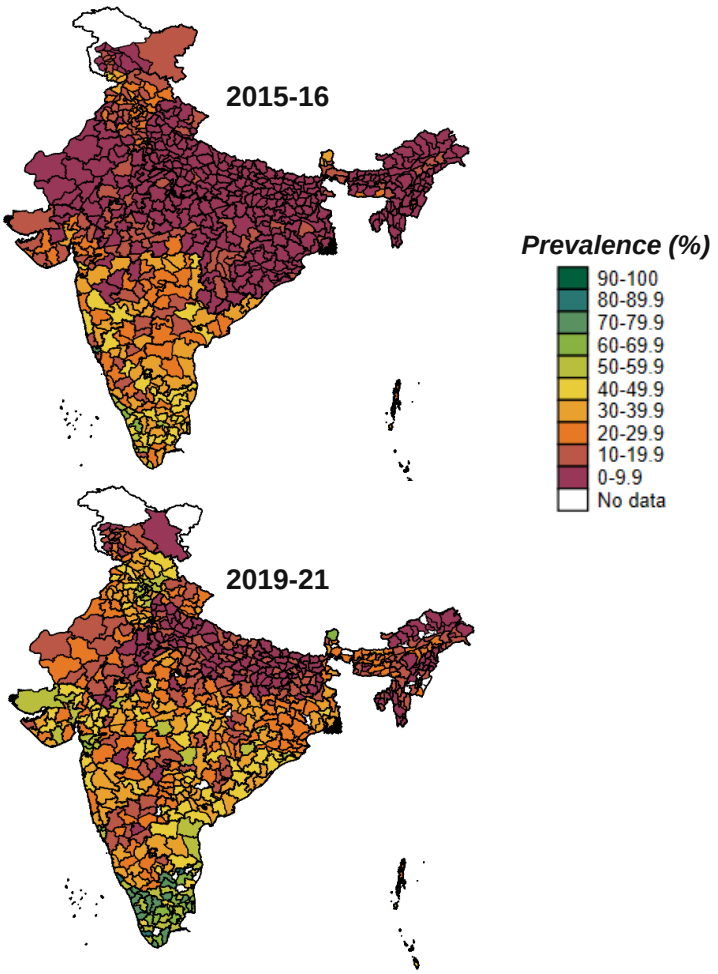
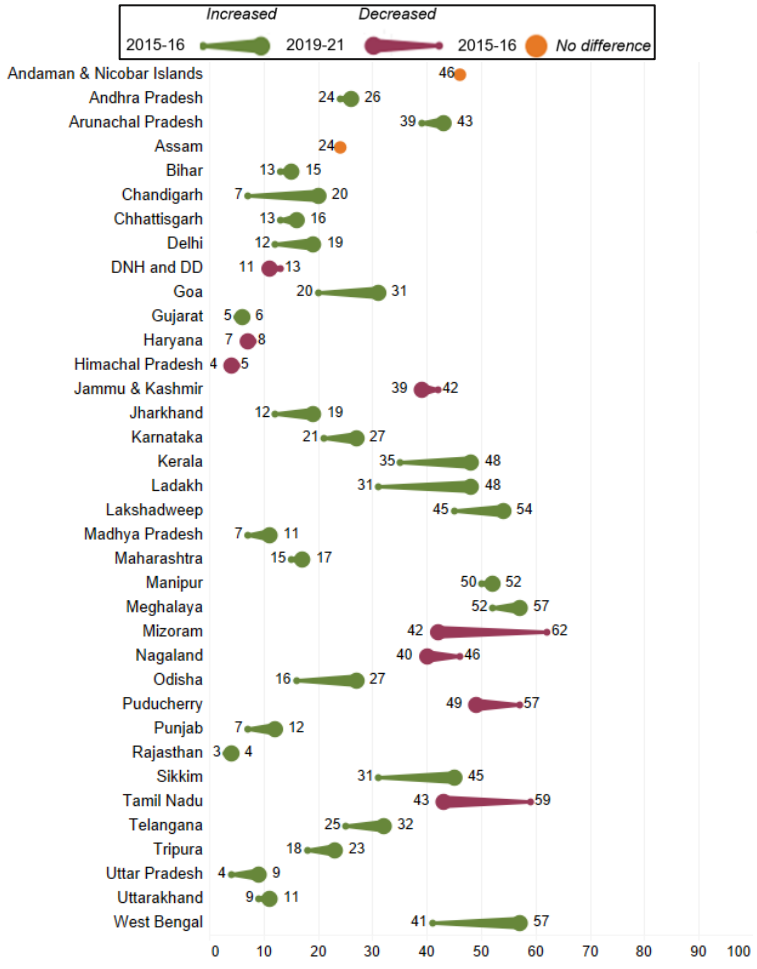
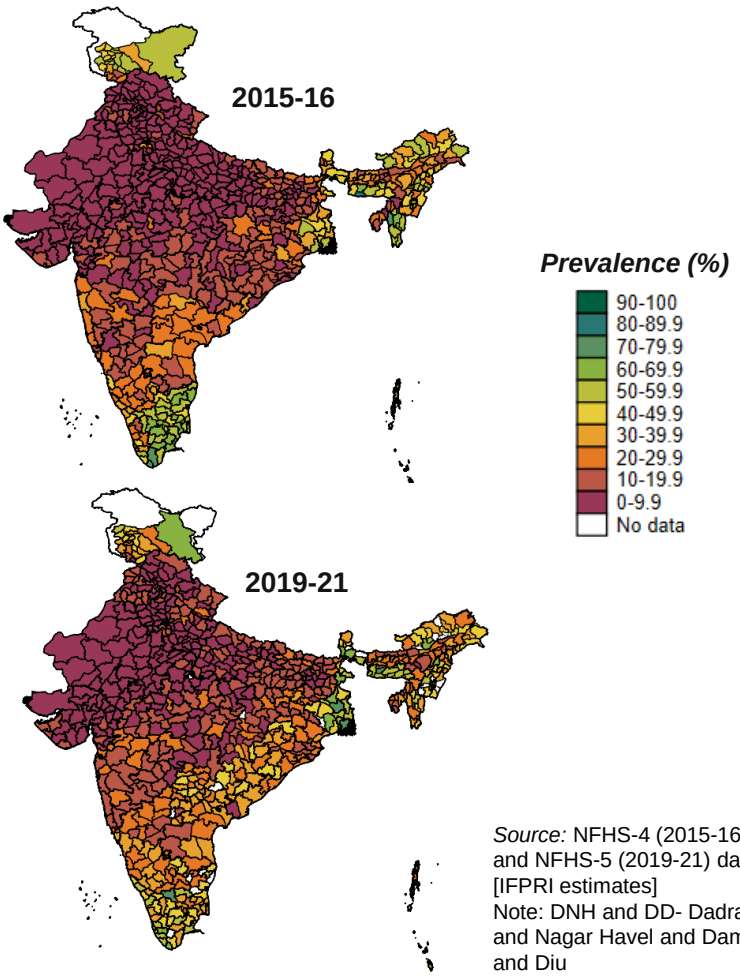


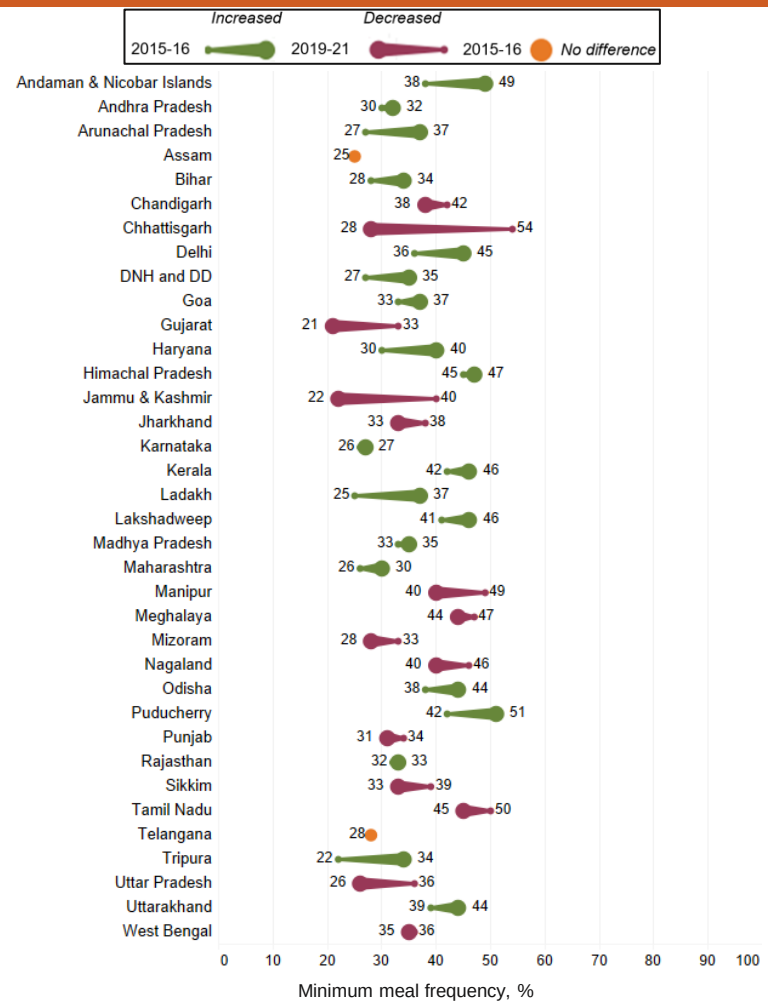
FIGURE 21 & MAP 11: Consumption iron-rich foods among children 6-23 months by state (left) and district (right), 2015-16 and 2019-21





Source: NFHS-4 (2015-16) and NFHS-5 (2019-21) data [IFPRI estimates]
Note: DNH and DD- Dadra and Nagar Havel and Daman and Diu

FIGURE 22 & MAP 12: **Minimum meal frequency** among children 6-23 months by state (left) and district (right), 2015-16 and 2019-21



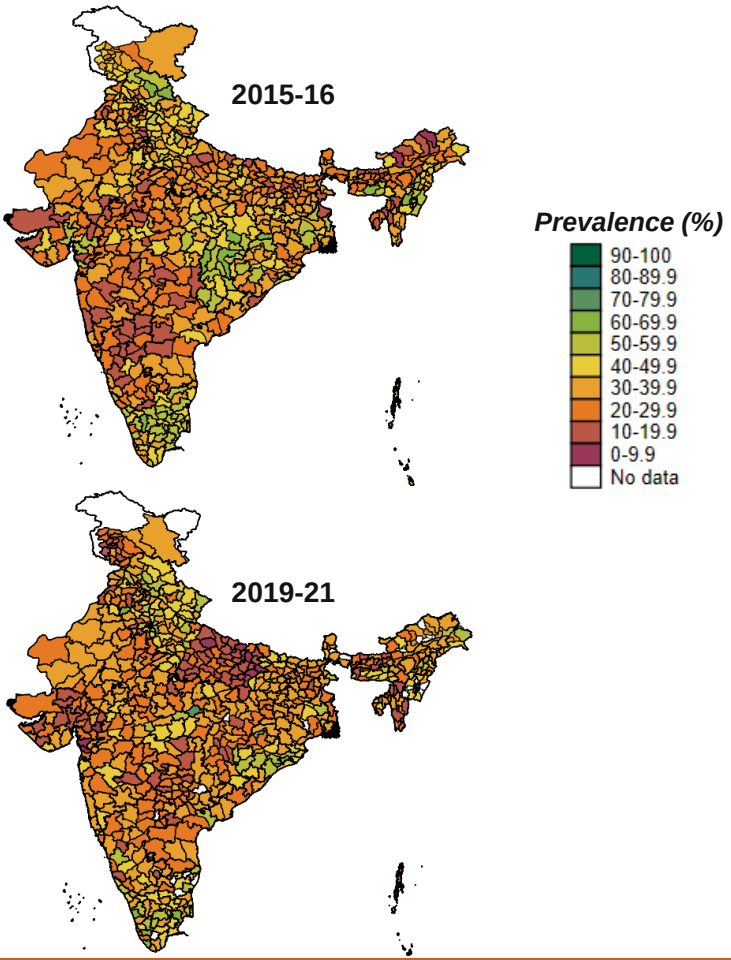
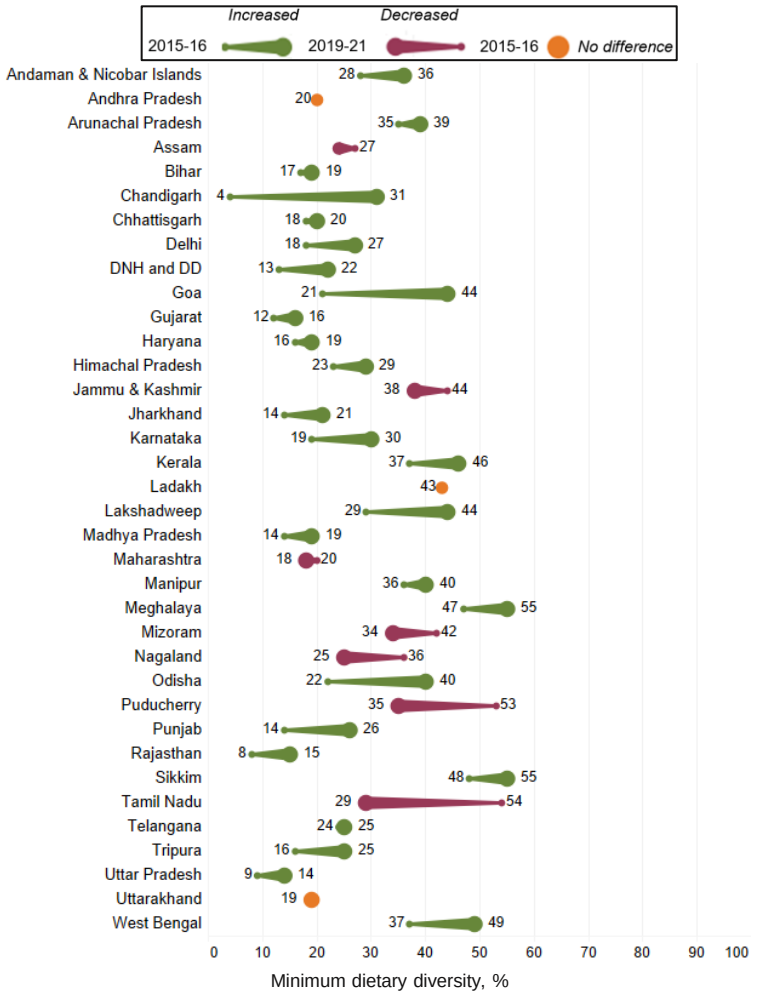
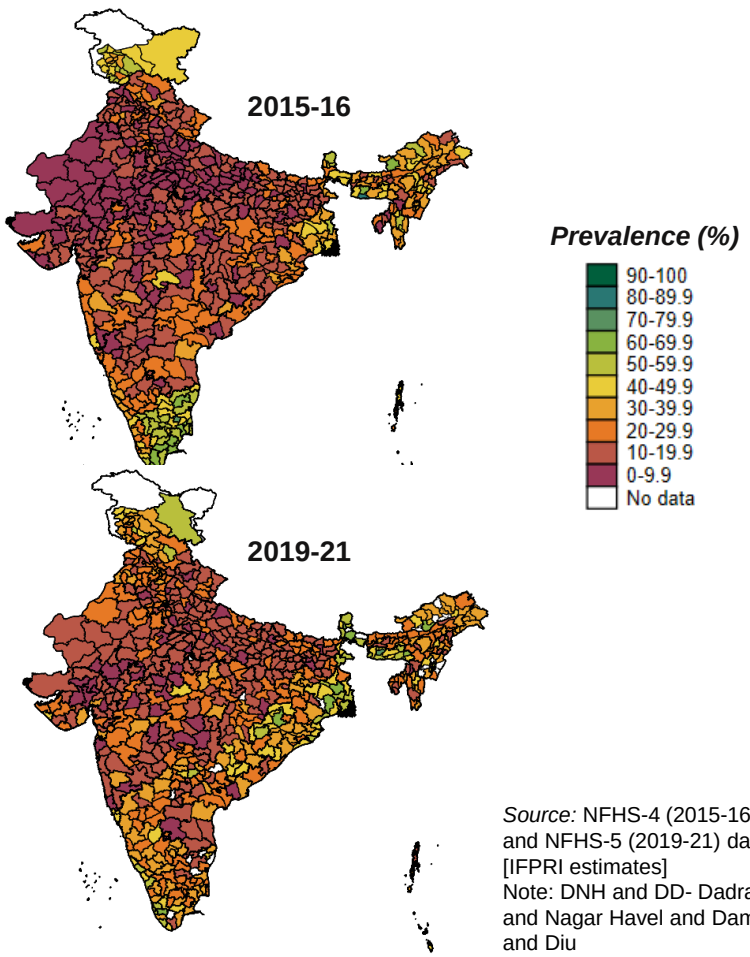


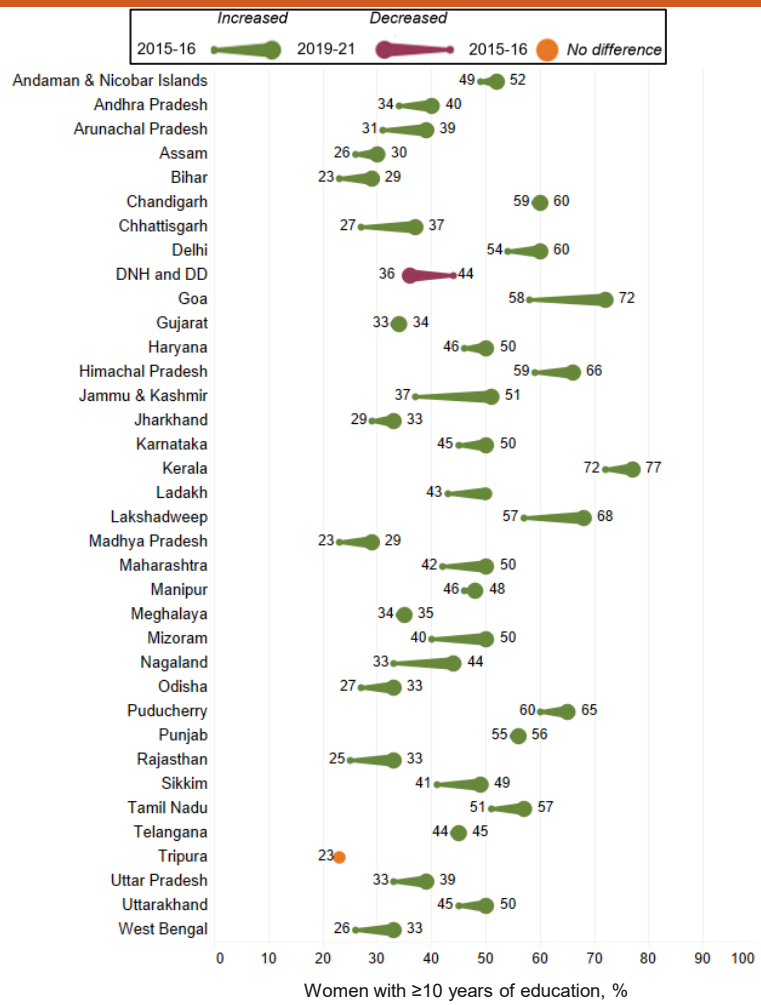
FIGURE 23 & MAP 13: **Minimum dietary diversity** among children 6-23 months by state (left) and district (right), 2015-16 and 2019-21





Source: NFHS-4 (2015-16) and NFHS-5 (2019-21) data [IFPRI estimates]
Note: DNH and DD- Dadra and Nagar Havel and Daman and Diu

FIGURE 24 & MAP 14: Women with ≥10 years of education by state (left) and district (right), 2015-16 and 2019-21



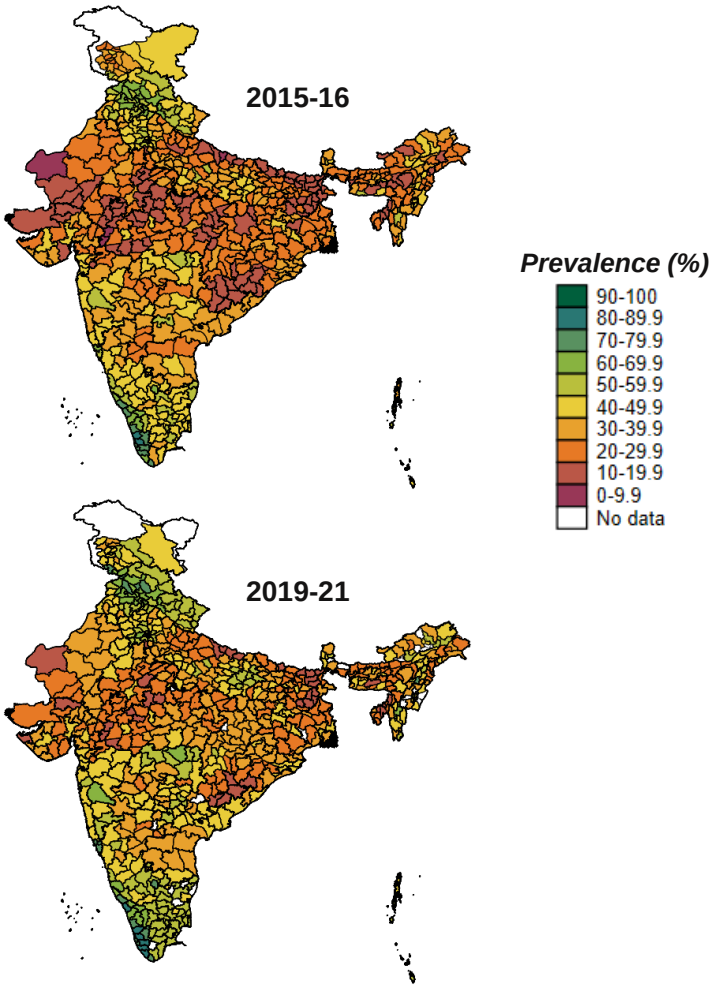
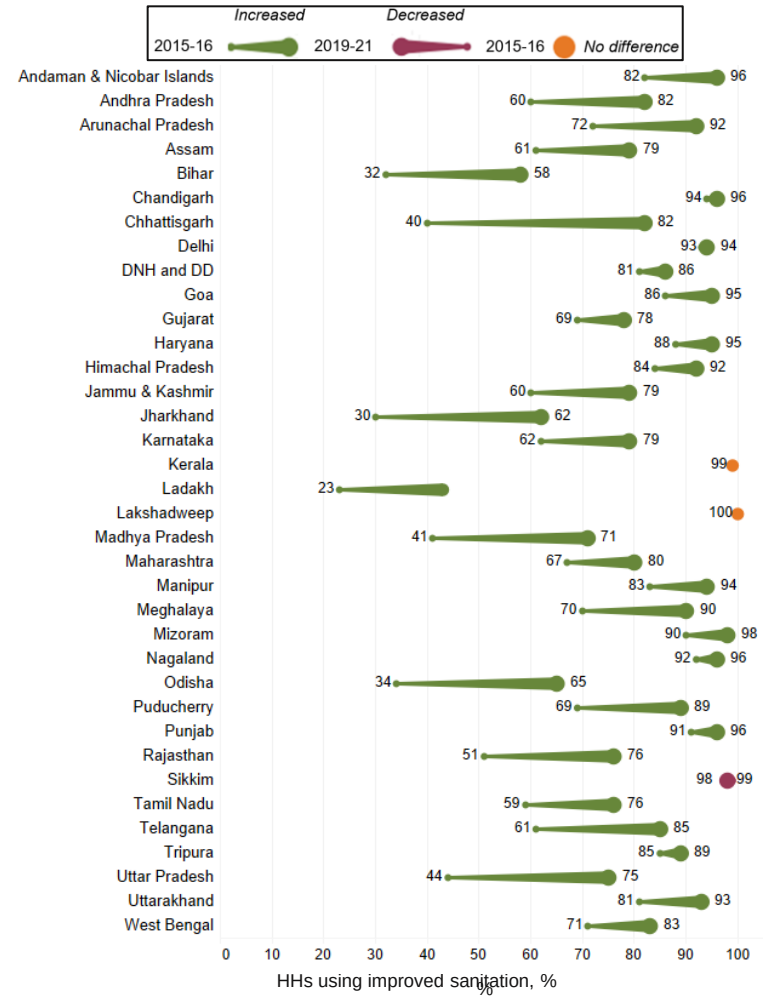
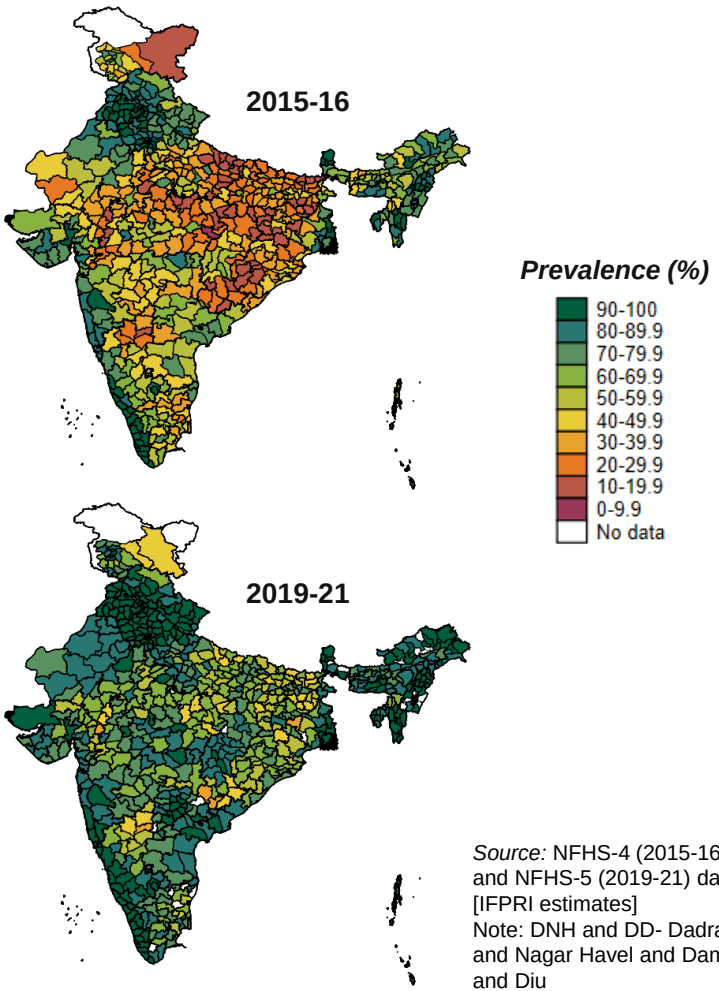


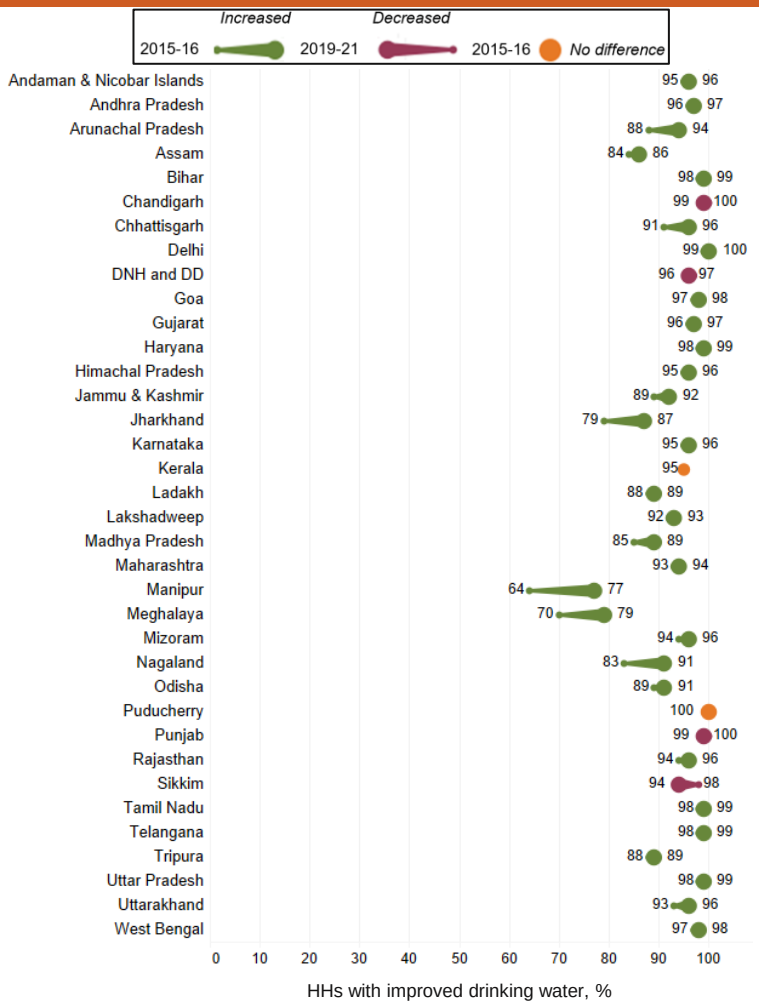
FIGURE 25 & MAP 15: HHs using an improved sanitation facility by state (left) and district (right), 2015-16 and 2019-21





Source: NFHS-4 (2015-16) and NFHS-5 (2019-21) data [IFPRI estimates]
Note: DNH and DD- Dadra and Nagar Havel and Daman and Diu

FIGURE 26 & MAP 16: HHs with an improved drinking water source by state (left) and district (right), 2015-16 and 2019-21



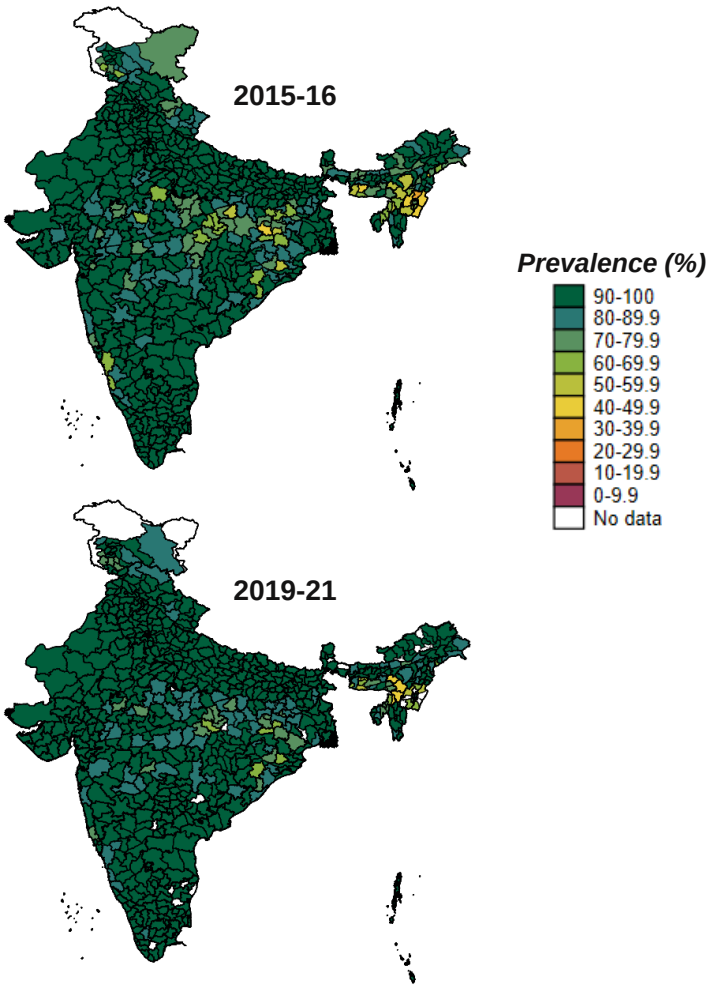
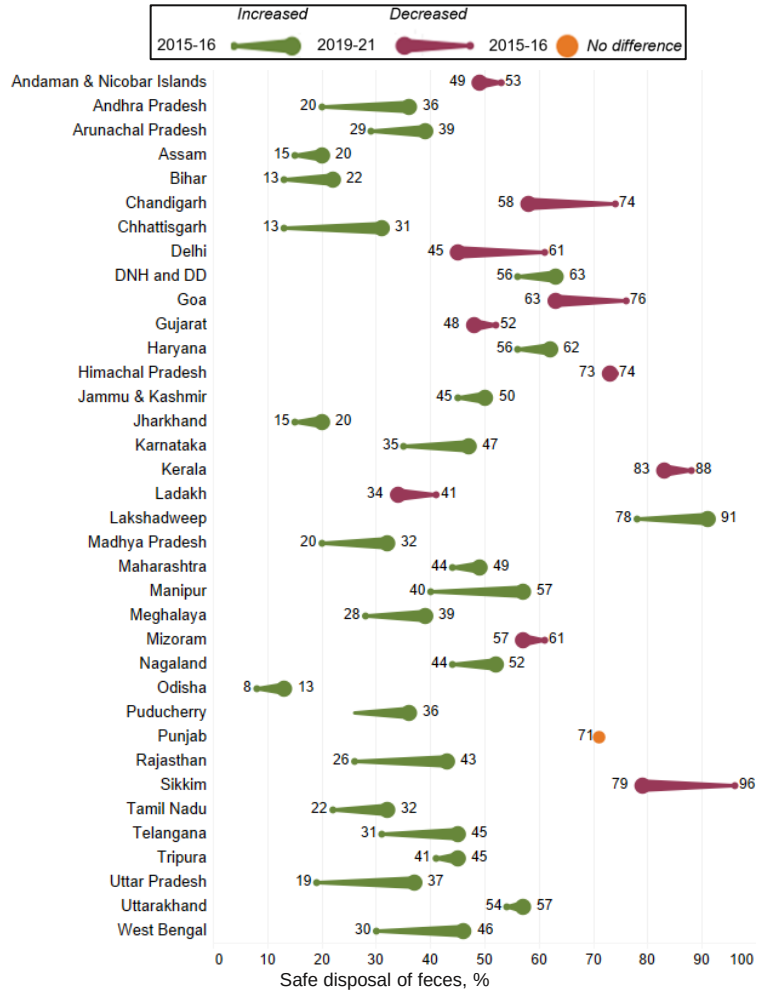
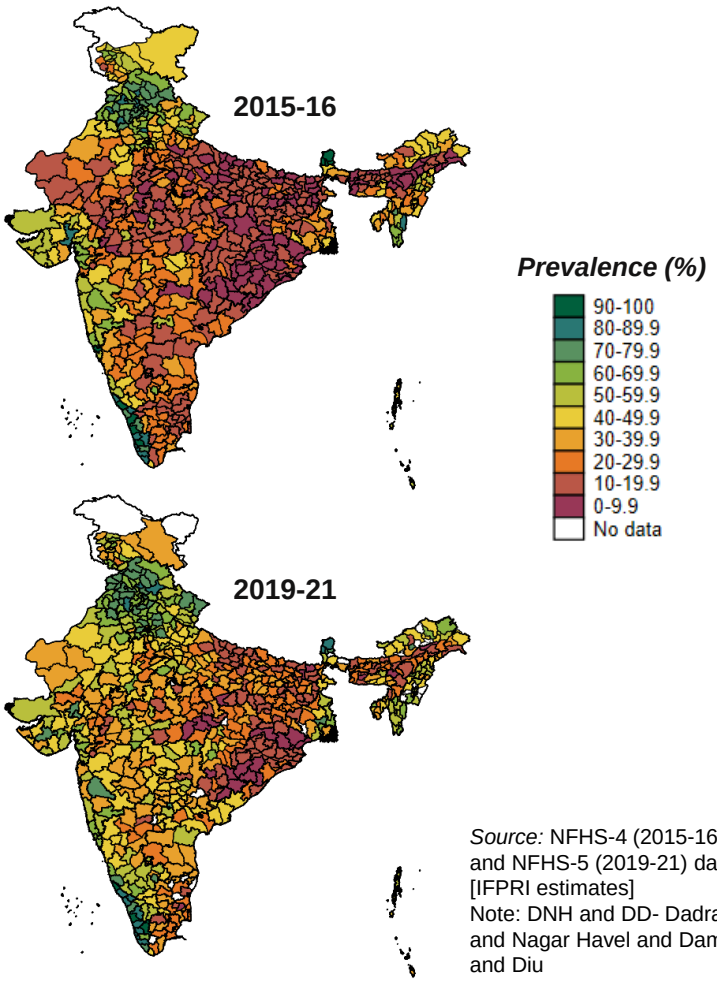


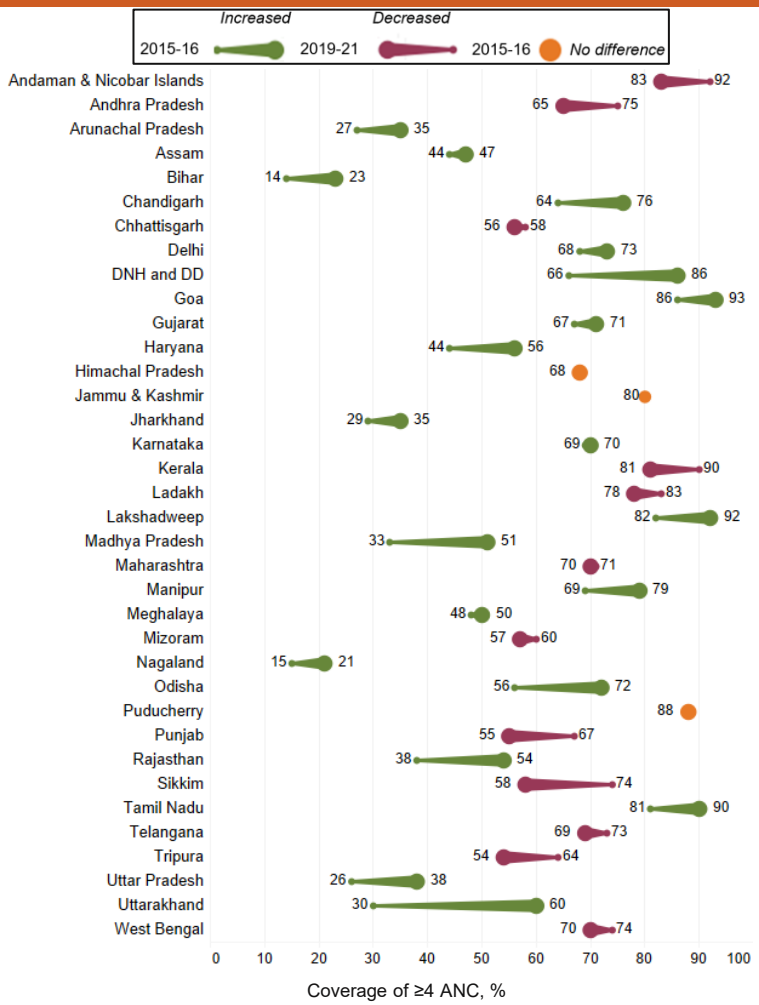
FIGURE 27 & MAP 17: Safe disposal of feces among children by state (left) and district (right), 2015-16 and 2019-21





Source: NFHS-4 (2015-16) and NFHS-5 (2019-21) data [IFPRI estimates]
Note: DNH and DD- Dadra and Nagar Havel and Daman and Diu

FIGURE 28 & MAP 18: Coverage of ≥4 ANC visits among women during pregnancy by state (left) and district (right), 2015-16 and 2019-21



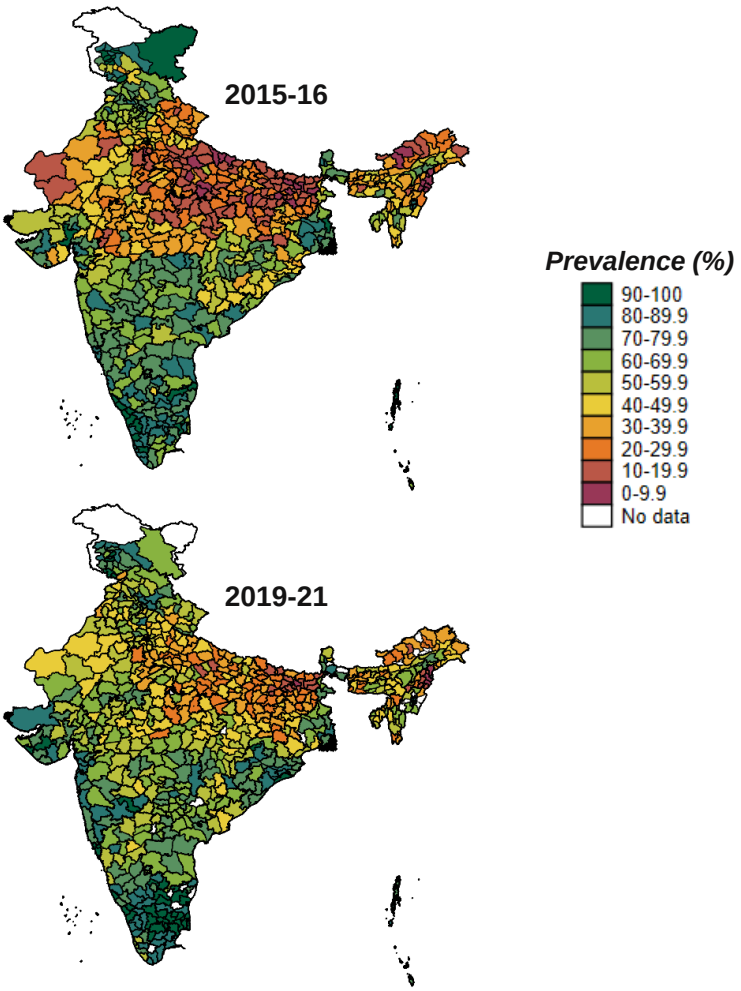
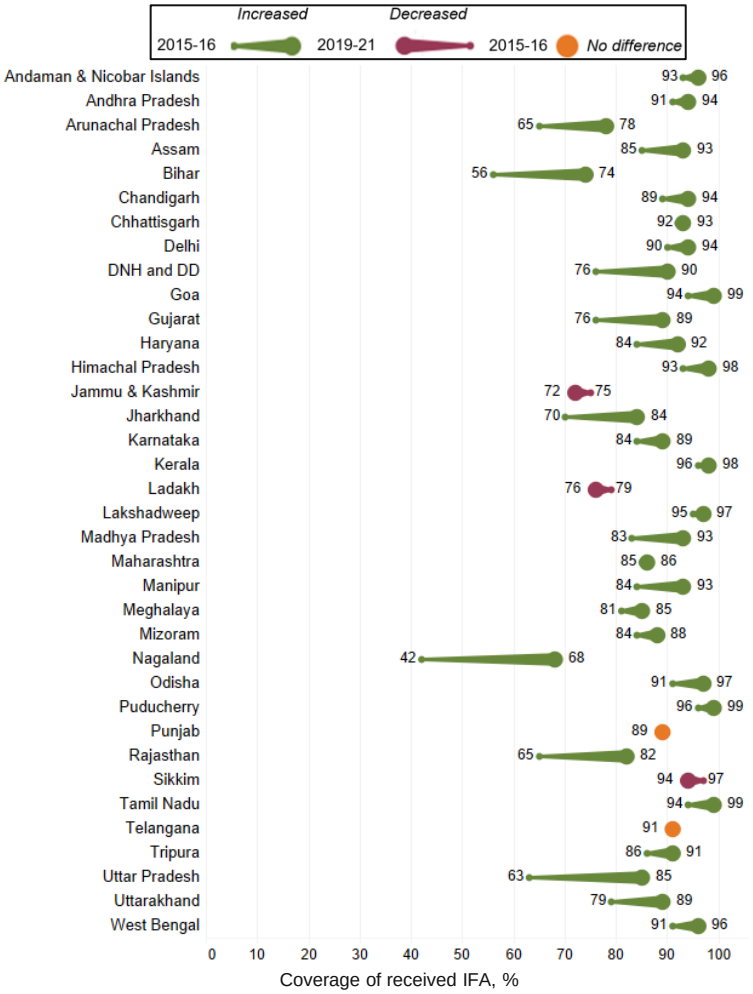
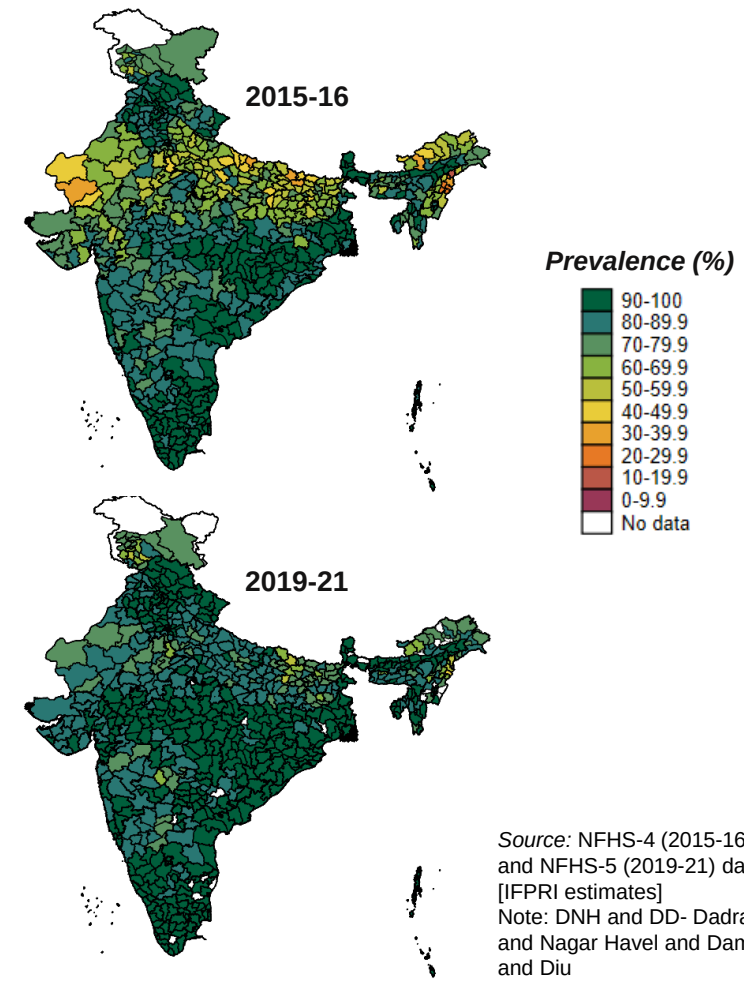


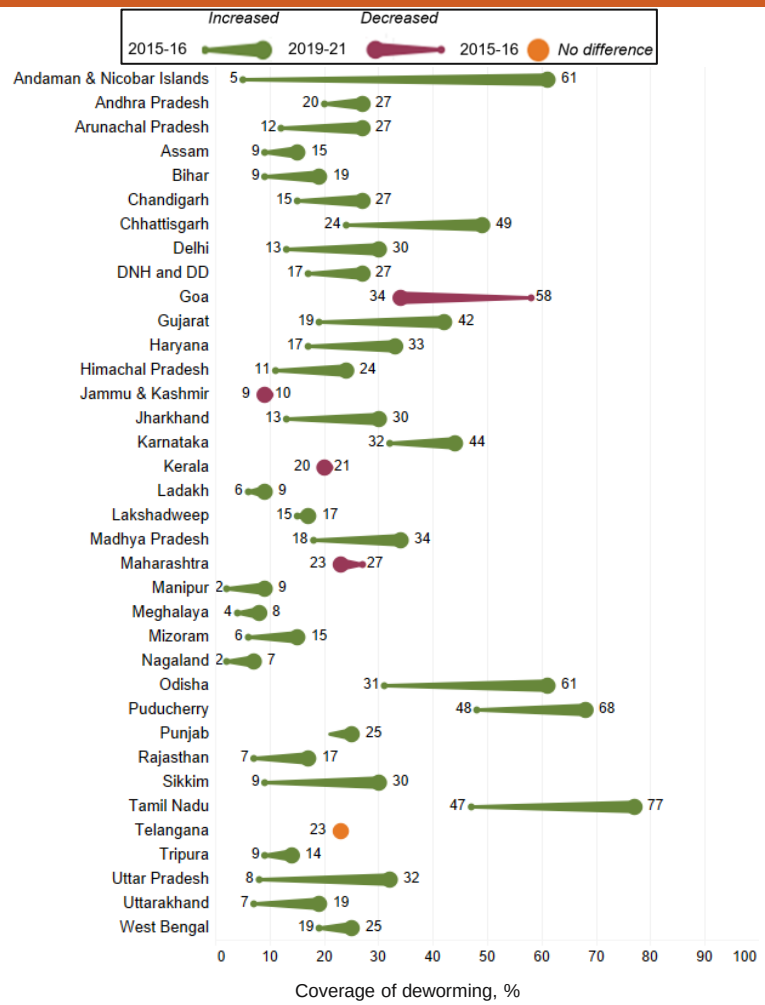
FIGURE 29 & MAP 19: Coverage of received IFA among women during pregnancy by state (left) and district (right), 2015-16 and 2019-21





Source: NFHS-4 (2015-16) and NFHS-5 (2019-21) data [IFPRI estimates]
Note: DNH and DD- Dadra and Nagar Havel and Daman and Diu

FIGURE 30 & MAP 20: Coverage of **deworming** among women during pregnancy by state (left) and district (right), 2015-16 and 2019-21



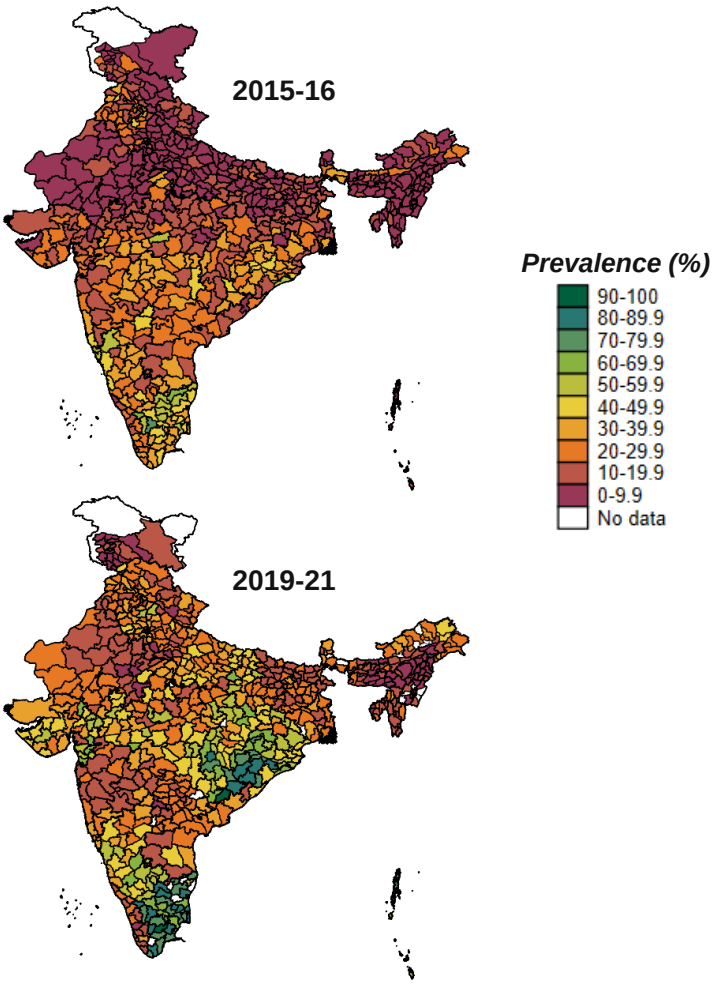
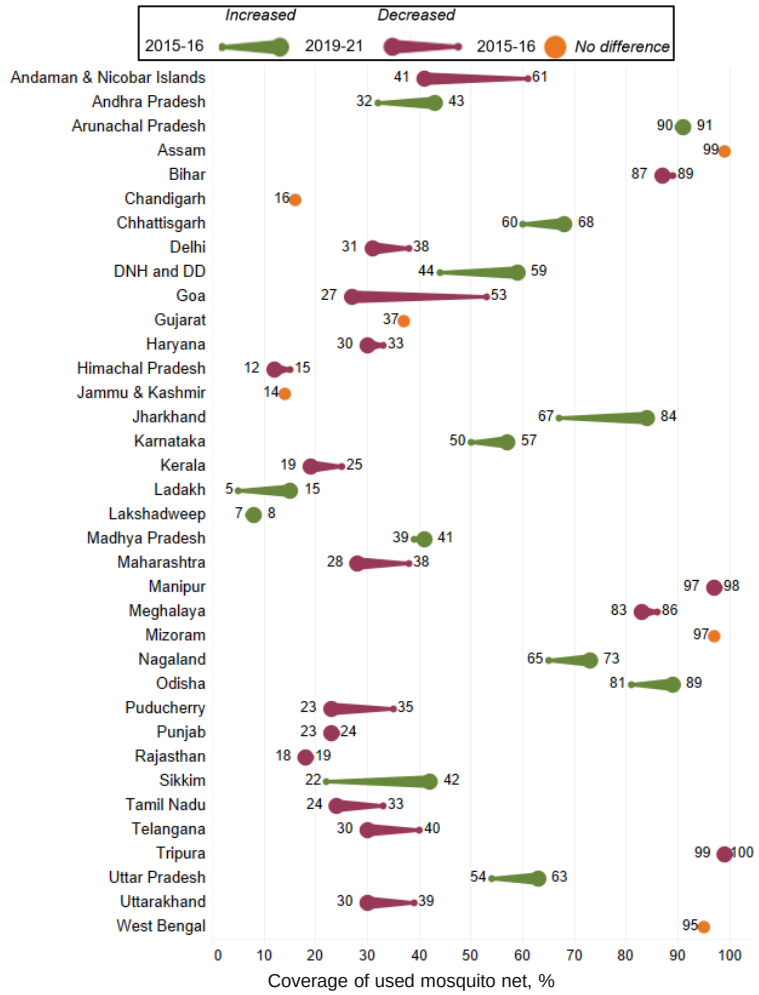
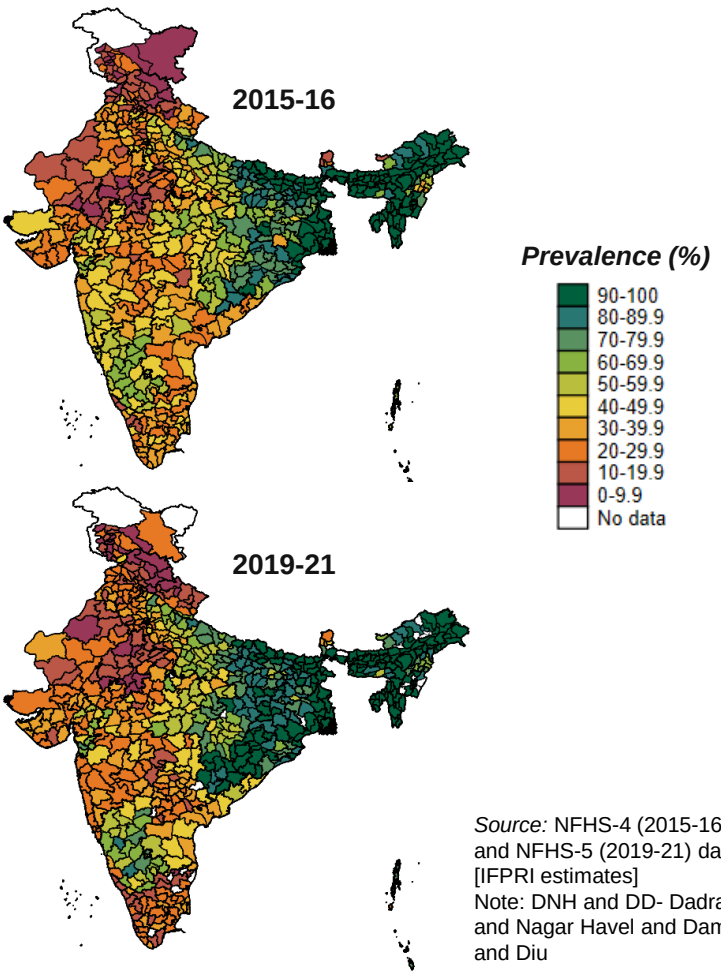


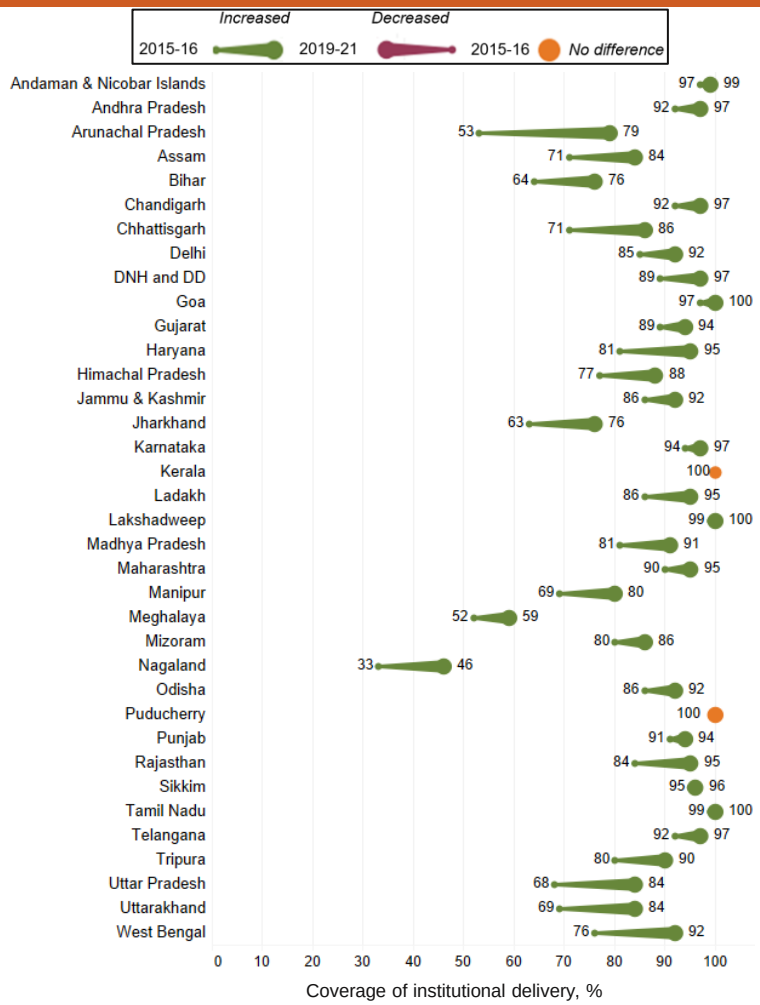
FIGURE 31 & MAP 21: Coverage of mosquito net use among women during pregnancy by state (left) and district (right), 2015-16 and 2019-21





Source: NFHS-4 (2015-16) and NFHS-5 (2019-21) data [IFPRI estimates]
Note: DNH and DD- Dadra and Nagar Havel and Daman and Diu

FIGURE 32 & MAP 22: Coverage of **institutional delivery** among live births by state (left) and district (right), 2015-16 and 2019-21



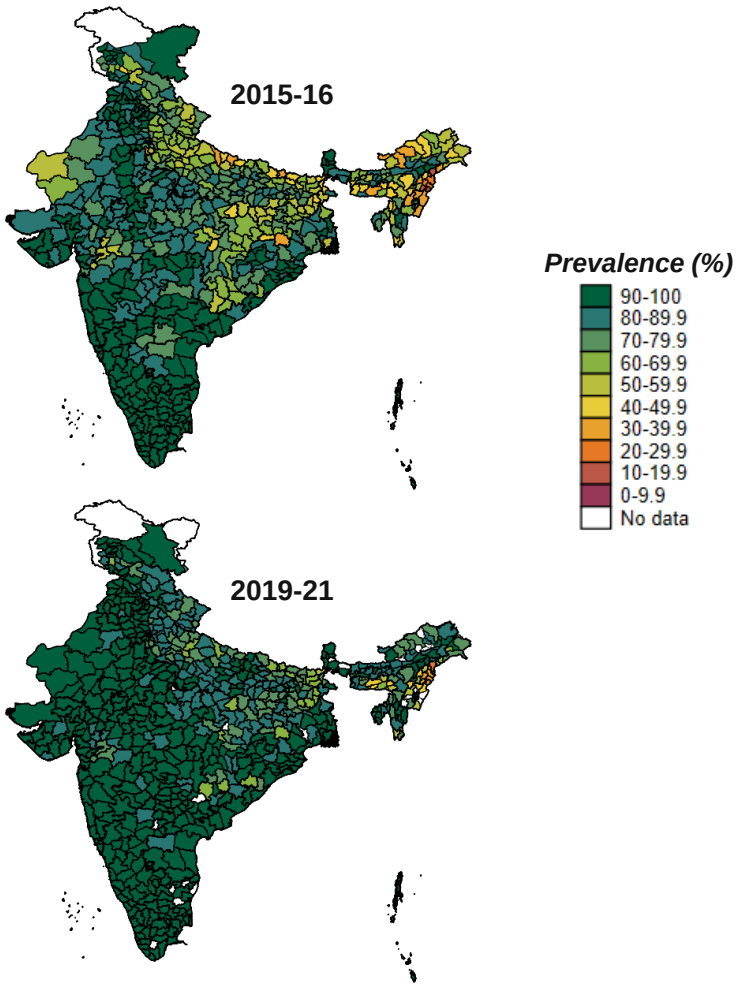
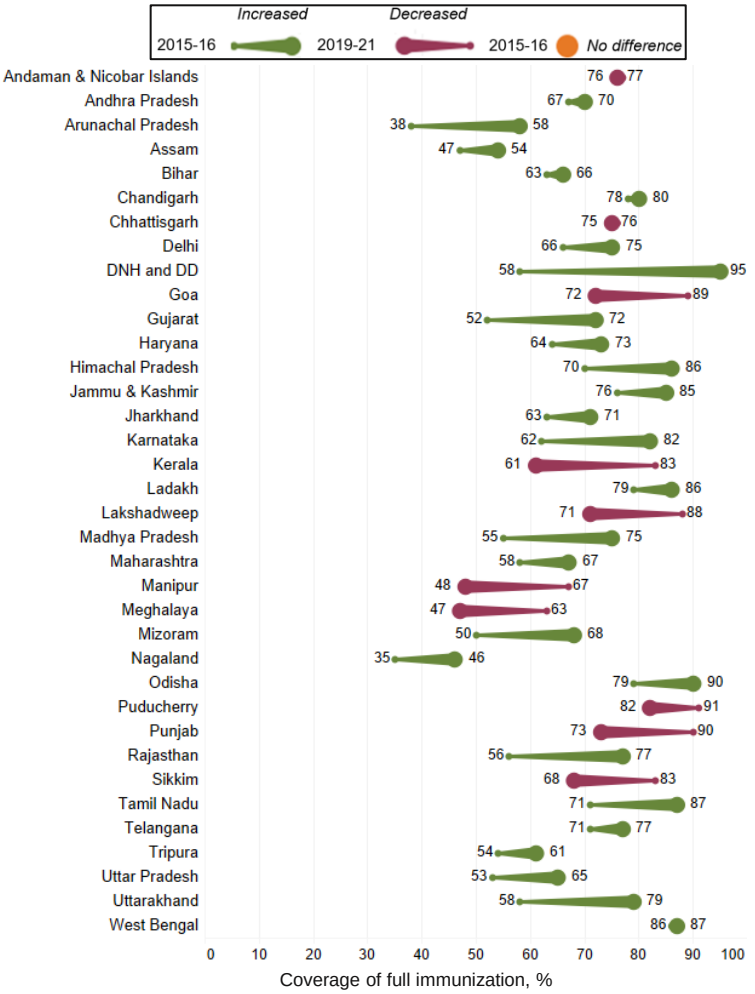
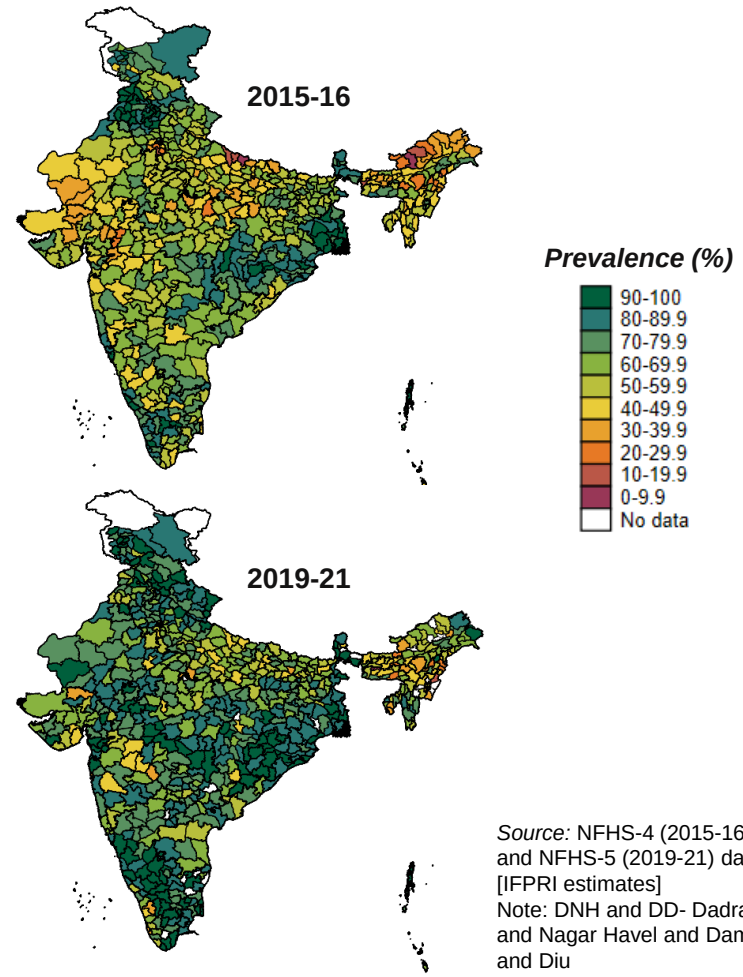


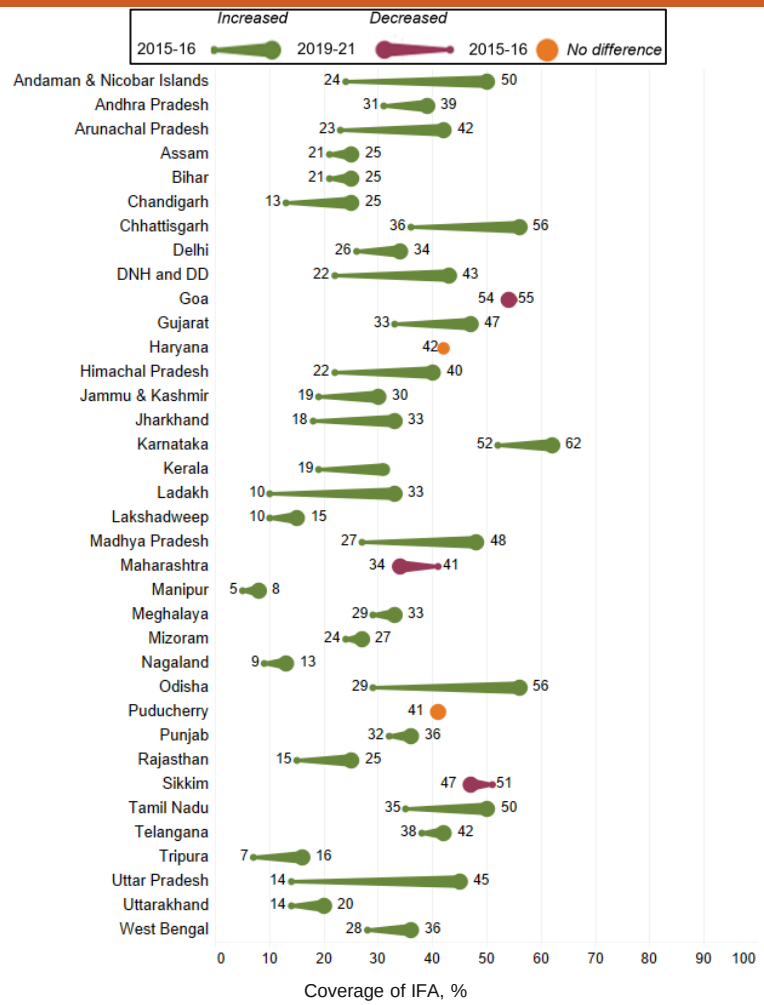
FIGURE 33 & MAP 23: Coverage of **full immunization** among children by state (left) and district (right), 2015-16 and 2019-21





Source: NFHS-4 (2015-16) and NFHS-5 (2019-21) data [IFPRI estimates]
Note: DNH and DD- Dadra and Nagar Havel and Daman and Diu

FIGURE 34 & MAP 24: Coverage of **IFA** among children by state (left) and district (right), 2015-16 and 2019-21



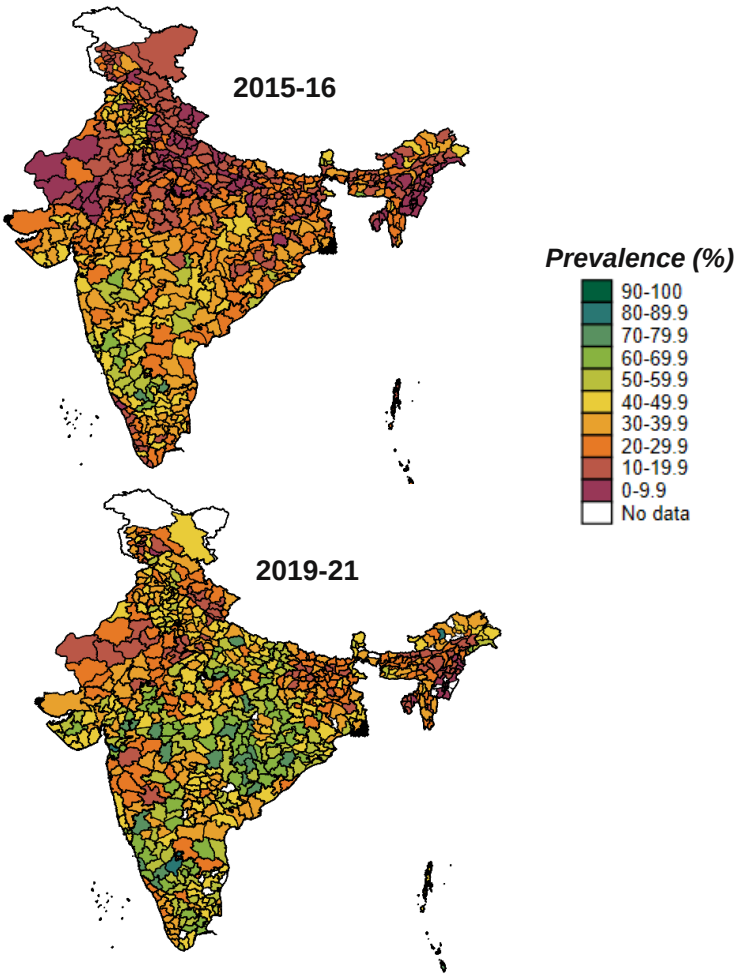
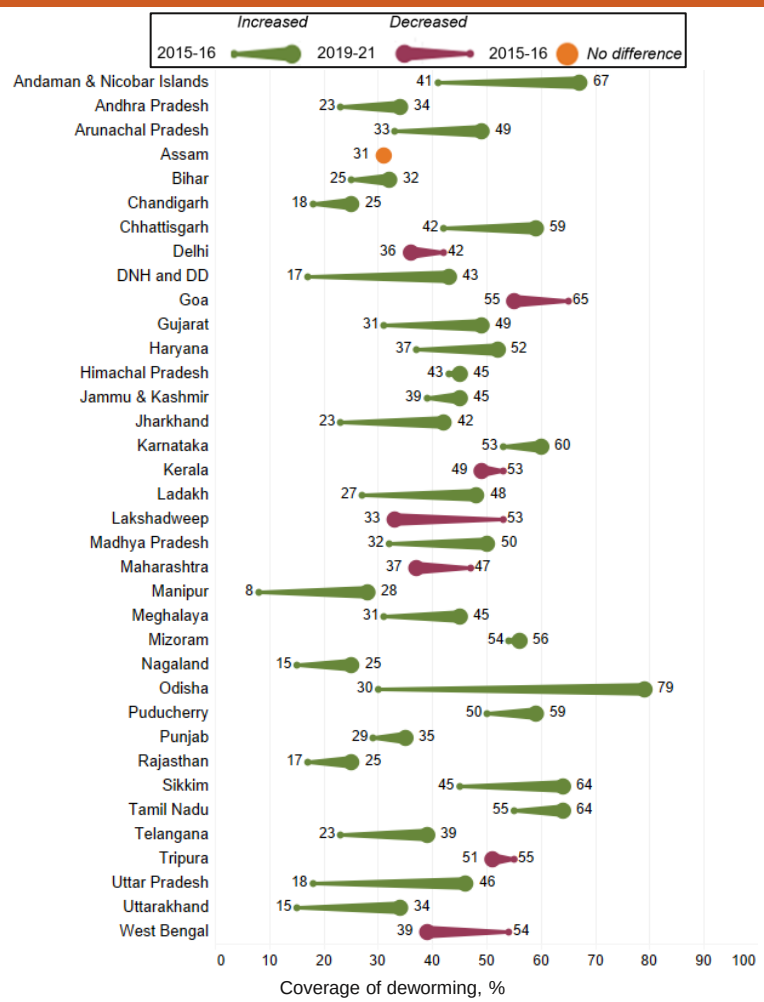
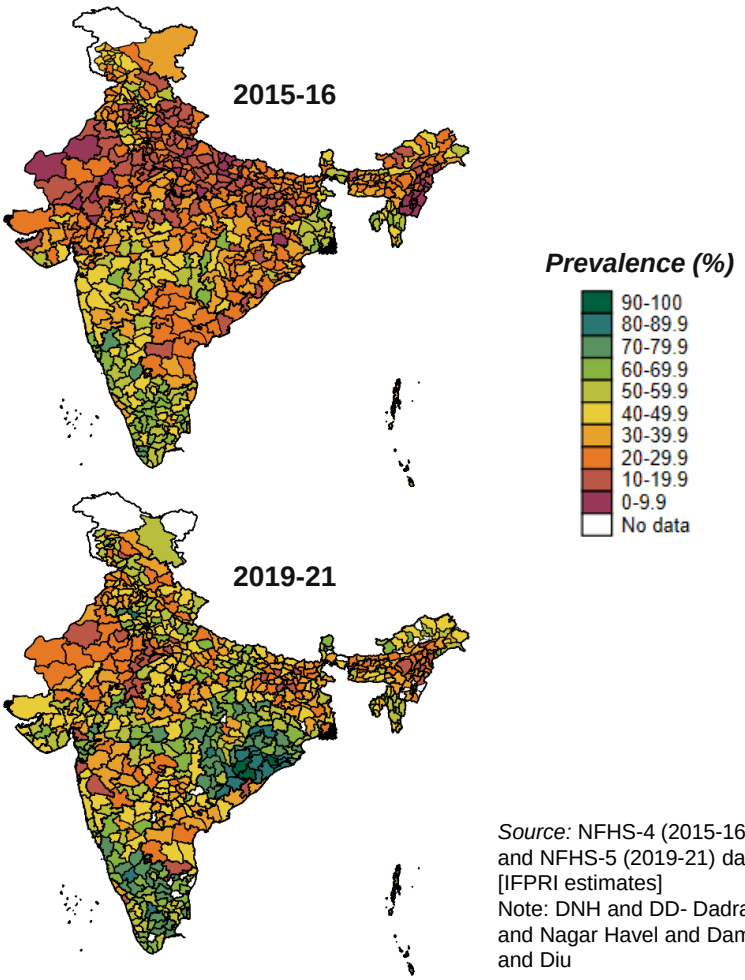


FIGURE 35 & MAP 25: Coverage of **deworming** among children by state (left) and district (right), 2015-16 and 2019-21





Source: NFHS-4 (2015-16) and NFHS-5 (2019-21) data [IFPRI estimates]
Note: DNH and DD- Dadra and Nagar Havel and Daman and Diu

Summary of findings

Anemia continues to be a significant public health concern in India among children, adolescent girls, and women. Anemia prevalence among children increased between 2015-16 and 2019-2021, and this was driven by an increase in the prevalence of moderate anemia. Anemia prevalence among other groups changed very little.

Factors that drive anemia reduction — Diet practices require substantial improvement. Only half of women consume dark green leafy vegetables (DGLV) daily and animal source protein at least once per week. Consumption of IFA remains low with just over one quarter of women consuming 180+ IFA during pregnancy. Sanitation improved substantially at the household level, but women's educational attainment remains low.

Coverage of anemia interventions differs by intervention type and population group. Nearly 90% of women received IFA during pregnancy in 2019-21. Despite improvements between 2015-16 and 2019-21, deworming during pregnancy failed to reach two-thirds of women in 2019-21. Coverage of IFA and deworming among children improved in most states.

Future efforts are needed to improve dietary diversity among women and children. While provision of IFA is high among women during pregnancy, consumption remains low. Data gaps on anemia interventions targeted towards adolescents and WRA, behaviour communication change, and fortification should be addressed. It is imperative to continue to monitor hemoglobin in the population through large scale surveys, especially for groups missed by NFHS such as children aged 6-14 years.

ANNEX 1 Definition of indicators used in the analyses

Indicator	Definition
Outcomes	
Anemia among girls[1]	Percentage of girls aged 6-59 months with any anemia (<11.0 g/dL)
Anemia among boys[1]	Percentage of boys aged 6-59 months with any anemia (<11.0 g/dL)
Anemia among children[1]	Percentage of children aged 6-59 months with any anemia (<11.0 g/dL)
Anemia among adolescent girls[1]	Percentage of adolescent girls aged 15-19 years with any anemia (<12.0 g/dL)
Anemia among adolescent boys[1]	Percentage of adolescent boys aged 15-19 years with any anemia (<13.0 g/dL)
Anemia among pregnant women[1]	Percentage of pregnant women aged 15-49 years with any anemia (<11.0 g/dL)
Anemia among lactating women [1]	Percentage of lactating women aged 15-49 years with any anemia (<12.0 g/dL)
Anemia among women[1]	Percentage of non-pregnant and non-lactating women aged 20-49 years with any anemia (<12.0g/dL)
Anemia among men[1]	Percentage of men aged 20-49 years with any anemia (<13.0g/dL)
Immediate determinants	
Consumption of dark green leafy vegetables[2]	Percentage of women aged 15-49 years who consumed dark green leafy vegetables at least once a day.
Consumption of fish and/or meat[2]	Percentage of women aged 15-49 years who consumed fish or meat at least once a week
Consumed 180+ IFA[2]	Percentage of women aged 15-49 years who took IFA tablets or syrup for 180 days or more during pregnancy for the most recent live birth in the 5 years preceding the survey
Consumption of iron-rich foods[2]	Percentage of youngest children aged 6-23 months living with their mother who consumed food rich in iron at any time in the 24 hours preceding the interview
Minimum meal frequency[3]	Percentage of youngest children aged 6-23 months who consumed solid, semi-solid, or soft foods (but also including milk feeds for non-breastfed children) at least the minimum number of times during the previous day
Minimum dietary diversity[3]	Percentage of youngest children aged 6-23 months who consumed foods and beverages from at least 5 out of 8 food groups during the previous day
Underlying determinants	
Women with ≥10 years of education[2]	Percentage of women aged 15-49 years with 10 or more years of schooling
HHs using improved sanitation facility[2]	Percentage of households using a flush (piped sewer system/septic tank/pit latrine), pit latrine (ventilated improved pit/with slab), or compositing toilet.
HHs with improved drinking water[2]	Percentage of households whose source of drinking water is piped into dwelling/yard/plot, piped to neighbour, public tap/standpipe, tube well or borehole, protected dug well, protected spring, rainwater, tanker truck, cart with small tank, bottled water, or community RO plant
Safe disposal of feces[2]	Percentage of youngest children below 2 years living with their mothers whose stools are disposed appropriately
Nutrition and health interventions	
≥4 ANC[4]	Percentage of women aged 15-49 years who received 4 or more antenatal care visits from a skilled provider for the most recent birth in the 5 years preceding the survey.
Received IFA during pregnancy[2]	Percentage of women aged 15-49 years who received IFA (given or purchased) during pregnancy for the most recent live birth in the 5 years preceding the survey
Deworming during pregnancy[2]	Percentage of women aged 15-49 years who took deworming medication during pregnancy for the most recent live birth in the 5 years preceding the survey
Used mosquito net[4]	Percentage of women aged 15-49 years who slept under a treated bed net during pregnancy of the most recent live birth in the 5 years preceding the survey
Institutional delivery[2]	Percentage of live births in the five years preceding the survey to women aged 15-49 years in a health facility for the most recent live birth
Full immunization[2]	Percentage of children aged 12-23 months who received all basic vaccines at any time before the survey according to either the vaccination card or mother's report
Pediatric IFA[4]	Percentage of children aged 6-36 months who were given iron supplements in the seven days preceding the survey
Deworming during childhood[4]	Percentage of children aged 12-36 months who received deworming medication in the six months preceding the survey

Source of definitions: [1]WHO. 2011. Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity. Vitamin and Mineral Nutrition Information System. Geneva, World Health Organization. [2]Croft, Trevor N., Aileen M. J. Marshall, Courtney and K. Allen. 2018. Guide to DHS Statistics. Rockville, Maryland, USA: ICF. [3]WHO and UNICEF. 2021. Indicators for assessing infant and young child feeding practices: definitions and measurement methods. Geneva, World Health Organization and the United Nation's Children's Fund. [4]Menon, P., R. Avula, E. Sarswat, S. Mani, M. Jangid, A. Singh, S. Kaur, A. K. Dubey, S. Gupta, D. Nair, P. Agarwal, and N. Agrawal. 2020. Tracking India's Progress on Addressing Malnutrition and Enhancing the Use of Data to Improve Programs. POSHAN Report 12. New Delhi: International Food Policy Research Institute.

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SUGGESTED CITATION

Gune, S., A. Christopher, P.H. Nguyen, P. Menon, W. Joe, S.K. Singh, L.K. Dwivedi, S. Pedgaonkar, P. Puri, A. Chauhan, K. Yadav, S. Chamois and S. Scott. 2023. *Tracking anemia and its determinants from 2015-16 to 2019-21 in India*. POSHAN Data Note No. 93. New Delhi, India: International Food Policy Research Institute.

ACKNOWLEDGEMENTS

Financial support for this Data Note was provided by the Bill & Melinda Gates Foundation through POSHAN, led by the International Food Policy Research Institute. The funders played no role in decisions about the scope of the analysis or the contents of the Note. We are grateful to NITI Aayog for their valuable contributions.

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National Centre of Excellence and Advanced Research on Anemia Control (NCEAR-A).
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ABOUT POSHAN

Partnerships and Opportunities to Strengthen and Harmonize Actions for Nutrition in India (POSHAN) is a multi-year initiative that aims to support the use of data and evidence in decision-making for nutrition in India. It is supported by the Bill & Melinda Gates Foundation and led by IFPRI in India.

ABOUT DATA NOTES

POSHAN Data Notes focus on data visualization to highlight geographic and/or thematic issues related to nutrition in India. They draw on multiple sources of publically available data.

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