लोकसत्ता जिल्हा निर्देशांक

District Development Index (2023)
for the State of Maharashtra & Districts' Progress on
Select Sustainable Development Goal Indicators



लोकसत्ता
लोकमान्य लोकशक्ती

सारस्वत बँक

प्रस्तुत

लोकसत्ता जिल्हा निर्देशांक

पॉवर्ड बाय

MSRDC
(A Govt. of Maharashtra Undertaking)

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शहरांचे शिल्पकार

नॉलेज पार्टनर

Education : An Ennobling Influence
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Pune – 411 004

A Research Project Undertaken for

The Indian Express (P) Ltd.



By

Gokhale Institute of Politics and Economics, Pune

March 2024

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Name of the Publisher:
The Indian Express (P) Ltd.
7th Floor, Mafatlal Centre, Ramnath Goenka Marg, Nariman Point, Mumbai - 400021

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Support from The Indian Express (P) Ltd.
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Duration of the Study was November 2023 to February 2024

ISBN 978-81-965202-5-0
Printed in India

Foreword

It has been a great pleasure to work on the second edition of the Loksatta Jilha Nirdeshank (District Development Index-DDI) for the state of Maharashtra. This is the second year that Loksatta along with our knowledge partner on the project, Gokhale Institute of Politics and Economics, came together to create the DDI and we are pleased to present the report.

The objective remained the same as that of last year: using data from government agencies and sources, a transparent process was devised to examine the development achieved by Maharashtra's districts.

It is impossible to exaggerate the role that districts play in a nation's growth and development. The purpose was to establish an unbiased system of measurement for district-level growth that would ideally help decision-makers make well-informed choices.

The intent is to undertake the study on an annual basis, use learning from the year gone by to improve upon the process and generate an annual index & report. This initiative has the potential to facilitate wide and grass root development by providing valuable insights and data-driven indicators to policy makers.

We sincerely thank Mr. Gautam Thakur, Chairman, Saraswat Bank for sharing our vision from the very beginning of this project. We also thank Dr. Ajit Ranade, Vice Chancellor, Gokhale Institute of Politics and Economics who spearheaded the entire process of creating the Index and our Knowledge Partner, Gokhale Institute of Politics and Economics and their team for relentlessly working on the first project of its kind.

We are grateful for guidance and time given to us by Mr. Sitaram Kunte, former Chief Secretary, Government of Maharashtra, Dr. Jitendra Chaudhari, Director, Directorate of Economics and Statistics, Government of Maharashtra, Dr. Abhay Pethe, Veteran Economist & Advisor, Gokhale Institute of Politics and Economics, Dr. Niranjan Rajadhyaksha, Executive Director, ArthaGlobal. A special mention of Mr. Bhushan Gagrani, veteran administrator with the Government of Maharashtra, is important considering the immense support and guidance given by him right from the beginning of this project.

We also thank our Partners Saraswat Bank, Maharashtra State Road Development Corporation & CIDCO for their support.

Girish Kuber
Editor,
Loksatta

Foreword

It gives me great pleasure to present the District Development Index (DDI) (2023) report for the state of Maharashtra. Envisaged by the Loksatta and supported by renowned economists and scholars, the first version of the DDI was published in 2022. The Gokhale Institute of Politics and Economics continued to work in the capacity of a knowledge partner in the second year to assess the development of Maharashtra's districts and to construct DDI (2023). The aim was to develop an objective measurement of the development which will highlight strengths and areas of improvement in districts of Maharashtra and aid the policy makers for future planning. The extreme intra-state inequality on socio-economic developmental parameters in Maharashtra makes the district comparison a challenging task. The DDI is constructed to reflect socio-economic development and infrastructural capacity created at district-level for future development. This year's index has seen a few modifications with the aim of improving the reliability of the index further.

This year, the team also decided to evaluate districts' performance with respect to the selected parameters closely linked with the key Sustainable Development Goals (SDG). While Health & Wellbeing (SDG-3) rightfully received the priority, Water & Sanitation (SDG-6) was also chosen acknowledging its strong linkages with the former.

The ranking of districts based on DDI and selected SDG targets would spur healthy competition among districts for holistic development in the long-run. It would also contribute to a political and administrative discourse on development policies and priorities. We sincerely hope that the study will provide insights to the district and state government for planning and allocation of resources for future development.

The present initiative of the DDI for the state has been supported by academicians and government officials. This exercise can be done annually to track the progress of each district of Maharashtra and a similar index can be constructed for districts in different states of India.

We thank the sponsors for their financial support in preparation of this report. We also thank the experts who have assisted the research team, and helped enhance the quality of the research work.

Dr. Ajit Ranade
Vice Chancellor
Gokhale Institute of Politics and Economics (GIPE)

Acknowledgement

The study "District Development Index for Maharashtra (2023)" has been carried out by the Gokhale Institute of Politics and Economics (GIPE), Pune with the view to assess the status of development of 34 districts of Maharashtra. The study was ideated by Loksatta (Indian Express Group) in 2022 and GIPE team worked in the capacity of knowledge partner in November 2022 as well as in November 2023. We, at GIPE would like to express our special thanks to Saraswat Co-operative Bank Ltd. for the financial support to this study. We place on record our sincere gratitude to Shri. Sitaram Kunte, the former chief secretary to the Government of Maharashtra for giving us his valuable time and guiding us from the stage of ideation to the completion of this study. We could also consult with Shri. Bhushan Gagrani, additional chief secretary in the Chief Minister's Office (CMO) to receive his opinion on this exercise and we are grateful to him. We also express our sincere gratitude to Dr. Jitendra Chaudhari, additional director, Directorate of Economics and Statistics, Government of Maharashtra for addressing data-related queries regarding the District Social and Economic Review report. Ms. Savita Chandrakant Dixit, Deputy Director DES, also helped us in providing necessary data and clarifications from time to time. The support, and valuable insights shared by Dr. Niranjan Rajadhyaksha, Senior Fellow at Artha Global is also acknowledged.

Our sincere thanks to Mr. Girish Kuber (Editor, Loksatta), Ms. Suparna Nayak and Mr. Sagar Deshpande from the Indian Express Group for bestowing trust on us as the knowledge partner.

We are very grateful to Prof. Abhay Pethe for his scholarly guidance in completing the study. Mr Sumedh Ranjane and Ms. Simran Sardar worked as research assistants and completed the tasks of data-entry and review of the literature. In the tenure of the study, we also consulted with Prof. Anjali Radkar, demographer-statistician and we express our sincere gratitude to her.

Abbreviations

ADP	Aspirational Districts Programme
ANM	Auxiliary Nurse Midwife
BPL	Below Poverty Line
CAGR	Compounded Annual Growth Rate
CMR	Child Mortality Rate
DDI	District Development Index
DES	Directorate of Economics and Statistics
DIC	District Industrial Centre
DSER	District Social and Economic Review
EDI	Economic Development Index
EII	Economic Infrastructure Index
EOC	Economic Overhead Capital
EPI	Economic Performance Index
GDI	Gender Development Index
GDP	Gross Domestic Product
GER	Gross Enrolment Ratio
GoI	Government of India
GoM	Government of Maharashtra
GST	Goods and Services Tax
Hb	Haemoglobin
HDI	Human Development Index
HDR	Human Development Report
HPAEs	High Performing Asian Economies
IMR	Infant Mortality Rate
IT	Information Technology
MSME	Micro, Small & Medium Enterprises
NAS	National Achievement Survey
NDP	Net Domestic Product
NFHS	National Family Health Survey
NSDP	Net State Domestic Product
NSS	National Sample Survey
LHV	Lady Health Visitor
PCDDP	Per Capita District Domestic Product
PCDNDP	Per Capita District Net Domestic Product
PCGNP	Per Capita Gross National Product
PMAY-G	Prime Minister Awaas Yojana-Gramin
SC	Scheduled Caste
SDG	Sustainable Development Goals
SECC	Socio Economic and Caste Census
SII	Social Infrastructure Index
SLBC	State Level Bankers' Committee
SOC	Social Overhead Capital
SPI	Social Performance Index
ST	Scheduled Tribes
UDISE	Unified District Information System for Education Plus
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
VAT	Value Added Tax
WHO	World Health Organization

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Part A : District Development Index for the State of Maharashtra

Introduction

The development of a society essentially refers to the freedom of choices citizens have to live a life which they have reason to value. All citizens shall be capable of living the life of their choices and such freedom is true development of a society. This definition of development originates from Prof. Amartya Sen's work. This broadens the scope of work for governments, civil society organizations which are expected to create a conducive environment and augment the set of capabilities for citizens. As the set of capabilities is varying for individuals/communities and essentially infinite and ever-changing, development is multidimensional in nature. The concepts of economic growth, economic development, social development and human development are distinct from each other. Each may have strong interlinkages with the others but also has standalone implications for human wellbeing. Economic growth deals with the annual growth in production or income whereas economic development deals with the efficient use of economic resources and sustainable economic growth. Social development primarily deals with the inclusivity of all sections of the population in the developmental processes and building institutional setup for fostering inclusivity and sustainability of human development. Human development is about enhancing citizen's capabilities, enlarging their range of choices, expanding their freedom and promoting human rights and can be considered as the ultimate aim of development. This multi-dimensionality nature of the development outcomes as well as processes poses critical challenges in the process of designing and evaluating development policies. The evidence-based developmental policy incorporates the knowledge of regional economic and social context and hence can guide the politicians and academicians for effective developmental initiatives. A composite index is a relatively superior tool to summarize the multidimensionality and localized nature of the developmental outcomes and processes. At present, indices like Human Development Index (HDI), Multidimensional Poverty Index (MPI) provide updated and frequent information about the state and national economy; however, there is dearth of such measurements at district-level.

Acknowledging this, the present study attempts to construct a parsimonious District Development Index (DDI) to assess the contemporary socio-economic development and infrastructural capacity at district level of Maharashtra for the year 2022-23. The present level of socio-economic development is captured through six indicators and availability or accessibility of the key infrastructural facilities for future socio-economic development is measured through another six indicators. All the indicators receive equal weights in the aggregation exercise. The infrastructural capacity, although an input variable, has been accorded equal importance with that of the existing socio-economic development (output variable), given its essentiality for development. The datasets and district-level reports published by the Directorate of Economics and Statistics, Government of Maharashtra and a few by the central

government agencies have been used. The first DDI for all districts in Maharashtra using data of FY2022 was published in 2023. The present report discusses some methodological changes carried out in presents the results of DDI-2023 and analyze districts' performance with respect to selected SDGs.

Objectives of the Study

The present study aims to re-calculate the DDI for the year 2023. It also attempts to measure incremental change in developmental outcomes and developmental infrastructural capacity at district level during 2021-22 to 2022-23. In accordance with the United Nations adopting Sustainable Development Goals (SDGs) framework in 2015, the NITI aayog monitors the progress of Indian states in achieving the SDGs-targets. The State Government of Maharashtra has developed a framework of indicators to be followed at district-level. The present study also attempts to assess districts' performance with respect to selected indicators related to two SDGs associated with health, water and sanitation.

Method of Calculating DDI

The DDI-2022 (published in 2023) was developed to reflect economic, social and human development of Maharashtra's districts. Sincere attempts were made to develop an index which will measure these key aspects of the district development. Along with the per capita income level of the district, the overall economic development of districts was captured through the economy's structure, technological advancements, investment-attracting capacity, and infrastructural development. In line with Prof. Sen's Capabilities approach, district level education and health related outcomes and related infrastructure were measured to analyze the district's social and human development. Attempts were made to assess the implementation of the select welfare scheme for marginalized sections and the status of law and governance at district level, both leading to inclusive and sustainable social development. Consequently, the DDI represents multiple aspects of a district's development and does not suffer from inadequacy of any unidimensional monetary metrics such as Gross Domestic Product (GDP) to measure development.

Another merit of the DDI is that it is based on indicators which are updated annually by the government. The existing composite indices such as HDI, Inequality-adjusted HDI, MPI generally exhibit robustness and correlation with other developmental indicators but are not updated annually at district level due to the unavailability of data. The DDI addresses this gap and enables year on year comparison of districts' performance. The subsequent section elucidates the steps taken to formulate the DDI, shedding light on its merits and limitations.

The methodology of constructing the DDI was highly influenced by the methodology of calculating Human Development Index (HDI) adopted by the United Nations Development Programme (UNDP). It entails the following steps:

Figure 1.1 : Steps Undertaken to Construct DDI



The subsequent section explains each step in detail.

Identification of Dimensions

Since the past couple of decades, the discourse on development revolves around human development which keeps individual's wellbeing at the centre of all economic and social policies. Economic growth and development supplies inputs to achieve wellbeing while education, health and an inclusive-harmonious social environment helps citizens to live the life of their own choice and increase wellbeing. This framework was adopted to choose the dimensions of development. Empirical evidence on the relationship between economic development and human development varies, with some scholars advocating the prioritization of policies that increase the national income, while others emphasize the primacy of human and social development for achieving equitable distribution and sustainable growth. Economic and social development can sustain only in the presence of adequate infrastructure. The economic literature, both theoretical and empirical, accords the status of leading sector to physical infrastructural facilities for sustainable economic growth. Public investment in roads, highways, bridges, electricity, irrigation facilities, transport-telecommunication systems are necessary to support business operations and make private businesses viable. These facilities generate external economies, attract domestic and foreign investment, and reduce transportation costs and foster other productive

activities. The World Development Report (1994) emphasizes a positive relationship between GDP level and per capita infrastructure stock. Soft infrastructure which includes schools, hospitals, clean water supply, housing, recreation facilities, financial and legal institutions improve labor productivity, foster innovation and research, and enhance human security. Regulatory institutions to maintain social stability are integral for inducing more investment and promoting growth.

Guided by this framework, the district's development is measured across four dimensions:

1) Economic Performance which measures the existing achievements in the context of the district
2) Infrastructural facilities made available for the future economic growth
3) Attained performance of the district in terms of social development
4) Soft infrastructure created for equitable social and human development

Each of these dimensions can be represented by multiple indicators and hence the following four separate sub-index were constructed to measure them.

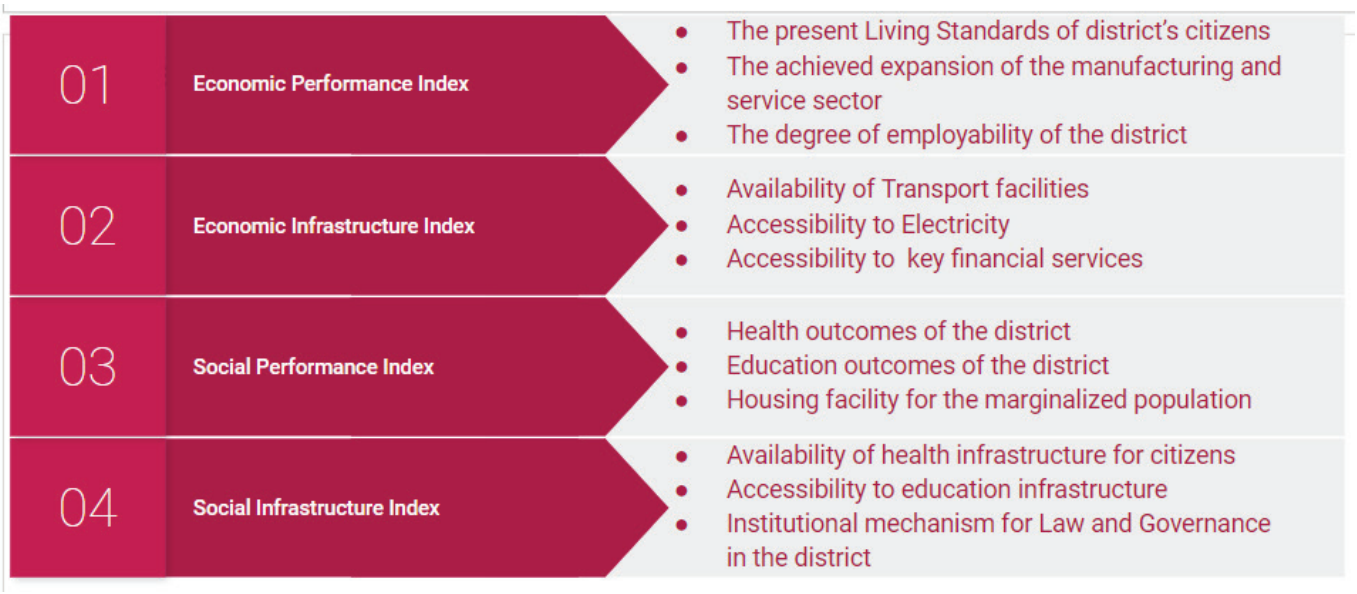
1) The Economic Performance Index (EPI) evaluates a district's attained levels of economic development. The existing standard of living, structure of the regional economy and district's capacity to generate local employment were considered as important aspects to capture the multidimensionality of the economic development.

2) The Economic Infrastructure Index (EII) assesses the availability of critical infrastructural amenities such as transportation networks, electricity access, and banking services directly necessary for economic activities.

3) The Social Progress Index (SPI) attempts to approximate the level of social development achieved by the district. It encompasses indicators such as educational attainment, health outcomes, and housing provisions tailored for marginalized populations to evaluate the social development of the district.

4) The Social Infrastructure Index (SII) refers to the infrastructural facilities developed for social and human development including law and governance. The presence of adequate healthcare and educational facilities, along with resources to maintain public safety and order, are considered integral components of social infrastructure essential for societal advancement.

Figure 1.2 : Information about the Sub-indices of the District Development Index



Selection of indicators for dimensional subindices:

The selection of indicators for dimension-specific subindices is always a critical task as the selected indicator needs to meet several criteria simultaneously. The first and foremost criteria is the direct link between the indicator and the underlined dimension, followed by the availability of frequently updated data. Unambiguous measurability and ease of interpretation were other two important considerations. The research team also attempted to look for indicators which are stock nature (as opposed to flow variables) so as to reflect the cumulative regional development. Attempts were also made to search and incorporate indicators which are not very sensitive to external factors like rainfall irregularities or external price shocks.

Districts of Maharashtra differ in terms of geographical size as well as in terms of population density. Given that the larger districts will invariably report higher values for each indicator than smaller districts, the higher level in such cases does not necessarily refer to a higher level of development. It was therefore necessary to eliminate any such influence of the geographical or population size. Standardization allows for fair comparisons between districts and captures proportionality. Each indicator therefore was first standardized using the projected population of the district or by the geographic area. Consequently, the indicators included in the subindices convey availability or accessibility per head or per square kilometer.

The EPI is constructed using the following three variables

1) Per Capita district NDP at constant prices in 2021-22 shows the achieved average living standard of the district population. Per Capita income represents the average output produced in a district within a ear. Net Domestic Product (NDP) adjusts GDP for year-on-year depreciation in capital goods such as

buildings, machines, and software, providing a more accurate measure of annual output growth. However, it overlooks non-monetized market activities and the informal economy. In addition, it overlooks the inequality in the distribution of NDP in the district population.

2) The ratio of secondary & tertiary sector's NDP to district's NDP at constant prices in 2021-22 represents the existing structure of the regional economy. Manufacturing sector was considered as an engine of growth post-industrialization. In recent times, the service sector has achieved the same status led by the Information Technology (IT) sector and the rapid expansion of communication, banking, business services. These two sectors are treated as indicators of economic growth and development largely owing to their backward and forward linkages with other sectors, potential for technological advancement and generated external economies. Higher job opportunities for semi-skilled labourers, innovations to meet ever-changing demands of the economy set in place a virtuous growth cycle. Transition of the district economy from primary sector to manufacturing or service sector makes the district economy relatively less vulnerable to climate change consequences. A transition towards these sectors signifies resilience against climate change impacts too.

3) Average investment in the MSME sector of the district as of 2022-23 captures the achieved employment generating capacity at district level. Micro, Small, and Medium Enterprises (MSMEs) significantly contribute to employment and income growth as per National Sample Survey (NSS) 73rd round (2015-2016). Their success relies on local entrepreneurship, traditional skills, and access to regional resources. The ability of MSMEs to create local jobs depends on MSME investment in a district. This variable does not account for factors such as the productivity of employees, value-addition or exports of the district MSME sector.

The sub-index of EII is measured based on the following three variables:

1) Road Length for each 100 sq. km. per 1000 population in 2022-23: Robust road networks facilitate mobility of labourers, capital, and goods, enhance market access and employment opportunities. A district can have national highways, expressways, primary state highways, state highways, and local roads in its boundary. Standardized by population density measures the effective availability of road infrastructure to the district's population. The variable does not account for the quality of roads and utilization for various purposes, as well as the railway network are not factored in.

2) Number of bank branches per 1000 population as on March 2023: Economists have acknowledged the causality flowing from the financial sector to economic growth and support poverty reduction efforts. Financial sector, including the banking system, mobilises capital, funds new ideas, manages risks and stimulates growth in capital accumulation and technology, hence driving the economy to grow Levine

(1997). As banks remain one of the key institutions for access to formal financial services, having an accessible bank branch is an important initial point of access to financial services including saving to insurance to borrowing at reasonable interest rates. Districts typically have urban, rural, semi-urban, and metro branches of all types of banks. Only accessibility of banking services is captured in this sub-index. Types of banking services used and efficiency of branches in catering to customer needs could not be captured.

3) Per Capita Electricity Consumption (kilowatt-hour) in the reference year 2022-23: With the increasing mechanization and digitalization, electricity consumption is on rise. Nighttime lights data has indicated a robust positive correlation with the region's economic activities (Prakash et al., 2019). Both domestic electricity consumption and public lighting, such as road lights, contribute to overall safety and citizen productivity. This is a consumption variable but approximates the production and availability of electricity.

The sub-index of SPI combines the following three Indicators

1) The proportion of students enrolled in 10th standard out of the eligible population in 2022-23: It indicates the share of students who have completed the Secondary School Level and aspired for higher secondary education. Education is a fundamental right and a key determinant of social development. However this variable does not reflect the quality of education as well as attainment of 10th level education.

2) The proportion of 'normally' weighted children (in Anganwadi, 0-5 years old) to those children whose weights were monitored in 2022-23: While discussing overall social wellbeing of the population, health of the population, especially of children, is a crucial indicator. Thus, this variable indicates health outcomes of the most vulnerable population of the district. The proportion of 'normally' weighted children compared to those whose weights were monitored in 2022-23 serves as a crucial gauge of the district's overall social wellbeing and specifically highlights the health outcomes of its most vulnerable population. Addressing early childhood malnutrition is of paramount importance, as it can have lasting effects on the health of the individual, her education attainment and overall development. By implementing comprehensive interventions focusing on nutrition, healthcare, and broader social factors, we can ensure better outcomes for children, laying the foundation for healthier and more prosperous communities in the future.

3) Proportion of completed housing over targeted housing under PMAY-G as on 15th January 2024: Adequate and affordable housing provides access to space, security, privacy. It also improves essential capabilities such as health, education, and resources ownership. Homelessness multiplies deprivations of capabilities for marginalized sections of the society. Pradhan Mantri Awaas Yojana Gramin

1 https://pmayg.nic.in/netiayHome/about.aspx

(PMAY-G) aims to provide a pucca house, with basic amenities, to all houseless householders and those households living in kutcha and dilapidated houses. The minimum size of the house has been increased to 25 sq.mt (from 20 sq.mt)1 with a hygienic cooking space. Households that are houseless and living in 0,1 and 2 kutcha wall and kutcha roof houses according to Socio Economic and Caste Census (SECC) 2011 are eligible for this scheme. Around 60 percent of the targeted housing is earmarked for SC/ST, 15 percent for minorities and at least 5 percent for persons with disabilities. The data captures house construction only in rural parts of the concerned district and excludes urban areas.

The sub-index of SII is composed of

1) Total number of beds in (Government & private hospitals) per 1000 population in 2022-23: Availability of a wide range of services such as health education, promotion of nutrition, provision of mother and child family welfare services, immunization, disease control, appropriate treatment for illness and injury in the district has gained the paramount importance, especially after COVID-19 pandemic. However, the important part of district health infrastructure such as primary health centres, subcentres, community health centres, and the quality and regularity of the medical services being provided are not factored in mainly due to unavailability of annually-updated data.

2) Availability of primary, secondary, high-secondary schools (with toilets) per sq.km in 2022-23: After the introduction of the Right to Education Act in India in 2009, the number of schools, teachers, and infrastructural facilities have increased manifold. Schools without basic facilities like toilets or schools at a far distance hamper the willingness of parents as well as students to attend school regularly. Therefore, easy accessibility to decent schools with basic amenities is necessary for educational attainment. The status of school infrastructure such as building, availability of educational infrastructure like playgrounds, laboratory etc are not considered here.

3) Proportion of police per 1000 population (Thana, outpost & Chauki) as on March 2023 indicates the strength of Conflict Management Institutions in districts. Social conflicts such as strikes, assassinations, divisions, riots, violence against weaker sections, use of public properties or common pool resources, and legal disputes regarding property or economic resources are costly for the economy and adversely affect economic growth. Institutions for local conflict management can positively affect growth by impeding social conflicts and promoting local participation. Trustworthy and stable societies with good conflict management institutions often attract more investment and enrich human lives. The high value of this variable in some cases may reflect the existing social unrest in the selected district and may not always guarantee social justice, peace and stability for higher developmental initiative.

Data Sources

The district level data was obtained from various reports and statistics made available by the Government of Maharashtra (GoM) and Government of India (GoI). The District Social and Economic Review (DSER) of 2023, 2022 provided by the Directorate of Statistics and Economics, GoM were used to extract data of the indicators. These reports compiled data supplied by the district statistical officers and are published on an annual basis. District level demographic and health related data was collected from the National Family Health Survey (NFHS-5) and district level population projections provided by the IIPS (Dhar M., 2022). The State Level Bankers' Committee, Maharashtra State publishes its agenda of meetings wherein it publishes data related to district-level bank branches. For the present study, the background notes and agenda papers of (159th SLBC Meeting 2023 were referred. The Prime Minister Awas Yojana-Gramin (PMAY-G) related webportal updates the data almost on a daily basis. Databases like UDISE+, National Achievement Survey, District Industrial Centre (DIC)'s report, Economic Survey of Maharashtra, and district's website were also consulted.

Table 1.1 : List of Standardised Indicators used in DDI			
Subindex	Standardised indicator	Datasource	Data Reference year
EPI	Per Capita district NDP at constant prices (2011-12)	DSER, 2023	2021-22
	Ratio of secondary & tertiary sector's NDP to district's NDP at constant prices	DSER, 2023	2021-22
	Ratio of MSME investment (Rs. lakhs) to number of MSMEs	Udyam	2022-23
EII	Per Capita Electricity Consumption (kilowatt-hour) @	DSER, 2023	2022-2023
	Road length for each 100 sq.km per 1000 population $	DSER, 2023	2022-2023
	Number of bank branches per 1000 population $	SLBC	2022-2023
SPI	The proportion of students enrolled in 10th standard out of the eligible population $	DSER, 2023	2022-2023
	The proportion of 'normally' weighted children (in Anganwadi, 0-5 years old) to those children whose weights were monitored in 2022-23	DSER, 2023	2022-2023
	Ratio of completed houses (Rural) to targeted/ sanctioned houses under PMAY in the reference year	pmayg.nic.in	Till 15th Jan 2024
SII	Proportion of police per 1000 population (Thana, outpost & Chauki)$	DSER, 2023	2022-2023
	Total number of beds in (Govt & private hospitals) per 1000 population $	DSER, 2023	2022-2023
	Availability of primary, secondary, high-secondary schools with toilets per sq.km ^#	DSER, 2023	2022-2023

@ deflated by estimated population on 1st October 2020 or 2019 for different districts by District Statistical Officers.

$ deflated by projected population for 2023.

^ inclusive of public schools, schools run by local urban bodies, private aided & private non-aided schools.

Values for primary, secondary, and higher secondary schools with toilets are not updated for Osmanabad, Gadchiroli, Bhandara, Wardha, and Jalgaon, so values from the last year (2021-22) are considered.

Missing Values: Data Adjustments Strategies

Official data on macroeconomic variables such as District NDP and sectoral share of secondary & tertiary sector is not available separately for Mumbai City and Mumbai Suburban region. Similarly, Palghar district was separated from Thane district on August 1, 2014, however the disaggregated data for these two districts is not yet available. Attempts were made to estimate PCDNDP and the sectoral shares for these districts separately. Bifurcation of PCDNDP in these two regions based on weights (population share or geographical area) or calculation of mean/median value of the variable of similar districts were explored to impute the missing values. However, Mumbai City and Suburban districts are quite distinct from other highly developed districts of Maharashtra, such as Pune, Kolhapur on various accounts including concentration of administrative offices, business activities, and higher population density. Similarly, with millions of commuters traveling from Mumbai suburban to Mumbai city, the bifurcation of the aggregate PCDNDP becomes difficult. Similarly, Palghar and Thane are characterized by remote and underdeveloped tribal belt as well as industrial urban centers. Such inter-district and intra-district disparities in terms of income and other social development indicators makes the exercise of district wise splitting of PCDNDP complicated. The short time span (2 months) of the present study further limits the ability to produce district-wise reliable estimates of PCDNDP and sectoral NDP at constant prices. Consequently, EPI was calculated for Mumbai city and Mumbai Suburban districts in a combined fashion, similarly, for Thane and Palghar. This was also applicable in case of average MSMEs investment. Therefore, distinct EPI computation was not possible for Mumbai city and Mumbai suburban area and similarly for Thane and Palghar. Consequently a decision was taken to combine these districts for the DDI calculation. The reference year for the Per capita district NDP (constant prices) for Bhandara was 2020-21.

Some irregularities were observed in the data on Per capita Electricity Consumption published in DSER 2023 on the official website of the Directorate of Economics and Statistics (DES), GoM. The values of Per Capita Electricity Consumption (kwH) were extremely high for districts like Thane and Beed with no factual information to substantiate it. The annual DSER also provides the number of MSMEs, number of employees and average investment (Rs. Lakh) in MSMEs in all districts of Maharashtra. However, for most districts these values were absent. Upon contacting, the DES office promptly provided the corrected values for these variables which were included. The Ministry of Women and Child Development, Government of India, under POSHAN Abhiyaan has implemented incentive guidelines for Anganwadi workers (AWWs) and Anganwadi helpers (AWHs) to promote regular growth monitoring of children. It insists on the sustained use of 'Poshan Tracker' and on service delivery during the first 1,000 days of the child. Growth monitoring of children in India is usually done by Anganwadi workers using weight-for-age growth charts under Integrated Child Development Services

(ICDS) program. The Anganwadi centres maintain the records of weights of registered children in the age group of 0-5 years. This data indicates children who have normal, moderately or severely low weights. The DSER provides rural and urban data at block level, further aggregated for the entire district. Only in the case of Haveli and Maval (urban area) of the district of Pune, the number of children with normal weights exceeded the number of weighted children during the last year. This discrepancy led us to omit these two data points from Pune's data.

Normalisation

DDI is calculated by aggregating variables which are in different units. Two variables in EPI are measured in monetary terms; electricity is measured in kwH terms; while most of the other variables are in percentage form. Normalization allows the conversion of all these variables to a common scale and make them comparable as well as additive. Similarly, without normalization, variables with larger magnitudes may dominate the index results. The following formula was used for the normalization.

$$Normalized\ indicator = \frac{Actual\ value\ - minima*}{Maxima - Minima*}$$

(* Non-significant number of 0.001 was deducted from the local & global minimum values to avoid zero as a normalised indicator.)

Minima and Maxima values used here are observational rather than being inspirational goalposts to be achieved by districts. The maxima and minima values were drawn by comparing the districts together. The study adopted two approaches to pick the observed maximum or minimum values for normalisation. The choice of maxima and minima affects the value of normalized indicators, the final index scores and therefore ranking.

1) Global Minima & Maxima: goalposts based on observable values by comparing all districts together: It provides maximum and minimum value of the variable achieved by any one of the 34 districts (Mumbai city & Mumbai Suburban; Thane and Palghar).

2) Local Minima & Maxima: It used the categorization of districts based on Human Development Index (HDI) scores provided by the Government of Maharashtra in 2011. All 35 districts (excluding Palghar) were categorised in four categories viz. low, medium, high and very high human development by the GoM. With the assumption that human development reflects the entirety of the achieved economic and social development, HDI categorization is used to draw minimum or maximum values. These values are obtained from each of these categorizations for intra-category comparison. It allowed the comparison and evaluation of a district against districts which were more similar than different.

Weights and Construction of the Index

Simple arithmetic mean of normalised indicators was calculated to arrive at a dimension subindex. Each normalized indicator received equal weights of ⅓ in the concerned subindex. It imposes perfect substitutability across indicators within a dimension. The four subindices viz. EPI, EII, SPI and SII were aggregated using geometric mean to produce DDI scores. The geometric mean conveys the interdependence between economic and social development and infrastructure for overall development. Geometric mean penalizes the inequalities in the values. As a result, weak performance in any one pushes the aggregate index scores down.

Methodological Changes between DDI(2023) and DDI(2022)

The four dimensions of the index are kept constant in both DDI (2023) and DDI (2022). However, some variables were modified in DDI(2023) largely owing to the unavailability of the data and availability of better-quality and updated data. Variables to measure health and education outcomes were replaced with better indicators in 2023. The DDI(2022) used the retention rate in secondary school as an indicator of education outcome as part of SPI. It was replaced with the ratio of students enrolled in the 10th standard to (projected) population of 15-19 years of age. The population projections are unavailable for the disaggregate ages in this age group of 15-19 years. In addition, the age of students enrolling in 10th standard may not be strictly 15 or 16 years but may vary for different regions. As a result, the entire projection population for the age group of 15-19 years was considered to arrive at this ratio.

The DDI(2022) measured health outcomes of a district based percent of women (15-49 years) who were not anemic in 2019-21. This data was obtained from NHFS-5. This indicator was replaced by the ratio of children with Anganwadi (0-5 years) with normal weights to children whose weights were monitored and recorded.

The EII variable, namely Road Length per sq.km was amended and was replaced by the Length per sq.km per 1000 population. The former variable measures the density of road infrastructure in the area and indicates the availability of transportation networks and allows the assessment of overall accessibility and mobility within the district. On the other hand, road per square kilometer per 1000 population takes into account the population density and indicates the level of road infrastructure relative to the number of residents. It helps to assess the adequacy of road infrastructure in meeting the transportation needs of the population. The estimated population for the year 2023 is taken into account for this.

MSMEs data from Udyam Registration was made available by DES. Last year's EPI was calculated using the District Industrial Centres's data published in the DSER report. As the number of MSMEs

registering themselves is increasing year on year, the research team recommended to switch to the more updated data source on the cost of comparability with the last year's EPI.

Dr. Murali Dhar, Professor, Department of Biostatistics & Epidemiology, IIPS, Mumbai had projected district population for males and females for all the age groups. These projections were used to calculate per capita availability whenever required as against Census 2011's data which was used to calculate DDI-2022.

These methodological changes, admittedly reduce the comparability of SPI (2022) and SPI(2023) and in general DDI. However, there is a fair degree of correlation between DDI_2022_variables and DDI_2023_variables. In the initial phase of any index, such modifications are permissible which will eventually improve the reliability of the index. On this backdrop, the proportion of y-o-y change in DDI caused by the actual change in the district's performance and due to methodological changes carried out in DDI_2023 is moot.

Features of the Index

1. Comprehensive in nature (total 12 variables)
2. Variables are standardized for the district population or geographical areas, thus factoring in district-wise heterogeneity and hence comparable
3. Accounts for the capacity created for economic growth and social development at district level
4. Geometric mean brings in imperfect substitutability between different dimensions to achieve overall development
5. For ranking exercise: comparison between districts which are more similar than different; not with outliers
6. Based on most updated data provided by various district administrative offices

Demerits of the Index

1. Selection of variables influenced by the availability of reliable data. A large set of economic and social variables were under consideration, but could not be included in the index due to unavailability of reliable and updated data. For instance, share of total land under irrigation to the total cultivable land is the most important indicator of infrastructure in place for agriculture. However, the most updated data for all districts is not available from the official sources. Ratio of GST & VAT (Rs.lakhs) to population (2011) was dropped on account of negative values for Mumbai, variation in the recovery amounts of VAT. Infant Survival Rate1 is considered as a robust indicator of social development. While DSER records the live birth and children death in the age

2 (1000-(child death (0-1 years)/live births) as calculated in Maharashtra Human Development Report, 2012

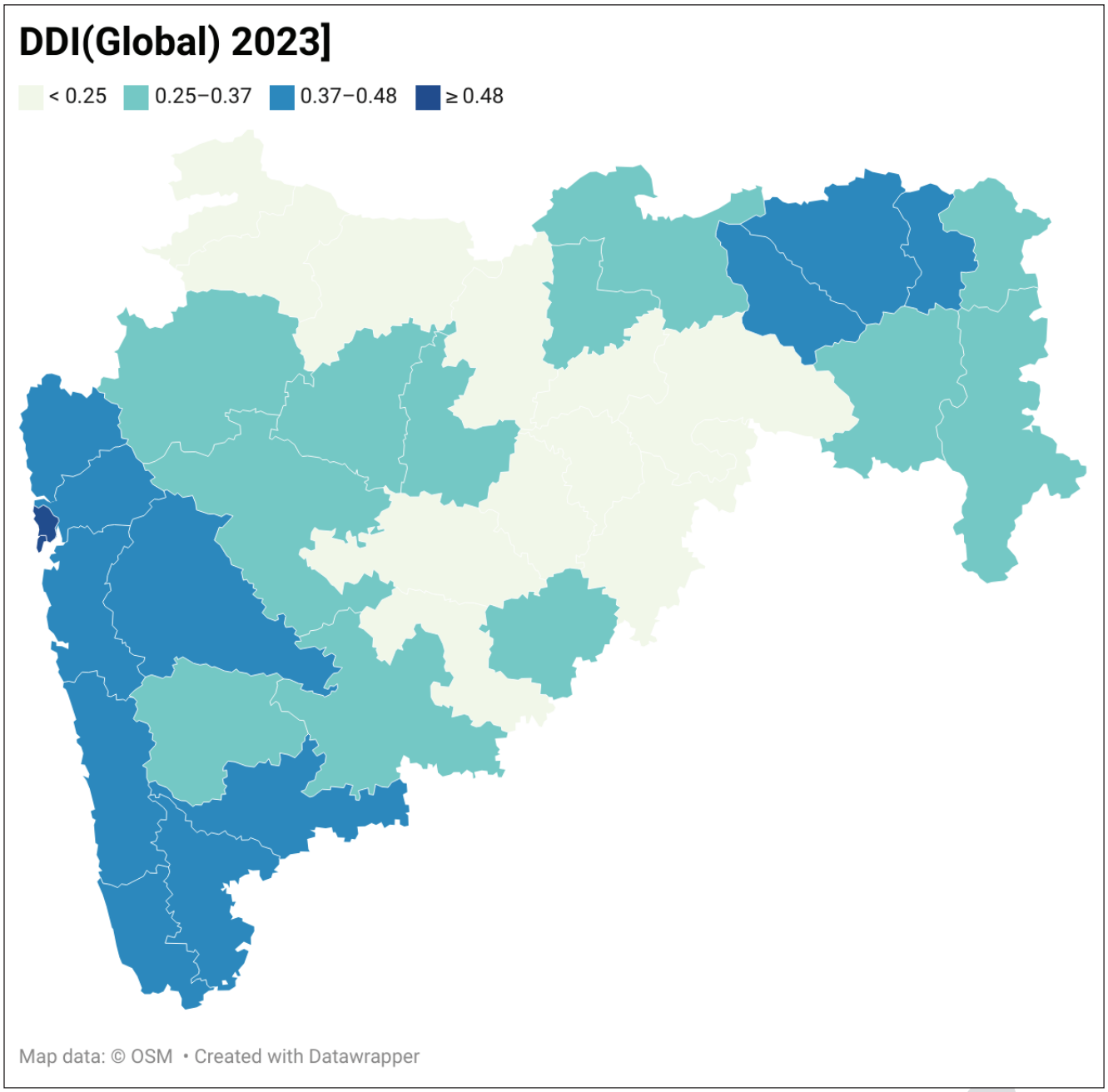
group of 0 to 1 year in a financial year, it does not permit the calculation of IMR with the life-table method. Estimation based on DSER data had weak reliability when compared with past datasets. Filled to approved posts of district judges or operational courts at district level/population were considered as informative indicators of the state of Law and Order in the chosen district. However, these were dropped owing to low variation in the data. As an indicator of Social Infrastructure for inclusion and conflict management, an attempt was made to incorporate the information of disposed cases (civil and criminal) at district level in a given year. However, construction of a meaningful and unambiguous standardised variable was challenging in the absence of the data on the number of years to dispose of the case across districts. In addition, this variable would have captured the efficiency of the district judiciary system instead of infrastructural capacity.

2. Nonlinearity in the association between infrastructure and potential for economic growth is not accounted for. (For instance, availability of physical infrastructure facilities may steer more economic activities at a low level of development, than it would achieve at a very high level of development). Similarly, the quality of the available infrastructure is not reflected in the DDI score.
3. Spatial dependence is not taken into account while comparing districts (such as inter-district migration influencing development outcome positively (through higher labour supply) & negatively (through backwash effect) or inter-district service availability & its impact on district's ranking)
4. Inability to account for or weigh exogenous driving forces that influence the level of achievement (disparities in natural endowments influencing irrigation)
5. The accuracy of index scores and ranks depends highly on the quality of the available data.

Key Findings

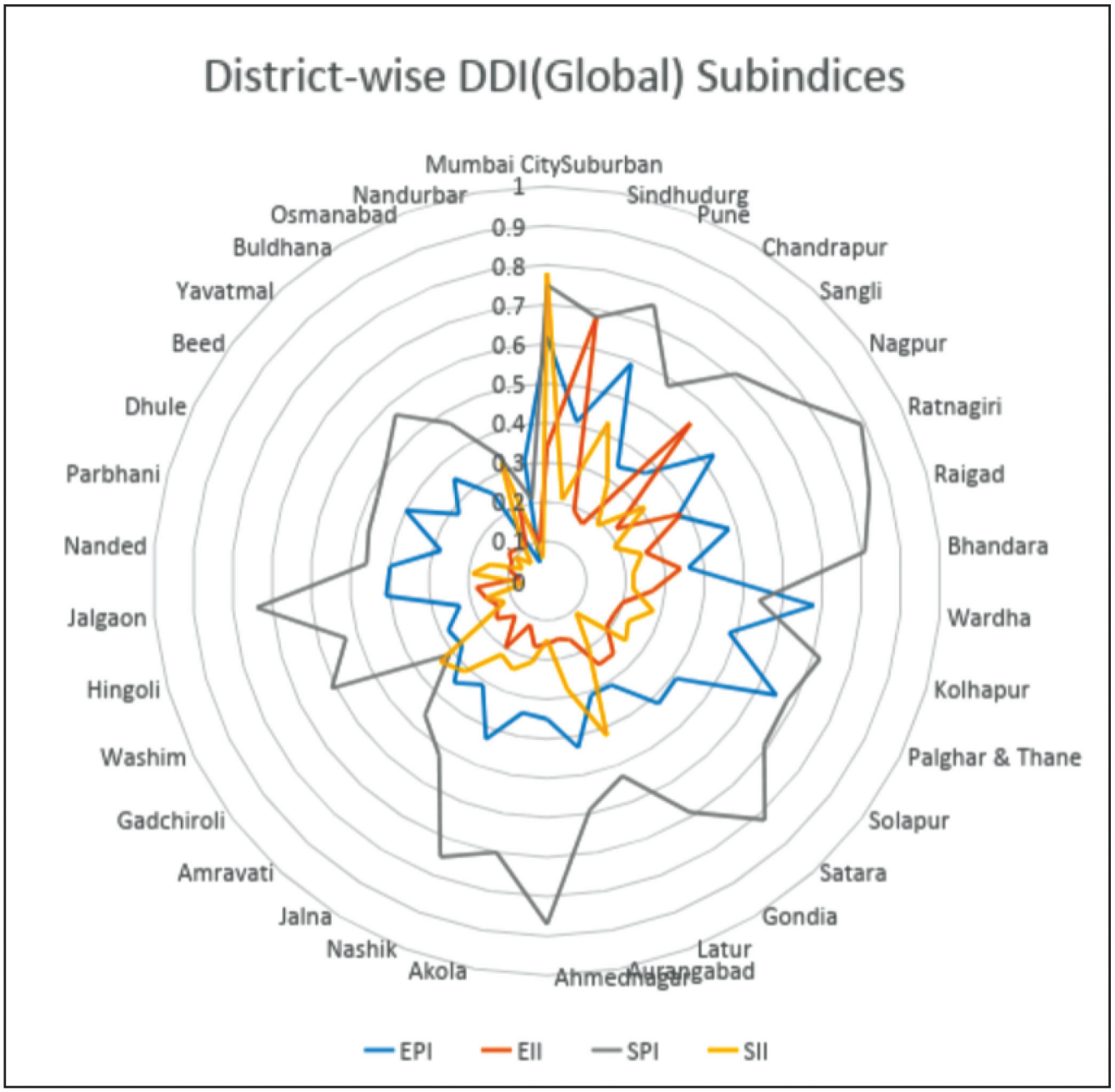
This section presents the key findings based on DDI_Global and DDI_Local.

Figure 1.3 : DDI(2023) with Global Maxima and Minima



As shown in the above map, Mumbai city and Mumbai suburban region continue to top the list of districts for overall development with the index score above 0.5. The DDI scores for Sindhudurg, Pune, Sangli, Nagpur and Raigad range between 0.4 to 0.5. Yavatmal, Dhule, Osmanabad (Dharashiv) and Nandurbar are on the other end of the spectrum with the scores being below 0.25.

Figure 1.4 : District-wise DDI(Global) and Subindices



The figure 1.4 shows the relative level of all subindices for each district. It shows that for most districts, SII and SPI scores are higher than EPI and EII scores. However, generally, SPI values are lower for districts in Marathwada and Vidarbha as compared to other districts. SII index lies closer below 0.3 with few exceptions like Mumbai city and suburban districts, Latur. Similarly, the EII scores are lower than EPI scores for most of the districts. Both highlight the scope for infrastructural investment at district level.

Table 1.2 : Ranking with Local min max (Mumbaicity+Suburban, Thane+Palghar)_2023								
Sr. no.	Name of the district	EPI	EII	SPI	SII	DDI score	DDI ranking	HDI_2011 categorization
1	Mumbai-city and suburban	0.55	0.3	0.47	0.79	0.5	1	Very high
2	Pune	0.64	0.14	0.53	0.48	0.39	2	Very high
3	Sindhudurg	0.35	0.67	0.53	0.11	0.34	3	Very high
4	Nagpur	0.49	0.17	0.62	0.24	0.33	4	Very high
5	Raigad	0.49	0.21	0.81	0.14	0.33	5	Very high
6	Kolhapur	0.46	0.15	0.57	0.22	0.31	6	Very high
7	Palg+Thane _Comb	0.8	0.13	0.41	0.13	0.27	7	Very high
8	Sangli	0.14	0.51	0.57	0.09	0.25	8	Very high
9	Nashik	0.37	0.06	0.53	0.13	0.19	9	Very high
DDI for Districts in 'High' HDI_2011 Category								
10	Ratnagiri	0.41	0.72	0.88	0.51	0.6	1	High
11	Solapur	0.49	0.41	0.52	0.75	0.53	2	High
12	Aurangabad (Chhatrapati Sambhaji Nagar)	0.58	0.3	0.34	0.89	0.48	3	High
13	Satara	0.48	0.32	0.74	0.45	0.48	4	High
14	Wardha	0.66	0.64	0.19	0.43	0.43	5	High
15	Akola	0.33	0.19	0.55	0.51	0.36	6	High
16	Ahmednagar	0.27	0.13	0.87	0.43	0.34	7	High
17	Jalgaon	0.32	0.41	0.62	0.02	0.21	8	High

DDI for Districts in 'Medium' HDI_2011 Category								
18	Chandrapur	0.58	0.68	0.36	0.89	0.6	1	Medium
19	Bhandara	0.47	0.83	0.74	0.41	0.59	2	Medium
20	Gondia	0.48	0.69	0.5	0.36	0.5	3	Medium
21	Amravati	0.61	0.41	0.21	0.63	0.43	4	Medium
22	Beed	0.36	0.34	0.38	0.16	0.3	5	Medium
23	Parbhani	0.37	0.11	0.38	0.29	0.26	6	Medium
24	Buldhana	0.13	0.34	0.33	0.2	0.23	7	Medium
25	Yavatmal	0.46	0.23	0.46	0.05	0.22	8	Medium
DDI for Districts in 'Low' HDI_2011 Category								
26	Latur	0.62	0.51	0.73	0.73	0.64	1	Low
27	Jalna	0.63	0.6	0.7	0.44	0.58	2	Low
28	Hingoli	0.54	0.52	0.74	0.38	0.53	3	Low
29	Washim	0.65	0.43	0.87	0.29	0.51	4	Low
30	Gadchiroli	0.39	0.55	0.46	0.33	0.43	5	Low
31	Osmanabad/ Dharashiv	0.25	0.66	0.41	0.45	0.42	6	Low
32	Dhule	0.84	0.22	0.71	0.21	0.41	7	Low
33	Nanded	0.85	0.11	0.56	0.45	0.39	8	Low
34	Nandurbar	0.57	0.26	0.33	0.33	0.36	9	Low

As shown in the above table, Mumbai-city and Mumbai suburban districts (jointly) stands first among the districts which were in the 'very highly developed' category based on HDI 2011. Ratnagiri and Chandrapur lead the category of 'highly developed' and 'medium developed' districts category. Latur continues to rank first among the low developed districts in terms of HDI 2011.

As mentioned above, the difference in DDI (2022) and DDI (2023) can not be completely attributed to the improvement in the performance of districts due to methodological differences and similarly, changes in the performance of various districts in the category can influence the relative ranking of all other districts. Acknowledging these, Washim, Sindhudurg and Bhandara reported more than 4 position jump in their respective categories. Washim's rank based on DDI(local) in Low-HDI category was 9 in 2022. It improved to 4 in 2023. Per capita NDP of the district registered an impressive growth of 18 percent during 2020-21 to 2021-22. Around 93 percent of the children had weights in the normal range. The number of hospital beds available also saw an increment from 1826 in 2022 to 3224 in 2023 as per DSER data. Similarly, Sindhudurg was ranked lowest, at 9 in the Very high-HDI category in 2022. DDI(local)scores for Sindhudurg have improved to be ranked at 3 in 2023. With Districts per capita NDP registering 5 percent growth, the district also topped the category for having the highest proportion of constructed homes under PMAY-G.

Part B : Districts' Progress on Select Sustainable Development Goal Indicators





Introduction

The DDI adopts a macro view to evaluate a district's performance in terms of various economic and social indicators as well as infrastructure capacity. Such composite indices provide the macro overview of the achievements of the concerned district. However, some sectors are more important than others to determine districts' ability to grow sustainably which warrants a micro or a sector-specific analysis. Arguably, the significance of specific sectors for the local economy depends on the geographical & weather characteristics, availability of natural resources etc. However, theoretical considerations and empirical evidence suggest the universality of certain sectors for sustained growth irrespective of the composition of the local economy. The United Nations Sustainable Development Goals (SDGs) framework identifies and accords significance to such sectors. The United Nations (UN) General Assembly in September 2015, adopted 17 SDGs and 169 targets to achieve economic, social and environmental sustainable development. These goals provide a shared blueprint for peace and prosperity.

People, planet, prosperity, peace and partnership are the key clusters around which these 17 SDGs are designed. SDGs related to People broadly aim to end poverty and hunger in all forms and ensure dignity and equality. SDGs linked with Planets aspire to protect the planet's natural resources and climate for future generations. SDG-16 specially envisages to foster peaceful, just and inclusive societies. The scope of prosperity is broad enough to ensure prosperous and fulfilling lives in harmony with nature. The below figure depicts the categorization of SDGs in 5Ps.

Figure 2.1 : Alignment of the Sustainable Development Goals with the 5P



Source: National report on the implementation of the 2030 Agenda for Sustainable Development Portul, 2017

The 2030 Agenda for Sustainable Development sets forth an action plan for people, planet and prosperity with an overriding principle of "leaving no one behind", while ensuring that the goals and targets are met for all countries and all people (UN 2015d). The goals of eradicating extreme poverty (surviving on less than $2.15 per person per day) and zero hunger have rightfully received the top positions in the list of 17 goals. (Trends G. 2017). The 18th century's Industrial revolution along with international trade brought in stable growth in material prosperity which was quite unprecedented in human history. Yet, a reasonably large section of the world's citizens even in the 21st century is living at or below the physical subsistence level. Undoubtedly, coordinated and integrated efforts are crucial to fight against this medieval-age character of human society. However, the conception of poverty and hunger is not limited to only the availability of food. SDG 1 and 2 deal with access to social protection and economic resources, removal of all types of deprivation and malnutrition among other issues.

A consensus has been built among various researchers and policy makers that SDGs cannot be looked at in isolation. Work on one SDG very much impacts work on other and related SDGs. David Le Blanc

of the United Nations Department of Economic and Social Affairs once opined that lack of integration across sectors in terms of strategies, policies, and implementation has long been perceived as one of the main pitfalls of previous approaches to sustainable development. Using the tools of network theory, or cross-impact matrix (Weitz and Trimmer (2019)), researchers have established interlinkages between different SDGs conceptually and empirically. Recognition of complementarities between different SDGs and targets is pivotal to accelerate the pace of achieving these targets and goals. SDGs ensure that progress in one goal creates a positive impact on others. The order of the SDGs reflects their interconnectedness and the understanding that progress in one goal is essential for achieving progress in others. By following this integrated approach, the framework encourages holistic thinking and action, promoting a more comprehensive and effective response to the challenges of sustainable development.

Choice of SDGs

Goal 1 (poverty and malnutrition eradication) has a bi-directional relationship with Goal 3, which promises healthy lives and promotes well-being for all at all ages. Health is defined by the World Health Organisation (WHO) as 'a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity'. Healthy life is one of the most desirable functioning in Prof. Amartya Sen's capability framework. It is perceived to be vital to exercise other freedoms and own agency. Returns on education and chances to be creative and innovative are maximized for healthy individuals. Both are evidently necessary to support poverty eradication efforts (Howden-Chapman 2017).

Life expectancy has increased substantially across all countries in the last century. However, widening economic and social inequalities, rapid urbanization, the continuing burden of HIV and emerging challenges such as noncommunicable diseases poses challenges to universal health coverage. The targets set by the UN under this SDG deal with maternal, child, and neonatal mortality. The UN has also taken cognizance of deaths caused by substance abuse, road traffic and the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases, hepatitis, water-borne diseases, and other communicable diseases while expressing concerns about the death led by hazardous chemicals and air, water and soil pollution and contamination. It strongly advocates universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all while supporting the research and development of vaccines and medicines.

The present study plans to give paramount importance to maternal health with the recognition that maternal health can be an indicator of health present as well as future generations. Malnourishment among women and children (0-5 years age group) are the results of various under-developed issues such

as poverty, poor functioning of health systems, and regressive social practices prioritizing women and children health outcomes the least. Anemia during pregnancies poses a greater risk of complicated delivery and higher mortality rates. Anemia therefore can be seen as a major obstacle in the target 3.1 which is reduction of the global maternal mortality ratio to less than 70 per 100,000 live births by 2030.

In addition, as admitted by the UN, most maternal deaths are preventable with advances in medical science and technology. Better quality care in pregnancy, and during and after childbirth is essential for the health of the mothers as well as newborn babies. Births attended by skilled health professionals can significantly reduce complications in the pregnancy and risks of infection for the babies. High maternal mortality rate, therefore shows the gaps or failures of the health systems, which needs urgent attention. SDG India index developed by NITI Aayog1 shows that Maharashtra is among the 'Front Runner states' in achieving targets related to SDG3 with the score of 83 in 2020. However, parallel to overall development, there exist district-wise variation in the status of health outcomes and health related infrastructure. With this perspective, inter-districts and district-wise temporal comparison is carried out for the following parameters :

1) Prevalence of anemia among women in the reproductive age group
2) Mothers who had at least 4 antenatal care visits (in percent)
3) Mothers who consumed iron folic acid for 100 days or more when they were pregnant (in percent)
4) Mothers who received postnatal care from a doctor/nurse/LHV/ANM/midwife/other health personnel within 2 days of delivery (in percent))
5) Institutional births (in percent)
6) Households with any usual member covered under a health insurance/financing scheme (in percent)
Health and well-being are dependent on the achievement of other SDGs. Among others, SDG 6, which deals with water and sanitation, has a direct and stronger link with SDG 3. A regular supply of potable water and clean surroundings reduces various disease burdens including diarrhoeal disease, respiratory infections, malnutrition, malaria, soil-transmitted diseases. Lower respiratory infections, one of among the main causes of death among children under 5 years can be prevented by encouraging hand-washing with soap. Intense and repeated infections affect the physical growth, cognitive development and nutritional status of children (WHO, 2019).
1. ODF Plus Villages as on 13th February 2024
2. Population living in households with an improved drinking-water source1 (in percent)
3. Population living in households that use an improved sanitation facility2 (in percent)

3. https://sdgindiaindex.niti.gov.in/#/state-compare?goal=AllGoal&area=IND027&timePeriod=2020

Analytical Framework

The Sustainable Development Goals District Indicator Framework 2021 provided by the Directorate of Economics and Statistics, Planning Department, Government of Maharashtra has been referred to carry out the district-level analysis (Appendix I) to assess districts' performance with respect to selected SDGs. District administration is often in-charge of the creation and maintenance of infrastructure to deliver services related to health, water, and sanitation. The central government's Aspirational District Programme also highlights the potentiality of district administration to drive local transformation. With this rationale, the present study evaluated the performance of districts with respect to selected health outcomes and infrastructure created to deliver health related services. This analysis will be further complemented by the districts' performance in delivering SDG 6 targets which play a pivotal role in realizing health outcomes.

Data Sources

The choice of the variables for the analysis are contingent on the availability of the data and theoretical justification. The National Family Health Surveys (NFHS) (Round 4 (2015-16) and Round 5 (2019-21) are used for inter-district as well as intra-district comparison. NFHS rounds are large-scale nationally representative surveys which capture comprehensive data on topics including demography, family planning, reproductive health, nutrition, and various other health-related issues. The NFHS-4 (2015–16) covered samples from 640 districts, 29 states and 6 union territories. The recent NFHS-5 was designed to provide information for 707 districts, 28 states, and 8 union territories. NFHS-4 interviewed 699,686 women of reproductive age (15–49 years) from 601,509 households and NFHS-5 interviewed 724,115 women from 636,699 households, with a response rate of 97 percent. As NFHS-4 does not include data for Thane and Palghar, comparison between these two rounds is not possible.

Districts' Performance on select Health Outcome

NFHS rounds provide district level estimates on various health indicators such as Neonatal Mortality Rate (NNMR), Infant Mortality rate (IMR) and Under-five mortality rate (U5MR) and Anaemia among Children and Adults. The present study chose to assess performance of Maharashtra's districts with respect to women's health, given its strong linkages with the first two targets of SDG-3 related to maternal and Neonatal & child mortality. Daru et al. (2018) have estimated the odds of maternal death were twice as high in those with severe anaemia compared with those without severe anaemia using a dataset of 312,281 pregnancies in 29 countries, including India from the WHO Multicountry Survey.

The World Health Organization (WHO) refers to anemia as a disorder in which the number of red blood cells or hemoglobin concentration within the red blood cells is below normal resulting in the decreased

oxygen-carrying capacity of blood. hemoglobin plays the vital role of transporting oxygen from the lungs to the tissues and carries carbon dioxide from tissues back to lungs. anemia is defined as a hemoglobin concentration below a specified cut-off point. This may vary based on an individual's age, gender, physiological status, smoking habits, etc. The WHO defines anemia in pregnant women as a hemoglobin concentration <11.0 g/dl, and anemia in non-pregnant women as a hemoglobin concentration <12.0 g/dl.

Anemia can have significant consequences on physical and mental health, and economic and social well-being of any woman. The most common physical symptoms of anemia include fatigue, weakness, and shortness of breath, which can lead to decreased quality of life, making it difficult for women to perform daily activities and work. Anemia can also cause headaches, pale skin, irritability, and a rapid heartbeat. Studies have also shown that anemia is associated with poor cognitive function and memory problems. These physical and cognitive deficiencies resulting from anemia have a significant impact on educational outcomes, productivity and overall life of individuals. Furthermore, anemia in pregnant women is associated with an increased risk of maternal mortality, preterm birth, low birth weight, and developmental delays in the baby. Maternal anemia leads to many adverse effects on the fetus including low birth weight to high Infant Mortality Rate (IMR), Child Mortality Rate (CMR). (Sinha D. 2019). Multiple factors contribute to anemia, including nutritional deficiencies, chronic infections, genetic conditions, and poor dietary habits. The most common form of anemia is iron-deficiency anemia, which is often attributed to inadequate dietary intake of iron-rich foods, poor absorption of iron, and blood loss during menstruation or childbirth. Maji et al. (2023) reported an increase in the prevalence of anemia from 53 percent to 57 percent in all women aged 15-49 years between NFHS 4 and 5 at India level.

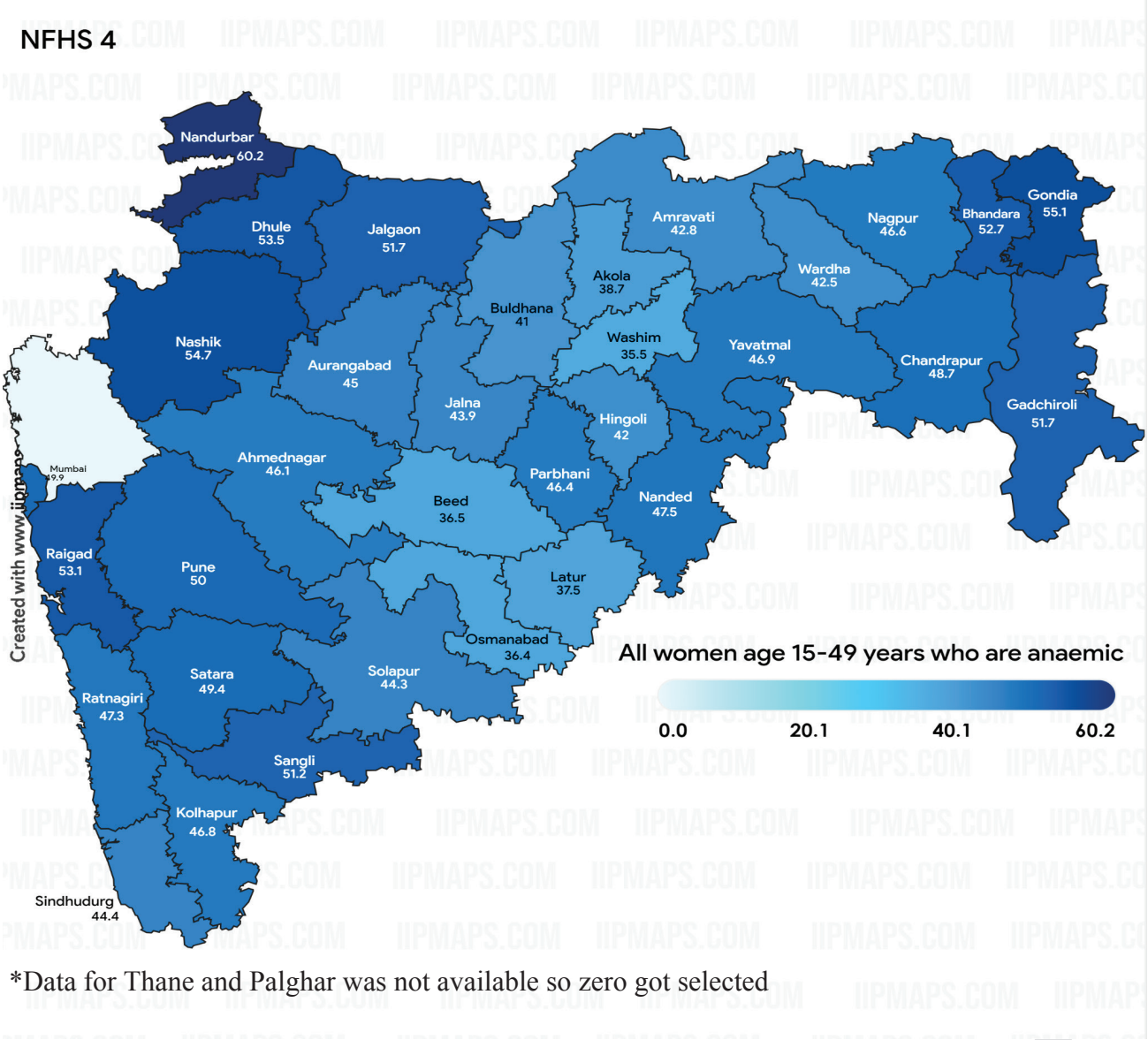
Horton and Ross (2003) estimates a 4.05 percent loss in gross domestic product (GDP) per year for developing countries due to the physical and cognitive health issues resulting from iron deficiency anemia. The losses associated with iron deficiency anemia amount to about 1.2 percent of GDP in India. The Anemia Mukt Bharat[4] initiative aims to raise awareness about the causes and consequences of anemia while advocating for prevention and control measures at all levels. Key focus areas include improving healthcare service delivery, timely diagnosis and treatment, promoting balanced nutrition, fortifying food staples with essential nutrients, implementing supplementation programs, strengthening food security, conducting behavior change communication campaigns, and fostering collaboration across sectors.

4 https://anemiamuktbharat.info/

i) Prevalence of Anemia among Women

NHFS-5 provides data on the percentage of non-pregnant, pregnant anemic women among those selected for anemia testing in the age group of 15-49 years. It is measured by collecting finger stick blood samples from all women aged 15-49 upon seeking consent for testing and by administering the on-site haemoglobin test.

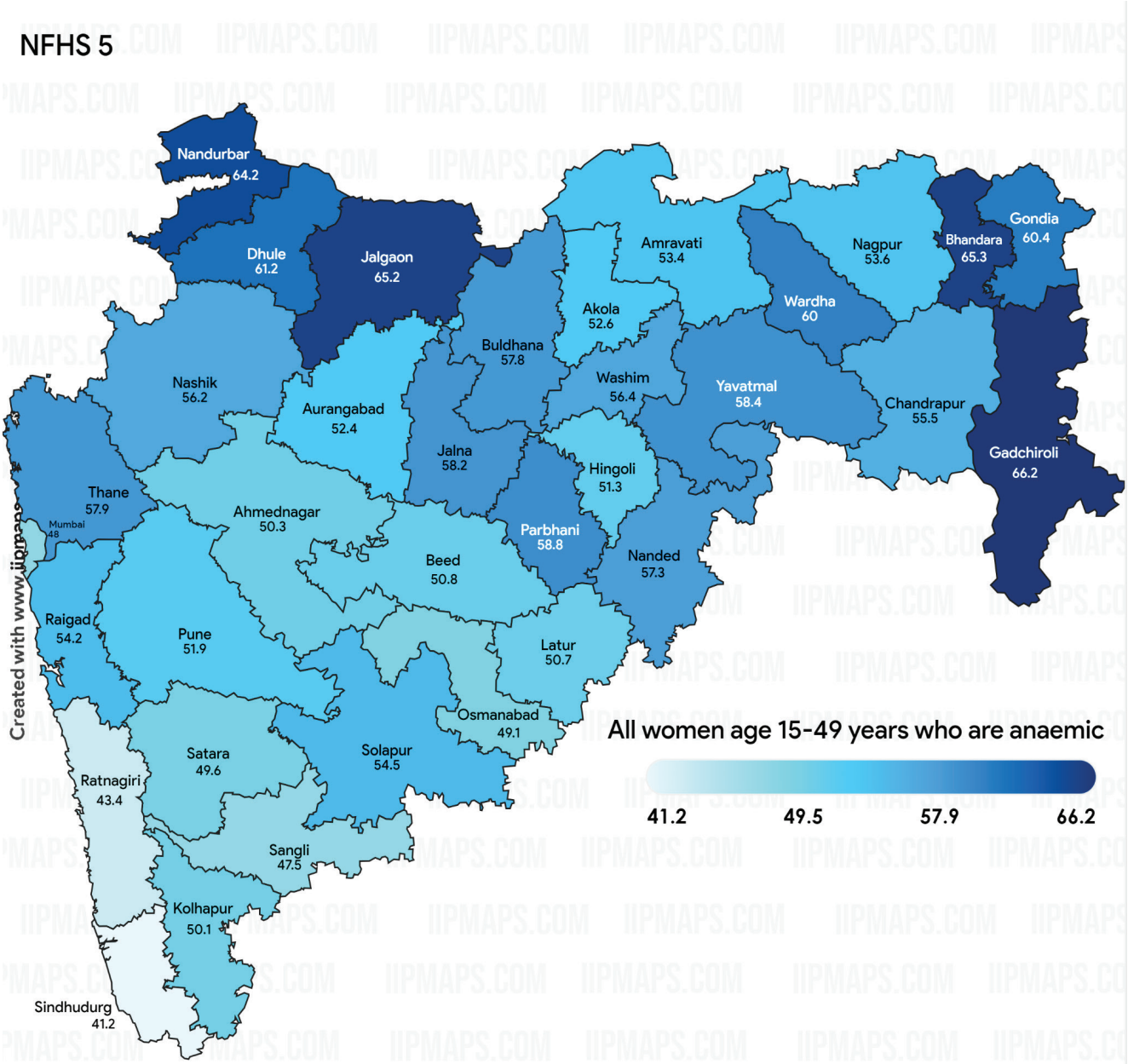
Figure 2.2 : District-wise Percentage of Anemic Women (15-49 years) (2015-16)



*Data for Thane and Palghar was not available so zero got selected

The data reveals varying levels of anemia prevalence among women aged 15-49 years across different districts of Maharashtra. Nandurbar district stands out with the highest anemia rate at 60.2 percent in 2015-16. Other districts with notably high rates include Gondia (55.1 percent) and Dhule (53.5 percent). Conversely, some districts exhibit lower anemia rates below 40 percent, such as Washim (35.5 percent), Osmanabad (36.4 percent), and Beed (36.5 percent). These variations show the importance of targeted healthcare interventions tailored to address anemia prevalence in specific regions.

Figure 2.3 : District-wise Percentage of Anemic Women (15-49 years) (2019-21)



The prevalence of anemia increased from 2015-16 to 2019-21 in some districts. Notably, districts like Bhandara, Gadchiroli, Dhule, Jalgoan, Gondiya and Nandurbar exhibit alarmingly high prevalence of anemia, exceeding 60 percent. Conversely, districts such as Mumbai City, Sindhudurg and Ratnagiri demonstrate comparatively lower anemia (below 45 percent). However, a significant portion of districts, including Akola, Amravati, and Buldhana show moderate anemia rates ranging from 50 percent to 60 percent, highlighting the widespread nature of the issue.

Districts' Performance in Delivering Select Health Services

This section presents inter-district comparison in delivering selected health services to achieve the listed SDG-3 targets above.

Antenatal, intranatal, and postnatal care is the single most important determinant to reduce infants' as well as mothers' morbidity and mortality. The main purposes of antenatal care are to prevent certain complications, such as anemia, and identify women with established pregnancy complications for treatment or transfer and therefore try to reduce maternal mortality and morbidity. Inadequate access and underutilization of modern health services are among the prime reasons for the high maternal mortality rate in India, followed by high illiteracy among females, early marriages, high cost of the low quality services, personal characteristics, and malnutrition especially among the rural and tribal populations. Antenatal check-ups can increase the probability of women giving birth in a medical institution. Mother's age and education and child's birth order also have strong effects on the likelihood of institutional delivery, along with the household standard of living.

Table 2.1 : Comparison of Districts based on delivery of various health services to mothers

District	Mothers who had at least 4 antenatal care visit (in percent)	Rank	Mothers who consumed iron folic acid for 100 days or more when they were pregnant (in percent)	Rank	Mothers who received postnatal care from a health persons^ within 2 days of delivery (in percent)	Rank
Osmanabad	89.2	1	66.1	4	94.4	6
Mumbai City	87.1	2	72.4	1	90.6	14
Gadchiroli	86.8	3	70.8	2	91.5	10.5
Palghar	86.3	4	65.3	5	97.0	1
Raigad	83.1	5	61.6	7	93.0	8

Solapur	81.9	6	60.3	10	89.6	18
Kolhapur	81.8	7	58.8	13	95.2	4
Satara	81.7	8	59.5	12	94.5	5
Sangli	80.1	9	58.2	14	95.6	3
Bhandara	79.0	10	64.4	6	87.5	19
Ratnagiri	78.6	11	54.6	18	89.7	17
Ahmednagar	76.6	12	53.3	20	90.9	13
Akola	76.3	13	60.6	9	82.3	26
Sindhudurg	73.4	14	59.6	11	96.7	2
Buldhana	72.7	15	61.2	8	86.7	21
Latur	72.6	16	53.6	19	93.3	7
Mumbai Suburban	72.2	17	54.8	17	91.5	10.5
Amravati	71.7	18	38.1	28	80.2	27
Nagpur	71.4	19	57.1	15	91.4	12
Wardha	70.4	20	50.6	21	89.9	16
Thane	70.2	21	54.9	16	87.2	20
Pune	68.6	22	50.2	22	84.2	23
Chandrapur	68.5	23	69.2	3	92.3	9

Yavatmal	66.9	24	41.7	26	85.6	22
Hingoli	66.6	25	23.2	33	82.4	25
Nashik	66.4	26	43.4	25	76.5	30
Gondia	66.2	27	46.0	23	90.0	15
Dhule	63.2	28	30.7	29	77.2	29
Washim	60.0	29	44.5	24	83.4	24
Jalgaon	58.4	30.5	28.9	30	74.5	33
Jalna	58.4	30.5	27.2	32	74.0	35
Nandurbar	58.2	32	38.3	27	74.4	34
Aurangabad	57.2	33	14.5	36	76.4	31
Beed	56.8	34	28.4	31	79.8	28
Nanded	53.5	35	21.7	34	76.1	32

Source : NHFS-5

^ doctor/nurse/LHV/ANM/midwife/other health personnel

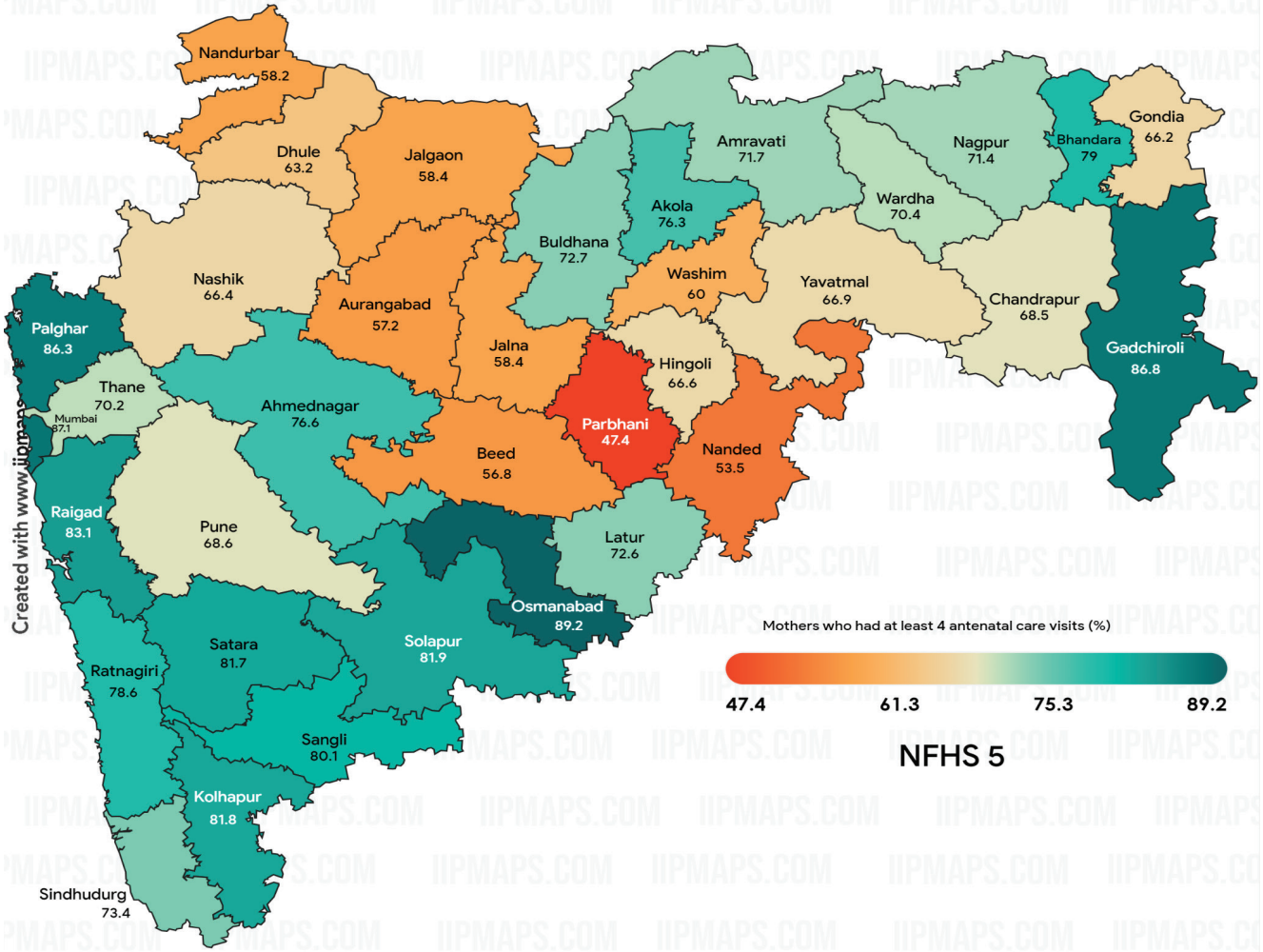
Table 2.1 (Heat map) shows the status and relative rank of each district in delivering the key health services to pregnant women. As evident from Table 2.1, districts like Osmanabad, Gadchiroli, Palghar which often falls in the category of low developed districts based on HDI or DDI record impressive performance regarding delivery of health services. Based on the data from NFHS-5 (2019-20), concerning trends in maternal healthcare indicators have been identified in districts, including Nandurbar, Aurangabad (Chhatrapati Sambhaji Nagar), Beed, Nanded, and Parbhani. In Nandurbar, there is a significant deficiency in the percentage of mothers attending at least 4 antenatal care visits, as well as those who consumed iron folic acid for 100 days or more during pregnancy and received postnatal care within 2 days of delivery. Similar pattern of underperformance is observed in other districts like Aurangabad, Beed, Nanded, and Parbhani.

i) Mothers who had at least 4 antenatal care visits

The variable "Mothers who had at least 4 antenatal care visits (in percent)" shows the percentage of pregnant women who went to the doctor at least four times while they were pregnant. These visits are important to make sure both the mother and the baby stay healthy. A higher percentage means more pregnant women are getting the care they need, which is good for their health and the health of their babies.

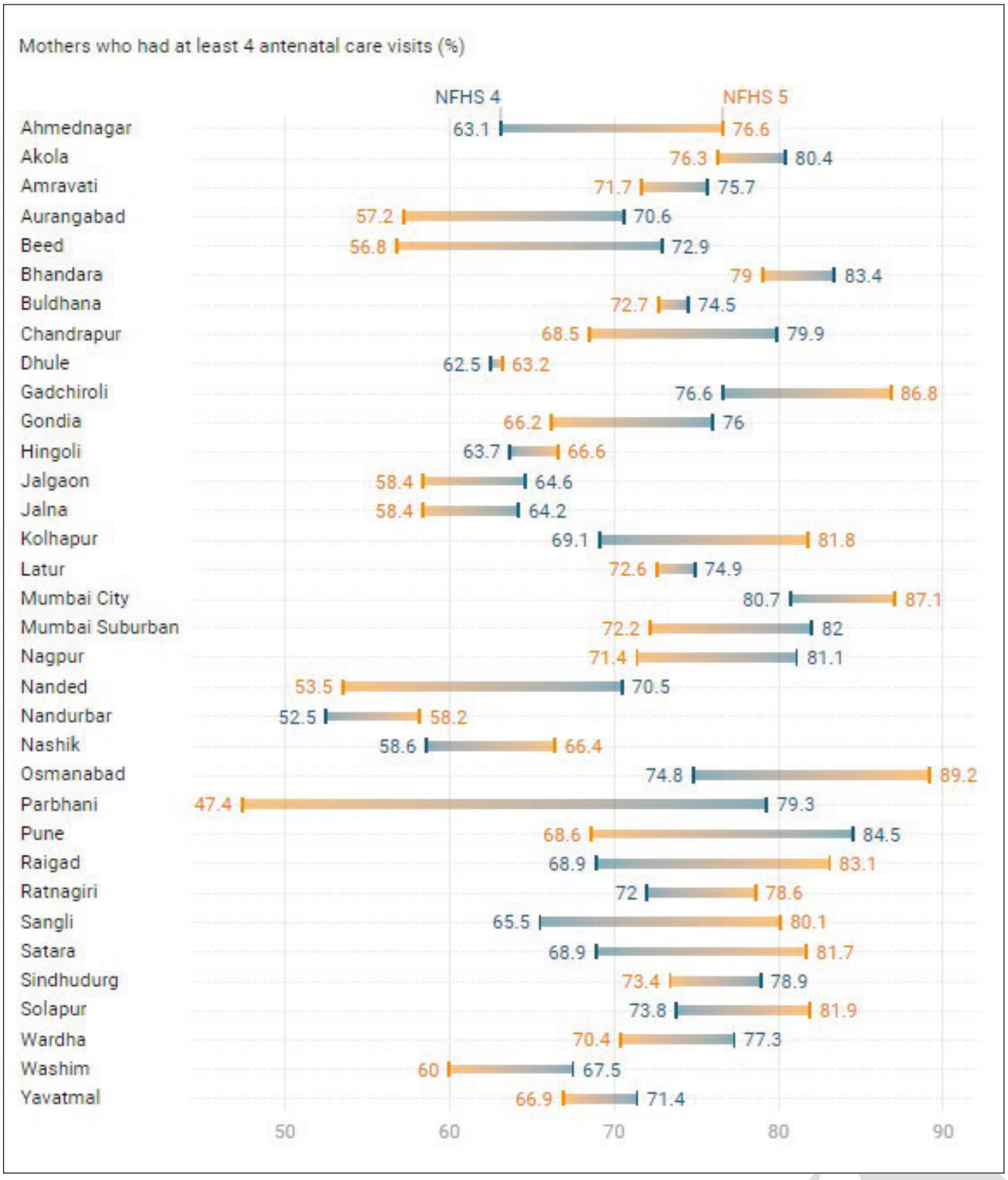
Antenatal care (ANC) visits play a critical role in ensuring the health and well-being of both expectant mothers and their babies. A recent cross-sectional study conducted in urban and rural areas of Delhi, India, involving 200 postpartum women, shed light on the utilization and determinants of comprehensive ANC. The findings revealed a concerning gap, with nearly half of the participants (47 percent) lacking comprehensive ANC utilization, indicating significant hurdles in accessing essential maternal health services. Moreover, deficiencies were identified in the content of ANC, particularly in counseling, complication readiness, dietary advice, and physical activity guidance. These shortcomings underscore the urgent need for improvements in the quality and comprehensiveness of antenatal care services. Furthermore, the study highlighted a correlation between lower maternal education levels and reduced awareness of ANC, which subsequently impacted ANC utilization. This emphasizes the pivotal role of education in promoting maternal health awareness and encouraging the uptake of antenatal care services.

Figure 2.4 : Percentage of Women receiving at least four Antenatal Care by Districts (2019-21)



As shown in the above map based on NFHS-5 (2019-21), districts like Gadchiroli, Osmanabad and Palghar have higher the percentage of women having at least four antenatal care visits. This proportion is substantially lower in districts like Nandurbar, Jalgoan, Jalna, Beed, Nanded and Parbhani has the lowest number of mothers receiving these visits. More alarming, districts like Aurangabad, Beed, Chandrapur, Gondia, Nagpur, Nanded, Parbhani registered a decline in the percentage of women receiving these visits from 2015-16. Interventions targeting poverty alleviation, infrastructure development, and education may be helpful.

Figure 2.5 : District-wise Comparison Of Mothers Who Had At Least 4 ANC Visits In NFHS-4 & NFHS-5



As shown in the above graph based on NFHS-4 (2015-16), districts like Pune, Bhandara, and Mumbai had a higher percentage of women having at least four antenatal care visits. This proportion was substantially lower in districts like Nandurbar and Nashik.

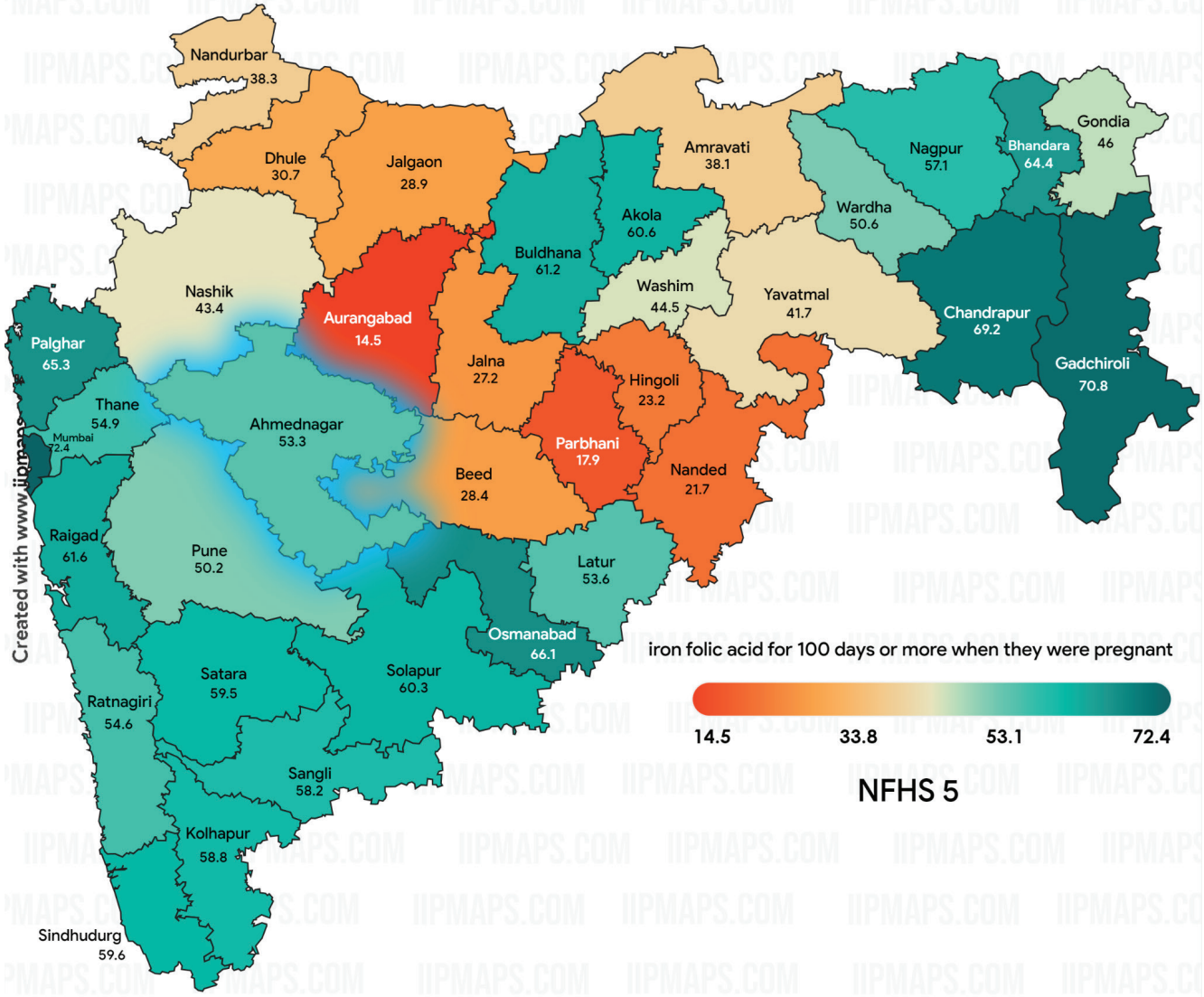
In the transition from NFHS 4 to NFHS 5 in Maharashtra, there are notable shifts in the percentage of mothers who had at least 4 antenatal care visits across various districts. Among the districts, Osmanabad emerges as a standout performer, showcasing a remarkable increase from 74.8 percent in NFHS 4 to 89.2 percent in NFHS 5. This considerable rise underlines significant improvements in maternal healthcare access and utilization within the region. Conversely, Parbhani demonstrates the lowest performance, witnessing a notable decrease from 79.3 percent in NFHS 4 to 47.4 percent in NFHS 5. Moreover, Chandrapur exhibits a noteworthy decrease from 79.9 percent in NFHS 4 to 68.5 percent in NFHS 5, indicating a substantial drop in antenatal care visits, which may require attention to understand the underlying factors contributing to this decline and address them effectively. Districts such as Ahmednagar, Beed, Gondia, Nagpur, Nanded also registered a considerable drop from 2015-16 to 2019-21. The drop can be attributed to the health infrastructure catering to rising population, higher rate of urbanization where registration for the antenatal services may not be as strong as in rural areas where Accredited Social Health Activist (ASHA) workers personally follow-up with pregnant ladies, a general drop in fertility rates or the out-migration.

ii) Mothers consuming iron folic acid for at least 100 days during pregnancy

Iron folic acid (IFA) supplementation is a crucial component of prenatal care aimed at preventing and addressing iron deficiency anemia and reducing the risk of any birth defects of the central nervous system in newborns. During pregnancy, the demand for iron increases to support the growth and development of the fetus, making iron supplementation essential for maintaining maternal and fetal health. Folic acid is also vital for preventing brain and spinal cord birth defects. The World Health Organization (WHO) recommends that pregnant women consume iron-folic acid supplements for a minimum of 100 days during pregnancy to ensure optimal health outcomes for both the mother and the baby.

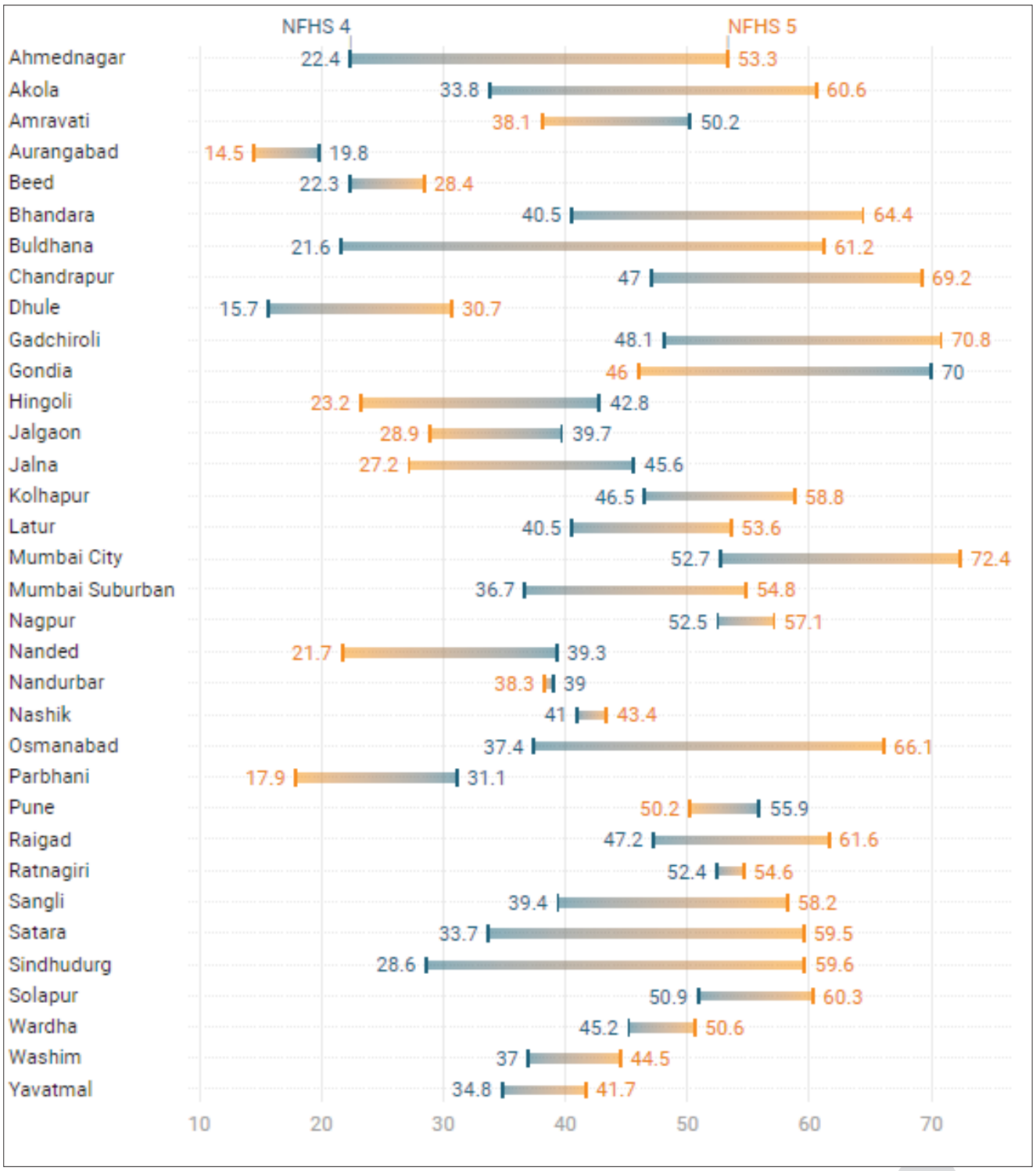
Higher percentages indicate better adherence to prenatal care recommendations and are associated with improved maternal and neonatal health outcomes. Conversely, lower percentages may indicate barriers to accessing healthcare services, lack of awareness, or challenges in adhering to the prescribed supplementation regiment.

Figure 2.6 : District-wise Percentage of pregnant women having consumed iron folic acid (2019-21)



As shown in the above map based on NFHS-5 (2019-20), districts like Gadhchiroli, Chandrapur, and Mumbai have a higher percentage of Mothers who consumed iron folic acid for 100 days or more when they were pregnant. This proportion is substantially lower in districts like Aurangabad, Parbhani and Nanded.

Figure 2.7 : District-wise Percentage of Pregnant Women consuming iron folic acid (NFHS - 4 & 5)



As shown in the above graph based on NFHS-4 (2015-16), districts like Gondia, Pune, and Mumbai have a higher percentage of Mothers who consumed iron folic acid for 100 days or more when they were pregnant. This proportion is substantially lower in districts like Aurangabad, Palghar & Thane, and Dhule. When compared with NFHS 4, percentage of pregnant ladies who consumed iron folic acid for 100 days or more in several districts in Maharashtra exhibit notable changes in 2019-21.

Mumbai City emerges as a significant performer, with a substantial increase from 52.7 percent in NFHS-4 to 72.4 percent in NFHS-5. Similarly, Buldhana district registered an impressive growth from 21.6 percent to 61.2 percent Ahmednagar and Sinhudurg were other two districts witnessing phenomenal growth. The former district increased the percentage of women availing the medicines from 22.4 percent in 2015-16 to 53.3 percent in 2019-21, while the later experienced a jump from 28.6 percent to 59.6 percent in this period. These were followed by Dhule, Akola and Dharashiv. Conversely, Jalna, Parbhani Nanded and Hingoli recorded a significant fall during this period. This decline highlights potential challenges or barriers hindering access to and utilization of prenatal supplements within the region.

iii) Mothers receiving professional postnatal care within 2 days of delivery

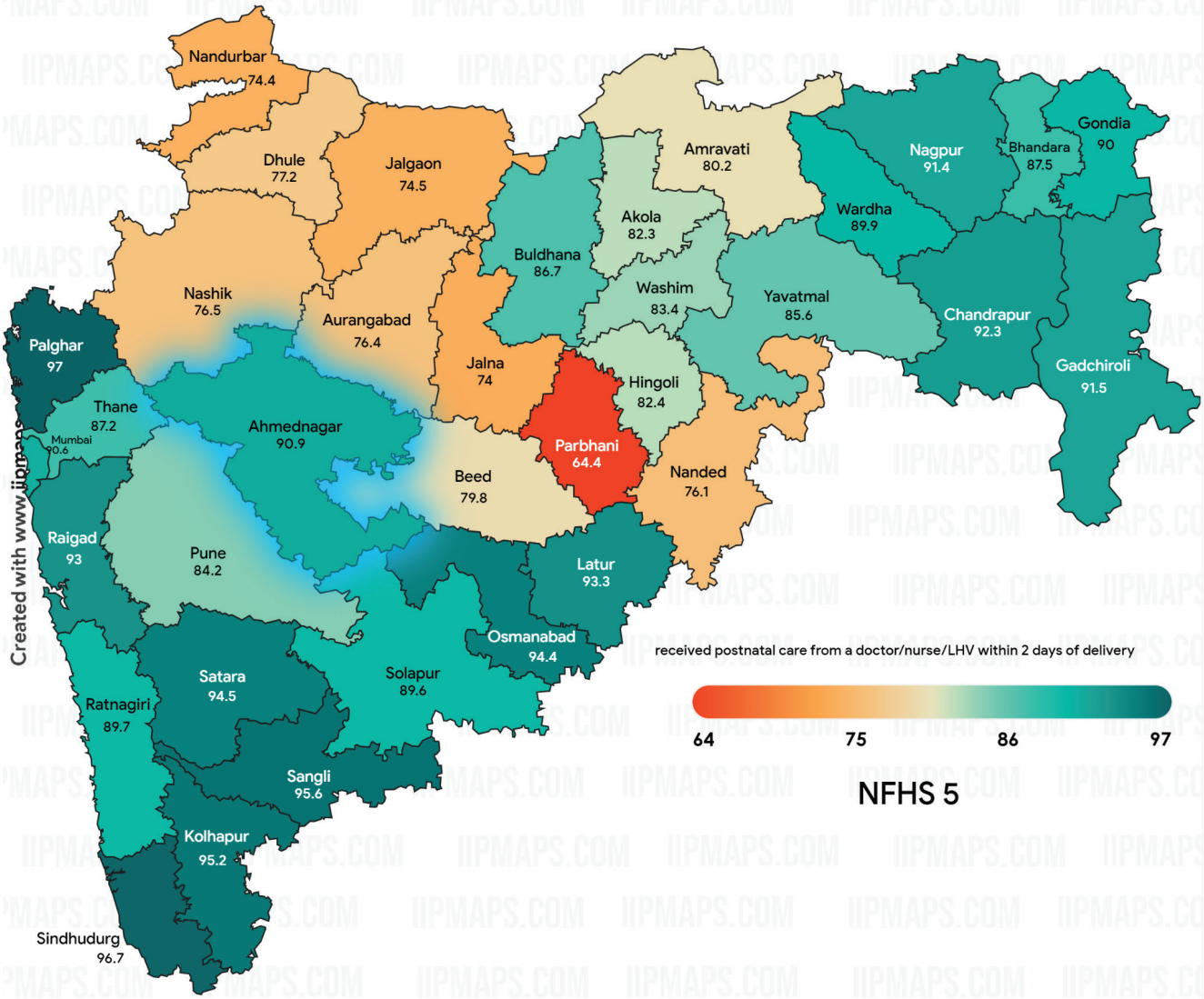
Postnatal care, also known as postpartum care, is essential for monitoring the health and well-being of both the mother and the newborn in the critical period following childbirth. Receiving postnatal care promptly after delivery allows healthcare providers to assess and address any potential complications or health issues that may arise during the postpartum period. This care may include physical examinations, monitoring vital signs, evaluating postpartum bleeding, assessing breastfeeding, providing counseling on newborn care and family planning, and addressing any concerns or questions the mother may have.

The presence of trained healthcare professionals such as doctors, nurses, Lady Health Visitors (LHVs), Auxiliary Nurse Midwives (ANMs), and midwives is crucial in ensuring the quality and effectiveness of postnatal care. These professionals are equipped with the knowledge and skills to identify and manage postpartum complications, provide appropriate medical interventions, and offer support and guidance to mothers and families during the early postpartum period.

Monitoring the percentage of mothers who receive postnatal care within two days of delivery provides insights into the accessibility and utilization of postpartum healthcare services. Higher percentages suggest better access to healthcare services and are associated with improved maternal and newborn health outcomes. Conversely, lower percentages may indicate barriers to accessing healthcare, such as geographical constraints, socioeconomic factors, cultural beliefs, or health system deficiencies.

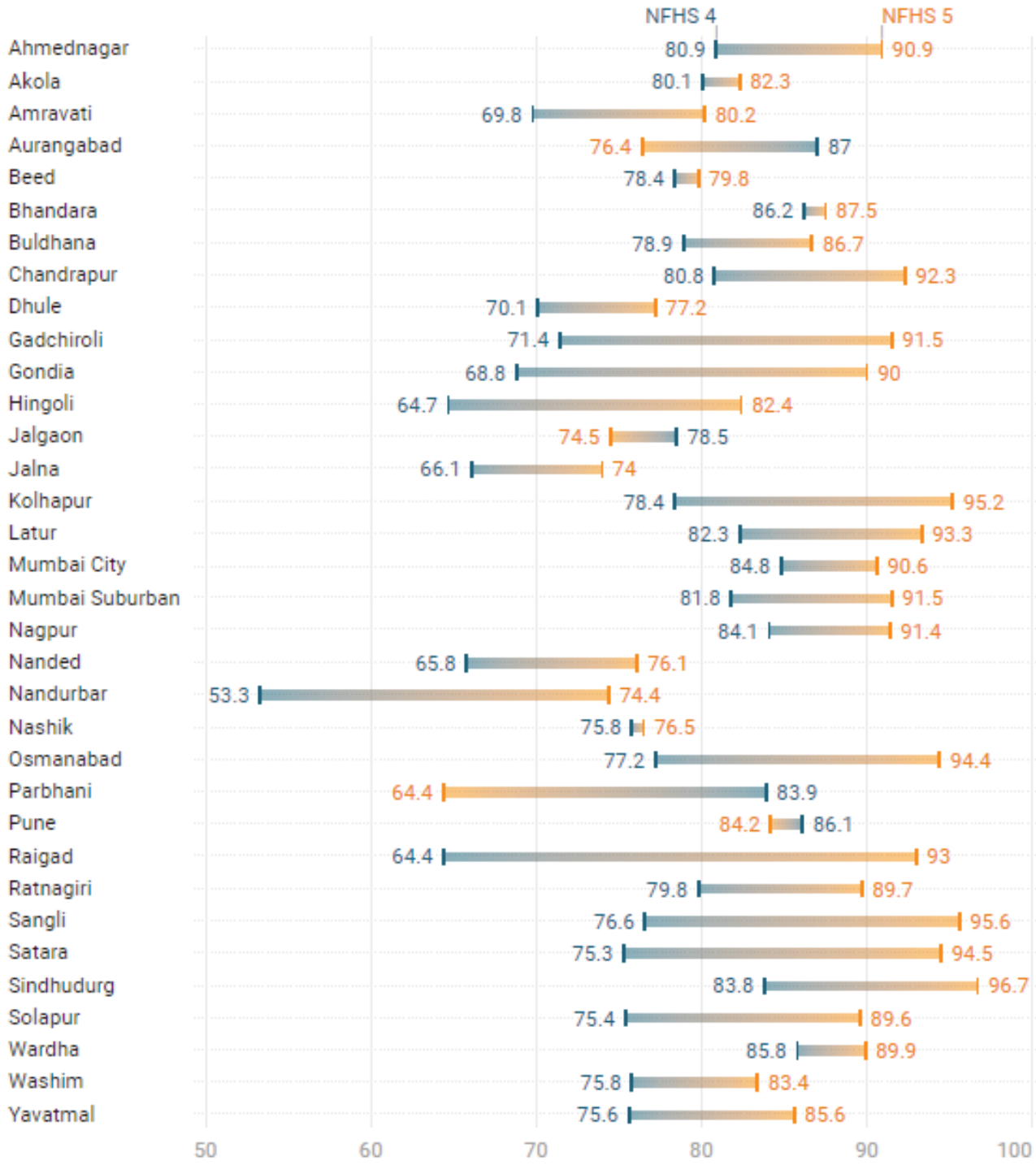
Efforts to increase the proportion of mothers receiving timely postnatal care are crucial for reducing maternal and neonatal mortality rates, preventing postpartum complications, and promoting the overall health and well-being of mothers and newborns. This variable is therefore important for assessing the effectiveness of postnatal care programs, identifying areas for improvement, and informing policy and healthcare interventions aimed at enhancing postpartum healthcare delivery.

Figure 2.8 : Percentage of Mothers receiving postnatal care within 2 days of delivery, by Districts (2019-21)



As shown in the above map, based on NFHS-5 (2019-20), districts like Sindhudurg, Sangli, and Palghar have a higher percentage of mothers who received postnatal care from a doctor/nurse/LHV/ANM/midwife/other health personnel within 2 days of delivery (in percent) in 2019-21. This proportion is substantially lower in districts like Parbhani, Jalna, Nanded and Nandurbar.

Figure 2.9 : District-wise Percentage of Mothers receiving postnatal care within 2 days of delivery, (in 2015-16 & 2019-21)



As shown in the above graph, as per NFHS-4 (2015-16), districts like Aurangabad, Bhandara, and Pune have a higher percentage of mothers who received postnatal care from a doctor/nurse/LHV/ANM/midwife/other health personnel within 2 days of delivery (in percent).

This proportion is substantially lower in districts like Nandurbar, Palghar, and Thane. Several districts in Maharashtra demonstrated noteworthy changes during two rounds of NFHS in the percentage of mothers receiving postnatal care from a doctor/nurse/LHV/ANM/midwife/other health personnel within 2 days of delivery.

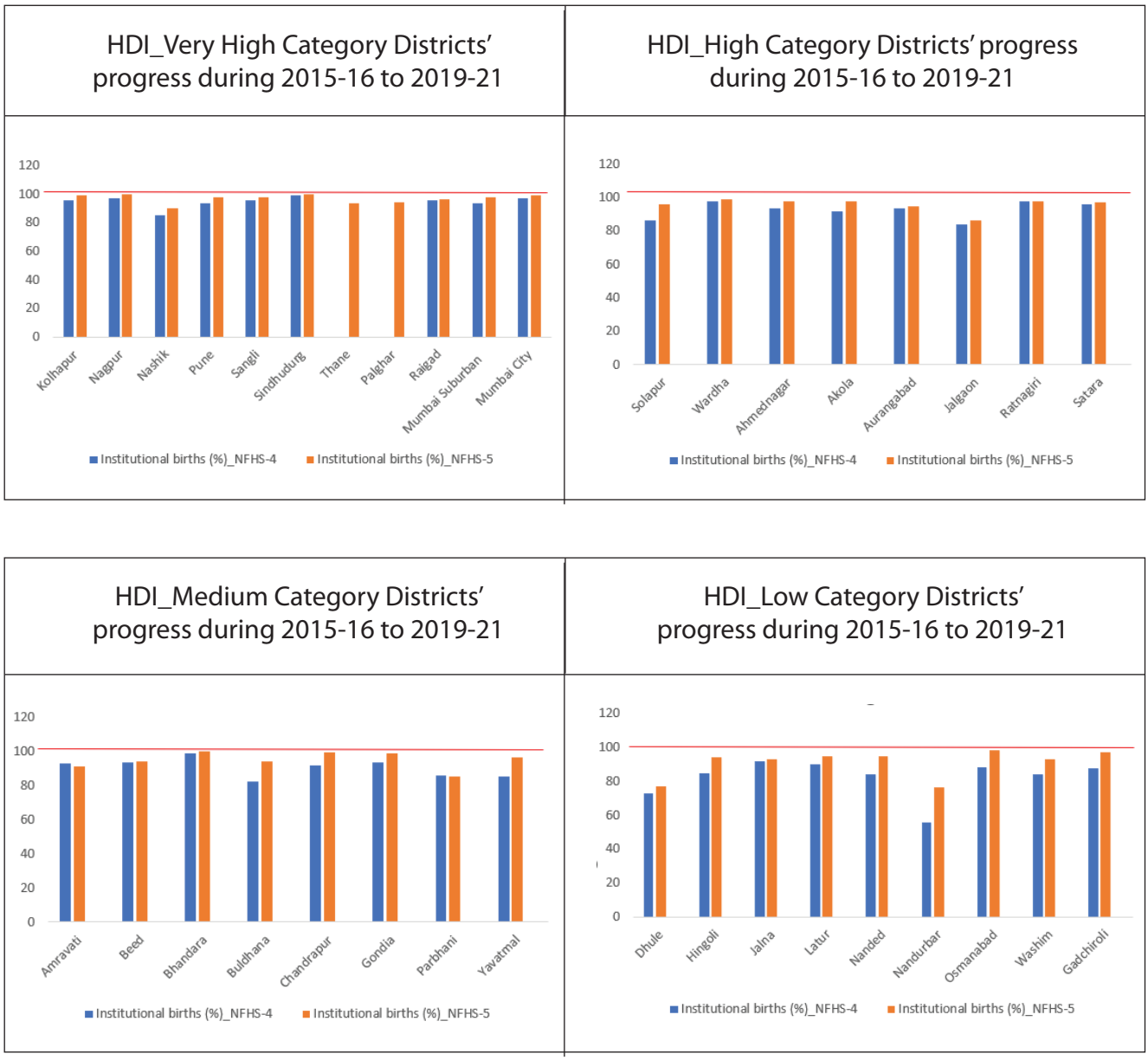
Among the districts, Sindhudurg emerges as a significant performer, with a remarkable increase from 83.8 percent in NFHS 4 to 96.7 percent in NFHS 5. This substantial surge reflects a commendable enhancement in postnatal care services within the region, indicating improved maternal healthcare accessibility and utilization. Districts like Sangli, Kolhapur, Satara also have higher percentage of women receiving postnatal care. Raigad, Nandurbar, Gondia and Gadchiroli district showed improvement during the period of 2015-16 to 2019-21 in reaching out to more mothers with postnatal care. This improvement underscores effective healthcare interventions or initiatives aimed at enhancing maternal and neonatal health outcomes within the district.

Conversely, Parbhani, Aurangabad, Jalgaon and Pune registered a fall in percentage of mothers who received treatment within two days of the childbirth. This shift highlights potential challenges or gaps in postnatal care provision within the district, warranting further investigation and targeted interventions to address underlying factors hindering timely postnatal care access.

iv) Institutional Births

Institutional delivery and avoiding births at home (especially in the absence of professionals) is one of the key and proven interventions to improve maternal health and to achieve the target of lower MMR under SDG-3. Complications that occur during labour, delivery and postpartum period are responsible for a majority of maternal deaths but are avoidable when handled safely by professional doctors. Women's education, parity, exposure of mass media, ANC visits, income and place of residence are some of the important determinants to avail institutional delivery

Figure 2.10 : District-wise Institutional Deliveries by HDI_2011 categorization



Source: NFHS-4 & NFHS-5

The above graphs show the variation in the performance of institutional births across HDI_categories and within each category. Most districts in HDI_high and very high category are very close to the SDG target of 100 percent institutional delivery.

The districts with the highest percentages of institutional births, like Nandurbar, Bhandara, and Sangli, show that they have improved family's access to hospitals for childbirth. Districts like Parbhani, Jalna, and Beed however see fewer women giving birth in hospitals. Inadequate health, transport infrastructure as well poor quality health services could be some of the key reasons for the lower proportion of institutional delivery. Cultural norms or behavioral factors like unawareness could also play a role.

Very High Category Districts' Progress from 2015-16 to 2019-21 in Institutional Births

The data from NFHS-4 (2015-16) and NFHS-5 (2019-20) shows significant advancements in institutional births across various districts of Maharashtra. Sindhudurg and Nagpur have almost achieved the target of full institutional births at 100.0 percent by 2019-21. Similarly, Nashik demonstrates progress from 85.3 percent to 90.5 percent during this period. Pune and Sangli showed substantial progress, with the institutional births ratio of 98 percent in 2019-21 from 93.5 percent and 95.9 percent respectively in the previous round. Overall, these districts demonstrate commendable progress, reflecting the government's commitment to improving maternal healthcare services statewide.

High Category Districts' Progress from 2015-16 to 2019-21 in Institutional Births

Solapur district shows a notable improvement from 86.4 percent to 96.2 percent, showcasing concerted efforts to enhance maternal healthcare access. Wardha maintains a high level of institutional births, with a slight increase from 97.9 percent to 98.8 percent. Similarly, Ahmednagar demonstrates commendable progress, with institutional births increasing from 93.9 percent to 97.9 percent, indicating improved maternal healthcare delivery and uptake. Akola district shows remarkable improvement from 92.0 percent to 97.7 percent, suggesting enhanced maternal healthcare access and utilization. While Aurangabad exhibits moderate progress from 93.5 percent to 94.8 percent, Jalgaon shows a slight increase from 84.2 percent to 86.5 percent, indicating progress in maternal healthcare access and services. Ratnagiri maintains its level of institutional births at 97.8 percent, reflecting stable maternal healthcare services in the district. Finally, Satara district maintains a high level of institutional births, with a slight increase from 96.3 percent to 97.1 percent, indicating consistent maternal healthcare service delivery.

Medium Category Districts' Progress from 2015-16 to 2019-21 in Institutional Births

Amravati district shows a slight decrease from 93 percent to 91.3 percent in institutional births, indicating potential challenges in sustaining maternal healthcare services. Beed district demonstrates a modest increase from 93.7 percent to 94.0 percent, reflecting ongoing efforts to improve maternal healthcare access and services. Conversely, Bhandara exhibits consistently high rates, maintaining full institutional births at 100 percent, showcasing robust maternal healthcare infrastructure and services. Buldhana district shows significant improvement from 82.6 percent to 93.9 percent, indicating enhanced maternal healthcare access and utilization. Chandrapur district demonstrates remarkable progress, with institutional births rising substantially from 91.7 percent to 99.6 percent, suggesting

effective interventions to promote institutional deliveries. Similarly, the Gondia district exhibits significant progress, with institutional births increasing from 93.3 percent to 99.1 percent, indicating successful efforts to improve maternal healthcare services. Parbhani district maintains its level of institutional births at 85.6 percent, reflecting stable maternal healthcare services in the region. Finally, the Yavatmal district shows notable improvement from 85.3 percent to 96.3 percent, indicating enhanced maternal healthcare access and services.

Low Category Districts' Progress from 2015-16 to 2019-21 in Institutional Births

Dhule district shows a modest increase from 72.6 percent to 77.2 percent in institutional births, indicating ongoing efforts to improve maternal healthcare access and services. Hingoli demonstrates significant improvement, with institutional births rising from 84.6 percent to 94 percent, reflecting enhanced maternal healthcare infrastructure and initiatives. Jalna maintains a high level of institutional births, with a slight increase from 92 percent to 92.8 percent, suggesting consistent maternal healthcare service delivery. Latur district exhibits progress from 89.9 percent to 94.7 percent indicating improved maternal healthcare access and utilization. Nanded shows notable improvement, with institutional births increasing from 84.3 percent to 94.8 percent, reflecting effective interventions to promote institutional deliveries. However, the Nandurbar district faces challenges, with institutional births increasing from 55.5 percent to 76.3 percent, indicating potential gaps in maternal healthcare services. Conversely, Osmanabad district demonstrates significant progress, with institutional births rising from 88.2 percent to 98.1 percent, showcasing successful efforts to enhance maternal healthcare access and services. Washim district shows improvement from 84.0 percent to 92.9 percent, indicating enhanced maternal healthcare access and utilization. Finally, the Gadchiroli district exhibits progress, with institutional births increasing from 87.7 percent to 97.3 percent, indicating effective interventions to promote institutional deliveries.

v) Coverage under health insurance/financing schemes

With the rising cost of medical services and higher out of pocket expenditure, any chronic or sudden illness can push a household below the poverty line. Subscription to the health insurance or financing schemes are seen as necessary. NFHS provides data about the coverage of households under health insurance/financing schemes. The variable - households with any usual member covered under a health insurance/financing scheme (in percent) represents the percentage of households where at least one regular member is enrolled in a health insurance or financing program)

Table 2.2 : Percentage of households covered under health insurance/financing scheme

	NFHS 5	NFHS 4
Ahmednagar	12.0	10.0
Akola	40.1	16.1
Amravati	31.9	24.3
Aurangabad	12.4	9.5
Beed	9.3	13.1
Bhandara	30	16.1
Buldhana	37.9	18.8
Chandrapur	28.9	11.3
Dhule	19.8	22.7
Gadchiroli	33.3	19.6
Gondia	30.6	16
Hingoli	14.7	14.4
Jalgaon	11.9	11.5
Jalna	9.7	11.2
Kolhapur	16.5	10.1
Latur	33.6	19.7
Mumbai City	30.7	14.7

Mumbai Suburban	20.2	12.4
Nagpur	25.6	18
Nanded	15.7	18.9
Nandurbar	15.3	12.5
Nashik	14.7	12.3
Osmanabad	14.8	6.8
Palghar	18.8	NA
Parbhani	10.5	10.3
Pune	14.4	21.4
Raigad	26.3	18.9
Ratnagiri	16.6	9.8
Sangli	12.3	10.3
Satara	11.4	8.9
Sindhudurg	13.2	10.8
Solapur	20.5	21.5
Thane	22.7	NA
Wardha	27.1	14.8
Washim	24.1	17.6
Yavatmal	29	14.9

A higher percentage for a district indicates more households covered under these schemes. Overall, there's a notable increase in coverage across many districts from NFHS 4 to NFHS 5. For instance, Akola, Amravati, Bhandara, Buldhana, Chandrapur, Gadchiroli, Gondia, Latur, Mumbai City, Nagpur, Osmanabad, Pune, Raigad, Satara, Solapur, Thane, Wardha, Washim, and Yavatmal all show an increase in coverage percentages. This suggests an improvement in access to health insurance and financing schemes, which can provide financial protection and access to healthcare services for more people. However, some districts like Aurangabad, Beed, Jalna, Kolhapur, Nandurbar, Nashik, Palghar, Ratnagiri, Sangli, and Sindhudurg either show minimal improvement or have slightly decreased.

This indicates potential areas where efforts may be needed to enhance access to health insurance and financing schemes in these districts.

District's Infrastructural Capacity regarding SDG6

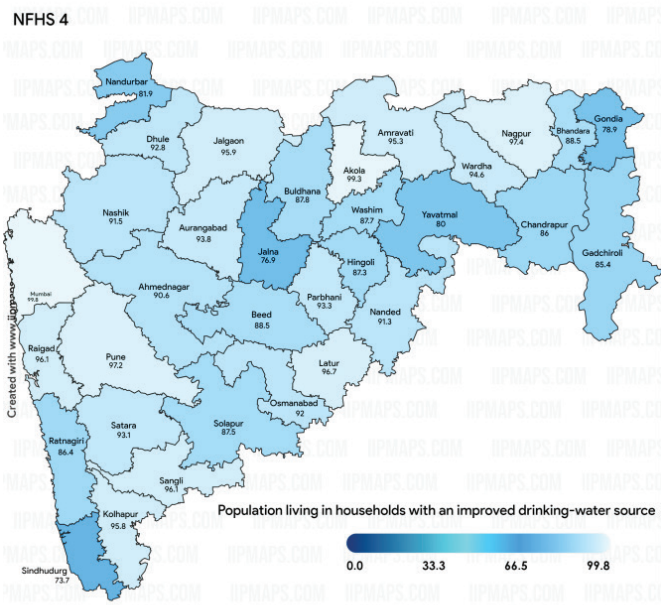
SDG 6 envisages safe and affordable drinking water for all by 2030 and calls for investment in adequate infrastructure related to sanitation facilities. The targets under the SDG deal with universal and equitable access to safe and affordable drinking water for all and access to adequate and equitable sanitation-hygiene for all, end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations. It also seeks to improve water quality by reducing pollution, eliminating dumping and minimising the release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally. SDG 6 is essential because it is linked with other SDGs (poverty eradication (SDG 1), ending hunger (SDG 2), healthy life and well–being (SDG 3), quality education(SDG 4), gender equality (SDG 5), Sustainable Consumption (SDG 12). It calls for support and strengthens the participation of local communities in improving water and sanitation management.

The central and state governments have already implemented several flagship programmes on these fronts. The Swachh Bharat (Clean India) Mission (SBM) launched in 2014 and the Jal Jeevan Mission have the ambitious target of universal coverage of sanitation facilities and drinking water supply. However, growing population, urbanisation, migration and climate changing impacts.
constantly pose challenges to achieve the SDG 6 targets as well as to maintain them. According to the Niti Aayog SDG Report, Maharashtra is doing well in SDG. The state scored 90 for Clean Water and Sanitation, showing its commitment to providing safe water, and good sanitation.

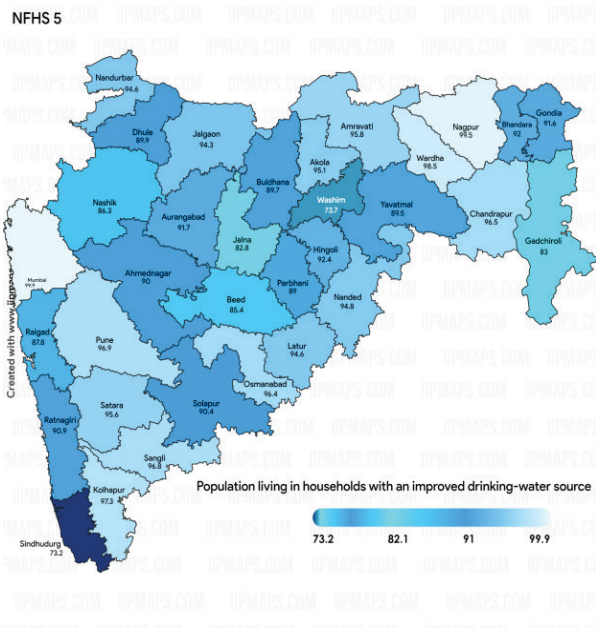
i) Infrastructural Capacity for Clean Water

Water collected from sources like-piped water into dwelling, piped water into yard/plot, household connection, public standpipes/tap, boreholes/tube well, protected dug wells, protected springs and rainwater collection and bottled water are generally considered as improved sources of drinking water. Drinking water collected from improved sources located on-premises, available when needed and free from faecal and contamination is known as safely managed drinking water.

Figure 2.12 : District-wise population with an improved drinking-water source



Source: NFHS -4



Source: NFHS-5

NFHS-5 round shares the data on the population living in households with an improved drinking-water source. The improved water sources includes piped water into dwelling/yard/plot, piped to neighbor, public tap/standpipe, tube well or borehole, protected dug well, protected spring, rainwater, tanker truck, cart with small tank, bottled water, community RO plant.

As it is evident from the above map based on NFHS-5 (2019-21),districts like Mumbai city, Mumbai Suburban, Nagpur in very highly developed category have achieved the universal coverage of safe drinking water. The proportion of the population living in households with an improved drinking-water source is approaching 100 percent. Wardha, Chandrapur, Dharashiv, Amravati, Satara, and Akola are the districts from high or medium developed categories that have provided safe drinking water to more than 95 percent of its population.

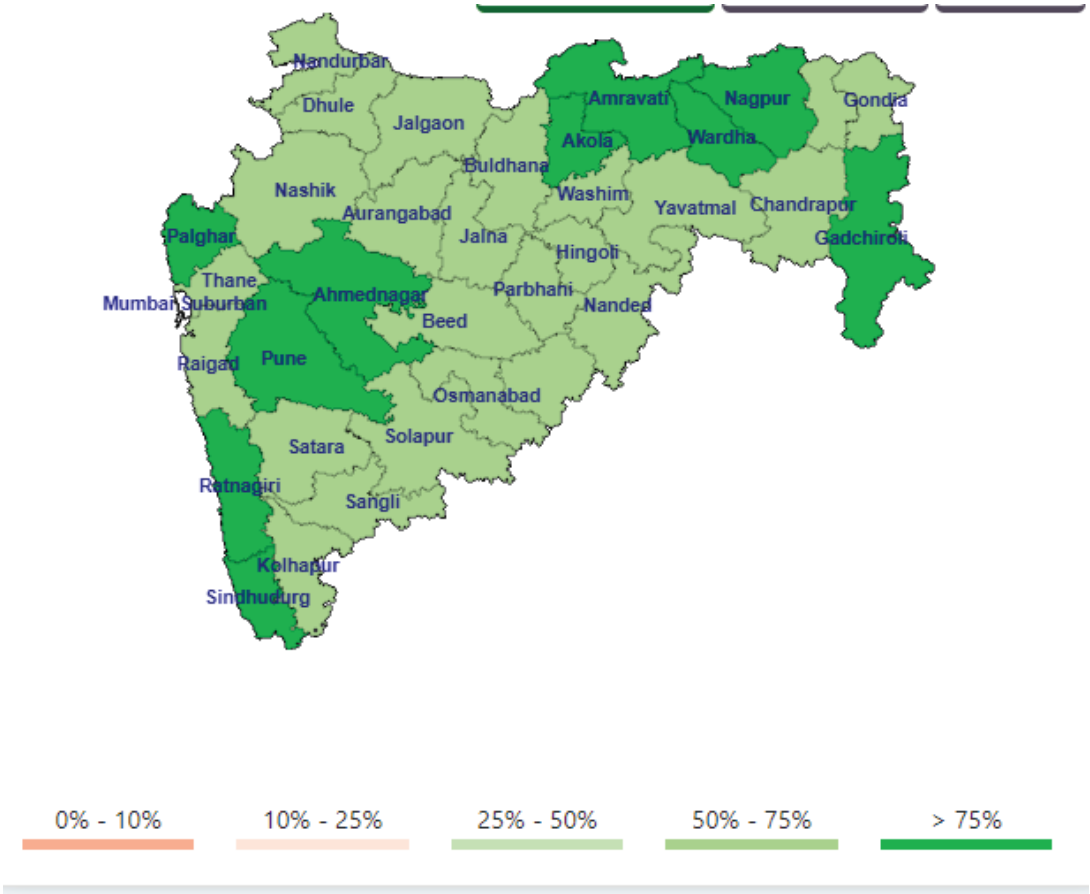
In the comparison between NFHS 4 and NFHS 5 data on improved drinking water sources across various districts of Maharashtra, several trends emerge. Chandrapur, Nandurbar and Gondia districts have improved their performance in supplying safe drinking water to their population during 2015-16 to 2019-21. Chandrapur's 96.5 percent of population has access to improved drinking water by 2019-21 as compared to 86 percent in 2015-16. Nandurbar experienced a jump from 81.9 percent to 94.6 percent whereas Gondia brought 91.6 percent of its population under the coverage of improved water sources as compared to 78.9 percent in 2015-16. Districts like Sindhudurg (73.2 percent), Washim (73.7 percent), Jalna (82.8 percent) and Gadchiroli (83 percent) need aggressive implementation of schemes like Jal Jeevan Mission. Infact, Washim, Parbhani, Raigad, Nashik and Beed experienced mild slippage in the percentage of population with improved water supply.

ii) District-wise Distribution of ODF Plus Villages

The Government of India in February 2020, approved Phase-II of the SBM-G which ensures the sustainability of the ODF status of villages and to cover the villages with Solid and Liquid Waste Management (SLWM) that would transform villages from ODF to ODF Plus by 2024-25. The major components of the Phase-II of SBM (G) are Sustaining Open Defecation Free Status (ODF-S), Solid (Bio-degradable) Waste Management, Plastic Waste Management (PWM), Liquid Waste Management (LWM), Faecal Sludge Management (FSM), GOBARdhan, Information Education and Communication/Behavior Change Communication (IEC/BCC) and Capacity Building. The SBM-G program has been instrumental in improving the health and well-being of millions of people across the country.

An ODF Plus Model village is one which is sustaining its ODF status and has arrangements for both Solid Waste Management and Liquid Waste Management; and observes visual cleanliness, i.e., minimal litter, minimal stagnant wastewater, no plastic waste dump in public places; and displays ODF Plus Information, Education & Communication (IEC) messages.

Figure 2.11 : Maharashtra Open Defecation Free (ODF) Plus Villages Map

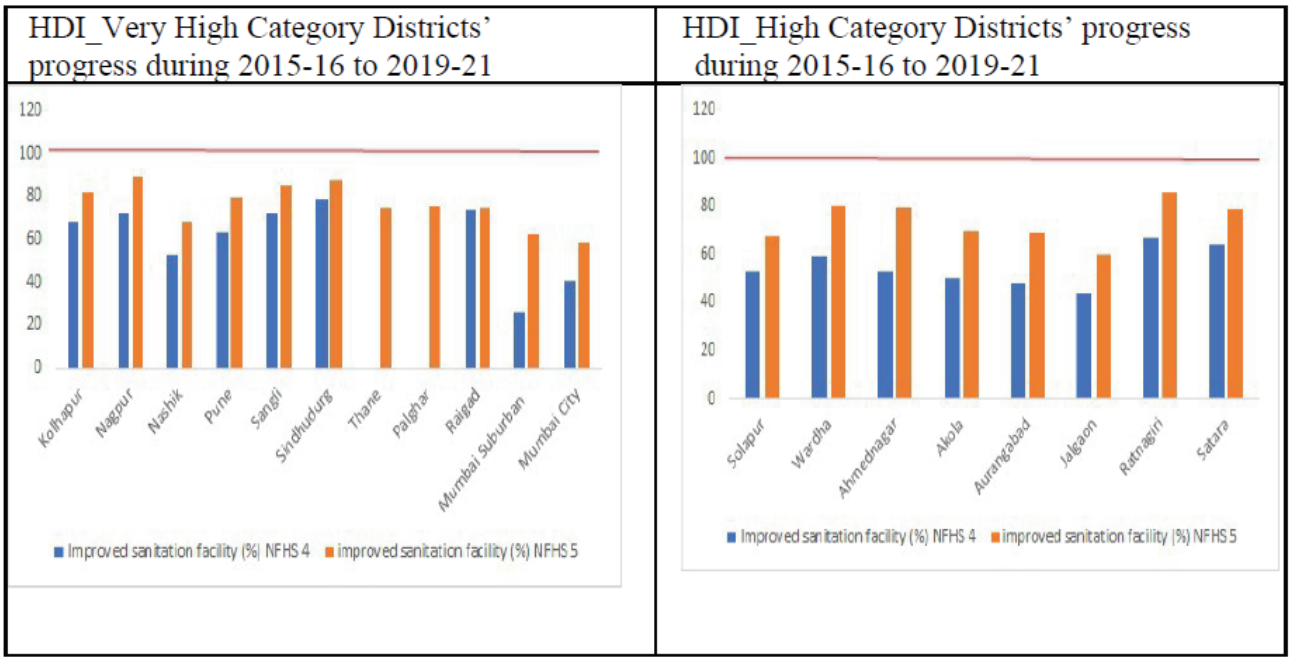


Source: Drinking Water and Sanitation Dept. Ministry of Jal Shakti GoI
https://sbm.gov.in/SBMGDashboard/DistrictDashboard.aspx, retrieved on 13th February 2024

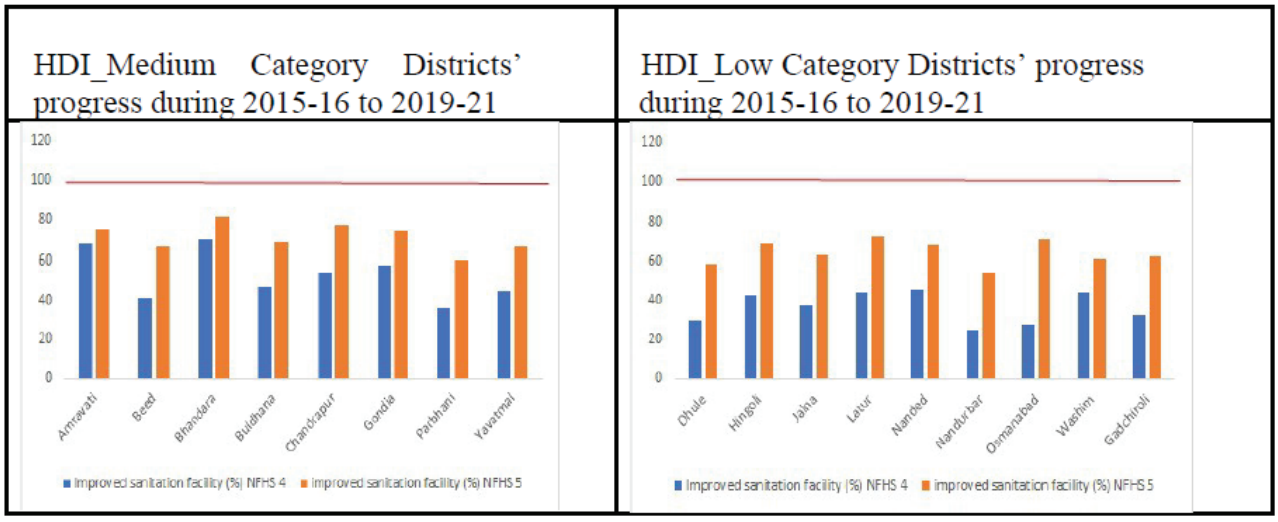
iii) Infrastructure for the Improved Sanitation Facility

Sanitation is another area where Maharashtra has made significant progress. NFHS rounds gathered data on the percentage of population living in households that use an improved sanitation facility. The improved sanitation facility includes flush to piped sewer system, flush to septic tank, flush to pit latrine, flush to don't know where, ventilated improved pit (VIP)/biogas latrine, pit latrine with slab, twin pit/composting toilet, which is not shared with any other household. However, as noted in the manual of NFHS-5, this indicator does not denote access to the toilet facility completely. Consequently, the district map regarding ODF Plus villages differ from the district-wise analysis of improved sanitation facilities presented below.

Figure 2.13 : District-wise improved sanitation facility by HDI_2011 categorization



Source: NFHS-4 & NFHS-5



Source: NFHS-4 & NFHS-5

Progress of districts in 'Very High HDI_2011' category' from 2015-16 to 2019-21 in improved sanitation facility

Nagpur, Kolhapur, Nashik, Pune, Sangli, and Sindhudurg have all made significant progress in providing sanitation facilities during the period mentioned above. However, districts like Mumbai Suburban and Mumbai City are lagging behind in this context. Rapid urbanization, migration, larger areas with slums having only community toilets, coupled with high population density, and smaller size of houses constantly challenges the government capacity to build sustainable infrastructure. In Mumbai Suburban, the percentage of people with improved sanitation facilities increased from 25.9 percent in NFHS 4 to 62.6 percent in NFHS 5. Similarly, in Mumbai City, the percentage increased from 40.2 percent to 58.6 percent, showing improvement with a great scope for improvement. Overall, the data shows positive changes in many districts, but there's still a need for ongoing improvement efforts, especially in urban areas.

Progress of districts in 'High HDI_2011' category from 2015-16 to 2019-21 in improved sanitation facility

Wardha emerges as a standout district, displaying a remarkable increase from 58.9 percent in NFHS 4 to 80.2 percent in NFHS 5, indicative of focused initiatives to bolster sanitation infrastructure. Ratnagiri district showcases commendable growth, with percentages increasing significantly from 67 percent to 85.6 percent, reflecting dedicated efforts toward enhancing sanitation access. Similarly, Ahmednagar shows substantial growth, with percentages rising from 52.8 percent to 79.5 percent, underscoring positive strides in sanitation provision within the district. Overall, the trends highlight positive advancements in several districts, signaling progress in addressing sanitation challenges, but sustained endeavors are necessary to achieve comprehensive sanitation coverage throughout the region.

Progress in districts in 'Medium HDI_2011' category from 2015-16 to 2019-21

Bhandara, Chandrapur, and Gondia have demonstrated significant advancements, with substantial improvement from NFHS 4 to NFHS 5. For instance, the proportion of population with improved sanitation facility increased from 53.8 percent to 77.3 percent in Chandrapur, and from 57.7 percent to 74.3 percent in Gondia. These increases suggest successful efforts in improving sanitation infrastructure and access within these districts. Additionally, districts like Amravati, Beed, Buldhana, and Yavatmal have shown moderate progress. Parbhani, however, stands out for its lower starting point and comparatively modest progress, with percentages increasing from 35.4 percent to 60.1 percent.

Progress in districts in 'Low HDI_2011' category from 2015-16 to 2019-21 in improved sanitation facility

Hingoli, Latur, and Osmanabad have shown significant advancements, with substantial increases in percentages from NFHS 4 to NFHS 5. For example, Osmanabad improved from 28 percent to 71.2 percent, Hingoli improved from 42.8 percent to 69 percent and Latur from 44.2 percent to 72.5 percent. These increases suggest successful efforts in improving sanitation infrastructure and access within these districts. Nandurbar and Gadchiroli, however, exhibit lower starting points and comparatively modest progress. Nandurbar increased from 24.8 percent to 54.1 percent, and Gadchiroli from 32.3 to 62.4 percentage. Overall, the data highlights positive developments in sanitation across several districts of Maharashtra.

Concluding Remarks

Districts are the third tier of the administration and with overall decentralization, the district administration has capacity to influence developmental policies and outcomes. The process of planning and designing the developmental policies initiates with evaluation of present data. There is a dearth of holistic measures to reflect the multidimensional development at district level and those are updated regularly. The District Development Index is an attempt to bridge this gap. DDI measures districts' economic performance, social performance and infrastructure created for socio-economic performance. These four dimensions received equal weights in the computation of DDI. A total of 12 indicators reflecting these dimensions were standardized to account for the heterogeneity in districts' geographical area or population. Largely following UNDP's methodology to calculate HDI, DDI was calculated for all districts of Maharashtra in 2022. Each district is compared against all other districts as well as with districts having similar HDI_2011 category. In the current year, some methodological changes in the construction of the index were seen as imperative in order to improve its reliability.

DDI (2023) largely confirms the pattern of having the cluster of developed districts in western Maharashtra whereas moderate and low developed districts being largely situated in Marathawada and Vidarbh region. Owing to the same, the progress or change in DDI scores at district level compared to the last year can not be strictly attributed as an improvement in district's performance. Mumbai city and Mumbai Suburban area (considered as one region) continue to be the best performer among all districts. Pune, Sangli, Nagpur, are some other top-performing districts when all 34 districts are compared together. Districts like Washim Sindhudurg, Bhandara have witnessed impressive Y-o-Y jump in their ranking when compared with districts of the same HDI category.

District's performance regarding selected SDG 3 and SDG 6 indicators were also evaluated comparing NFHS 4 and NFHS 5 rounds. While almost all districts have registered some improvement during the period of 2015-16 and 2019-21, the analysis shows most districts need to gear up to achieve targets set for each SDG. Districts which are placed in low or medium developed categories based on HDI (2011) or DDI (2023) also report relatively poor performance on health outcomes (percentage of anemic women) and inadequate investment in the infrastructural capacity to deliver services regarding health, water and sanitation. The insights drawn from DDI (2023) and SDG 3 and SDG 6 would support the district administration's initiatives for holistic and sustainable development.

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Appendix

Table 3.1 : Maharashtra Sustainable Development Goals District Indicator Framework (2021)

Goal 3 : Ensure healthy lives and promote well-being for all at all ages	
DIF Code	District Indicator
Target 3.1 : By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births	
D.3.1.1	Percentage of births attended by skilled health personnel
D.3.1.2	No. of beneficiaries under Janani Suraksha Yojana (scheme applicable to BPL, SC and ST)
D.3.1.3	Percentage of women aged 15-49 years with a live birth,for last birth, who received antenatal care,four times or more (period 5 years)
D.3.1.4	Percentage of institutional deliveries
Target 3.2 : By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births	

D.3.2.1	(a) Percentage of fully immunized children (9-11 months) out of total children (0-1 years) (b) Percentage of children aged 12-23 months fully immunized (BCG, Measles and three doses of Pentavalent vaccine)
Target 3.3 : By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases	
D.3.3.1	Covid-19 prevalence rate (per cent)
D.3.3.2	Tuberculosis incidence per 100,000 population
D.3.3.3	Malaria incidence per 1,000 population
Target 3.4 : By 2030, reduce by one third premature mortality from non- communicable diseases through prevention and treatment and promote mental health and well- being	
D.3.4.1	Number of deaths due to non-communicable diseases (a) cancer (b) stroke (c) diabetes
Target 3.5 : Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol	
D.3.5.1	Percentage of population (men (15-54 years) and women (15-49 years)) who consume alcohol
D.3.5.2	Percentage of men and women of aged 15 -49 years with use of any kind of tobacco (Repeated in D.3.a.1)
Target 3.7 : By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes	

D.3.7.1	Percentage of currently married women (15-49 years) who use any modern family planning methods (Repeated at D.3.8.1, D.5.6.1)
Target 3.8 : Achieve universal health coverage, including financial risk protection, access to quality essential health- care services and access to safe, effective, quality and affordable essential medicines and vaccines for all	
D.3.8.1	Percentage of currently married women (15-49 years) who use any modern family planning methods (Repeated at D.3.7.1, D.5.6.1)
D.3.8.2	Number of beds per lakh population in public/ Govt. aided, local bodies and trust medical institutions
D.3.8.3	(a) Number of physicians (b) Number of nurses (c) Number of midwives per 10000 population (Repeated at D.3.c.1)
Target 3.a : Strengthen the implementation of the World Health Organization Framework Convention on Tobacco Control in all countries, as appropriate	
D.3.a.1	Percentage of men and women of age 15 - 49 years who use any kind of tobacco (Repeated at D.3.5.2)
Target 3.c : Substantially increase health financing and the recruitment, development, training and retention of the health workforce in developing countries, especially in least developed countries and small island developing States	
D.3.c.1	(a) Number of physicians (b) Number of nurses (c) Number of midwives per 10000 population (Repeated in D.3.8.3)

Source : Maharashtra Sustainable Development Goals District Indicator Framework (2021)

https://mahades.maharashtra.gov.in/files/publication/Sustainable%20Developments%20Goals%20District%20indicator%20Framework%20Eng.pdf

Select Media Coverage

Devendra Fadnavis Commends 'Loksatta' District Index Initiative"

https://youtu.be/ZlRRtUmBYcI?si=MNLs2NgO5m0ToAKj

Loksatta District Development Index Repeat telecast: Celebrating Progressive Districts
https://www.youtube.com/live/WK-JVMcNA5w?si=gdObmJOgVnuG5Y1P

Devendra Fadnavis Acknowledges 'Loksatta' at District Development Index Celebration Event!
https://youtu.be/p53HZ1HE9ls?si=jG6t-F5ZWL5zAPBg

Devendra Fadnavis: "No Scarcity of Opportunities and Resources"; Statement by Devendra Fadnavis
https://youtu.be/kxLfKDoYvKY?si=ha6lsatN469eB-In

Leading Districts to be Honoured Today
https://indianexpress.com/article/cities/mumbai/leading-districts-to-be-honoured-today-9162190/

Leading Districts to be Honoured Today
https://www.loksatta.com/sampadkiya/features/loksatta-district-index-initiative-should-be-implement-in-other-states-ajit-ranade-zws-70-4215160/

Ratnagiri is on the path of development due to the network of banks, roads
https://www.loksatta.com/maharashtra/loksatta-district-index-road-construction-in-ratnagiri-district-achievements-in-banking-sector-zws-70-4210011/

सारस्वत बँक

प्रस्तुत

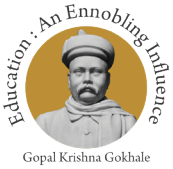
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