NITI Aayog

Strategy for New India @ 75

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November 2018

सत्यमेव जयते

प्रधान मंत्री
Prime Minister

Foreword

The collective effort of 1.25 billion Indians is transforming the country. The Union Government is an active partner in the people's quest for building a New India by 2022. It is our endeavour to create an ecosystem which enables every Indian to reach his or her full potential. This will pave the way for inclusive growth, and ensure prosperity to all. Policy is a necessary catalyst for change. We are, therefore, reforming our policy architecture to achieve the best outcomes. Much has been achieved, but more needs to be done.

The 'Strategy for New India @ 75' put together by NITI Aayog is an attempt to bring innovation, technology, enterprise and efficient management together, at the core of policy formulation and implementation. It will encourage discussion and debate, and invite feedback for further refining our policy approach. We believe that economic transformation cannot happen without public participation. Development must become a *Jan Andolan.*

I thank the State Governments and Union Territory Administrations, for their valuable comments on the draft of this document. Union Government Ministries have also added value to the document, through their extensive comments and observations.

In the spirit of Team India, let us now combine our energies to achieve the targets outlined in the Strategy, thereby fulfilling the aspirations of our citizens.

(Narendra Modi)

New Delhi
October 22, 2018

Preface

India is on the cusp of a major transformation. Change has been in the making over the last four years. The economy is finally moving out of the negative legacies of the past, specially the reckless credit expansion. India has regained its position as the fastest growing large economy in the world. This is highly commendable. However, to meet the rising aspirations of our young population, India needs to achieve and sustain a high rate of GDP growth for the next three decades. There will be several milestones in this long and arduous journey. The first of these milestones will be in 2022 when India celebrates the 75th anniversary of its independence. The government's goal is for India to be a USD 4.0 trillion economy when we celebrate the platinum jubilee of our independence.

Moreover, the Prime Minister has given his clarion call for establishing a New India by 2022. The 'Strategy for New India @ 75' captures three key messages from the Prime Minister. First, development must become a mass movement, in which every Indian recognizes her role and also experiences the tangible benefits accruing to her in the form of better ease of living. Collective effort and resolve will ensure that we achieve a New India by 2022 just like independence was achieved within five years of Mahatma Gandhi giving his call of Quit India in 1942. The direct implication of ensuring rapid growth with inclusion is that policymaking will have to be rooted in Indian ground realities and emphasize the welfare of all in both design and implementation.

Second, development strategy should help achieve broad-based economic growth to ensure balanced development across all regions and states and across sectors. This implies embracing new technologies fostering innovation and upskilling. We will have to focus on the necessary modernization of our agriculture and mainstreaming of regions such as the North East, hilly states and the 115 Aspirational Districts. The direct outcome of this will be improved regional and inter-personal equity and elimination of dualism that has so far characterised our economy. We will put in place an economy that is predominantly formal, rule-driven and facilitates investment and innovation.

Third, the strategy when implemented, will bridge the gap between public and private sector performance. The Prime Minister has focused on putting in place a 'development state' in place of the 'soft state' that this government had inherited. In this context, the government has focused on the efficient delivery of public services, rooting out corruption and black economy, formalizing the economy and expanding the tax base, improving the ease of doing business, nursing the stressed commercial banking sector back to a healthy state, and stopping leakages through direct benefit transfers and widespread use of the JAM trinity.

Efficient, transparent and accountable governance has come to be recognized as this government's USP. This will ensure that India will not only achieve its ambitious goals for 2022, but also go on to become one of the two largest economies in the world by 2047, when we celebrate the centenary of our independence.

'Strategy for New India @ 75' has identified 41 different areas that require either a sharper focus on implementing the flagship schemes already in place or a new design and initiative to achieve India's true potential. Each chapter summarizes the current status of the sector, takes full cognizance of the progress made thus far and spells out the objectives. It then identifies the binding constraints and proposes measures to address these constraints. It is our hope that this new approach will provide an inventory of readily implementable measures for the government departments and agencies both in the central and state governments. The focus of the strategy is to further improve the policy environment in which private investors and other stakeholders can contribute their fullest towards achieving the goals set out for New India 2022.

We have followed a deeply participative approach in preparing the strategy. The process started with a series of consultations with all possible stakeholders. Each area vertical in NITI Aayog had in depth consultations with all three groups of stakeholders, viz., business persons, academics including scientists, and government officials. This was followed by consultations held by NITI Aayog with seven sets of stakeholders that included scientists and innovators, farmers, civil society organizations, think tanks, labour representatives and trade unions, as well as industry representatives (Lists at Annex 1 and 2).

Each chapter draft was sent to the respective line ministry for their inputs, suggestions and comments. The completed draft document was circulated to all the States and Union Territories. As many as 23 States and 4 Union Territories sent detailed and well considered comments and suggestions. These have helped in improving the draft by reflecting state specific features in various chapters. This exercise has further strengthened NITI Aayog's efforts at cooperative federalism. It will also encourage us to collaborate with the states to develop state specific development blueprints.

With these extensive consultations and inputs, the strategy reflects ground realities and a collective consensus on addressing the challenges and achieving the goals for a New India. The attempt is to present a set of ideas that can provide the basis for a constructive public-private-personal partnership and promote centre-state cooperation. We hope that the document will also help to build the trust required among all stakeholders for making development into a mass movement.

I would like to thank NITI Aayog members Dr. V. K. Saraswat, Dr. Ramesh Chand and Dr. Vinod K. Paul for their leadership and invaluable inputs at every stage of the process. This document would not have been possible

without the contribution of NITI Aayog CEO, Amitabh Kant and senior officials of NITI Aayog. I would like to thank Additional Secretaries Yaduvendra Mathur and R. P. Gupta; Senior Advisers Sunita Sanghi and Srikara Naik; Advisers Alok Kumar, Anil Srivastava, Anna Roy, Ashok K. Jain, J. P. Mishra, Jitendra Kumar, Maninder Kaur Dwivedi, Praveen Mahto, Ravinder Goyal, S. S. Ganapathy, U. K. Sharma, Vikram Singh Gaur, Yogesh Suri; Senior Consultants C. Muralikrishna Kumar, Rakesh Ranjan and Sujeet Samaddar and Officer on Special Duty Sanyukta Samaddar.

This task would not have been completed without the help of a dedicated team of experts attached to the Vice Chairman's office, led by Ramgopal Agarwala and Dhiraj Nayyar. The team consisted of Urvashi Prasad, Ranveer Nagaich, Devashish Dhar, Atisha Kumar, Chinmaya Goyal, Vaibhav Kapoor and Ajit Pai. Tara Nair provided crucial editing inputs.

Preparing the strategy is only the first step towards India's economic transformation. The foresighted framers of our celebrated Constitution have set the enormous challenge of simultaneously completing India's triple transition across social, political and economic fields. India is one of the very few countries that have taken on this historical challenge of completing the three transitions together. Having successfully taken forward the social and political transitions, India is now within sight of completing its economic transition as well. This will see per capita incomes rising from about USD 1,900 in 2017-18 to around USD 3,000 in 2022-23. As outlined in this Strategy Document, successfully completing our economic transition will enable us to achieve freedom from squalor, illiteracy, corruption, poverty, malnutrition and poor connectivity for the common Indian.

By 2022, New India will provide a solid foundation for clean, inclusive, sustained and sustainable growth for the next three decades. The 'Strategy for New India @ 75' reflects our preparedness to make this transition. Its recommendations are practical and detailed to facilitate time-bound implementation. All levels of government must work together to achieve the vision of New India. Working together as 'Team India' will ensure prosperity for all while protecting our environment and promoting the emergence of an innovative eco-system, propelling India to the front ranks of the global economy.

Dr. Rajiv Kumar
Vice Chairman
NITI Aayog

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Introduction

On August 15, 2022, independent India will turn 75. In the lifespan of nations, India is still young. The best is surely yet to come. India's youthful and aspirational population deserves a rapid transformation of the economy, which can deliver double-digit growth, jobs and prosperity to all. A strong foundation has been laid in the last four years. While there is every room for confidence, there is none for complacency. A surge of energy, untiring effort and an unshakeable resolve on the part of the government, private sector and every individual citizen can achieve this transformation in the next five years.

Seventy years ago, similar energy, effort and resolve from all Indians freed the country from colonial rule within five years of the launch of the Quit India movement in 1942. Then, like now, foundations had been laid but a committed acceleration of effort was necessary. The Prime Minister's call for *Sankalp Se Siddhi* is a clarion call for a radical transformation for a New India by 2022-23.

The government has to be in the vanguard of the transformation of the Indian economy. However, the government's role must be defined correctly. This Strategy document attempts to do this. The document is being framed in a context where a re-imagination of governance is taking place. We need a 'development state' that focuses sharply on the difficult and accountable delivery of key public goods and services. There is an ongoing effort to achieve an optimum level of public-private partnership. Policies have been put in place for more efficient delivery of public goods and services such as health, education, power, urban water supply and connectivity. In this context, a deliberate effort is being made to cut red tape and end burdensome over-regulation for promoting entrepreneurship and private investment. Also, in an effort to align the 'Strategy for New India @ 75' with India's commitment to the United Nations' Sustainable Development Goals, each chapter is mapped to the relevant goals. India is currently putting in place a 'development state' guided by the philosophy of *Sabka Saath, Sabka Vikas*.

The purpose of this document, 'Strategy for New India @ 75', is to define clear objectives for 2022-23 in a diverse range of 41 areas that recognize the progress already made; and challenges that remain; identify binding constraints in specific sectors; and suggest the way forward for achieving the stated objectives.

The Strategy document has disaggregated the 41 sectors under four sections: drivers, infrastructure, inclusion and governance. The first section on drivers focuses on the engines of economic performance – in macroeconomic terms with chapters on growth and employment. The section also discusses strategies for the doubling of farmers' incomes; boosting Make in India; upgrading the science, technology and innovation eco-system; and promoting sunrise sectors like fintech and tourism. An annual rate of growth of 9 per cent

by 2022-23 is essential for generating sufficient jobs and achieving prosperity for all. Four key steps, among others have been spelled out for achieving this GDP growth rate. These are:

a. Increase the investment rate as measured by gross fixed capital formation (GFCF) from present 29 per cent to 36 per cent of GDP by 2022. About half of this increase must come from public investment which is slated to increase from 4 per cent to 7 per cent of GDP. Government savings have to move into positive territory. This sharp increase in investment-to-GDP ratio will require significantly higher resource mobilization efforts as elaborated in the chapter on Growth.

b. In agriculture, emphasis must shift to converting farmers to 'agripreneurs' by further expanding e-National Agriculture Markets (e-NAMs) and replacing the Agricultural Produce Marketing Committee (APMC) Act with the Agricultural Produce and Livestock Marketing (APLM) Act. The creation of a unified national market, a freer export regime and abolition of the Essential Commodities Act are essential for boosting agricultural growth.

c. A strong push would be given to 'Zero Budget Natural Farming' (ZBNF) techniques that reduce costs, improve land quality and increase farmers' incomes. This is a tested method for putting environment carbon back into the land. Therefore, ZBNF allows India to significantly contribute to reducing the global carbon footprint.

d. To ensure maximum employment creation, codification of labour laws must be completed and a massive effort must be made to upscale apprenticeships.

The second section on infrastructure deals with the physical foundations of growth. A lot of progress has been made across all infrastructure sectors. This is crucial to enhancing the competitiveness of Indian business as also ensuring the citizens' ease of living. Three key steps, among others, are:

a. Expediting the establishment of the Rail Development Authority (RDA), which is already approved. RDA will advise or make informed decisions on an integrated, transparent and dynamic pricing mechanism for the railways. Investment in railways will be ramped up, including by monetising existing railway assets.

b. The share of freight transported by coastal shipping and inland waterways will be doubled. Initially, viability gap funding will be provided until the infrastructure is fully developed. An IT-enabled platform would be developed for integrating different modes of transport and promoting multi-modal and digitised mobility.

c. With the completion of the *Bharat Net* programme in 2019, all 2.5 lakh *gram panchayats* will be digitally connected. In the next phase the last mile connectivity to the individual villages will be completed. The aim will be to deliver all government services at the state, district, and *gram panchayat* level digitally by 2022-23, thereby eliminating the digital divide.

The section on inclusion deals with the urgent task of investing in the capabilities of all of India's citizens. The three themes in this section revolve around the various dimensions of health, education and mainstreaming of traditionally marginalized sections of the population. While there are multiple dimensions and pathways contained in the chapters in this section, four key steps, among others, are:

a. Successfully implementing the *Ayushman* Bharat programme including the establishment of 150,000 health and wellness centres across the country, and rolling out the *Pradhan Mantri Jan Arogya Abhiyaan*.

b. Upgrading the quality of the school education system and skills, including the creation of a new innovation ecosystem at the ground level by establishing at least 10,000 Atal Tinkering Labs by 2020.

c. As already done in rural areas, affordable housing in urban areas will be given a huge push to improve workers' living conditions and ensure equity while providing a strong impetus to economic growth.

d. Implementing strategies to achieve regional equity by focusing on the North-East region and successfully rolling out the Aspirational Districts Programme.

The final section on governance delves deep into how the tasks/business of government can be streamlined and reformed to achieve better outcomes. It involves a sharp focus on ensuring accountability and a shift to performance-based evaluation. The government will revamp its data systems and analysis so that all policy interventions and decision-making are based on evidence and real-time data. This will yield efficient and targeted delivery of services and justice to those who need them the most. Three key steps, among others, are:

a. Implementing the recommendations of the Second Administrative Reforms Commission as a prelude to appointing a successor for designing reforms in the changing context of emerging technologies and growing complexity of the economy.

b. A new autonomous body, viz., the Arbitration Council of India, may be set up to grade arbitral institutions and accredit arbitrators to make the arbitration process cost effective and speedy, and to pre-empt the need for court intervention.

c. The scope of *Swachh Bharat Mission* may be expanded to cover initiatives for landfills, plastic waste and municipal waste and generating wealth from waste.

To achieve the goals of New India in 2022-23, it is important for the private sector, civil society and even individuals to draw up their own strategies to complement and supplement the steps the government intends to take. With the available tools of 21st century technology, it should be possible to truly create a mass movement for development. With the *Sankalp* of all Indians, India will have *Siddhi*.

DRIVERS

1. Growth

Objectives

- Steadily accelerate the gross domestic product (GDP) growth rate to achieve a target of about 8 per cent during 2018-23 (*note that this target has been set to catalyse policy action and does not represent a forecast*). This will raise the economy's size in real terms from USD 2.7 trillion in 2017-18 to nearly USD 4 trillion by 2022-23. Besides having rapid growth, which reaches 9-10 per cent by 2022-23, it is also necessary to ensure that growth is inclusive, sustained, clean and formalized.
- The investment rate should be raised from 29 per cent to 36 per cent of GDP which has been achieved in the past, by 2022-23.
- Exports of goods and services combined should be increased from USD 478 billion in 2017-18 to USD 800 billion by 2022-23.

Current Situation

Economic growth in India has been broadly on an accelerating path. It is likely to be the fastest growing major economy in the world in the medium-term.

The share of manufacturing in India's GDP is low relative to the average in low and middle-income countries. It has not increased in any significant measure in the quarter century after economic liberalization began in 1991. Within manufacturing, growth has often been highest in sectors that are relatively capital intensive, such as automobiles and pharmaceuticals. This stems from India's inability to capitalize fully on its inherent labour and skill cost advantages to develop large-scale labour intensive manufacturing. Complex land and labour laws have also played a notable part in this outcome. There is a need to increase the pace of generating good quality jobs to cater to the growing workforce, their rising aspirations and to absorb out-migration of labour from agriculture.

The positive news is that high growth rate has been achieved with strong macroeconomic fundamentals including low and stable rates of inflation and a falling fiscal deficit. However, along with macroeconomic stability, the sufficient condition for escalating growth is to continue with the structural reforms that address the binding constraints for a more robust supply-side response.

Constraints

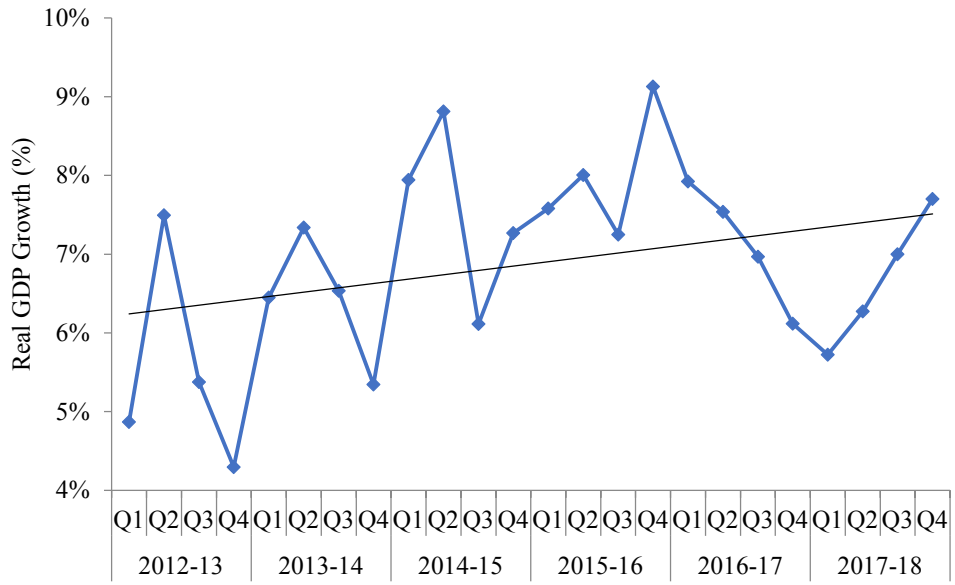
Overall, growth can be accelerated by a number of measures across different policy areas, which have been detailed in different chapters of this strategy for 2022-23. This chapter focuses on the macroeconomic drivers of growth.

Way Forward

1. **Raising investment rates to 36 per cent by 2022-23**

- To raise the rate of investment (gross fixed capital formation as a share of GDP) from about 29 per cent in 2017-18 to about 36 per cent of GDP by 2022-23, a slew of measures will be required to boost both private and public investment.

Figure 1.1: India's real GDP growth



Source: Ministry of Statistics and Programme Implementation

- India's tax-GDP ratio of around 17 per cent is half the average of OECD countries (35 per cent) and is low even when compared to other emerging economies like Brazil (34 per cent), South Africa (27 per cent) and China (22 per cent). To enhance public investment, India should aim to increase its tax-GDP ratio to at least 22 per cent of GDP by 2022-23. Demonetization and GST will contribute positively to this critical effort. In addition, efforts need to be made to rationalize direct taxes for both corporate tax and personal income tax. Simultaneously, there is a need to ease the tax compliance burden and eliminate direct interface between taxpayers and tax officials using technology.
- In 2016-17, the share of government (central and state combined) capital expenditure in total budget expenditure was 16.2 per cent,[1] and government's contribution to fixed capital formation was close to 4 per cent of GDP. This needs to be increased to at least 7 per cent of GDP by 2022-23 through greater orientation of expenditure towards productive assets, and minimizing the effective revenue deficit.
- States could also undertake greater mobilization of own taxes such as property tax, and taking specific steps to improve administration of GST to increase tax collections.
- Two areas in which higher public investment will easily be absorbed are housing and infrastructure. Investment in housing, especially in urban areas, will create very large multiplier effects in the economy. Investment in physical infrastructure will address long-standing deficiencies faced by the economy. Sector-specific measures are mentioned in corresponding chapters.
- The government has taken significant measures to attract foreign direct investment by easing caps on the extent of permissible stake holding

and the norms of approval. By 2022-23, the government may consider further liberalizing FDI norms across sectors. Domestic savings can be complemented by attracting foreign investment in bonds and government securities. Regulatory limits can be relaxed for rupee denominated debt.

- The government should continue to exit central public sector enterprises (CPSEs) that are not strategic in nature. Inefficient CPSEs surviving on government support distort entire sectors as they operate without any real budget constraints. The government's exit will attract private investment and contribute to the exchequer, enabling higher public investment. For larger CPSEs, the goal should be to create widely held companies by offloading stake to the public to create entities where no single promoter has control. This will both improve management efficiency and allow government to monetize its holdings with substantial contribution to public finances.
- Private investment needs be encouraged in infrastructure through a renewed public-private partnership (PPP) mechanism on the lines suggested by the Kelkar Committee.

2. Macroeconomic stability through prudent fiscal and monetary policies

- Sustained high growth requires macroeconomic stability, which is being achieved through a combination of prudent fiscal and monetary policies.
- The government has targeted a gradual lowering of the government debt-to-GDP ratio. It will help reduce the relatively high interest cost burden on the government budget, bring the size of India's government debt closer to that of other emerging market economies, and improve the availability of credit for the private sector in the financial markets.
- But even as lowering of debt and limiting fiscal deficit are important, the government should be flexible in its approach towards setting annual targets based on prevailing economic conditions. This approach is enshrined in the existing Fiscal Responsibility and Budget Management (FRBM) architecture that has built in flexibility in the form of adequately defined "escape and buoyancy" clauses. Targets should take cognizance of the stage of the business cycle and fiscal deficit and borrowing targets should not be set in isolation.
- The effective revenue deficit should be brought down as rapidly as possible. Capital expenditure incurred for the health and education sectors, which in effect builds human capital, should be excluded from estimates of revenue expenditure. This will increase government savings.
- One of the major institutional reforms of recent years has been to statutely mandate the RBI to maintain "... price stability while keeping in mind the objective of growth". Inflation needs to be contained within the stated target range of 2 per cent to 6 per cent. Inflation targeting provides a reasonably flexible policy framework which is in line with global best practices and can respond appropriately to supply shocks.
- Policy should be directed to minimize volatility in the nominal exchange rate.

3. Efficient financial intermediation

- Efficient functioning of the financial markets is crucial to maintain high growth in the economy. There is a need to deepen financial markets with easier availability of capital, greater use

of financial markets to channel savings and an improved risk-assessment framework for lending to avoid a situation of large-scale non-performing assets in the banking sector.

- Governance reforms in public sector banks require, apart from the establishment of independent and commercially driven bank boards, performance assessment of executives and increased flexibility in human resources policy.
- The Gujarat International Finance and Tech City (GIFT) should be leveraged to push the envelope on financial sector liberalization. It is an opportunity to onshore trading in rupees and other derivatives, which currently happens outside India for regulatory reasons. If GIFT succeeds, liberalization can be extended to the rest of the country.
- Enable alternative (to banks) sources of credit for India's long-term investment needs. The bond market needs deepening through liberalization of regulations and continued fiscal consolidation.

4. Focus on exports and manufacturing

- India needs to remain globally competitive, particularly in the production and exports of manufactured, including processed agricultural, goods. The following reforms would help in improving the competitiveness:
    - o A focused effort on making the logistics sector more efficient is needed.
    - o Power tariff structures may be rationalized to ensure global competitiveness of Indian industries.
    - o Import tariffs that seek to promote indigenous industry should come with measures to raise productivity which will provide the ability to compete globally.
- Improve connectivity by accelerating the completion of announced infrastructure projects. Enhancing physical connectivity will help reduce delivery times and improve global connectivity and the reach of our exporters. By 2022-23, we should complete projects that are already underway such as the Delhi-Mumbai Industrial Corridor (DMIC) and Dedicated Freight Corridors.
- Work with states to ease labour and land regulations. In particular, we should introduce flexibility in labour provisions across sectors. All state governments should speedily implement fixed term employment (FTE) that has now been extended to cover all sectors.
- The government has recently established a dedicated fund of INR 5,000 crore for enhancing 12 "Champion Services Sectors". Among others, these include IT & ITeS, tourism, medical value travel and audio visual services. Given the significant role of services exports in maintaining India's balance of payments, the government should continue to focus on these sectors.
- Strengthen the governance and technical capabilities of Export Promotion Councils (EPCs) by subjecting them to a well-defined, performance-based evaluation. Performance evaluations of EPCs could be based on increasing the share of Indian exports in product markets covered by these EPCs. Those EPCs unable to achieve mutually agreed upon targets for increasing market shares could be closed down or re-structured.
- Explore closer economic integration within South Asia and the emerging economies of South East Asia particularly Cambodia, Laos, Myanmar and Vietnam, using the existing Bangladesh, Bhutan, India, Nepal (BBIN) and

the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Co-operation (BIMSTEC) frameworks.

  - Building the physical infrastructure and putting in place measures to facilitate seamless cross-border movement of goods in the North-East region would help accelerate integration and promote exports.

5. Employment generation

- The necessary condition for employment generation is economic growth. Achieving the growth targets by implementing the development strategy outlined in this document can generate sufficient jobs for new entrants into the labour force, as well as those migrating out of agriculture. A large part of jobs would hopefully be generated in labour-intensive manufacturing sectors, construction and services. In addition, the employability of labour needs to be enhanced by improving health, education and skilling outcomes and a massive expansion of the apprenticeship scheme.

[1] Source: RBI.

2. Employment and Labour Reforms

Objectives

- Complete codification of central labour laws into four codes by 2019.
- Increase female labour force participation to at least 30 per cent by 2022-23.
- Disseminate publicly available data, collected through rigorous household and enterprise surveys and innovative use of administrative data on a quarterly basis by 2022-23.
- Encourage increased formalization of the labour force by reforming labour laws, easing of industrial relations and ensuring of fair wages, working conditions and social security through significant productivity improvements in the economy.

Current Situation

To capitalize on its demographic dividend, India must create well-paying, high productivity jobs. Of India's total workforce of about 52 crore, agriculture employed nearly 49 per cent while contributing only 15 per cent of the GVA. Comprehensive modernization of agriculture and allied sectors are needed urgently. In contrast, only about 29 per cent of China's workforce was employed in agriculture (Figure 2.1).[1] Industry and services accounted for 13.7 and 37.5 per cent of employment while making up for 23 per cent and 62 per cent of GVA, respectively.[2]

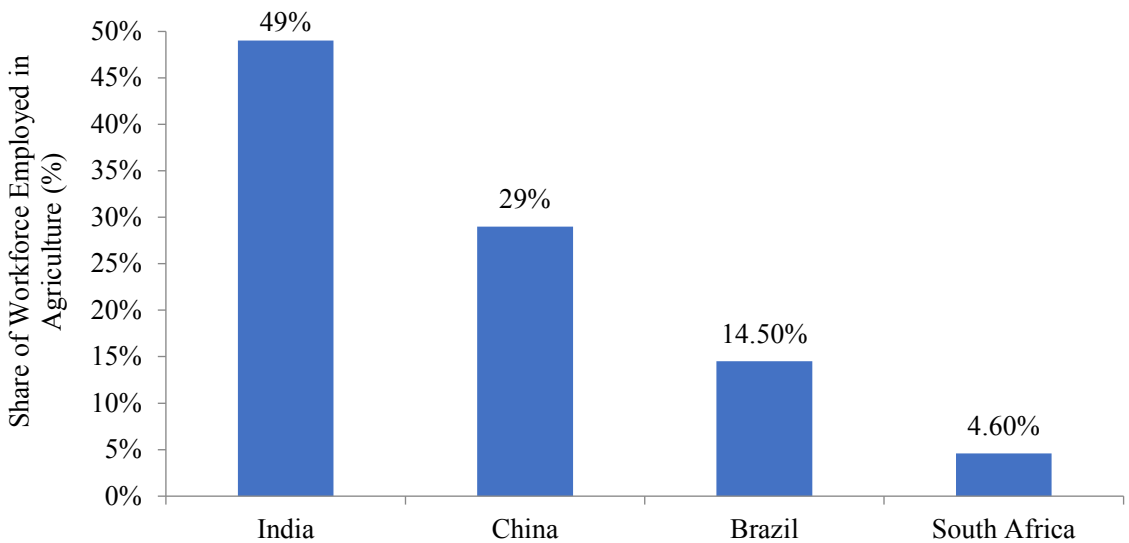
A significant number of workers, currently employed in agriculture, will move out in search of jobs in other areas. This will be in addition to the new entrants to the labour force as a result of population growth. By some estimates, the Indian economy will need to generate nearly 70 lakh jobs annually to absorb the net addition to the workforce. Taking into account the shift of labour force from low productivity employment, 80-90 lakhs new jobs will be needed in the coming years.

Micro and small-sized firms as well as informal sector firms dominate the employment landscape in India. As per the National Sample Survey (NSS) 73rd round, for the period 2015-16, there were 6.34 crore unincorporated non-agricultural micro, small and medium enterprises (MSMEs) in the country engaged in different economic activities providing employment to 11.10 crore workers. A large majority of these firms are in the unorganized sector. By some estimates, India's informal sector employs approximately 85 per cent of all workers.[3]

India also exhibits a low and declining female labour force participation rate. The female labour force participation rate in India was 23.7 per cent in 2011-12[4] compared to 61 per cent in China, 56 per cent in the United States.[5]

Recognizing the high cost of compliance with existing labour regulations and the complexity generated by various labour laws at the central and state levels, the central government has recently introduced policies to make compliance easier and more effective. They are also simplifying and rationalizing the large and often overlapping

Figure 2.1: Share of workforce employed in agriculture



Source: NSSO; World Bank

number of labour laws. These measures include moving licensing and compliance processes online, simplifying procedures and permitting self-certification in larger number of areas. One of the government's key initiatives is to rationalize 38 central labour laws into four codes, namely wages, safety and working conditions, industrial relations, and social security and welfare. Of the four codes, the one on wages has been introduced in the Lok Sabha and is under examination. The other three codes are at the pre-legislative consultation stage and should be completed urgently.

The government has put in place several schemes to help generate employment. These include the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), *MUDRA Yojana*, Prime Minister's Employment Generation Programme and *Pradhan Mantri Rojgar Protsahan Yojana*. Additional initiatives aid job creation through providing skill development, easing access to credit and addressing sector specific constraints. The government also made the EPFO premium portable so that workers can change jobs without fear of losing their provident fund benefits.

The government has recently made publicly available the data on employment collected by the Employment Provident Fund Organization (EPFO), Employees' State Insurance Corporation (ESIC) and National Pension Scheme (NPS). With MOSPI collecting employment data through its enterprises and household surveys – particularly the Periodic Labour Force Survey – and the focus on improving payroll data, the effort is to vastly improve availability of reliable employment data and release it on a regular basis.

Constraints

- **Productivity across all sectors**. A large share of India's workforce is employed in low productivity activities with low levels of

remuneration. This is especially true of the informal sector where wages can be one twentieth of those in firms producing the same goods or services but in the formal sector.[6]

- **Protection and social security**. A large number of workers that are engaged in the unorganized sector are not covered by labour regulations and social security. This dualistic nature of the labour market in India may be a result of the complex and large number of labour laws that make compliance very costly. In 2016, there were 44 labour laws under the statute of the central government. More than 100 laws fall under the jurisdiction of state governments.[7] The multiplicity and complexity of laws makes compliance and enforcement difficult.
- **Skills**. According to the India Skill Report 2018, only 47 per cent of those coming out of higher educational institutions are employable.[8]
- **Employment data**. We currently lack timely and periodic estimates of the work force. This lack of data prevents us from rigorously monitoring the employment situation and assessing the impact of various interventions to create jobs.

Way Forward

1. **Enhance skills and apprenticeships**

- The Labour Market Information System (LMIS) is important for identifying skill shortages, training needs and employment created. The LMIS should be made functional urgently.
- Ensure the wider use of apprenticeship programmes by all enterprises. This may require an enhancement of the stipend amount paid by the government for sharing the costs of apprenticeships with employers.

2. **Labour law reforms**

- Complete the codification of labour laws at the earliest.
- Simplify and modify labour laws applicable to the formal sector to introduce an optimum combination of flexibility and security.
- Make the compliance of working conditions regulations more effective and transparent.
- The National Policy for Domestic Workers needs to be brought in at the earliest to recognize their rights and promote better working conditions.

3. **Enhance female labour force participation**

- Ensure the implementation of and employers' adherence to the recently passed Maternity Benefit (Amendment) Act, 2017, and the Sexual Harassment of Women at Work Place (Prevention, Prohibition and Redressal) Act. It is also important to ensure implementation of these legislations in the informal sector. Further details may be found in the chapter on Gender.
- Ensure that skills training programmes and apprenticeships include women.

4. **Improve data collection on employment**

- Ensure that data collection for the Periodic Labour Force Survey (PFLS) of households initiated in April 2017 is completed as per schedule and data disseminated by 2019.
- Conduct an annual enterprise survey using the goods and service tax network (GSTN) as the sample frame.
- Increase the use of administrative data viz. EPFO, ESIC and the NPS to track regularly the state of employment while adjusting for the formalization of the workforce.

5. Ease industrial relations to encourage formalization

- Increase severance pay, in line with global best practices.
- Overhaul the labour dispute resolution system to resolve disputes quickly, efficiently, fairly and at low cost.
- Strengthen labour courts/tribunals for timely dispute resolution and set a time frame for different disputes.

6. Wages

- Make compliance with the national floor level minimum wage mandatory.
- Expand the Minimum Wages Act, 1948, to cover all jobs.
- Enforce the payment of wages through cheque or *Aadhaar*-enabled payments for all.

7. Working conditions and social security

- Enact a comprehensive occupational health and safety legislation based on risk assessment, employer-worker co-operation, and effective educational, remedial and sanctioning. Workers housing on site will help to improve global competitiveness of Indian industry, along with enhancing workers' welfare.
- Enhance occupational safety and health (OSH) in the informal sector through capacity building and targeted programmes.
- Ensure compulsory registration of all establishments to ensure better monitoring of occupational safety as well as recreation and sanitation facilities.
- Enhance transparency in the labour inspection system by allowing online complaints and putting in place a standardized and clear mechanism.

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1 2017 OECD Economic Survey of India; NSSO.

2 Sectoral Contribution to GVA calculated using data from MOSPI's Second Advance Estimates. Industry consists of manufacturing, mining and quarrying and electricity, gas, water supply& other utility services. The services sector consists of trade, hotels, transport, communication and services related to broadcasting; construction; financial, real estate and professional services; and public administration, defence and other services.

3 OECD India Policy Brief, Education and Skills. Accessed May 15, 2018. https://www.oecd.org/policy-briefs/India-Improving-Quality-of-Education-and-Skills-Development.pdf.

4 NSSO 68th Round (2011-12). Female labour force participation rate calculated using usual principal status, covering both urban and rural areas.

5 World Development Indicators database, World Bank. Accessed May 16, 2018.

6 Data from Annual Survey of Industries (ASI) and NSS, cited in the Annual Economic Survey, 2015-16 http://indiabudget.nic.in/es2015-16/echapvol1-10.pdf. Accessed May 15, 2018.

7 Ministry of Labour and Employment, India. http://labour.nic.in/about-ministry. Accessed May 15, 2018.

8 India Skill Report 2018.

3. Technology and Innovation

Objectives

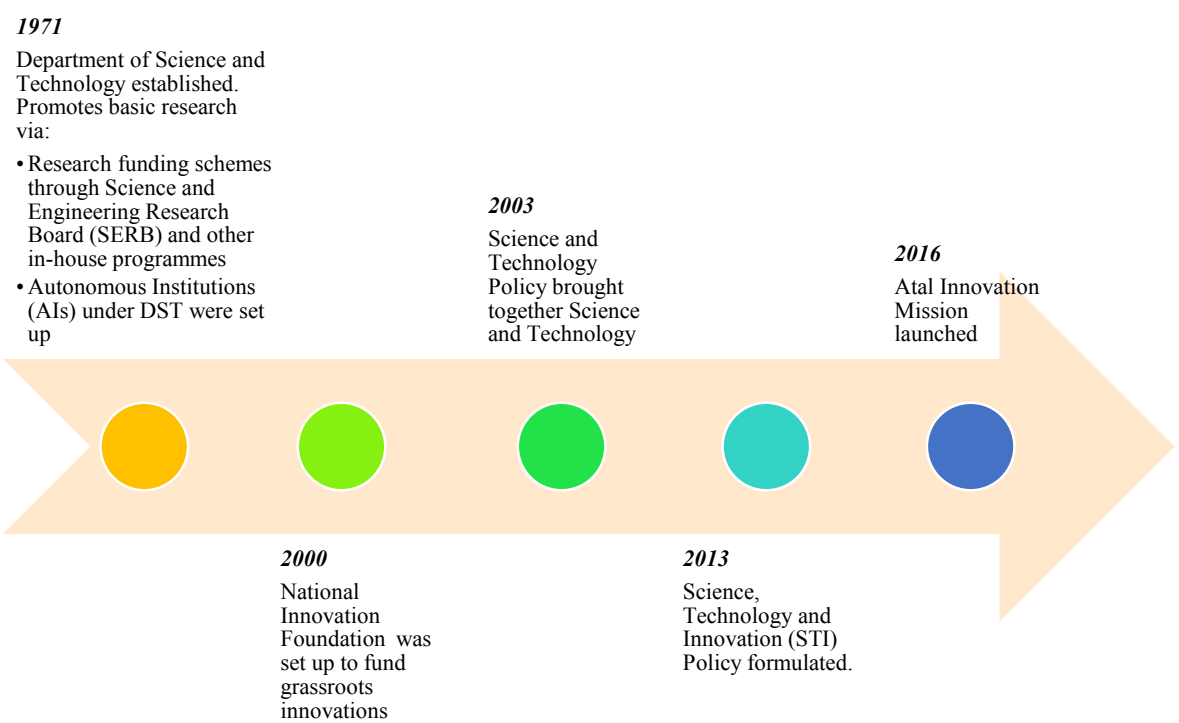
- India should be among the top 50 countries in the Global Innovation Index by 2022-23.[1]
- Five of our scientific research institutions should be amongst the top 100 in the world.
- India should aim to spend at least 2 per cent of gross domestic product (GDP) on R&D with equal contributions from the public and private sector.

Current Situation

Recognizing the crucial role of technology and innovation in economic development, India's policy makers have taken several initiatives to promote science, technology and innovation (see figure below).

Various schemes have been launched to attract, nurture and retain young researchers and women scientists in the field of scientific research. Some important achievements in the field of science and technology are enumerated below.

Figure 3.1: Steps taken to promote science, technology and innovation in India



- India has become a major destination for outsourced R&D activities. We currently have more than 1,100 R&D centres set up by multi-national companies (MNCs) such as IBM, Google, Microsoft, Intel, Lupin, Wockhardt, etc. These R&D centres cover areas including information and communication technologies, biotechnology, and aerospace, automotive, chemicals and materials technology. India's relatively strong intellectual property regime will facilitate its emergemce as a major R&D centre.
- Indian scientists are at the forefront of some global groundbreaking work. Recent contributions by Indian scientists to frontier research and technology have been encouraging. For example, 37 Indian scientists from nine Indian institutions played a key role in the discovery of gravitational waves that received the Physics Nobel prize in 2017. Indian scientists also contributed to the discovery of a neutron star merger at Laser Interferometer Gravitational Wave Observatory (LIGO), USA.
- The development of Brahmos, advanced air defence supersonic interceptor missiles, diverse missiles and rocket systems, remotely piloted vehicles, light combat aircraft, etc., are brilliant examples of India's progress in strategic and defence technologies.
- India now ranks amongst a handful of nations that have credible capabilities in the field of space technology. The upgrading from SLV to ASLV and PSLV to GSLV, the first moon orbiter project Chandrayan-1, Mars Orbiter Mission and the recent simultaneous launch of 104 satellites are India's significant achievements.
- India is now the third largest country in terms of the number of start-ups. This number is expected to rise exponentially in the coming years. The government has set up the Atal Innovation Mission (AIM) to transform radically the innovation, entrepreneurship and start-up ecosystem of the country.

While India has improved in most areas of technology, it is also necessary to recognize the challenges that we need to overcome to become an innovation led society.

Constraints

- Low R&D expenditure, especially from the private sector, is a key challenge facing the innovation ecosystem in India. The latest R&D Statistics[2] released by the National Science and Technology Management Information System (NSTMIS) of the Department of Science and Technology (DST) show that while R&D expenditure in India tripled in the period from 2004-05 to 2014-15, its size as a percentage of GDP remained at 0.7 per cent. This is very low compared to the 2 per cent and 1.2 per cent spent by China (for 2015) and Brazil (for 2014) respectively.[3] Countries like Israel spend as much as 4.3 per cent of their GDP on R&D. Furthermore, while the share of the private sector in R&D investment in most technologically advanced countries is as high as 65 per cent to 75 per cent, it is only about 30 per cent in India.
- The number of scientific R&D professionals in India at 218 per million population is distressingly low compared to China's 1,113 and USA's 4,019.
- The link between research, higher education and industry is weak and nascent. It needs to be strengthened and put on a firm platform.
- Our education system has so far not focused on cultivating a scientific temperament at an early age. Even at the later stages of an aspiring sci-

entist's career, the lack of career opportunities in basic sciences leads to the diversion of potential researchers to other rewarding sectors.

- "Lab to Land" time is too long. Renowned public funded institutions like the Council of Scientific & Industrial Research (CSIR), Defence Research and Development Organization (DRDO), Bhabha Atomic Research Centre (BARC), Indian Council of Medical Research (ICMR), Indian Council of Agricultural Research (ICAR) Indian Space Research Organisation (ISRO), Indira Gandhi Centre for Atomic Research (IGCAR) etc., along with prominent universities across the country, have developed many frontline technologies. However, the rate of transfer of these technologies to industry and for societal benefits is low.
- The adoption of indigenous innovations by Indian industry is not very encouraging. Frequent violation of Preferential Market Access (PMA) is an issue leading to large-scale imports of foreign products and services.
- The public procurement system is heavily biased in favour of experienced and established products and technologies. This strongly discourages new and innovative technologies offered by start-ups, who do not get much-needed support from government procurement.
- There has been poor progress in the development and deployment of affordable technologies for rural areas, particularly in agriculture, agro-processing, micro irrigation, etc.

The Way Forward

- An empowered body is needed to steer holistically the management of science in the country. Its scope will include science education and scientific research as well as coordinating and guiding various science initiatives. The proposed body will help in pursuing inter-ministerial, inter-disciplinary research besides breaking silos among various scientific departments/agencies.
- The major weaknesses of public funded R&D and technology institutions like CSIR, DRDO, BARC, ICMR and ISRO are their poor marketing skills and information dissemination. Some measures for enhancing technology commercialization by public funded institutions are provided below:
    - Value addition centres may be set up in each of these institutions for (i) up-scaling technologies, (ii) improving technologies from Technology Readiness Level (TRL) 4 to TRL 6/7, (iii) demonstrating industrial scale pilot production, (iv) coordinating with investors to incubate entrepreneurs, (v) bridging the gap between industry and technology development teams, (vi) enabling formal technology transfer, (vii) enabling commercialization and marketing and (viii) providing technology support during production.
    - DST should create a National Technology Data Bank in coordination with all publicly funded R&D institutions. This will provide a central database for technologies that are ready for deployment or under development.
    - Public funded research institutions should consider shifting their focus to the development and deployment of socially relevant technologies in areas such as clean drinking water, sanitation, energy, affordable healthcare, organic farming, etc. These technologies have large potential for commercialization.
- Measures related to government procurement include the following:

- In all government procurements, international competitive bidding for both products and services should be resorted to only when Indian manufacturers are unable to supply products/services of comparable international quality. This will promote the Make in India initiative.
- Quarterly workshops may be organised for creating awareness among procurement managers of various ministries/ departments/state governments/CPSUs, about the DIPP's Public Procurement Order 2017 (which aims to promote Make in India products/services).
- To adopt innovative technologies, experts/scientific practitioners should be mandatorily included on board/committees related to government procurement. All RFP/RFQ documents should include a suitable clause in this regard.
- In order to promote procurement of goods/ services developed by Indian start-ups, preference in the technical evaluation could be provided to them.

- To bring vibrancy to frugal innovations, a non-lapsable "District Innovation Fund" with a corpus of about INR 2 crore in each district may be created and used to promote grass root innovations.
- AIM has already launched Atal New India Challenges in partnership with five ministries to create products from technologies and prototypes in areas of national importance such as solid waste management, water and wastewater management as well as road and rail transport. These, along with Atal Incubation Centres (AICs) will also provide the platform for promoting frugal innovation. More such challenges will be launched in partnership with ministries and support will be provided to these ministries to adopt the resultant innovations.
- AIM has set up over 1000 Atal Tinkering Labs (ATLs) around the country covering over 625 districts. It is aimed to take this number to at least 5,000 by 2019 and 10,000 by 2020. Further expansion will be considered based on the outcomes of the first phase.
- To promote entrepreneurship and startups, AIM is supporting AICs across the country including at Tier II/III locations. These include existing and new incubation centres. It is expected that more than 100 world-class incubation centres will be up and running by 2020.
- Foreign collaborators, consultants, visiting faculty, adjunct scientists, etc., need to be involved in pursuing R&D in the emerging areas of basic sciences such as nano-technology, stem cell research, astronomy, genetics, next generation genomics, drug discovery, etc. DST, in collaboration with Indian Missions abroad, may identify discipline wise foreign experts who can collaborate with Indian scientists to take basic research in these areas to the next level.
- The Higher Education Commission once set up may consider giving credits for innovation and start-ups and also setting up online entrepreneurial development courses in colleges and universities.

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[1] Published by World Intellectual Property Organization jointly with Cornell University and INSEAD.

[2] Source: http://www.nstmis-dst.org/Statistics-Glance-2017-18.pdf. Accessed April 20, 2018.

[3] World Bank Statistics.

4. Industry

Objectives

- Double the current growth rate of the manufacturing sector by 2022.
- Promote in a planned manner the adoption of the latest technology advancements, referred to as 'Industry 4.0', that will have a defining role in shaping the manufacturing sector in 2022.

Current Situation

India is the fifth largest manufacturer in the world with a gross value added (GVA) of INR 21,531.47 billion in 2017-18 (2nd advance estimate for 2017-18 at 2011-12 prices). The sector registered a compound annual growth rate (CAGR) of around 7.7 per cent between 2012-13 and 2017-18.[1]

The government has taken several initiatives to promote manufacturing. Among these are the Make in India Action Plan aimed at increasing the manufacturing sector's contribution to 25 per cent of GDP by 2020,[2] the Start-up India initiative to promote entrepreneurship and nurture innovation, and the Micro Units Development and Refinance Agency (MUDRA) and Stand-up India to facilitate access to credit. It has also undertaken massive recapitalisation of public sector banks[3] to ease availability of credit to micro, small and medium enterprises (MSMEs). Besides, it has undertaken major infrastructure projects, such as the setting up of industrial corridors, to boost manufacturing.

The Department of Industrial Policy & Promotion (DIPP) has been engaging with states/UTs to enhance the ease of doing business. Following concerted efforts of the government, the World Bank ranked India 100th among 190 countries in the Ease of Doing Business (EODB) in 2018. This was a jump of 34 positions since 2014. While these indices are useful for comparison, actual improvement in EODB will come only with greater coordination between the centre and states.

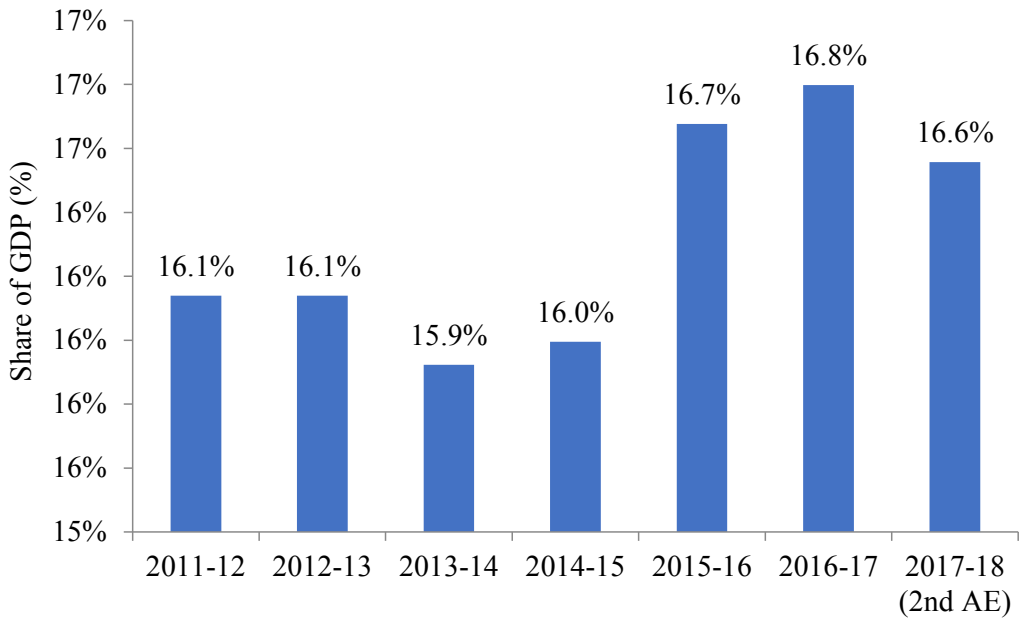
The foreign direct investment (FDI) regime has been substantially liberalized, significantly improving India's rank in terms of annual FDI inflows from 14 in 2010 to 9 in 2017. However, India receives only 25 per cent of the FDI that China gets and only 10 per cent of what the USA receives. FDI inflows into the manufacturing sector reached about 35 per cent of total FDI.[4]

Manufacturing as a percentage of the gross domestic product has remained at about 16 per cent. Improvement are evident in recent quarters, where manufacturing growth at 6.9 per cent and 8.1 per cent in Q2 and Q3 2017-18 (year-on-year as compared to 2016-17) outpaced GDP growth. Figure 4.1 shows the trend in manufacturing as a percentage of GVA from 2011-12 until 2017-18.

Constraints

The main constraints on achieving the objectives set for India's industry in 2022-23 are the following:

Figure 4.1: Manufacturing as a share of GDP, 2011-12 to 2017-18



Source: MoSPI

- **Regulatory uncertainty**: Regulatory risks and policy uncertainty in the past have dented investor confidence.
- **Investment**: There has been a cyclical slow-down in fresh investment since 2011-12.
- **Technology adoption**: The adoption of new technologies like artificial intelligence, data analytics, machine-to-machine communications, robotics and related technologies, collectively called "Industry 4.0", are a bigger challenge for SMEs than for organized large-scale manufacturing. Data security, reliability of data and stability in communication/transmission also pose challenges to technology adoption.
- **Exports and insufficient domestic demand**: There has been no export driven industrial growth. Domestic demand alone may not be adequate for sustained, high value manufacturing.
- **Challenges to doing business**: Despite recent improvements in our global EODB rank, it continues to be a drag on the system. This is also true of investment conditions in the states. Getting construction permits, enforcing contracts, paying taxes, starting a business and trading across borders continue to constrain doing business.

Way Forward

Demand generation, augmentation of industrial infrastructure and promotion of MSMEs

- The government can play a crucial role in creating domestic manufacturing capabilities by leveraging proposed public procurement and projects. Mega public projects such as *Sagarmala, Bharatmala*, industrial corridors, and the *Pradhan Mantri Awas Yojana* (PMAY) can stimulate domestic manufacturing activities provided the projects are suitably structured and demand is aggregated strategically. This should be

accompanied by simplification of the regulatory process. The Madhepura Electric Locomotive Project, a joint venture between the Indian Railways and the French multinational Alstom, provides a good example of how mega projects can be leveraged to boost domestic production. The project enabled effective transfer of technology and the availability of state-of-the-art locomotives for the railways. The Madhepura model is replicable in the defence, aerospace, railways and shipping sectors.

- Set up a portal to monitor projects beyond a given threshold so that any roadblocks are identified and addressed on a real time basis. State governments should be encouraged or incentivized to contribute data to this portal. NITI Aayog's Development Monitoring and Evaluation Office (DMEO) can help set up the portal. An inter-ministerial body with representatives of state governments and project promoters (as special invitees) may be constituted.
- Efforts should be made to develop self-sufficient clusters of manufacturing competence, with Cluster Administrative Authorities empowered to provide single window clearances to entrepreneurs and investors. Industrial corridors should address the lack of infrastructure and logistics. Logistics will need to be supplemented with warehousing and other elements of the manufacturing supply chain.
- NITI Aayog could work with states to prepare manufacturing clusters and develop export strategies based on their sector competitiveness and resource strengths. A cluster should have supporting industries and infrastructure. It should also develop a local brand and distribution channel through an e-commerce platform. A Cluster Administration Office should be given the responsibility to award factory permissions and compliances.
- For India to become the world's workshop, we should encourage further FDI in manufacturing, particularly when it is supported with buybacks and export orders.
- Streamline discretionary powers vested at different levels of governance by adopting digitized processes and making all approvals electronic in a transparent, time bound manner.
- Disruptive technology, while leading to job losses in traditional areas, also presents new job opportunities. A greater connect between government-industry-academia is required to identify the changing requirements in manufacturing and prepare an employable workforce. In the context of employability of engineers, there is a need for thorough review of standards of engineering education and its linkages with industry.
- E-commerce can be the driver of overall economic growth over the next decade through its impact on generating demand, expanding manufacturing, employment generation and greater transparency. A Committee, chaired by CEO, NITI Aayog examined issues related to the e-commerce industry[5]. It made recommendations for the sector's growth including increasing internet access, digitizing payments, further improving transportation infrastructure, logistics and distributed warehousing support. These may be examined for implementation at the earliest.
- Harmonize Indian quality standards with global standards in many sectors. Lack of harmonization has affected Indian exports and prevented the leveraging of trade agreements adequately.

For e.g., the medical device industry would benefit greatly from conformity to standards that are essential for new products to be acceptable to doctors and patients abroad. The issues of regulations and standards setting are also intertwined. The following initiative is required in this regard:

  - Task the Bureau of Indian Standards and Quality Council of India with assessing the improvements in standards and productivity required to achieve global standards.

- Address the following issues in respect of MSMEs:
  - Setting up of mega parks and manufacturing clusters in labour intensive sectors with common facilities to reduce costs and improve quality. It is also recommended that state governments should set up plug and play parks (flatted factories) to ensure international productivity standards.
  - Workers of industrial units in the new mega parks should have decent accommodation within reasonable proximity of the work place.
  - An expert committee should examine sector-specific pain points and make its recommendations within three months.
  - The Department of Public Enterprises (DPE) should ensure registration of all public sector units (PSUs) on the Trade Receivables Discounting System (TREDS) portal.
  - Initiate a small business research programme in some select ministries for encouraging R&D in MSMEs.

Industry 4.0

- Launch a major initiative to push industry to adopt Industry 4.0. Industry 4.0 is characterized by increasing digitization and interconnection of products, value chains and business models. It will significantly impact sectors like automobile, pharmaceuticals, chemicals and financial services and will result in operational efficiencies, cost control and revenue growth. Experts feel that emerging markets like India could benefit tremendously from the adoption of Industry 4.0 practices.
- In his 2018 Budget Speech, the Finance Minister mandated NITI Aayog to initiate a national programme directing India's efforts on Artificial Intelligence[6]. On a similar note, NITI Aayog could organize a discussion on "Industry 4.0," inviting leading manufacturing companies from various sectors including automobile/auto components, electrical and electronics, chemicals, cement/steel, etc., along with concerned ministries to discuss plans for adopting Industry 4.0.
- The Indian Institute of Science, a few select Indian Institutes of Technology (IITs), National Institutes of Technology (NITs) and other premier engineering colleges should create specialized training programmes on 'Smart Manufacturing' to address the shortage of high-tech human resources.
- The Department of Heavy Industry (DHI) should develop the Central Manufacturing Technology Institute (CMTI), Bangalore, as a Centre of Excellence for pursuing R&D in Industry 4.0 technologies and systems. The Department of Science & Technology should spearhead industry-academia R&D projects on cyber physical systems.

- The development of industries that produce the key building blocks forming the basis of Industry 4.0 could be incentivized. Incentives could be focused on MSMEs that manufacture products including sensors, actuators, drives, synchronous motors, communication systems, computer displays, and auxiliary electromechanical systems. Similarly, industries adopting Industry 4.0 standards could be provided support for a fixed period of time.
- Reliability, stability and integrity of smart manufacturing systems can be increased by creating Indian standards for the systems and sub-systems for adoption by manufacturers.

Ease of doing business

- Introduce a "single window" system in all states that provides a single point of contact between investor and government and facilitates all required licences and approvals. It should be based on stakeholder consultation.
- For efficient approval/inspection process, develop a system of accountability for major stakeholders like inspection bodies, testing labs, etc.
- For geographical planning and ease of environmental clearances, adopt the system of using Geographic Information System (GIS) based maps at all levels to create pre-approved land banks for manufacturing facilities. This is already being practiced in some states. In such designated land banks, standards can be clearly laid down in advance relating to (i) environmental requirements (ii) building bye-laws, and (iii) safety and other norms.
- Replicate in other states the Gujarat Pollution Control Board (GPCB) Environmental Audit Scheme based on third party certification.
- To strengthen third party certification systems, develop suitable accreditation agencies.
- Ensure the seamless integration of the *Shram Suvidha* portal and state agencies' portals.

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1 Ministry of Statistics and Programme Implementation data Accessed April 30, 2018.

2 Make in India website. Accessed April 30, 2018. http://www.makeinindia.com/about.

3 http://pib.nic.in/newsite/PrintRelease.aspx?relid=171900. Accessed April 30, 2018.

4 http://dipp.nic.in/sites/default/files/FDI_FactSheet_21February2018.pdf. Accessed April 29, 2018.

5 http://pib.nic.in/newsite/mbErel.aspx?relid=169011. Accessed April 27, 2018.

6 http://www.indiabudget.gov.in/ub2018-19/bs/bs.pdf. Accessed April 27, 2018.

5. Doubling Farmers' Income (I): Modernizing Agriculture

Objectives

- Modernize agricultural technology, increase productivity, efficiency and crop diversification.
- Generate income and employment through a paradigm shift that ensures food security while maximizing value addition in agriculture.

Current Situation

The existing yield levels of a majority of crops remains much lower than the world average. The predominant causes are low irrigation, use of low quality seeds, low adoption of improved technology, and knowledge deficit about improved agricultural practices. Close to 53 per cent of cropped area is water stressed. Rainwater management practices and services are resource starved. This limits a farmer's capacity to undertake multiple cropping and leads to inefficient utilization of land resources.

Inefficient extension delivery systems have led to the presence of large yield gaps as well. Yield gaps exist at two levels in India. First, there is a gap between best scientific practices and best field practices. The second gap exists between best field practices and the average farmer. There exist significant yield gaps both amongst and within states. Yield gaps have been found to exist in even highly productive states such as Punjab. Closing these gaps provides an opportunity to enhance productivity and incomes significantly. This further implies that states with low productivity (or large yield gaps) have significant potential for catch-up growth in their productivity levels.

Demand side factors favour the expansion of area under fruits and vegetables, and livestock products. These enterprises also offer better income. Staple crops (cereals, pulses and oilseeds) occupy 77 per cent of the total gross cropped area (GCA) but contribute only 41 per cent to the output of the crop sector. High value crops (HVCs) contribute an almost similar amount to total output as staples do, but they occupy only 19 per cent of the GCA.[1] Research has also shown that diversification to the fruits and vegetables segment is likely to benefit small and medium farmers more than large ones.[2]

Over the past few years, new development initiatives aimed at modernising agriculture have been introduced. *Pradhan Mantri Krishi Sinchai Yojana* (PMKSY) aims to expand irrigation coverage whilst promoting water use efficiency. Area under micro irrigation has grown 2.5 times in the last four years. The second cycle of the Soil Health Card (SHC) scheme is underway, which will focus on job creation and entrepreneurship development through local entrepreneurship models. So far, 3.76 crore SHCs have been distributed under the second cycle.

Constraints

1. Use of outdated and inappropriate technology is the main reason for low productivity of crops and livestock.
2. Given the pre-dominance of small and marginal farmers in Indian agriculture, affordability becomes a significant constraint on technology adoption by farmers.
3. There exist several bottlenecks hampering on-farm adoption of technology developed in public sector.
4. Agricultural research in the country is constrained by resource inadequacy, regulations and intellectual property rights (IPR).
5. Multiple private and public sources supplying different information to farmers create confusion.
6. A huge gap exists between the demand for and supply of skills in agriculture, hindering diversification, adoption of precision agriculture and on farm post-harvest value addition.
7. India has not caught up to the rest of the world in terms of technology, which has led to the dominance of inefficient production practices, such as flood irrigation, at the farm level. Renewed focus on on-ground absorption of technology, market intelligence, skills and extension and modernising trade and commerce in agriculture are needed to modernise agriculture in India.
8. Both production and marketing suffer due to the absence of adequate capital.
9. Low scale is a serious constraint on the adoption of improved practices and in the input and output market.

Way Forward

Productivity and efficiency

Increase area under irrigation: Irrigation coverage needs to be increased to 53 per cent of gross cropped area (GCA) by 2022-23.[3] The focus should be on increasing coverage through micro-irrigation.

Increase adoption of hybrid and improved seeds: States should take the lead through the following measures:

- Dynamic seed development plans are required. These may be based on crop wise area (each season separately), seed rate per hectare used, desired/targeted seed replacement rate and crop wise seed requirement. Crop wise requirement should be worked out based on historical trends, introduction of new varieties and replacement of poor yielding varieties.
- States should aim to increase the seed replacement rate (SRR) to 33 per cent for self-pollinated crops and 50 per cent for cross-pollinated crops in alternative years.

Increase Variety Replacement Ratio (VRR): Phase out old varieties of seeds and replace them with hybrid and improved seeds to enhance productivity. The Indian Council of Agricultural Research (ICAR) along with State Agricultural Universities (SAUs) should develop climate resilient varieties of crops suitable for the 128 agro-climatic zones of the country, through farmer participatory plant breeding and adopting farm varietal trials from the third year of the development of the seed.

Strengthen seed testing facilities: Seed testing facilities need upgradation in terms of both personnel and technical expertise. Regular performance monitoring is required to maintain the quality of test results.

Uniform national procedure for seed licensing: To tackle the problem of heterogeneity in seed licensing procedures across states, the central government should develop model guidelines for seed licensing and support states in implementing these.

Efficient fertilizer usage: Strengthen the SHC scheme and include not merely nine but all sixteen parameters in the tests. This will ensure SHC based fertilizer distribution at the ground level. Seed SHCs with the integrated fertilizer management system. Link SHCs with Kisan credit cards and make SHCs mandatory for subsidies. Ensure proper functioning of the SHC labs.

Reorient fertilizer subsidy policy: The current lopsided fertilizer subsidy policy needs to bring secondary and micronutrients on the same nutrient-based subsidy (NBS) platform as phosphorus (P) and potash (K).

Regulate pesticide use: Align the pesticide regulatory framework with food safety laws to make adoption broad based. Strengthen extension activities to ensure that best practices reach the average farmer.

Custom hiring centres: Madhya Pradesh has had demonstrable success with their custom hiring centre model to hasten the pace of farm mechanization. This model should be replicated nationwide by employing rural youth and promoting entrepreneurship.

Subsidies on liquid fertilizers: Targeted subsidy should be provided on liquid fertilizers to encourage fertigation with micro-irrigation.

Investment subsidies for micro-irrigation: Rather than power and water subsidies, investment subsidies for micro-irrigation can be provided through the DBT mode.

Strengthening extension systems

Synergy between Agriculture Technology Management Agency (ATMA) and Krishi Vigyan Kendras (KVKs): The ATMA programme needs to be reoriented to include bottom up planning at the district and block levels to develop Strategic Research Extension Plans (SREP).[4] Further decentralization and autonomy are essential to the success of this programme. Subject matter specialists at KVKs should orient their research to the block action plans developed by ATMA.

Public Private Partnership in KVKs: The guiding principles of ATMA provide for the promotion of PPP in extension delivery. With each KVK in possession of approximately 50 acres of land, KVKs should incubate private sector initiatives in extension delivery.

Market led extension: Give priority to extension services that disseminate information to farmers regarding (i) crop selection (ii) demand for and supply of crop produce, (iii) expected price of commodity and (iv) availability of infrastructure facilities for storage, transport and marketing of produce.

Value added extension: Prioritise value added extension services to enable a reduction in post-harvest losses by converting raw agricultural produce to processed products. This allows for increased price realization and contributes towards increasing farmers' income.

District level skill mapping: ICAR and SAUs should map the demand for and supply of skills in agriculture at the district level and coordinate with skill development missions to impart the required skills to farmers and agricultural labour.

Replicate dealer training programme in state agricultural universities: The National Institute of

Agricultural Extension Management's (MANAGE) dealer training programme should be replicated in SAUs, with diploma holders granted licences to conduct extension activities.

Sustainable water use in agriculture: About 83 per cent of water is used in agriculture. The solution to resolving India's imminent water crisis lies in conserving water in agriculture. Therefore, more efficient irrigation technologies, water harvesting and better crop selection must be encouraged.

Diversification: promotion of high value crops (HVCs) and livestock

High value crops

Encourage diversification to HVCs: Design an incentive mechanism to wean farmers away from cereal crops to HVCs. The area under fruits and vegetables needs to increase by 5 per cent every year.[5]

Establish regional production belts: As in the cluster-based approach, regional production belts for HVCs need to be identified and supported through the Mission on Integrated Development of Horticulture (MIDH). Make SHCs mandatory in these belts.

Use of hybrid technology in vegetables: Shift to using hybrid varieties for vegetables. At present, 10 per cent of the cropped area under vegetables is under hybrids. Shifting to hybrids has the potential to increase yields by 1.5 to 3 times and provide a significant increase in income.[6]

Rootstocks for production of fruits: Rootstock technology has shown the capacity to double production and be resilient to climate stress. Measures should be taken to standardize and promote usage of rootstocks to produce fruits.

Smart horticulture: There have been pockets of success spread throughout the country, using techniques such as high-density plantation, protected cultivation and organic production. These methods need to be documented and replicated at the national level. It is recommended that a mission on smart horticulture may be setup to identify and promote new technologies. This mission must work in synergy with various agricultural research institutions in the country.

Strengthen market for organic products: Targeted efforts to create a market for niche products is recommended. Spices unique to a state can be branded by the Spice Board to encourage the production of organic spices.

Convert agricultural waste: Recycling and utilizing agricultural waste would give a further filip to farmers' income.

Livestock and fisheries

Breed indigenous cattle with exotic breeds: Breeding of indigenous cattle with exotic breeds needs to be encouraged to arrest the issue of inbreeding. This will enable greater gene coverage, reduced diseases and greater resilience to climate change.[7]

Promote and develop bull mother farms: Employing multiple ovulation and embryo transfer technologies, these farms can significantly enhance milk productivity through the supply of cattle with enhanced milk potential to farmers.

Village level procurement systems: Installing of bulk milk chillers and facilities for high value conversion of milk are needed to promote dairy in states. The private sector should be incentivized to create a value chain for HVCs and dairy products at the village level.

Convergence of schemes in fisheries sector: Integrate the Blue Revolution scheme with MGNREGA. Ponds created through MGNREGA should be used to promote aquaculture and can be used to create potential clusters as well.

Capacity building for fish breeders and farmers: Establish fish co-operative organisations and run village level schemes in coordination with *panchayats* to disseminate best practices and research.

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1 Chand, Ramesh (2017), Doubling Farmers' Income: Rationale, Strategy, Prospects & Action Plan, NITI Aayog Policy Paper, NITI Aayog. New Delhi.

2 Committee on Doubling Farmers' Income, Ministry of Agriculture and Farmers Welfare (2018). Vol. II: Status of Farmers' Income: Strategies for Accelerated Growth, Doubling Farmers' Income. New Delhi.

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6 Committee on Doubling Farmers' Income, Ministry of Agriculture and Farmers' Welfare (2018). Vol. VIII-C. Horticulture and Sericulture: Production Enhancement through Productivity Gains. New Delhi.

7 Ministry of Agriculture and Farmers' Welfare (2018). National Conference on Agriculture. Background Paper on Promotion of Livestock, Dairy, Poultry and Fisheries as Engines of Growth. New Delhi.

6. Doubling Farmers' Income (II): Policy & Governance

Objectives

- Create a policy environment that enables income security for farmers, whilst maintaining India's food security.
- Encourage the participation of the private sector in agricultural development to transition from agriculture to robust agri-business systems.
- Promote through government policies the emergence of 'agripreneurs' so that even small and marginal farmers can capture a higher share of value addition from 'farmgate to fork'.

Current Situation

The mismatch between the contribution of agriculture to national income and share in employment has remained large and has widened. The manufacturing and service sectors have failed to absorb the excessive workforce in agriculture. Consequently, value addition per worker in agriculture grew slowly and income per farmer never crossed one-third of the income of a non-agriculture worker since the 1980s. The country took 22 years to double farmers' income at an annual growth rate of 3.31 per cent during 1993-1994 to 2015-16; doubling farmers' income between 2015-16 and 2022-23 will require an annual growth rate of 10.4 per cent in farmers' real income.

Corporate investment in agricultural infrastructure has not exceeded 2 per cent. In the years post-independence, the policy structure was focused on increased production and productivity to ensure food security for India. However, to achieve the target of doubling farmers' income by 2022-23, we need to shift our focus from agriculture to agri-business.

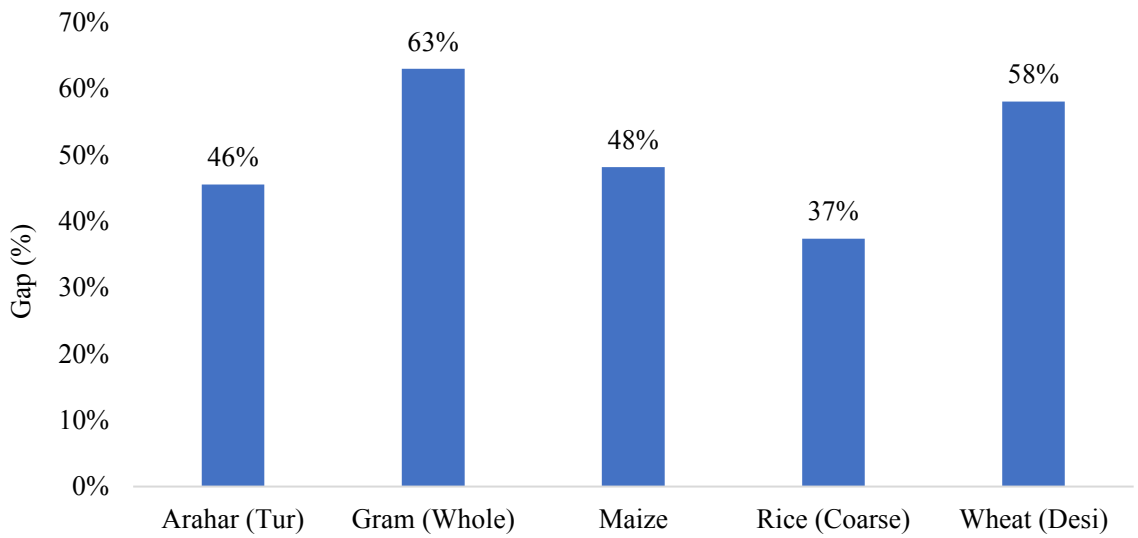
The current government has taken several steps to improve private investment in agriculture. 100 per cent foreign direct investment (FDI) was allowed in 2016-17. Similarly, the SAMPADA scheme targets creation of food processing infrastructure. The budget allocation to the food processing sector was doubled in the Union Budget 2018-19. Introduction of the Model Agricultural Produce and Livestock Marketing Act (2017), Model Contract Farming Act, new guidelines for agro-forestry are some other key policy initiatives taken over the past few years.

Constraints

1. **Fragmented land holdings**

   Agriculture is characterised by an extremely fragmented landholding structure with an average farm size of 1.15 hectares and the predominance of small and marginal farmers, with those holding less than 2 hectares

Figure 6.1: Price spread between farm harvest prices and retail prices for select agricultural commodities, 2015-16



Source: NITI Aayog Calculations & Directorate of Economics & Statistics, Ministry of Agriculture & Farmers Welfare

(accounting for 85 per cent of agricultural households).[1] This makes it difficult for them to access credit or new technology, severely affecting farm productivity and hence, farmers' incomes.

2. **Low price realization**

   There exists a large gap between farm harvest prices (FHP) and retail prices (see Figure 6.1).[2] Prices also tend to fall below the minimum support prices in a good production year, leading to agrarian distress. Mechanisms need to be developed to ensure remunerative prices to farmers, in both 'good' and 'bad' monsoon years.

3. **Non-farm employment**

   Lack of non-farm employment opportunities has resulted in excessive dependence on agriculture for livelihood among both small and marginal farmers as well as among the landless.

4. **Agricultural credit**

   Despite an allocation of more than INR 11 lakh crore of commercial credit, access to institutional credit remains a constraint, especially in the case of tenant farmers.

5. **Agricultural trade**

   Exporters of agro-commodities are not successful in raising their share in global markets because of uncertainty in the foreign trading regime.

Way Forward

- **Marketing reforms**

  Many of the constraints in marketing can be addressed by adopting the Model Agricultural Produce and Livestock Marketing Act (APLM), 2017,[3] which provides for progressive agricultural marketing reforms, including the setting up of markets in the private sector, allowing

direct sales to exporters/processors and customers, farmer-consumer markets, e-trading, single point levy of market fee, a unified single trading licence in a state, declaring warehouses/silos/cold storage as market sub-yards and the launch of the National Market for Agriculture. APLM should be adopted by all states as expeditiously as possible.

- **Amend Essential Commodities Act**

  The Essential Commodities Act, which has proven a disincentive to large investment in agricultural technology and infrastructure, should be replaced with a modern statute that balances the interests of farmers and consumers.

- **Stable export policy**

  In consultation with all stakeholders, the Government of India should come up with a coherent and stable agricultural export policy, ideally with a five to ten-year time horizon and a built-in provision for a mid-term review. Efforts should be made to achieve this urgently.

- **Price realization**

  The government should consider replacing the Commission on Agricultural Costs & Prices (CACP) by an agriculture tribunal in line with the provisions of Article 323 B of the Constitution. NITI Aayog should set up a group to examine the following:

  - Replacing the minimum support price (MSP) by a minimum reserve price (MRP), which could be the starting point for auctions at mandis.
  - Separating the criteria for MSPs for (i) surplus produce; (ii) for deficit but globally available products; and (iii) for products that are in deficit both domestically and globally.
  - Examine options for including private traders operating in markets to complement the minimum support price regime through a system of incentives and commission payments.

  Raising MSP or prices can only be a partial solution to the problem of assuring remunerative returns to farmers. A long-term solution lies in the creation of a competitive, stable and unified national market to enable better price discovery, and a long-term trade regime favourable to exports.

  Agriculture advisory service: An effective and technology driven Agriculture Advisory Service may be considered on the lines of those of the United States Department of Agriculture (USDA) and the European Union (EU). The mandate would be to ensure that farmers adopt an optimal cropping pattern that maximizes their income.

  Futures trade: Futures trade should be encouraged. Removal of entry barriers to increase market depth should be considered.

  Crop insurance: PMFBY needs to be modified to -

  - Promote weather-based insurance.
  - Increase non-loanee farmers' insurance coverage.
  - Allow for mixed cropping and increase the number of crops notified.

- **Contract farming**

  Encourage states to adopt the Model Contract Farming Act, 2018: Contract farming can be thought of as a form of price futures. The

contract will specify the price and quality at which the farmers' produce will be purchased. This protects the farmer in cases where prices fall below the MSP.

Box 1: Salient features of the Model Contract Farming Act, 2018

The Draft Model Contract Farming Act, 2018, is an attempt to provide an enabling environment for contract farming to thrive. First, the Act takes contract farming out of the ambit of Agricultural Produce Marketing Committees (APMCs). Under the Model Act, every agreement shall be registered with a Registering and Agreement Recording Committee, consisting of officials from departments such as agriculture, horticulture, animal husbandry, marketing, fisheries and rural development. The committee can be set up at the district, block or *taluk* levels. The Act also contains a provision for the creation of a State-level Contract Farming (Promotion and Facilitation) Authority.

Dispute resolution is essential to the smooth functioning of the Model Act. Both farmers and buyers need to be protected from risks pertaining to executing the contract. For example, buyers are exposed to the risk of the farmer selling his produce to a third party, whilst the farmer is exposed to the risk of receiving a price below the agreed price. The Model Act contains several provisions for dispute resolution. Briefly, these are (i) negotiation and reconciliation for a mutually acceptable solution, (ii) referral of the matter to a nominated dispute settlement officer and (iii) appealing to the Contract Farming (Promotion and Facilitation) Authority if no suitable solution is found through solutions (i) and (ii).

- **Land aggregation**
  - *Encourage states to adopt the Model Agriculture Land Leasing Act, 2016*: The Model Act aims to improve land access to small and marginal farmers through land leasing, whilst also providing for a mechanism for tenants to avail of institutional credit. A major constraint to land leasing under the present regulatory environment is the unwillingness of landowners to lease out land due to fears of land capture by tenants. The Model Act spells out the rights and responsibilities of both landowners and tenants. Like the Model Contract Farming Act, 2018, this Act too contains provisions for dispute resolution within a specified timeframe.
  - *Digitize land records*: Complete digitization of land records is a must for effective implementation of land leasing. Geo-tagging, along with location agnostic online registration of land records to generate updated land records, must be carried out.[4]
  - *Promote farmer producer organizations (FPOs)*: There are now 741 FPOs in the country, managed under the aegis of Small Farmers Agribusiness Consortium (SFAC). They have demonstrated that aggregating farmers can help achieve economies of scale. The benefits accorded to start-ups under the Start-up India Mission need to be extended to FPOs as well. National Bank for Agriculture and Rural Development (NABARD's) model of joint liability groups can be promoted to channelize small growers into the value chain.

- **Research & development**
  - *Focus on precision agriculture*: Support research on energy friendly irrigation pumps, micro irrigation, climate smart technologies, internet of things (IoT), and use of technology in animal husbandry to monitor animal behaviour, health and production to prepare for future challenges.
  - *Raise research spending*: Research spending, currently at 0.3 per cent, needs to be increased to at least 1 per cent of agricultural GDP.
  - *Create a knowledge hub to disseminate best practices*: It is essential that new technology be adopted at the farm level. The performance of *Krishi Vigyan Kendras* (KVKs) should be regularly reviewed by external agencies and well performing KVKs must be strengthened to disseminate best practices at the field level.
  - *Develop models of integrated farming*: Research so far has focused on practices for individual crops or enterprises. The Indian Council of Agricultural Research (ICAR) and State Agriculture Universities (SAUs) should focus on providing recommendations across the farming value chain, covering production, post-production, processing and other value-addition activities.
- **Innovation**

  Several breakthroughs have the clear potential for quickly doubling farmers' income.
  - One is the recorded success of zero budget natural farming by Subhash Palekar. It is now being adopted across the country and providing notable increases in farmers' net income by sharply reducing costs of production and improving incomes by raising yields and improving the quality of agricultural produce.
  - Two, there are patented herbal inputs that improve soil quality and make plants more pest resistant. These herbal inputs, for which actual performance data is now available for a few thousand farmers, need to be applied across the country.
  - Three, rapid progress has also been made in organic farming techniques, which have also helped improve incomes of cultivators and dairy farmers. These should be carefully examined for possible application across the country.
- **Non-farm income**
  - Moving labour out of agriculture into manufacturing will go a long way towards the goal of doubling farmers' income. According to estimates prepared by Chand, Srivastava & Singh (2017), nearly two-thirds of rural income is generated in non-agricultural activities. In non-agricultural activities in rural areas, another avenue is shifting farmers to agro-business and farm-related skills which are currently in short supply. Create and nurture agripreneurs for achieving greater value addition through agro-processing and propagation of modern extension services.
  - India will also have to accelerate growth in the manufacturing, services and exports sectors to wean labour away from agriculture. This will result in higher productivity and income for farmers.

[1] Agriculture Census 2010-11.

[2] Latest data on FHP is available only for 2015-16. Where state weighted average was not available or FHP was not available, the FHP for 2014-15 was increased by an amount equal to the MSP increase between 2014-15 and 2015-16. The annual retail price has been derived by taking a simple average of monthly prices across states.

[3] Committee on Doubling Farmers' Income, Ministry of Agriculture & Farmers Welfare (2017). Volume XIII: Structural Reforms and Governance Framework. New Delhi.

[4] Committee on Doubling Farmers' Income, Ministry of Agriculture & Farmers Welfare (2017). Volume XIII: Structural Reforms and Governance Framework. New Delhi.

7. Doubling Farmers' Income (III): Value Chain & Rural Infrastructure

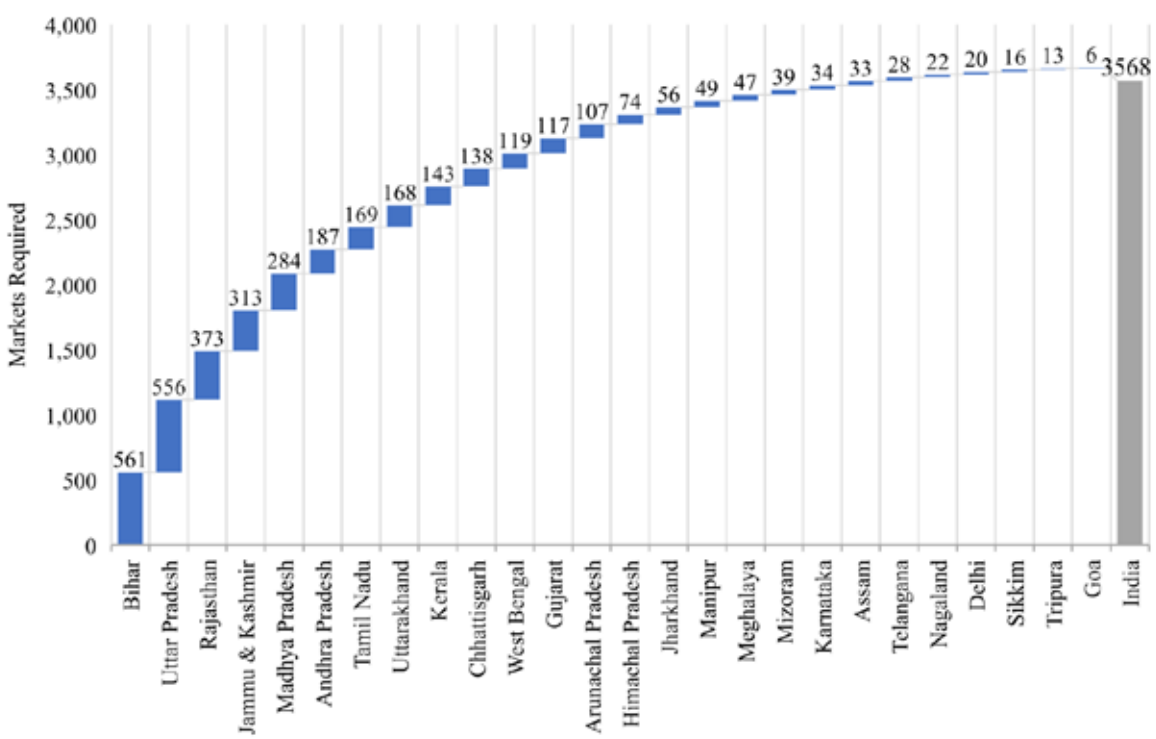
Objectives

- Transform the rural economy through the creation of modern rural infrastructure and an integrated value chain system.
- Leverage the value chain to boost India's exports of food products.
- Create occupational diversification and quality employment opportunities for doubling farmers' income by 2022-23.

Current Situation

Despite rapid progress, rural India suffers from an infrastructure deficit. The present government has done an admirable job in achieving full village electrification and accelerating the pace of

Figure 7.1: Additional markets required by 2022-23



Source: Ministry of Agriculture & Farmers' Welfare

Table 7.1: Gaps in cold-chain development

Type	All-India Requirement 2015	Status on 31.12.2017
Pack-houses	69,831	20,864
Cold Storage (million)	34.16 MT	35.88 MT
Reefer Vehicles	52,826	1,047
Ripening Chambers	8,319	443

Source: National Centre for Cold Chain Development (2015)

connecting habitations through the *Pradhan Mantri Gram Sadak Yojana* (PMGSY). Similarly, household electrification has been given a significant push under the *SAUBHAGYA* scheme. Agriculture infrastructure, such as rural markets, warehouses, cold chain, farm machinery hubs and public irrigation need upgradation.

Based on the recommendations of the Dalwai Committee on Doubling Farmers' Income, the number of additional markets required comes to 3,548. The recent 2018-19 budget announcement to develop the existing 22,000 Rural Periodic Markets (RPMs) into *Grameen* Agriculture Markets (GrAMs) will offer better market access to small and marginal farmers. This initiative recognises GrAMs as facilities for first stage post production activities, enabling aggregation and transport from the village level to wholesale markets. The electronic national agriculture market (e-NAM) was launched in 2016 to create a unified national market. So far, 479 *mandis* across 14 states and UTs have been integrated on the platform.

The lack of an adequate and efficient cold chain infrastructure leads to massive post-harvest losses, estimated at INR 92,561crore annually.[1] Perishables account for the bulk of post-harvest losses. Moreover, as a recent report indicates,[2] most existing cold storages are single commodity storages, resulting in their capacities lying idle for up to six months a year. The cold-chain infrastructure is also unevenly distributed among states.

Inadequate cold-chain infrastructure hampers India's food exports as well. Countries across the world have stringent guidelines for import of agricultural and processed food products. The European Union (EU) has raised more notifications, issued more rejections and destroyed more consignments from India as compared to consignments from other developing countries such as Turkey, Brazil, China and Vietnam.[3] India has huge export potential, reflected in the fact that its domestic commodity prices were below export parity prices in 72 per cent of cases.[4]

The present government has taken several steps to modernise the agri value chain. The SAMPADA central sector scheme aims to supplement agriculture by modernising processing activities and decreasing agri-waste. Similarly, in the 2018-19 budget, 'Operation Green' on the lines of 'Operation Flood' was announced. This scheme aims to promote farmer producer organisations, agri-logistics, processing facilities and professional management of such operations.

Constraints

1. Public and private investments in agriculture have remained low since the early 90s. Bottlenecks in implementation and a high degree of uncertainty have further reduced investor appetite for agricultural investments.
2. Inability to acquire land for setting up of market yards, resulting from the restrictions on land leasing and land acquisition, is another major constraint.
3. Even the existing marketing infrastructure suffers because of a lack of finances, manpower and proper facilities. Sub-market yards largely function as a location for government procurement and do not provide opportunities for open auction. Further, they are irregular in their operations and handle less than five per cent of the volume handled in principal yards.
4. Poor maintenance of rural roads is a major constraint as well. Linkages with local and feeder roads remain sub-optimal.
5. In the electricity sector, separate feeders for supply of power to agriculture and domestic electrification have not been carried out in many states.
6. Lack of agriculture best practices hinders India's food exports. Interventions at the farm or producer level are needed to ensure that products meet export standards. However, factors such as the lack of a traceability mechanism from the farm to the consumer, fragmented holdings and restrictions on direct procurement of products from farmers in some states makes it virtually impossible to ensure that products meet export quality standards.

Way Forward

Markets and value chain

Infrastructure status for agriculture value chains: Warehousing, pack-houses, ripening chambers, and cold storages, including those set up at the village level, should be accorded full-fledged infrastructure status to enable them to avail of the fiscal benefits that come with infrastructure status.

Village level procurement centres: To benefit small and marginal farmers, government collection centres and warehousing facilities should be set up at the village/block level. The budget announcement of developing Gramin Agricultural Markets (GrAMs) will help develop the agricultural marketing infrastructure and bring markets closer to the farm-gate.

Link production to processing: Village level collection centres for fruits and vegetables should be linked to larger processing units. Actively engage the private sector in developing processing centres near rural periodic markets (RPMs).

Food processing: A greater focus should be placed on the food processing industry for enhancing value addition in vegetable and fruit crops. The government has now shifted its attention to promoting "agripreneurs". This will result in rapid modernization of the agriculture sector.

Rural markets: Develop private market yards. Agro-processors and food processors that wish to establish backward integration to secure their raw material should partner with the government in organizing sourcing through the RPMs.

Upgrade wolesale markets: Upgrade wholesale markets with facilities for temporary storage, pack-house operations and cold storage facilities.

Warehouse upgradation: Pledge financing at warehouses, through negotiable warehouse receipts (NWR), needs to be adopted and popularized as an alternative means of financing. The Department of Agriculture and Farmers' Welfare (DACFW) should draw up guidelines to promote warehouse based post-harvest loans and e-NWR trading.

Block level resource centres: Establish functional block level resource centres to create value chains, targeting clusters of villages along with social services. It will create an integrated solution for the farmer to access his/her requirements for agriculture and other services. It will also add to employment generation at the local level by engaging youth and creating village level entrepreneurs.

Convergence in government initiatives: Coordination is needed between the initiatives of the Ministry of Agriculture, Food Processing, and Commerce to develop effective procurement linkages, processing facilities, retail chains and export activity. This will facilitate synergies between various initiatives such as the *Rashtriya Krishi Vikas Yojana* (RKVY) of the agriculture ministry, viability gap funding of the Ministry of Commerce for cold chains and warehousing infrastructure development and *Pradhan Mantri Kisan Sampada Yojana* of MOFPI.

Strengthen railway freight operations: Railway freight operations should be strengthened through temperature-controlled containers and loading and unloading facilities to reduce post-harvest losses and connect land-locked states to export markets.

Rural roads, electricity and mechanization

Maintenance of rural roads through women SHGs: The maintenance of roads by women SHGs has been experimented with by some states (Uttarakhand for example) and has been found to be very promising. This model could be replicated by other states.

Revisit criteria for identification of rural habitats for road connectivity: To ensure better inclusion, the criteria for identification of habitats for rural roads connectivity in hill and left-wing extremism (LWE) affected districts must be revisited.

Incentivize feeder separation: All distribution companies (DISCOMs) need to be incentivized for rural feeder separation. Agriculture connections and electricity supply feeders should be separated from domestic rural electricity supply.

Incentivize private investment in farm implements: Private entrepreneurs should be incentivized to establish small farm implement mechanization hubs for every 1000 ha and big machinery hubs for every 5000 ha of cultivated area.

Export enablers

Develop export oriented clusters: The Agricultural and Processed Food Export Development Authority (APEDA) has been championing the development of export-oriented clusters with common infrastructure facilities. These clusters should contain a functional, end-to-end cold chain system along with processing facilities.

Increase the number of testing laboratories: There exists a shortage of testing laboratories, essential for health certificates for exports. Private laboratories should be extended financial support to achieve international accreditation. As suggested by APEDA, agricultural universities should also seek to get their labs accredited by APEDA.

Augment cargo handling facilities at airports: APEDA has suggested augmenting the capacity of the Ahmedabad Air Cargo Complex and Mumbai Airport to handle agricultural cargo.

Green channel clearance: Efforts must be made to setup a green channel for perishable produce at identified airports handling cargo.

Regulatory frameworks to combat rejections in export markets: Regulatory frameworks regarding use of pesticides, growth hormones, and antibiotics for marine produce need to be developed and implemented effectively to curb the rejection rate in the export market.

Ensure traceability mechanism: Promotion of farmer producer organizations (FPOs), export-based clusters and contract farming will go a long way towards ensuring traceability of farm produce, a key export requirement.

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1 ICAR-Central Institute of Post-Harvest Engineering and Technology (CIPHET).

2 Grant Thorton and ASSOCHAM (2017), Food Processing Sector: Challenges and Growth Enablers <http://www.grantthornton.in/globalassets/1.-member-firms/india/assets/pdfs/food_processing_sector.pdf>. Accessed April 12, 2018.

3 Goyal, Mukherjee and Kapoor (2017). India's Exports of Food Products: Food Safety Issues and Way Forward. ICRIER: New Delhi.

4 Gulati and Saini (2017). Price Distortions in Indian Agriculture. ICRIER: New Delhi.

8. Financial Inclusion

Objectives

- **Banking for the unbanked**
  - Bank accounts: Ensuring universal access to bank accounts, which are a gateway to all financial services.
  - Digital payment services: Providing access to digital payment services and increasing its penetration.
- **Securing the unsecured**
  - Insurance and social security: Ensuring universal coverage of insurance for life, accidents, etc., and of pensions and other retirement planning services.
  - Asset diversification: Allowing diversification of asset portfolio of households through increased participation in capital markets.
- **Better access to credit at a reasonable cost for those presently excluded**

Current Situation

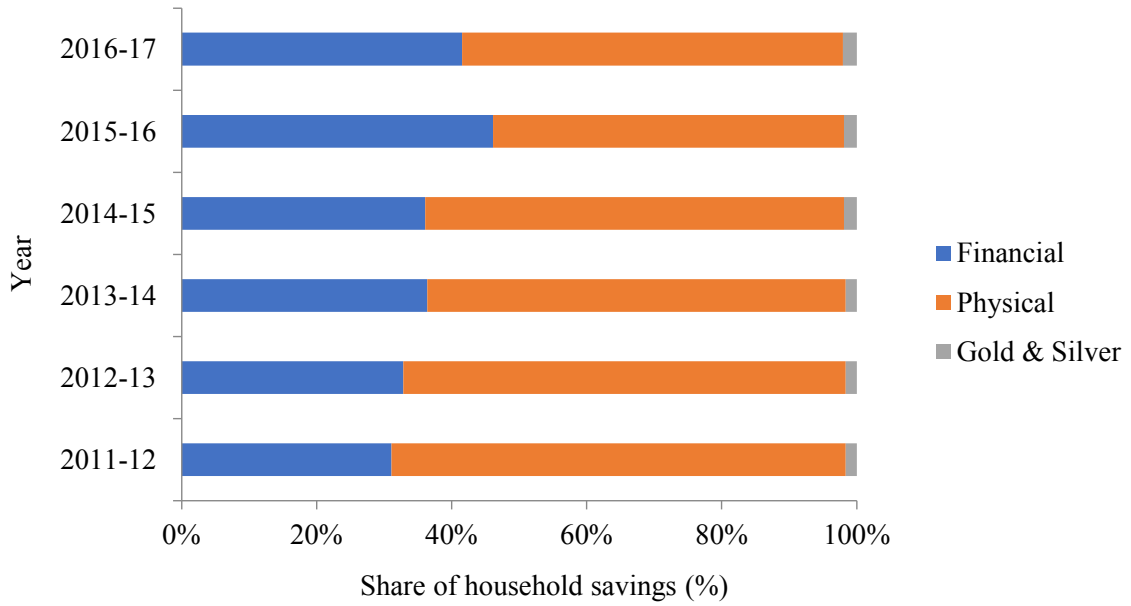
The government has launched many flagship schemes to promote financial inclusion and provide financial security to empower the poor and unbanked in the country. These include the *Pradhan Mantri Jan Dhan Yojana, Pradhan Mantri Mudra Yojana,* Stand-Up India Scheme, *Pradhan Mantri Jeevan Jyoti Bima Yojana, Pradhan Mantri Suraksha Bima Yojana, and Atal Pension Yojana.* In addition, the promotion of *Aadhaar* and direct benefit transfer schemes facilitate financial inclusion.

These schemes have led to significant progress. According to World Bank data, in 2014, 53 per cent of adults had a bank account. This increased to 80 per cent in 2017, which is now comparable to China.[1] Many recent independent studies have documented the increased ownership and active use of bank accounts because of the *Jan Dhan* scheme.[2] There has also been an increase in the penetration of low cost insurance schemes and pension schemes. Even as the importance of financial assets is increasing for Indian households, physical assets continue to be the predominant asset class for savings for them.

Awareness and use of mobile payments in India had been low. In 2016, the percentage of the population using mobile money services in India was only 1 per cent, compared to Bangladesh (40 per cent), Pakistan (9 per cent), Kenya (81 per cent) and Tanzania (61 per cent).[3] Many of these models in other countries have been driven by non-banking providers such as telecommunication companies, using modes of communication such as Unstructured Supplementary Service Data (USSD). However, after demonetization and the launch of the *BHIM* platform, penetration of mobile payments has improved. Several new initiatives such as *Aadhaar*-enabled payment services, payment banks, etc. will boost the use of mobile payments.

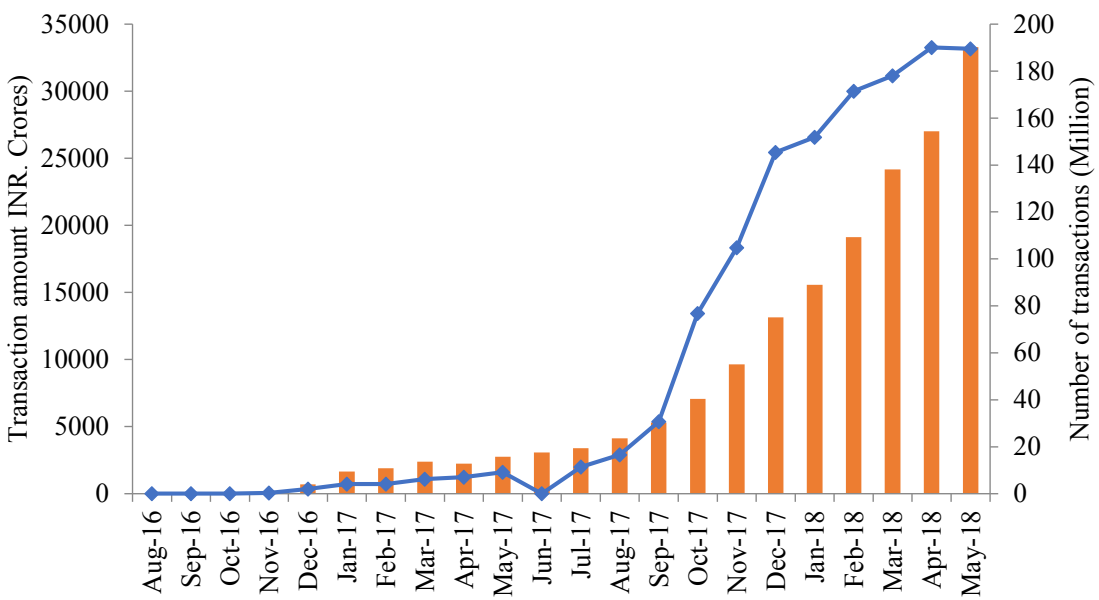
In terms of credit access, India has considerable ground to make up. In 2016, the number of loan accounts per 1,000 adults was 154 in India. In comparison, the number of loan accounts per

Figure 8.1: Distribution of household savings across physical and financial assets



Source: First Revised Estimates of National Income, Consumption Expenditure, Saving and Capital Formation for 2016-17, Central Statistics Office, January 2018

Figure 8.2: Growth in unified payment interface (UPI) usage



Source: UPI Product Statistics: National Payments Corporation of India (NPCI)

1,000 adults was 88 in Bangladesh, 26 in Pakistan, 417 in South Africa, and 231 in Kenya. Similarly, bank credit to GDP ratio in India is 51 per cent, as compared to 98 per cent in China in 2016.[4]

Constraints

1. Lack of financial literacy amongst low income households and small informal businesses.
2. The high cost of operations of the traditional banking model.
3. Excessive regulatory requirements on products, and market entry, and conservative regulatory approach to new technologies.

Way Forward

1. **Launching a new scheme for comprehensive financial literacy**

- An *Arthik Shiksha Abhiyan* will help improve financial literacy and may be integrated in the regular school curriculum. Besides, efforts to improve financial literacy should be complemented by mass media campaigns to provide information on financial products and their use.

2. **Assess the performance of banking correspondents and give better incentives**

- Given the infeasibility of locating branches in every nook and corner of the country, bank correspondents are used to reach out to prospective clients. However, an inadequate compensation structure makes correspondent banking unattractive. The issue of inadequate training is being addressed by the RBI which has developed a framework for certification for both basic and advanced levels. There is also a need to create better monetary incentives for banking correspondents as well as to provide them better training.

3. **Facilitating growth of online and paperless banking**

- Paperless banking will reduce friction, documentation proof requirements and the cost of banking services. This, in turn, will bring a larger proportion of the population within the ambit of the formal financial system. The following actions are required on the policy front:
    - Ease transaction limits for e-KYC based deposit and loan accounts.
    - Push digital signature for loan accounts by asking public sector banks to carry out at least 25% of their transactions through paperless accounts by 2022-23.
    - Expand digilocker services by including more issuers of documents.

4. **Using technology to improve the assessment of credit-worthiness for households and informal businesses**

- One of the main constraints in providing low-income households and informal businesses is the lack of information available with formal creditors to determine their credit worthiness. This results in high cost of credit. This constraint can be overcome by the adoption of appropriate technology.
- Create a new data-sharing framework that builds on the success of *Jan Dhan* and *Aadhaar* platforms to enable easier access to credit, with adequate safeguards for maintaining data privacy.
- Existing gaps in land records such as transfers of ancestral properties, conversion to free hold, regularization of colonies, extension of limited tenure pattas, etc., need to be filled. In addition, a central land holding register could be prepared and maintained in a digital format.

In addition to greater digitization, there is also a need to strengthen cyber security in the country. A common cyber security framework across different stakeholders should be created.

5. Leverage payment banks and other platforms to scale up payments systems in underserved areas

- Post offices are familiar sights in all villages. Payment banks, including the India Post Payment Bank, can potentially revolutionize the payments system like telecom companies did in Africa and other South Asian countries, with innovative products like mobile money.
- A flexible and proactive approach towards regulations on payment banks, such as regulations on minimum capital requirements, transaction amounts, and restriction on investments, should be adopted to ensure that the payment bank model becomes commercially viable and scalable.
- Payments through the USSD channel have an advantage over the internet in that it can also cover a large proportion of non-smartphone users. This has been the experience from the successful scale up of payments systems in many African countries. In India, USSD can be particularly useful in rural areas where some segments still do not have reliable access to the internet. Thus, the USSD channel should be promoted for government and non-government payment platforms. Further, fee on failed USSD transactions should be refunded to consumers to enable greater participation.

6. Overhaul the regulatory framework governing formal financial products to attract households

- Household acceptance of formal financial products, such as insurance, equity, etc., can be increased if regulations governing these are simplified and made more consumer-friendly.
- Instances of mis-selling of financial products to households needs to be tackled by overhauling the regulatory framework. Disclosure requirements for insurance and pension products need to be strengthened to make it easier for consumers to understand them.
- Simplification and relaxation of insurance sector regulations – Substantial simplification of broker regulations can be made. Further, restrictions on payment of incentives and bonuses to agents in insurance can be removed.
- KYC restrictions in the capital markets can be eased and linked to other KYC information to enable ease of doing business and increase the participation of retail investors.
- The lock-in period for gold bonds should be reduced to make them more attractive.

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1 The Global Findex Database 2017, World Bank. Accessed June 14, 2018.

2 The Progress of Financial Inclusion in India: Insights from Multiple Waves of Survey Data", Manuela Kristin Günther, Overseas Development Institute, 25 May 2017; "Banking the Unbanked: What Do 255 Million New Bank Accounts Reveal about Financial Access?", Sumit Agarwal, Shaswat Alok, Pulak Ghosh, Soumya Ghosh, Tomasz Piskorski, Amit Seru, Columbia Business School Research Paper No. 17-12; Georgetown McDonough School of Business Research Paper No. 2906523; HKUST Finance Symposium 2017; Indian School of Business WP 2906523. October 2017; "Bank Accounts for the Unbanked: Evidence from a Big Bang Experiment", Yakshup Chopra, Nagpurnanand Prabhala, Prasanna L. Tantri, Robert H. Smith School: Research Paper No. RHS 2919091; Indian School of Business WP 219109, May 2017.

3 IMF Statistics.

4 IMF Statistics.

9. Housing For All

Objectives

- Provide every family with a pucca house, with a water connection, toilet facilities, and 24x7 electricity supply and access.
- Build 2.95 core housing units in rural areas and 1.2 crore housing units in urban areas.

Current Situation

The President's clarion call to ensure the provision of houses to every family remains the key objective of the 'Housing for All' scheme. Following this announcement, the government has made it clear that one of its key priorities is to ensure safe and affordable housing for all. This mandate also includes upgradation of slums. Recent estimates of the Ministry of Rural Development and Ministry of Housing and Urban Affairs indicate a housing shortage of nearly 3 crore units in rural areas and 1.2 crore units in urban areas. Achieving the goal of 'Housing for All' will be a big step in the realization of New India Vision 2022 that will trigger economic growth and create millions of jobs for skilled as well as unskilled workers. Moreover, given the forward and backward linkages of the housing sector, the focus on affordable housing could bring rich dividends for other distressed sectors such as steel and cement.

Since 1985, the Government of India has been implementing a rural housing scheme for families living below the poverty line (BPL). A new scheme, the *Pradhan Mantri Awas Yojana* (Gramin – PMAY-G) was launched in 2016. This scheme now provides per unit assistance of INR 1,20,000/- in plain areas and INR 1,30,000/- in hilly states/ integrated action plan districts/difficult areas. This support is provided to homeless families or to those who live in *kutcha* houses as per the Socio-Economic Caste Census (SECC), 2011 data.

PMAY-G is converged with *Swachh Bharat Mission* (Gramin) and *Mahatma Gandhi National Rural Employment Guarantee Scheme* (MGNREGS) for the construction of sanitary toilets and also to provide the unskilled wage component.

Under PMAY-G, it was proposed to build one crore rural houses in three years between 2016-17 and 2018-19. The estimated financial requirement for the construction of one crore houses in these three years is INR 81,975 crore. During 2016-17, about 32.14 lakh houses were constructed. For the financial year 2017-18, the government set a target of completing 51 lakh houses; 51.38 lakh houses had been sanctioned and 44.54 lakh houses (i.e., 87.29 per cent of the target) had been completed by the end of March 2018.

Under the *Pradhan Mantri Awas Yojana* (Urban-PMAY-U), the mission aims to achieve the objective of 'Housing for All' by 2022 through its four pillars – a) in-situ slum redevelopment; b) affordable housing through a credit linked subsidy scheme; c) affordable housing in partnership between public and private agencies and d) subsidy for beneficiary-led individual house construction or enhancement. For financial year 2017-18, the PMAY (Urban)

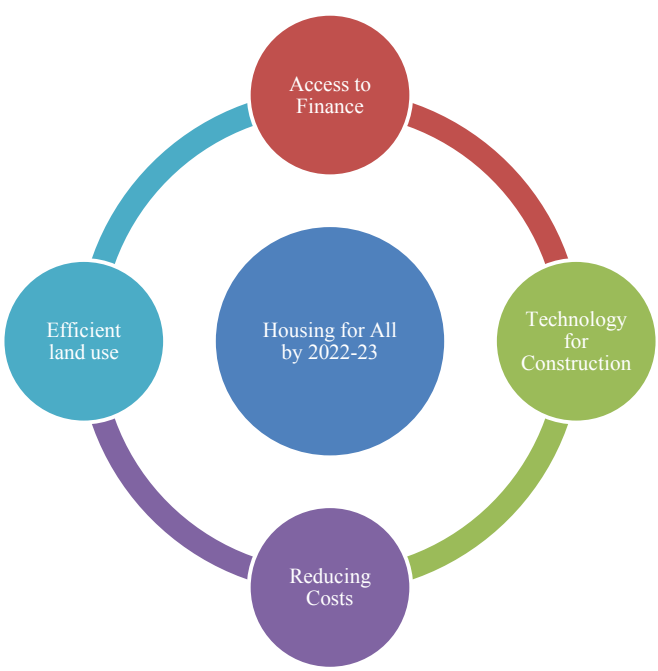
targeted the sanctioning of 25 lakh houses and completing the construction of at least half the sanctioned strength. Against the mission target of 1.2 crore, 44.36 lakh houses have been sanctioned and 4.01 lakh houses had been completed by the end of March 2018.

Constraints

The 'Housing for All' scheme faces the following key constraints:

- Lack of access to finance from formal financial institutions.
- Long-drawn out, multi-level approval system in urban areas in a large majority of municipal jurisdictions.
- For several categories of houses or those in particular locations, these delays are common even where a single window system has reportedly been introduced.
- Limited private sector participation in affordable housing schemes in urban areas.
- Predominance of conventional construction practices that result in delayed progress in urban areas and the limited use of pre-fabricated and pre-engineered materials.
- Limited access to suitable land banks for affordable housing projects.
- Continued rise in the number of slum dwellers.
- Insufficient number of trained masons despite the operation of the Construction Sector Skills Development Council since 2013.
- Capacity constraints in urban local bodies (ULBs) to formulate and design mass housing projects.

Figure 9.1: Multi-pronged approach to resolving constraints in the 'Housing for All' scheme



Way Forward

The strategies to overcome the constraints on affordable housing can be grouped into the following categories: 1) access to finance; 2) technology for construction; 3) reducing costs and 4) efficient use of land.

1. Access to finance

- To ensure greater access for the poor to institutional finance, the Department of Financial Services should consider a sub-category under priority sector lending (PSL) for affordable houses. It should also consider relaxing eligibility conditions for bank loans such as raising the cap of INR 10 lakh on the cost of the house and raising the INR 2-lakh income threshold.
- The government should continue to raise funds commensurate with the 'Housing for All' targets. The Union Budget 2018-19 announced the setting up of an Affordable Housing Fund in the National Housing Bank (NHB). It would achieve greater synergies among agencies that are implementing government housing schemes. It would also enable the NHB to mobilize larger funds for housing projects. The Budget for 2018-19 has already announced increased allocations for PMAY (Gramin) to INR 33,000 crore and to INR 25,000 crore for PMAY (Urban) through internal and extra budgetary resources.

2. Technology for construction

- Sixteen new emerging technologies have been identified, evaluated and promoted under PMAY(U). These fall under formwork systems (3), precast sandwich panel systems (6), light gauge steel structural systems (2), steel structural systems (2) and precast concrete construction systems (3). These alternate and sustainable technologies offer safer and disaster resilient affordable housing. These will also improve the quality of construction in a cost effective and environment friendly manner across states/regions and achieve economies of scale in urban areas.
- A Global Housing Technology Challenge has been launched. It will bring internationally proven construction technologies for adoption in India, enabling us to learn from the best practices from similar economies around the world.
- The success of the East Kidwai Nagar redevelopment project in Delhi may be replicated wherever possible. The key feature is the replacement of old style public housing that suffered from grossly inefficient use of land with a modern, space optimising housing design.
- It is necessary to ensure convergence of provisions under the National Urban Livelihood Mission, *Pradhan Mantri Kaushal Vikas Yojana*, Construction Skill Development Council of India and MGNREGS (for rural areas) for large-scale training of masons to meet construction targets.
- There is need for a major push in the form of slum development programmes in urban areas. A National Mission for Slum Rehabilitation will bring a greater focus on making the country slum free.

3. Reducing costs

- Government projects should focus on the life cycle cost (LCC) approach to the construction of houses rather than the cost per square foot approach to ensure quality of construction and reduce expenditure incurred on the maintenance of houses.

- Fiscal support should be provided to companies that use recycled products made from waste. The use of such products should be standardized and adapted to shortlisted design types and pre-fabricated technologies.
- Regulatory complexities should be rationalized and a single window approval system adopted to reduce the time taken to construct houses in urban areas. The timeline for granting approvals should be specified and if approvals are not accorded within the stipulated time period, it should be treated as deemed approval.
- Financial engineering, like 'rental-cum-ownership housing' in which houses are initially offered on rent and ownership is transferred to the tenant once the cost of the unit is recovered, should be adopted.

4. Efficient use of land

- The land lying idle with various sick/loss making public sector undertakings(PSUs) of the central/ state governments may be used to resolve the issue of land availability for affordable housing projects under 'Housing for All'.
- The Department of Public Enterprises (DPE) should expedite release of land parcels available with central PSUs that have been identified for affordable housing projects.
- As suggested in the NITI Aayog's Three-Year Action Agenda, Indian cities have focused on horizontal growth for far too long. It should now focus on vertical growth. The following measures can be taken to accelerate vertical growth:
    - o Launch a mass campaign to sensitize cities and states on the benefits of vertical growth.
    - o Provide capacity building to states and cities willing to undertake measures towards vertical growth.
    - o Provide considerable rewards to cities that relax their floor space index (FSI) norms. One of the key reasons behind India's horizontal sprawl is stringent FSI norms. The discussion on changing FSI norms considering trunk infrastructure and other social issues needs to be expedited across India.
    - o Provide additional central government funding to cities that undertake FSI reforms under the Smart Cities Mission.

In addition to the measures outlined above, urban governance reforms, such as removing the need to obtain permission for non-agricultural use in the case of land that has been earmarked for residential purposes in master plans, amending rental laws and others, have the potential to alleviate the challenges to achieving the goal of 'Housing for All' by 2022-23.

10. Travel, Tourism and Hospitality

Objectives

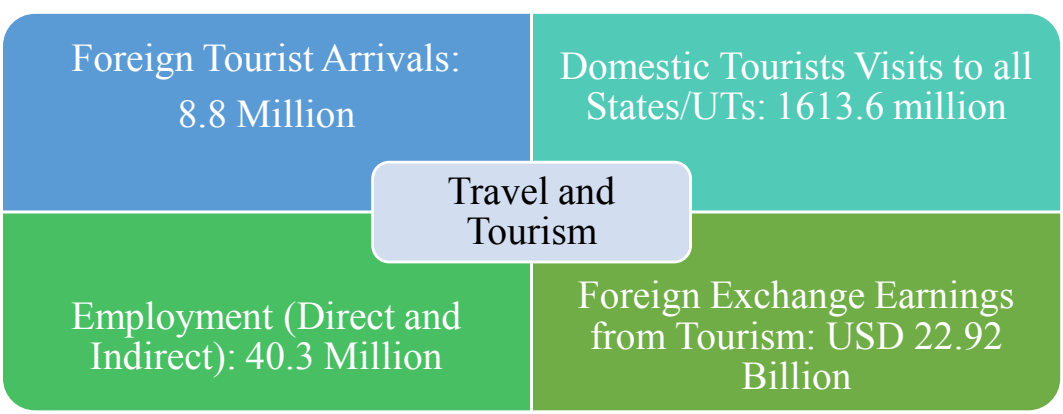
- Increase India's share in global international tourist arrivals from 1.18 per cent to 3 per cent.
- Increase the number of foreign tourist arrivals from 8.8 million to 12 million.
- Double the number of domestic tourist visits, from 1,614 million in 2016 to 3,200 million visits.

Current Situation

There has been significant progress in the travel, tourism and hospitality sector in the last decade but there is much further room for improvement. India moved up 12 places from 52nd to 40th in the World Economic Forum's Travel and Tourism Competitiveness Index in 2017. Foreign tourist arrivals have increased from 5.1 million in 2009 to 8.8 million in 2016; yet they account for less than 1 per cent of global tourist arrivals. With 35 world heritage sites, 10 bio-geographical zones and 26 biotic provinces, India has significant potential to increase the number of tourist arrivals.

The sector is an important contributor to national income. In 2017-18, India's travel and tourism sector accounted for foreign exchange earnings of USD 22.92 billion. Hotels and tourism also accounted for USD 0.9 billion of foreign direct investment (FDI) in 2016-17, making up around 3 per cent of total FDI between April 2000 and October 2017.[1] Domestic tourism plays a key role within the sector. In 2016, domestic tourist visits to all Indian states and union territories numbered 1614 million, an increase of about 13 per cent from the previous year.

Figure 10.1: Contribution of travel and tourism in India, 2016



Source: Ministry of Tourism, India

As a highly labour-intensive sector, tourism has the capacity to generate large-scale, good quality employment. In 2016, it accounted for 25 million direct and more than 14 million indirect jobs. Direct jobs in the sector made up 5.8 per cent of India's total employment. Together, direct and indirect jobs accounted for 9.3 per cent of total employment. The sector has multiple forward and backward linkages with further job generating potential in sectors such as agriculture, retail, transport and financial services.

Recognizing the sector's potential to generate income and employment, the government has undertaken several measures to strengthen infrastructure and facilitate tourism. India recently introduced tourist visa on arrival, enabled with electronic travel authorization (ETA) (renamed as the "e-Tourist Visa") for tourists from 150 countries.[2] The Ministry of Tourism has launched a round-the-clock, toll-free tourist helpline in 12 international languages. The government has launched several schemes to develop tourist circuits; develop our islands as tourist destinations; build large-scale convention centres in different cities; improve connectivity and develop niche offerings such as medical tourism and pilgrimage-based tourism.

Constraints

- **Entry/exit**: Despite the introduction of an e-visa facility, visitors find the process of applying for a visa still cumbersome. Further, awareness about the e-visa facility remains low. In addition, medical e-visa holders face difficulties because of the limited number of repeat visits allowed under the visa, the number of accompanying persons permitted and cumbersome registration processes.
- **Infrastructure and connectivity**: Deficiencies in infrastructure and inadequate connectivity hamper tourist visits to some heritage sites.
- **Tourism segments or circuits**: India has various tourist destinations but few circuits or segments such as the Golden Triangle (Delhi-Agra-Jaipur).
- **Promotion and marketing**: Although it has been increasing, online marketing/branding remains limited and campaigns are not coordinated. Tourist information centres are poorly managed, making it difficult for domestic and foreign tourists to access information with ease.
- **Skills**: The number of adequately trained individuals for the tourism and hospitality sector is a key challenge to giving visitors a world-class experience. A limited number of multi-lingual trained guides, and the limited local awareness and understanding of the benefits and responsibilities associated with tourist growth act as constraints on the sector's growth.

Way Forward

1. **Entry/exit for tourism**

- Increase e-visa awareness globally by launching an information campaign through our consulates abroad. It is also necessary to launch an e-visa regime to attract clientele from the meetings, incentives, conferences and exhibitions (MICE) market. To attract repeat visitors, the validity period of e-visas may be increased to 10 years.
- Enhance the number of annual visits allowed under an e-medical visa. Currently, e-medical visa holders are allowed three repeat visits during their one-year visa period. This may not be sufficient for patients who require follow-up/post-operative care.
    - o Simplify the process of registering online with the Foreigner Regional Registration

Offices (FRRO). Establishing FRRO help-desks at major Indian airports and hospitals will provide visitors with the information to complete the process online.

- Increase the number of accompanying persons with e-medical visa holders from two to up to four under the same visa, as has been done in countries like Malaysia.

2. Infrastructure and connectivity

- Tourism infrastructure projects, viz., hotels, resorts, equipment, parks etc., having a project cost more than INR 1 crore should be notified as 'infrastructure' to enable promoters to avail loans on a priority basis.
- Conservation and development of all heritage sites should be undertaken and completed through either government funding or through NGOs/Corporate Social Responsibility (CSR) activities. The Ministry of Tourism's *Swadesh Darshan* and National Mission on Pilgrimage Rejuvenation and Spiritual Heritage Augmentation Drive (PRASHAD) schemes are already undertaking the development or maintenance of heritage sites.[3,4] The number of projects sanctioned under this scheme should be increased and their implementation accelerated.
- Increase domestic tourist traffic by upgrading existing infrastructure and leasing out the maintenance of such infrastructure to private players. New destinations can be developed around the metros using the PPP model.
- Improve flight connectivity to tourist destinations through the timely implementation of the Ministry of Civil Aviation's Regional Connectivity Scheme – UDAN (RCS-UDAN). Larger cities like Delhi, Mumbai, Kolkata and Chennai should be converted into efficient and seamless transit hubs.

3. Building tourist circuits or segments

- Develop the marine leisure industry by issuing national boating guidelines to regulate the industry in terms of safety, security, marina development, nautical infrastructure for safe access to water, cruising and charters, crewing (skill training), rescue and rationalization of import duties and local taxes to encourage the growth of local boat building. This segment will also help attract additional FDI into the sector.
- Promote river cruise tourism by making the entire stretch of National Waterway No. 1, the River Ganga, from Allahabad to the Farakkah Barrage, fully navigable.
- Build deep-water marinas in the coastal areas of India including in the Andaman and Nicobar Islands and in Mumbai. Create enabling policies that permit scuba diving or other activities requiring boat travel.
- Promote India's Buddhist circuit by increasing coordination among all stakeholders and improving connectivity. Tourism to the Buddhist circuit can be greatly enhanced by increasing promotion, building wayside amenities and connecting lesser-known sites to core circuits. We should also fully utilize the *Swadesh Darshan* and existing schemes to promote this circuit.
- Develop 100 "Smart Tourist Destination Sites" showcasing theme-based museums and heritage sites.
- Develop 100 "Model *Swachh* Tourist Destinations" by undertaking a special clean-up initiative focused on 100 iconic heritage, spiritual and cultural places in the country.
- Develop at least five "Beach Destinations" as exclusive tourism zones.

- Develop at least five "World Class Museums" drawing from world class museums such as Bilbao or the Asian Civilization Museum in Singapore. Further, ease the process of accepting gifts by museums in India.
- Plan and develop five globally competitive and world-class national circuits from entry to exit.

4. Skill development

- Connect local communities to tourism by encouraging them to set up small enterprises to supply the tourism industry (accommodation, food and material). Employment opportunities can be expanded by ensuring that investors and operators in the organized sector are encouraged to hire staff locally.
- Local craftspersons, masons, carpenters and labourers should be engaged for heritage conservation and restoration activities to create jobs.
- Create a database of artisans based on the different craft forms they are associated with and the areas where they live.
- Upgrade the skills of existing workers such as taxi drivers, boat operators, guides, and restaurant and dhaba workers through state tourism departments in association with local tourism and hospitality institutes and industry.
    - Expertise available with heritage hotels may also be used for skill development in the sector.
    - Language competencies of tour guides should be improved through a bridge course conducted by the sector council all across the country.
- Support private sector institutes in tourism regulated by government to create the required talent pool. This can be done by expanding the number of private sector institutes or bodies recognized as implementing agencies for delivering the Ministry of Tourism's *Hunar Se Rozgar Tak* initiative to create employable skills.
- Create Centres of Excellence for leadership in the tourism sector as a fulcrum of professional education, research and advocacy to create managers and entrepreneurs in tourism. Additionally, ensure that tourism management and leadership is included as a distinct course in top management institutes in India.
- Enable access to markets for traditional handicrafts producers by linking them with global markets. The government should also encourage the export of tribal handicrafts.

5. Promotion and marketing, especially with respect to cultural sites

- Launch targeted promotional campaigns in Asian countries such as China, Thailand, Malaysia, Singapore and South Korea, using digital media including TV advertisements.
- Design policies using data on consumer usage to target marketing efforts and segments of the population.
- Reconsider differential pricing for heritage sites as the higher ticket price for non-Indians leads to losing out on a large segment of youth travellers.
- Consider establishing cultural centres in additional countries to spread Indian culture worldwide.
- Create an online portal of all heritage sites to increase awareness regarding these.
- Ticketing and access to monuments and museums.

- An online ticket distribution system for heritage sites and wild life areas should be developed with time slots to visit.
- Buying tickets at reception centres should be streamlined to avoid long queues.
- Create common passes to visit multiple heritage sites.
- Provide foreign exchange counters at each tourist site.
- Tourist information centres should be operated by trained personnel and must have resources like maps, travel guides, etc.

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1 Department of Industrial Policy and Promotion, Ministry of Commerce and Industry.

2 Ministry of Tourism Annual Report 2015-16, Government of India.

3 Ministry of Tourism, Swadesh Darshan Scheme website. Accessed May 12, 2018. http://www.swadeshdarshan.gov.in/

4 Ministry of Tourism, Brochure for PRASAD scheme. Accessed May 11, 2018. http://tourism.gov.in/sites/default/files/News/PRASAD%20Low%20Res%20-17_3_205_compressed.pdf

11. Minerals

Objectives

- Double the area explored from 10 per cent of obvious geological potential (OGP) area to 20 per cent.[1]
- Accelerate the growth of the mining sector from 3 per cent in 2017-18 to 14 per cent, with an average growth of 8.5 per cent during 2018-23.
- Increase the job contribution (direct, associated and indirect) from the current 10 million (2 million in coal and major metals and 8 million in minor minerals) to 15 million in 2022-23.

Current Situation

India has huge mineral potential, as its prospective geology is broadly similar to that of Western Australia, especially in relation to iron ore, bauxite, coal, diamonds, and heavy minerals sand. India has identified 5.71 lakh sq. km as the obvious geological potential (OGP) area, but only 10 per cent of it has been explored and 1.5 per cent is being mined.

This is one of the reasons why India's imports of minerals, estimated at INR 3,73,662 crore, far outstripped, more than seven times, the value of domestic production of minerals (excluding coal, atomic and fuel minerals) of INR 47,432 crore in the financial year 2016-17.[2] India's share in the global production of metallic minerals, such as bauxite, chromite, iron ore and manganese ore is relatively high; India is ranked 4th to 6th among global producers. In industrial minerals, India is a large producer of zinc, aluminium and steel, ranking 5th, 5th and 3rd respectively.

Six major minerals producing states, viz., Odisha Rajasthan, Andhra Pradesh, Chhattisgarh and Karnataka, account for nearly two-thirds of the value of minerals produced in the country.[3]

In addition to the above, India also has large potential to increase the production of minor minerals. It is estimated that their share in the value of production is about 26 per cent.[4] Even though minor minerals have a small share in value terms, their production is more labour intensive as compared to major minerals. Thus, they can be a source of large-scale employment generation.

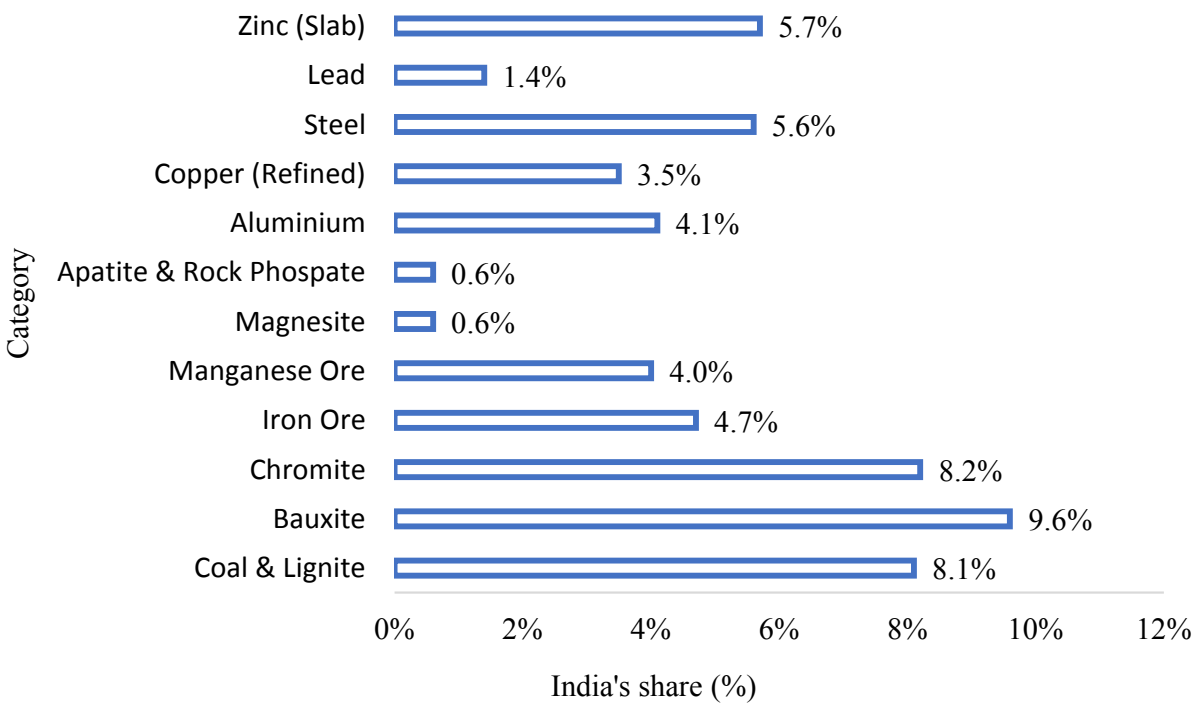
The sector has been affected by legalities. This has restricted the scope of mining operations and raised costs.

In 2015, the government amended the Mines and Minerals (Development and Regulation) (MMDR) Act to mandate auctions for the allocation of exploration and mining rights for minerals under its purview. The results have been encouraging.

Constraints

- Shortcomings in the licensing regime such as the separation of auction of prospecting licences and provision of mining licences, and the different auction methodologies across different sectors like coal, oil and minerals.

Figure 11.1: India's share in world production, 2015



Source: Ministry of Mines

- Heavy cost of acquiring land.
- High incidence of taxes, royalties and levies in comparison to global standards (more than 65 per cent).
- Inadequate infrastructure resulting in evacuation problems.
- Workforce productivity and skilling challenges because of the disconnect between training institutions and industry.

Way Forward

1. **To facilitate participation by private sector players in exploration, launch a mission "Explore in India", by revamping the minerals exploration and licensing policy**

The policy should have the following features:

- For bulk or surfacial minerals, i.e., iron-ore, bauxite, limestone etc, the provision of "reservation" of areas for exploration by state agencies should be utilised and such areas should be allocated through the auction route after the development of reserves.
- It is desirable for public sector units (PSUs) and private sector companies to have a level-playing field with respect to mining concessions.
- An exclusive subset of rules to facilitate the exploration of rare earth minerals through private sector participation should be framed.
- Mining companies should be allowed the freedom to co-mine other minerals found in the same mining area.

- To promote this sector we need to rationalize tax structures and facilitate investment including FDI. This would help both export promotion and import substitution.

2. Single window and time-bound environment and forest clearances

- While *PARIVESH* has been launched on August 10, 2018 as a single window hub for environment, forest, wildlife and CRZ clearances, the Ministry of Environment and Forest (MoEF) should declare upfront inviolate forest areas. This should specify whether underground mining or open cast mining can be done or not in these areas.
- All statutory approvals should mandatorily be granted within 180 days of application for exploration and mining of minerals. Further, a provision for the issue of deemed approval letters by a competent authority should be incorporated in cases where delay beyond the specified period has occurred.
- Local forest officers may be empowered to grant permission under the FC Act, 1980 for exploration in forest areas.
- State PSUs and the private sector should also be allowed to undertake compensatory afforestation on degraded government forestland like central PSUs.

3. Boosting minor minerals through a relaxed licensing regime

- Landowners/farmers/tribals need to be given mining rights for minor minerals on their land, to enable them to mine either on their own or by outsourcing it, without auction or payment of an additional 30 per cent of the royalty to the DMF.
- If the landowner does not intend to undertake mining of minor minerals on her land, these mining leases can be allocated through the auction route.

4. Data repository, regulation and reporting

- A National Mineral Regulatory Authority, with subordinate state authorities, may be created to regulate the minerals sector to operate transparently with internationally recognized technical standards.
- A National Data Repository (NDR) of Mineral Resources should be created and uploaded online.
- Introduce a robust and transparent public reporting mechanism for exploration firms, which is compliant with the Joint Ore Resources Committee (JORC) code or an equivalent code in the statute.
- The huge mineral bearing areas reserved for state agencies that have not been utilized for more than 2 years should be de-reserved and allocated to the end user industry/ auctioned.
- Instead of field inspections, a system of self-approval/self-certification with GIS based monitoring should be adopted for enforcing the provisions of the MMDR Act. This should be accompanied with a provision for heavy monetary penalties for each violation.

5. Other measures

- Immediate steps should be taken to reduce rail freight charges for all minerals that are available in India in abundance but are imported because it is currently uneconomical to transport them by rail.
- Rationalize taxation/royalty and other levies on mining, capping it at a maximum of 40 per cent of the sale value, as per global practice, to make mining competitive globally.

- Mining engineering colleges should be developed as centres for mineral exploration.
- Encourage technological upgradation by reducing import duty, initially for a period of five to ten years, on equipment/cutting edge technology to boost safety, limit environmental damage, improve productivity and increase growth.
- To enhance the resource base and ensure mineral security, India should create an organization for strategic acquisitions of mines in other countries and to sign diplomatic and trade agreements.
- Promote zero waste mining by incentivizing leaseholders to utilize and sell sub-grade minerals/rejects.
- As per the provision of Section 8A (6) of MMDR Act, 2015, the 50-year or more lease granted to 288 non-captive mines will end on March 31, 2020. To ensure smooth transition in 2020 and to avoid disruption in mineral supplies and job losses, the Ministry of Mines should complete the process of bidding for these mines one year before the date of expiry.

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[1] This chapter includes all minerals, except for oil and gas resources.

[2] Annual Report 2017-18, Ministry of Mines (import figures for gold taken from Ministry of Commerce).

[3] Ibid.

[4] Ibid (major minerals include coal also).

INFRASTRUCTURE

12. Energy

Objectives

The government's on-going energy sector policies aim "to provide access to affordable, reliable, sustainable and modern energy". At the convergence of its domestic goals and the global development agenda, it also intends to hit the following milestones on the way –

- Make available 24x7 power to all by 2019.
- Achieve 175 GW of renewable energy generation capacity by 2022.
- Reduce imports of oil and gas by 10 per cent by 2022-23.
- Continue to reduce emission intensity of GDP in a manner that will help India achieve the intended nationally determined contribution (INDC) target of 2030.

Current Situation

India's energy mix is dominated by coal with a 49.6 per cent share, followed by oil (28 per cent), biomass (11.6 per cent), gas (7.3 per cent), renewable and clean energy (2.2 per cent) and nuclear energy (1.2 per cent). India is the world's third largest energy consumer. However, in 2017, its per capita energy consumption was about 625.6 kilogram of oil equivalent (kgoe) against the world average of 1860 kgoe. The US and China's per capita energy consumption in 2015 was 6800 kgoe and 2170 kgoe, respectively.

In the power sector, the all-India installed power capacity is about 334 GW, including 62 GW of renewable energy. The energy sub-sectors continue to face challenges. On energy supply, India is still heavily dependent on petroleum imports to meet its requirements – we imported approximately 82 per cent of crude oil and 45 per cent of natural gas requirements during 2017. Also, at present, about 16000 km of gas pipeline networks exist. The progress of 10,000 Km of pipeline bid out by Petroleum and Natural Gas Regulatory Board (PNGRB), which was to be completed by 2016-17, is behind schedule.

In the coal sector, the government has recently in 2018 allowed commercial mining. Furthermore, power sector companies, especially state government utilities, continue to deal with difficult financial positions.

Due to energy efficiency (EE) measures, demand side management (DSM) and advanced technology in the energy value chain, India's energy intensity declined from 0.158 koe/$ in 2005 to 0.122 koe/$ in 2016 at 2005 prices, indicating an efficiency increase of 22.8 per cent. The energy intensity of the UK and Germany in the year 2016 were 0.074 koe/$ and 0.101 koe/$ at 2005 prices, respectively. This indicates that India still has the potential to improve energy efficiency.

Constraints

The constraints on achieving the milestones set for 2022-23 can be divided into two broad categories – overall energy sector and sub-sector specific.

1. Overall energy

Subsidies and taxes:

- A variety of subsidies and taxes distort the energy market and promote the use of inefficient over efficient fuels.
- They also make Indian exports and domestic production uncompetitive as energy taxes are not under GST and hence, no input credit is given. This is a serious lacuna.

2. Power

- Old inefficient plants continue to operate whereas more efficient plants are underutilized.
- As the gap between the average cost of supply (ACS) and average revenue realized (ARR) persists due to high aggregate technical and commercial (AT&C) losses, distribution companies (DISCOMs) use load shedding to minimize losses.
- Although legally independent, Regulatory Commissions are unable to fully regulate discoms and fix rational tariffs.
- Unmetered power supply to agriculture provides no incentive to farmers to use electricity efficiently.
- There is a lot of hidden demand because of unreliable supply and load shedding.
- State power utilities are not able to invest in system improvements due to their poor financial health.
- High industrial/commercial tariff and the cross-subsidy regime have affected the competitiveness of the industrial and commercial sectors.

3. Oil & gas

- Non-discriminatory access for private and public sector companies to the gas pipeline network does not exist.
- Lack of market-driven gas prices for old fields disincentivizes further production.
- The gas pipeline infrastructure is also inadequate.

4. Coal

- Land for coal mining is becoming a major issue.
- There is a tendency to expand opencast mining and discourage underground operation even for better quality coal reserves. This aggravates the land availability problem.
- There is no competitive coal market.

5. Renewable energy

- High energy costs result in reneging on old power purchase agreements (PPAs) and erode their sanctity. This leads to uncertainty regarding power offtake and consequently endangers further investments.
- Flexibility in generation and balance requirements for the integration of renewable energy are emerging as major issues.
- There are supply chain issues in biomass power generation.

6. Energy efficiency

- Limited technical capabilities, high initial capital expenditure, limited market and policy issues have adversely affected efforts to achieve energy efficiency.

- High transaction costs (which involves appointing suitable consultants and vendors for execution) relative to project size, especially in the micro, small-scale and medium enterprises (MSME) sector, makes energy efficiency investments unattractive for investors.
- The non-availability of sufficient credit facilities and difficulties in obtaining required finances for energy saving projects are strong deterrents to investments in energy efficiency in India.

Way Forward

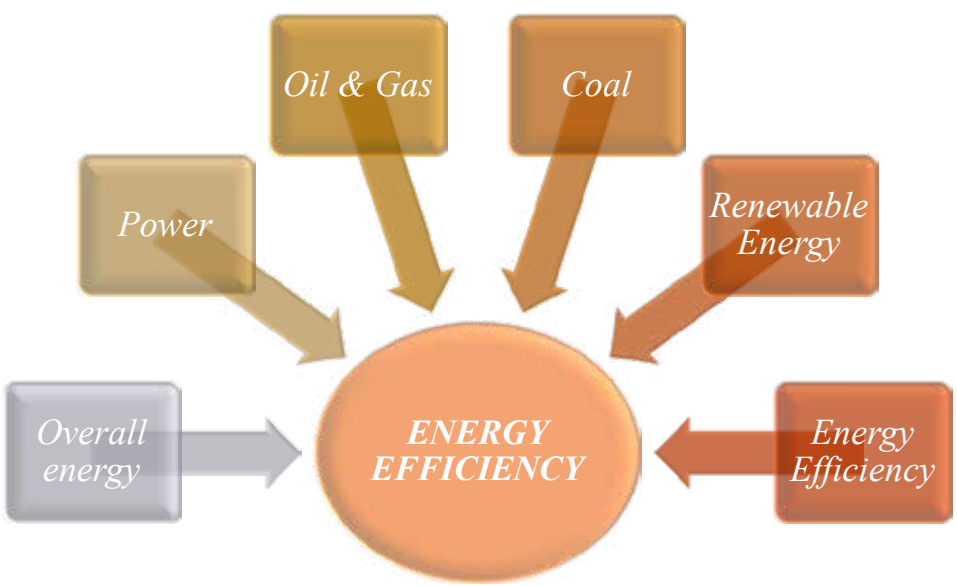
1. Overall energy

- Oil, natural gas, electricity and coal may be brought under GST to enable input tax credit.
- Have the same GST rate for all forms of energy to enable a level playing field.
- All form of subsidies should be provided as functional subsidies to end-consumers to empower them to choose the energy form most suitable and economical to them.

2. Power

- Promote smart grid and smart meters.
- All PPAs including those with state generation companies (GENCOs) should be based on competitive bidding.
- Introduce a capacity market to encourage flexible capacity for peak demand and intermittency.

Figure 12.1: Strategies for improving the energy sector in India



- Privatizing state distribution utilities and/or the use of a franchisee model will reduce AT&C losses.
- Discoms may adopt a franchisee model for its retail business in rural areas and stipulate a minimum level of performance parameters, including the use of decentralized generation sources and storage systems for local reliability and resilience.
- Regulatory bodies need to be further strengthened and made truly independent.
- For agriculture, an upfront subsidy per acre of land through Direct Benefit Transfer (DBT) may be considered instead of providing separate subsidies for fertilizers, electricity, crop insurance etc.
- Promote the use of solar pumps for agriculture. Local discoms should buy surplus power from the farmer.
- Discoms may be fined for load shedding.
- Ensure effective enforcement of a cap on cross-subsidy and open access. It is also necessary to remove high open access charges.
- Actively promote cross-border electricity trade to utilize existing/upcoming generation assets.
- Introduce time-of-day tariff to promote the use of renewable energy.
- Introduce performance-based incentives in the tariff structure.
- To manage the demand for power, it is necessary to introduce 100 per cent metering, net metering, smart meters, and metering of electricity supplied to agriculture.

3. Oil & gas

- Provide for a common carrier and open access to gas pipelines.
- Separate the developmental and regulatory functions of the PNGRB.
- Expedite establishing the National Gas Grid.
- Promote city gas distribution to provide piped natural gas (PNG).
- Review and provide the required flexibility in contract terms to make stranded oil and gas assets functional.
- Enhance production from the existing fields of ONGC and OIL using cutting-edge technology through a framework of production enhancement contracts.
- Consider market pricing for blocks that are not viable because of low gas pricing.
- Provide for shared infrastructure for evacuation of oil and gas from small and scattered on-shore and offshore fields.
- Provide "priority sector" status for 2G bio-ethanol projects. The concept of 'solar parks' can be applied to bio-fuels; land can be leased by the government to oil marketing companies (OMCs) for energy crops.
- The government should provide viability gap funding/financial assistance for 2G ethanol project developers/technology partners.
- Declare regasified liquefied natural gas (R-LNG) as transportation fuel and promote PNG in rural areas.
- Create strategic reserves through various policy options.

4. Coal

- Expeditiously complete detailed exploration through exploration-cum-mining leases based on production/revenue sharing model.
- Put the onus on concerned state governments to make the land required for mining available.

- Expeditiously operationalize commercial coal mining.

5. Renewable energy

- Provide a mechanism for cost-effective power grid balancing (gas-based, hydro or storage).
- Renewable purchase obligations (RPO) should be strictly enforced and inter-state sale of renewable energy should be facilitated.
- It is necessary to have national level markets and regulations for balancing of power. Central level agencies like Central Electricity Regulatory Commission or National Load Despatch Centre should socialize the costs of balancing inter-state transmission systems (ISTS) connected power plants, over the entire system, on the lines of the point of connection (PoC) or a similar mechanism.
- Decentralized renewable energy in rural areas in conjunction with the discoms' grid can offer reliability.
- Hybrid renewable energy systems such as solar PV + biomass should be explored.
- Commercial biogas needs to be promoted by providing subsidy to consumers.

6. Energy efficiency

- The Bureau of Energy Efficiency (BEE) should come out with a white paper on its 5-year strategy on energy efficiency in various sectors and specify energy consumption norms.
- State designated agencies (SDAs) need to be more empowered and provided with adequate resources to implement EE related programmes. There is a need to ensure greater participation of energy service companies (ESCOs) using appropriate financing models with a risk sharing mechanism, particularly by public sector banks.
- States should adopt the second version of the Energy Conservation Building Code (ECBC) in their building by-laws and ensure faster implementation.
- Promote the mandatory use of LED and the replacement of old appliances in government buildings with five-star appliances. Focus the *UJALA* (*Unnat Jyoti* by Affordable LEDs for All) programme on lower-income households and small commercial establishments. The number of appliances covered under the Standards and Labelling (S&L) programme should be increased.
- Widen and deepen the perform, achieve and trade (PAT) programme; make Energy Saving Certificate (ESCert) trading under the PAT scheme effective by ensuring strict penalties against defaulters.
- For the MSME sector, BEE should develop cluster-specific programmes for energy intensive industries to introduce energy efficient technologies.
- The Forum of Regulators and State Electricity Regulatory Commissions (SERCs) should provide for lower heat rate requirements for new power stations. Old and inefficient plants consuming more than the threshold energy should be retired in a phased manner.
- Promote the use of the public transport system. Public transport systems may be converted to electric in a time bound manner. Expand the corporate average fuel efficiency standards (CAFE) beyond passenger cars to other vehicle segments.

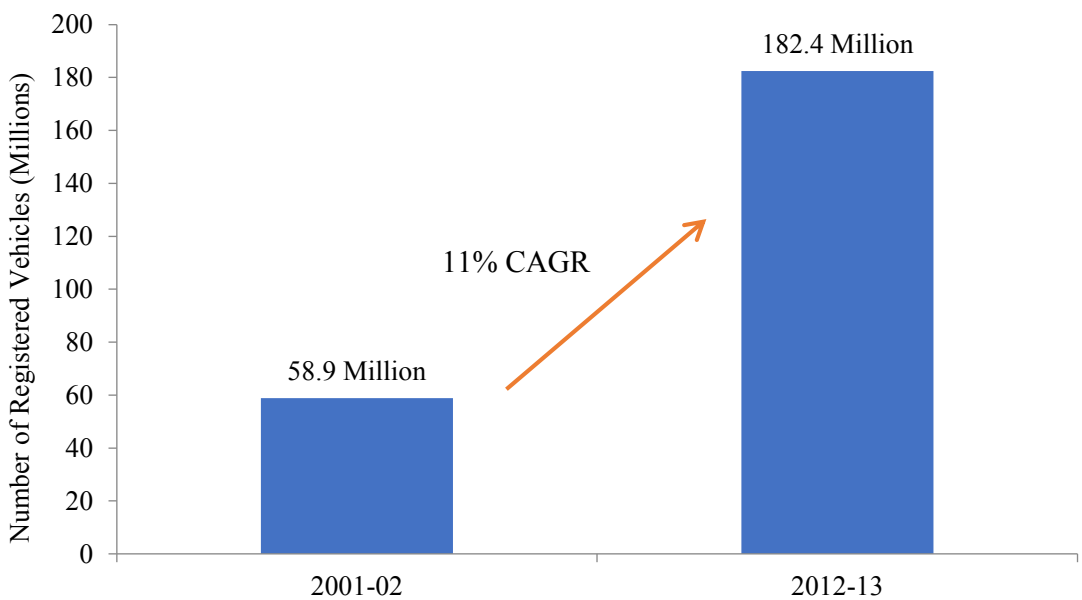
13. Surface Transport

Objectives

Increasing the coverage and quality of roads and highways is critical to enhancing connectivity and internal and external trade. By 2022-23, we should achieve the following objectives:

- Increase connectivity by expanding the road network:
  - Achieve the *Bharatmala* Phase-I target by completing 24,800 km by 2021-22, including 2,000 km of coastal and port connectivity roads.[1]
  - Complete Phase I of the *Pradhan Mantri Gram Sadak Yojana* (PMGSY) with quality monitoring at every stage.
  - Double the length of national highways (NHs) to 2 lakh km by 2022-23 from the existing 1.22 lakh km.
  - Widen single/intermediate lane (SL/IL) NHs and reduce the length of SL/IL NHs to less than 10 per cent of total length by 2022-23 from the present 26.46 per cent.[2]
- Improve the regulatory framework for roads to achieve better compliance, seamless connectivity, road safety and quality.
- As a signatory to the Brasilia Declaration, reduce the number of road accidents and fatalities by 50 per cent by 2020.[3]

Figure 13.1: Total number of registered vehicles in India (millions)



Source: TERI, 2015-16

Current Situation

The road sector in India accounts for the largest share in the movement of both passengers and freight. Driven by a rapidly growing economy, access to vehicle finance and improved road connectivity, the demand for mobility on roads has risen continuously, leading to a sharp rise in the number of road transport vehicles. The total number of registered vehicles in India increased from 58.9 million in 2001-02 to 182.4 million in 2012-13,[4] a CAGR of almost 11 per cent during this period.

However, access to and quality of public transportation need continuous improvement. In urban areas, the increasing use of personal vehicular transport leads to road congestion, longer journey times and higher levels of air and noise pollution. Expansion of the public transport fleets has been hampered by the short supply of vehicles – the total demand for buses was approximately 3.40 lakh in FY 2017, while the availability/supply was only about 1 lakh.

Constraints

1. **Capacity of existing highways**: The existing length of the NH network is 1.22 lakh km, which is 2.2 per cent of the country's total road network of 56.03 lakh km.[5] The existing NH length with 4-lane and above NH standards is 27,658 km (22.59 per cent), and that with single/intermediate lane (SL/IL) width is 32,395 km (26.46 per cent); the remaining 62,379 km (50.95 per cent) is of 2-lane NH standard.[6] Further, national and state highways are already overstrained, carrying more than 65 per cent of the road traffic. National highways carry 40 per cent of India's total road traffic.[7]
2. **Maintenance of existing infrastructure**: The annual outlay earmarked for maintenance and repair of national highway stretches[8] is only about 40 per cent of the funds required. This is one of the main reasons for the inability to take up timely maintenance interventions.
3. **Accidents and safety concerns**: Road safety is a major issue in the country with nearly 400 road related deaths being recorded daily. In 2013, India had an accident death rate of 18.9 for every 100,000 people, higher than other South Asian countries such as Bangladesh (11.6), Mauritius (12.2) and Sri Lanka (13.7).[9] At least a part of the fatalities is because of the poor quality of roads.
4. **Cost escalation for roads**: Delays in acquiring land can affect project costs as the average cost of land has escalated from Rs. 0.80 crore per hectare during 2012-13 to Rs. 3.20 crore per hectare during 2017-18.

Way Forward

1. **Increase connectivity by expanding the road network**

- Four projects to be undertaken:
    - *Bharatmala Pariyojana* Phase-I: complete 24,800-km by 2021-22.[10]
    - Special Accelerated Road Development Programme for the North-Eastern region (SARDP-NE), Phase 'A': improve about 4,099 km in the North-East.
    - 'North-East Road Network Connectivity Project Phase I': improve infrastructure in Meghalaya and Mizoram and enhance connectivity with inter-state roads and international borders.[11]
    - *Chardham Mahamarg Vikas Pariyojna.*
- Improve the implementation capacity of states'/UTs' public work departments (PWDs) through institutional strengthening and training.

- A dedicated Metropolitan Urban Transport Authority in each city with a population of more than 1 million by 2022-23 is needed.
- Similarly, set up dedicated cells for integrated planning, coordination and delivery of transport services in smaller cities.

2. Improve road maintenance and safety

- Maintain NH assets by adopting a maintenance management system (MMS). Earmark funds from the Central Road Fund (CRF) for maintenance activities. India should begin with earmarking 10 per cent of its annual budget for road and highways for maintenance to move towards the developed country norm of earmarking 40 per cent to 50 per cent of the budget for roads and highways for maintenance.
- Build in heavy penalties on contractors for poor quality of operations and maintenance (O&M) into contracts across all contract modes.
- Eliminate 789 black spots identified by the Ministry of Road Transport and Highways (MORTH) by March 2020 by constructing permanent structures such as flyovers/vehicular underpasses (VUPs) and pedestrian underpasses (PUPs). Of these spots, 136 are on state roads and need to be dealt with by state governments.
- The Motor Vehicles (Amendment) Bill, 2016, pending before the *Rajya Sabha*, must be passed without delay. Constitute a National Safety Board to enforce road safety rules.

3. Streamline land acquisition

- Ensure that MORTH's *Bhoomi Rashi* web portal, which is integrated with the Ministry of Finance's Public Financial Management System (PFMS), is fully functional by March 2019.
- Sensitize stakeholders to iron out details of land acquisitions like determining market value, deciding a compensation amount, disbursement of compensation, etc., as detailed in the 2017 guidelines issued by MORTH, which covered various aspects of the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation & Resettlement (RFCTLARR) Act, 2013, and The National Highways Act, 1956.

4. Skill development

- Introduce vocational training courses on road construction in Industrial Training Institutes (ITIs).
- Collaborate with original equipment manufacturers and other stakeholders to set up driving training centres (DTCs) to train commercial vehicle drivers.
- Ensure stringent testing of driving skills before granting driving licences by adopting technologically advanced methods such as the automated driving testing system.
- MORTH has targeted training more than one lakh workers employed in various projects by June 2018 and a further 2.5 lakh workers by 2019 under its programme.

5. Increase emphasis on research and development

- Earmark 0.1 per cent of MORTH's annual budget for R&D.
- Establish a transport data centre at the national level for applied research on roads.
- Enhance R&D on IT-enabled traffic management systems.
- Develop new materials/techniques for construction.
- Periodically revise codes/standards/guidelines related to technology use in line with the latest technological developments in the highways sector and disseminate codal provisions.

6. Increase the capacity and reach of public transport

- Transform state road transport undertakings (SRTUs) and promote public transport, rural transport and last mile connectivity.
- Additional funding for public transportation and the creation of interoperable systems will help expand the reach and capacity of public transport.
- The central government will work with states to develop bus ports and provide support on technologies/software such as *VAHAN* (for vehicle registration) and *Saarthi* (for driving licences).

7. Expand the reach of the electronic toll collection (ETC) system

- Complete the setup of 'FASTag', which employs radio-frequency identification, for ETC in all lanes for the 418 toll plazas with the National Highway Authority of India (NHAI) by March 31, 2019. ETC should be interoperable across toll plazas on all national and state highways.
- Streamline the 'FASTag' charging system.
- Engage with stakeholders and concessionaires (for PPP toll plazas) to ensure that all toll plazas have the requisite infrastructure for ETC.

8. Complete targets for rural connectivity

- Phase-I of PMGSY should be completed by March 2019. The total length under the LWE (Left Wing Extremism) programme of 5400 km must be completed by March 2020.
- Beyond 2020, we should focus on building last mile connectivity.

9. Increase technology adoption and seamless movement between different modes of transport

- Urban mobility must move towards multimodal solutions by ensuring seamless movement between different modes.
- Identify and develop multimodal logistics parks (MMLP) to ensure seamless movement of freight.
- Encourage the road freight industry to adopt innovative technologies through incentives.

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1 Ministry of Road Transport and Highways, Press Information Bureau. Accessed April 24, 2018. http://pib.nic.in/newsite/PrintRelease.aspx?relid=17193

2 Ibid.

3 http://pib.nic.in/newsite/PrintRelease.aspx?relid=142444. Accessed April 25, 2018.

4 TERI Energy & Environment Data Diary and Yearbook (TEDDY) 2015-16.

5 Ministry of Road Transport and Highways.

6 Ibid.

7 Ibid.

8 These include national highway stretches not covered under any programme or of completed stretches where no liability devolves on the contractor to maintain these.

9 World Health Organization "Global Status Report on Road Safety 2015".

10 Ministry of Road Transport and Highways, Press Information Bureau Archive. Accessed May 11, 2018. http://pibarchive.nic.in/ndagov/Comprehensive-Materials/compr5.pdf.

11 Ibid.

14. Railways

Objectives

By 2022-23, India should have a rail network that is not only efficient, reliable and safe, but is also cost-effective and accessible, both with respect to the movement of people and goods. This requires achieving the following objectives:

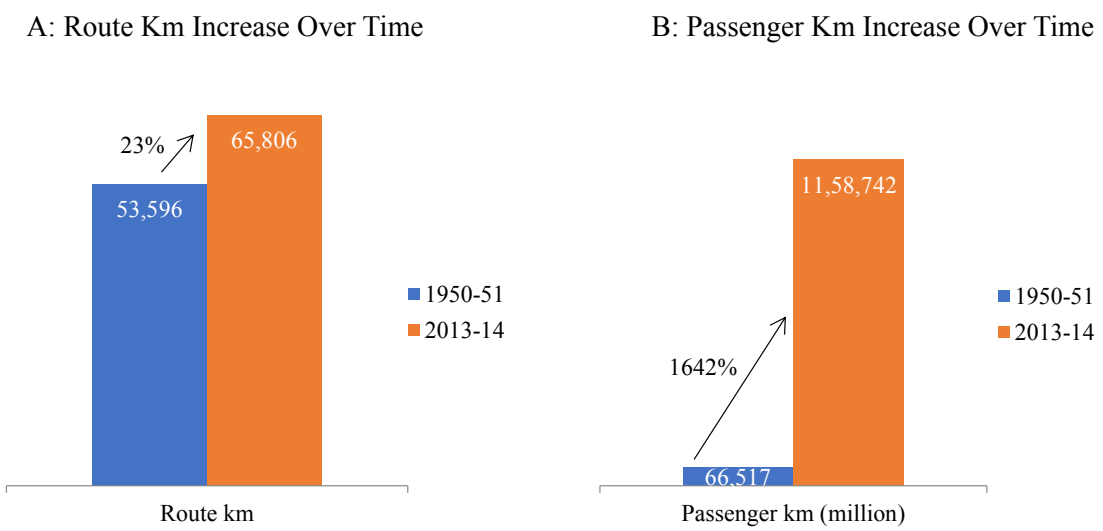
- Augment the capacity of existing railway infrastructure.
- Increase the speed of infrastructure creation from the present 7 km/day to 19 km/day by 2022-23.[1]
- Achieve "100 per cent"[2] electrification of broad gauge track by 2022-23 from the 40 per cent level in 2016-17.
- Increase the average speed of freight and mail/express trains to 50 km/hr (from about 24 km/hr in 2016-17) and 80 km/hr (from about 60 km/hr), respectively.[3]
- Improve the safety of the railways, achieving zero fatalities from the 2016-17 level of 238 fatalities and reducing the number of accidents from the 73 recorded in 2017-18.[4]
- Enhance service delivery, achieving 95 per cent on-time arrivals by 2022-23.[5]
- By 2022-23, the railways should have a freight load of 1.9 billion tonnes and an improved modal share of 40 per cent of freight movement from the current level of 33 per cent.[6]
- Increase the share of non-fare revenues in total revenue to 20 per cent.

Current Situation

The Indian Railways (IR) is the fourth largest network in the world in terms of route km (67,368 km in FY17).[7] It is also the largest passenger (1,150 billion-passenger km in FY17)[8] and fourth largest freight (620 billion net-tonne km in FY17)[9] transporting railway system globally. In FY17, 13,329[10] passenger trains carried over 22.24 million[11] passengers daily, i.e., almost equivalent to Australia's population, while the freight transported was 1.1 billion tonnes.[12] During FY07-FY17, railways' revenue increased at a CAGR of 5.7 per cent to USD 25.1 billion[13] in FY17, led by strong demand, increasing urbanization and rising incomes.

Despite its extensive reach and the substantial growth in freight load, the modal share of railways in the transportation of surface freight has declined from 86.2 per cent in 1950-51[14] to 33 per cent in 2015, in part due to a shortfall in carrying capacity and lack of price competitiveness. IR's golden quadrilateral and its diagonals make up only 15 per cent of the total route of the railways but it transports 52 per cent of passenger traffic and 58 per cent of total freight load.[15] This highlights the high saturation and over-utilized capacity on popular routes. Since passenger and freight traffic move on the same tracks in India, we have not been able to increase speed or capacity in a significant manner relative to global benchmarks.

Figure 14.1: Growth of Indian Railways, 1950-51 to 2013-14



Source: 'Indian Railways: Lifeline of the nation (A White Paper)' February 2015

The expenditure on the railways as a percentage of transport expenditure declined from 56 per cent in 1985-90 (7th plan) to 30 per cent in 2007-12 (11th plan).[16] Despite its contribution to the overall economy, under-investment in the sector has crippled operations and hampered capacity augmentation. From 1950-51 to 2013-14, the route km increased by only 23 per cent against the growth in freight and passenger km of 1,344 per cent and 1,642 per cent respectively.[17]

The government has recognized the need for additional investment in rail infrastructure and scaled up investment by almost three times, from INR 53,989 crore in 2013-14 to INR 1.47 lakh crore[18] in 2018-19 (BE).

Constraints

1. **Congested networks**: Over-stretched infrastructure with 60 per cent plus routes being more than 100 per cent utilized, leading to a reduction in average speed of passenger and freight trains.
2. **Organizational structure**: Delays in decision-making, inadequate market orientation and long project approval durations lead to slow turnover times and delays in the implementation of railways projects.
3. **Internal generation of resources**: Negligible non-fare revenues and high freight tariffs have led to a sub-optimal freight share. The lower relative cost of transporting freight by road has led to a decline in the share of the railways. Low and static prices for the passenger segment have also contributed to low internal generation of resources.
4. **Safety and poor quality of service delivery**: There have been a number of accidents and safety issues in the IR in recent years. Poor cleanliness of trains and stations, delays in train departures/arrivals, quality of

food and difficulties in booking tickets are key issues.

5. **Efficiency of terminals**: Poor terminal facilities lengthen loading and unloading times. Eighty per cent of railway loads come from terminals. The functioning of terminals needs to be strengthened to improve rail freight.
6. **Economies of scale**: The lack of scale economies especially impact management quality and system accountability.

Way Forward

1. **Better utilization of existing infrastructure to address congestion:**

- Prioritize ongoing projects to improve capacity utilization. Timely completion of these projects will generate more revenue. At the same time, we need to maintain and upgrade the existing network to ensure that supply keeps up with demand.
- Ensure that the dedicated freight corridors (DFCs) and the Mumbai-Ahmedabad High Speed Rail (MAHSR) are completed on schedule, particularly by timely completion of land acquisition for DFCs. DFCs should be fully commissioned by FY20; feeder routes to the DFCs should be developed simultaneously.

2. **Ease organizational rigidity through structural reforms:**

- Consider opening up the ownership and operations of freight terminals and ownership of locomotives and rolling stock to the private sector under a transparent, neutral (non-railway) and fair regulatory mechanism. This will improve performance and attract private players and investments.
- Consider transferring coach and locomotive manufacturing and repairs to private players. However, since human safety is involved in the case of coaches and wagons, IR should continue to have regulatory and technical control over their manufacture and maintenance to ensure the safety of users in compliance with the General Rules of IR.
- Separate suburban passenger transport from the rest of the network and put a light rail network in place in all major urban areas under local governments.

3. **Rationalize fare structures and subsidies, and monetize assets to generate revenues:**

- Revisit IR's pricing model to make the passenger and freight segments sustainable. Freight tariffs should be competitive with the cost of road transportation.
- Expedite the process of establishing the Rail Development Authority (RDA), already approved by the government[19]. DA must advise/ make informed decisions on an integrated, transparent and dynamic pricing mechanism to determine rail fares and rebalance the passenger and freight categories to improve efficiency and rebalance the modal mix of goods transport.
- Monetize land resources with the railways, particularly through developing non-railway revenues such as through retail or other activities.
- Increase retail revenues from railway stations by investing in facilities, modernizing stations and contracting space to private players.

4. **Enhance safety of trains to reduce accidents and modernize stations:**

- The government has created the *Rashtriya Rail Sanraksha Kosh* (RRSK) in 2017-18 to address critical safety related issues.

- Eliminate level crossings and cattle crossings and fence railway tracks in areas with high levels of activity to prevent accidents.
- Increase the use of proven, advanced technologies such as automatic train protection, fog safety devices, end of train telemetry devices and on-board/online condition monitoring systems.
- Implement the 22 recommendations of the High-Level Safety Review Committee chaired by Dr. Kakodkar.[20]
- Upgrade and ensure the smooth functioning of by-pass crossings and grade separations.
- Redevelop 100 out of 400 identified railway stations by 2022.
- Award station-cleaning contracts to private vendors and sharply increase the number of bio-toilets by 2019.

5. Enhance the ease of doing business:

- Set up an independent homologation and standardization agency to adopt new railway technology and improve the speed and reliability of the railway network.
- Switch to common transport documents with (i) an internationally accepted liability regime for domestic and international transportation and (ii) common carrier status to all rail-based service providers.
- To enhance credibility, ensure that there are no interim changes in tariff and non-tariff rules.
- Use technology to schedule and route freight business to improve asset productivity and utilization.
- Complete by 2022-23 the commissioning of the remaining 55 of the 100 new freight terminals announced in the Rail Budget of 2016-17 under 'Mission Hundred'.[21]
- Improve terminal efficiency by promoting the concept of 'engine-on-load' system, developing proper terminal layouts, adopting efficient operational practices, operating trains end-to-end, and using proper handling methods/systems for loading and unloading operations.[22]

6. Set up an independent regulator for the Indian Railways:

- The government has already approved the formation of the RDA, an independent regulator for IR in February, 2018. The regulator's functions will include the following:[23]
  - Take decisions regarding price regulation and enhancement of non-fare revenue.
  - Protect consumer interests, promote competition, efficiency and economy and ensure a fair deal to stakeholders and customers.
  - Help attract investment, promote efficient resource allocation, benchmark service standards and enforce standards.
  - Put in place measures to absorb new technologies and develop human resources.
  - Provide a framework for non-discriminatory open access to the dedicated freight. corridors

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1 Indian Railways, July 2017. "Reform, Perform and Transform." http://www.indianrailways.gov.in/Reform-Perform-Transform%202022_v10%20(2).pdf. Accessed April 30, 2018.

2 Budget Speech 2018-19.

[3] Rail Budget Speech 2016-17.

https://www.thehindubusinessline.com/opinion/a-multitrack-approach-to-railway-reform/article9937255.ece. Accessed April 30, 2018.

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[7] Ibid.

[8] Ibid.

[9] Indian Railways http://www.indianrailways.gov.in/railwayboard/uploads/directorate/stat_econ/MTHSTAT/2017/Freight_March_2017.pdf. Accessed April 26, 2018.

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[12] Report on Railways by IBEF, September 2017 https://www.ibef.org/download/Railways-September-2017.pdf. Accessed April 27, 2018.

[13] Ibid.

[14] India: Three Year Action Agenda 2017-18 to 2019-20 by NITI Aayog http://niti.gov.in/writereaddata/files/coop/India_ActionAgenda.pdf. Accessed April 28, 2018.

[15] http://pib.nic.in/PressReleseDetail.aspx?PRID=1514320. Accessed April 28, 2018.

[16] 'Indian Railways: Lifeline of the nation (A White Paper)' February 2015 http://www.indianrailways.gov.in/railwayboard/uploads/directorate/finance_budget/Budget_2015-16/White_Paper-_English.pdf. Accessed April 30, 2018.

[17] 'Indian Railways: Lifeline of the nation (A White Paper)' February 2015 http://www.indianrailways.gov.in/railwayboard/uploads/directorate/finance_budget/Budget_2015-16/White_Paper-_English.pdf. Accessed April 30, 2018.

[18] Ministry of Railways.

[19] http://pib.nic.in/newsite/PrintRelease.aspx?relid=176324. Accessed April 28, 2018.

[20] http://pib.nic.in/newsite/PrintRelease.aspx?relid=175038. Accessed April 29, 2018.

[21] Ibid.

[22] 'Terminals on Indian Railways' by S. B. Ghosh Dastidar, The Asian Journal (2009), http://www.aitd.net.in/pdf/AsianJournals/24%20-%20Rail%20Terminal%20Facilities.pdf. Accessed April 30, 2018.

[23] http://pib.nic.in/newsite/PrintRelease.aspx?relid=176324. Accessed May 10, 2018.

15. Civil Aviation

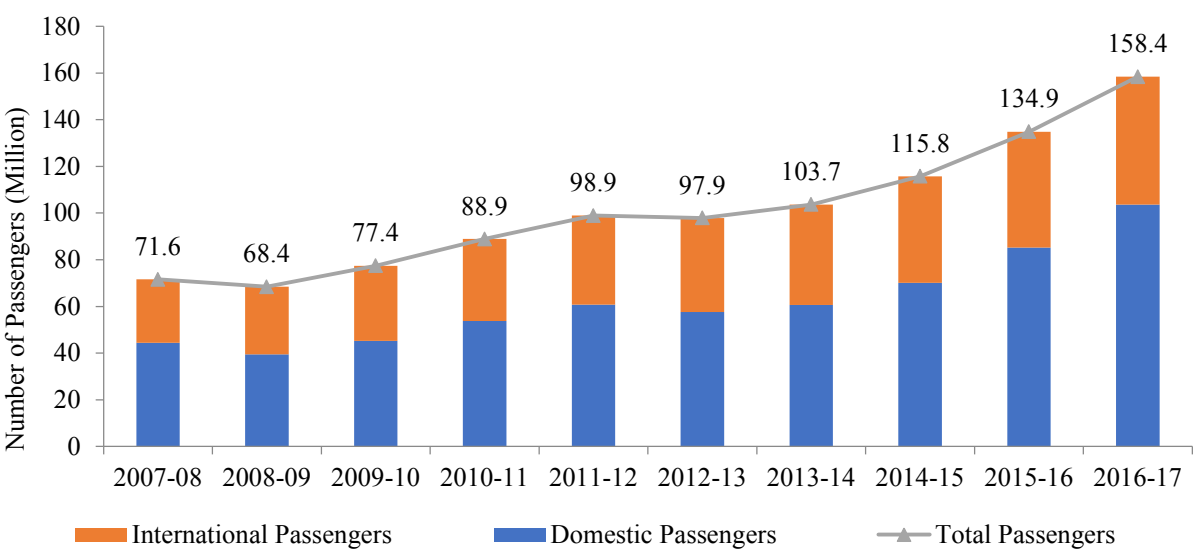
Objectives

- Enhance the affordability of flying to enable an increase in domestic ticket sales from 103.75 million in 2016-17[1] to 300 million by 2022.[2]
- Double air cargo handled from about 3.3 million tonnes in 2017-18 to about 6.5 million tonnes.
- Expand the maintenance, repair and overhaul (MRO) industry from USD 1.8 billion in 2017 to USD 2.3 billion.
- Expand airport capacity more than five times to handle one billion trips a year.
- Enhance availability and affordability of regional air connectivity and revive/upgrade 56 unserved airports and 31 unserved helipads through the Regional Connectivity Scheme – *Ude Desh Ka Aam Naagrik* (RCS-UDAN).
- Ensure that airport tariffs, taxes on fuel, landing charges, passenger services, cargo and other charges are determined in an efficient, fair and transparent manner.

Current Situation

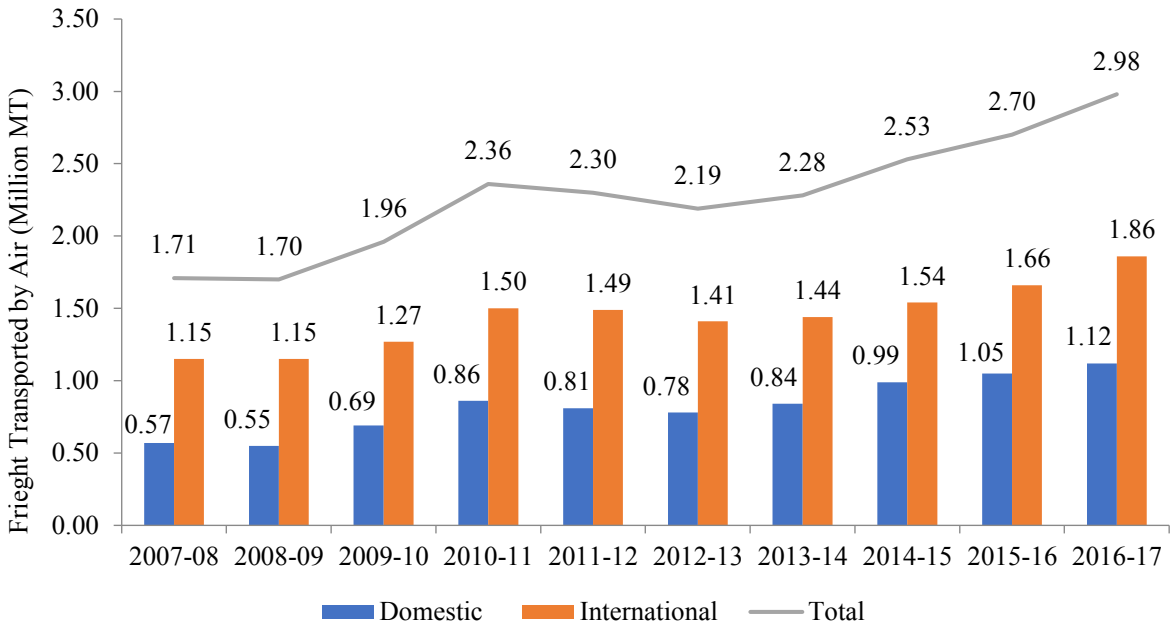
The civil aviation sector contributed USD8.9 billion to India's GDP in 2014 and supported 1.31 million direct, indirect and induced aviation jobs.[3] In 2016, the demand for domestic air travel was twice that in China.[4] India's domestic air traffic made up 69 per cent of total airline traffic in South Asia.[5] The World Economic Forum's Global Competitiveness Report,

Figure 15.1: Passenger traffic by scheduled carriers, 2007-08 to 2016-17



Source: Hand Book on Civil Aviation Statistics 2016-17

Figure 15.2: Freight transported by air, 2007-08 to 2016-17



Source: Ministry of Civil Aviation

2018 ranks India as 53rd out of 140 countries worldwide in air transport infrastructure.

The Airport Authority of India (AAI) aims to bring around 250 airports under operation across the country by 2020.[6] The Ministry of Civil Aviation's regional connectivity scheme, UDAN, is a 10-year scheme, which will promote balanced regional growth and make flying affordable for the population. It will help enhance connectivity to the country's unserved and underserved airports.

India's civil aviation sector has been growing steadily; the number of passengers was 158 million in 2016-17.[7] Domestic passenger traffic increased at a CAGR of almost 10 per cent between 2007-08 and 2016-17 and international passenger traffic grew at a CAGR of 8.07 per cent during the same period.[8] Between 2014-15 and 2016-17 in particular, traffic growth in the domestic passenger segment was 48 per cent and 20 per cent in the international segment.[9] India is also catching up with other leading aviation markets in terms of market penetration.

There has been an increase in air cargo, both domestically and internationally, in 2016-17. IATA has forecast that India will cross over into the top 10 air freight markets in 2018-19.

Constraints

- **Capacity and infrastructure**: Due to the rapid expansion of India's civil aviation sector, airspace, parking bays and runway slots will become increasingly scarce over the next few years, especially at metro airports. Mumbai and Chennai airports are already close to saturation. Capacity and infrastructure constraints could decrease efficiency and safety and have

negative economic effects. Inadequate hangar space and unavailability of land to expand airports at their current sites, particularly in major cities, are two of the major constraints that face the sector. While this may be less binding in metro cities where the number of passengers is large enough to support more than one airport, building more than one airport is not feasible in non-metro cities because of low passenger volume.

- **Skilled workers**: According to a study conducted by the Ministry of Civil Aviation, Indian aviation could directly support 1.0 to 1.2 million jobs by 2035. This implies that about 0.25 million persons will need to be skilled over the next 10 years.
    - Shortage and gaps in availability of industry-recognised skills – from airline pilots and crew to maintenance and ground handling personnel – could constrain the growth of different segments of the sector.
    - Aviation Gasoline (AvGas) is used as fuel by almost all training aircraft. This fuel is imported, its supply is not assured and it attracts a tax of 18 per cent (earlier 28 per cent) under GST. Coupled with a shortage of instructors, this makes flying training an expensive and time-consuming exercise.
- High cost to passengers and of air cargo:
    - **Tariff determination**: The Ministry of Civil Aviation has mandated that all airports move from a single to a hybrid till structure. Although this is beneficial as it incentivizes infrastructure investment, it raises costs for airlines and passengers.
    - **Taxes on aviation turbine fuel (ATF)**: Due to high taxes and lack of competition among providers, ATF is relatively expensive in India. Since it remains outside the GST network, there are also regional disparities in its price. The price of aviation fuel in India may be up to 60 per cent per cent higher than prices in ASEAN and the Middle East countries because of high central and state taxes.[10] Fuel cost as a percentage of operating charges amounts to 45 per cent[11] in India as compared to the global average of 30 per cent.
    - Incidence of GST on Aircraft Leases and Spare Parts: GST of 5 per cent is applied on aircraft lease rentals; GST ranges between 5 per cent and 28 per cent on aircraft engines and spare parts. This also raises costs for the sector.
- **Aviation safety**: Although, the number of aviation safety violations in 2017 (337) has declined in comparison to 2016 (442), the absolute number still remains high.

Way Forward

1. **Enhance aviation infrastructure**

- Complete the planned airports under the UDAN initiative in a time-bound manner. Revival of 50 un-served and under-served airports/airstrips should be completed.
- In addition to completing two new airports for Delhi and Mumbai by 2022, the infrastructure capacity in the 10 biggest airports (in terms of traffic) should be significantly augmented.
- Include provisions for domestic hub development while auctioning traffic rights.

2. **Increase investment in the sector through financial and infrastructure support**

- Reduce taxes on MRO services and consider granting infrastructure status for MRO.

- Increase aircraft parking infrastructure and facilities at metro airports.
- Create additional parking hubs at suitable locations, accessible through short haul flights, to accommodate additional aircraft.
- Monetize vacant real estate near AAI airports in all major centres of traffic to increase non-aeronautical revenues.

3. Address shortage of skilled manpower

- Promote collaboration between original equipment manufacturers (OEMs), industry and educational institutes to teach the latest concepts in the aviation industry including management principles, IT in aviation, etc.
- Formulate long-term plans for advanced research in aviation technologies to create a manufacturing ecosystem in the country.
- Expedite commencement of courses by the National Aviation University after due consultation with stakeholders.
- Facilitate greater involvement of the private sector in sponsoring aviation institutions, industrial training and R&D projects.
- A further reduction in GST rates on Avgas will allow flying training organizations to make training more affordable.

4. Promote air cargo growth

- Promote "Fly-from-India" through the creation of transhipment hubs. The transhipment hub in Delhi is scheduled to be launched in May 2018 followed by the launch of those in Chennai and Mumbai.
- Develop an integrated digital supply chain or e-cargo gateway based on the National Air Cargo Community System (NACCS) platform.

  The modular development may include the following digital business enablers as plug-ins:
- e-contracting/booking of cargo – with access to financial payment gateways.
- e-transportation multimodality (road-air first/last mile connectivity).
- e-compliances (initially online clearances by six participating governmental agencies; rest to follow).
- Cargo Sewa – a grievance redressal module linked to Air Sewa.

5. Ease the regulatory environment for airports

- Deregulate further and open up the aviation market to help increase passenger and freight traffic in India.
- Adopt a consistent model for tariff determination so that it reduces passenger cost.
- Align taxation and pricing structure to global benchmarks by considering bringing aviation turbine fuel (ATF) under the rubric of GST.
- Amend the AAI Act to allow commercial usage of land with airports by liberalising end-use restrictions for existing and future airports.
- Strengthen regulatory capacity with respect to public private partnerships and streamline the judicial review process to ensure timely implementation of DGCA's decisions.
- Ensure that the DGCA acts as a truly independent regulator, with the Ministry of Civil Aviation focusing on policies.
- Meet the regulatory and security requirements prescribed by the International Civil Aviation Organization (ICAO) at all times. Additional skilling of personnel may be required for this and the DGCA should

adequately build the capabilities of its staff to ensure compliance.

6. Prioritize aviation safety[12]

- Shift focus to pre-empting and preventing accidents/incidents.
- There should be zero tolerance of safety violations.
- DGCA should be given autonomy for an effective aviation safety oversight system. It should also be authorized to impose fines and penalties depending upon the nature of violations.
- DGCA should continue ensuring real time safety tracking and prompt incident reporting.
- DGCA should create a single-window system for all aviation related transactions, queries and complaints.

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1 Hand Book on Civil Aviation Statistics 2016-17' http://dgca.nic.in/pub/Handbook_2016-17.pdf. Accessed April 25, 2018.

2 National Civil Aviation Policy 2016 http://www.civilaviation.gov.in/sites/default/files/Final_NCAP_2016_15-06-2016-2_1.pdf. Accessed April 25, 2018.

3 IATA and Oxford Economics, "The Importance of Air Travel to India". http://www.iata.org/publications/economics/Reports/voa-country-reports/2016/ap-india-2017.pdf. Accessed April 25, 2018.

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5 Ibid.

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7 'Hand Book on Civil Aviation Statistics 2016-17' http://dgca.nic.in/pub/Handbook_2016-17.pdf. Accessed April 26, 2018.

8 Ibid.

9 Ibid.

10 "Aviation Sector: Status Check and Roadmap." Accessed April 27, 2018. http://www.advayalegal.com/articles/article-october,-2014-(edition-of-infrastructure-today-magazine).pdf.

11 Hindu Business Line, April 14, 2014. "Indian Aviation grounded by High Taxes." Accessed April 27, 2018. https://www.thehindubusinessline.com/economy/India-aviation-grounded-by-high-taxes-IATA-chief/article20727740.ece.

12 National Civil Aviation Policy, 2016. Ministry of Civil Aviation. Accessed April 27, 2018. http://www.civilaviation.gov.in/sites/default/files/Final_NCAP_2016_15-06-2016-2_1.pdf.

16. Ports, Shipping and Inland Waterways

Objectives

- Double the share of freight transported by coastal shipping and inland waterways from 6 per cent in 2016-17[1] to 12 per cent by 2025.
- Increase the port handling capacity to 2,500 million metric tonnes (MMT)[2] by 2022-23.
- Reduce the turnaround time at major ports from about 3.44 days (2016-17)[3] to 1-2 days (global average) by 2022-23.
- Increase the throughput of inland waterways from 55.20 MMT in 2016-17 to 60-70 MMT by 2022-23.
- Augment the capacity of inland water transport by increasing the least available depth.

Current Situation

1. Ports and shipping

India has a coastline spanning about 7,500 km, forming one of the biggest peninsulas in the world. Around 90 per cent of India's external trade by volume and 70 per cent by value are handled by ports.[4] Twelve major ports and 205 non-major ports operate on India's coast. Yet, roads and railways continue to be the dominant mode for cargo movement. Despite being the most cost-effective (Figure 16.1) and efficient mode, water transport accounted for 6 per cent of freight transport in India in 2016-17.

The total cargo handling capacity at major and non-major ports stands at 2161.85 MMT[5] as on March 3l, 2017. Total capacity utilization across all ports was 52.44 per cent. During 2016-17, the total cargo throughput through major and non-major ports was 1133.69 MMT.

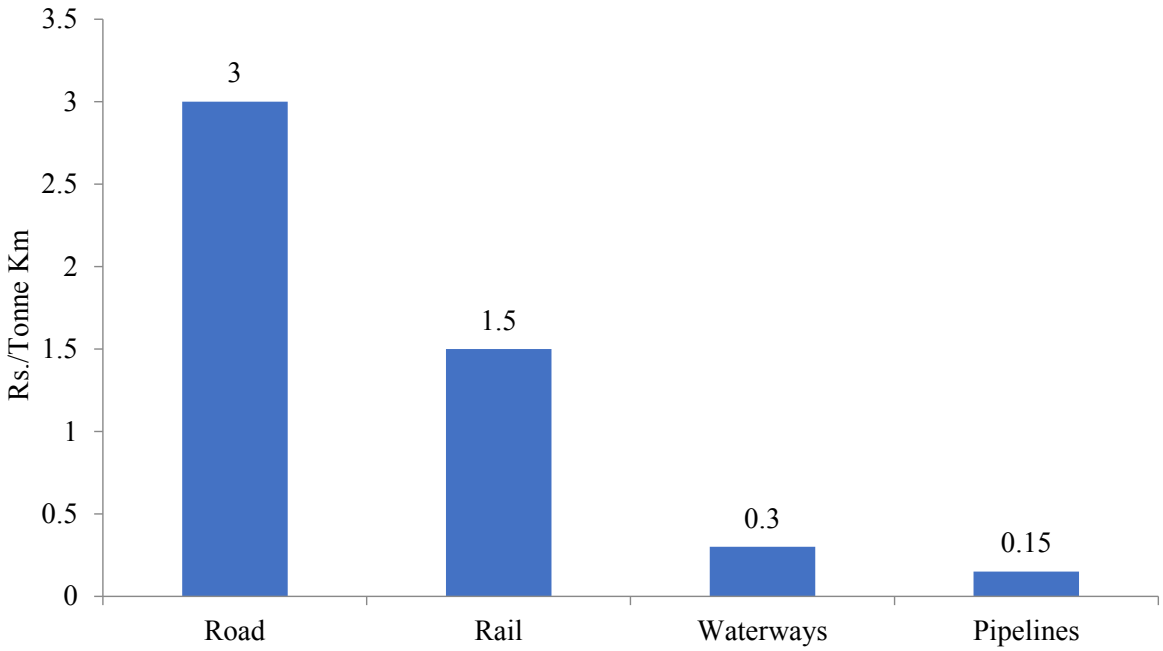
The Ministry of Shipping's *Sagarmala* programme focuses on modernizing and developing ports, enhancing port connectivity, supporting coastal communities and stimulating port-linked industrialization (Figure 16.2). *Sagarmala* aims to reduce the logistics costs for foreign and domestic trade, leading to an overall cost savings of INR 35,000 to INR 40,000 crore annually by 2025. It also aims to double the share of water transportation in the modal mix.

The government has set up the *Sagarmala* Development Company Limited (SDCL) to provide funding support to special purpose vehicles (SPVs) set up to implement projects and the Indian Port Rail Corporation Limited (IPRCL) to undertake port-rail connectivity projects under *Sagarmala*.

2. Inland waterways

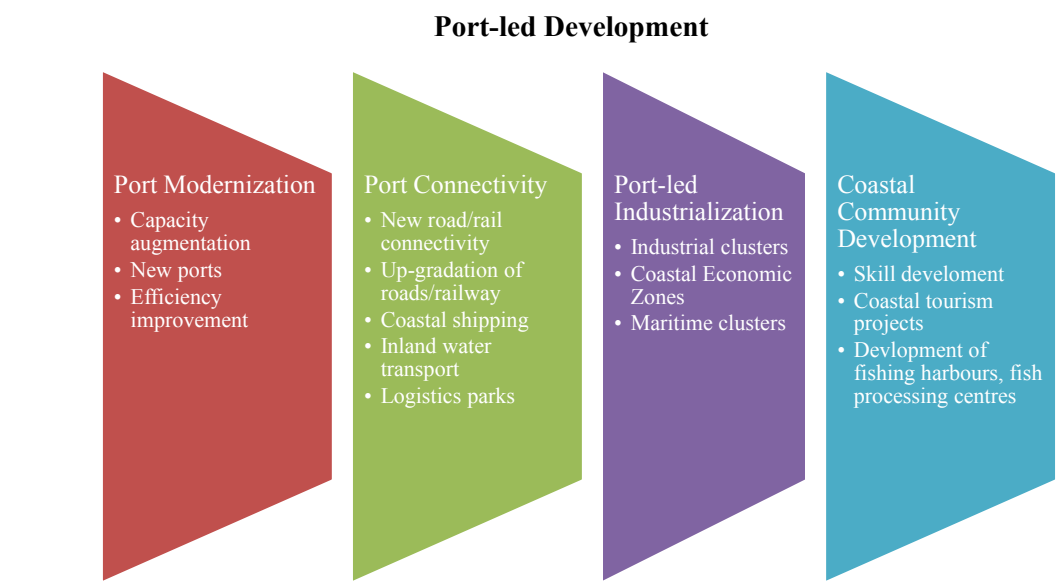
Inland Water Transport (IWT) carries less than 2 per cent of India's organized freight traffic and negligible passenger traffic. The annual freight volumes carried on inland waterways using National Waterways (NW-1, NW-2, and NW-3) and Goa Waterways was 21.91 MMT in 2016-17. Additionally, Maharashtra Waterways alone transported more than 33.29 MMT.

Figure 16.1: Operating cost comparison in transporting cargo through various modes



Source: Sagarmala National Perspective Plan, 2016

Figure 16.2: Pillars of the *Sagarmala* programme



Source: Ministry of Shipping

The Inland Waterways Authority of India (IWAI) is mandated to develop and maintain infrastructure for fairway, navigational aids and terminals. The IWAI also provides an enabling environment for private investment in cargo vessels and operational services. Until 2015, there were only five NWs in the country. In April 2016, 106 more waterways spread over 24 states were declared as NWs. The ministry is augmenting the capacity of NW-I under the *Jal Marg Vikas* project. The project will enable the movement of larger vessels of 1,500-2,000 tonnes on inland waterways. The government is also proposing to fund NWs through the Central Road Fund (CRF). The Ministry of Finance has amended the Central Road Fund Act, 2000, as part of the Finance Bill 2018 to include a list of projects and infrastructure sub-sectors, including inland waterways, for which the CRF could be used. The CRF has since been renamed the Central Road and Infrastructure Fund.

Constraints

1. **Modal mix**: Roads (54 per cent) continue to be the dominant mode of transporting cargo, followed by rail (33 per cent). Transportation of cargo through waterways – shipping and inland water – accounts for a minuscule modal share (6 per cent) despite it being the most cost-effective and efficient mode.
2. **Draught levels**: Most Indian container handling ports lack the capability to handle large container vessels due to inadequate depth; a minimum draft depth of 18 metres is needed to enable mother vessels to dock at ports. With international trade leaning towards the more economically viable mother vessels, shallow draft adversely affects a port's potential to become a hub port.
3. **Connectivity to ports**: Weak hinterland connectivity between production centres and gateway ports often leads to higher costs and delays because of sub-optimal mode choices.
4. **Transhipment port**: A large percentage of containers in India are currently transhipped through other ports, such as Colombo (just south of India), Singapore (East), Dubai and Salalah (West) due to the absence of a transhipment port in the country. This has led to additional costs and delays due to the feeder voyage from India to the hub port.
5. **Charges by the shipping lines**: The business practices of shipping lines have played a key role in the present negative perception of sea transport. A long pending concern has been the high rate and multiplicity of charges imposed by shipping lines.
6. **Capital for inland vessels**: At present, the cost of capital is very high and makes IWT freight uncompetitive. It is difficult to attract capital for building inland vessels as it is a significant investment.
7. **Technical issues in inland waterways**: The varying and limited depths due to the meandering and braiding of alluvial rivers and the erosion of their banks causing excessive siltation, lack of cargo earmarked for IWT, non-mechanized navigation lock systems and insufficient unloading facility at terminals hinder the use of IWT by shippers.
8. **Regulatory issues for inland waterways**: States' Ferries Acts from various years govern cross ferry movement and this may present a barrier to inland navigation, as the regulations may not take into account safety considerations.

Way Forward

1. Open up India's dredging market

- The government needs to open up the dredging market to attract more players, particularly international players, in dredging activities to increase and maintain draft depth at ports to attract large vessels and enable them to become hub ports. At present, the Dredging Corporation of India (DCI) and a limited set of private vendors serve the Indian dredging market, limiting competition. Foreign players will be attracted to the market if the government takes measures such as consolidating dredging contracts across cohorts of ports and withdrawing, at least temporarily, the right to first refusal given to Indian vendors.
- To enable major ports to handle larger vessels, an action plan to increase the draft depth of ports has been prepared. Most major ports have already achieved a draft of 14 metres or more except Kolkata Port, where deeper draft has not been feasible because of the riverine nature of the port. Some major ports are striving to achieve deeper drafts up to18 metres. The outer harbour in Visakhapatnam has very deep draft of more than 18 metres. Work is in progress to create a draft of more than 18 metres in Mormugao and Kamarajar Port.

2. Expedite the implementation of *Sagarmala*

- Expedite the completion of various projects under *Sagarmala*, especially those aimed at improving port connectivity, setting up coastal economic zones (CEZs) and establishing new ports.
- The setting up of a single window facility for cargo clearance and putting in place fully mechanized cargo handling infrastructure will be critical to increase throughput.

3. Ease the business environment around shipping and ports

- The Government of India needs to take a fresh look at its policy of imports on a ''Free on Board" basis (FoB policy) as it needs to balance risk between the importer and exporter.
- Enhance technology use in ports and, wherever feasible, draw lessons from successful global ports such as Rotterdam, Felixstowe and Singapore to improve efficiency.

4. Transhipment ports and shipping lines

- Transhipment via Cochin ICCT (already commissioned), the upcoming Vizhinjam Port and the Enayam Port at Colachel will create a transhipment cluster similar to the clusters in Malaysian and Singaporean ports. The cluster should be completed within the targeted timelines and a business plan should be drawn up to make it a success.
- The new Merchant Shipping Bill to replace the Merchant Shipping Act, 1958, needs to be enacted at the earliest to promote the ease of doing business, transparency and effective delivery of services. Opening up of the sector will improve the availability of ships and help reduce costs.

5. Enhance last mile connectivity to inland waterways

- IWT should be integrated to multimodal/ intermodal connectivity. Inland terminals with proper road and/or rail connectivity and seamless transfer of goods from one mode to the other are important for an efficient logistics supply chain.
- Procure floating terminals and cranes and place them suitably so that access to roads is possible.

- Enhance linkages between national waterways and state waterways and feeder canals.

6. Facilitate access to capital for inland vessels

- Financing for inland vessels could be made part of priority sector lending by banks.
- Categorizing inland vessels as infrastructure equipment will further ease access to capital issues for a sector where capital investments and operational costs are high.
- Initially, viability gap funding needs to be given at least for 10 years until the infrastructure is fully developed, so that inland water transport is competitive.
- We should consider waiving waterway charges and lock charges until operable infrastructure is made available.
- Revive the shipbuilding finance scheme in line with the subsidy scheme that was in force during 2002-2007, which led to high growth rates in the shipping sector and full order books for Indian shipyards.

7. Address technical and regulatory constraints in inland waterways to ease movement of inland vessels

- CCEA, chaired by the Hon'ble Prime Minister approved the implementation of the *Jal Marg Vikas* project (JMVP) to augment the capacity of National Waterway-1 (NW-1) with technical assistance and investment support from the World Bank at a cost of INR 5369.18 crore. We must ensure that the project is completed by March 2023.[6]
- From a regulatory standpoint, detention of a vessel without a valid reason should not be allowed.
- A clear directive needs to be issued for security of inland vessels, crew and cargo.
- Strengthen existing Inland Water Transport Directorates or Maritime Boards or set them up in states where they do not exist to ease the IWT business and to ensure efficient regulation and facilitation of IWT for cargo movement.

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1 Financial Express, September 19, 2016. Accessed May 8, 2018. https://www.financialexpress.com/economy/narendra-modi-govt-does-well-with-its-inland-waterway-move-but-infrastructure-is-a-challenge/381439/.

2 In 2016, the government announced that INR 1 lakh crore would be dedicated to increasing India's port handling capacity to 3,000 MMT by 2025.

3 Press Information Bureau, Government of India. April 12, 2017. "Major Ports Register 6.79 per cent Growth in Traffic over last year, Outperform Private Ports for Second Consecutive Year." Accessed May 8, 2018. http://pib.nic.in/newsite/PrintRelease.aspx?relid=160949.

4 Press Information Bureau, Government of India. December 20, 2017. "Ministry of Shipping – 2017 Consolidation." Accessed May 8, 2018. http://pib.nic.in/PressReleaseIframePage.aspx?PRID=1513281.

5 Port capacity of major ports rerated on berthing policy as per international norms.

6 Press Information Bureau, Government of India. January 3, 2018. "Cabinet approves *Jal Marg Vikas* Project for enhanced navigation on the Haldia-Varanasi stretch of National Waterway-1." Accessed May 8, 2018. http://pib.nic.in/newsite/PrintRelease.aspx?relid=175208.

17. Logistics

Objectives

- Achieve multi-modal movement of cargo on par with global logistics standards.
- Reduce the logistics cost to less than 10 per cent of GDP from the current level of 14 per cent.
- Expand the logistics market to USD215 billion by 2020 from the current level of USD160 billion.[1]
- Improve logistics skilling and increase jobs in the sector to 40 million by 2022-23 from about 22 million in 2016.
- As per the approved National Trade Facilitation Action Plan, reduce border compliance time to 24 hours for exports and to 48 hours for imports by 2020.

Current Situation

The Indian logistics industry employs more than 22 million people (as of 2016). Between 2011-12 and 2015-16, the logistics sector's value has grown at a compound annual growth rate (CAGR) of 7.8 per cent. However, existing logistics costs in India are high relative to other countries. Logistics costs have been estimated at 14 per cent of India's GDP relative to 9 per cent of GDP in the United States, 11 per cent in Japan, 12 per cent in Korea and 14.9 per cent in China.[2] A 10 per cent decrease in indirect logistics cost has the potential to increase exports by 5-8 per cent.[3]

Recognizing its importance for exports and growth, the government has included logistics in the harmonized master list of the infrastructure subsector. This will ease access to credit and simplify the approvals process for building infrastructure in the sector. The government has also created a new Logistics Division in the Ministry of Commerce and Industry that will focus on the integrated development of the logistics sector, improving procedures and introducing new technologies.

Infrastructure or transport quality is a particular area of concern for the logistics sector. About 35 per cent of export-import cargo originates in or is destined for hinterland locations. The World Economic Forum's Global Competitiveness Index (GCI) ranked India 66th out of 137 countries in infrastructure in 2017-18. The World Bank's Ease of Doing Business ranks India 146 out of 190 countries in 'trading across borders'. India ranks lower than China (96), Vietnam (93), Sri Lanka (90) and Indonesia (108).

Constraints

1. **Cost of logistics**: The cost of logistics remains high due to challenges in accessing finance, underdeveloped infrastructure, poor connectivity and an unfavourable modal mix.

2. **Coordination due to multiple stakeholders' involvement**: Logistics has four key components that account for the majority of the sector: transport, warehousing, freight forwarding and value added logistics. Each of these falls under different segments of regulatory oversight, which adds complexity to the system. The presence of multiple agencies often leads to duplicate processes. Further,

non-uniform documentation across states adds to transaction costs. While the recently implemented Goods and Services Tax (GST) has simplified documentation requirements across states to some extent, there still remains further room for improvement. Countries with multiple agencies in logistics have reduced efficiency, coordination and competitiveness.[4]

3. **Warehousing capacity and fragmented structure**: India's current reported warehousing capacity is 108.75 million metric tonnes (MMT) of which the private sector makes up less than 20 per cent. There is low value addition in the warehouse sector. Handling and warehousing facilities are still largely un-mechanized with manual loading, unloading and handling in the case of many commodities.
4. **Seamless movement of goods across modes and high dwell time**: In addition to lack of interoperable technology, the movement of goods across modes suffers from the absence of last mile connectivity and infrastructure. For example, poor road and rail connectivity to most non-major ports leads to delays in travel time. The share of cargo moving through coastal shipping is small, primarily due to the lack of infrastructure and connectivity for feeder ships that operate between smaller container ports.
5. **Competition and underutilized capacity**: There is no level playing field as the public sector is provided benefits that are not available to private players such as container train operators or foreign vessel owners, leading to limited competition, capacity underutilization and other inefficiencies.
6. **Interoperable technology across modes**: The lack of interoperability of software systems used by the authorities governing different modes of transport leads to inefficiencies as it increases transit time and the need for manual intervention when switching modes.
7. **Border compliance and document processing time**: India's average border compliance time (including customs regulations and mandatory inspections) for exports is 106 hours and for imports 264 hours. India's document processing time (including documentary compliance for various agencies including regulators) is an average of 38 hours for exports and 61 hours for imports.

Way Forward

1. **Rationalize tariffs and determine prices in an efficient manner across different modes**: Tariff policies need to be rationalized. The Railways chapter provides details on rail freight while the Civil Aviation chapter highlights the need to determine air cargo tariffs in a consistent manner across airports.
2. **Create an overarching body that maintains a repository of all transport data**: Such a body or institute will be responsible for acquiring, managing and disseminating data to internal stakeholders. The proposed institute can also conduct robust analysis of the data, which it should make publicly available. This body can be a part of the logistics portal that is under development.
3. **Enhance efficiency of warehouses and their operation, especially to optimize food storage**:

- *Create vertical silos for food storage and transport food grains by specialized wagons.* We could operate smaller silos at the mandi level connected to mother silos that have bulk handling and rail connectivity. Further, specialized wagons with top loading and bottom discharge functions should be made available for handling grains. These measures will help reduce food losses.

- *Optimize existing warehouse space.* Existing warehouses can be converted into multi-storeyed ones to store multiple commodities at the same time. This will greatly increase warehousing space.

4. **Increase emphasis on multimodal solutions**: Setting up multimodal logistics parks will help address issues related to underdeveloped infrastructure, an unfavourable modal mix and connectivity. The government has already approved 24 logistics parks under the *Bharatmala* programme and seven have been identified under the *Sagarmala* programme. These may be completed by 2022-23. They should reflect best practices from global logistics parks with respect to comprehensive development and synergies across modes of transport.

5. **Allow private players to operate in CONCOR and port terminals**: There is no level playing field for private container train operators (CTOs) vis-à-vis the Container Corporation of India (CONCOR). Providing shared space at CONCOR terminals to private CTOs will help utilize the infrastructure better. Similarly, opening up port terminals to private players at a fee will enhance capacity utilization.

6. **Increase technology use to enhance logistics:**

- *Integrate technologies across modes of transport by developing an integrated information technology (IT) platform.* Increasing the interoperability of technology across modes by implementing container tracking systems, radio frequency identification (RFID), etc., will reduce delays and enhance efficiency. The integrated IT platform should be a single window for all logistics related matters. The portal should be linked to the IT systems of all transport modes, and customs and state transport authorities. It should act as a logistics marketplace.

- *Create an institutional mechanism for technology adoption in transport.* India needs to create an office, similar to the Office of the Assistant Secretary for Research and Technology (OST-R) in the USA, under the Commerce Ministry's newly created Logistics Division to advance the use of innovation, develop technology and create a skilled interdisciplinary transportation workforce.

7. **Shift towards international standards for transport equipment and software**: To increase efficiency and ensure compatibility, we should gradually adopt international standards, especially in operations, and adopt global benchmarking on unit load devices such as containers and pallets. While this will require changes in the overall infrastructure of ships, ports and railways, it will help realize savings in cost, time and accounting. Associated handling equipment such as forklifts, cranes, tractors, scanning and inspection technologies, and flatbed rail wagons should be standardized and become ubiquitous.

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1 Annual Economic Survey 2018-19. Ministry of Finance.

2 National Transport Development Policy Committee (NTDPC). "India Transport Report: Moving India to 2032", 2014. Data for China are from the National Development Reform Commission, 2016.

3 Annual Economic Survey 2018-19. Ministry of Finance.

4 Annual Economic Survey 2017-18.

18. Digital Connectivity

Objectives

Given the relevance of digital connectivity to economic growth and the need to eliminate the digital divide by 2022-23, India should aim to achieve:

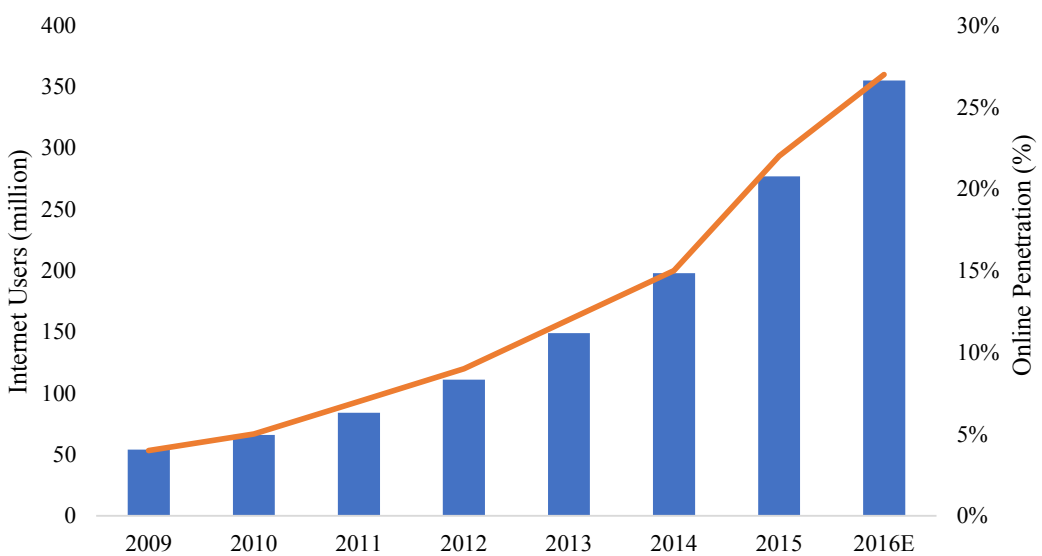
- Physical digital connectivity across all states, districts and *gram panchayats* (GPs).
- Delivery of government services digitally by 2022-23.
- Hundred per cent basic digital literacy across the country to be able to leverage the benefits of digitization.

Current Situation

According to the Internet Trends 2017 report,[1] 27 per cent of India's population (355 million users) uses the internet. While this represents exponential growth compared to the 4 per cent penetration in 2009 (see Figure 18.1 below), there is scope for improvement.

The Digital India scheme launched in 2015 brought the topic of digitization to the forefront of public discourse. Areas including construction of broadband highways, public internet access, e-governance and development of basic information technology skills, etc., have achieved considerable progress under this programme[2].

Figure 18.1: Increase in internet users and online penetration in India



Source: Internet Trends 2017 by KPCB[3]

In 2011,[4] the scheme for the creation of a National Optical Fibre Network (NOFN) was initiated to connect all the GPs of the country with high-speed internet. Although the project has lagged behind its original timelines, significant progress has been made in the past two years. As of February 4, 2018,[5] under *BharatNet*, work had started in 1.24 lakh GPs of which 1.08 lakh GPs were service ready. The targeted timeline to connect the remaining 1,50,000 GPs is March 2019. Furthermore, the National Information Infrastructure (NII) will ensure the integration of the networks and cloud infrastructure to provide high-speed connectivity to various government departments up to the *panchayat* level.[6] The components of NII include networks such as the State Wide Area Network (SWAN), National Knowledge Network (NKN), *BharatNet*, Government User Network (GUN) and the *MeghRaj* Cloud.

The government also launched the Public Internet Access Programme[7] to make 2,50,000 common service centres (CSCs) operational at the *gram panchayat* level to deliver government services online. Under this programme, 1,50,000 post offices will be converted into multi-service centres. The last mile connectivity, through Wi-Fi or any other suitable broadband technology, is to be provided at all GPs in the country, funded by the Universal Service Obligation Fund (USOF). Since the last mile connectivity will be provided by a service provider, it will ensure the presence of at least one telecommunications service provider (TSP)/internet service providers (ISP) at each GP to provide data service.

The government has identified 55,619 villages[8] with no mobile coverage. Most of these villages are in the North-Eastern states. A comprehensive development plan, to be implemented in phases, has been initiated to cover remote villages in the North-East.

Constraints

With the increasing role of technology in our daily lives and the growing significance of Industry 4.0, India can only unlock its true potential once digital connectivity, the basic building block for most technological solutions, reaches the last mile. The constraints that need to be addressed to unleash the full benefits of digital connectivity in India fall under five major areas:

1. **Broadband connectivity**

- Internet access is plagued by issues related to quality and reliability, outages, call drops and weak signals.
- The current definition of broadband of 512 kbps[9] speed is inadequate and not in line with the expected rise in demand in the future.
- Existing networks have been strained by limited spectrum availability and usage, affecting the provision of quality services.

2. **Digital access and literacy**

- A significant portion of our population does not have access to devices such as laptops, computers, smartphones, etc.
- Digital literacy in India is estimated to be less than 10 per cent of the population.[10]

3. **Content in Indian languages**

- Currently, most digital content is in English. However, a KPMG[11] report suggested that "9 out of every 10 new internet users in India over the next 5 years are likely to be Indian language users".

4. **Availability of e-services**

- A large number of e-services are not available on the digital platform and there is wide variation across states in the availability of citizen e-services. Currently, citizens have to physically visit government offices to access most government-to-citizen (G2C) services, as municipalities and other government bodies have been slow to digitize their processes.

5. **Cyber security**

- The regulatory framework for cyber security is inadequate.
- Hacking and denial-of-service attacks have led to disruption of services, both in the government and the private sector – banks and governments increasingly face security breaches.

Way Forward

Broadband connectivity

- A modified strategy for expediting the pace of implementation of the *BharatNet* project was approved on July 19, 2017. As part of the modified strategy, the remaining 1.50,000 GPs are to be connected in Phase-II through a state-led model (8 states), private sector model (2 states) and CPSU model (10 states) by using an optimal mix of media (OFC, radio and satellite). Further, about 5298 GPs located in remote and hilly locations with poor connectivity are being connected on satellite media, so as to provide broadband connectivity to all GPs. The service delivery mechanism, by providing last mile connectivity through Wi-Fi or any other suitable broadband technology to all GPs, has been made an integral part of the project. The project is targeted to be implemented by March, 2019. In addition, public Wi-Fi hotspots are being set up by BSNL at its 25,000 telephone exchanges in rural areas and Wi-Fi *choupals* are being set up in 5,000 GPs by CSC-SPV under the Ministry of Electronics and Information Technology (MeitY).
- The provision of universal broadband coverage at 50 Mbps to every citizen and the enabling of 100 Mbps broadband on demand to all key development institutions, including educational institutions, are under consideration in the new National Digital Communications Policy, 2018.
- As the sector regulator, TRAI should consider putting in place a credible system to track call drops, weak signals and outages to ensure the quality and reliability of telecom services. The results may be put in the public domain. Government should also put in place telecom ombudsman for complaint redressal.

Quality of service

- Adequate spectrum availability is critical to ensure service quality. Efficient spectrum allocation in large contiguous blocks should be explored. We should also explore migration to new technologies which would resolve some of the bandwidth challenges.

Access and digital literacy

- Digital literacy needs special focus at the school/college levels. The National Digital Literacy Mission should focus on introducing digital literacy at the primary school level in all government schools for basic content and in higher classes and colleges for advanced content. The multiplier effects of this mission will be realized when these students in turn educate their family members. Higher digital literacy will also increase the adoption of computer hardware across the country.

Content in Indian languages

- State governments should pay special attention to creating content, particularly those relating to government e-services, in Indian regional languages.

  To fulfil the vision of making all government's online services available in all 22 official languages, there needs to be focused collaboration between the centre, states and researchers to promote Natural Language Processing (NLP) in Indian languages. Machine learning now makes this well within reach. Focus could be laid on the automatic translation of content into regional languages from Hindi or English. Case studies like those of the European Union, which had similar problems in making content available in the languages of member countries, should be explored to identify models that can potentially be adopted.

Availability of e-services

- Individual ministries and states have to play a pivotal role in ensuring that all their services are available and easily accessible by citizens over digital platforms. Digital platforms, that enable real-time data updates, would increase accountability, and facilitate monitoring, quality checks and timely intervention by the higher administrative authorities. Procurement of such digital platforms could be standardized by the central government based on an analysis of successful case studies in India. This would ensure expedited implementation across the country. As mentioned earlier, ministries/states should also ensure that the services are reliable, safe and available in regional languages as well as in Hindi/English.

Cyber security

- MeitY will need to evolve a comprehensive cyber security framework for data security, safe digital transactions and complaint redressal. The National e-governance Division of MeitY should periodically audit compliance of e-services offered by state governments. It should bring out a performance report of e-services with a view to improve service delivery.

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19. Smart Cities for Urban Transformation

Objectives

Leverage the 'Smart Cities' concept in select urban clusters to:

- Drive job creation and economic growth.
- Significantly improve efficiencies in service delivery.
- Leverage technology for inclusive, sustainable and participatory development by 2022-23.

Current Situation

Smart Cities is an approach to urban development characterized by area-based development, efficient delivery of basic infrastructure and services in an equitable manner and citizens' participation.

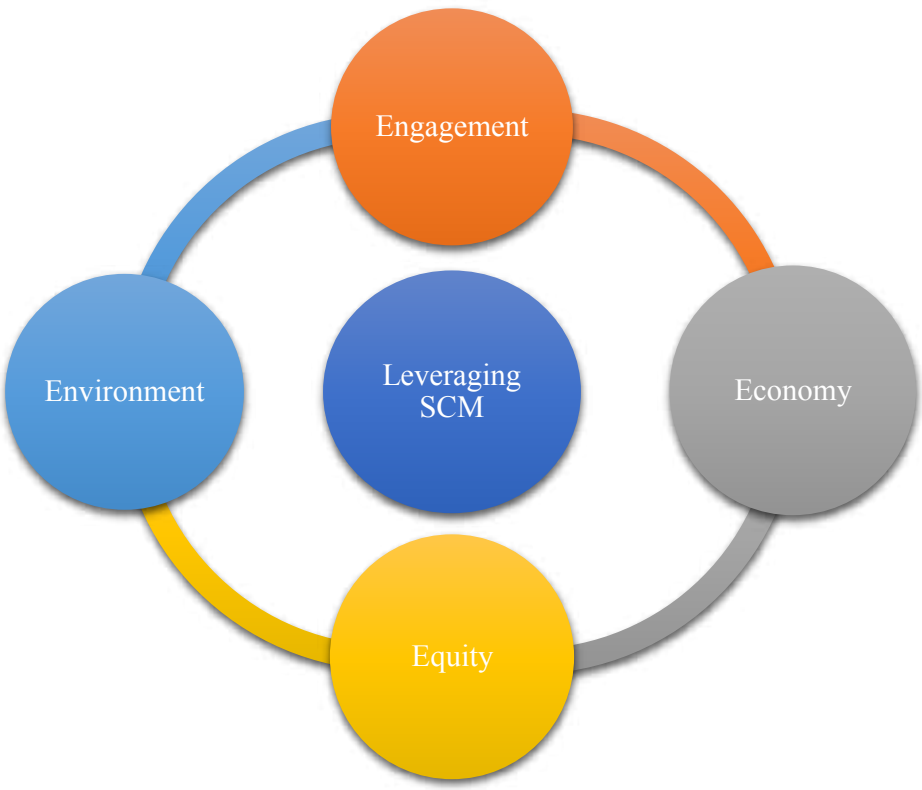
The Government of India has so far selected 99 cities with an outlay of INR 2.04 lakh crore. These cities have started implementing projects such as smart command and control centres, smart area-based development, smart roads, solar rooftops, intelligent transport systems and smart parks. These projects have the unique feature of integration between different infrastructural elements of the projects. As of 14 May 2018, projects worth INR 4,800 crores have been completed and works worth more than INR 20,000 crores are underway, as per the Ministry of Housing and Urban Affairs' Smart City MIS portal.

Constraints

The key operational challenge areas in the Smart City Mission include the non-availability of the following:

- An institutional mechanism for inter-agency coordination, including special purpose vehicles (SPVs), for effective delivery.
- A robust spatial plan as an overall framework within which smart city planning and implementation can happen.
- Smart mechanisms to enhance the voices of the urban poor, slum dwellers, migrants and other underprivileged citizens.
- A digital master plan or a digital strategy and roadmap.
- Data-driven decision making for service delivery and resource sustainability.
- Availability of skilled human resources to handle various functional domains.
- Financing smart cities and financial sustainability of ULBs.

Figure 19.1: Four paradigms to leverage Smart Cities Mission



Way Forward

The following strategies are proposed to leverage the Smart Cities Mission across the four paradigms of economy, equity, environment and engagement in India by 2022-23:

Economy

- *Scaling area-based development*: There is a need to measure the impact of current area-based development projects on the ease of living, economic growth, investments, job creation and citizens' participation. The central government can consider transferring the lessons learnt from such area-based development projects to other cities. States should also be encouraged to launch their own state-level missions for other cities.
- *Mobility*: An integrated institutional architecture for planning and coordinating the regulation of mobility such as a Unified Metropolitan Transport Authority is needed. Spatial plans should provide for integrating land-use and transport planning to support more mixed-use development for enhancing economic activity, reducing commuting time and improving environmental quality. There is a need for focused attention to public transport, including existing intermediate and para-transit services, especially in smaller cities. A pooled green transport fund to support such investments is recommended. A high-level inter-ministerial electric vehicle (EV) mission is necessary for proper coordination on the EV agenda.

- *Achieving desired service delivery levels*: Funds for the provisioning of basic services and infrastructure are accessed from complementary missions, such as the Atal Mission for Rejuvenation and Urban Transformation (AMRUT), *Swachh Bharat Mission* (SBM), and Housing for All (HFA). There is a need for a framework that mandates measurable outputs and outcomes for all capital investments in infrastructure and services in cities. These outputs and outcomes should be predefined and measured at quarterly intervals. The present liveability assessment underway will provide the baseline for measurement on 73 indicators.
- *Digital transformation roadmap*: Conventionally, cities have been using information technology and communication (ICT) in three ways: (1) use a single application to address burning problems, say, waste collection, and then add more applications as per the needs and priorities of the city; (2) build infrastructure and add services, and (3) experiment with a number of applications without having a long-term or definitive vision in place.

  The conventional ways ignore the value hidden in human interactions – among citizens, with the city's infrastructure (e.g. roads, bridges, parks) and the environment. These interactions contain data and information and digital technology has the potential to recognize and capture the hidden value in their interactions. To harness internet connectivity and its various applications in governance and service delivery, cities need to put in place a digital transformation roadmap across both hard infrastructure and software applications. A digital transformation roadmap would recognize and capture these interactions and the whole becomes greater than the sum of its parts once the information that flows in the "systems of systems" is captured.

  Additionally, the digital transformation roadmap would also build on the considerable work done in cities on geographic information systems (GIS) and apply these for geo-locating, mapping and publishing public assets in the city such as parks, playgrounds, public toilets, bus stops, streetlights, manholes, water and sewerage lines, storm water drains, power lines, etc., and linking these to grievance redressal, participatory budgeting, transparent works management, and contractor payments. Municipal acts need to provide for a digital transformation roadmap for ULBs as a mandatory policy document, like spatial plans. This will also help build data observatories for multiple uses, including citizen engagement.

Equity

- *Inclusive development*: Cities must ensure that the urban poor and slum dwellers including recent migrants can avail of city services and subsidies and are financially included through the *Jan Dhan Yojana*. A dedicated benchmark could be considered to measure if benefits reach the targeted poor. Cities should dedicate a single-window facility for the urban poor to access basic services such as water supply, drainage and sewerage, and affordable housing in the form of dormitory and rental housing. Urban poor communities and slums, benefitted by area-based development (ABD) or pan city proposal (PCP) solutions, should be mapped in conjunction with improvements in parameters such as access to public assets and reducing service deficit including in the areas of education and health.

Environment

- *Resilient cities*: It is strongly recommended that India should mainstream the resilient cities approach and integrate it with service levels as indicated in the chapter on Approach to Sustainability in our National Building Code 2016. The resilient cities approach should also be in line with the 11th Sustainable Development Goal (SDG), which emphasizes the sustainable development of cities and communities. Environment sustainability should be recognized as a distinct goal and be measured as part of service levels. The Ministry of Housing and Urban Affairs (MoHUA) can issue model guidelines in this regard.

Engagement

- *Data observatories in partnership with civil society*: More than 20 smart command and control centres are under implementation and an equal number are under tendering. About six of these centres have been completed in Vishakhapatnam, Kakinada, Surat, Nagpur, Vadodara and Ahmedabad, with nearly all of them using open-source codes. There is need to use the information available in these centres to develop urban data observatories with a flexible architecture and continue open source accessibility. The purpose of such observatories is to serve as a decision support mechanism for policy makers and to engage citizens. The MoHUA guidelines should institutionalize the need for regulation around data observatories and make them open source in nature (by limiting private ownership of such data), while at the same time protecting the privacy of citizens. The data observatory incubated by the National Institute of Urban Affairs offers one such model. Institutionally, there is need to leverage information to achieve better inter-agency coordination within ULBs and with SPVs.

20. Swachh Bharat Mission

Objectives

The key objectives of the *Swachh Bharat Mission* include:

1. Making India Open Defecation Free (ODF) by October 2, 2019.
2. Carrying out extensive information, education and communication (IEC) and behaviour change campaigns to change the attitude of people regarding healthy sanitation practices.
3. Ensuring scientific solid and liquid waste management.
4. Augmenting the capacity of local bodies.
5. Creating an enabling environment for private sector participation.
6. Eradicating manual scavenging.

Current Situation

The *Swachh Bharat Mission* (SBM) was launched on October 2, 2014, to make India open defecation free by 2019. It has two sub missions –1) *Swachh Bharat Mission* (*Gramin*) for rural areas under the Ministry of Drinking Water and Sanitation (MDWS) and 2) *Swachh Bharat Mission* (Urban) for urban areas under the Ministry of Housing and Urban Affairs. Given the cross cutting impact of SBM, the Ministry of Drinking Water and Sanitation is the nodal ministry for SBM with several other ministries being actively involved in achieving its goals.

SBM has the potential to address wide-ranging issues. For instance, water and sanitation related diseases continue to remain among the major causes of death among children under five years of age. In India, the under-five mortality rate is 50 per thousand live births as compared to the global average of 41. The lack of sanitation facilities leads to groundwater contamination and pathogen contamination leads to diarrhoeal diseases, resulting in malnutrition, stunting and death. Women, who do not have access to toilets, mostly relieve themselves under the cover of darkness, i.e., before dawn or after sunset. Such practices are not only a threat to their physical security but are also a cause of various diseases.

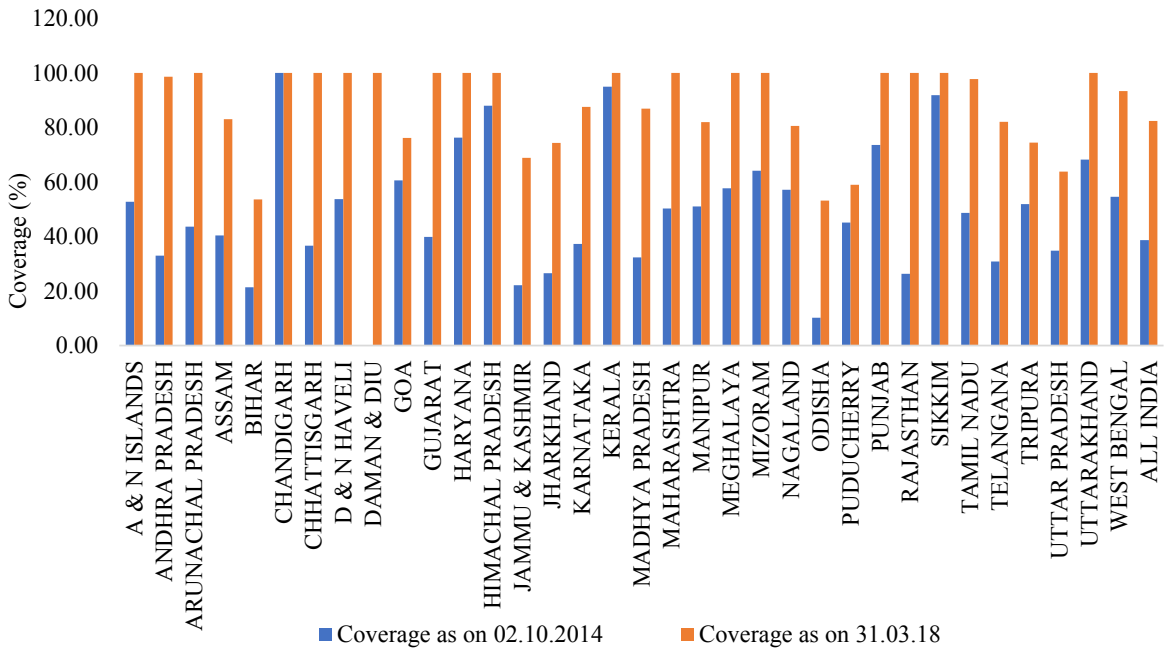
***Swachh Bharat Mission* (*Gramin*)**

According to Census 2011, only 32.7 per cent of rural households had access to toilet facilities. Only 39 per cent of households had access to toilets before the launch of the Mission. Under the Mission, from October 2, 2014 to March 2018, about 6.95 crore individual household toilets have been constructed. The rapid pace of construction of toilets is due to mass mobilization of resources and extensive behaviour change campaigns under the mission. It has helped the country achieve sanitation coverage of 81 per cent in rural India by March 2018. About 3.50 lakh villages, 371 districts and 13 states and 3 union territories have declared themselves ODF.

***Swachh Bharat Mission* (Urban)**

As of March 2018, 47.04 lakh household toilets and 3.18 lakh seats of community/public toilets

Figure 20.1: Improvement in *Swachh Bharat Mission* (Gramin) coverage



Source: http://swachhbharatmission.gov.in/

have been constructed against the mission targets of 66.42 lakh and 5.08 lakh respectively. Hundred per cent door-to-door collection of solid waste has been achieved in 62,436 out of 84,049 wards and 2,648 cities have declared themselves ODF. Waste-to-energy production has reached 88.4 megawatts and new plants that can produce 415 megawatts are under construction.

Constraints

The constraints faced by the mission are largely related to implementation challenges in meeting the 2019 targets. Some of these are as follows:

1. Lack of availability of space for construction of household toilets in slum areas.
2. Issues regarding the operation and maintenance of community toilets.
3. Non-availability of water.
4. Non-segregation of waste.
5. Sustaining the change in behaviour patterns among people.
6. Continued unwillingness of urban local bodies (ULBs) to levy user charges.
7. Inadequate infrastructure for collection, transportation and processing of segregated waste.
8. The continuing practice of decentralized treatment of waste.
9. Lack of on-site treatment of waste by bulk generators.
10. Insufficient number of dustbins, particularly in urban and peri-urban areas.
11. Lack of credit from financial institutions for solid and liquid waste management projects.
12. Discharge of untreated effluent into rivers.

13. Tackling the problem of lagging states – of the 1.56 crore household toilets yet to be constructed in rural areas, 0.90 crore are to be constructed in two states, namely Uttar Pradesh and Bihar.

Way Forward

The strategies to tackle the challenges faced by SBM have been categorized under four broad heads – expanding the scope of SBM, inducing behavioural change, expediting construction and leveraging technology, and changing governance and practices. These are detailed below.

Expanding the scope of SBM

1. The concept of *Swachhata* needs to be integrated into hospitals, government offices and other public establishments.
2. Where space is a constraint, construct community toilets with participation and ownership of stakeholders. The responsibility for operation and maintenance of community toilets should vest with the community.
3. To ensure continued usage of toilets and limit water used for flushing, rural toilets with steep slope should be widely promoted in rural areas.
4. Bulk generators of waste should ensure on-site treatment of waste.
5. All drains/tributaries flowing to rivers should be covered with sewage treatment plants by 2022-23.
6. Give higher monetary compensation and social security to rag pickers and small sanitation workers for segregating waste. This will help waste-to-energy plants as well as projects related to dry waste management and help reduce the burden on landfills.
7. The scope of SBM may be expanded to cover initiatives for landfills and plastic waste.
8. Increase the number of community toilets along the highways.

Inducing behavioural change

1. Plan intensive behaviour change communication (BCC) and inter-personal communication (IPC) campaigns beyond the SBM target year of 2019.
2. Draw up a clear and concerted behaviour change communication campaign specifically aimed at *panchayats* and cities that have shown slow progress towards ODF status.
3. Teach them young – Children should be made aware of sustainable waste management practices through suitable changes in the school syllabus; engage college campuses and teachers to spread awareness of these practices.
4. BCC should lay greater emphasis on encouraging people to segregate waste into wet, dry and hazardous waste right at the point of waste generation.
5. Promote disposal of kitchen and home waste at the local level through resident welfare associations. A decentralized system of disposal of waste needs to be in place, especially in urban areas.

Expediting construction and leveraging technology

1. To reduce the cost and time incurred on laying sewage pipelines and constructing sewage treatment plants, SBM should encourage the use of bio-digester technology.
2. A special strategy should be adopted to expedite the construction of household toilets in the states of Uttar Pradesh and Bihar.

3. Adopt the wider use of twin-pit toilets. It is a low-cost technology that decomposes waste into bio-fertilizer.
4. Promote the use of modular wet waste disposal machines or other such devices for the disposal of bio-waste at the household level itself.
5. The cement and construction sectors should be encouraged to consume material made of recycled construction and demolition (C&D) waste. Similarly, the fertilizer sector should procure compost produced out of organic waste.
6. Ensure the availability of adequate numbers of dustbins in public spaces in urban and peri-urban areas.

Changing governance and practices

1. Expenditure on bio-toilets/bio-digesters may be considered for concession from the goods and services tax (GST) to encourage large-scale adoption.
2. Draft and implement a 5-year action plan to integrate SBM and faecal sludge management (FSM) at the ward level in cities.
3. Waste-to-energy projects are not bankable in the absence of tariff orders by the appropriate authority. Companies that want to establish waste-to-energy plants should have tripartite agreements in which one party is the producer of energy from waste; the other two should be the concerned municipal body and electricity distributing company.
4. ULBs should be nudged to charge adequate user charges for collection and disposal of waste and maintenance of toilets. The user charges for these activities are as important as user charges for electricity and water.
5. Solid and liquid waste management projects should be covered under priority sector lending.
6. To maintain the ODF status of villages and cities, the government should continue to monitor and undertake corrective measures for areas that might be slipping back from ODF status.

21. Water Resources

Objectives

By 2022-23, India's water resources management strategy should facilitate water security to ensure adequate availability of water for life, agriculture, economic development, ecology and environment. This broader vision can be achieved by attaining the following sectoral goals:

- Provide adequate (rural: 40 litres per capita per day (lpcd); urban 135 lpcd) and safe drinking water (piped) and water for sanitation for citizens and livestock.
- Provide irrigation to all farms (*Har Khet Ko Pani*) with improved on-farm water-use efficiency (more crop per drop).
- Provide water to industries, encourage industries to utilize recycled/treated water and ensure zero discharge of untreated effluents from industrial units.
- Ensure *Aviral* and *Nirmal Dhara* in the Ganga and other rivers along with their tributaries.
- Create additional water storage capacity to ensure full utilization of the utilizable surface water resources potential of 690 billion cubic metres (bcm).
- Ensure long-term sustainability of finite ground water resources.
- Ensure proper operation and maintenance of water infrastructure with active participation of farmers/consumers.
- Promote R&D to facilitate adoption of the latest technologies in the water sector.

Current Situation

Annual precipitation in India, including snowfall, which is the main source of water, is about 4000 bcm. About 53.3 per cent of the total precipitation is lost due to evapo-transpiration, which leaves a balance of 1869 bcm water in the country. Of this, the available utilizable water resource potential is 1137 bcm, comprising 690 bcm of surface water and 447 bcm of ground water.

Figure 21.1: Status on average annual water availability

According to the Water and Related Statistics published by the Central Water Commission, per capita annual water availability in the country has decreased from 1816 cubic metres (cu m) in 2001 to 1544 cu m in 2011. As per the Falkenmark Index, one of the most commonly used measures of water scarcity, if the amount of renewable water in a country is below 1,700 cu m per person per year, the country is said to be experiencing water stress; below 1000 cu m it is said to be experiencing water scarcity. The National Commission for Integrated Water Resources Development (NCIWRD) has projected the total demand for water at 1,180 bcm for a high demand scenario.

Water resources are facing pressure due to population explosion, urbanization, rising demand for water from the agriculture, energy, and industry sectors, pollution, inefficient use, poor management and poor institutional mechanisms. Several regions experience water scarcity due to the uneven distribution of water resources over space and time.

The government has specific programmes for various aspects of water resources. The scheme, *Pradhan Mantri Krishi Sinchayee Yojana* (PMKSY), which is an umbrella scheme for irrigation has prioritized 99 major and medium irrigation projects for completion by December 2019. The government also launched the "*Namami Gange*" scheme in 2014-15 to clean and rejuvenate the River Ganga to maintain "*Aviral*" and "*Nirmal Dhara*" and ensure its ecological and geological integrity. Data for the period 2015-17 indicates improvement in water quality in terms of dissolved oxygen and coliform bacteria. However, a lot needs to be done in terms of meeting the targets of sewage treatment plans (STP) and of controlling household and industrial waste. Besides, a scheme for groundwater development and management to prepare aquifer management plans and facilitate sustainable management of groundwater has been launched.

Constraints

1. There is a huge gap between the irrigation potential created (112.5 million ha in 2012) and the irrigation potential utilized (89.3 million ha in 2012). Apart from the underutilization of the potential, the efficiency of the irrigation systems is low at 30 per cent to 38 per cent for surface water and 55 per cent for ground water.
2. Despite clear evidence of rising water stress, water is still used inefficiently and indiscriminately, particularly in agriculture. Poor implementation and maintenance of projects, absence of participatory irrigation management, non-alignment of cropping patterns to the agro-climatic zones, and absence of field channels (CAD works) are some of the challenges.
3. The Easement Act, 1882, which grants groundwater ownership rights to the landowner is one of the reasons for water over-use and depletion of groundwater levels.
4. The subsidized pricing of water in various states has resulted in non-revenue water and a sharp decline in groundwater levels in all states.
5. As per 2011 Census, only 30.8 per cent of the total rural households and 70.6 per cent of the total urban households get piped water supply.
6. The sustainability of the source and growing contamination of ground water in newer areas are constraints in ensuring safe drinking water supply in rural and urban areas.

Way Forward

1. On-going programmes

- By 2022-23, the water storage capacity needs to be increased from the current level of 253 bcm to 304 bcm by completing on-going projects on time.

- A coordination mechanism at the field level may be set up for PMKSY to find the reasons for delays in the completion of projects and corrective measures undertaken project wise to ensure speedy implementation.
- The Ministry of Water Resources (MoWR) may draw up an action plan to complete CAD works in 317 identified projects to reduce the gap between the irrigation potential created and utilized.
- Other notable programmes that need to be completed include the Ken-Betwa River linking project, the Pancheshwar project, the Rajasthan feeder and Sirhind feeders (Punjab &Rajasthan) and the Siang project in North-East India.
- The National Mission for Clean Ganga needs to coordinate with the Ministry of Drinking Water, Supply and Sanitation for solid and liquid waste management in 1600 *gram panchayats* (covering 4464 villages situated on the banks of the Ganga in five states). Corrective measures need to be taken to expedite the completion of the projects.

2. Water efficiency

- Incentivize the wider adoption of sprinkler and drip irrigation by diverting resources otherwise used to subsidize power and surface irrigation.
- As per the fourth Minor Irrigation (MI) Census, there are about 5 lakh water bodies/tanks with an irrigation potential of 5.89 million ha. For these, the MoWR's programme to revitalize, renovate and repair water bodies should be significantly expanded and adequately funded.
- Special emphasis should be laid on desilting of water bodies, including river, lakes, ponds and reservoirs.

3. Recycle of waste water

- With the country generating 140 bcm of wastewater annually, a pilot scheme to irrigate 10 lakh ha with treated waste water by 2020 may initially be taken up.
- Industries should be encouraged to meet a major share of their demand through recycled water. Besides, programmes for smart water meters and tradable permits for use of recycled water may be launched.

4. Groundwater management

- As on date, development of groundwater, i.e., utilization of groundwater resources vis-à-vis replenishable quantity, is 62 per cent. There is a need to develop recharging zones at identified places to make groundwater resources sustainable using check dam, farm ponds, tanks and injection wells.
- Participatory aquifer management initiated in the 12th Plan National Aquifer Management (NAQUIM) under PMKSY should be strengthened through a network of partnerships to control unbridled, competitive extraction of groundwater since it is virtually impossible to police more than 30 million groundwater structures through licences and permits.
- The participatory approach to encourage behavioural changes and community engagement in ground water management at the *gram panchayat* level as envisaged in the *Atal Bhujal Yojana* (ABHY) should be adopted and extended to other regions.
- Promote the use of solar pumps to improve the utilisation of groundwater in Eastern India where utilisation is hampered by the lack of power. In Western India, solar pumps with a buyback guarantee for surplus solar power can offer reliable daytime energy for irrigation and stable cash income as well act as an incentive to conserve power and water.
- PMKSY – *Har Khet Ko Pani* – envisaging enhancement of food production more than two-fold in 96 prioritized most 'deprived irrigation districts' in 12 states by creating

irrigation facilities through tube wells, dug wells, bore wells and dug-cum-bore wells, should be expedited. This will facilitate assured irrigation in tribal and backward areas that traditionally have been deprived of canal irrigation.

- Special focus should be placed on the quality of rural drinking water supply in arsenic and fluoride affected areas by tapping multiple sources through conjunctive use of surface water, ground water and rain water harvesting. All new, piped water supply schemes should have mandatory provisions on operation and maintenance involving local communities and stakeholders.

5. Water harvesting

a. Watershed (check dam development)

- The MoWR may develop specific strategies to tap water through watershed development (check dams) in rain-fed areas, expand micro irrigation coverage to 80 lakh ha, and link ground water development to aquifer mapping.
- The timeline for watershed development projects needs to be shortened from seven to four years with special efforts by state governments. Funds available under MGNREGA and state plans may be used for watershed development projects.
- Introduce public-private partnerships in the water sector, initially to develop micro-irrigation-based CAD works based on a hybrid annuity model. This should be accompanied by a revision in water tariffs to recover at least operation and maintenance costs.

b. Rainwater harvesting

- Model Building Bye Laws, 2016 circulated by Ministry of Urban Development includes the provision of rain water harvesting. Barring the states/UTs of Manipur, Sikkim, Mizoram and Lakshadweep, all states have incorporated the provision in their respective Building Bye Laws. It is suggested that the states ensure effective implementation of the rain water harvesting structures for buildings.

6. Suggested reforms

- To mitigate conflicts and achieve equitable distribution of water, an integrated river basin management approach needs to be adopted. The setting up of river basin organisations for major basins may be expedited.
- NITI Aayog has developed a concept note on Revitalization of Rivers, which may be implemented on a pilot basis before being expanded across major states.
- To ensure *Aviral* and *Nirmal Dhara* in the Ganga, the river should be managed as a single system.
- There is need for a scheme on medium term measures for flood management. This should include completion of incomplete works in the states of Assam, Bihar, Uttar Pradesh, Uttarakhand and West Bengal. Besides, long term measures for Bihar, UP and NE states should be explored to achieve permanent protection from floods. The formation of North East Water Management Authority (NEWMA) in North-East states will comprehensively address the flood issue in the region.
- A water regulatory framework should be established for water resources in all states.
- An action plan should be drawn up to improve water use efficiency (with 2017 as the base year) by 20 per cent in all sectors by 2022.
- The composite water management index developed by NITI Aayog may be used as a potent tool to assess and further improve the efficiency of water resources management.

22. Sustainable Environment

Objective

The objective is to maintain a clean, green and healthy environment with peoples' participation to support higher and inclusive economic growth through sustainable utilization of available natural resources. The 2022-23 goals include the following.

Air pollution:

- Bringing down PM2.5 levels in Indian cities to less than 50.
- Creating 175 GW of renewable energy generation capacity.
- Eliminating crop residue burning.
- Ensuring the coverage of all households with LPG for cooking.

Solid waste management

- Implementing effectively the Solid Waste Management Rules, 2016.

Water pollution

- Encouraging industries to utilize recycled/ treated water to the extent possible and ensuring zero discharge of untreated effluents from industrial units.
- Ensuring *Aviral* and *Nirmal Dhara* in the Ganga, Yamuna, and other rivers.

Forestry

- Increasing the forest cover to 33.3 per cent of the geographical area, as envisaged in the National Forest Policy, 1988.
- Improving the quality of existing forests.
- Encouraging Farm Forestry.

Current Situation

The Central Pollution Control Board (CPCB) has identified 302 polluted river stretches on 275 rivers. The government is aware of this challenge and has launched National Mission for Clean Ganga to address this concern. The total polluted riverine length is 12,363 km. Moreover, Indian cities face a high risk of air pollution. The rise in air pollution can be attributed to rapid industrialization, high urbanization, increased use of vehicles, uncontrolled burning of crop residue and emissions from coal power plants and brick kilns, etc.

Forests are critical to achieving sustainable environmental management. In March 2018, the Ministry of Environment, Forest and Climate Change released the Draft National Forest Policy, 2018. The 1894 and 1952 versions of the forest policy largely focused on the production and revenue generation aspects. The National Forest Policy of 1988, for the first time, focused on environmental sustainability. The new National Forest Policy seeks to increase the sustainability of forest management in India. At present, forest and tree cover occupies about one-fourth of the total geographical area in our country. The new forest policy aims to increase this share to 33.3 per cent. Moreover, out of the total land area under forest cover, about 40 per cent has only 10 to 40 per cent canopy density.

Solid waste generation and its treatment is a pressing concern as well. In 2016, the government had estimated an annual waste generation of 62 million tonnes in the country, including 5.6 million tonnes of plastic waste, 0.17 million tonnes of bio-medical waste, 7.90 million tonnes of hazardous waste and 1.5 million tonnes of e-waste. Of this, between 22 and 28 per cent was processed and treated.[1]

Constraints

1. A major contributor to air pollution is the practice of burning crop residue, particularly in North India. Convincing farmers to discontinue the practice by providing alternative methods of disposal through economically productive use of crop residues is a key challenge.
2. Lack of awareness of the ill effects of pollution impedes efforts to control pollution. This makes it difficult to bring about the behavioural change that is critical to fighting pollution.
3. 'Polluters should pay for the pollution' principle is not effectively implemented.
4. Agro-forestry is hampered by regulatory restrictions. Besides, biodiversity conservation and maintenance of healthy habitats for wild life have to be aligned with sustainability goals.

Way Forward

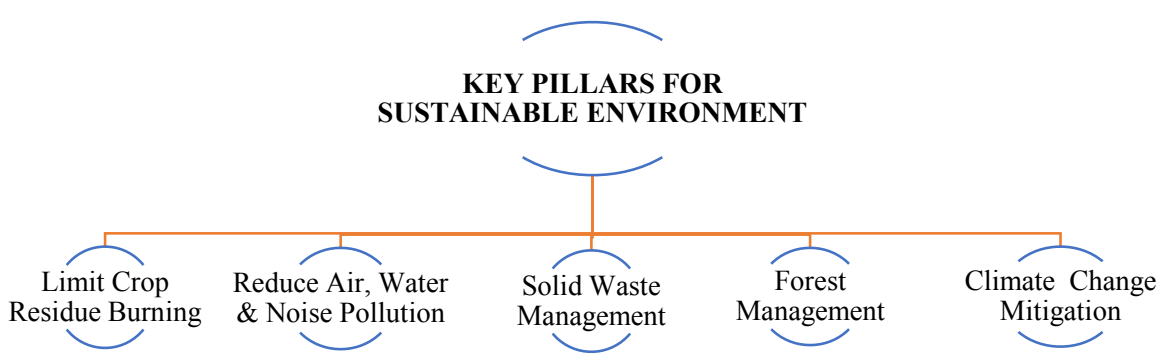
Crop residue burning

To eliminate the practice of burning biomass (crop residue), the Ministry of Agriculture, Cooperation and Farmers' Welfare should introduce suitable modifications in their guidelines of schemes for farm mechanization to provide support to farmers to purchase equipment to collect, transport and sell biomass to processing sites for economic benefits.

The Task Force on Biomass Management, constituted by NITI Aayog under the 'Cleaner Air, Better Life' initiative, has made the following key recommendations in its report titled "Action Plan for Biomass Management" that need to be implemented by the central and state governments expeditiously:

- Extend financial support to farmers in the short-term for in-situ treatment of paddy-straw/non-burning of crop residue.
- Create a "Clean Air Impact Fund" to provide viability gap funding (VGF) for projects with long gestation periods and low returns on investment such as bio-power or bio-ethanol projects.

Figure 22.1: Strategies for achieving sustainable environment



- Upscale technologies for crop harvesting and utilization of farm residue
    - Support service-based shared infrastructure.
    - Provide process-based incentives for entrepreneurs.
    - Allow accelerated depreciation for farm implements.
- Reward and monitoring at the local level
    - Institute a reward scheme for village *panchayats* with zero burning.
    - Put in place a mechanism to monitor farm fires.
- Provide regulatory support for business models for crop residue utilization
    - Re-assess the fuel quality criteria for briquettes/pellets made out of crop residue.
    - Issue directives to power plants to procure paddy-straw briquette/pellet.
    - Remove the size limitation for bio-power captive generation.
- Create awareness amongst farmers for better soil management practices
    - Plan awareness campaigns for farmers.
    - Recognize farmers following non-burning practices.
    - Design information tools for in-situ mulching and on-farm management.

Solid waste management and air, water and soil pollution

- Effective implementation of Solid Waste Management Rules, 2016, which has significantly expanded the scope of efficient solid waste management in the country, will help achieve environmental sustainability by 2022-23.
- It is necessary to ensure the remediation of contaminated sites, safe disposal of hazardous substances, protection and restoration of ecosystems through stringent enforcement of relevant Acts, implementation of specific schemes, generation of awareness, stakeholders' participation and application of best practices. Action plans for remediation of contaminated sites should be prepared and implemented.
- The air pollution issue will require continued efforts on the *Pradhan Mantri Ujjwala Yojana*. The scheme has already met with resounding success and it is recommended that continued efforts be made to prevent any slippage back to cooking using solid bio mass. Initially, the scheme aimed to distribute 50 million LPG connections to BPL households by 2019; however, the target has been increased to 80 million households. As of 19 March 2018, about 35 million connections had been released.
- A task force should be set up to study and implement measures to control pollution from brick kilns. The focus of this task force should be on the technological upgradation of kilns to control pollution.
- Emission and effluent standards for industries need to be revised and effectively implemented.
- Sewage treatment plants of adequate capacity should be installed at suitable locations to make rivers pollution free.
- Wastewater discharge from industrial units into rivers and other water bodies should be reduced to zero.
- The use of bio-digester toilets, a technology licensed by the Defence Research and

Development Organisation (DRDO), may be expeditiously considered for nationwide implementation. It can be a complete game changer as, if successful, it can do away with the need to have sewers and sewage treatment plants.

- Revised waste management rules including Plastic Waste (Management and Handling) Rules, Bio-Medical Waste (Management and Handling) Rules, E-Waste (Management) Rules, Hazardous and other Wastes (Management and Trans-boundary Movement) Rules and Construction & Demolition Waste Management Rules should be effectively implemented.
- Introduce an eco-labelling scheme to promote the sale of products made out of waste.
- Introduce stringent civil penalties to strengthen enforcement of environment-related Acts.

Forest management

- Afforestation should be promoted aggressively through joint forest management (peoples' participation) and the involvement of the private sector. Highly denuded forests and wastelands in the country could be leased out to the private sector for specified periods for afforestation. Participation of people, particularly those dependent on forests for their livelihood, may also be encouraged along with the private sector.
- Public land available along railway tracks, highways, canals, etc., should be used for greening India. Further, re-stocking of degraded forests needs to be accorded priority.
- We should tap the huge scope that exists in agro-forestry. States and UTs may consider exemption of trees grown on private farmland from permit/transit pass. Revenue record and geo tagging should be used to verify the origin of wood and wood-based products to identify species extracted from farm forestry.
- The new National Forest Policy, after incorporating the comments of states, concerned central ministries/departments and other stakeholders, should be expeditiously implemented.
- The boundaries of national parks and wildlife sanctuaries, which cover more than 5 per cent of the country's geographical area, need to be protected and habitats for wildlife kept healthy.
- Undertake measures to convert vacant spaces in urban areas into urban green areas. This will help increase the overall tree cover in the country, which is presently 2.85 per cent of the geographical area, as per the India State of Forest Report 2017.

Climate change

- By 2030, 40 per cent of cumulative power generation capacity installed should be non-fossil fuel based. The strategies to achieve this are given in the chapter on Energy Supply and Demand.
- Access to low cost finance especially through the Green Climate Fund should be encouraged.
- Review all eight national missions under the National Action Plan on Climate Change in the light of new scientific information and technological advances.
- New national missions on wind energy, waste-to-energy and coastal areas should be developed.
- The National Water Mission should be re-designed for efficient water resource management. Similarly, the National Mission on

Sustainable Agriculture should be redesigned to increase agricultural productivity and contribute significantly to achieving the vision of doubling farmers' income by 2022-23.

- Projects under state action plans on climate change that have been endorsed by the National Steering Committee on Climate Change need to be implemented.
- Use the National Adaptation Fund for Climate Change and other global funds for strengthening resilience against climate change in sectors like agriculture, forestry, infrastructure and others.
- Scientific and analytical capacity for climate change related assessments should be strengthened.

[1] 'Solid Waste Management Rules Revised After 16 Years; Rules Now Extend to Urban and Industrial Areas': Javadekar, Press Information Bureau, Government of India, Ministry of Environment, Forest and Climate Change, April 5, 2016.

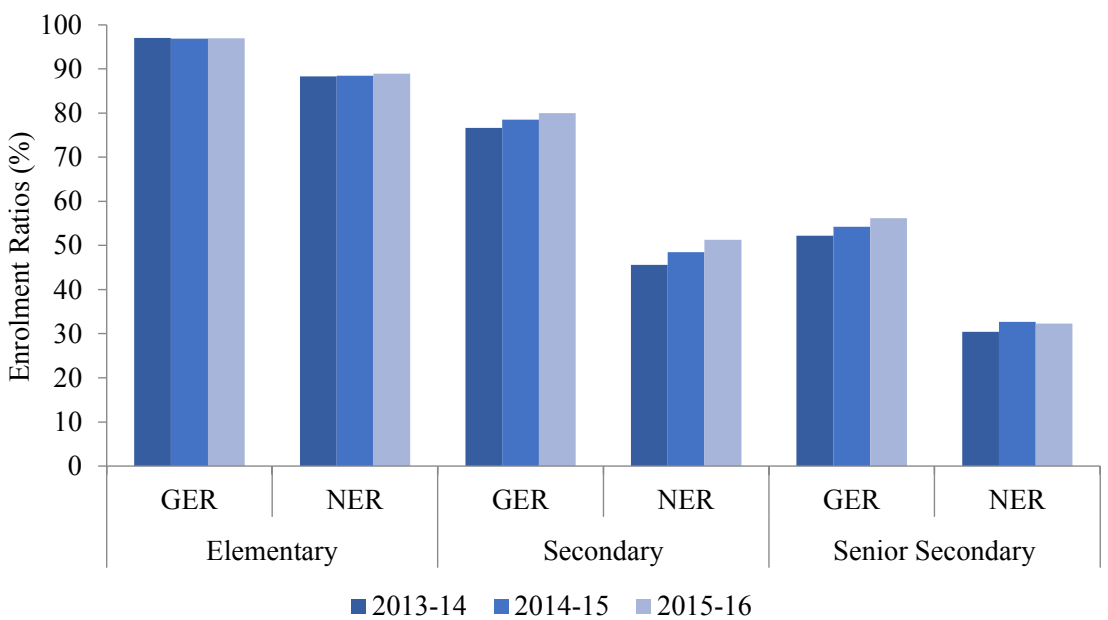
INCLUSION

23. School Education

Objectives

- Universal access and retention:
  - o Hundred per cent enrolment and retention at elementary education and secondary education levels; achieve zero dropouts until Class X.
  - o Equitable participation by all society segments, in terms of attendance, retention and years of schooling to ensure maximum social inclusion.
- Improvement in learning outcomes for elementary and secondary education, as measured by successive rounds of the National Achievement Survey (NAS).
- Creating a robust framework for tracking individual students across their schooling years that incorporates data on their learning outcomes.
- Providing a real and viable alternative path for vocational education starting at higher levels to improve employability.

Figure 23.1: Gross and net enrolment ratios for elementary, secondary and senior secondary



Source: Unified District Information System for Education (U-DISE)

- Strengthening support for children as part of the school curriculum to improve child mental health.

Current Situation

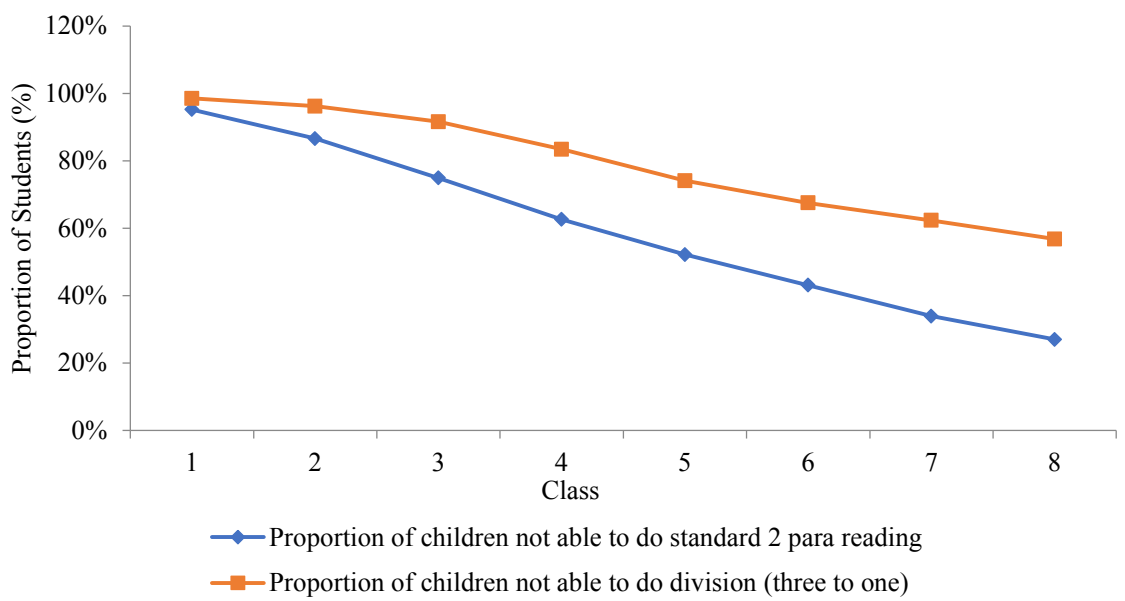
The enrolment ratios for the elementary level are close to 100 per cent. In addition, the gross enrolment ratios (GER) for secondary education have also increased, even though the net enrolment ratio (NER) is still low. Moreover, data shows enrolment is largely similar across gender and castes.

The ASER surveys estimate that national attendance in primary and upper primary schools is 71.4 per cent and 73.2 per cent respectively, with considerable differences across states.[1] The retention rates in elementary school are 70.7 per cent. The retention rates amongst scheduled tribes (STs) is 50.1 per cent.

The learning outcomes of those enrolled in the schooling system need improvement. The previous NAS conducted by National Council for Educational Research and Training (NCERT) reports that over 60 per cent of Grade V students scored below 50 per cent across subjects. Findings by an independent ASER household level survey (2016) in rural areas shows that among Grade V children, only 47.8 per cent could read Grade II level text and only 26 per cent could do Grade V level arithmetic.

Despite increasing access, enrolment in government primary schools declined by 2.31 crores in absolute numbers from 2007-08 to 2015-16 while enrolment in private primary schools increased by 1.45 crores over the same period.[2] The reasons for the move from public to private schools is the perception of better quality of education provided by private schools amongst parents (which is also borne out

Figure 23.2: Learning outcomes from ASER survey 2016 for rural areas



Source: ASER (2016)
Note: The division problem was three digit numbers by a one-digit number.

from data by ASER over the years), and growth in private schools having affordable fees.

The government has already made significant efforts towards addressing the issue of poor learning outcomes. Recent changes by the government include the introduction of a new and comprehensive National Achievement Survey. The Ministry of Human Resource Development has also spelt out the competencies and learning levels at different grades on which school grading will be based.

In 2016-17, 4,790 vocational training schools across India were approved for providing vocational education at the secondary level. Of these, 3,662 schools are implementing the scheme.

Finally, the mental pressure on students, especially in secondary education, has been increasing. Data from the National Crime Records Bureau shows that student suicides have increased from about 6,600 in 2012 to about 9,000 in 2015, many of these because of stress related to examinations and careers. Thus, there is a need to reduce the mental stress students suffer from.

Constraints

- Inadequate public funding in the sector.
- Disproportionate focus on school infrastructure as opposed to learning outcomes.
- Challenges in governance and monitoring mechanisms for learning outcomes.
- Accountability systems in government schools.
- Inadequate teacher training, large number of teaching vacancies and rampant absenteeism.
- Limited options for vocational education in the school system.
- Inadequate support and counselling given to children in schools.

Way Forward

1. Education sector funding by government

Government spending on education as a whole (not just school education) should be increased to at least 6 per cent of GDP by 2022. At present, allocations to the education sector by the centre and states remains close to 3 per cent of GDP, while according to the World Bank, the world average in this regard is 4.7 per cent of GDP.

2. Revamped governance system to improve monitoring and accountability

State governments should develop and formulate robust mechanisms to enforce regulations on teacher qualifications, teacher absenteeism and learning outcomes. Learning outcomes should be regularly assessed by bodies independent of the line ministries.

3. Gearing the system towards learning outcomes

Rationalize public school structure

School integration or clubbing of small schools (i.e. those with very low enrolment – see Table 23.1 below) could result in additional human, financial and infrastructure resources. States like Rajasthan have already initiated school integration programmes along with improved transport facilities for sparsely populated regions to achieve both higher quality and savings. The preliminary result of these reforms has been a reduction in teacher vacancies from 60 per cent to 33 per cent, and a 6 per cent increase in enrolment in one year. In addition, retention rates have also increased, especially for girls.[3] Rajasthan's experience could be a good model to replicate.

Table 23.1: Profile of public schools with low enrolment

Type of public school	Number of schools	Avg. students per school	Avg. spend per child per year	Total teacher salary bill
20 students or less enrolled	~1,00,000	12.7	Rs. 80,000	9,440 cr.
50 students or less enrolled	~3,70,000	29	Rs. 40,800	41,630 cr.

Source: Geeta Gandhi Kingdon, "Put the onus on teachers", Indian Express

Right to learning and measurement of remediation

- Given the amendment to Rule 23(2) of the RTE, states should codify the expected learning outcomes for each class and put greater emphasis on continuous and comprehensive evaluation (CCE) to achieve the defined learning outcomes.
- The comprehensive national achievements survey initiated in 2017 needs to be institutionalised on an annual basis.
- The remediation process should be made part of the education system and should be run concurrently with regular classes so that no child gets left behind.
- In addition, high-school readiness programmes/ tutorials, including bridge programmes, should be incorporated just after class VIII or in the early months of class IX especially for remediation.
- The CCE should also encompass compartmental exams to check the quality and outcomes of remediation. Passing each subject either directly or through subsequent CCE could be made a necessary condition for eligibility to appear in the subsequent grade's exam. This may be implemented with or without the 'no detention policy'.

Individualized tracking

An electronic national educational registry may be conceptualised for tracking each child's learning outcomes based on CCE and final exams through a unique ID. This will help track the cohort survival rate, and monitor students requiring remediation. It will also help prepare a list of children who drop out after the elementary education level. Further, this will enable greater attention to be paid to the needs of children from socially deprived groups and those with physical or intellectual disabilities.

4. Flexibility in education stream and vocational education

- Develop a system of awarding credits for every subject and grade passed, specifying the minimum credits required to appear in the final exam for any grade. This system of credits may remain valid forever and be seamlessly integrated across different levels of education, providing an opportunity for life-long tracking of learning outcomes in the electronic national educational registry. This will enable bright children to amass more credits in the subjects of their interest, once the system attains maturity.
- Give children the option, under the guidance of the school and parents, of branching into vocational courses from secondary school level

upwards. Only children who expressly choose to continue with general education should be allowed to do so.

- Develop separate track even within the general education stream, as has been done in certain advanced countries. A specially devised aptitude test must be conducted in the IX grade and re-checked in the Xth grade, based on which students should be given the option of choosing a 'regular' track versus an 'advanced' track. These two tracks would differ in the difficulty level and choice of subjects. Those pursuing the 'regular' track should be given the option of completing the 'advanced' track syllabus through open schooling at a later point in life.
- Design guidelines for states to implement vocational education at the school level, which may cover aspects such as selection of schools/trades, tendering process for labs, database of industry contacts for field visits/guest lectures, timings, workshops, permitting informal apprenticeships or assistantship in the formal system, etc.
- Pilot different innovation models in vocational education and provide adequate funding for successful innovative programmes.

5. Curriculum/syllabus

- Pre-primary and primary syllabus should be designed on a skill/competency-based continuum. At the pre-primary level, it would help develop school readiness, and at the primary level, it would facilitate multi-level and multi-grade teaching.
- The vocational education syllabus should be NSQF-aligned and ensure smooth transition from school education to vocational education.
- The curriculum should include summer activities and monthly study trips, including visits to practitioners for practical learning.

6. Teacher training

- Improving the quality of teaching is an integral aspect of improvement in school education. Given its importance, it is being covered separately in another chapter.

7. Reducing mental stress

- The above recommendations in terms of remedial education and allowing different tracks of education will help address students' mental stress.
- Life skills, including coping with failure/crises and stress management, should be included as part of the school curriculum.
- Easy and safe access to mental health support should be strengthened. Child helplines should feed into easy and safe access to counselling in schools, especially for children at risk.
- Easy and safe access to counselling and support must be provided for girl children in schools, especially focused on victims of abuse, violence and other gender-related social evils.

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[1] ASER 2016.

[2] Elementary education in India: Trends, National University of Educational Planning and Administration.

[3] http://www.thehindu.com/news/national/UNICEF-report-shows-results-of-integrated-schools-in-Rajasthan/article14463872.ece. Accessed May 03, 2018.

24. Higher Education

Objectives

- Increase the gross enrolment ratio (GER) in higher education from 25 per cent in 2016-17 to 35 per cent by 2022-23.
- Make higher education more inclusive for the most vulnerable groups.
- Adopt accreditation as a mandatory quality assurance framework and have multiple highly reputed accreditation agencies for facilitating the process.
- Create an enabling ecosystem to enhance the spirit of research and innovation.
- Improve employability of students completing their higher education.

Current Situation

India has 864 university-level institutions, 40,026 colleges and 11,669 stand-alone institutions.[1] The number of university-level institutions has grown by about 25 per cent and the number of colleges by about 13 per cent in the last five years. The private sector accounts for a large share of these institutions, managing 36.2 per cent of universities, 77.8 per cent of colleges and 76 per cent of stand-alone institutions in 2016-17.

India's higher education GER (calculated for the age group, 18-23 years) increased from 11.5 per cent in 2005-06 to 25.2 per cent in 2016-17. However, we lag behind the world average of 33 per cent and that of comparable economies, such as Brazil (46 per cent), Russia (78 per cent) and China (30 per cent).[2] Korea has a higher education GER of over 93 per cent.[3]

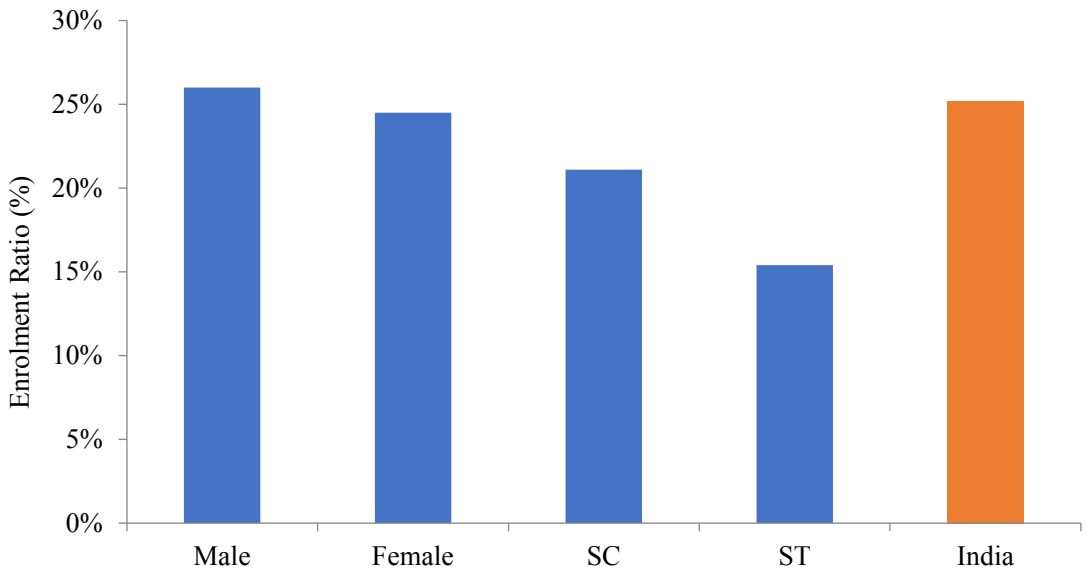
In addition, regional and social disparities continue to exist in higher education: GER varies from 5.5 per cent in Daman & Diu to 56.1 per cent in Chandigarh. Figure 24.1 indicates GER in terms of gender and social groups. GER is 26.0 per cent for males and 24.5 per cent for females, with females constituting 46.8 per cent of the total enrolment of 35.7 million. While the GERs for scheduled castes (SCs), scheduled tribes (STs), other backward castes (OBCs) and minorities have been increasing, these are still below the overall average in most cases.

Quality is a challenge in higher education in India. Few Indian institutions feature in the top 200 in world rankings. In comparison, China has seven universities in the top 150 (3 in top 50) of the Quacquarelli Symonds (QS) world rankings. These rankings did rank three IITs and the IISc amongst the top 20 BRICS universities in 2018. Another issue is the employability of graduates.

Recognising the need to improve access, equity and excellence in higher education in the country, the government has taken significant steps, including the following:

- Implementation and continuation of the centrally sponsored scheme, *Rashtriya Uchchatar Shiksha Abhiyan* (RUSA): This scheme seeks to improve access, equity and quality in state higher education institutions through a reforms-based approach and links funding to performance.[4] The continuation of RUSA was recently approved until March 2020

Figure 24.1: Gross enrolment ratio in higher education, 2016-17

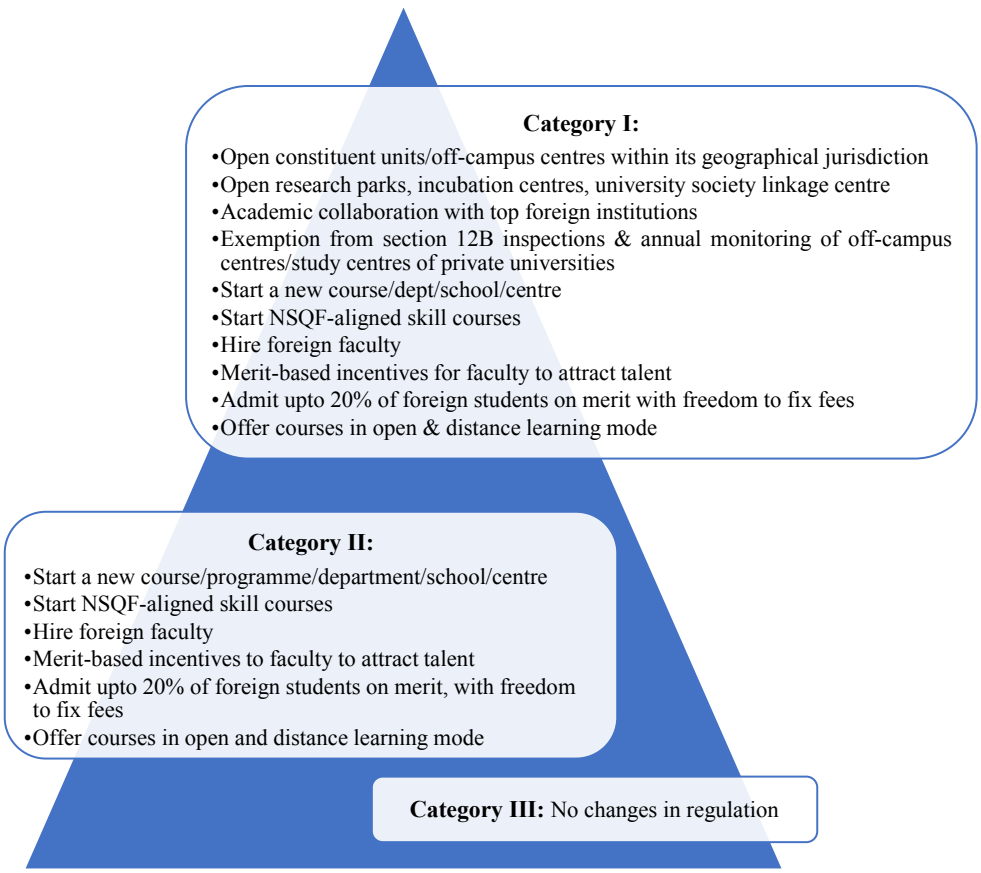


Source: All India Survey on Higher Education, 2016-17

with an almost three-fold increase in allocation compared to that in its first phase (2013-17). The second phase of RUSA puts a premium on quality enhancement and addresses concerns of access and equity in the aspirational districts identified by the NITI Aayog.

- National assessment and accreditation reforms: While making accreditation of higher education institutions mandatory, the reforms move away from an intrusive system to a more enabling, mixed method of assessment and accreditation. The process of accreditation has been fast-tracked and made more transparent. The emphasis is more on self-assessment, data capture, validation by third party evaluation and objective peer review. This is a paradigm shift from the subjective assessment parameters adopted earlier. Ongoing reforms could lead to the empanelment of multiple accreditation agencies.
- Regulations for graded autonomy to universities and autonomous colleges: A three-tiered graded autonomy regulatory system has been initiated, with the categorization of institutions as per their accreditation score by the National Assessment and Accreditation Council (NAAC) or other empanelled accreditation agencies, or by their presence in reputed world rankings. Category I and Category II universities will have significant autonomy as shown in Figure 24.2. Similarly, the University Grants Commission (UGC) has also issued new regulations for granting autonomy based on accreditation scores for colleges. These colleges will have the freedom to conduct examinations, prescribe evaluation systems and even announce results but are not allowed to grant degrees.

Figure 24.2: UGC's graded autonomy regulations for universities



Source: UGC

Constraints

- Outdated and multiple regulatory mechanisms limit innovation and progressive change.
- Outdated curriculum results in a mismatch between education and job market requirements, dampens students' creativity and hampers the development of their analytical abilities.
- Quality assurance or accreditation mechanisms are inadequate.
- There is no policy framework for participation of foreign universities in higher education.
- There is no overarching funding body to promote and encourage research and innovation.
- Public funding in the sector remains inadequate.
- There are a large number of faculty posts lying vacant, for example in central universities, nearly 33 per cent of teacher posts were vacant in March 2018;[5] faculty training is inadequate.

Way Forward

1. Regulatory and governance reforms

- Ensure effective coordination of roles of different higher education regulators, such as the UGC, All India Council for Technical Education (AICTE) and National Council for Teacher Education (NCTE), and restructure or merge these where needed.

- Amend the UGC Act to provide legislative backing to the tiered regulatory structure.
- Create a framework to allow foreign universities of global repute to operate in India, in collaboration with Indian institutions to offer joint degree programmes.
- Ensure that the selection process of Vice-Chancellors of universities is transparent and objective.
- Link at least a proportion of the grants to performance and quality.

2. Curriculum design

- Domain experts in each educational field should be asked to develop a basic minimum standard in curriculum that will serve as a benchmark for institutions at the undergraduate and post-graduate levels. Institutions should be given the freedom to innovate and expand curriculum beyond this basic minimum standard. Curriculum and pedagogy at all higher education institutions should be updated continuously through mandatory feedback from domain experts, faculty, students, industry, and alumni.
- Diverse post-secondary career options should be provided through skills/vocational training that should be integrated seamlessly with higher education and the skilling mission.
- Internships by students in undergraduate courses should be encouraged and potentially mandated in all professional and technical courses. This would help with the practical orientation of students.

3. Reforming accreditation framework

- All higher education institutions must be compulsorily and regularly accredited. Despite a two-fold increase in accreditation levels in the last five years, accreditation coverage is still inadequate. One way to bridge this gap by 2022-23 is to allow credible accreditation agencies, empanelled through a transparent, high quality process, to provide accreditation. Accreditation must give adequate weightage to outcomes rather than inputs only. Public information material brought out by institutions and their websites should prominently display the accreditation status and grade.

4. Creating 'world class universities'

- Twenty universities – 10 each from the public and private sector – are being selected as 'Institutions of Eminence' and are helping to attain world-class standards of teaching and research. The funding of INR 1,000 crore over a 5-year period to each institution, planned for selected public universities, could be further increased. Further, a graded mechanism to ensure additional funds flow to the top public universities should be developed. This is similar to the model adopted by Singapore and China to develop their top two public universities.

5. Performance-linked funding and incentives

- Only two out of 47 central universities have NAAC scores of above 3.51, despite generous funding available to them. An evaluation may be undertaken to understand the challenges faced by these central universities, and they should be asked to develop strategic plans for getting into the top 500 of global universities rankings in the next 10 years.
- Going forward, funding to these institutions should be linked to performance and outcomes through the Ministry of Human Resource Development and the newly constituted Higher Education Funding Agency.

- RUSA may be continued beyond March 2020, subject to a credible third-party evaluation. This reforms-based scheme has already made significant headway in getting state public education institutions into the mainstream. Continued support, linked to performance, will go a long way in pushing some of India's leading state public universities up the ranking ladder.

6. Development of teacher resources

- Develop stringent norms for faculty recruitment in universities and colleges. A rigorous and transparent process of identifying the best talent for the higher education sector should be put in place. An ecosystem should be created where the most deserving talent is hired and retained. This should include eligibility tests of a high standard, such as existing UGC-recognised NET, as a minimum eligibility criterion for faculty recruitment, to ensure recruitment of candidates with academic and/or research aptitude.
- Quality teaching skills are in short supply across disciplines. A central scheme may be launched to attract teachers of Indian origin.
- Enable and encourage the recruitment of practitioners with distinguished experience from professional bodies/industry as faculty. This can be achieved through the creation of a separate parallel track, on which the mandatory Ph.D qualification for faculty may be relaxed. These industry practitioners may also be encouraged to join as adjunct faculty in the higher education institutions.
- Introduce pre-service faculty training (3-6 months), including faculty exposure to the latest tools/techniques of quality teaching and research. Continuous faculty training and updating process should be introduced and made mandatory.
- Develop a system of outcome-based faculty evaluation in higher education, which is flexible across different categories of institutions.
- Conduct regular quality checks of journals, especially those that are used for evaluating faculty on academic performance indicators (APIs).

7. Distance and online education

- There is a need to broaden the scope of Massive Open Online Course (MOOCs) and Open and Distance Learning (ODL) and tap their potential to provide access to quality education beyond geographical boundaries. Universities with high accreditation scores may be permitted to offer online education programmes. In regular courses, technology could be leveraged to overcome faculty shortages.

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1 AISHE 2016-17.

2 UNESCO, 2013.

3 World Bank.

4 ww.rusa.nic.in. Accessed May 10, 2018.

5 Ministry of Human Resource Development.

25. Teacher Education and Training

Objectives

There cannot be a quality education system without quality teachers. Therefore, a thorough revamp of the entire ecosystem of teacher education both at the school and college level is necessary. In this context, the objectives for 2022-23 include:

- Enforcing minimum teacher standards through rigorous teacher eligibility tests and criteria for the induction of teachers.
- Improving in-service teacher training system.
- Increasing teacher accountability for learning outcomes of students.
- Addressing the problem of teacher vacancies and teacher absenteeism.

Current Situation

The current institutional framework for teachers training consists of the following:

- The National Council for Teacher Education (NCTE) is the regulator for teacher education in the country.
- NCTE has recognized 23,219 teacher-training institutes in the country. Around 90 per cent of these are privately run, of which 1,011 institutions[1] are for training teacher-educators (M Ed). The intake of these teacher-training institutes was 17.58 lakh in 2016.
- The in-service training framework includes 592 District Institutes of Educational Training (DIETs), 112 Colleges of Teacher Education (CTEs), 35 Institutes of Advanced Studies (IASEs) and 17 Block Institutes of Teacher Education (BITEs).

  The block resource centres (BRCs) and cluster resource centres (CRCs) form the lowest rung of institutions providing in-service training to schoolteachers.

As per the Right to Education (RTE) Act, a teacher appointed in schools should have passed the teacher eligibility test (TET) conducted by the relevant government body. In institutions of higher education, passing the National Eligibility Test (NET)/State Level Eligibility test (SLET) has been the minimum eligibility criterion for teaching.

While teacher education institutes churn out a large number of candidates with a Bachelor's and Master's in education, the quality of teacher education has not been assured. In 2015, only 13.53 per cent candidates who sat for the Central Teacher Eligibility Test (CTET) qualified.[2] A primary reason for this is inadequate accreditation and grading process followed by NCTE in the past. In 2017, NCTE initiated the process of collecting information from the institutes and grading them based on their learning outcomes. At the higher educational level, the pass percentage in the UGC-NET exams is also low, where only 6 per cent candidates qualify. Besides, the quality of PhDs in severals institutions does not rise to the required standard.

In-service teacher training needs upgradation. While only about 20 per cent of school teachers are still professionally untrained,[3] only 14.9 per cent

teachers received in-service training for elementary education in 2015-16 even though the *Sarva Shiksha Abhiyan* (SSA) has a provision of 20 days of in-service training for all teachers. The BRCs and CRCs are primarily involved in administrative work and provide very little resource support to schools.

In 2017, Section 23(2) of the RTE Act was amended to ensure that all teachers acquire minimum qualifications prescribed under the Act by March 31, 2019.

To assess the performance and progress of teachers, the National Council of Educational Research and Training (NCERT) had developed performance indicators (PINDICS) in 2013. Fourteen states have adopted or adapted the PINDICS and two more have initiated its implementation thus far.

Teacher vacancies are also affecting the quality of education. Out of the total sanctioned posts of 51.03 lakhs, the number of working teachers is 42.03 lakhs, leading to vacancies of 9 lakh teachers in schools, of which 4.2 lakh teacher vacancies are in SSA schools. Thirty-three per cent of schools do not meet the pupil-teacher ratio. Ironically, despite the overall shortage of teachers, there are also 2.91 lakh surplus teachers across the country because of an imbalance in regional demand-supply.[4]

Teacher attendance at schools is another issue of concern. A study shows that 25 per cent of teachers were absent from school, and only half were teaching during an unannounced visit as part of a national representative sample survey of government primary schools in India.[5]

Constraints

- There is insufficient regulatory monitoring of teacher education institutions.
- Teacher eligibility tests in some states may not be adequately robust.
- There are inadequate in-service training programmes as well as lack of public funding support.
- There is no robust system for balancing the demand for and supply of teachers at the regional or state level.
- There are limited accountability systems for teachers.

Way Forward

Strengthening the regulatory framework

- A committee should be set up to develop transparent/objective and rigorous criteria to recognize institutions. NCTE may assess institutions on these criteria and take steps to enforce them.
- In addition, the accreditation system developed should ensure the closure of fraudulent or dysfunctional teacher education institutions.
- Five to six teacher training institutions of eminence with an annual intake of 2000 students each need to be established.

Robust in-service teacher development

- In-service teacher professional development programmes should be redesigned with continuous progressive development through different modes such as early tenure coaching, peer-learning, resource centres, demonstration classes, sabbaticals for research/advanced studies, seminars and visits to other institutions.
- The *Pt. Madan Mohan Malviya National Mission for Teachers & Teaching*, which seeks to "build a strong professional cadre of teachers by setting performance standards and creating top

class institutional facilities for the professional development of teachers"[6], should be taken up in mission mode.

Accountability of teachers

- A national electronic teacher registry should be set up as part of the National Education Registry that has been proposed in the section on school education. The entire educational profile of each teacher aspirant may be hosted in one section of this registry by all teacher-training institutions. This will be an electronic platform to bring together employers and job aspirants in this sector. All teachers should be listed on the National Educational Registry by 2020, while linking students to teachers.
- Performance Indicators (PINDICS), 2013, and the Quality Monitoring Tools of NCERT should be adopted or adapted by states/UTs. Universal monitoring of teachers' competencies should be done using PINDICS or any such state developed tool on an annual basis and uploaded on the National Electronic Teacher Registry. The salary increment of teachers should be linked to an assessment of their performance.
- States should test teachers tri-annually on the same test designed for the children they are teaching. It will ensure competency of teachers in the subjects being taught by them.
- The Teacher Eligibility Test (TET) accross states should be strenthened as per central TET: standardization of results, quality benchmarking of testing-items and extending the TET for teachers at pre-school and classes 9-12 levels.
- The UGC-recognised NET/SLET should be continued as a minimum eligibility criterion for recruitment to Assistant Professor positions. States that currently do not conduct SLET should do so to enable availability of a larger base of qualified candidates for faculty positions. Eligibility tests should ensure quality in selection.

Tackling teacher demand-supply imbalance

- Each state must develop a teacher-demand forecast model for all levels, starting from elementary to higher education. The surplus and deficiency can be aggregated at the national level and appropriate decisions taken on whether to set up new training institutions or provide leverage to existing ones to correct overall deficiencies.

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1 http://www.teindia.nic.in. Accessed April 20, 2018.

2 Gohaini, M. Record 14 per cent of aspirants clear central teachers test. TNN, Chennai. Times of India e-Newspaper. April 3, 2015.

3 UDISE (2015-16).

4 AWP&B and PAB minutes 2017-18.

5 AWP&B and PAB minutes 2017-18.

6 Mission Statement for Pt. Madan Mohan Malviya National Mission for Teachers & Teaching.

26. Skill Development

Obejctives

For harnessing the demographic advantage that it enjoys, India needs to build the capacity and infrastructure for skilling/reskilling/up-skilling existing and new entrants to the labour force. The goals to be met until 2022-23 are as follows:

- Increase the proportion of formally skilled labour from the current 5.4 per cent[1] of India's workforce to at least 15 per cent.
- Ensure inclusivity and reduce divisions based on gender, location, organized/unorganized, etc.
- India's skill development infrastructure should be brought on par with global standards by.
    - Developing internationally compliant National Occupation Standards (NOS) and the Qualification Packs (QP) that define a job role.
    - Making all training compliant with the National Skills Qualification Framework (NSQF).
    - Anticipating future skill needs to adapt skill development courses.
- Skill development should be made an integral part of the secondary school curriculum.

Current Situation

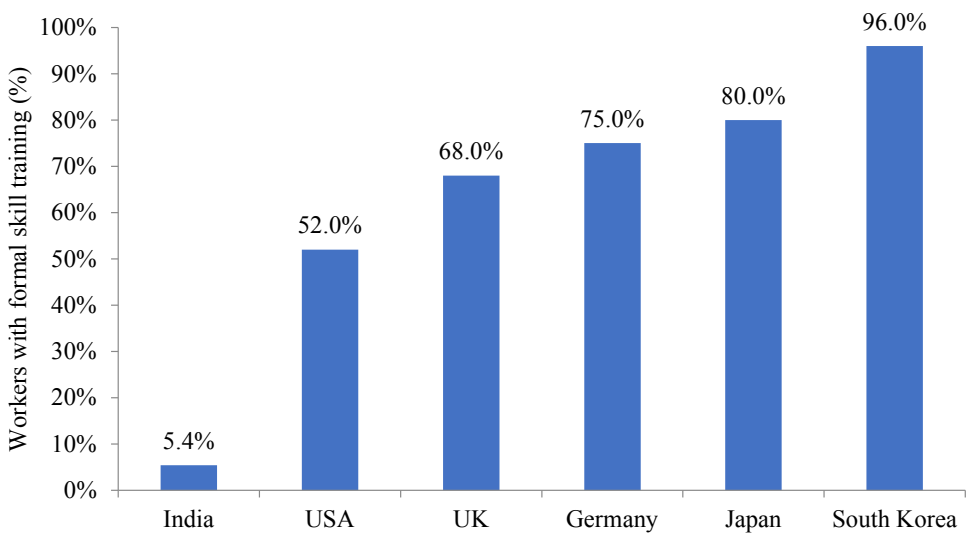
According to the National Policy for Skill Development and Entrepreneurship,[2] more than 54 per cent of India's population is below 25 years of age and 62 per cent of India's population is aged between 15 and 59 years. This demographic dividend is expected to last for the next 25 years.[3]

With most of the developed world experiencing an aging population, India has the opportunity to supply skilled labour globally and become the world's skill capital. However, the demographic advantage might turn into a demographic disaster if the skills sets of both new entrants and the existing workforce do not match industry requirements. Recognizing the challenge, the Government of India has launched many initiatives to equip fresh entrants with relevant skills and to upgrade the skills of the existing workforce.

A dedicated Ministry of Skill Development and Entrepreneurship (MSDE) was set up in 2014 to implement the National Skill Development Mission, which envisions skilling at scale with speed and standards. On July 15, 2015, on the first ever World Youth Skills Day, the Honourable Prime Minister launched the Skill India scheme.[4]

To improve the relevance and quality of courses offered by industrial training institutes (ITIs), polytechnics and private training providers, sector skill councils (SSCs) have been involved in curriculum up-gradation/preparation, and in the assessment and certification process. Courses are being aligned to the National Skills Qualifications Framework (NSQF). Recognition of prior learning (RPL) has been introduced to ensure certification of and bridge training for the existing work force. The year-end review 2017 released by MSDE suggests that government initiatives are gathering pace. Until

Figure 26.1: Workforce that has undergone formal skill training



Source: National Skill Development Policy

2017, 2.5 crore candidates have been skilled under the ministry's programmes since its inception.[5] This includes 40.5 lakh candidates trained under the *Pradhan Mantri Kaushal Vikas Yojana* (PMKVY), and 74 lakh candidates under fee based training programmes run by National Skill Development Corporation (NSDC).[6]

Constraints

The National Skill Development Policy[7] estimates that only 5.4 per cent of the workforce in India has undergone formal skill training as compared to 68 per cent in the UK, 75 per cent in Germany and 96 per cent in South Korea.

The India Skill Report 2018 states that only 47 per cent of those coming out of higher educational institutions are employable.[8] Given that 83 per cent of the workforce is engaged in the unorganized sector with limited training facilities, upgrading of skills, both in manufacturing and services sectors remains a challenge.

The major challenges to skill development are the following:

- Mapping skill requirements sector-wise and geographically.
- Making vocational training an aspirational choice.
- Involving industry for improved quality and relevance – scaling up the apprenticeship programme.
- Integrating the informal sector into the skill development ecosystem.
- Putting in place an effective, internationally recognized assessment and certification system.

Way Forward

Mapping skill requirements for a demand driven skill development ecosystem

- Skill development plans and strategies should be developed by geography and sector by

mapping the availability of infrastructure and on the basis of assessing skill requirements both at the national and state levels. *Talukas*/districts should be required to provide the information required for such mapping.

- Industry stakeholders must be incentivized to provide data on their skill requirements on an ongoing basis, which could be used as input for the skill requirement assessment made at different levels.
- Regular labour market studies should be conducted and published by the MSDE in collaboration with the SSCs. These studies should capture changes in industry requirements to assess the skill sets required and introduce changes in training curricula.
- Create vocational training innovation centres for systematic research and conducting longitudinal studies on improving vocational education.

Improving training delivery and quality

- Capacities of teacher training institutes need to be upgraded to ensure the availability of qualified trainers. It is also important to provide for cross learning by teachers and industry experts through industry-institute linkages.
- A single regulatory body with branches in all states should be set up to lay down minimum standards for all players in the skilling system like training providers, assessors, etc., and to issue NSQF aligned certificates.
- To address the requirement of skilled workers in the unorganized sector, scaling up RPL is required under the PMKVY, using bridge training, apprenticeship, dual training, work-based learning and advanced courses.
- In addition to scaling RPL, there should be a focus on the identification of transferable skills. This can be done by developing a skills/trade matrix; and highlighting the overlap of skills across different trades, such as information and communication technology (ICT), knowledge of languages, etc. The most common transferable skills across the board should be made part of the basic skill development curriculum.

Vocational education in secondary schools

- As recommended by the Sub-Group of Chief Ministers on Skill Development,[9] vocational education may be initiated from class VIII. The report pointed out that lessons could be drawn from the "*The Himachal Pradesh Payment of Skill Development Allowance to Educated Unemployed Persons Scheme, 2013*." This has provided for an allowance starting from INR 1,000 per month for students who have at least passed VIII standard.[10] This will help children get acquainted with formal vocational courses and apprenticeship training. Provisions for credit transfers into higher education could also be considered.
- Participation by private schools should be incentivized with lower interest rates on loans to expand training facilities.

Apprenticeship programmes

- Active advocacy is needed to create awareness about recent amendments in the Apprenticeship Act, 1961, and about the National Apprenticeship Promotion Scheme (NAPS) among different stakeholders.
- The claim process for reimbursement, through which companies get appropriate refund for funds spent on stipends under the NAPS, needs to be streamlined.
- Facilitate the integration of the micro, small & medium enterprises (MSME) sector into the

apprenticeship system by linking it to MUDRA scheme.

Skilling

- Mainstreaming skill development with education through a system for academic equivalence to ITI's qualifications. This would provide ITI candidates option to attain academic qualification as well.
- An Overseas Employment Promotion Agency should be set up at the national level under the Ministry of External Affairs. Apart from working with the MSDE to train and certify Indian workers keen on overseas employment, in line with international standards, it could also support pre-departure orientation training (PDOT), including language and soft skills training modules. This agency could help in identifying potential partners and streamlining efforts of India international skill centers.
- Publicize role models/micro entrepreneurs who have benefitted from vocational training courses.

Funding

- Alternative financial sources such as Corporate Social Responsibility (CSR) funds, Compensatory Afforestation Fund Management and Planning Authority (CAMPA) funds, Building & Construction Workers' Cess, Members of Parliament Local Area Development (MPLAD) Fund, Mahatama Gandhi National Rural Employment Guarantee Act (MGNREGA), etc., should be tapped to expand the skill programme and contribute to national skill development fund.

Strengthening SSCs

- SSCs should be clustered and based on occupations/functions with respect to job standards/QPs across domains. New technologies could also be considered as a criterion for clustering. This would ensure convergence in efforts of different SSCs.
- It is recommended that job roles of SSCs having horizontal applicability across sectors should be integrated and customized to a sector's requirements.[11]

Monitoring and evaluation

- Since skilling is dynamic, it is necessary to monitor programmes regularly. Hence, it is necessary to develop state level indicators, such as placement rates, which help monitoring whether demand requirements are being addressed, and the impact of various government schemes.
- NSDC may get into partnerships with private jobs counseling agencies for helping newly skilled persons with soft skills and adapting to local conditions.

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1 https://data.worldbank.org/indicator/SL.TLF.TOTL.IN?locations=IN&view=chart. Accessed May 03, 2018.

2 National Skill Development Policy, 2015 – Page 55.

3 http://www.msde.gov.in/assets/images/Skill%20India/policy%20booklet-%20Final.pdf. Accessed May 03, 2018.

4 http://pib.nic.in/newsite/PrintRelease.aspx?relid=123296. Accessed May 03, 2018.

5 http://pib.nic.in/newsite/PrintRelease.aspx?relid=175282. Accessed May 06, 2018.

[6] http://pib.nic.in/newsite/PrintRelease.aspx?relid=175282. Accessed May 03, 2018.

[7] National Skill Development Policy 2015 – framework document.

[8] India Skill Report 2018.

[9] http://niti.gov.in/writereaddata/files/Final%20report%20%20of%20Sub-Group%20Report%20on%20Skill%20Development.pdf. Accessed May 03, 2018.

[10] http://himachal.nic.in/showfile.php?lang=1&dpt_id=14&level=2&lid=4282&sublinkid=14849. Accessed May 07, 2018.

[11] One such example is Management and Entrepreneurship and Professional Skills Council (MEPSC).

27. Public Health Management and Action

Objectives

To revamp radically the public and preventive health system in the nation through the following strategic interventions:

- Mobilize public health action through an integrated, inter-sectoral and pan-stakeholder approach, targeted at communities and individuals as well as grassroots organizations, aimed at creating an unprecedented people-led movement for health and wellness.
- Operationalize vital enablers - a) public health and management cadre, b) public health agency with capacitated supporting institutions (c) municipalities and *panchayati raj institutions*.

Current Situation

Public health, i.e., the science of keeping communities healthy through the prevention of disease and promotion of health and wellness, has historically been a low priority in India. Of the total current expenditure on health classified by healthcare functions, preventive care accounts for 6.7 per cent. The money spent on curing people on the other hand is 51 per cent of the expenditure[1] with the remaining money being spent on pharmaceuticals, other medical goods and patient transportation.

Although India accounted for only 18 per cent of the global population in 2016, we accounted for 34 per cent of the global tuberculosis burden and 26 per cent of the premature mortality due to diarrhoea, lower respiratory and other common infectious diseases.[2] At the same time, non-communicable diseases (NCDs), including cardiovascular conditions, chronic obstructive respiratory diseases, diabetes, mental health conditions and cancers are now the leading cause of health loss, with 55 per cent morbidity and premature mortality attributable to these conditions. The range of health loss[3] across states is wide. Kerala and Goa have the lowest rates while Assam, Uttar Pradesh and Chhattisgarh have the highest rates.[4]

Public health action and management is a scientific and professional endeavour which should not be left to untrained employees relying on common sense alone.

A suboptimal public health system:

- Makes it challenging to tackle NCDs, which, in the first place, is all about prevention and early detection.
- Causes us to resort to high-cost secondary and tertiary health care in many cases.
- Diminishes our preparedness for new and emerging threats such as bioterrorism.
- Compromises our ability to harness the demographic dividend.

The nations with whom we compete or aspire to emulate have achieved health and wellness outcomes on the foundation of strong public

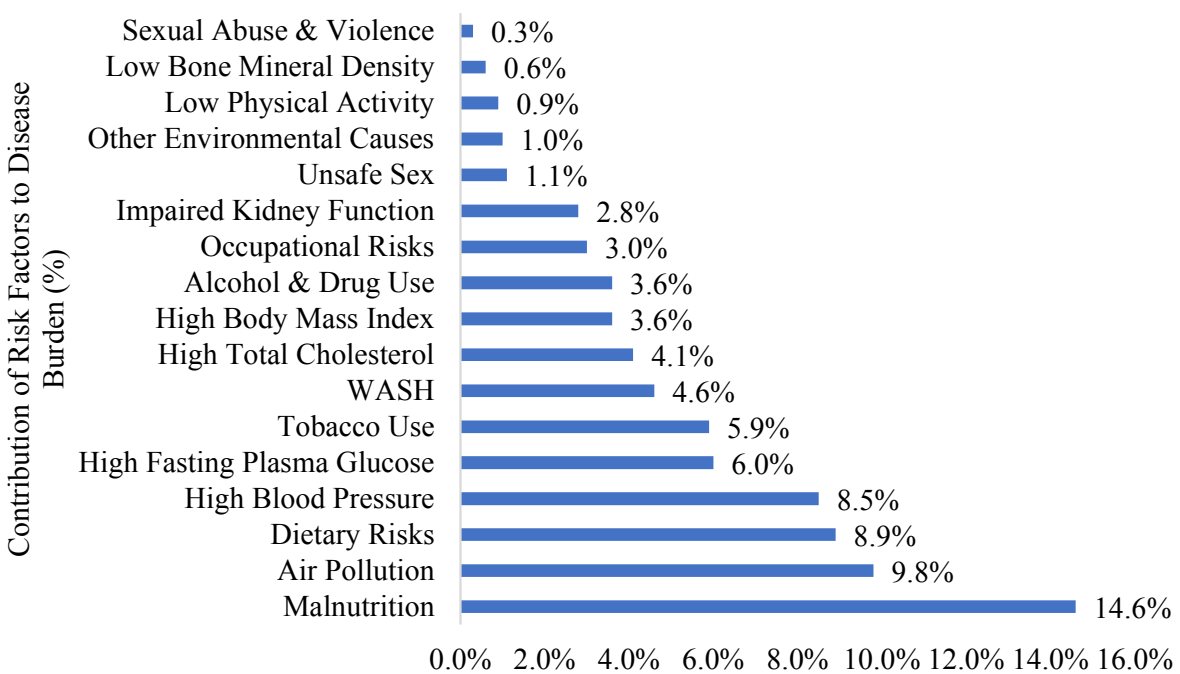
health systems. Thus, it is an absolutely essential ingredient for building a New India.

During the last four years, the government has taken several steps to strengthen public health in the country including the launch of Mission *Indradhanush* and Intensified Mission *Indradhanush* as well as the National *AYUSH* Mission. Efforts have also been intensified for eliminating Neglected Tropical Diseases like *Kala Azar* and Lymphatic Filariasis. Further, the war against Tuberculosis has been escalated through the launch of the National Strategic Plan in 2017.

Constraints

1. Diseases need to be prevented first, a concept that has historically been inadequately acknowledged in India. The large burden of NCDs requires lifestyle and community-level interventions. Ensuring people eat right, sleep right, maintain good hygiene, exercise, and adopt a healthy lifestyle necessitates concerted interventions at various levels of the system.
2. In most states, population health management positions are staffed by doctors, trained primarily in the provision of curative services, or by generalist civil servants. They have limited public health training, which includes an understanding of the causes and linkages between risk factors and diseases as well

Figure 27.1: Preventable risk factors are the biggest contributors to the disease burden, 2016



Source: India: Health of the Nation's States, 2017[5] ; Disease burden measured in terms of Disability Adjusted Life Years

as disciplines including epidemiology, biostatistics, social and behavioural sciences and management of health services. Likewise, hospitals are run by clinicians with little expertise in managing health facilities.

3. The following preventable risk factors are causes for a major proportion of diseases in the country: maternal and child malnutrition, air pollution, unhealthy diets, high blood pressure, high blood glucose, tobacco consumption, unsafe water, and poor sanitary practices; of these, nutrition, environment, water and sanitation are outside the purview of the health ministry. Therefore, accountability for ensuring vital public health actions is spread thin.

4. There is no single authority responsible for public health that is legally empowered to enforce compliance from other public authorities and citizens, even though several factors may require inter-sectoral action to achieve a measurable impact on population health.

Way Forward

1. Mobilize public health action at multiple levels

- Public funding on health should be increased to at least 2.5 per cent of GDP as envisaged in the National Health Policy, 2017.
- Create an environment, through appropriate policy measures, that encourages healthy choices and behaviours:
    - Make the practice of yoga a regular activity in all schools through certified instructors.
    - Increase taxes on tobacco, alcohol and unhealthy foods such as soda and sugar sweetened beverages.
    - Co-locate AYUSH services in at least 50 per cent of primary health centres, 70 per cent of community health centres and 100 per cent of district hospitals by 2022-23.[6]
- Strengthen the Village Health Sanitation and Nutrition Day platform to cover a broader set of health issues across various population groups instead of only focusing on child health.
- Activate multiple channels (schools, colleges, women's groups, traditional events like fairs, social media platforms, National Cadet Corps etc.) and prepare communication materials for catalysing behavioural change towards greater recognition of preventive health care.
- Make nutrition, water and sanitation part of the core functions of *panchayati raj institutions* and municipalities.

2. Institute a public health and management cadre in states

Incentivize state governments to invest in creating a dedicated cadre for public health at the state, district and block levels:

- Characteristics of the cadre
    - Train officials in public health related disciplines including epidemiology, biostatistics, demography and social and behavioural sciences.
    - Provide training in hospital management to suitably equip personnel responsible for managing large facilities.
    - Create a career pathway up to the highest levels within the state health departments for those trained in public health, as well as for those with clinical specialties.
    - Allow mid-level providers responsible for managing health and wellness centres delivering comprehensive primary

healthcare to rise to higher-level positions within the cadre. Similarly, allow public health functionaries at the block and district levels to enter the cadre.

- Mandate a master's level qualification, in addition to specified training, for officials taking on leadership positions.

- Institutional mechanisms
  - Develop a model public health and management cadre by drawing upon best practices and engage with states to adapt, refine and institutionalize the model.
  - Formulate guidelines to create the cadre, primarily by re-aligning the requisite skill sets of existing functionaries with service conditions.

3. **Create a focal point for public health at the central level with state counterparts**
   - Create a designated and autonomous focal agency with the required capacities and linkages to perform the functions of disease surveillance, information gathering on the health impact of policies of key non-health departments, maintenance of national health statistics, enforcement of public health regulations, and dissemination of information to the public. An appropriately empowered and capacitated National Centre for Disease Control may be considered to play this role with support from relevant organizations.
   - Create a counterpart Public Health Agency in each state, where they do not already exist.

4. **Miscellaneous**
   - Explore the need for a Public Health Act to legislatively empower and, if necessary, institutionalise the Public Health Agency discussed above.
   - Redefine the role of the technical directorate (Directorate General of Health Services) and create a Directorate of Public Health.
   - Develop a comprehensive MIS including baseline data for NCDs.

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1 National Health Accounts 2014-15, MoHFW.

2 Global Burden of Disease 2016, Institute of Health Metrics and Evaluation.

3 Health loss is measured in disability-adjusted life years (DALYs). One DALY represents the loss of one year lived in full health.

4 Indian Council of Medical Research, Public Health Foundation of India, and Institute for Health Metrics and Evaluation. GBD India Compare Data Visualization. New Delhi: ICMR, PHFI, and IHME; 2017. Available from http://vizhub.healthdata.org/gbd-compare/india. Accessed November 19, 2017.

5 Published by the Indian Council of Medical Research, Public Health Foundation of India and the Institute for Health Metrics and Evaluation.

6 The NITI Aayog's three-year Action Agenda had recommended that the co-location AYUSH services should be ensured in 50 per cent of primary health centres (PHCs), 60 per cent of community health centres (CHCs) and 100 per cent of district hospitals by 2020. Until the end of the 12th Five-Year Plan period, AYUSH facilities had been co-located in 37 per cent of PHCs, 50 per cent of CHCs and 63 per cent of district hospitals.

28. Comprehensive Primary Health Care

Objectives

Under *Ayushman Bharat*, scale-up a new vision for comprehensive primary health care across the country, built on the platform of health and wellness centres (HWCs), to:

- Provide quality ambulatory services for an inclusive package of diagnostic, curative, rehabilitative and palliative care, close to the people.
- Deliver preventive and promotion services, and action on the ground to tackle determinants of ill health locally.
- Create a mass movement for Healthy India (*Swasth Bharat Jan Andolan*).

Current Situation

Primary health care is a key enabler for higher life expectancy, better health outcomes and lower costs for the nation. Primary health interventions help detect diseases early, well before complications set in, thus pre-empting the need for secondary and tertiary care.

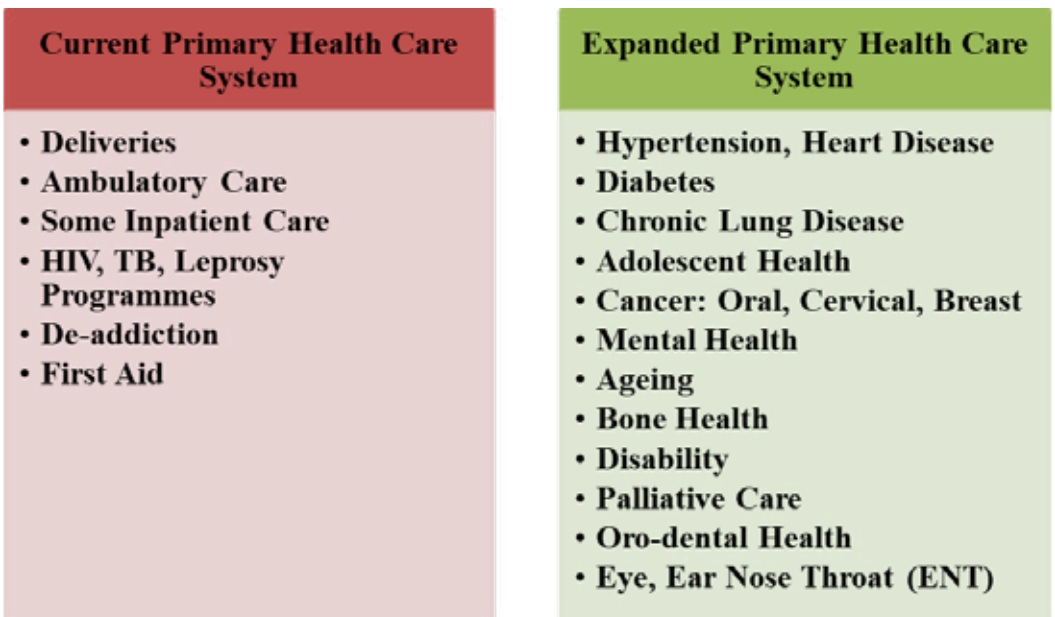
Developed nations such as the UK, Australia, Canada, Netherlands and Sweden spend a large share of their federal healthcare budgets on primary care.[1] In India, primary care infrastructure exists as a network of sub-centres, primary health centres and community health centres. However, the focus of services has remained narrow – largely prioritized around reproductive, maternal and child healthcare, and some communicable diseases (notably, malaria). The battle against non-communicable diseases can only be won through a primary health system that ensures that chronic diseases are not only detected early, but also that preventive action is taken to ensure improved lifestyles.

The National Health Policy (NHP), 2017, envisages comprehensive primary health care delivered through HWCs. The policy also commits that two-thirds or more of government spending will be targeted at primary care. Additionally, the announcement of *Ayushman Bharat* by the government is a game changer.

Constraints

1. The existing primary health care model in the country is limited in scope. Even where there is a well-functioning public primary health centre, only services related to pregnancy care, limited childcare and certain services related to national health programmes are provided, which represent only 15 per cent of all morbidities for which people seek care.[2]
2. The conversion of 150,000 sub centres into HWCs was announced in the budget speech in 2017 and was enshrined in the NHP, 2017. Although less than 4000 such centres were sanctioned in 2017-18, the government is committed to accelerating the pace of sanctioning and putting up HWCs to meet the target in good time.

Figure 28.1: Additional services to be provided under the New India primary care system



Source: Based on the 'Report of the Task Force on Comprehensive Primary Health Care', MoHFW 2016

3. Supply side deficiencies, poor management skills and lack of appropriate training and supportive supervision for health workers prevent delivery of the desired quality of health services.
4. A primary health care model for the growing urban population has not been conceptualized, notwithstanding a few assorted initiatives by some states.
5. Although the National Health Mission focuses on engaging communities through village health, nutrition and sanitation societies, health has not yet become a people's movement.
6. Funding for health is inadequate, leading to low spending on primary care.
7. Citizens have to incur high out-of-pocket expenditure on primary health care, of which the largest expenditure is on drugs.
8. There is a shortage of adequately trained and motivated personnel.

Way Forward

1. Accelerate the establishment of a network of 150,000 HWCs

- Operationalize a network of 150,000 HWCs on priority by 2022-23 in order to ensure sufficient coverage of affordable primary care and lower the burden on secondary and tertiary care.
- HWCs should provide services such as screening and management of non-communicable diseases; screening and basic management of mental health ailments; care for common ophthalmic and ENT problems; basic dental health care; geriatric and palliative health care, and trauma care and emergency care.

- These are in addition to the existing requirement for primary care services related to reproductive and child health, adolescent health, and selected communicable diseases covered by national health programmes.
- The key features of New India's primary health care system will be:
    - o A primary health care nucleus comprising five to six upgraded sub-centres coupled with a primary health centre, and population outreach.
    - o A team led by a mid-level health service provider,[3] auxiliary nurse midwives (ANMs), accredited social health activists (ASHAs) and a male health worker responsible for comprehensive primary health care services for a population of about 5,000.
    - o Planning of health facility distribution in districts to ensure that a continuum of care is available on the principles of 'time to care' through a strong referral linkage.
    - o Digitization of family records and information from the community to the facility level.
    - o Use of real-time data to guide public health action and implementation monitoring.
    - o The HWCs would act as the 'gateway' for access to secondary and tertiary health services.

2. Enable mechanisms for rapid scale up

- Put in place the following work streams to create 150,000 well-functioning HWCs across the country – infrastructure; human resources (mid-level professional recruitment, training

Figure 28.2: Revamped primary health system for New India

Source: School of Planning & Architecture, Delhi

and deployment; deployment and orientation of ANMs and male health workers); an Information and Communication Technology (ICT) system; supply chain for drugs and disposables; clinical and public health protocols and tools; managerial/supervisory processes, and monitoring, evaluation and accountability systems.

- Under *Ayushman Bharat*, put in place the necessary institutional mechanisms with a focus on health and wellness at the central and state levels for effective, timely and robust system level implementation as well as strong engagement with departments/directorates of health in the states.
- Establish special national and state level task forces and 'command centres'.
- Create mechanisms for rapid scaling up of training.
- Develop empowered governance mechanisms for efficient decision-making, coordination, funds flow, procurement, contracting, recruitment, construction and implementation.
- Mobilize Corporate Social Responsibility (CSR) and Non-Resident Indians for funding HWCs.
- Some HWCs could also be mobile, particularly for better access to remote communities.

3. Coordinate action for disease prevention and public health promotion and to address social determinants of health

- Provide preventive services to improve healthy behaviours for family health and control the incidence of communicable and non-communicable diseases among the population covered by HWCs.
- Facilitate partnerships between HWC teams and other frontline development teams (nutrition, education, *Swachh Bharat* etc.) to engage with communities to address the socio-cultural and environmental determinants of ill health at the local level.

4. Catalyse people's participation for healthy India: *Swasth Bharat Jan Andolan*

- Mandate and motivate HWC teams to work closely with village health, sanitation and nutrition societies, *panchayati raj institutions* as well as all other constituents of civil society in rural and urban spaces. This is vital because people are not just targets of health services but partners and multipliers of health-related activities.

5. Emphasise concurrent learning, operations research and innovation

- Undertake a well-funded research programme to find the best pathways for effective and context-specific scaling up of primary health care. This is critical because it is well-known that a single model of primary health care may not work for all districts/states in the country.
- Conduct research to assess the population-level health impact of the programme and effects on out-of-pocket expenses.
- Develop urban adaptations of comprehensive primary care.

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[1] Government of India, Ministry of Health and Family Welfare: Report of the Task Force on Comprehensive Primary Health Care Rollout, 2016.

[2] Government of India, Ministry of Health and Family Welfare: Report of the Task Force on Comprehensive Primary Health Care Rollout, 2016.

[3] With a degree in nursing, AYUSH or community health, and with required training in public health and primary care.

29. Human Resources for Health

Objectives

- Achieve a doctor-population ratio of at least 1:1400 (WHO norm 1:1000) and nurse-population ratio of at least 1:500 (WHO norm 1:400) by 2022-23.
- Ensure availability of paramedics and doctors as per Indian Public Health Standard (IPHS) norms in high priority districts by 2020 (National Health Policy, 2017).
- Deploy mid-level providers (MLPs) to manage the primary healthcare system.
- Generate at least 1.5 million jobs in the public health sector by 2022-23, a large number of which will employ women.

Current Situation

India's health workforce is characterised by a diversity of providers delivering services in allopathy and alternative systems of medicine like ayurveda, homeopathy, unani and siddha.

As of March 2017, there were 10.23 lakh allopathic doctors registered with the Medical Council of India or state medical councils. Assuming 80 per cent availability, it is estimated that around 8.18 lakh doctors may actually be available for active service. This gives a doctor-population ratio of 1:1613.

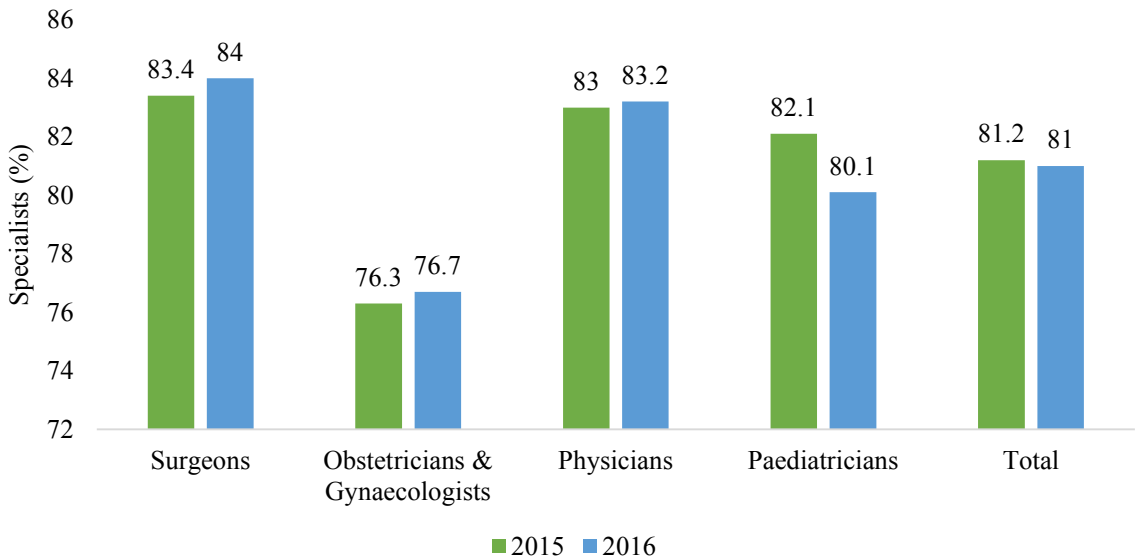
The current nurse-population ratio is 1:588.[1] Due to the suboptimal quality of training offered by several institutions that have mushroomed over the years, limited career prospects and poor working conditions, especially in the private sector, there is a significant shortage of skilled nurses in the country.

Moreover, the distribution of doctors and nurses across the country is uneven. Urban areas have four times as many doctors and three times as many nurses as compared to rural areas. Medical and nursing colleges are concentrated in a few states, e.g., Andhra Pradesh, Karnataka, Tamil Nadu, Kerala, Gujarat and Maharashtra.

There are also severe shortages in the category of allied health professionals (AHPs) including medical lab technicians, optometrists and radiologists. For instance, as of March 31, 2016, there was a shortfall[2] of 13,659 lab technicians at primary health centres (PHCs) and community health centres (CHCs) across India. Similarly, there was a shortfall of 3645 radiographers at CHCs. The absence of a central regulatory authority for AHPs has resulted in the mushrooming of institutes/ colleges without affiliation or recognition, giving rise to quality issues for this category of health professionals as well.

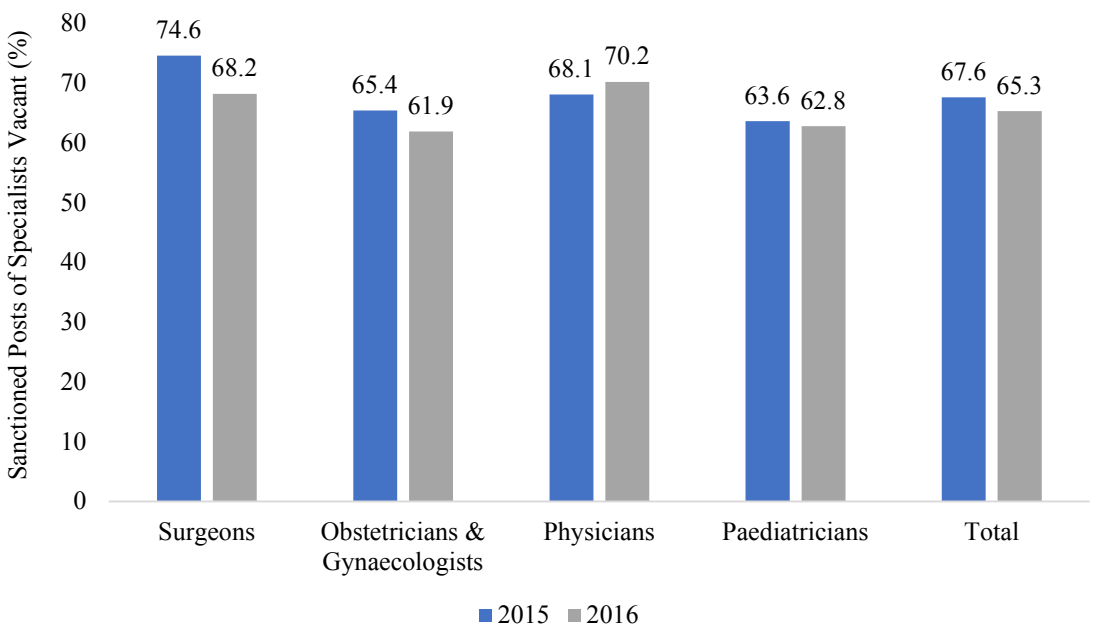
As far as specialists are concerned, a large number of posts are vacant all over the country. According to estimates, India needs close to 0.5 million additional specialists. *Ayushman Bharat* has triggered the need for even more human resources for health (HRH). There is also an acute shortage of medical faculty. Of the 1,830 faculty posts across

Figure 29.1: Shortfall of specialists in government health centres compared to the requirement based on existing infrastructure



Source: Rural Health Statistics, 2016

Figure 29.2: Sanctioned posts of specialists vacant



Source: Rural Health Statistics, 2016

six All India Institutes of Medical Sciences (AIIMS), approximately 583 (31 per cent) had been filled up until July 2017.

The government has made several efforts to address the shortage and quality of HRH in the country. These include the passage of the National Medical Commission (NMC) Bill, 2017 by the Union Cabinet, addition of 15,364 undergraduate and 9,855 postgraduate seats in medical colleges as well as increasing the superannuation age of doctors to 65 years in the Central Health Service, among other measures. Steps have also been taken to address the shortage of specialists through the system of diplomas from the College of Physicians and Surgeons (CPS), for instance.

Constraints

- The regulatory system (Medical Council of India, Nursing Council of India) has failed to ensure adequate availability and quality of health professionals.
- There is inadequate capacity to train doctors, especially specialists and super-specialists.
- Private practice by medial faculty in teaching institutions is rampant in several states, compromising on the commitment to teaching and institutional clinical work.
- Many state and private medical/nursing/dental colleges have poor infrastructure.
- There is no comprehensive and consistent HRH policy.
- Workforce shortages and uneven distribution of doctors, nurses, specialists and allied health professionals plague the sector.
- The quality of health professional training and adherence to standards is sub-optimal, including in the private sector.
- Health professionals in the public sector are inadequately compensated and motivation levels are extremely poor. Fair compensation in the private sector, e.g., for nurses, is also a challenge.
- There is paucity of data on HRH in the country.

Way Forward

1. **Reform the governance of medical, nursing, dentistry and pharmacy education in the country**

- Enact the NMC Bill, 2017.
- Revamp the AYUSH, nursing, dentistry and pharmacy councils along the lines of the NMC Bill, 2017.
- Establish a Council for Allied Health Professionals to ensure standardization of education and putting in place quality control mechanisms for educational institutions, teaching methods, clinical protocols and workforce management.
- Put in place an updated curriculum for medical and allied professions that keeps pace with the changing dynamics of public health, policy and demographics.
- Establish a nursing school in every large district or cluster of districts with a population of 20-30 lakhs as per the National Health Policy, 2017.
- Take steps to revamp the regulatory system of nursing education, ensure quality training in nursing schools, develop specialties in nursing, develop centres of excellence in nursing and enhance the stature of government nurses.
- Take steps to stop private practice by faculty of government teaching institutions by providing attractive salaries and incentives.

2. **Enhance production of doctors (especially specialists and super- specialists)**

- While some steps have been taken, the system of Diplomate of National Board (DNB) and Diplomas from CPS, may be expanded. This will help to address the shortage of specialists in the country.
- Link at least 40 per cent of district hospitals with medical colleges.[3]
- Meet faculty shortages in new AIIMS with an active search strategy, visiting/adjunct faculty system (from India and abroad), and other methods.
- Create pathways for training of doctors in specialties and super-specialties at private hospitals (certification, short courses, exchange programmes, etc.)
- Utilize extensively and incentivize district hospitals for formal (DNB/CPS diploma) and informal specialty training of doctors and nurses.
- Provide opportunities for training in specialized/cutting edge areas at the best centres in the world for faculty of national institutions of excellence (NIEs) (AIIMS, PGIMER, JIPMER, NIMHANS) and of state medical colleges of repute.
- Create conditions to facilitate the import of doctors, especially those of Indian origin, working abroad.
- Consider deploying teachers from universities abroad as visiting professors at AIIMS/NIEs.
- An enabling framework for deployment of doctors and specialists from the private sector to government hospitals on a visiting/honorary basis may be developed and piloted.

3. **Develop a comprehensive HRH policy in states**

- To enable the formulation of a comprehensive HRH policy in states for all categories, develop a model policy covering issues pertaining to staff recruitment, retention, transfer, incentive structures for posting in difficult areas including access to housing facilities, performance management and competency-based career tracks for professional advancement.

4. **Skill and deploy non-physicians and other health providers**

- Develop plans for training a full range of allied health professionals such that it meets national requirements as well as creates a surplus for placements abroad.
- Create a cadre of primary healthcare practitioners by introducing a three-year competency-based dynamic course for primary, community and family medicine.
- Place 150,000 skilled and independently certified MLPs to manage the health and wellness centres to be operationalized over the next five years.
- Explore some specific task shifting opportunities like developing a cadre of nursing practitioners and physician assistants.

5. **Generate data on HRH, track progress**

- Generate comprehensive real-time data on forecasting, production capacity and skill mix as well as generate trends with respect to the key categories of HRH in the country.
- By 2019, put in place a system for tracking progress against the stipulated HRH requirements.

- Ensure meeting country commitments and targets under the Global Strategy on HRH.[4]

6. Engage private sector for skilling and training HRH

- Establish partnerships with medical device manufacturers as part of the Skill India and Make in India programmes to identify skill gaps and design appropriate curricula for training programmes.
- Partner with private hospitals/private medical practitioners to skill technicians, nursing and para-nursing as well as para-medical staff under the National Skill Development Corporation's Healthcare Sector Skill Council.

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1 Nursing Council of India.

2 Rural Health Statistics, 2016.

3 NITI Aayog 3-year Action Agenda states that up to 20 per cent of district hospitals must be linked with medical colleges by 2020.

4 Global strategy on human resources for health: Workforce 2030, World Health Organization.

30. Universal Health Coverage

Objectives

On the strong platform of *Pradhan Mantri - Jan Arogya Yojana* (PM-JAY):

- Attain a coverage of at least 75 per cent of the population with publicly financed health insurance (covering most secondary and tertiary care procedures) by 2022-23.
- Reduce by 50 per cent the proportion of households facing catastrophic health expenditure from the current levels.[1]

Current Situation

There have been noteworthy strides over the past two decades in the quality of health care delivered to citizens and population health outcomes. Yet, there is wide variation across states in the availability of resources, the status of state health programmes, rural-urban differentials and governance capacity.

Public health infrastructure in the country expanded considerably following the launch of the National Health Mission in 2005; however, there continues to be a shortfall in several areas. In 2015, the number of sub-centres (SCs) fell short of requirements by 20 per cent, of primary health centres (PHCs) by 22 per cent and of community health centres (CHCs) by 32 per cent in rural India. The quality of public sector health facilities has also suffered because of shortage of personnel and lack of necessary supplies.

Data from the National Sample Survey Organisation's 71st Round (January-June 2014) shows that only 28 per cent and 21 per cent of patients in rural and urban areas respectively use the outpatient care provided by health facilities in the public sector. The corresponding figures for the usage of in-patient care are 42 per cent and 32 per cent. The mixed health system, therefore, remains largely dominated by the private sector, which provides services at widely varying costs and quality levels.

Public funding of health has been consistently low in India (approximately 1.3 per cent of GDP). As a result, out-of-pocket expenditure (OOPE) is 62 per cent of the total expenditure on health. In 2007, the central government launched the *Rashtriya Swasthya Bima Yojana* (RSBY) to cover hospital expenses of up to INR 30,000 for a family of five members living below the poverty line. Evaluation studies for RSBY have shown that while it did increase access to health care as well as non-medical health spending for the poor, it did not provide significant financial protection, perhaps due to the exclusion of spending on outpatient care, drugs and diagnostics.

The decision to launch PM-JAY under *Ayushman Bharat* is a path breaking step towards Universal Health Coverage. It aims to cover 10.74 crore families at the bottom two quintiles with INR 5 lakh cover each year for secondary and tertiary care hospitalization. The PM-JAY will be implemented in alliance with state government schemes.

As per the NSSO 71st Round, out of the total OOPE, 63.5 per cent is on outpatient care. Of this, the largest expenditure (71 per cent) is on medicines.

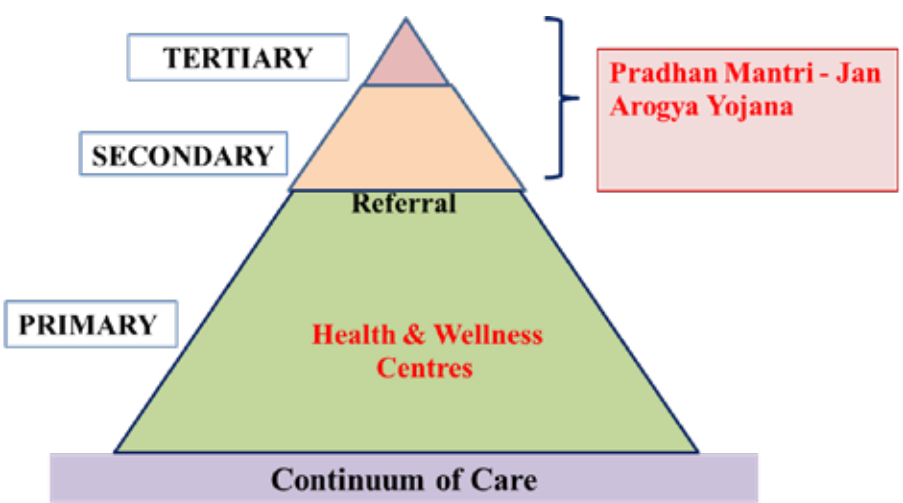
It is paradoxical that although India is one of the largest suppliers of generic drugs to the world, a significant proportion of the country's population lacks access to essential medicines.

During the last four years, however, the government has taken significant steps to enhance access to medicines especially for the poor and middle classes. The prices 958 drugs have been capped along with the prices of cardiac stents and knee implants. The *Pradhan Mantri Bhartiya Janaushadhi Pariyojana* has been expanded from 99 functional stores in May, 2014 to 4,024 functional stores in September, 2018.

Constraints

1. There has been inadequate focus on comprehensive preventive care and primary care in the past.
2. The multiplicity of government-sponsored insurance schemes has resulted in the fragmentation of the risk pool. A sizeable risk pool comprising low- and high-risk individuals is imperative to ensure the viability and sustainability of insurance.
3. Since outpatient care, drugs and diagnostics are not covered under several government insurance schemes, people often delay seeking care until they are severely ill.
4. The coverage ceiling of RSBY is inadequate.
5. There is an acute shortage of motivated human resources for health, attributable at least partly to the poor incentives for government providers.
6. Access to drugs and medical devices at affordable prices is an essential ingredient of Universal Health Coverage. According to estimates by the Central Drugs and Standards Control Organization, around 84 per cent of the active pharmaceutical ingredients (APIs) for drugs manufactured in India are imported. This dependence on import of APIs has gone up more than fourfold between 2004 and 2013.
7. While the notification of medical devices rules is an important step, a clearly defined and comprehensive regulatory framework is required. Additionally, approximately 75 per cent of the current demand for devices is met through imports.

Figure 30.1: Pillars of universal health coverage



8. The prices of diagnostic tests can vary widely across the country. For example, a lipid profile test can cost Rs. 90 in some cities, going up to Rs. 7,110 in others.

Way Forward

Recommendations pertaining to comprehensive primary healthcare, public health action and human resources for health are covered in other chapters of this document. Other strategies for overcoming the constraints listed are described below.

1. Roll out PM-JAY

- Establish the *Ayushman Bharat*-National Health Agency at the central level and counterpart institutions at the state and district levels for management of the PM-JAY.
- Develop a robust, modular, scalable and interoperable IT platform as per standards formulated by the National Digital Health Authority to enable paperless and cashless transactions under the scheme.
- Put in place mechanisms for fraud prevention, detection and control as well as for grievance redressal.
- Design a comprehensive media and outreach strategy to increase awareness of the scheme among intended beneficiaries and other stakeholders.
- Institutionalise health technology assessment at the central and state levels to determine the service packages to be covered under PM-JAY in the future.
- Develop costing frameworks for determining accurate package rates for procedures.
- Develop standard treatment guidelines for priority conditions.
- Monitoring, evaluation and research
    - o Put in place data analytics systems to guide strategic purchasing[2] of health services, forecasting and generating policy inputs.
    - o Institutionalize a mechanism for undertaking independent audits of the scheme.
    - o Conduct research on the population-level impact of the programme including financial protection, healthcare access and health outcomes.

2. Galvanize health facilities in the public sector and engage the private sector

- Provide greater autonomy to public hospitals to use claims money generated under PM-JAY to improve facilities, purchase the necessary drugs/tests and provide performance-based incentives to staff.
- Strengthen district hospitals to conform to the Indian Public Health Standards.
- Institutionalize ranking of district hospitals based on their performance on health indicators to foster competition and nudge them towards quality improvement.
- Introduce appropriate gate-keeping mechanisms for adoption by the proposed health and wellness centres.
- Reform the compensation system for professionals in public sector health facilities by shifting to a blended capitation mode of payment (part salary and part incentive based on achieving pre-agreed outcomes).
- Trigger private investments in rural/supply deficit areas by providing appropriate incentives for empanelling hospitals.

3. **Ensure access to affordable drugs and medical devices**

- Institute a new Drug Price Control Order (DPCO), which ensures rational drug prices by reducing trade margins.
- Include consumables, in addition to drugs, in the DPCO to control undue profiteering.
- Finalize the national pharmaceutical policy to enable access to affordable medicines, promote the use of generic drugs, clamp down on unfair marketing practices and give a boost to local manufacturing to reduce dependence on imports.
- Formulate and implement the e-pharmacy policy to facilitate online access to quality medicines in a cost-effective and timely manner.
- Review and iron out the challenges with the business model of *Jan Aushadhi* stores to ensure that they can function as self-sustaining entities and scale up rapidly across the country.
- Find the best pathways for scaling up and adapting the process of bulk procurement of drugs adopted in states like Tamil Nadu and Rajasthan.
- Boost domestic production of APIs by setting up six large API intermediate clusters as per the recommendations of the Katoch Committee.
- Streamline regulatory processes including providing a single window clearance mechanism to manufacturers.
- Introduce a separate Act for medical devices as per global best practises, so that medical devices are regulated separately from pharmaceuticals.
- Formulate an appropriate pricing policy for medical devices and re-examine it periodically to ensure access to affordable devices for the population while also ensuring a sufficient return on investment.
- Develop the National List of Essential Medical Devices along the lines of the National List of Essential Medicines to improve patient care, increase the affordability of tests, improve the regulation and quality of diagnostic tests, and promote the rational use of diagnostics.

4. **Strengthen health research capacity**

- Set up research consortia for diseases of high priority including neglected tropical diseases and emerging infections along the lines of the India TB Research and Development Corporation.
- Identify at least 20 academic or research institutions at the regional level to act as hubs capable of training a minimum of 500 doctors every year.
- Ensure the presence of at least one model rural health research unit in every state.
- Cover the entire country with a network of viral research and diagnostic laboratories with a testing capacity of more than 15 lakh samples per year.
- Identify key research areas in traditional medicine and facilitate collaborative research with modern systems of medicine.

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[1] It is proposed that the achievement of this target be advanced to 2022 instead of 2025 as stated in the National Health Policy, 2017.

[2] Strategic purchasing means active, evidence-based engagement in defining the service-mix and volume and selecting the provider-mix in order to maximize societal objectives.

31. Nutrition

Objectives

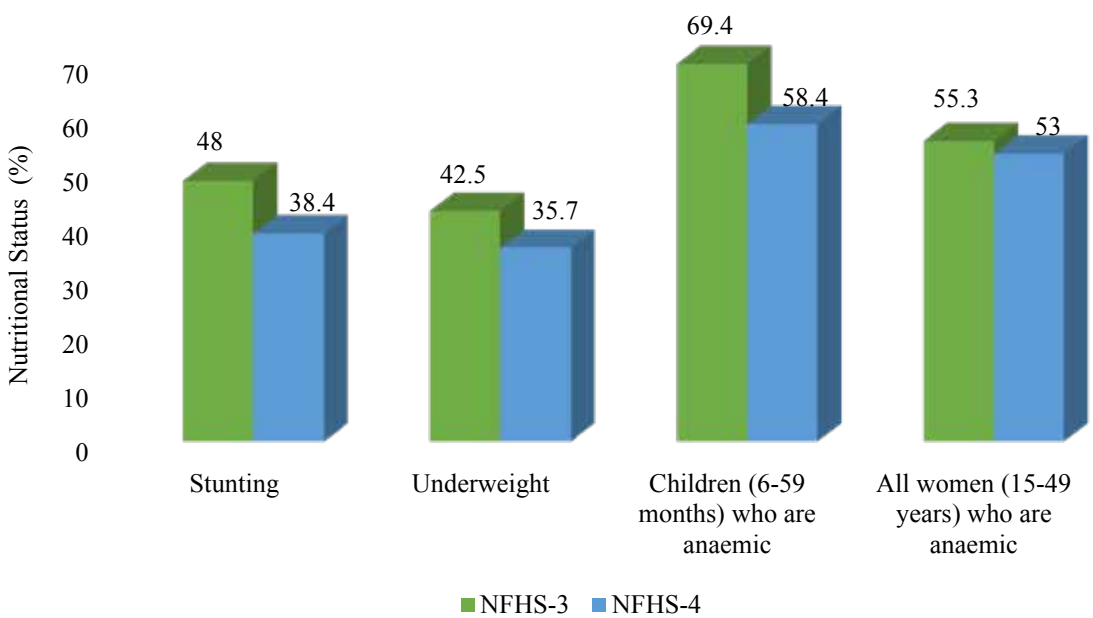
Under *POSHAN Abhiyaan*, achieve the following outcomes by 2022-23, compared to the baseline of 2015-16 (National Family Health Survey-4):

- Reduce the prevalence of stunting among children to 25 per cent or less.
- Reduce the prevalence of underweight in children (0-6 years) to 25 per cent or less.
- Reduce the prevalence of anaemia among young children (6-59 months) to 43 per cent or less.
- Reduce the prevalence of anaemia among adolescent girls and women (15-49 years) to 38 per cent or less.

Current Situation

Under-nutrition is the prime risk factor in over 40 per cent of under-five child deaths. Children with under-nutrition, anaemia and iodine deficiency will have low IQ scores and productivity as adults. A World Bank estimate[1] indicates that reducing stunting can raise India's GDP by 4-11 per cent. The prevalence of stunting declines by an estimated 3.2 per cent for every 10 per cent increase in income per capita. Similarly, a 10 per cent rise in income per capita translates into a 7.4 per cent fall in wasting. Thus, increasing per capita incomes through rapid and equitable economic growth is a necessary condition for improving nutrition outcomes.

Figure 31.1: Key nutritional indicators in India



Source: NFHS 3 (2005-06) & NFHS 4 (2015-16)

Although progress has been made, according to National Family Health Survey-4 (NFHS-4), 2015-16, over one-third of all under-five children are stunted (low height-for-age), every fifth child is wasted (low weight-for-height), and more than 50 per cent of the children are anaemic.

Other emerging economies such as Brazil (stunting – 6.1 per cent, wasting – 1.6 per cent), China (stunting – 6.8 per cent, wasting – 2.1 per cent) and Mexico (stunting – 13.6 per cent, wasting – 1.6 per cent) fare far better on nutrition indicators compared to India.

Ironically, at the same time, India is also grappling with the rising menace of 'over-nutrition'. Nearly one fifth of India's adults are either obese or overweight as per NFHS-4 data, leading to an increased risk of diabetes and cardiovascular disorders.

India can leverage its demographic dividend only if its citizens attain optimum levels of health, nutrition and cognition.

Recognising this, the government launched the *POSHAN Abhiyaan* in March, 2018 to provide police and programmatic guidance to high burden states and districts, facilitate multisectoral planning, catalyse resource mobilisation and develop a surveillance system for nutrition.

Constraints

1. **Multidimensional determinants of under-nutrition are inadequately reflected in policymaking**

- Inadequate and poor-quality food is an important, but not the only, cause of under-nutrition.
- The underlying causes of malnutrition are multifaceted and rooted in economic and social factors like low levels of female literacy, lack of access to clean drinking water and sanitation.
- At a more proximate level, nearly half of childhood under-nutrition is attributable to illnesses (in particular, diarrhoea, pneumonia and measles) and foetal growth restriction that results in low birth weight due to maternal nutrition, maternal health, pregnancy complications and epigenetic factors.

2. **Design limitations of the Integrated Child Development Services (ICDS)**

- The design of the ICDS programme has an important limitation – its focus on the first 1000 days of the child's life is inadequate. Over 80 per cent of brain growth occurs during the first 1000 days of a child's life. This has a significant bearing on work capacity, productivity and IQ in adulthood. Hence, nutrition programmes in the country must accord the highest priority to this critical period of life. However, the ICDS programme's most prominent activities are focused on the delivery of pre-school education and hot cooked meals as well as growth monitoring at *anganwadi* centres for children between 3 and 6 years. Only 10% of children between 6 and 13 months received an adequate diet in 2015-16 (NFHS-4).

3. **ICDS programme implementation**

- The ICDS programme is beset with persistent challenges such as shortage of staff and field workers, poor monitoring, instances of food pilferage and poor quality of services.
- Given the complex nature of the challenge, a multi-dimensional approach is a must. NITI Aayog has already detailed a possible action agenda in its National Nutrition Strategy,[2] which needs to be urgently implemented.

Way Forward

1. Address policy and governance issues

- Provide greater flexibility to states under the *POSHAN Abhiyaan* to adapt programmes for context-specific implementation and to experiment with innovative approaches to attain high coverage, quality, equity and better outcomes.
- Establish an institutional mechanism, outside the government, to conduct independent annual audits of the programme to achieve implementation improvements.

2. Ensure convergent action at all levels

- Develop and implement Annual Integrated Health, Nutrition and *Swachh Bharat Mission* (SBM) action plans for all districts under the *POSHAN Abhiyaan*.
    - o Ensure accountability of the local administration.
    - o Actively engage *panchayati raj institutions*, the public distribution system (PDS) and public health engineering departments for delivery of the action plans.
- Integrate health, SBM and nutrition services at the village level through the Village Health, Sanitation and Nutrition Committees and by ensuring regular observance of Village Health Sanitation and Nutrition Days (VHSNDs).
- Develop an implementation guide for integrated action for nutrition ('a cook book') for district administrators.
- Establish a state-level convergence mechanism for nutrition under the chief secretary/ equivalent officer and corresponding structures at the district and block levels.

3. Implement mission mode action in districts with a high burden of malnutrition under *POSHAN Abhiyaan*

- Set up convergence mechanisms at the state, district and block levels; develop action plans specifying timelines; ensure sufficient budgetary allocation; strengthen monitoring systems; galvanize coordination; demonstrate change guided by annual surveys and intensively monitor implementation by NITI Aayog.

4. Refine programme interventions

Focus on first 1000 days

- As envisaged under the *POSHAN Abhiyaan*, devise a strategy for additional home-based contacts under the home-based young child care initiative with:
    - o Mothers having children in the age group of 3 months to 2 years to ensure compliance with infant and young child feeding practices as well as healthy behaviours.
    - o Mothers having a child with moderate or severe malnutrition for regular follow-up.
    - o These home visits should be conducted by accredited social health activists, a second auxiliary nurse midwife or community infant and young child feeding counsellors.
- Replace the food-centric approach with more broad-based action that includes healthcare measures (special care of low birth weight infants and immunization), birth spacing, delaying age of marriage, exclusive breastfeeding for 6 months, and timely and adequate access to complementary food interventions.
- Focus on immunization including Rota Virus and Pneumococcal Vaccines; target the vaccines preferentially to high focus districts.

Fortification

- Consider mandatory fortification of staples produced in the organized sector and provide incentives to the industry to do so.
- Incorporate fortified food grains and double fortified salt within government programmes such as ICDS, mid-day meal scheme, and PDS.
- Explore approaches to bio-fortification of grains for micronutrient deficiencies.

Research

- Create a national nutrition surveillance system to track food quality and consumption patterns and nutritional deficiency profiles for all age groups in different regions.
- Conduct implementation research studies to inform improvements in the programme.
    - Key research areas include assessing the effectiveness of conditional cash transfers/ vouchers in improving child nutrition and the optimum formulation of supplementary nutrition for young children.
    - Evaluate ICDS programme in depth and suggest reforms for greater effectiveness.
- Track changes in birth weight and prematurity rates at the population level; conduct long-term cohort studies on changes in body composition and early biomarkers of metabolic disorders.
- Review and redesign nutrition programmes targeted at adolescent girls; link these with pre-pregnancy interventions.
- Test approaches to prevent childhood and adult obesity at the population level.

5. Scale-up nutrition MIS and strengthen monitoring mechanisms

- Establish an IT-based real time monitoring mechanism by rolling out the Common Application Software (CAS) developed by the Ministry of Women and Child Development on a countrywide basis.
- Undertake joint health and nutrition reviews in the field as a standard practice.
- Establish accountability with defined responsibilities at all levels – state, district and field.

6. Make '*POSHAN Abhiyaan*' a *Jan Andolan*

- Make *POSHAN Abhiyaan* a community-led movement with adequate political backing.
- Develop behavioural change communication modules and ensure its use by all frontline workers, especially during VHSNDs; emphasise individual as well as group counselling.

7. Galvanize the National Anaemia Control Programme

- Implement the revised strategy for the anaemia control programme based on evidence; incorporate home, community, school and facility level action; embed the strategy in the activities of the emerging health and wellness centres.
- Consider 'screen and treat' as a part of the anaemia control intervention package.

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[1] http://www.worldbank.org/en/news/feature/2016/06/29/india-investing-in-a-childs-early-years-for-a-stronger-economy. Accessed April 15, 2018.

[2] http://niti.gov.in/writereaddata/files/document_publication/Nutrition_Strategy_Booklet.pdf. Accessed April 10, 2018.

32. Gender

Objective

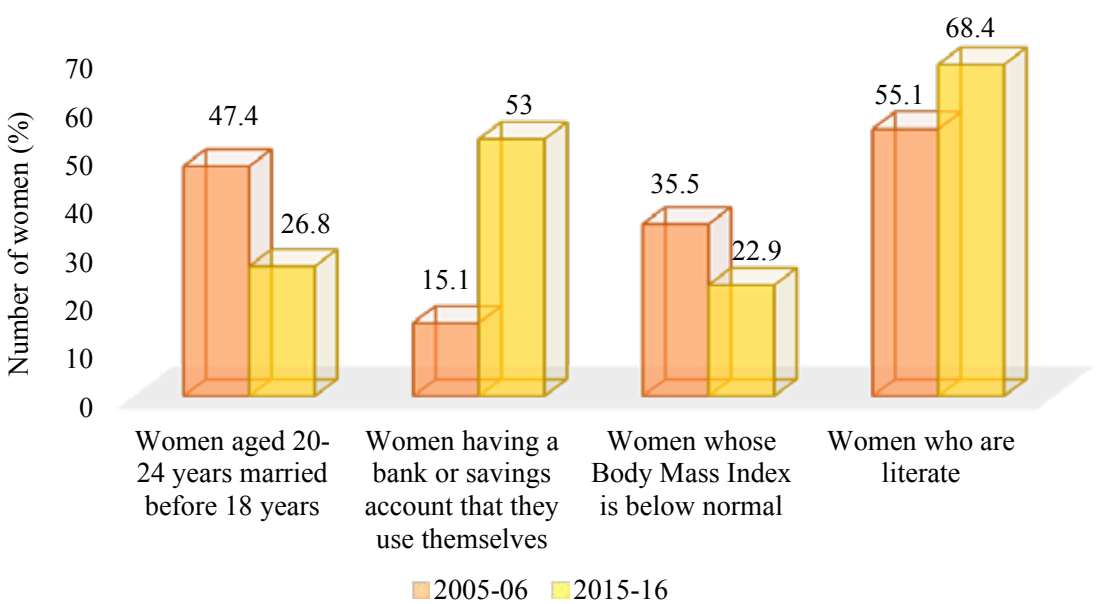
- To create an enabling environment, sans institutional and structural barriers.
- To enhance the female labour force participation rate to at least 30 per cent by 2022-23.

Current Situation

As highlighted in the Economic Survey 2018, a number of indicators that reflect the position of women in Indian society have moved in the right direction. Out of 17 indicators pertaining to women's agency, attitudes and outcomes, 14 have improved over time. On seven of them, the improvement is at least on par with countries at similar levels of development as India.

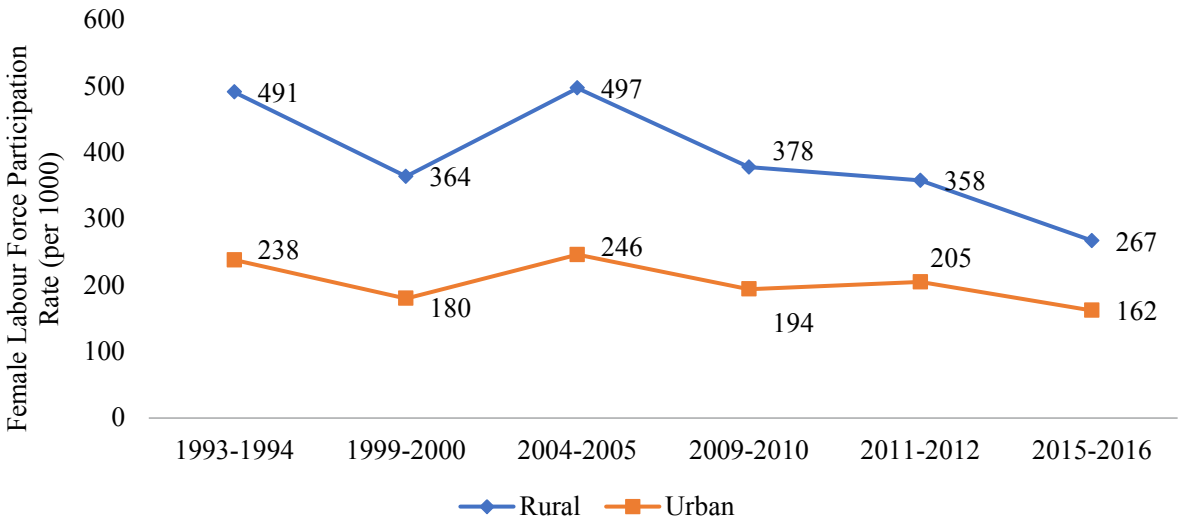
However, a declining female labour force participation rate (LFPR) despite increasing levels of education and declining fertility rates has emerged as a worrying trend. The current female LFPR is 23.7 per cent (26.7 per cent in rural areas and 16.2 per cent in urban areas).[1] The declining trend is particularly strong in rural areas, where it has gone down from 49.7 per cent in 2004-05 to 26.7 per cent in 2015-16[2].

Figure 32.1: Progress with respect to gender-related indicators



Source: National Family Health Survey Rounds 3 and 4

Figure 32.2: Female labour force participation



Source: Economic Survey

At the all India level, women are confined mainly to the large, informal sector. It is estimated that if women did as much formal work as men, India would experience an additional 1.4 per cent GDP growth.[3] On average, 66 per cent of women's work in India is unpaid, compared to 12 per cent of men's.

The government has taken some important initiatives to promote gender equality and welfare. These include the *Beti Bachao, Beti Padhao campaign, the Maternity Benefit (Amendment) Act, 2017, Pradhan Mantri Matru Vandana Yojana, POSHAN Abhiyaan and the Pradhan Mantri Ujjwala Yojana.*

Constraints

- Constraints of workplace distance, inflexibility in working hours, lack of availability of crèches, safety etc., deter women from participating in economic activities.
- The absence of opportunities for part-time work and challenges surrounding re-entry into the workforce further worsen the situation.
- Women's work comprises mostly of invisible/ unpaid work.

Way Forward

1. **Ensure gender-sensitive thinking for legislation and policies keeping in view the challenges faced by women including**

- different life stages (single women, married women, young mothers and women re-entering the workforce after a break).
- levels of education (illiterate, school educated, vocationally trained, college graduates, professionals).
- geographic inequities (rural, urban, towns, peri-urban areas, remote locations) and marginalization (SC/ST, OBCs etc.).
- special need groups such as single mothers, widows, homeless women and women with disabilities, among others.

2. **Strengthen legal frameworks to eliminate discrimination against women and promote gender equity**

- Craft legislations for women engaged in the unorganized sector to ensure at least a minimum set of gender-sensitive provisions such as access to privacy, minimum wages, maternity benefits, leave and grievance redressal.
- Ensure mechanisms for implementation of mandatory laws like the Maternity Benefit Act and The Sexual Harassment of Women at Work Place (Prevention, Prohibition and Redressal) Act, including for workers in the informal sector.
- Create liberal laws/guidelines that encourage women to re-enter the workforce after a break.
- Develop and implement Equal Opportunity Policies:
    - Establish a set of norms (for job advertisements and selection guidelines, availability of crèche at workplace, grievance redressal, flexi hours, part-time work, maternity benefits etc.) for both the government and private sectors.
    - Persuade the private sector, autonomous organizations and others to voluntarily inscribe a statement in job advertisements to the effect: *'We are an equal opportunity organization and are fully committed to women's inclusion in our workforce'*, pending a formal policy. This can be accomplished in partnership with organisations like the Confederation of Indian Industry that have developed equal opportunity guidelines.
- Reward villages/districts with an equal child sex ratio through information, education, and communication (IEC) campaigns.

3. **Generate gender-disaggregated data and rank states on key indicators**

- Establish a dedicated unit within the Ministry of Women and Child Development.
    - The unit should focus on data gathering, conducting regular reviews with other ministries on explicitly defined gender targets (e.g. under the *POSHAN Abhiyaan*, reduce anaemia rates among adolescent girls and women in the 15-49 years age group by at least one-third by 2022-23), ensuring optimum budgetary resources for women's welfare and evaluating the effectiveness of gender-based budgeting.
    - In setting up this unit, lessons could be leveraged from similar institutional arrangements in countries like Rwanda (Gender Monitoring Office) and Finland (Gender Equality Unit). State government should establish similar units at the state level.
- Improve data systems to generate gender-disaggregated data through the use of technology, geo locating information and generating maps in real time.
- Rank states on a set of reliable and comparable indicators that reflect changes in the status of women at the national and sub-national levels over time.

4. **Encourage women's participation in industry and enterprise**

- Develop sector/industry specific targets for women's employment and incentivize their implementation by firms.
- Create policies and guidelines, on priority, to enhance access to credit by women entrepreneurs; provide facilitated credit access

Figure 32.3: Examples of indicators that could be used for developing the gender-based index and ranking states

pathways for single women, women's self-help groups/guilds/co-operatives, handicapped women, and SC/ST women.

- Consider incentivizing sectors/companies that have over 30 per cent women workers by providing tax benefits.

5. Improve asset ownership and economic security

- Prioritize groups of women farmers seeking to lease land, water bodies, etc., at the village *panchayat* level.
- Encourage joint registration with spouses/ sole registration of land in the name of the woman through registration fee and stamp duty concessions through special drives/awareness campaigns.
- Recognize and secure women's rights over common property resources like irrigation systems, fishing grounds, forests and water.

6. Create enabling conditions for women engaged in agriculture

- Ensure 50 per cent membership of women farmers in Farmer Producer Organizations (FPOs).
- Consider creating a separate budget to bear the registration/processing fee for the registration of women FPOs.
- Specially focus on skill development among women, particularly for activities such as soil conservation, social forestry, dairy development, horticulture, organic farming, and livestock rearing (including animal husbandry, poultry, fisheries).
- Target agricultural extension services to women farmers as well, not just males.

7. Enhance women's skills and leveraging ability

- Consider extending the Post Graduate Indira Gandhi Scholarship for Single Girl Child scheme to families with two girl children.
- Provide relatively higher financial incentives for girls' education until Class XII to curb the higher dropout rate among girls and raise the average age at marriage by keeping girls in schools.
- Promote skill development among women in non-traditional work such as electronic technicians, electricians, plumbers, taxi drivers etc.

- Organize women into professional groups/ guilds to improve their bargaining power.
- Use platforms like Digital India (i) to create apps for the guilds (ii) for marketing and branding purposes and (iii) to establish linkages with corporates, markets and consumers.

8. Ensure mobility, security and safety for all women

- Provide affordable housing, residential hostels and gender friendly facilities in upcoming towns and big cities.
- Improve rural connectivity and public transport systems.
- Ensure gender-sensitive, rights-based and time-bound trials as well as disposal of cases pertaining to violence against women.
- Strengthen the standard operating protocols for tackling crimes against women, including new forms of violence such as cybercrimes.
- Introduce training (including refresher training) on women-specific issues and laws for all ranks and categories of police personnel, health practitioners, protection officers, legal service authorities, judicial authorities as well as other stakeholders who interact with survivors of violence, especially in remote areas.

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1 http://labourbureaunew.gov.in/UserContent/EUS_5th_1.pdf. Accessed April 15, 2018.

2 NSSO Survey, Various Rounds.

3 McKinsey, 2015.

33. Senior Citizens, Persons with Disability and Transgender Persons

SENIOR CITIZENS

Objective

- To ensure a life of dignity, social security and safety for senior citizens, enabling them to actively participate in economic development and the nation building process.

Current Situation

As per Census 2011,[1] India had 10.38 crore senior citizens (60 years and above). Of this, 3.8 crore were above the age of 80 years. The share of the elderly in the population increased from 5.6 per cent in 1961 to 8.6 per cent in 2011. It is expected to increase to 20 per cent of the population by 2050.

Senior citizens face several challenges. They are prone to chronic illness. However, access to institutional support and specialized medical care is skewed, with most of these concentrated in urban areas and out of reach for the large number of the elderly who live in rural areas.

The government has taken steps to provide various tax benefits to senior citizens including raising the basic exemption limit from INR 2.5 lakh to INR. 3 lakh, increasing the deduction for health insurance from INR 15,000 to INR 50,000 as well as raising the deduction for bank interest from INR 10,000 to INR 50,000. The *Pradhan Mantri Vaya Vandana Yojana* has also been launched to provide a maximum pension of INR 10,000 per month with an investment of INR 15 lakh.

Constraints

- Poverty and lack of income security makes it difficult to meet even basic needs like food, housing, healthcare, etc., for a large number of senior citizens.
- There has been a rapid emergence of nuclear families and ageing parents living away from their children.
- There is a shortage of well-trained personnel for delivering care giving and other services for senior citizens.

Way Forward

- Given the changing demographics and socio-economic needs, revise the National Policy for Older Persons. The policy should cover housing, income security, pension, and access to healthcare. It should also emphasize the concept of 'ageing in place' or 'ageing in own home'.
- Bring schemes pertaining to senior citizens under the restructured Department of Empowerment of Persons with Disabilities and Senior Citizens. An integrated implementation and monitoring plan should be developed in consultation with stakeholders and the plan

should be reviewed periodically by an inter-ministerial committee headed by the Secretary.

- Bring the necessary amendments to the Maintenance and Welfare of Parents and Older Persons Act, 2007, currently under consideration by the Ministry of Social Justice and Empowerment (MoSJE).
- Consider establishing an old age home in every district by 2020 and ensure adherence to minimum quality standards.
- Expand the National Programme for Health Care of the Elderly to all districts following a comprehensive evaluation of the scheme.[2]
- Prioritize supply of aids and assistive devices for senior citizens below the poverty line.
- Ensure a barrier-free environment in all public buildings, parks, etc., for the elderly.
- Strengthen the National Institute of Social Defence and Regional Resource Training Centres to meet the rising demand for quality caregivers.

PERSONS WITH DISABILITIES

Objective

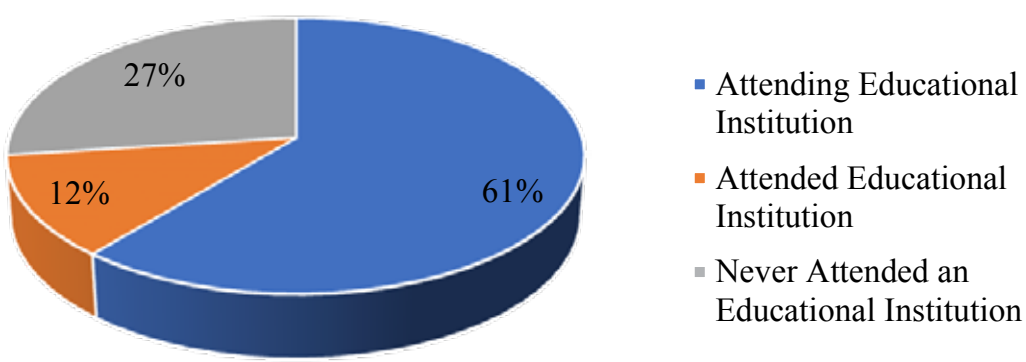
- To create opportunities for and empower persons with disabilities (PwDs) to realize their potential and live a productive and dignified life.

Current Situation

According to Census 2011, India had 2.68 crore PwDs constituting approximately 2.21 per cent of the total population. India enacted the first legislation for PwDs in 1995, which has been replaced by the Rights of Persons with Disabilities Act, 2016. The Act is harmonized with the United Nations Convention on the Rights of Persons with Disabilities, 2006, and lists 21 categories of disabilities. India also formulated its first National Policy for PwDs in 2006.

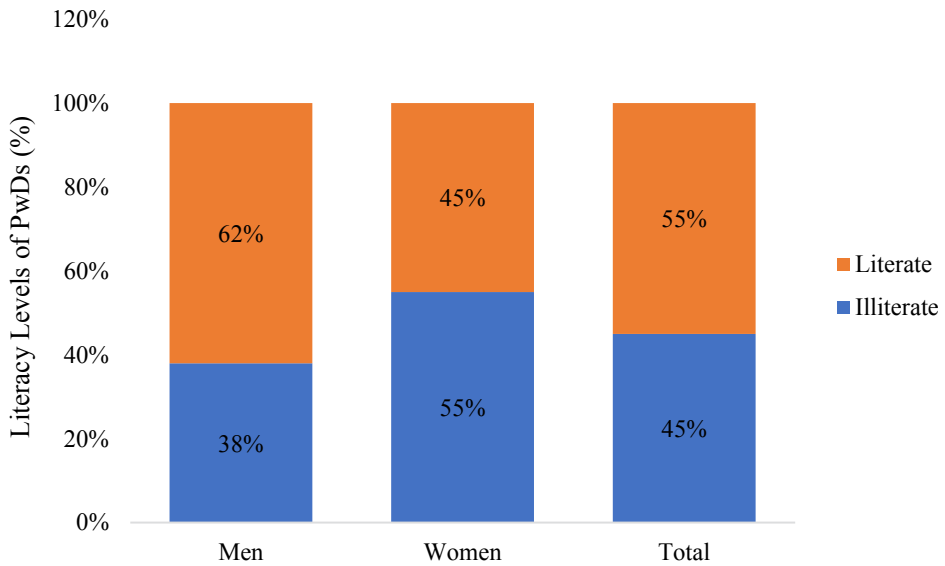
PwDs face several challenges.[3] According to the Census 2011, 27 per cent of disabled children between the ages of 5-19 had never attended an educational institution. Only 50 per cent of the

Figure 33.1: School attendance of children with disabilities between 5-19 years



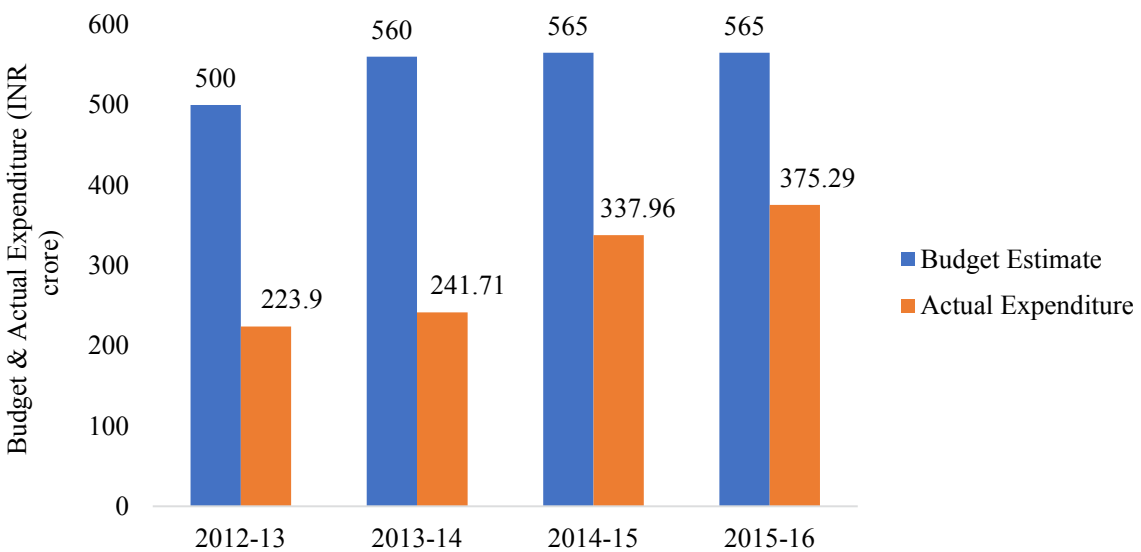
Source: Census 2011

Figure 33.2: Literacy status of PwDs



Source: Census 2011

Figure 33.3: Allocation and expenditure pertaining to the Department of Empowerment of Persons with Disabilities



Source: Government of India budget documents

disabled population in the 15-59 years category was working.

They also tend to be stigmatized and discriminated against and lag behind others with respect to access to basic infrastructure and opportunities for economic participation.

The Department of Empowerment of Persons with Disabilities (DEPwDs) has the overall responsibility for implementing several schemes; however, utilization of funds has been a challenge.

Constraints

- Accurate identification of the disabled population in India has been a major problem. People tend to hide their disability to avoid facing social stigma.
- Beyond Census statistics, there is a lack of appropriately disaggregated data for PwDs generated at regular intervals.[4] In India, the last survey on disability was carried out by the National Sample Survey Organisation in 2002.
- Disability related issues require multi-sectoral action, which has been difficult to achieve in practice.
- The National Institutes (NIs), Composite Regional Centres (CRCs), District Disability Rehabilitation Centres (DDRCs) and the Rehabilitation Council of India (RCI) need special attention to ensure adequacy of resources and infrastructure as well as effective monitoring of schemes.

Way Forward

1. Generate data on PwDs

- Disaggregate data by sex, age and socio-economic status in order to identify reliable and regular trends for informed policymaking.
- Feed data collected into an electronic database for PwDs at the national level and link with the Unique Disability Identity Card.

2. Bolster the institutional architecture and policy framework

- Reorient the DEPwD to focus on data collection, identifying gaps and evaluating the impact of various schemes, instead of focusing on the implementation of a large number of schemes with small budget allocations.
- Bring programmes focused on improving specific issues related to PwDs under the purview of the relevant line ministries.
- Earmark at least 5 per cent of the total budget of social sector ministries for schemes for PwDs.

3. Education

- Include courses in disability etiquette and success stories on PwDs in the mainstream curriculum to change attitudes towards PwDs.
- Provide special education training in teacher training courses.
- Enhance scholarships/fellowships to students with disabilities.
- Make schools more inclusive by addressing the barriers related to the physical environment (e.g. accessible toilets), admission procedures as well as curriculum design.
- Ensure that schools have at least one section of every class accessible under the Universal Design Guidelines.
- Foster partnerships between the Ministry of Human Resource Development and MoSJE to promote synergies among inclusive and special schools in the government and private sectors.
- Develop indicators for rating schools on inclusivity.

- Include disabled friendly sports, cultural and technical programmes in schools and colleges.

4. Healthcare

- Provide aids and assistive devices to at least 3 lakh beneficiaries every year.
- Conduct cochlear implant and corrective surgeries for 5000 children annually.
- Establish 20 state spinal injury centres.
- Set up early diagnostic and intervention centres at the district level to screen children and identify special needs or requirements for assistive devices at an early age.

5. Employment and income generation

- Integrate the skill development scheme with schemes of the National Trust (e.g., Disha), to address the needs of the intellectually disabled.
- Establish dedicated training centres for PwDs to meet the requirements of the private sector.
- Integrate initiatives of various ministries to provide skill training, soft loans and entrepreneurship opportunities to PwDs.

6. Institutional strengthening

- Upgrade NIs into centres of excellence.
- Establish 50 CRCs in states having a population of more than 6 crore.
- Provide comprehensive rehabilitation services to 50 lakh PwDs through the NIs and CRCs.
- Enrol 17,000 rehabilitation personnel in various long-term courses offered by NIs and CRCs every year.

7. Accessibility and inclusivity

- Make the Accessible India Campaign a mass movement with the involvement of citizens and civil society.
- Conduct awareness programmes in collaborations with DDRCs, CRCs and Vocational Rehabilitation Centres (VRCs).
- Incorporate universal design and accessibility standards in engineering, architecture and computer science studies.
- Introduce the requirement of an accessibility certificate for all future commercial enterprises above a specified size in order to be awarded a completion certificate.
- Extend the DDRC schemes to all districts.
- Construct residential homes for disabled adults whose parents are no longer alive.
- Adopt a life-cycle approach for community-based rehabilitation in mission mode.

TRANSGENDER PERSONS

Objective

- To ensure a life of dignity, social security and safety for transgender persons, enabling them to actively participate in economic development and the nation building process.

Current Situation

As per Census 2011, India had 4.87 lakh transgender persons. The transgender community is among one of the most marginalized communities in the country. Extreme social exclusion diminishes their self-esteem and is a violation of their human rights. An Expert Committee constituted under the direction of the Honourable Supreme Court recommended several measures to ameliorate their problems. Following that, the "Scheme for Transgender Persons" was launched.

Constraints

- Parliament is yet to pass the Rights of Transgender Persons Bill, 2016.
- Accurate identification of transgender persons is a major challenge.
- The implementation of the "Scheme for Transgender Persons" is suboptimal.

Way Forward

- Provide for identification of transgender persons in all government and non-government records by introducing a separate column to include the third gender.
- Sensitize communities towards the challenges and needs of transgender persons.
- Create a forum for the active participation of transgender persons at all levels of governance.
- Put in place institutional mechanisms to effectively implement programmes for transgender persons.
- Determine the number of transgender persons and map their socio-economic status to design customized policy interventions. This enumeration and mapping can be carried out by the MoSJE along with the Ministry of Statistics and Programme Implementation.
- Mandate the provision of housing and community services to accommodate at least 50 per cent of transgender persons.
- Formulate and implement a scheme for establishing residential schools in all districts for transgender persons.
- Design a scheme for providing skill and employability training to transgender persons to integrate them with mainstream society.
- Launch a centrally sponsored scheme to provide pension to transgender persons above 60 years.
- Ensure *Aadhaar* and Direct Benefit Transfer based implementation and monitoring of social security programmes.
- Consider creating a fund at the national level for supporting states that have mapped out the needs of and designed the necessary policy interventions for various vulnerable sections of society including persons with disabilities, senior citizens and transgender persons in line with the relevant legislations.

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1 Elderly in India, 2016, Ministry of Statistics and Programme Implementation, Government of India.

2 As of 2017, the programme was being implemented in 281 districts across 27 states and 6 union territories.

3 Disabled Persons in India, A Statistical Profile 2016, Ministry of Statistics and Programme Implementation, Government of India.

4 Disabled Persons in India, A Statistical Profile 2016, Ministry of Statistics and Programme Implementation, Government of India.

34. Scheduled Castes (SCs), Scheduled Tribes (STs), Other Backward Classes (OBCs), Other Tribal Groups and Minorities

SCs, STs, OBCs, De-Notified Tribes (DNTs), Nomadic Tribes (NTs) and Semi-Nomadic Tribes (SNTs)

Objective

- To accelerate the socio-economic development of SCs, STs, OBCs, *safai karamcharis* as well as DNTs, NTs and SNTs through focused affirmative action so as to bring them on par with the rest of the population as far as key human development indicators are concerned.

Current Situation

High incidence of poverty and low educational attainment are the two major challenges faced by weaker sections in India. Other challenges include high levels of malnutrition and limited opportunities for meaningful economic engagement.

Among the weaker sections, *safari karmacharis* constitute one of the most deprived groups. Other groups that require special attention include the Particularly Vulnerable Tribal Groups (PVTGs) among the STs as well as performing artists and those engaged in begging among the DNTs, NTs and SNTs.

Research[1] on SCs and STs suggests that historical inequities among the different segments of India's workforce have diminished over the last three decades. The gaps have narrowed most markedly for the youngest cohorts in the workforce, especially in the domain of education. However, there is still a long way to go before the inequities are bridged completely.

Table 34.1: Incidence of poverty across social groups

Social Group (%)	Rural			Urban		
	2004-05	2009-10	2011-12	2004-05	2009-10	2011-12
SCs	53.53	42.26	31.5	40.56	34.11	21.70
STs	62.28	47.37	45.3	35.52	30.38	24.10
OBCs	39.80	31.9	22.60	30.60	24.30	15.40
Others	41.79	33.8	15.5	25.68	20.09	8.10

Source: Planning Commission

Table 34.2: Literacy rate among social groups[2]

Social Group (%)	1981	1991	2001	2011
SCs	21.38	37.41	54.69	66.07
STs	21.38	37.41	54.69	66.07
Others	43.57	52.21	64.84	72.99

Source: Census data

Constraints

- Problems of isolation, exclusion and occupational subjugation are major obstacles to mainstreaming these social groups in the socio-economic development of the country.
- Governance including lack of inter-ministerial convergence and suboptimal targeting of beneficiaries is another major issue.
- Resources are distributed thinly among a large number of schemes, especially under the scheduled caste sub-plan (SCSP) and tribal sub-plan (TSP), instead of among a few targeted schemes.
- There is limited awareness about the schemes resulting in leakages and denial of benefits.
- Mainstreaming these groups has also been hampered by the inability to incorporate specific cultural and social requirements of SC/ST groups while designing interventions.

Way Forward

1. **Institutional and programmatic strengthening**
    - Undertake a baseline survey and target remote and tribal habitations for implementation of various development programmes.
    - Design schemes that are tailored to and narrowly focus on the challenges and needs of specific communities.
    - Institutionalize social audits for assessing the impact of these schemes on the basis of quantifiable benefits to targeted households.
    - Establish the National Institute for Tribal Research.
    - Earmark funds under all developmental programmes for DNTs, SNTs and NTs.
    - Put in place mechanisms to regularly monitor the implementation of legislations like the *Panchayat* (Extension to Scheduled Areas) Act and Forest Rights Act (FRA), 2006.
    - Set up a permanent commission for NTs, DNTs and SNTs along the lines of the National Commission for SCs and STs.
2. **Education**
    - Establish residential schools in uncovered blocks/districts with facilities for vocational training.
    - Define and ensure adherence to quality parameters for existing and new residential schools.
    - Increase the number of scholarships provided under the pre-matric, post-matric,

National Fellowship and National Overseas Scholarship schemes for SCs, STs and OBCs.

3. **Economic empowerment**
    - Expand the Stand-Up India scheme to include uncovered social groups like OBCs, DNTs, NTs and SNTs.
    - Extend venture capital funds and credit guarantee schemes for covering STs, OBCs, DNTs, NTs and SNTs.
    - Cover a larger number of beneficiaries under various finance and development schemes with an annual increase of 10 per cent every year.
    - Provide concessional loans for promoting entrepreneurship among OBCs by doubling the number of beneficiaries covered under the National Backward Classes Finance & Development Corporation by 2022-23.
    - Encourage indigenous tribal medicine alongside other systems to create additional livelihood opportunities.
    - Establish contact points with potential employers along with pre-job training sessions for youth.
4. **Miscellaneous**
    - Ensure universal coverage of DNT, SNT and NT populations for BPL and *Aadhaar* cards.
    - Prepare a Vulnerability Index and Vulnerability Intervention Index for PVTGs based on the methodology suggested by the National Institute of Rural Development and *Panchayati Raj*, Hyderabad. These indices will be useful for assessing the socio-economic disparities between PVTGs and other social groups and designing policy interventions accordingly.
    - Extend habitat rights to PVTGs within the FRA framework, as has been done for the Baiga Tribe of Dindori District, Madhya Pradesh.
    - Provide project-based funding under special central assistance (SCA) to SCSP and to TSP, especially in *gram panchayats*/blocks where the population of SCs/STs is more than 25 per cent.
    - Prioritize vulnerable groups like tribal children under the National Nutrition Mission through tag-tracking and additional home visits for underweight children conducted by frontline workers.
    - Empower marginalized communities by promoting community-owned radio stations.
    - Promote habitations along the lines of Samasthapuram in Tamil Nadu where people belonging to all communities live together.

MINORITIES

Objective

- To bridge the gap between minority communities and the rest of the population with respect to various socio-economic and human development indicators through affirmative action.

Current Situation

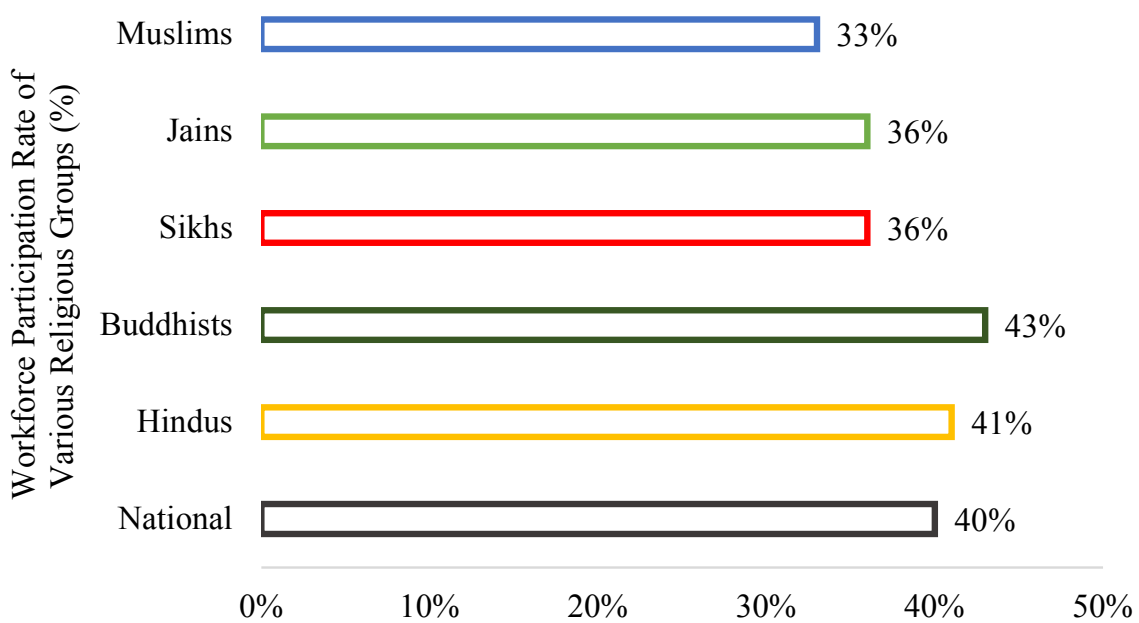
As per Census 2011, of the total population of 121 crore, Hindus constitute 79.8 per cent, Muslims 14.2 per cent, Christians 2.3 per cent, Sikhs 1.7 per cent, Buddhists 0.7 per cent and Jains 0.4 per cent. While improvements have been made on several fronts, religious minorities lag behind on certain indicators pertaining to educational attainment, gender equality and workforce participation.

Table 34.3: Literacy rate among minority communities

Community (%)	Census 2011			Census 2001		
	Males	Females	Total	Males	Females	Total
National	80.87	64.63	72.98	75.3	53.7	64.8
Hindus	81.69	64.34	73.27	76.2	53.2	65.1
Muslims	74.73	62.03	68.53	67.6	50.1	59.1
Christians	87.69	81.40	84.53	84.4	76.2	80.3
Sikhs	80.02	70.30	75.39	75.2	63.1	69.4
Buddhist	88.31	74.04	81.28	83.1	61.7	72.7
Jains	96.78	92.91	94.88	-	-	-

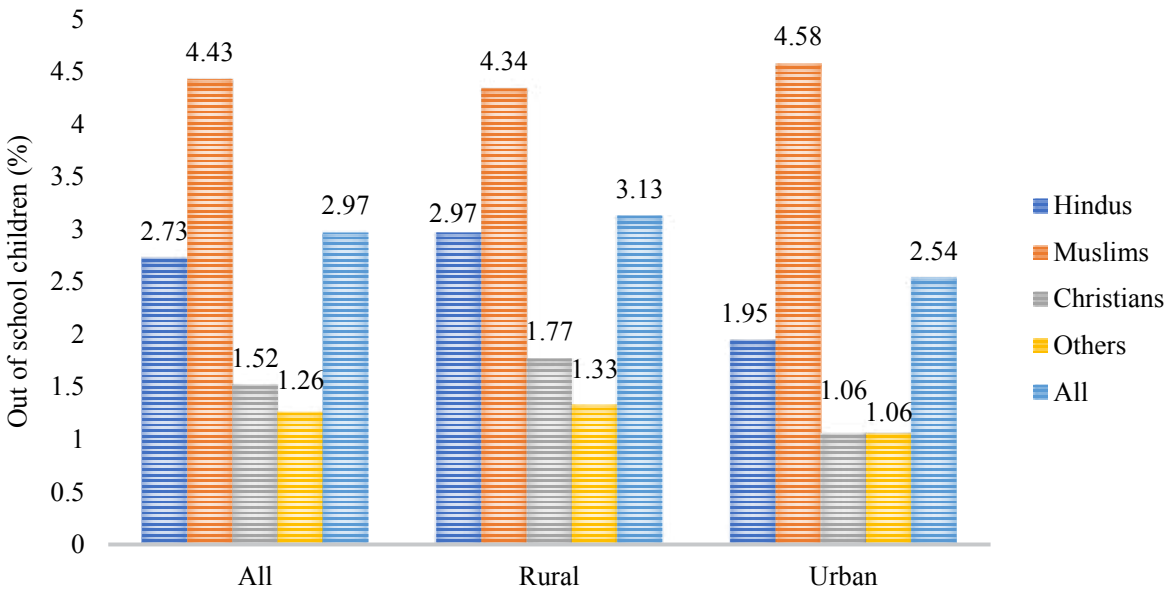
Source: Census 2001 and Census 2011

Figure 34.1: Workforce participation rate



Source: Census 2011

Figure 34.2: Out of school children by religious group



Source: Sarva Siksha Abhiyan [3]

Disaggregated data from a survey[4] highlighted that the highest proportion of out of schoolchildren in the country belong to Muslim communities (4.43 per cent), followed by Hindus (2.73 per cent), Christians (1.52 per cent) and others (1.26 per cent).

Data from the 68th Round of the National Sample Survey revealed that the proportion of households in urban India with casual labour and self-employment as the dominant income source was the highest among Muslims at 15 per cent and 50 per cent respectively. The Workforce Participation Rate among Muslims, Sikhs and Jains was lower than the national average according to Census 2011.

Constraints

- Data on development indicators for minorities is not generated at regular intervals.
- Some minority communities are also included under SCs, STs and OBCs, which could result in the duplication of schemes for the same set of beneficiaries.
- Awareness levels and demand for programmes being implemented for the benefit of minorities are limited.

Way Forward

1. Institutional restructuring

- Vest the primary responsibility for a number of schemes currently being implemented by

the Ministry of Minority Affairs (MoMA) with the relevant line ministries. MoMA should be involved with the finalization of physical and financial targets by the line ministries.

- Increase the emphasis of the MoMA on data collection and analysis, identifying gap areas, online monitoring of the PM's 15-Point Programme, evaluating the impact of various schemes and popularizing schemes in local languages using social media.

2. *Education*

- Enhance pre-matric scholarships, post-matric scholarships, merit-cum-means scholarships, *Maulana Azad* National Fellowships and National Overseas Scholarships with a 15 per cent increase annually from 2019-20.
- Increase the number of scholarships for girls from minority communities by 10 per cent every year.
- Ensure that girls who pass out from *Kasturba Gandhi Balika Vidyalayas* can continue their education after completing Class 8.
- Provide access to public transport in the form of buses and cycles or vouchers for meeting private transport costs to raise enrolment rates among girls from vulnerable communities.
- Train at least 100,000 minority women under the *Nai Roshni* scheme every year.

3. *Economic empowerment*

- Identify the poorest among the minority communities through the Socio-Economic Caste Census data for proper targeting of various schemes.
- By 2022-23, provide integrated education and livelihood programmes to 100,000 beneficiaries under the *Nai Manzil* programme.
- Train at least 350,000 beneficiaries during the 5-year period under *Seekho Aur Kamao*.
- Achieve a 15 per cent increase per annum in loans to vulnerable sections through the use of alternative channels like regional rural banks.
- Put out job advertisements in Urdu and local language newspapers as well as through other locally appropriate channels.

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1 http://www.ncaer.org/uploads/photo-gallery/files/1405592467IPF%202014%20Bhattacharjee-Hnatkoyska-lahiri%20Conference.pdf. Accessed April 29, 2018.

2 Other Backward Classes (OBCs) made its way into the lexicon of India's social justice movement in the year 1990. Hence, comparable Census data is not available for OBCs for all the Census years.

3 http://ssa.nic.in/pabminutes-documents/NS.pdf. Accessed April 24, 2018.

4 http://ssa.nic.in/pabminutes-documents/NS.pdf. Accessed April 24, 2018.

GOVERNANCE

35. Balanced Regional Development: Transforming Aspirational Districts

Objective

- Achieve balanced development in India by uplifting 115 districts, currently below the national average in the areas of health and nutrition, education, agriculture and water resources, financial inclusion and skill development, and basic infrastructure.

Current Situation

The Aspirational Districts Programme (ADP) was launched on January 5, 2018, by the Honourable Prime Minister. Under phase-1 of ADP, 115 districts were identified based on the level of human development, physical infrastructure, threat of left wing extremism (LWE) and the views of state governments. Over 15 per cent of India's population lives in these districts.

A list of 49 target indicators has been developed by NITI Aayog. These will be regularly monitored for promoting improvements in health and nutrition, education, agriculture and water resources, financial inclusion and skill development, and basic infrastructure.

In April 2018, NITI Aayog issued a ranking of these districts according to baseline data collated from secondary sources on these selected indicators. According to this, the top five districts are Vizianagaram (Andhra Pradesh), Rajnandgaon (Chhattisgarh), Osmanabad (Maharashtra), Cuddapah (Andhra Pradesh), and Ramanathapuram (Tamil Nadu) with a score ranging from 46.78 per cent to 48.13 per cent.

The bottom five districts are Shrawasti (Uttar Pradesh), Kiphire (Nagaland), Singrauli (Madhya Pradesh), Asifabad (Telangana) and Mewat (Haryana) with a score ranging from 26.02 per cent to 28.13 per cent.

Despite economic progress in the country, if these places have remained underdeveloped, it is because they suffer from a host of contributing factors. Relatively poorer endowment of physical resources, lack of infrastructure, poor social capital, low standards of health, nutrition, education and skill, poor governance and above all, inhabitants demotivated due to years of poverty and deprivation can be cited as major contributory factors.

Constraints

The constraints impeding the development of these districts are institutional; aggregating assistance from different sources and applying the principle of convergence indicates that paucity of funds is unlikely to be a major issue.

- Governance challenges:
  - Governance inadequacy hampers the effective implementation of government schemes.
  - The institutional framework has been fragmented because of the multiplicity of implementing agencies and schemes.
  - There is no accountability on the part of either the government or district administrations.
- Non-availability of periodical data makes it difficult to track progress and implement evidence-based policymaking.
- There is lack of social awareness and community participation in development programmes.
- There is lack of competitiveness among districts to improve developmental performance.

Way Forward

The ADP aims to address governance issues by using a combination of approaches: lifting levels of aspirations through a vision and district plan, adequate institutional arrangements, convergence in all stakeholders' efforts and above all, ranking-based public competition among the districts by setting up a real-time monitoring mechanism.

1. **Create a positive narrative of development by making development a mass movement**

   Referring to these districts as 'aspirational' rather than 'backward' highlights the programme's recognition that people are the most valuable resource to improve a district's performance. Changes in people's mind-sets and attitudes are critical to achieve progress.

   As a strategy, district officials will draw up a vision and action plan for their districts spanning the period 2018-19 to 2022-23. Officials will engage the public in formulating these plans. Each action plan should be based on a SWOT analysis. To facilitate the preparation of such plans, NITI Aayog has already shared a broad common framework with all district administrations.

   Setting off a virtuous cycle of growth in aspirational districts requires that people from all walks of life – especially those who have a track record of effecting change despite existing challenges – come together. The scheme's design encourages states and district administrations to give a lead role to such champions of change to turn this initiative into a mass movement.

2. **Use data to inform decision-making and spur competition among districts**

   Composite Index and Data: Across the selected dimensions, NITI Aayog has identified 49 key performance indicators (KPIs) with 81 data points. Extensive consultation with central ministries and knowledge partners informed the selection of these KPIs. An online dashboard allows for the tracking and display of district-level data on a real-time basis.

   A key policy question is how to prioritize among different indicators across sectors. The ADP assigns different weights to the indicators, informed by a policy focus on social sectors. Health and nutrition, and education have been given the highest weightage and cumulatively, they account for 21 of the 49 indicators. Table 35.1 indicates the weights assigned to each of the core dimensions.

Table 35.1: Core dimensions of ADP and their weightage

Dimension	Weightage	Number of Indicators
Health and Nutrition	30%	13
Education	30%	8
Agriculture and Water Resources	20%	10
Financial Inclusion and Skill Development	10%	11
Basic Infrastructure	10%	07

Source: NITI Aayog

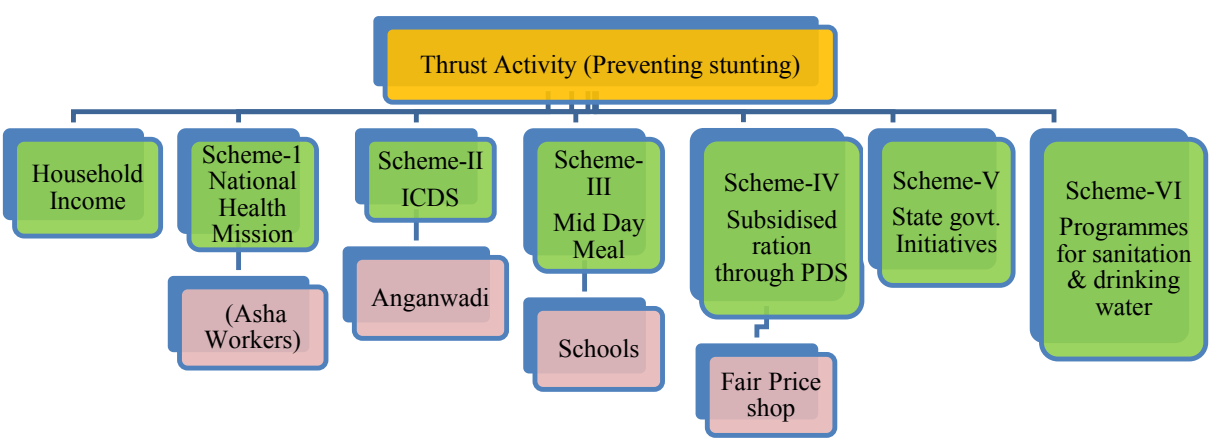
Rankings: Ranking districts based on performance relative to their baseline highlights the progress made by a district. Making these rankings and the underlying data available in the public domain will help boost competition between districts.

3. **Converge initiatives across all levels of government**

The ADP aims to ensure convergence between different government schemes while also seeking complementarity between public initiatives and private efforts of households (for example, choosing to attend a course on skill development). To achieve this, the action plan prepared by the district collectors of aspirational districts will identify the thrust activity, map existing schemes and their respective implementation agencies and set targets for rapid improvement.

Figure 35.1 highlights that for every thrust

Figure 35.1: Illustration of how the ADP converges stakeholders' efforts in the prevention of stunting



Source: Adapted from Aruna Sharma: Mainstreaming of Resource Convergence in Policymaking, Programme Design and Execution. (December 2013)

activity identified, such as the prevention of stunting, there would be many schemes addressing the issue, which in turn would have different implementing agencies. The ADP will bring together these efforts.

4. **Promote federalism and put in place institutional mechanisms to ensure teamwork between the central, state and district administration**

   Harnessing and creating synergies among the efforts of different stakeholders is the backbone of the ADP. While states are the main drivers and district magistrates/collectors are the fulcrum of the programme, a major innovation here is the emphasis on team formation. Senior Government of India officials of the rank of Joint Secretary/Additional Secretary have been appointed as 'guardians' ('*prabharis*') for a district. Their role is to act as a bridge between the central and state governments.

   Set up Empowered Committees of Secretaries of Government of India to supervise and troubleshoot. At the centre, committees have been constituted including the Secretaries of key ministries/departments that are implementing schemes in the social sector. Their mandate is to fine-tune existing programmes and improve their impact.

5. **Partner with expert organizations with demonstrated technical competence**

   While data-based objective ranking and competition among districts are major elements of the ADP's strategy, another core component is bringing in technical expertise through public private partnerships. The approach here is to involve all, including philanthropies, the private sector under the Corporate Social Responsibility (CSR) framework and civil societies, in implementing the ADP.

36. The North-East Region

Objectives

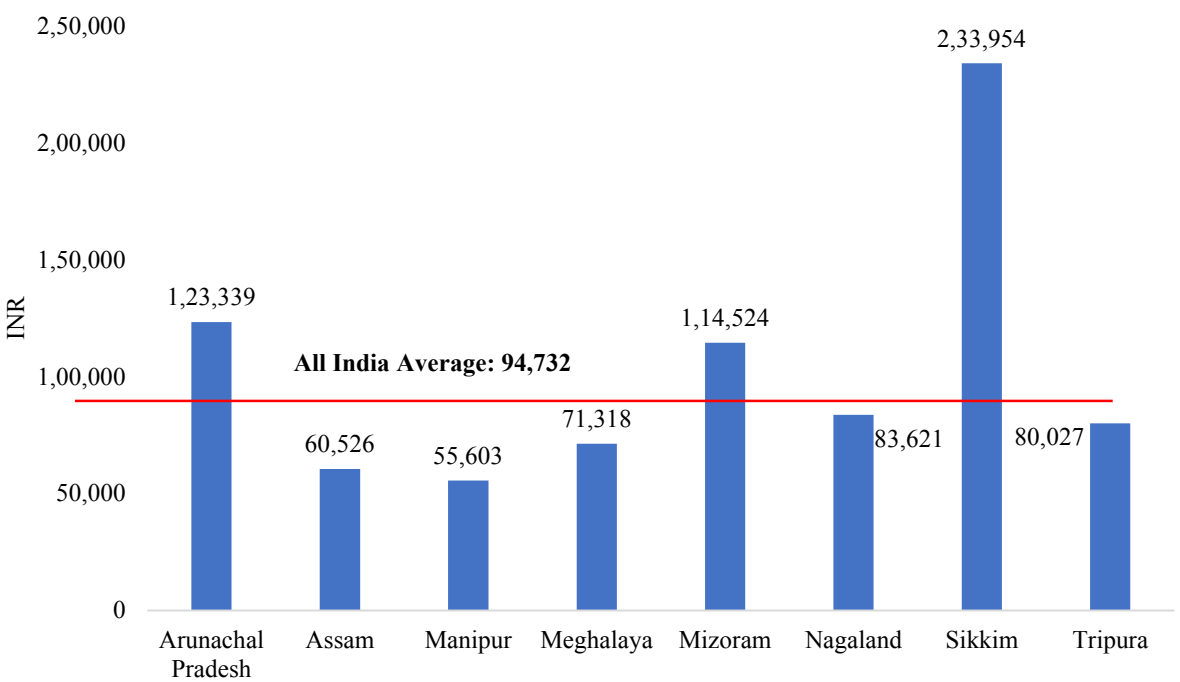
The North-East Region (NER) should:

- Have adequate road, rail and air connectivity, waterways, internet connectivity and financial inclusion. This will form the platform upon which suitable interventions for all sectors where the NER has a comparative advantage (for e.g., tourism, hydropower generation, handicrafts, organic agriculture, etc.) can be effectively implemented.
- By 2022-23, the region should also be developed for enhanced trade, particularly for the export of products made in the NER, to the Association of Southeast Asian Nations (ASEAN) region and other neighbouring countries (Bangladesh, Bhutan and Nepal).

Current Situation

The NER consists of eight states, namely Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura. The region accounts for 3.78 per cent of India's population and covers 7.98 per cent of its total geographical area. Its contribution to national GDP is 2.5 per cent.[1] Figure 36.1 illustrates the per capita net state domestic

Figure 36.1: Per capita NSDP for north-east states, 2015-16



Source: MoSPI

product (NSDP) for the year 2015-16 (base year 2011-12) for the North-Eastern states.

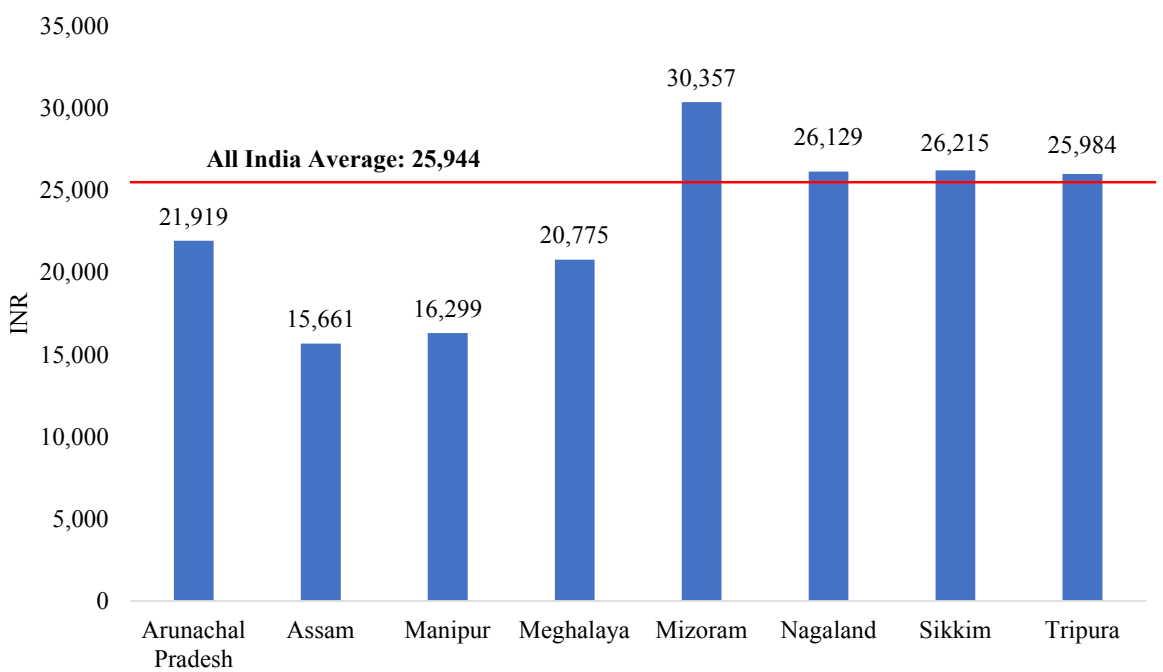
The figure clearly illustrates the disparity in development within the region. While five out of the eight states have a per capita income below the national average, Sikkim enjoys a per capita income level that is 2.5 times the national average.

A comparison of the per capita incomes in these states in 2015-16 and 2004-05 (given in Figure 36.2) indicates that the ranking within the NER has also changed over the years.

Arunachal Pradesh and Sikkim have shown the most significant improvement in per capita incomes. Per capita income in Arunachal Pradesh, which was below the national average in 2004-05, rose to 1.3 times the national average in 2015-16. Sikkim's per capita income, which was on par with the national average, increased to 2.5 times the national average in 2015-16. States like Nagaland and Tripura, which were on par with the national average in 2004-05, have fallen behind. The heterogeneity among the NE states is noteworthy and calls for a state specific development approach.

The North-East states have performed well in different aspects of human development. For e.g. according to the Sikkim Human Development Report 2014,[3] Sikkim increased its social sector spending from 23 per cent of total expenditure in 2001 to 37 per cent in 2012-13. The female labour force participation rate in Sikkim is 40 per cent compared to the national average of 26 per cent. Furthermore, according to the National Family Health Survey - 4,[4] all states in the NER except Assam have a lower mortality rate for under-fives than the national average. Lastly, Sikkim was recently declared India's first fully organic state.

Figure 36.2: Per capita NSDP for north-east states, 2004-05



Source: NER Vision 2020[2]

This area is strategically important for India both for its geographical location and the resources found there. Some of the key strengths of the NER are given below:

- NER shares about 5,437 km of international boundaries with Bangladesh, Bhutan, China, Myanmar and Nepal.[5]
- Total coal reserves in the NER is estimated at 1,597 million tonnes.[6] These were exported in the past.
- Limestone deposits are found extensively throughout the NER.
- Petroleum, natural gas and uranium are other natural resources to be found in the NER.
- According to the India State of Forest Report 2017,[7] some of the North-Eastern states have the highest forest covers in the country. The total forest cover in the region is 1,71,306 sq km, which is 65.3 per cent of its geographical area, which is thrice the national average of 21.5 per cent.
- Hydropower potential for the NER has been estimated at 58,971 MW,[8] which is 40 per cent of India's total hydropower potential. However, only 2.1 per cent of this vast potential of clean energy has been utilized.

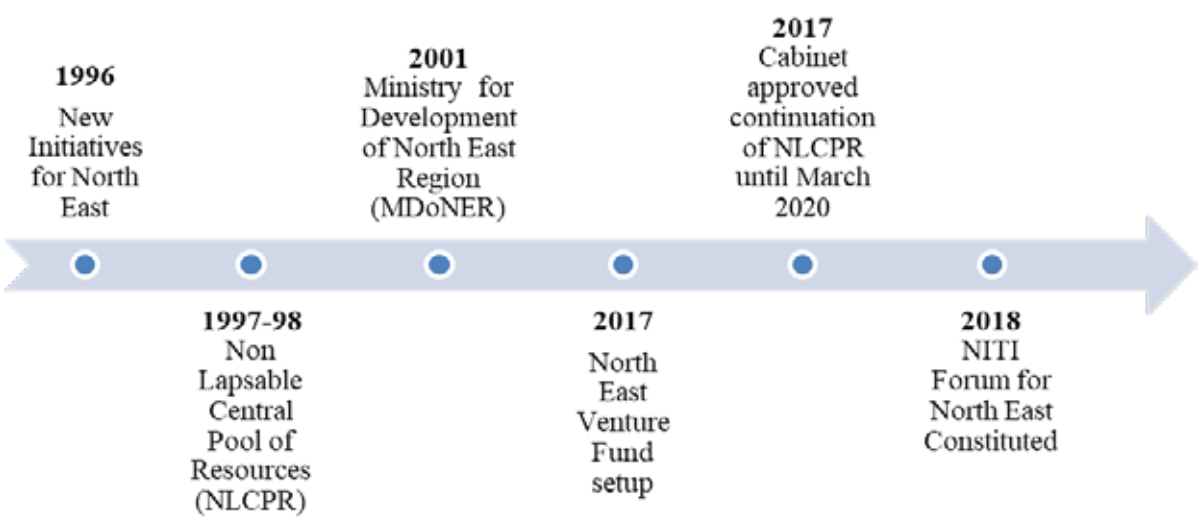
Despite the region's strengths and the government's focus on developing the NER, a lot of challenges remain. These are highlighted below.

Constraints

While the NER has all the ingredients needed to become prosperous, it could not achieve the expected level of economic growth mainly due to inadequate road, rail and air connectivity. A lot of its resources remain untapped. For e.g.

- Despite abundant rainfall, the irrigation coverage in this region is less than the national average of 46.35 per cent.
- The NER's natural scenic beauty and distinct ethnic heritage offers great attractions for mountaineering, trekking and other tourist activities. However, the tourism industry remains underdeveloped.

Figure 36.3: Timeline of government initiatives for the development of north-east region



The major constraints hampering economic growth in the NER are:

- Inadequate infrastructure in terms of limited air, rail and road connectivity.
- Under-utilization of available natural resources
- Safety and security related issues.
- Difficulties in transfer of land on lease to entrepreneurs.

Way Forward

- A targeted strategy needs to be devised, in consultation with representatives from all eight NE states, to disseminate information on the various central government schemes that are already in place for the development of the NER. All central ministries and departments should consider sharing their targets and vision for the NER and spell out modalities for spending the stipulated 10 per cent of their budget for the NER. The Ministry of Finance should formally acknowledge the availability of funds under the NLCPR.
- Each state within the NER may be encouraged to draw up their development blueprint in consultation with the NITI Aayog and the North-East Council (NEC).
- As noted earlier in this chapter, different states in the NER have achieved success in different aspects of human development. The Ministry of Development of North-Eastern Region (MDoNER) should document such best practices and disseminate its findings within the region so that the learning can be implemented suitably in other states.
- The NER Vision 2020[9] noted, *"responsive governance and planning from below require significant augmentation of capacity"*. It is recommended that mechanisms like project management units be considered to augment the capacities of state governments.
- To address the issue of inadequate connectivity in the NER, the following measures need to be taken:
    - As a general point, transit treaties for the NER and its neighbouring countries need to be put in place. India could consider initiating a regional multi-modal transit agreement between the NER and the four neighbouring countries.
    - It is necessary to monitor closely on-going transport projects with focus on projects that boost inter-regional connectivity and help transform the region into a major trade hub with South East Asia. It is recommended that a high-level committee be set up in 2018 (possibly as a sub-committee under the "NITI Forum for North-East") to focus on expediting such projects, including the Kaladan Multi-Modal Transit Transport Project, the India-Myanmar-Thailand Trilateral Highway, the 5-km road stretch between the border city of Zokhawthar in Mizoram and Rih in Myanmar and the rail link from Imphal to Moreh and further from Moreh to Kalay (in Myanmar)
    - One of the projects that will boost connectivity within India and significantly benefit the NER is the Agartala-Akhaura rail project. This project, 15 km in length, has already been sanctioned and will reduce the distance between Kolkata and Agartala by 1,200 km.[10] The Ministry of Railways needs to fast track the project.
- UDAN III may be launched. Its international component could connect Guwahati to ASEAN capitals.

  - The viability gap funding (VGF) required for UDAN III could come from the Government of Assam or could be met from the NLCPR. It is envisaged that VGF requirements would not be large and demand will rise in response to improved air connectivity.

- The Government of India and the NER should work together to create an environment to attract more private investment into the region. On March 21, 2018, the Union Cabinet approved the North-East Industrial Development Scheme (NEIDS) with a project outlay of INR 3,000 crore up to March 2020, to incentivize new industrial units in manufacturing and services sector in the region.[11] Indicators of development in the NER should be monitored closely and taken up in mission mode.
- A few other measures that could also be considered over the next few years are:
  - Set up industrial estates/parks in the region.
  - Focus on sectors such as organic agriculture, tourism, renewable energy, etc, in which the NER has competitive advantage.
  - Accelerate skill development as suitable for the region.
- One of the most pressing issues hampering the progress of hydropower projects in the region is rehabilitation and resettlement (R&R). Attractive R&R packages should be devised for hydropower projects in the region.
- NER is endowed with natural beauty, rich flora and fauna and a unique culture. Tourism, particularly eco-tourism and adventure tourism, should be promoted by identifying suitable sites and creating supporting infrastructure at these sites through the PPP mode.
- Water management is a major issue in the NER. Early completion of ongoing irrigation projects, particularly Borolia, Dhansiri and Champavati in Assam, and Thoubal and Dolaithabi Barrage in Manipur under the Accelerated Irrigation Benefits Programme, should be accorded high priority. It is expected that the establishment of the North East Water Management Authority will help address the issue.

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1 As of 2015-16, GSDP data for some North-East states is not available beyond 2015-16 with the Central Statistics Office.

2 http://www.mdoner.gov.in/sites/default/files/silo2_content/ner_vision/Vision_2020.pdf. Accessed May 02, 2018.

3 http://www.sikkim.gov.in/stateportal/Link/Sikkim%20Human%20Developent%20Report%202014.pdf. Accessed May 02, 2018.

4 http://rchiips.org/NFHS/NFHS-4Reports/India.pdf. Accessed May 03, 2018.

5 http://planningcommission.nic.in/sectors/NTDPC/voulme3_p2/transport_dev_v3_p2.pdf. Accessed May 05, 2018.

6 https://coal.nic.in/content/coal-reserves. Accessed February 27, 2018.

7 http://fsi.nic.in/isfr2017/isfr-forest-cover-2017.pdf. Accessed May 02, 2018.

8 The North-Eastern Electric Power Corporation Limited (NEEPCO) http://neepco.co.in/neepco/#. Accessed February 03, 2018.

9 http://www.mdoner.gov.in/sites/default/files/silo2_content/ner_vision/Vision_2020.pdf. Accessed May 02, 2018.

10 http://www.unescap.org/sites/default/files/5.2_Manoj_Singh_NITI_Aayog.pdf. Accessed May 04, 2018.

11 http://pib.nic.in/newsite/PrintRelease.aspx?relid=177822. Accessed May 02, 2018.

37. Legal, Judicial and Police Reforms

Objective

- To ensure the safety and security of citizens and ensure access to effective legal systems and speedy delivery of justice.

Current Situation

Legal and judicial reforms are urgently needed to address the massive pendency and capacity issues in Indian courts, which impede access to justice. Several archaic and defunct laws have already been repealed and many others are in the process of being weeded out. The recently announced umbrella scheme on "Modernisation of Police Forces" to strengthen law and order and modernize the police is a welcome stimulus. A part of police reform is intrinsically linked to legal/judicial reform, which would result in efficient criminal justice dispensation.

Constraints

1. The major challenge facing the judiciary is the huge backlog of over 2.7 crore pending cases. There are also significant capacity issues.

2. Ease of doing business in India is severely constrained by the inability to enforce contracts or laws, lengthy and costly litigation and arbitration processes, and archaic legislations. Although we have the Arbitration Law of 1996, which is in tune with global principles, it has not yielded desired results in terms of lessening the pressure on courts. Nor have the alternative dispute resolution mechanisms been utilized adequately. The World Bank "Doing Business Report" 2018 ranks India at 164 in 'Enforcing Contracts'; though an improvement of 8 positions, it is clearly not an acceptable situation.

3. Police reform until recently had been stuck due to various reasons. Police/law and order is a state subject, falling under List II of the Seventh Schedule of the Constitution of India. In a federal set up like ours, this makes policy reform a rather sticky issue. After accounting for vacant positions, there are only 137 police personnel per 100,000 citizens (17.3 lakh in all). The UN recommends 222 police personnel per 100,000 citizens.

Way Forward

A. Legal reforms

1. Create a repository of all existing central and state laws, rules and regulations

- The centre and state(s) need to create repositories of laws, rules, regulations and government orders.
- Alternatively, a three-tier repository system can be considered in line with the system of governance enshrined in the Constitution.

2. Repeal redundant laws and introduce a new initiative to remove restrictive clauses in existing laws

- For the first time since independence, as many as 1,420 redundant laws have been repealed over the past four years. An identical process should be followed by all states.
- A new programme to repeal unnecessarily restrictive clauses and procedures in existing laws should be started. It will enhance both ease of living and ease of doing business indices.

3. Consider the following changes in criminal justice and procedural laws

- Introduce changes to procedural laws in line with the principles and thinking behind the Commercial Division Bill.
- Change from the present litigant driven outlook to one led by an effective judiciary in line with global practice. To begin with, a review of the Code of Civil Procedure (CPC), 1908, may be considered.
    - The Commercial Court, Commercial Division and Commercial Appellate Division of High Courts Act, 2015, needs to be amended to provide for pre-institution mediation and settlement by using the services of agencies created under the Legal Services Authorities Act. The amendment can be on the lines of the provisions of Section 89 of the CPC, under which Courts can refer disputes to one of the alternate dispute resolution mechanisms after a suit is filed. It is also necessary to fast track the consequential amendments in the respective provisions of the CPC once the Act has been amended.
- Reduce the criminalization of violations, and move towards compounding of minor offences:
    - Sixty eight per cent of under-trials in jail are awaiting trial. The under-trial waiting time needs to be drastically reduced. It is also necessary to move towards community service and other non-imprisonment based punishments.
    - It is necessary to re-examine the procedure for initiating criminal proceedings, arrest and bail. Summary proceedings and plea bargaining should be reorganized and implemented so that criminal cases can be settled in a time bound manner.
    - Reform forensics and ballistics testing by outsourcing to accredited laboratories.

4. Create a law-abiding society

- It is necessary to inculcate respect for the rule of law among citizens. The process should start at the school level and can be effected by mandatorily introducing innovative programmes with well thought out content and activities.
- Introduce incentive and sanction-based models of motivation to ensure that citizens abide by the law. The following measures may be considered:
    - Prohibitive penalties should be imposed to check traffic violations, civic violations including littering in public, first time petty offenders, etc.
    - Use of advanced technology is an essential pre-requisite to check these violations of the law; person-to-person direct interface should be minimized to eliminate corruption.

- If there is a resource constraint, then additional resources may be allocated for this critical purpose.

5. A time line for implementation of necessary amendments should be stipulated. Such amendments should also have stipulated and binding time limits within which reports, such as ballistics and forensic reports, need to be submitted. Review and sunset clauses in legislations may also be considered.
6. Continuing legal education in selected areas should be made mandatory for lawyers and judges and rules of professional conduct and ethics need to be drawn up and implemented.
7. Greater sensitivity on the part of government officials to citizens' needs can help reduce the number of litigations/disputes. This will require an attitudinal reorientation among government officials through sensitization programmes. Future prospects of employees can be made contingent on their successfully completing such programmes.
8. New laws should be drafted in simple, plain language.

B. Judicial reforms

1. A study carried out by the Ministry of Finance found that it takes, on an average, almost 20 years for a property related dispute to be resolved, and that it would take 324 years just to clear the present backlog at the current rate of disposal. The huge backlog of pending cases is a critical logistical and efficiency issue. To tackle the issue, the following capacity building and sustainable solutions should be considered in consultation with the judiciary:

- Shift certain sections of the workload out of the regular court system to commercial courts, the commercial division and the commercial appellate division of High Courts for commercial disputes and the Criminal Judicial Magistrate for criminal cases at least in metropolitan areas to decongest courts.
- A mechanism may be considered whereby litigants in a commercial dispute must first be made to exhaust the remedy of pre-institution mediation and settlement. However, it should be ensured that such cases do not create one more stratum in litigation.
- The Arbitration and Conciliation Act, 1996, should be amended to make India a robust centre for institutional arbitration, both domestic and international. A new autonomous body, viz., the Arbitration Council of India, should be set up to grade arbitral institutions and accredit arbitrators to make the arbitration process cost effective and speedy, and to pre-empt the need for court intervention.
- Merge and rationalize tribunals to enhance efficiency. Appointments to tribunals must be streamlined either through a specialized agency or under the Department of Personnel and Training (DoPT).

2. Judicial decisions need to take account of their economic and social impact, especially in cases pertaining to contract, labour, tax, corporate and constitutional issues as observed by the Supreme Court in a recent judicial decision.
3. An all-India judicial services examination on a ranking basis can be considered to maintain high standards in the judiciary. The selection process may be entrusted to the Union Public Service Commission (UPSC) for a cadre of lower judiciary judges (first induction level), Indian Legal Service (both centre and

states), prosecutors, legal advisors, and legal draftsmen. This will attract young and bright law graduates and help build a new cadre that can enhance accountability in the governance system.

4. Continuing training may be introduced to ensure development of skills, ethics, knowledge and awareness of international best practices.
5. Multi-faceted training faculty for judicial academies including reputed lawyers, successful NGOs and others, for holistic exposure may be considered.
6. Training modules should be live streamed on an e-platform to make information easily accessible, and widely disseminated.
7. Consider a performance index for judges and a separate state wise index for ease of getting justice.
8. Introduce an administrative cadre in the judicial system to streamline processes. To maintain judicial independence, the cadre should report to the Chief Justice in each High Court.
9. Prioritize court process automation and ICT enablement for electronic court and case management, including electronic management of court schedules and migration of all courts to the unified national court application software.
10. Facilitate the availability and usage of video-conferencing facilities to assist in speedy access to justice and to minimize logistical issues. At present, even the available video conferencing facilities are not utilized optimally.

C. Police reforms

With fiscal support to the states now being looked after under the umbrella scheme, the following reforms maybe considered:

1. The Model Police Act of 2015 can serve as the basis for legislative reform as it modernizes the mandate of the police, puts in place a governance mechanism that insulates the police from political interference and provides for the measurement and tracking of police performance.
2. A task force may be created under the Ministry of Home Affairs (MHA) to skill personnel and identify non-core functions that can be outsourced to save on staff.
3. States should be encouraged to ensure greater representation of women in the police force. The MHA should come up with a policy to encourage greater participation of women to achieve a target share of 30 per cent women among new recruits.
4. Launch a common nation-wide emergency contact number to attend to emergency security needs of citizens.
5. Integrate the Lokpal and Prevention of Corruption Acts into police reforms to enhance accountability.
6. Transfers/postings of police personnel should be made more transparent and the involvement of police in prosecution needs to be looked at more closely.
7. It is important to consider introduction of remodelled training modules, refresher courses and continuing education for police personnel including live-streaming of training modules on e-platforms. A concept of certification of security personnel with identified skill sets may be considered with linkage to promotion and deployment.
8. Introduce reform of the First Information Report (FIR) lodging mechanism, including introducing filing e-FIRs for minor offences. Besides, police

challans, investigation reports, etc., should be made available through the online portal of each police station.

9. A separate cadre for exclusively looking into cyber-crimes, cyber threats and fraud needs to be developed.
10. A panel of experts in psychology, negotiation, language proficiency and training may be put together.
11. A technology centre may be considered for benchmarking and identifying suitable technologies for the police under BPR&D in collaboration with IITs. A separate National Cyber Security Division may be considered to support and coordinate initiatives of state governments in handling cyber-crimes. A separate dashboard for interface with citizens for reporting and redressal of cyber crimes may be considered. Besides, big data analytics may be utilized in a big way. The Crime and Criminal Tracking Network and Systems project may be completed along with the launch of Phase 2 for linking of crime, prosecution, court and prison databases.

38. Civil Services Reforms

Objective

- To put in place a reformed system of recruitment, training and performance evaluation of the civil service to ensure more effective and efficient delivery of public services to achieve the development goals envisaged in New India 2022.

Current Situation

The Second Administrative Reforms Commission (ARC) was constituted in 2005 and in 2009, the Commission submitted around 15 reports on various aspects of governance, making 1514 recommendations. Of these, 1183 have been accepted by the central government. Decisions on the accepted recommendations have been sent to the relevant central ministries and state/union territories, with a request to set up an institutional mechanism to monitor their implementation. However, a bulk of the recommendations have not yet been implemented. In the meantime, the demands on the civil service continue to grow with the ambitious programmes of the government.

Reforms in civil services are a continuous process and several initiatives have been taken in recent years by the present government. These include, the introduction of a multi-stakeholder feedback (MSF) performance evaluation, dispensing with interviews for lower level positions, introduction of online mechanisms for appraisals and filing of various returns by employees, implementation of e-office, and strengthening training and merit-based postings. About 18 states and 7 union territories have also discontinued the practice of interview for recruitments to lower level posts.

Constraints

Several constraints impede the development of a highly efficient, transparent and accountable civil service.

1. There is a mismatch between positions and skill sets. Recruitment is not competency specific and often, the right person is not placed in the right job.
2. A related issue is the opposition to lateral entry, which hinders the development process. As the complexity of the economy increases, policymaking becomes a specialized activity. This creates an inherent need for the lateral entry of professionals into government service.
3. There is a need to forecast staffing needs in the civil services. This could ideally be done on a five-year rolling basis. There are instances of lack of employment opportunities in some areas, while there are many vacancies in others.
4. Attracting talent and nurturing excellence, ensuring transparency and accountability along with participatory and representative decision-making are some issues that need to be addressed..

WAY FORWARD

The strategy for 2022-23 should be centred on the implementation of the Second ARC recommendations that have been accepted by

the government. Broadly, the constraints can be tackled through interventions in the following areas: recruitment, training and evaluation, and governance.

Recruitment

- Improve the teeth to tail ratio: Promote an officer-oriented culture and focus on expanding the numbers of officers.
- Objectivity in the recruitment and placement process: Widely disseminate job descriptions and selection criterion and eliminate elements of arbitrariness.
- Reduce the number of civil services: The existing 60 plus separate civil services at the central and state level needs to be reduced through rationalization and harmonization of services. Recruits should be placed in a central talent pool, which would then allocate candidates by matching their competencies and the job description of the post. Concomitantly, the number of exams for civil services should ideally be brought down to one with all India ranking. States may also be encouraged to use this pool for recruitments.
- Encourage lateral entry: Inducting specialists at higher levels of government will provide much needed expertise.
- Nurture specialization: The key to reform in the civil services is encouraging officers to cultivate specializations based on their education and skills early on in their careers. Wherever possible, longer tenure postings need to be made based on the officers' expertise. However, it is also necessary to ensure cross-sector mobility for civil servants from areas where they have become surplus to areas of emerging importance.
- Mentorship: Upon induction, young officers should be assigned mentors, preferably with an officer having a similar functional specialization or with high-quality NGOs for values and soft-skill mentorship.
- Information Technology (IT): Use of IT needs to be significantly upscaled for planning, forecasting staffing requirements and recruitments.
- Hiring policies: The upper age limit for the civil services should be brought down to 27 years for the general category in a phased manner by 2022-23. Service conditions for employees of autonomous bodies need to be regulated and harmonized.
- Strengthen municipal corporation cadres: The number of staff at municipal corporations should be increased. Measures that monitor performance along the same lines as proposed for other services, including through online appraisals and biometric attendance, need to be introduced.
- Outsource service delivery: Efforts need to be made to outsource service delivery to reduce dependence on the administrative machinery. Research is needed to identify possible services to be outsourced; various PPP models should be explored to determine the best possible mode of outsourcing.

Training

- Reorient training: Alter the current system of training to meet job-outcome oriented goals. With economic gravity shifting towards cities, training should be reoriented to focus relatively more on managing urban areas.
- Introduce mid-career training modules for all services.

- Strengthen and leverage online avenues for training
  - Introduce pre and post-training matching of skills to determine postings.
  - Digitize human resource records across states.
  - Develop a competency matrix to monitor ongoing skill acquisition and help match requirements with resources in real time.
  - Institute an e-learning platform to conduct training modules.
- Mid-career exams/skill assessment might be undertaken to evaluate and decide on future postings.
- Prepare handbooks for skill orientation to improve competency.
- Introduce the 'living university' concept of value creation based on outcomes and good ideals.
- Develop ongoing training and immersion modules on a district-by-district basis.

Evaluation

- Consider replacing annual confidential reports (ACRs) with multi stake holder feedback (MSF): ACRs could be replaced with MSF. It is important for MSF to be online to retain transparency and accountability.
- Institute goal setting and tracking: There is an inherent need to set key responsibility/focus areas and progressively reduce discretionary aspects to evaluate civil servants. Institute the online Smart Performance Appraisal Report Recording Online Window (SPARROW) template in all central and state cadres.
- Incentivization: Review existing schemes and introduce new schemes of incentives for extraordinary performance.
- Compulsory retirement for underperforming officers: Develop benchmarks to assess the performance of officers and compulsorily retire those deemed unable to meet the benchmarks.

Governance

- Citizen-centric framework: An inclusive policy framework with citizens at the centre needs to be developed. Apart from improving public access to information through the use of Information and Communication Technology (ICT) and the Right to Information Act (RTI), the RTI's management information system portal needs to be expanded to cover more public authorities, especially subordinate offices of ministries and public sector units.
- Institutionalize system for effective monitoring of suo moto disclosures: To bring further transparency to public affairs and adopt safeguards to promote accountability, effective monitoring of suo moto disclosures is essential.
- Enhance capability of public authorities: The capabilities and knowledge base of central public information officers (CPIOs), appellate authorities (AAs) and information commissions need to be upgraded on a continuous basis to enable them to perform their assigned roles without external influence.
- Protection of civil servants: Introduce an appropriate system of checks and balances, including for the process of suspension, to ensure that officers are given their due process and are not vulnerable to vested interests and political pressures.
- Revisit Allocation of Business Rules (AoBR)/ Transaction of Business Rules (ToBR): Every ministry/department should review their AoBR/ ToBR keeping in view present day requirements.

E-initiatives and Probity

- Ensure probity in governance: Strengthen institutional mechanisms for prevention and detection of corruption:
  - Reviewing existing vigilance operating manuals and instructions to ensure probity.
  - Improving transparency in placement through initiatives in recruitment, placement and training.
  - Reviewing performance of officers based on probity.
- Strengthen implementation of a Centralized Public Grievance Redressal and Monitoring System (CPGRAMs): Develop a reform framework for the top twenty departments for periodic monitoring of grievance receipts. A revised version of CPGRAMS became operational in January 2018, which enables citizens to monitor the grievances lodged by them on a single screen. An updated version that enables transfer of grievances between ministries/departments, bulk disposal of grievances and multiple forwarding will be operational shortly.

  The Department of Administrative Reforms & Public Grievances (DARPG) has analysed these grievances, identified the top grievance prone areas and their root causes and recommended systemic reforms to bring about improvements in service delivery. These initiatives need to be continued with greater vigour and over time; CPGRAMs should emerge as a strong mechanism for efficient redressal of public grievances with similar mechanisms across all states/UTs.
- Implementation of e-Office[1]: Implementation of e-Office may be expedited in all ministries/ departments; all states/UTs may also be encouraged to adopt it.
- Prompt delivery of services: Every department should seek to simplify their processes to cut administrative delays and ensure participatory feedback mechanisms for efficient service delivery. IT tools need to be expanded for single window clearances and stakeholder consultations in policy.

[1] e-Office is a mission mode project under the National e-Governance Project of the government. The product, developed by the National Informatics Centre (NIC), brings together independent functions and systems under a single framework to enhance transparency, increase accountability and transform government work culture and ethics

39. Modernizing City Governance For Urban Transformation

Objective

- To transform our cities into economically vibrant and environmentally sustainable habitats that provide equitable access to basic infrastructure, public services and opportunities to all citizens and platforms for democratic participation.

Current Situation

Global experience indicates that cities are central to raising economic productivity, enhancing job creation and improving public finance at all levels. Successful and long-lasting urban transformation critically depends on reforming the way our cities are governed. Hence, city governance is a key enabler for urban transformation, and sustained economic growth and job creation.

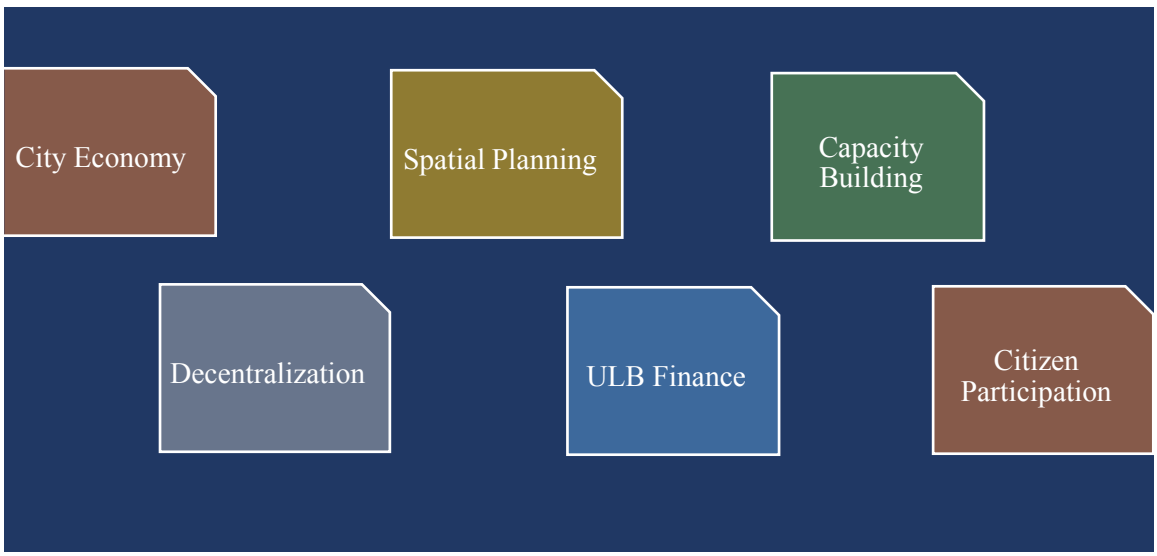
India is urbanizing at a fast pace and it is expected that by 2050, close to 50 per cent of India's population would be residing in urban areas, requiring the availability of sustainable infrastructure and services for a better quality of life.[1] Such infrastructure and services can only be ensured through modern urban governance. Indian cities are in the process of modernizing their governance structures. The government has undertaken various initiatives focusing on tourism (HRIDAY - *Heritage City Development and Augmentation Yojana*), infrastructure (Housing for All, Smart Cities Mission, AMRUT - *Atal Mission for Rejuvenation and Urban Transformation*) and sanitation (*Swachh Bharat Mission*), among others. The current status of urban governance can be assessed through an analysis of its constraints.

Constraints

The key challenges plaguing urban governance in India include the following.

- The absence of a modern spatial planning framework, public utility design standards and land titling in cities takes a huge toll on economic growth and productivity, environmental sustainability and living conditions in cities.
- There is lack of human resource capacities in the urban sphere at all levels, especially in urban local bodies (ULBs). The municipalities are heavily under-staffed and there are significant gaps in the skills required for urban management.
- Indian ULBs have huge scope to improve their financial autonomy and capacity to raise resources.[2] Some of the key reasons behind the poor state of municipal finances are the narrow, inflexible and non-buoyant tax base, broken financial accounting and audit systems, and the inability of municipalities to levy and recover taxes and user charges.

Figure 39.1: Key strategies to improve urban governance by 2022-23



- Multiple institutions like parastatals, development authorities, public works departments, and ULBs themselves report to different departments of the state government and have been entrusted with overlapping responsibilities. The distribution of power between elected officials at the city level (mayors and councillors) and central administrative service cadres at the city/ district levels are highly tilted towards the latter. The 74th Constitutional Amendment (CAA) to decentralise urban governance has not translated into reality, affecting citizen participation in cities.

Way Forward

The following strategies are proposed to improve urban governance in India by 2022-23.

1. Leveraging city economy

- Each city needs to be recognized as a distinct unit of the economy. In larger cities, City Economic Councils can serve as a clearinghouse between business and governments to hasten the progress of specific projects, improve the ease of doing business and catalyse investments into the city.
- Concomitantly, a quarterly city dashboard capturing city-level investments, GDP and employment growth, financial position and financial performance, and status of infrastructure projects can provide a framework for data-driven decisions. This will measure transformation and encourage competition among cities. For this, the Ministry of Housing and Urban Affairs (MoHUA), the Ministry of Finance and the Ministry of Statistics and Programme Implementation may create frameworks for a dashboard subsuming scheme-specific performance MIS.

2. Decentralization and metropolitan governance

- The multiplicity of agencies with overlapping jurisdictions and fragmented roles and

responsibilities is common in Indian cities. This leads to delays in implementation of projects and inefficient service delivery. To achieve the decentralization goals of 74th CAA, there is an urgent need for articulating a framework for governance of cities that includes development authorities, other parastatals, special purpose vehicles (SPVs) and Census Towns.

- Metropolitan governance systems are also needed in million-plus cities. There is a strong case for having a two-tier governance structure where all local functions are transferred to the ward committees and citywide services, such as transportation, water supply, sewerage, etc., are vested with the city council or regional authorities.
- Moreover, state governments can be encouraged to transfer 12th Schedule funds, functions and functionaries to the ULBs. At the same time, governance should be devolved to the ward and area levels to enhance downstream accountability mechanisms. States can learn from innovative governance frameworks involving the ULB and the state government as seen in models like the Greater Shimla Water Supply and Sewerage Circle.

3. Spatial planning and land titling

- There is urgent need for a synchronous and modern national framework for the spatial planning of cities that replaces the current Urban Development Plans Formulation and Implementation (UDPFI) guidelines. This framework should factor in plan preparation, implementation and enforcement at metropolitan, municipal and ward levels. It should also include congruent endpoints, pre-defined success measures and a transparent mechanism for consultative modification.
- Guaranteed land titling may also be evaluated to foster a transparent land market. In this regard, cities should lay out their own action plans to provide infrastructure and formalize existing settlements of the underprivileged.

4. Strengthening finances of ULBs and civic agencies

- Cities require a financial sustainability roadmap to be financially self-sufficient to support high-quality infrastructure and the delivery of services.
- This comprises fiscal decentralization, medium-term fiscal plans, innovative models to improve revenue collection, optimizing return on assets especially land and buildings, value capture methods, market-oriented revenue models, PPPs in urban infrastructure and services, and financial accountability through audited balance sheets and performance MIS reports.
- MoHUA, in consultation with the Ministry of Finance, may draw up model provisions for consideration by states in their municipal and civic agency acts.

5. Capacity building by skilling for municipal jobs and strengthening institutions

- There is huge potential for the creation of direct and indirect skilled jobs in ULBs to improve the quality of infrastructure and services and the management of ULBs. MoHUA will develop model municipal talent and in/outsourcing guidelines to leverage efficiencies generated by technology and outsourcing.
- The National Skill Development Corporation (NSDC) should be leveraged to improve understanding of municipal jobs including job definitions, technical competencies and key result areas, which can be considered for

inclusion in recruitment rules at the state level and for performance standards/accreditation for training institutes to foster a functional platform for knowledge sharing. A separate sector skill council for municipal services may be considered.

6. Citizen participation

- Enhanced citizen participation is needed for greater trust between citizens and governments, improved sustainability, better service delivery and accountability. Ward committees and area sabhas should be activated with a technology-enabled 'Open Cities Framework' and the use of digital tools for feedback and reporting.
- ULBs should also encourage the participation of all community associations, including settlements of the underprivileged and civil society organizations. ULBs should engage with them frequently through city watch groups, public hearings and city consultations to create a framework for formal partnerships. Rules and procedures need to be simplified for faster implementation of constructive recommendations.

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[1] Reforms to Accelerate the Development of India's Smart Cities Shaping the Future of Urban Development & Services, World Economic Forum, 2016.

[2] High Powered Expert Committee (HPEC) for Estimating the Investment Requirements for Urban Infrastructure Services, 2012.

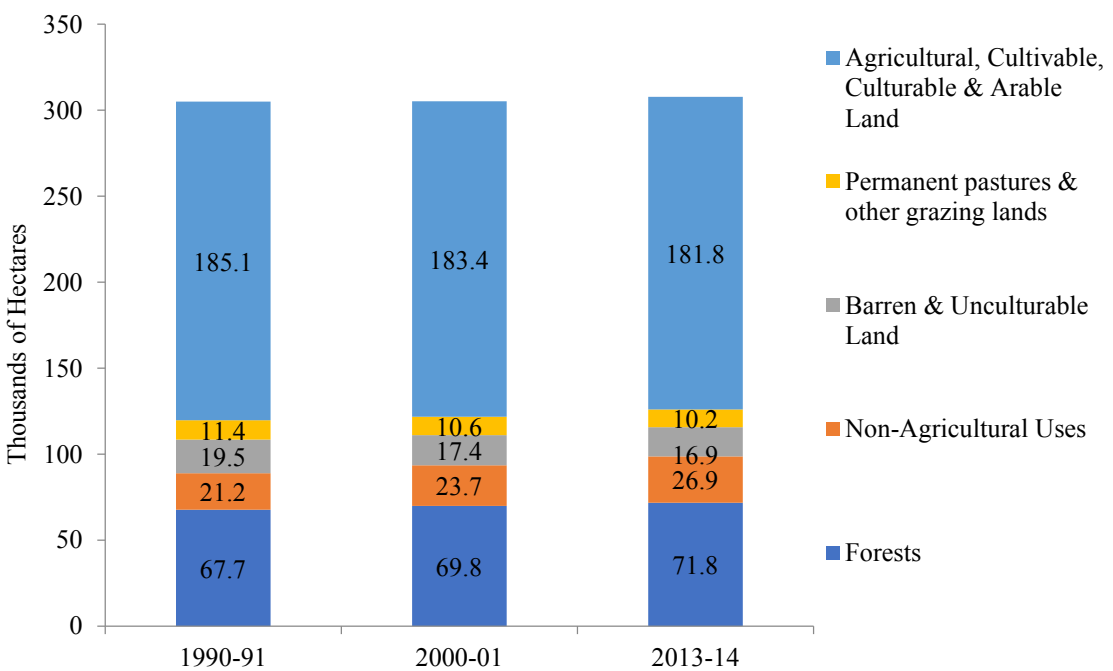
40. Optimizing the Use of Land Resources

Objectives

Ensuring that land markets function smoothly, through efficient allocation of land across uses, provision of secure property rights and titles, and clear and consistent regulations around the operations, leasing and sale of land are critical for India to achieve and sustain high economic growth. To this end, the following goals have to be achieved by 2022-23:

- Legalise and ease land leasing.
- Consolidate fragmented plots of farmers to enhance efficiency and equity.
- Create a digitized and integrated land records system that is easily accessible in all states.
- Increase efficiency in the management of forest land.
- Convert waste and fallow land to productive uses.

Figure 40.1: Land use across different uses in India, 1990-91 to 2013-14



Source: Directorate of Economics and Statistics, Department of Agriculture, Co-operation and Farmers' Welfare

- Strengthen property rights, especially community rights over forest land.

Current Situation

As measured by the land-to-population ratio, India is one of the most land scarce countries in the world. Agriculture accounts for the bulk of land use although the sector contributed only 17.45 per cent of value added to gross domestic product (GDP) in 2015. There has been a sharp fall in the average farm size from 2.28 ha in 1970-71 to 1.15 ha in 2010-11.[1]

The total recorded forestland in India is 76.4 million hectares, which is about 23.3 per cent of the total geographical area. Although it has more than one-fifth of its land under forest cover, Indian forests contribute only 6.4 per cent of the demand for wood.[2] Property rights over forestlands can be strengthened. The passing of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights Act (FRA)), which provides individual as well as community rights over forests and allows local communities/*gram sabhas* to protect and manage their customary forests on a sustainable basis, is a step forward.

At the same time, there is an imperative need to make land available to meet the needs of a fast expanding economy and rising population with a greater thrust on vertical development.

Constraints

- **Restrictive agricultural tenancy laws**: Agricultural tenancy laws passed by various state governments between the 1950s and 1970s are highly restrictive.
    - **Conditions on leasing**: While the states of Kerala and Jammu & Kashmir prohibit leasing out agricultural land without any exception, states such as Bihar, Telangana, Odisha, Madhya Pradesh, Chhattisgarh, Tripura, Karnataka and Himachal Pradesh allow leasing out only by certain disabled categories of landowners, such as physically and mentally handicapped persons, persons from the defence services, minors, widows, etc.
    - **Lack of ease in leasing**: In other states, there is no explicit ban on land leasing, but there are restrictive clauses that discourage landowners from leasing out land.
    - **High informal tenancy**: Due to legal restrictions, many landowners prefer to keep land fallow rather than lease it out, fearing they may lose their land rights for illegally leasing out land. At the same time, as market forces drive land leasing, there is informal tenancy in several places. Informal tenants do not have either security of tenure or access to institutional credit, insurance and disaster relief. As a result, productivity on tenanted land suffers.
- **Small sized land parcels**: Landholdings in India are small and highly fragmented, which not only results in diseconomies of scale, but also makes the task of irrigation management and land improvement difficult. Punjab, Haryana, Uttar Pradesh and Maharashtra have completed their first round of consolidation, but further sub-division and fragmentation of land have necessitated reconsolidation. The progress in other states is either nil or negligible.
- **Productivity of forestland**: There has been no systematic effort to increase the area and productivity of forests on a sustainable basis. One important reason is the lack of human resources. The number of forest officials for

management of both timber and non-timber forest resources is lacking relative to the size of forests.

- **Absence of conclusive titling and records**: Deficient land records and lack of conclusive land title result in costly litigation and adversely affects investment and economic growth.

Way Forward

1. Agricultural Land

- States may consider the Model Land Leasing Act, 2016. Further details on land leasing are given in the chapter on Agriculture.
- Consolidate smaller plots of land through pooling to enhance productivity. The consolidation of fragmented landholdings is essential to exploit scale economies and increase farm incomes. Pooling the land of willing farmers and organizing them into land shares or joint stock companies will allow farmers to earn dividends based on their equity shares. Farmers will also earn wages/salaries as an employee based on agricultural output.

2. Increase efficiency around the management of forest land

- Implement effectively the Forest Rights Act (FRA) in all states to strengthen the property rights of forest dwellers, tribal populations and local communities.
- Zone land on a priority basis to clearly demarcate forest and revenue lands.
- Bring more area under agro forestry using wasteland, non-cultivable fallow lands, etc.
- Revisit the policy on tree-felling. Encourage trees as a resource for farmers especially by easing restriction on certain species of trees. Current restrictions on inter-state and inter-district movement of wood should also be removed.

3. Updating and modernization of land record systems

- Beyond creating and maintaining land records, efforts must be made to update and digitize these records in a user-friendly manner. The National Land Records Modernization Programme (NLRMP), now Digital India Land Records Modernization Programme, aims to develop a well-functioning and transparent electronic land records management system that will provide easy access to all available and relevant information to give a fair comprehensive position of any plot of land to the landowner, concerned officers/agencies and interested persons/entrepreneurs. This will improve real-time information on land, optimise use of land resources, benefit landowners and prospectors, assist in policy and planning, reduce land disputes and check fraudulent/ benami transactions.
- While most states have started digitizing their records, all states must have digitized textual as well as spatial records so that they are easily available and verifiable. In this area, commendable efforts have been made by the states of Karnataka and Gujarat. It will also be desirable to link the land record database with banks.
- Other states should review their progress in terms of digitization and move toward complete and accessible up-to-date records. In due course, states may move towards conclusive land titling.

4. **Initiating Public Private Partnerships (PPPs) for wasteland development**

- Cultural wastelands, estimated at about 12 million ha, need to be improved and productively utilized as a potential resource.
- This can be done either by *gram panchayats* with financial support from states/union government or through PPPs, with clearly laid down procedures and norms.
- Strengthen property rights, plan urbanization and prevent land degradation.
- Define and identify common land, along with details of ownership, control and use rights.
- Recognize the customary land tenure system including community ownership in tribal areas.
- Remove encroachments on public land to ensure that land is used efficiently.
- Free estimated ceiling surplus land of over 1 lakh acres that has been under litigation for several years through speedy disposal of cases.
- Define and demarcate revenue and forestland, including land used for shifting cultivation.
- Plan urbanization as per master plans with greater emphasis on vertical growth.
- Prevent land degradation and soil erosion through policies that promote fertilization and organic farming.

5. **Using land as resource to finance urban development**

- Tools such as land value capture, incentive zoning, town planning schemes, and land-based taxes like land value tax, vacant land tax, land value increment tax, etc., can be used to finance rapid and efficient urbanization.

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[1] Directorate of Economics and Statistics, Department of Agriculture, Co-operation and Farmers' Welfare "Land Use Statistics at a Glance-State Wise" http://eands.dacnet.nic.in/LUS_1999_2004.htm. Accessed April 20, 2018.

[2] State of Forest Report 2011, Forest Survey of India.

41. Data Led Governance and Policy Making

Objectives

Evidence based policy making should be made integral to the overall governance structure in New India, 2022-23. To achieve this, timely generation and dissemination of robust data at all levels of governance would be a pre-requisite. This would require:

- Collecting data for new measurable parameters using latest technologies.
- Improving efficiencies in processes related to existing data collection by government departments and agencies.
- Expanding warehousing facilities for storing and integrating data from different sources.
- Making data available for industry practitioners, academicians, researchers, etc., wherever feasible.
- Integrating data analysis and interactive data visualization into all policy formulation.

Current Situation

Background

Countries, where large-scale developmental efforts are needed, require their policy delivery mechanisms to be robust and efficient. However, paradoxically, these countries have very little data needed for the selection, implementation and evaluation of effective policies.[1] In India, decision-making is often based on surveys and consultations that are released with a considerable lag. For e.g., the population census comes out once in ten years; the latest National Family Health Survey – 4 was released in 2015-16 after a period of 10 years.

Rapid advancements in technology have led to an explosive growth in the volume of data produced. Data is now being touted as one of the most valuable resources. Given the proprietary access to high value data sources, public services and governance systems in India can better harness the value of this data.

Statistical system in India

At the government level, various ministries/ departments of the Government of India, state governments and the Office of the Registrar General & Census Commissioner under the Ministry of Home Affairs collect data. One important step taken towards creating the availability of non-sensitive data for public consumption on a common platform was the launch of National Data Sharing and Accessibility Policy (NDSAP) in 2012. The objective[2] of the policy was to *"increase the accessibility and easier sharing of non-sensitive data amongst the registered users and their availability for scientific, economic and social developmental purposes"*. This led to the creation of the Open Government Data initiative where the domain data.gov.in was registered in 2012. It is now one of the important pillars of the Digital India programme.

As stated by the Ministry of Statistics and Programme Implementation (MoS&PI),[3] central ministries/departments or state government departments that are responsible for an area/subject are usually the key agencies for collecting the statistics for that domain. The usual flow of statistical information is from states to the centre except in cases where the operations are part of centrally sponsored schemes or when the data is collected through national sample surveys. Viewed from the national level, the Indian statistical system at the centre is laterally decentralized between the ministries and departments while the vertical represented by each ministry is vertically decentralized between the centre and the states. A similar decentralized structure exists at the state levels, which have lateral decentralization at the state department level and vertical decentralization at the district level. In addition, statistical offices at the central and state levels, i.e., the Central Statistics Office (CSO) and the Directorate of Economics and Statistics (DESs) respectively, bring together all statistics related to India and examine various aspects including quality, accuracy, and timeliness.

The need for evidence-based policymaking has been recognised for years now. Five-year plans in the past have stressed the need for frequent and robust data collection processes in various contexts ranging from health to natural calamities to agriculture. The Report of the Dr. Rangarajan Commission in 2001 also acknowledges the increased need for data in the decision-making process.[4]

Constraints

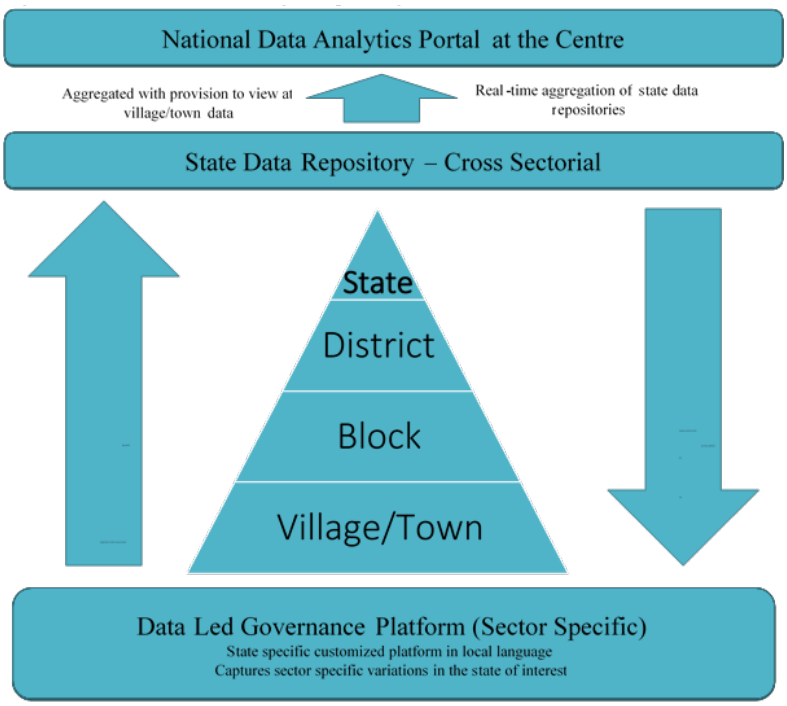
The following constraints need to be overcome to enable India's transition to a data-led governance structure.

- There is over-reliance on data collection through surveys. These are released at a considerable lag, which diminishes their usefulness in policymaking. There is a dearth of availability of real time operational/administrative data.
    - One challenge in this regard is that considerable numbers of stakeholders are involved in enabling data collection systems that are premised on a "bottom-to-top" approach. It will be a huge challenge to get all these stakeholders on board for a streamlined data collection and reporting mechanism as envisaged for 2022-23.
- There is a problem with the usability of data that is currently generated.
    - Large volumes of data collected by different government agencies and departments are not shared, even among the departments.
    - The data shared is often not available in machine readable format or cannot be integrated with data from other sources to help develop multi-dimensional insights.
    - Enabling adoption of the latest technology at the grassroots level would involve substantial investment along with skill development of local functionaries.
    - Furthermore, planning will be required to integrate different technologies so that ground level data can be aggregated.
- Lastly, there is considerable lack of awareness regarding currently available data sources.

Way Forward

The following framework, which focuses on the key aspects requiring intervention, needs to be enabled by 2022-23 to achieve transparent governance:

Figure 41.1: Framework for achieving transparent governance



Data collection methods should be streamlined through the following measures:

- Both administrative and survey data need to be collected in digital formats across various sectors in real time to move from paper based to digitally driven operations. This would require the adoption of latest technologies that require recording in digital format, geo-tagging etc. This will address the issues related to time lags, data cleansing, etc., associated with surveys to a large extent.
- Ensure availability of data at a more granular level – village/block/district. NITI Aayog is already engaged in developing a National Data Analytics Portal, which is envisioned as a central repository for real-time data across different sectors for all states/UTs.
- Enable data sharing in real time through Application Programming Interfaces (API) between data stored across different databases and across ministries in a central location for easy access by the public.

The following specific steps will ensure that the above objectives are achieved.

1. **Data integration and quality assurance**

   Most of the administrative and survey data are generated at the state level. It is recommended that after going through the process of quality assurance, where discrepancies are removed, and formats are standardized, the data should be integrated in a state data repository. This process should be followed by all states based on guidelines drawn up by the central government.

   Reliable and timely data is essential for evidence-based policy making, which should be the norm. Necessary reform of our statistics and

data collection system must be undertaken as soon as possible to achieve this objective.

Some state governments like Andhra Pradesh, Gujarat, and Rajasthan have taken important steps to leverage technology for evidence-based policymaking. However, these steps need to be further streamlined and adopted by all states. This will empower the officer on the ground to take data led decisions. This aspect forms an integral part of the Digital Transformation Index being instituted by NITI Aayog. Measures to leverage technology for informed policymaking will be implemented in a time bound manner and closely monitored for desired results.

2. **Data protection**

The issue of confidentiality will need to be ensured while dealing with citizen level data. The Justice Sri Krishna Committee Report submitted its recommendation in July 2018. Its recommendations are under active consideration to formulate a data protection law in India.

3. **Role of tertiary big data**

For better governance and evidence-based policymaking, it is recommended that tertiary big data collected by private third parties should be used. Over time, the National Data Analytics Portal aims at collecting, analysing and disseminating various types of tertiary data of different levels of granularity.

4. **Skill development and restructuring**

Government statistical organizations responsible for data collection and reporting need to be updated on new technologies. Data scientists with multiple skills in the areas of statistics, analytics, computer science and programming are rare in the Indian government. MoS&PI needs to have an adequate number of data scientists to take advantage of new technologies. Re-skilling needs to be promoted across government agencies, both at the state level and at the centre. A roadmap for strengthening various government agencies including MoS&PI needs to be formulated and implemented in a time bound manner.

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1 http://live.worldbank.org/sites/default/files/Big%20Data%20for%20Development%20Report_final%20version.pdf. Accessed April 20, 2018.

2 http://www.dst.gov.in/national-data-sharing-and-accessibility-policy-0. Accessed April 22, 2018.

3 http://www.mospi.gov.in/142-present-indian-statistical-system-organisation. Accessed April 25, 2018.

4 http://mospi.nic.in/11-background. Accessed April 30, 2018.

Annex 1

During the preparation of this document, the NITI Aayog consulted extensively with groups of scientists, think tanks, voluntary organizations, industry, agriculture and labour. This Annex provides a comprehensive list of these outside experts and organizations. Any omissions are inadvertent.

Agriculture

- Shri A. J. Tharakan, Member, Seafood Exporters Association of India
- Shri Ajay Kumar, Adviser, Merino Group
- Shri Anand Kothadiya Krishiratna, Extension Activist, Sahaydri Farmers Producer Organisation
- Dr. Ashwini Mahajan, Co-Convener, Swadeshi Jagran Manch
- Shri B. Ramarao, Farmer Representative, Andhra Pradesh
- Dr. B Venkateswarlu, Vice-Chancellor, Vasantrao Naik Marathwada Krishi Vidyapeeth
- Shri Balbir Singh Rajewal, President, Bharatiya Kisan Union
- Ms. Chhaya Bhavsar, Senior Coordinator, ASHA
- Shri D. Bhuyan, Director, SFAC
- Dr. Gopal Naik, Professor & Dean Faculty, IIM- Bangalore
- Dr. GV Srinivasan, Scientist, Spices Board
- Ms. Ishira Mehta, Director & Co-Founder, Crop Connect Enterprises Pvt. Ltd.
- Shri Ishwar Lal Patidar, Chairman, Rajya Krishi Aayog, Madhya Pradesh
- Shri Jalees, Researcher, Navdanya
- Shri Joy P Joseph, Spice Farmer, Kerala
- Kiran Vissa, National Co-Convener, ASHA
- Shri K. K. Agarwal, Farmer Representative, Madhya Pradesh
- Shri Krishan Bir Chaudhary, President, Bharatiya Krishak Samaj
- Shri Kuldeep Singh Brar, Farmer Representative, Punjab
- Shri Lalit Deora, Farmer Representative, Rajasthan
- Shri P. Srinivas, Member, Warehousing Development & Regulatory Authority (WDRA)
- Dr. PK Joshi, Director, South Asia, IFPRI
- Shri Prakash Lohia, MD, Merino Industries Ltd
- Shri Pravesh Sharma, Founder & CEO, Sabziwala.com
- Prof. Anil Kumar Singh, Vice-Chancellor, Rajmata Vijayaraje Scindia Krishi Vishwavidyalaya
- Shri Puneet Jhajharia, Director & Co-Founder, Crop Connect Enterprises Pvt. Ltd.
- Shri Raghunath Patil, Shetkari Sangathan, Maharashtra State
- Dr. Rajaram Tripathi, National Convener, All India Farmers Alliance

- Shri Rajkumar Singh Hajari, Farmer Representative, Karnataka
- Shri Ramesh Kumar Yadav, Chairman, Haryana Farmers Commission
- Shri Rampal Jat, National President, Kisan Mahapanchayat
- Shri RG Agarwal, Chairman, Dhanuka Agritech Ltd.
- Shri RS Sodhi, MD, Amul
- Dr. Sandeep Kumar, Haryana State Farmers Commission
- Dr. Shanti Swarup Khanna, Former Adviser (Agriculture), Planning Commission
- Shri Sharad Marathe, UTS
- Ms. Smita Bhatnagar, Senior Coordinator, ASHA
- Shri Tshering Gyatso Lepcha, Spice Farmer, Sikkim
- Shri Tushar Jagtap, Senior Manager, Sahaydri Farmers Producer Organisation
- Shri V. Ravichandra, Farmer Representative, Tamil Nadu
- Shri Veerpal Singh, Farmer Representative, Uttar Pradesh
- Shri Vijay Pratap Singh Aditya, CEO, EkGaon
- Shri Vikas Chaudhary, Farmer Representative, Haryana
- Shri Vilas Shinde, MD, Sahaydri Farms Producer Company Ltd.
- Ms. Vimla Sihag, Farmer Representative, Rajasthan
- Dr. Vinod Kumar Bhatt, Executive Director, Navdanya
- Dr. VL Patil, President, Bharatiya Krishak Samaj – Vidharbha

Services Sector

- Shri Ajay Singh, CMD, Spicejet
- Shri Ajit Gulabchand, CMD, HCC Ltd
- Shri Aroon Purie, Chairman, India Today Group
- Shri Arun Maira, former Chairman, Boston Consulting Group India
- Shri Aseem Chauhan, Chancellor, Amity Education Society
- Shri Ashish Chauhan, CEO, BSE
- Shri Bharat Anand, Senior Partner, Khaitan & Co.
- Shri Bharat Joshi, Director, Trac1 Logistics Joshi-Konoike Transport & Infrastructure
- Shri Bipin P Singh, Founder, Mobikwik
- Shri Deep Kalra, Founder & CEO, makemytrip.com
- Shri Kamal Hingorani, SVP, Spicejet
- Shri Kandula, Grant Thornton
- Ms. Kanika Tekriwal, CEO, JetSetGo
- Shri Nikhil Sahni, Head - Government & Branch Banking, Yes Bank
- Shri Prabodh Thakker, Chairman, Global Insurance
- Shri Raghav Bahl, Founder, The Quint
- Shri Raghav Verma, Co-Founder, Chaayos
- Shri Rahul Bhasin, Managing Partner, Baring Private Equity Partners

- Shri Rahul Vatts, Senior VP, Idea Cellular
- Shri Rajat Mukarji, CCAO, Idea Cellular
- Shri Rajeev Talwar, CEO, DLF
- Shri Rajnish Wahi, Senior Vice President, Snapdeal
- Shri Ranji Dua, Chairman, Dua Associates
- Shri Soumya Palchoudhuri, Yes Bank
- Shri Sunil K Goyal, MD & Fund Manager, Your Nest Venture Capital
- Shri Suresh Senapaty, Wipro
- Shri Utsav Somani, Partner, Angelist India
- Shri Vikesh Mehta, Grant Thornton

Manufacturing Sector

- Shri Adesh Gupta, CEO, Liberty Group & Chairman, Council For Footwear, Leather and Accessories (CFLA)
- Shri Dilip G Shah, Secretary General, Indian Pharmaceutical Alliance
- Shri Dinesh Aggarwal, Joint MD, Anchor Electricals
- Shri Eshwar K Vikas, CEO, Mukunda Foods
- Shri Gautam Nair, MD, Matrix Clothing (P) Ltd.
- Shri G.K. Raman, Group President Corporate Affairs, Arvind Textiles Ltd.
- Shri Harsh Mariwala, Chairman, Marico Ltd.
- Ms. Ishita Dey, Chief Project Manager, Economic Times
- Shri Jagdish Khattar, Founder, Carnation Auto
- Shri Mahendra Singhi, CEO (Cement), Dalmia Cement (Bharat) Ltd.
- Shri Manish Chaturvedi, MD & CEO, Indus Strategy
- Shri Manish Mishra, Chief Regulatory Affairs, Tata Steel
- Shri Manish Sharma, CEO, Panasonic India
- Ms. Meghana Narayan, Founder, Slurrp Farm
- Shri Narasimha Hegde, Vice President, Ashok Leyland Limited
- Ms. Nidhi Saxena, CEO, Zoctr
- Shri Om Prakash Lohia, CMD, Indorama Synthetics
- Shri Probir Das, MD, Terumo India Private Limited
- Shri Rajesh Shah, CMD, Mukund Iron and Steel
- Shri Ramakrishna NK, CEO, Rang De
- Shri Ramesh Ramachandran, Senior Vice President, Strategy & Precision Farming Mahindra & Mahindra Ltd.
- Shri Roshan Lal Tamak, Executive Director, Sugar DCM Shriram
- Shri Sahil Malik, MD, Da Milano
- Shri Sanjay Modi, MD, APAC & Middle East Monster.com
- Shri Shailesh Pathak, CEO, L&T Infrastructure Development Project
- Shri Subrata Biswas, Director (Engineering, Research & Development), BHEL
- Shri Vedant Jhaver, CEO, Jhaver Group
- Shri Vijay Iyer, MD, Rio Tinto India
- Ms. Vinita Sethi, Senior Vice President, Apollo Hospitals

Civil Society Organisations

- Shri Aloysius P. Fernandes, Secretary, MYRADA
- Shri Aditya Patnaik, Antodya Chetana Mandal
- Shri Akhil Dobhal, Sr. Manager, Prayas
- Shri Amod Kanth, General Secretary, Prayas
- Dr. Ashok Khosla, Chairman, Development Alternatives
- Shri Ashwath Bhatt, Jt. Secretary, H. N. Wanchoo Trust
- Dr. Bindeshwar Pathak, Founder, Sulabh International
- Shri Harish Hande, CEO, Selco
- Dr. Indumathi Rao, Regional Adviser, CBR Network, Bengaluru
- Dr. J. Paul Bhaskar, Chairman, Peace Trust
- Dr. Lalit Kumar, Sr. Vice President, Sulabh International
- Dr. Madhav Chavan, Director, Pratham Education Foundation
- Shri Manas Satpathy, Pradan
- Shri Nachiket Mor, Bill & Melinda Gate Foundation (BMGF)
- Shri Neichute Duolo, CEO, Enterprises Associates
- Shri Prabhat Pani, TATA Trust
- Shri Pradip Kumar Sarmah, Executive Director, Centre for Rural Development
- Shri Rajan Bahadur, MD & CEO, CARE India
- Dr. Rajesh Tandon, President, PRIA
- Shri Ratna Mathur. Dy. Programme Director, CARE India
- Shri Ravi Pokharna, Executive Head (Projects), Rambhau Mhalgi Prabhodhini, Delhi
- Shri Ravindra Gajbhiye, Activist, Sampoorna Bamboo Kendra, Melghat, Maharahtra
- Shri Ravindra Sathe, Executive Director, Rambhau Mhalgi Prabhodhini, Mumbai
- Dr. R. C. Jha, Scientist, Sulabh International
- Shri Rohit Choudhary, Regional Director
- Shri Santhosh Gupta, CEO, Indian Social Responsibility Network (ISRN)
- Shri Shashi Bhushan, Chairman, SATHI-UP
- Shri Shubham Oswal, Programme Head. Water & Environment, Green Energy Foundation
- Shri Srikanth Viswanathan, CEO, Janaagraha
- Shri Surendra Kulkarni, Member (Director), Seva Bharati Purbanchal
- Ms. Bhavana Luthra, Executive Director, LEAD India
- Ms. Puja Marwaha, CRY
- Ms. Sandhya Venkateswaran, Dy. Director, BMGF
- Ms. Sharmila Oswal, President, Green Energy Foundation
- Ms. Shatabdi Pande, Executive Member, Chhattisgarh Mahila Manch
- Dr. S. Chatterjee, Executive President, Sulabh International
- Dr. Vijay Mahajan, CEO, BASIX

Scientists and Innovators

- Shri Amit Mishra, GM, Piramal Water Pvt. Ltd.
- Prof. Anil Gupta, National Innovation Foundation
- Shri Arjun P. Gupta, Founder & CEO, (Energy Management), Smart Joules
- Shri Chander Shekhar, SCI(G), ICMR, New Delhi
- Dr. H. Purushottam, CMD, National Research Development Corporation
- Dr. K.D. Nayak, Former Chief Controller, R&D (MED & MIST), DRDO
- Shri Karunakara M. Reddy, Smart India Pvt. Ltd
- Ms. Poyni Bhatt, CEO, Sine IIT - B
- Shri Pradeep Mehta, Head Finance & Legal, Finance & Legal F/A Technology
- Shri Premkumar Seshadri, HCL Info systems
- Dr. Raghunath Mashelkar, Former DG, CSIR
- Shri Rajeev Kher, Saraplast
- Dr. S.K. Sarin, Director, ILBS
- Shri Sandeep Goenka, Zebpay
- Shri Sanjeev Malhotra, CEO, IOT Centre of Excellence, NASSCOM
- Shri Shishir K. Jha. Asstt. Professor, IIT Bombay
- Shri Sudesh Menon, WaterLife
- Prof. Supriyo Mitra, Dean, IISER, Kolkata
- Dr. T. Mohapatra, DG, ICAR
- Shri Vignesh Subrahmanian, Lead Scientist, GE Global Research
- Dr. Vijay Bhatkar, Chancellor, Nalanda University
- Prof. Vijay Chandru, Co-Founder, Strand Life Sciences

Labour Representatives and Trade Unions

- Shri Ajit K Ghose, Institute of Human Development
- Shri AK Sahu, ESIC
- Shri Alakh Sharma, Institute for Human Development
- Shri Arup Mitra, DG NILERD
- Prof. Chinmay Tumbe, IIM-A
- Shri GB Gawde, Indian National Trade Union Congress
- Prof. Jeemol Unni, Ahmedabad University
- Ms. Kamal Gaur, Save the Children
- Ms. Manali Shah, SEWA
- Ms. Nayana Mallapurkar, Tata Institute of Social Sciences
- Ms. Neelam Chibber, Industree Foundation
- Dr. Nomaan Majid, ILO
- Shri Saji Narayanan C.K., BMS
- Shri Sanjay Singh, Tata Sons
- Shri Sanjeev Bikhchandani, Naukri.com
- Shri Santosh Mehrotra, JNU
- Prof. Shalini Bharat, Tata Institute of Social Sciences
- Dr. Sher Verick, ILO
- Dr. S K Sasikumar, VV Giri National Labour Institute

- Ms. Sudipta Bhadra, ILO
- Shri Sunil Rana, Mercer - Global Consulting Practice & Public Sector
- Shri Yoginder Alagh, Economist

Think Tanks

- Dr. A Ganeshkumar, Professor, IGIDR
- Shri Ajay Lele, Senior Fellow, IDSA
- Dr. Amit Chandra, Associate Director, Centre for Civil Society
- Dr. Anant Sudarshan, India Director, Energy Policy Institute at
- Dr. Anirban Ganguly, Director, Shyama Prasad Mukherjee Research
- Dr. Anshu Bharadwaj, Director, CSTEP
- Shri Arghya Sengupta, Research Director, Vidhi Centre for Legal Policy
- Ms. Bindu Ananth, Chair, IFMR
- Dr. Errol D'Souza, Director-in-Charge, IIM-Ahmedabad
- Dr. Harsha Vardhana Singh, Executive Director, Brookings India
- Shri Harshit Sehgal, Senior Director, Ananta Centre
- Dr. Jaydeep Mukherjee, Faculty, IIFT
- Dr. KR Shanmugam, Director, Madras School of Economics
- Dr. Navroz Dubash, Senior Fellow, CPR
- Dr.Pradeep Apte, Professor, Gokhale Institute of Politics & Economics
- Shri Prashant Girbane, Director, Pune International Centre
- Dr. Pravarkar Sahoo, Professor, IEG
- Dr. Radhicka Kapoor, Fellow, ICRIER
- Shri Rajesh Chakraborty, Co-Founder, Sunay Policy Advisory
- Dr. Rupa Chanda, Professor, IIM-Bangalore
- Ms. Rwitwika Bhattacharya, CEO, Swaniti Initiative
- Dr. Sachin Chaturvedi, DG, RIS
- Shri Saket Mishra, India Foundation
- Shri Saurabh Chandra, Fellow, Takshashila Institution
- Dr. Seeta Prabhu, Tata Chair Professor, TISS
- Dr. Shakti Sinha, Director, Nehru Memorial Museum & Library
- Dr. Shekhar Shah, DG, NCAER
- Dr. Sumeet Bhasin, Director, PPRC
- Shri Sunjoy Joshi, Chair, ORF

Annex 2

This Annex provides a comprehensive list of outside experts and organizations consulted by the different verticals in NITI Aayog. Any omissions are inadvertent.

Employment and Labour Reforms

- Dr. Ajit Ghose, Visiting Professor, Institute of Human Development
- Secretary General, Social Security Association of India
- Self-Employment Women's Association
- Dr. Alakh N. Sharma, Professor & Director, Institute for Human Development
- Dr. Jeemol Unni, Expert on Employment, IRMA
- President, Bhartiya Mazdoor Sangh
- President, Indian National Trade Union Congress
- Dr. S. K. Sasikumar, Senior Fellow, V. V. Giri National Labour Institute
- Employment Specialist, International Labour Organisation (ILO)
- Shri Amod K. Kanth, Prayas Juvenile Aid Centre
- Dr. Prabhu P. Mohapatra, Delhi University
- Prof. Aditya Bhattacharjea, Delhi School of Economics

Technology and Innovation

- Dr. Raghunath Mashelkar, Former DG, CSIR
- Shri Vignesh Subrahmanian, Lead Scientist, GE Global Research
- Dr K. D. Nayak, Former Chief Controller, R&D (MED & MIST), DRDO
- Dr T. Mohapatra, DG, ICAR
- Ms. Poyni Bhatt, CEO, Sine IIT - B
- Shri Rajeev Kher, Saraplast
- Shri Sandeep Goenka, Zebpay
- Shri Karunakara M Reddy, Smart India Pvt Ltd
- Shri Sanjeev Malhotra, CEO, IOT Centre of Excellence, NASSCOM
- Shri Premkumar Seshadri, HCL Info systems
- Prof. Vijay Chandru, Co-Founder, Strand Life Sciences
- Prof. Anil Gupta, National Innovation Foundation
- Dr. H. Purushottam, CMD, National Research Development Corporation
- Dr. SK Sarin, Director, ILBS
- Prof. Supriyo Mitra, Dean, IISER Kolkata
- Dr. Vijay Bhatkar, Chancellor, Nalanda University
- Shri Sudesh Menon, WaterLife
- Shri Pradeep Mehta, Head Finance & Legal, Finance & Legal F/A Technology
- Shri Amit Mishra, GM, Piramal Water Pvt. Ltd.
- Shri Shishir K. Jha. Asstt. Professor, IIT Bombay

- Shri Chander Shekhar, SCI(G), ICMR, New Delhi
- Shri Arjun P. Gupta, Founder & CEO, (Energy Management), Smart Joules

Industry

- Shri Ajay Shankar, Former Secretary, Department of Industrial Policy and Promotion
- Dr. Pankaj Chandra, Vice Chancellor, Ahmedabad University
- Shri Nakul Anand, Executive Director, ITC
- Shri Nirupam Srivastava, Vice President, Hero Enterprise
- Shri Mukhtarul Amin, Chairman, Council for Leather Exports
- Shri M.S. Unnikrishnan, Managing Director & CEO, Thermax India Pvt Ltd
- Shri Ajay Khanna, Chief, Strategic and Public Affairs, Jubiliant Bhartia Group
- Shri Ankur Kanaglekar, Director, Boeing India
- Shri Anup Rai, SMCC Construction India Ltd.
- Shri Samir Advani, Rafael India
- Shri K K Gupta, Vice President, L&T Construction
- Shri Salhotra Bharat, Managing Director of Alstom India Limited
- Shri Madhu S Nair, CMD, Cochin Shipyard Ltd
- Shri Parameshwaran Nath, Director, PayPal Payments
- Shri Praveen Shankar Pandya, Chairman, The Gem and Jewellery Export Promotion Council

Doubling Farmers' Income

- Dr. Punjab Singh, President National Academy of Agricultural Sciences, Pusa New Delhi
- Dr. P. K. Joshi, IFPRI-South Asia Office, Pusa, New Delhi
- Dr. P. G. Chengappa, Forcer Vice-Chancellor, University of Agricultural Sciences
- Dr. Sukhpal Singh, Professor, IIM, Ahmedabad
- Shri Ashish Bahuguna, Chairperson, FSSAI, FDA Bhawan, New Delhi
- Dr Gopal Krishna, Director & VC, Central Institute for Fisheries Education, Mumbai
- Dr. S. Shivkumar, Chief Executive of the Agri Business Division, ITC Kolkata
- Shri H K Bhanwala, Chairman & Managing Director, NABARD, Mumbai
- Shri Satish Chander, Director General, Fertilizer Association of India, New Delhi
- Dr. R. S. Sodhi, Managing Director, Gujarat Co-operative Milk Federation Ltd.
- Shri Raghunath Dada Patil, President, Maharashtra State Shetkari Sangathan, Sangli, Maharashtra
- Shri Anil Kumar Sahni, Tigra Farm
- Shri Mayank Jalan, Keventer Agro Limited
- Shri Sudesh Menon, Water Life
- Shri Sudhir Mehta, Pinnacle Industries Limited.
- Shri Rahul Mirchandani, Aries Agro Limited.
- Shri Nikhil Nanda, Escorts Ltd.
- Ms. Priya Nair, Hindustan Unilever

- Shri Pritam Shah, Parag Milk Foods
- Shri Pravesh Sharma, Former Managing Director, Small Farmers' Agribusiness Consortium
- Dr. S K Goel, Former Additional Chief Secretary, Agriculture, Cooperation and Marketing, Government of Maharashtra
- Shri Gokul Patnaik, Global Agri System, New Delhi

Travel, Tourism and Hospitality

- Dr. (Mrs) C.T. Misra, Secretary, General, INTACH
- Shri Deep Kalra, CEO, Make My Trip
- Shri Ritesh Agarwal, CEO, Oyo Rooms
- Shri Vishesh Chandiok, CEO, Grant Thornton India LLP
- Shri Dipak Deva, Travel Corporation of India
- Shri Kapil Chopra, Oberoi Hotels
- Shri Arjun Sharma, MD, World Travel & Tourism Council (WTTC)
- Shri Manan Thadan, MD, HVS
- Ms. Priya Paul, Chairperson, Apeejay Surrendra Park Hotel
- Shri Vivian Peres, Director, Ventours Int. Pvt. Ltd.
- Shri Sujay Chouhan, Ocean Blue
- Shri Dhruv Shrangi, CEO Yatra Online, Inc
- Ms. Jyotsana Suri, CMD Bharat Hotels
- Shri Sunil Munjal, Chairman Hero Enterprises
- Shri Ratish Nanda, Aga Khan Trust
- Shri Ranjan Mathur, MD Top Travels
- Shri Ajeet Bajaj, MD, Snow leopard Adventure
- Shri Aman Nath, MD & CEO, Neemrana Heritage
- Shri Joseph Dominic, CGH Earth Experience Hotels
- Shri Ashish Phookan, MD, Assam Bengal Navigation
- Shri Rahul Bhatia, MD, Indigo
- Ms. Aparajita Jain, Nature Morte

Minerals

- Prof. Durga Charan Panigrahi, Indian School of Mines, Dhanbad
- Shri S.Vijay Kumar, Former Secretary (Mines), TERI
- Prof. S.K.Sharma, Head, Department of Mining Engineering, IIT-BHU
- Shri Vijay Iyer, Managing Director, Rio Tinto
- Dr. V.N.Vasudev, Senior Geologist, Consultant
- Shri Sunil Duggal, CEO & Managing Director, Hindustan Zinc Limited, Vedanta Resources
- Shri Rahul Baldota, Jt. Managing Director, M/s. Ramgad Minerals & Mining Limited
- Shri Anjani Agarwal, Ernst & Young
- Shri Saradchandra Rao Peshwa, Director, Deccan Exploration Services Private Limited
- Shri Rajeev Singhal, Vice President, Tata Steel
- Shri Tuhin Mukherjee, Managing Director, FICCI
- Prof. Raman Srikanth, NIAS
- Shri R.K.Sharma, Secretary, FIMI
- Shri Arun Kumar Kothari, President Mining Engineers Association of India

- Shri Upendra Kumar, Member, CII
- Shri Akshaydeep Mathur, Secretary General, Federation of Mining Association of Rajasthan

Energy

- Shri Kirit S. Parikh, IRADE
- Director (Exploration and Production), Oil and Natural Gas Corporation
- Shri R.V. Shahi, Ex-Secretary, MOP
- Shri Ajay Mathur, The Energy & Resources Institute
- Shri Tulsi Tanti, Chairman and Managing Director, Suzlon
- Shri Chetan S. Solanki, IIT Bombay
- Shri Vipul Tuli, CEO, Cemcorp Industries Limited
- Shri Rahul Tongia, Ph.D.Fellow, Brookings India
- Shri Sumant Sinha, ReNew Power
- Shri Ajay Khandelwal, President, Exploration and Production, Reliance Petroleum
- Shri Shantanu Dixit, PRAYAS Energy Group
- Shri Anshu Bhardwaj, CSTEP
- Shri Deepak Gupta, Shakti Sustainable Energy Foundation
- Shri Tarun Sawhney, Triveni Group
- Shri Anil Sardana, CEO & MD, Tata Power
- Shri U.C. Muktibodh, Director, Technical, NPCIL
- Shri Anil Kumar Chalamalasetty, MD, Greenko
- Shri Pramod Chaudhari, Chairman, Praj Industries Limited, Praj Group
- Shri Alla Ayodhya Rami Reddy, Chairman, Ramky Group
- Head, Research Division, CRISIL
- Shri H.N. Sharan, Founder Desi Power
- Shri Tejpreet, Bharat Light and Power
- Director, The Energy and Resources Institute
- Prof. Ashok Jhunjhunwala, IIT Madras
- Shri R. K Srivastava, ED-NETRA
- Dr. Markus Braunsperger, CTO, Hero Moto Corp
- Shri Rajan Wadhera, Mahindra and Mahindra
- Dr. Rajan Rawal, CEPT University
- Chairman, Alliance for an Energy Efficient Economy (AEEE)
- Dr. Anurabha Ghosh, CEO, Council on Energy, Environment and Water
- Ms. Priyavrat Bhati, Director, Centre for Science and Environment
- Shri Shantanu Dixit, Group Coordinator, PRAYAS (Energy Group)
- Group Head (Energy Management), National Productivity Council
- Chief Engineer, Smart Grid Project Gurgoan
- Shri A.K Asthana, Sr.Technical Expert, GIZ India
- Shri Puneet Dalmia, MD, Dalmiya Bharat Group
- Shri Arjun Gupta, Smart Joules Pvt Ltd.,
- Shri Arindam Paul, Atom berg Technologies Pvt Ltd.
- Shri Rangan Banerjee, HOD, Department of Energy Science and Engineering, IIT Bombay
- Shri Manit Rastogi, Founder Partner, Morphogenesis
- Shri Shubhreet Barmer, Sr. lighting Application Specialist, Philips lighting India Ltd.

- Shri Kaushik Sanyal, HOD-Business Service Group, Tata Power Distribution Ltd

Surface Transport, Railways, Civil Aviation, Ports, Shipping and Inland Waterways, Logistics

- Shri Kapil Kaul, Centre for aviation
- Shri Ranjit S. Walia, Managing Counsel, Walia & Co
- Shri G. Raghuram, Director, IIM Bangalore
- Shri Afaq Hussain, Director, Bureau of Research on Industry & Economic Fundamentals
- Dr. G. V. R. Shastri, Coastal India Development Council
- Shri Anoop Kumar Sharma, Indian National Ship Owners Association
- Capt. I. V. Solanki
- Shri Umesh Grover, Secretary General, Container Freight Station Association of India
- Capt. Ashwani Nayar, Hind Terminals Pvt. Ltd.
- Dr. Mahesh Reddy, Infrastructure Industry & Logistics Federation of India
- Shri K. Janardan Rao, MD, Indian Port Association
- Shri Akshima T Ghate, Fellow, TERI
- Shri R. N. Malik, Professor, Manav Rachna University
- Prof. Sudhir Mishra, Professor, IIT Kanpur
- Shri D.P. Gupta, Asian Institude of Transport Development
- Shri Sachin Bhanushali, Director & CEO, GatewayRail
- Shri Jaspal Singh, Consultant, International Association of Public Transport)
- Dr. Ravindra Kumar, Principal Scientist, Central Road Research Institute
- Shri Vinod Vasudevan, Assistant Professor, IIT Kanpur
- Shri Gopal Patil, Associate Professor, IIT Bombay
- Shri Seema Sharma, IIT Delhi
- Dr. Sewa Ram, SPA, Delhi
- Shri Sunil Sherlekar, Chairman and CEO, Sankhyasutra, Bangalore
- Shri Partha Mukhopadaya, Senior Fellow, Centre for Policy Research
- Ms. Rupali Ghanekar, Economic Adviser, Indian National Ship Owners Association
- Dr. Kulwant Singh, UN Habitat
- Shri Amitabh Verma, Ex IAS
- Shri Dhiraj Mathur, PWC
- Shri Manish Sharma, PWC
- Shri Clay Stranger, RMI
- Shri Kartike Karwal, Associate Director, SIAM

Smart Cities for Urban Transformation and Modernizing City Governance for Urban Transformation

- Dr. Chetan Vaidya, Former Director, School of Planning and Architecture, New Delhi
- Shri Srikanth Vidwanathan, CEO, Janaagraha, Bangalore
- Dr. Jagan Shah, Director, National Institute of Urban Affairs, New Delhi

- Dr. O. P. Agarwal, Ex-OSD, Urban Transport, WRI
- Ms. Shreya Gadepalli, South Asia Director, Institute for Transport and Development Policy
- Dr. Renu Khosla, Director, Centre for Urban and Regional Excellence, New Delhi
- Dr. Suresh Kumar Rohilla, Centre for Science and Environment, New Delhi
- Dr. Rajesh Tandon, Founder and President, Participatory Research in India
- Shri Parth Mukhopadhyay, Senior Fellow, Centre for Policy Research
- Prof. Shreekant Gupta, Delhi School of Economics
- Dr. Debolina Kundu, National Institute of Urban Affairs

Housing for All and Swachh Bharat Mission

- Shri Ravindra Singh, IAS (Retired), Former Secretary to Government of India
- Shri H.P. Prakash, Secretary & Commissioner, RWS & SD, Government of Karnataka
- Ms. Asha Kapur Mehta, Professor, IIPA, New Delhi
- Shri P Sivaram, Professor & Head, CRI&CFL, NIRDPR, Rajendra Nagar, Hyderabad
- Shri Munish Gupta, Member, FICCI, National Committee on S&T and Innovation, New Delhi
- Shri Chandrakant Raipat, CMD, Rameshwaram Projects, Pvt. Ltd., Ranchi
- Shri Samirendra Chatterjee, Exec. President, SULABH INTERNATIONAL, New Delhi
- Shri Mahesh Babu, MD, IL & FS Environment, New Delhi
- Shri Ravi Shroff, Executive Director, Excel Industries Ltd., Mumbai
- Shri Kartikeya Nitin Desai, Executive Director, ASHA Impact, New Delhi
- Shri Ashok K Agarwal, CEO, ESSEL Infra Projects Ltd., Mumbai
- Shri Subhash Chandra Vashisth, Director - SVAYAM, Jindal Saw Ltd., New Delhi
- Shri Sandip Dutt, GM, Jindal Ecopolis, New Delhi
- Shri Shreekanth Sreenivasan, Head -Business Development, KEF Holdings, Bengaluru

Water Resources

- Dr. A.K. Gosain, Professor IIT Delhi
- Dr. Deepak Khare, IIT Roorkee
- A.B.Pandya, Secretary General, International Commission on Irrigation & Drainage
- Dr. Arvind Kumar, India Water Foundation

Sustainable Environment

- Dr. P. K. Khosala,VC, Shoolini University
- Shri Vipin Chaudhary, DDG, ICFRE, Dehradun
- Shri Ajay Shankar, Former Secretary to Government, TERI, New Delhi
- Shri Jaison Varghese, Programme Officer, CEE, New Delhi
- Shri Shikhar Jain, Pr. Counselor, Confederation of Indian Industry, New Delhi
- Shri Ram Muivah, Secretary North-Eastern Council, Shilong

- Shri George C. Varughese, President, Development Alternatives
- Prof. Manmohan yadav, Professor, IIFM, Bhopal
- Shri Ravi Singh, Secretary General & CEO, WWF-India

School Education

- Dr. Dhir Jhingran, Language and Learning Foundation
- Ms. Seema Bansal, Boston Consulting Group
- Prof. Venita Kaul, CECED
- Prof. Neelam Sood, On behalf of NUEPA
- Shri Amit Kaushik, Australian Council for Educational Research (India)
- Shri Shailendra Sharma, On behalf of Pratham
- Prof. Padma Sarangapani, TISS
- Ms. Jayshree Oza
- Prof. Poonam Agrawal, On behalf of NCERT
- Dr. Vineeta Sirohi, NUEPA
- Ms. Deepa Sankar
- Shri Bikkrama Daulet Singh, On behalf of Central Square Foundation
- Shri Raj Gilda, Lend-a-Hand India
- Ms. Renu Seth, On behalf of Pratham Second Chance
- Ms. Aparna Bijapurkar, On behalf of BCG
- Ms. Jyotsana Jha, Centre for Budget and Policy Studies

Higher Education

- Prof. Furqan Qamar, AIU
- Prof. Sudhanshu Bhushan, NUEPA
- Shri Pramath Raj Sinha, Ashoka University

Teacher Education and Training

- Dr. Santhosh Mathew, NCTE
- Prof. Hrushikesh Senapaty, NCERT
- Prof. Pranati Panda, NUEPA
- Ms. Indu Prasad, On behalf of Azim Premji University
- Shri Hriday Kant Diwan
- Prof. Disha Nawani, TISS Mumbai

Skill Development

- Director General, CII
- Secretary General, FICCI
- Vocational Training & Skill Development Specialist, ILO

Public Health Management and Action, Comprehensive Primary Health Care, Human Resources for Health, Universal Health Coverage

- Dr. M.K Bhan, IIT Delhi
- Ms. Sandhya Venkateswaran, BMGF
- Dr. T Jacob John, (Retired) Christian Medical College Vellore TN Child Health FDN
- Shri NK Arora, The INCLEN Trust International
- Ms. Shamika Ravi, Brookings India
- Shri Anjan Bose, NATHEALTH

- Shri Rajesh Kumar, PGIMER School of Public Health Chandigarh
- Ms. Sarojini, Sarna
- Shri Yogesh Jain, Jan Swasthya Sahyog Village PO Gramyan Bilaspur CG
- Dr. Henk Bekedam, WHO
- Dr. Subhash Salunke, PHFI
- Shri Sanjay Zodpay, PHFI
- Shri Jorge Coarasa, World Bank
- Shri Priyanka Saksona, WHO India
- Shri Chandrakant Lahariya, WHO India NPO-UHL
- Dr. Arvind Kasaragod, Director Medical Services, India Cloudnine Hospitals
- Ms. Anjula Solanky, Director, CII

Nutrition

- Shri D.S. Swaminathan, ICMR
- Shri Manoj Kumar Singh, MWCD
- Shri Gulshan, MWCD
- Shri Raj Kumar Bhandari, Poshan
- Dr. Ajay Khera, MoHFW
- Ms. Manjula Singh, CIFF
- Ms. Rekha Sinha, Intemadonal Institute of Life Sciences
- Dr. Basanta Kumar Kar, Coalition for Food and Nutrition Security
- Ms. Naiyya Saggi, Babychakra
- Dr. B. Sesikaran, NIN
- Ms. Deepika Srivastava, Expert
- Shri C.S. Pandav, ICC
- Dr. J.H. Panwal, MWCD
- Dr. Kapil Yadav, AIIMS
- Dr. Anju Sinha
- Dr. Arun Gupta, BPNI
- Shri Amod Kanth, Prayas
- Ms. Gayatri Singh, UNICEF
- Dr. Rasmi Avula, CGIAR
- Dr. Deepika Chaudhury, World Bank
- Dr. Satish B. Agnihotri, IIT
- Shri Sameer Maheshwari, Healthkart
- Ms. Esha Saraswat, IFPRI
- Ms. Arkalina Dwibedi, FSSAI
- Dr. A.C. Mishra, FSSAI
- Shri Sumit Aggarwal, ICMR
- Dr. M K Bhan, AIIMS

Gender

- Ms. Sanchita Mitra, SEWA
- Dr. Kiran Sharma, WHO
- Dr. Seema Arora, CII
- Dr. Neeta Pradhan, CII
- Ms. Rehana Riyawala, SEWA
- Ms. Kapilaben, SEWA
- Prof. Pam Rajput, Women's Resource & Advocacy Centre
- Dr. Ratna Sudarshan, Institute of Social Studies Trust
- Prof. Mary E John, Centre for Women's Development Studies

- Ms. Suneeta Dhar, Jagori
- Prof. Ravinder Kaur, IIT Delhi
- Ms. Ena Singh, UNFPA
- Ms. Shobhana Boyle, UNFPA
- Prof. Bina Agarwal, Economist
- Ms. Diya Nanda, UN Women

Social Inclusion

- Justice Shri Eshwaraiah, Former Chairman National Commission for Backward Classes
- Dr. Sham Singh Shashi, Former DG Information & Broadcasting, Visiting Professor Anthropology& Sociology Media and Journalism, Hindi, IGNOU
- Dr. Tanweer Fazal, Associate Professor, Associate Professor Center for the Study on Social Systems, Jawahara Lal Nehru University
- Dr. R.R. Prasad, Rtd. Professor, Centre for exclusion & Inclusive studies, NIRD, Hyderabad
- Prof. G.G. Wankhede, Former Professor (TISS)
- Prof. Anita Julka, Department of Education of Groups with Special Needs, National Council of Educational Research and Training
- Dr. Siddhartha Sarkar, Principal & Executive Head, Ananda Chandra College of Commerce, Jalpaiguri
- Shri Javed Abidi, Director, National Centre for Promotion of Employment for Disabled People (NCPEDP) & founder of the Disability Rights Group
- Shri Nipun Malhotra, Co-founder and CEO, Nipman Foundation
- Dr. Aloka Guha
- Shri G.B. Panda, Former Senior Adviser, Backward Castes Division, Planning Commission
- President / Secretary, Bharatiya Adim Jati Sevak Sangh
- Shri Ashif Shaikh, Director, Jan Sahas Social Development Society
- Shri R.C. Durga
- Ms. Ruth Manorama
- The Secretary, National Commission for Scheduled Castes
- The Secretary, National Commission for Scheduled Tribes
- The Secretary, National Commission for Safai Karmacharies
- The Secretary, National Commission for Minorities
- The Member Secretary, National Commission for Denotified, Nomadic & Semi-Nomadic Tribes
- The Secretary, National Commission for Backward Classes
- The CEO and Joint Secretary, National Trust

The North-East Region

- Shri Chandan Mahanta, Dean, IIT, Guwahati
- Prof. Sachin Chaturvedi, DG, RIS
- Shri Amitabha De, IIM, Shillong
- Prof. Milindo Chakrabarti, Visiting Fellow, RIS
- Shri R.S.C. Jayraj, Director, Rain Forest Renewal Institute

Legal, Judicial and Police Reforms

- Shri Suresh Chandra, Secretary Law, Ministry of Law & Justice
- Prof. S. Sivakumar, Member, Law Commission of India
- Ms. Anupama Nilekar Chandra, Inspector General, BPR & D
- Shri Amod Kanth, Founder, Prayas Institute of Juvenile Justice & Chairman DWSSC
- Shri Shekhar Gupta, Founder, The Print

Civil Services Reforms

- Shri Shyam Bang, Chairman NABCB
- Dr. Sanjeevan Bajaj, CEO FICCI Quality Forum
- Shri P. K. Tripathi, EO & Additional Secretary, DoPT
- Ms. Vasudha Mishra, Additional Secretary, DARPG
- Shri B. S. Baswan, Former Chairman UPSC Committee on Civil Services Examinations
- Prof. Dolly Arora, IIPA, New Delhi

Optimizing the Use of Land Resources

- Shri Prabhat Kumar Sharma

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