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Public investment in key infrastructure sectors is a force multiplier with historically proven ability to revive the broader economy by directly enhancing capital stock and productivity and by attracting private investment.

”

–*Shaktikanta Das*¹

2



**BUILDING RURAL INDIA THROUGH
INFRASTRUCTURE DEVELOPMENT**

2.1 Infrastructure drives growth

Rural infrastructure is critical for stimulating the rural economy and achieving the United Nations’ Sustainable Development Goals (SDGs) by 2030.² For India to become a \$5 trillion economy by FY2025 too requires additional infrastructure.³ Studies reveal that a 1% increase in the stock of infrastructure is associated with a 1% increase in gross domestic product (GDP) across countries.⁴ Furthermore, the estimated welfare multiplier of 0.8 for effective public infrastructure investment can lead to the substantial welfare gains.⁵ Several studies have articulated theoretically⁶ and established empirically⁷ the positive impact of infrastructure on agricultural development. Gulati *et al.* (2021) established infrastructure as one of the three important factors behind agrarian growth (Box 2.1).⁸ Infrastructure is defined by various agencies in different ways (Box 2.2).

Box 2.1: Role of rural infrastructure in enabling agrarian growth

A recent study by Gulati *et al.* (2021) found that in six states, viz. Punjab, Madhya Pradesh, Gujarat, Uttar Pradesh, Bihar, and Odisha, three factors explained most of the agrarian growth, i.e., (i) access to infrastructure including irrigation, roads, and uninterrupted quality power; (ii) diversification to high value agricultural products like fruits, vegetables, and allied activities like dairy and poultry; and (iii) price incentives or favourable terms of trade.

The study advocates the need to bring markets closer to farmers. In this context, setting up of the ₹1 lakh crore Agriculture Infrastructure Fund by the Government of India under the post-pandemic

(Continued)

AatmaNirbhar Bharat package would address the issues of lack of adequate cold storage, post-harvest management infrastructure, and markets in the vicinity of farm gate.

The study has also shown that increasing the efficiency of the value-chains is an important factor that explained agricultural growth in Gujarat (mainly cotton, groundnut, livestock); Madhya Pradesh (wheat, soybean, pulses); Odisha (livestock and fruits and vegetables); and Bihar (maize and livestock).

Source: Ashok Gulati, Ranjana Roy, and Shweta Saini (eds) (2021), *Revitalising Indian Agriculture and Boosting Farmer Incomes*, Springer, New Delhi.

Box 2.2: What is infrastructure?

World Bank

Infrastructure includes

- public utilities such as power, telecommunications, piped water supply, sanitation and sewerage, solid waste collection and disposal, and piped gas;
- public works such as roads and major dam and canal works for irrigation and drainage; and
- other transport systems including urban and interurban railways, urban transport, ports and waterways, and airports.

Food and Agriculture Organization of the United Nations

Infrastructure includes physical structures that aid the competitiveness of the productive agricultural sector, and the related organisational systems that support their planning, procurement, design, construction, regulation, operation and maintenance.

Asian Development Bank

Infrastructure includes fixed asset investments in transport (road, rail, airports, and ports); energy; telecommunications; and water and sanitation, including dams, irrigation, and flood control waterworks.

Reserve Bank of India

Infrastructure includes projects in

- road, including toll road, a bridge, or a rail system;
- highway, including other activities being an integral part of the highway project;
- port, airport, inland waterway, or inland port;
- water supply, irrigation, water treatment system, sanitation and sewerage system, or solid waste management system; and
- telecommunication service.

NABARD

Under its Rural Infrastructure Development Fund (RIDF), NABARD has, over time, expanded and broad-based the activities eligible for assistance. At present it considers 37 activities under (i) irrigation; (ii) agriculture and related sector; (iii) rural connectivity (roads and bridges); and (iv) social sector (projects related to drinking water provisioning, rural education institutions, public health institutions, construction of toilets in schools, public toilets, construction of anganwadi centres, sanitation infrastructure and rural industrial estates).

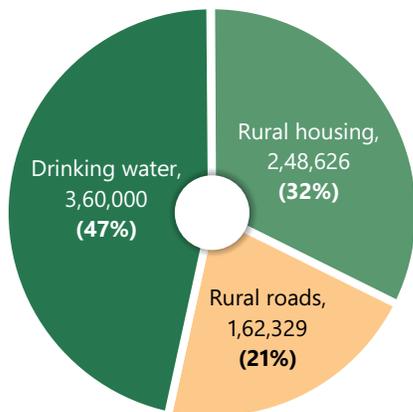
Sources:

1. World Bank (1994), *World Development Report 1994: Infrastructure for Development*, published for the World Bank by Oxford University Press, New York, Box 1, p. 2. <http://documents1.worldbank.org/curated/en/535851468336642118/pdf/131840REPLACEMENT0WDR01994.pdf>.
2. Michael Warner, David Kahan, and Szilvia Lehel (2008), Market-oriented agricultural infrastructure: Appraisal of public-private partnerships, *Agricultural Management, Marketing and Finance Occasional Paper 8*, Food and Agriculture Organization of the United Nations, Rome, p. 1, para 2. <http://www.fao.org/3/i0465e/i0465e.pdf>.
3. ADB (2017), *Meeting Asia's Infrastructure Needs*, Asian Development Bank, Manila. p. 19. <https://www.adb.org/sites/default/files/publication/227496/special-report-infrastructure.pdf>.
4. RBI Circular DBOD.BP.BC.No.66/08.12.014/2013-14 dated 25 November 2013.



India has expressly prioritised infrastructure development more than ever during FY2021. The Taskforce on National Infrastructure Pipeline (NIP) estimates capital expenditure of ₹7,73,915 crore between FY2020 and FY2025 on rural infrastructure development by the centre and states (Figure 2.1).⁹

FIGURE 2.1: Distribution of capital expenditure for rural infrastructure (FY2020–FY2025) (₹ crore)



Note: The estimated capital expenditure on rural infrastructure from State Budgets is ₹2,960 crore.

Source: GOI (2020), *Report of the Taskforce on National Infrastructure Pipeline Volume II*, Department of Economic Affairs, Ministry of Finance, Government of India.

2.2 Regional spread of infrastructure

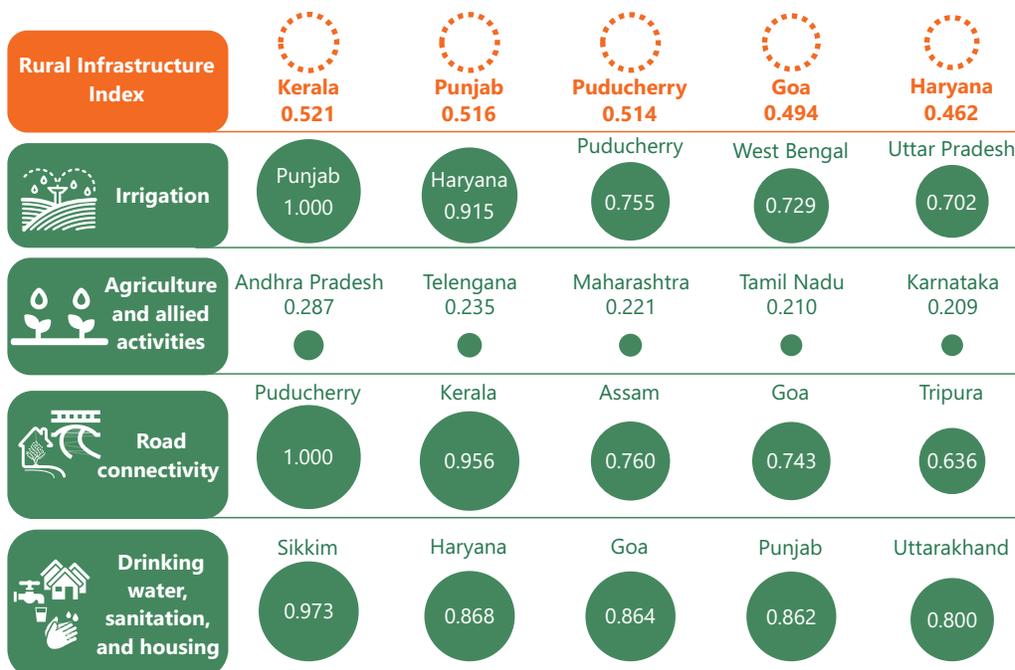
A state-wise composite Rural Infrastructure Index (RII)¹⁰ constructed by the Economic and Political Weekly Research Foundation shows Jharkhand, Manipur, Arunachal Pradesh, Meghalaya, Odisha, Chhattisgarh, Madhya Pradesh, Bihar and Uttar Pradesh as states with low RII (Figure 2.2).¹¹ It is, therefore, imperative to accord high priority to these states in terms of access to financial resources for creation of rural infrastructure. NABARD considers low RII as one of the criteria for allocating higher RIDF corpus annually.

Most states with high RII of irrigation (more than 0.7) are also major producers of foodgrains with high irrigation coverage¹²—Punjab (99%), Haryana (92.7%), West Bengal (80.4%), and Uttar Pradesh (69.8%).¹³ Large states with low RII of irrigation such as Odisha (0.195), Maharashtra (0.209), and Chhattisgarh (0.243) figure among the top 10 states to be sanctioned loans for irrigation under the Rural Infrastructure Development Fund (RIDF).¹⁴ There is a need to prioritise investment in irrigation in the North Eastern states, three of which figure among the bottom five states in terms of RII of irrigation (Figure 2.2).

Major states like Bihar, Uttarakhand, and Goa, along with the North Eastern states, lag in terms of RII

FIGURE 2.2: Rural Infrastructure Index by state: Best and worst performers

A. Best performers



B. Worst performers

Rural Infrastructure Index	Jharkhand 0.120	Manipur 0.187	Arunachal Pradesh 0.215	Meghalaya 0.227	Odisha 0.233
 Irrigation	Manipur 0.034	Mizoram 0.067	Assam 0.068	Jharkhand 0.111	Sikkim 0.124
 Agriculture and allied activities	Sikkim 0.004	Arunachal Pradesh 0.013	Nagaland 0.017	Meghalaya 0.019	Manipur 0.031
 Road connectivity	Jammu and Kashmir 0.002	Arunachal Pradesh 0.013	Mizoram 0.022	Chattisgarh 0.044	Haryana 0.051
 Drinking water, sanitation, and housing	Jharkhand 0.047	Odisha 0.048	Tripura 0.148	Madhya Pradesh 0.184	Uttar Pradesh 0.198

Note: The report followed three approaches of weighting nine infrastructure components for constructing the Rural Infrastructure Index, i.e. equal weights, conjectural weights based on expert opinion, and weights based on Principal Component Analysis (PCA). Above figure presents state-wise indices based on PCA.

Source: Dennis J. Rajakumar, Vijayata B. Sawant, and S.L. Shetty (2020), Construction of State-wise Rural Infrastructure Indices, Economic and Political Weekly Research Foundation, Mumbai (sponsored by NABARD).

in agriculture and allied activities (less than 0.1) and, therefore, there is a strong case for higher investment in agri-infrastructure in these states. As expected, most Himalayan and hill states in the North and North East score poorly in terms of RII of road connectivity. It is, however, more worrisome to note that the same is less than 0.2 for even populous and large states such as Andhra Pradesh, Uttar Pradesh, Madhya Pradesh, Rajasthan, and Gujarat. Big states with low RII (below 0.5) in social infrastructure include not just Jharkhand, Odisha, Madhya Pradesh, and Uttar Pradesh but also, Andhra Pradesh, Rajasthan, Tamil Nadu, West Bengal, Chhattisgarh, and Bihar, which calls for urgent action.¹⁵

2.3 Government initiatives in rural infrastructure

The emphasis laid by successive five-year plans on the development of rural infrastructure comprising irrigation, rural connectivity, post-harvest infrastructure, and digital network has shown results. About 49% of the net sown area in the country is irrigated at present¹⁶ though growth of net irrigated area is stagnating (with a compounded annual growth rate of only 1.3% between FY1996 and FY2015).¹⁷ The total length of rural roads in the country has increased more

than 20 times from 0.2 million km in FY1951 to 4.2 million km in FY2017.¹⁸ The Warehousing Development and Regulatory Authority (WDRA) estimated that a storage capacity of 162.7 million tonne was available in the public, private, and cooperative sectors in the form of warehouses.¹⁹ Besides Electronic National Agriculture Markets (e-NAMs) in Agricultural Produce Marketing Committee (APMC) mandis, the Bharat Net project aims to set up the world's largest rural broadband infrastructure connecting all 2.5 lakh Gram Panchayats in the country.

Major government initiatives like the Mahatma Gandhi National Rural Employment Guarantee Scheme, AatmaNirbhar Bharat, Pradhan Mantri Awaas Yojana–Gramin (PMAY–G), Pradhan Mantri Gram Sadak Yojana (PMGSY), SP Mukherjee Rurban Mission, Swachh Bharat Mission–Gramin (SBM–G), Jal Jeevan Mission, Pradhan Mantri Kisan Sampada Yojana, Deen Dayal Upadhyay Gram Jyoti Yojana, and Pradhan Mantri Sahaj Bijli Har Ghar Yojana–Saubhagya package, all focused on infrastructure in all major economic sectors (Figure 2.3 and Appendix A2.1).

Major announcements in the Union Budget FY2022 for the creation of rural infrastructure are presented in Figure 2.4. The Budget raised the estimates for capital



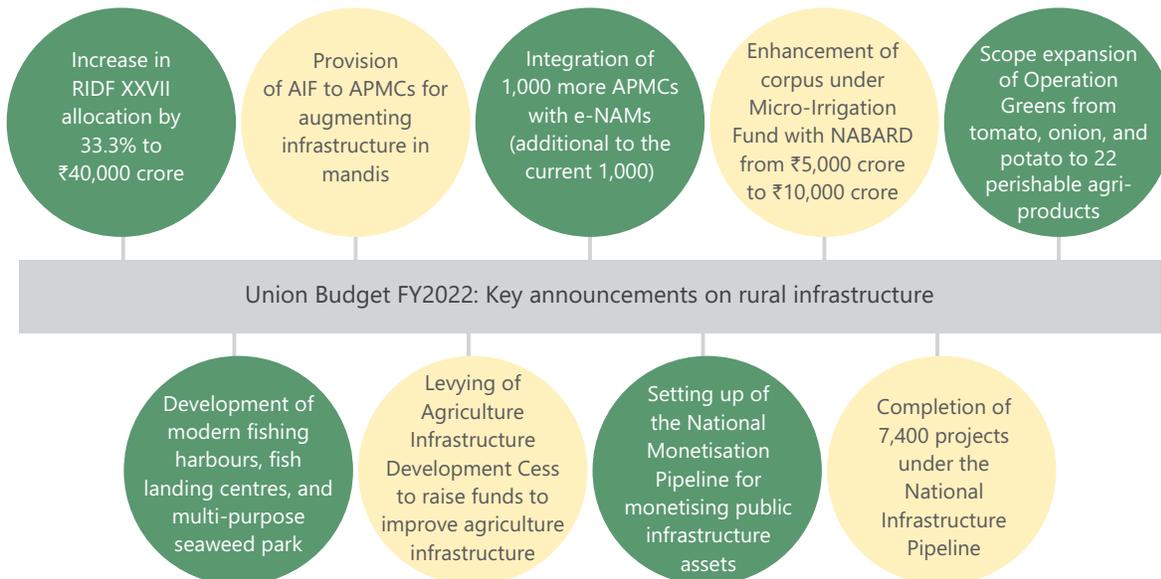
FIGURE 2.3: AatmaNirbhar Bharat package for rural infrastructure

Agriculture Infrastructure Fund	<ul style="list-style-type: none">• ₹1,00,000 crore• Post-harvest infrastructure projects at farm gate or aggregation points, PACS, FPOs, agri-entrepreneurs, start-ups, etc.
Pradhan Mantri Matsya Sampada Yojana	<ul style="list-style-type: none">• ₹20,050 crore• Fishing harbours, cold chains
Scheme for Formalisation of Micro-Food Processing Enterprises	<ul style="list-style-type: none">• ₹10,000 crore• Technical upgrading of MFPEs to attain FSSAI standards• Cluster-based approach
Animal Husbandry Infrastructure Development Fund	<ul style="list-style-type: none">• ₹15,000 crore• Supporting private investment in dairy processing, value addition, cattle feed infrastructure• Establishing plants for export of niche products

Notes: FPO = Farmer Producers' Organisation; FSSAI = Food Safety and Standards Authority of India; MFPE = Micro-Food Processing Enterprise; PACS = Primary Agricultural Credit Societies.

Source: Compiled by author from AatmaNirbhar Bharat Mission website, <https://aatmanirbharbharat.mygov.in/>.

FIGURE 2.4: Union Budget FY2022: Key announcements on rural infrastructure



Notes:

1. AIF = Agriculture Infrastructure Fund; APMC = Agricultural Produce Marketing Committee; e-NAM = Electronic National Agriculture Market; RIDF = Rural Infrastructure Development Fund.
2. For details on the National Monetisation Pipeline, see Appendix A2.2.

Source: Union Budget FY2022 speech of Union Finance Minister Nirmala Sitharaman.

expenditure by 34.5% over the previous year to ₹5.54 lakh crore.

2.4 Issues and challenges of India's rural infrastructure

The report of the Taskforce on National Infrastructure Pipeline has identified critical challenges faced by major rural infrastructure development programmes in India.²⁰ It has also recommended measures to address these challenges (Table 2.1).

TABLE 2.1: Addressing the challenges to rural infrastructure development

Sector	Challenges	Suggested measures
Rural housing 'Housing for All by 2022'	Land scarcity; inadequate financing; and legal constraints	Efficient land usage; easy access to finance and innovative financing mechanism; and setting up an affordable housing fund in the National Housing Bank
Roads	Poor condition of rural road network	To follow Rural Roads Maintenance Policy prepared by the National Rural Infrastructure Development Agency and International Labour Organization
Water supply and sanitation	Poor delivery	Decentralised service delivery model with key role to Gram Panchayats and local communities

Poor quality of infrastructure is a major cause of economic inefficiency. Uniform regulation and output-based performance standards, consistent processes for updating/setting standards, improving compliance mechanism, alignment with development strategy, and social and environmental sustainability would help strengthen infrastructure quality. The taskforce therefore recommended that a National Framework for Infrastructure Quality be laid down, based on global and national standards.²¹

2.5 Investment opportunities for building rural India

There is a wide array of investment opportunities in rural infrastructure. Some of these are presented here.

2.5.1 Digital infrastructure

Infrastructure should not only be about highways but also about information highways! The way ahead lies in creating optical fibre networks.

— Prime Minister Shri Narendra Modi

The Government of India (GOI) has taken up various initiatives including Bharat Net for achieving the goal of the Digital India programme. Under the project, network infrastructure is being established for broadband highways, accessible on a non-discriminatory basis to provide affordable broadband services to citizens and institutions in rural areas, in partnership with states and the private sector.²²

2.5.2 Market and value chain infrastructure

Lack of cold-chain systems forces farmers in India to monetise their produce at first instance by selling into food processing units and inefficient wholesale markets.²³ Further, lack of food processing infrastructure in the vicinity of farm gates results in about 25%–30% post-harvest losses. It may be concluded that although the GOI has prioritised investment in food parks and cold chain infrastructure under the Pradhan Mantri Kisan SAMPADA (Scheme for Agro-Marine Processing and Development of Agro-Processing Clusters) Yojana, there is further scope for investment in value chain infrastructure across India, especially in the North East, Sikkim, Uttarakhand, Jammu & Kashmir, Ladakh, and states in the Eastern and Central regions of India.

2.5.3 Agriculture export infrastructure

The Agriculture Export Policy (AEP), 2018 has argued that the development of export-oriented clusters across states will be central to ensuring surplus produce with standard physical and quality parameters which meet export demand.²⁴ The AEP has further recommended the establishment of Agri Export Zones (AEZs) with common facility creation to facilitate value addition to agri-commodities. Farmer producers' organisations need to be linked to the AEZs. The GOI needs to further consider the development of Dairy Export Zones in collaboration with state governments.²⁵

2.5.4 Disaster-resilient infrastructure

The Coalition for Disaster-Resilient Infrastructure, launched in September 2019 at the United Nations Climate Action Summit, has initiated the process of national level risk and resilience assessment of infrastructure to support better decision making and policy development, and thus protect infrastructure investments from disasters and climate change.²⁶



2.5.5 Rural health infrastructure

While National Family Health Survey data has shown improvement in rural health indicators,²⁷ the pandemic (with attendant loss of food, health, and livelihoods security) poses a gargantuan challenge to rural health infrastructure which must be modernised and strengthened.

2.5.6 Infrastructure development in Aspirational Districts

The Transformation of Aspirational Districts programme (2018) of the NITI Aayog (transforming 115 districts across 28 states) focuses on (i) health and nutrition; (ii) education; (iii) agriculture and water resources; (iv) financial inclusion and skill development; and (v) basic infrastructure including roads (PMGSY), houses (PMAY-G), potable water, rural electrification, household toilets (SBM-G), internet connection, and common service centres.

2.5.7 Micro-infrastructure

To ensure that even the most remote villages attain SDGs by 2030, a micro-infrastructure approach could revolutionise poverty alleviation through a highly

decentralised, smart, clean, climate-resilient system to provide agriculture, water, and energy services. Specialist designers and investors could be brought on board to deliver appropriate infrastructure to the poorest 1–2 billion people on the planet.²⁸ Solutions would involve designing electricity or piped water distribution networks to reach every house, using an appropriate modern mix of extending the existing centralised systems (e.g., electricity grid), building stand-alone mini-networks (e.g., mini/micro/pico grids for medium/small/tiny villages), and home-based services (such as solar home systems and household water tanks).

2.6 NABARD's contribution to rural infrastructure

NABARD is a major player in India's rural infrastructure space. During its 26-year journey, RIDF has evolved into a dependable, affordable, and timely source of funding for rural infrastructure projects for state governments.²⁹ As on 31 March 2021, under tranches RIDF I (FY1996) to XXVI (FY2021), cumulative sanctions aggregating to ₹4,09,063 crore have been accorded to various states/UTs including an earlier sanction of ₹18,500 crore under the Bharat Nirman Programme (Figure 2.5).³⁰

FIGURE 2.5: Cumulative sanctions, share, and growth by sector under Rural Infrastructure Development Fund (I–XXVI) as on 31 March 2021

	Irrigation	Agri-related	Connectivity	Social sector
Cumulative sanctions (₹ crore)	1,25,044	45,486	1,47,210	72,823
Share (%)	32.0	11.7	37.7	18.6
CAGR (%)	11.4 (FY1996–FY2021)	14.3 (FY1996–FY2021)	9.5 (FY1997–FY2021)	12.5 (FY2005–FY2021)
AAG (%)	10.8	29.6	10.8	17.9
Top 10 states	GJ, MP, UP, OD, MH, AP, CH, RJ, TN, WB	WB, UP, OD, TN, KL, AP, RJ, AS, BH, GJ	BH, JH, OD, UP, TN, WB, RJ, AP, KN, AS	RJ, TN, AP, GJ, TL, KN, MP, KL, OD, HR

Total Sanctions ₹4,09,063 crore (including ₹18,500 crore under Bharat Nirman)

Notes: AAG = Average Annual Growth; AP = Andhra Pradesh; AS = Assam; BH = Bihar; CAGR = Compounded Annual Growth Rate; CH = Chhattisgarh; GJ = Gujarat; HR = Haryana; JH = Jharkhand; KL = Kerala; KN = Karnataka; MH = Maharashtra; MP = Madhya Pradesh; OD = Odisha; RJ = Rajasthan; TL = Telangana; TN = Tamil Nadu; UP = Uttar Pradesh; WB = West Bengal.

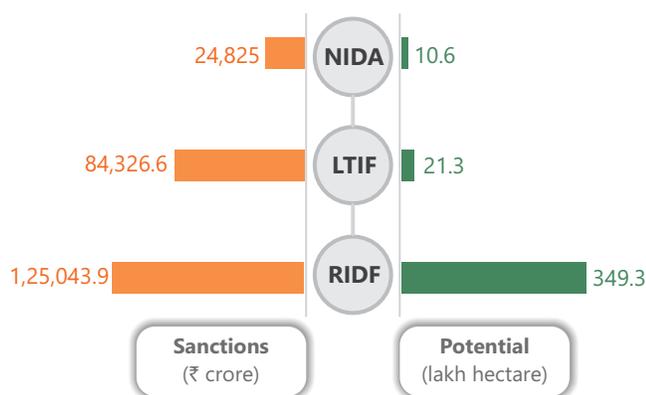
Source: Data accessed from NABARD.

On completion of the RIDF projects sanctioned under major sectors up to 31 March 2021, the cumulative benefits likely to be generated include the creation/restoration of 349.3 lakh ha of irrigation potential, rural road length of 4.9 lakh km, and rural bridges of 12.3 lakh metre. In addition, these projects are expected to generate around 2,000 crore person days of non-recurring employment.

NABARD has been funding the National Water Development Agency, the special purpose vehicle of the GOI and willing state governments under the Long Term Irrigation Fund (LTIF) since FY2017 towards identified major and medium irrigation projects. Cumulative loans sanctioned and released under LTIF as on 31 March 2021 stand at ₹84,326.6 crore and ₹52,479.7 crore, respectively. The LTIF aimed at increasing the total irrigation potential of the 99 projects identified under the fund from 41.4 lakh ha as on 31 March 2016 to 76 lakh ha. Up to 31 March 2020, an incremental irrigation potential of 21.3 lakh ha was achieved, bringing the total to 62.7 lakh ha, just shy of the final target by 13.3 lakh ha (Figure 2.6).

Cumulative sanctions of NABARD under RIDF, LTIF, and the NABARD Infrastructure Development Assistance (NIDA) amount to ₹2,34,195.5 crore (as on 31 March 2021), creating a total irrigation potential of 381.2 lakh ha (Figure 2.6).

FIGURE 2.6: Cumulative sanctions and irrigation potential under various NABARD funds for rural infrastructure as on 31 March 2021



Notes:

1. LTIF = Long Term Irrigation Fund; NIDA = NABARD Infrastructure Development Assistance; RIDF = Rural Infrastructure Development Fund.
2. Sanctions under NIDA include micro-irrigation.

Source: Data accessed from NABARD.

Set up by NABARD in FY2011, NIDA offers flexible options for financing a wide array of rural infrastructure projects to public sector entities as well as corporate sector through public-private partnership (PPP). Cumulative sanctions under NIDA as on 31 March 2021 stood at ₹57,724.3 crore.

Investments in warehouses and cold storages are the primary development focus of post-production agriculture for holding inventory for extended durations, enabling farmers to avoid distress sale of their produce; facilitating better price discovery mechanism; and providing post-harvest credit support to farmers through electronic negotiable warehouse receipts. Cumulative sanctions stood at ₹9,728 crore and disbursements at ₹7,620.7 crore as on 31 March 2021, under the Warehouse Infrastructure Fund (instituted by the GOI in NABARD in FY2014) for a total designed capacity of 12.7 million tonne (Table 2.2).

TABLE 2.2: Status of Warehouse Infrastructure Fund in top states as on 31 March 2021

	Total designed capacity (million tonne)	Total sanctions (₹ crore)	Total disbursements (₹ crore)
Tamil Nadu	1.8	2,520.9	2,088.4
Karnataka	1.3	1,700.5	1,366.2
Telangana	1.8	951.7	852.3
Total (all states)	12.3	9,575.4	7,484.0
Loans to other agencies	0.4	152.7	136.7
Grand Total	12.7	9,728.0	7,620.7

Source: NABARD.

Despite NABARD's significant contribution, shortfall in India's rural infrastructure financing vis-à-vis demand persists.

2.7 Financing rural infrastructure

The aggregate infrastructure spending gap in low and middle income countries is estimated at about \$1 trillion³¹—a challenge for most of them to fill with domestic revenues. China, now an upper middle income economy,³² figures among the few exceptions (Box 2.3). For nearly eight decades, multilateral development banks and development finance institutions (DFIs) have supported such economies bridge this gap (Figure 2.7).³³



Box 2.3: Infrastructure development in China

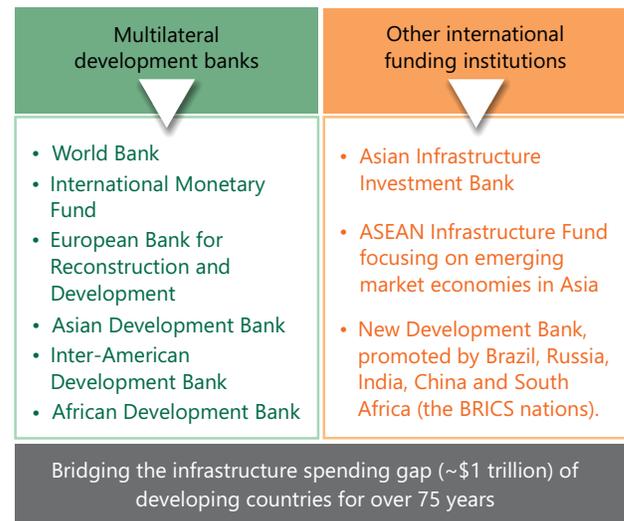
Infrastructure has driven the economic growth of China.^a In 2017, investments formed 45% of China's GDP, over a fifth of it (>9% of GDP) from infrastructure. The world's highest (and still expanding) railway, biggest hydropower station, and largest water transfer system are all in China.^b In response to the COVID-19 pandemic, China is rolling out new nationwide digital infrastructure—5G networks, artificial intelligence, internet of things, intercity high-speed rail, digital industrial infrastructure, and research and development institutions. China's model of improving physical infrastructure coupled with formation of human capital that encompasses policy, planning, financing, executing, and implementing large and at scale projects, at times ecologically sensitive, is instructive for other countries.^c

Sources:

- ^a Liang Chuan (2008), Infrastructure Development in China, in Kumar, N. (ed.), *International Infrastructure Development in East Asia – Towards Balanced Regional Development and Integration*, ERIA Research Project Report 2007-2, China: IDE-JETRO, pp. 85-104.
- ^b Mohamed Zeeshan (2021), *Flying Blind: India's Quest for Global Leadership*, Penguin Random House India.
- ^c Pravakar Sahoo, Ranjan Dash, and Geenthanjali Nataraj (2010), Infrastructure development and economic growth in China, IDE Discussion Papers 261, Institute of Developing Economies, Japan External Trade Organization.

**The ambitious NIP for
FY2019–FY2025 aims at
increasing infrastructure outlay
to take India closer to its goal of
becoming a \$5 trillion economy.**

FIGURE 2.7: Financing infrastructure by multilateral and regional institutions



Source: Compiled by author.

Many of these institutions extend easy long-term credit and technical and advisory services aimed at developing infrastructure for sustainable growth.

The World Bank has identified a sizeable global opportunity to invest in infrastructure, provided stronger infrastructure governance is in place. Private capital could help bridge the large-sized infrastructure funding need gaps that the member countries have.³⁴

With a similar population, India's GDP is less than a fourth of China and our outlay for infrastructure at 5.2% of GDP (FY2019) is less than one-eighth. The ambitious NIP for FY2019–FY2025 aims at reducing this gap

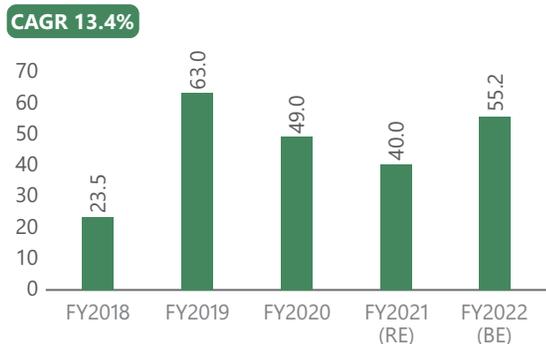
as India attempts to become a \$5 trillion economy by FY2025.³⁵ The over ₹7.7 lakh crore³⁶ NIP multi-year spending (capital expenditure) envisaged for rural India during the period will act as a major boost to physical infrastructure.

The key sources for financing India's rural infrastructure are:

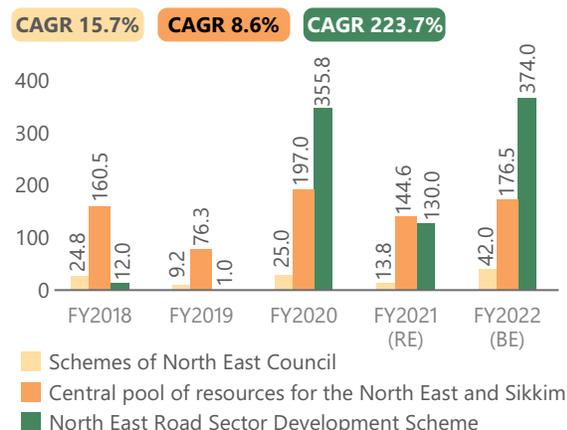
1. **Union budgetary resources:** Capital expenditure exceeding ₹15,000 crore through prominent centrally sponsored and central sector schemes between FY2018 and FY2022 for rural infrastructure development (Figure 2.8).

FIGURE 2.8: Capital expenditure on select central sector schemes for development of rural infrastructure (₹ crore)

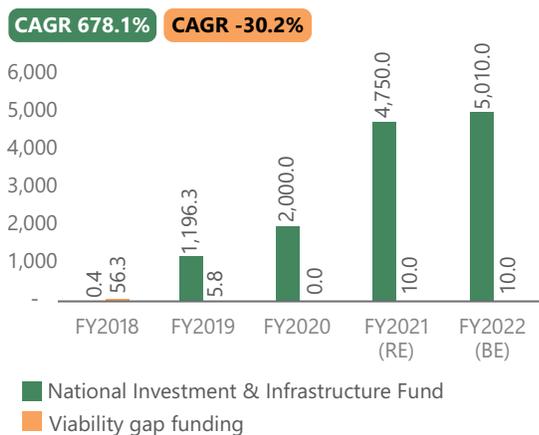
Department of Food & Public Distribution, Storage & Godowns



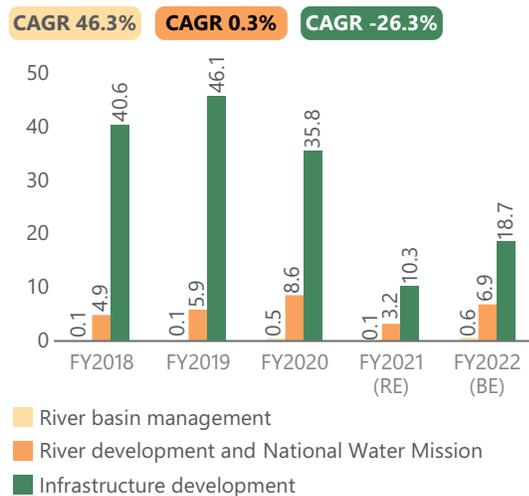
Ministry of Development of North East Region



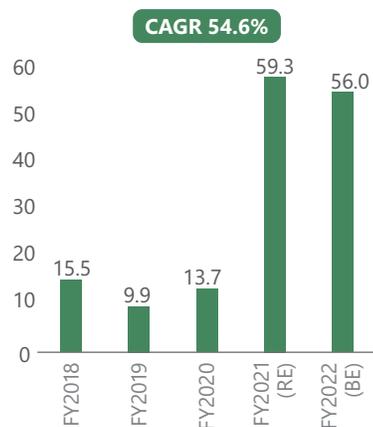
Department of Economic Affairs



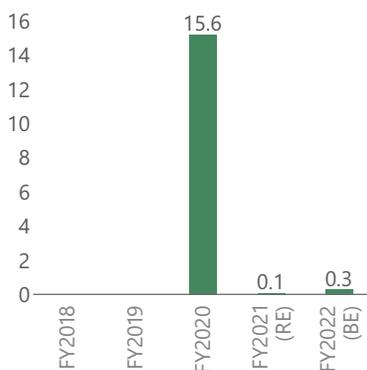
Department of Water Resources, River Development & Ganga Rejuvenation



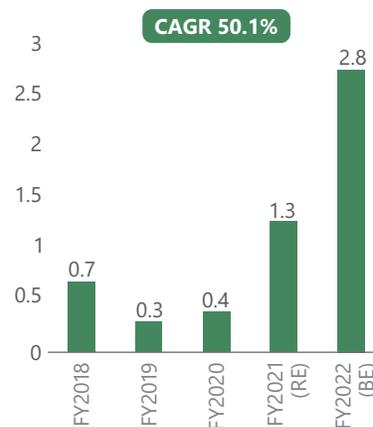
Green Revolution



Jal Jeevan Mission/ National Rural Drinking Water Mission



Pradhan Mantri Krishi Sinchayee Yojana



Notes:

1. BE=Budget Estimate; CAGR = Compounded Annual Growth Rate; RE = Revised Estimates.
2. CAGR calculated for the period FY2018–FY2022.

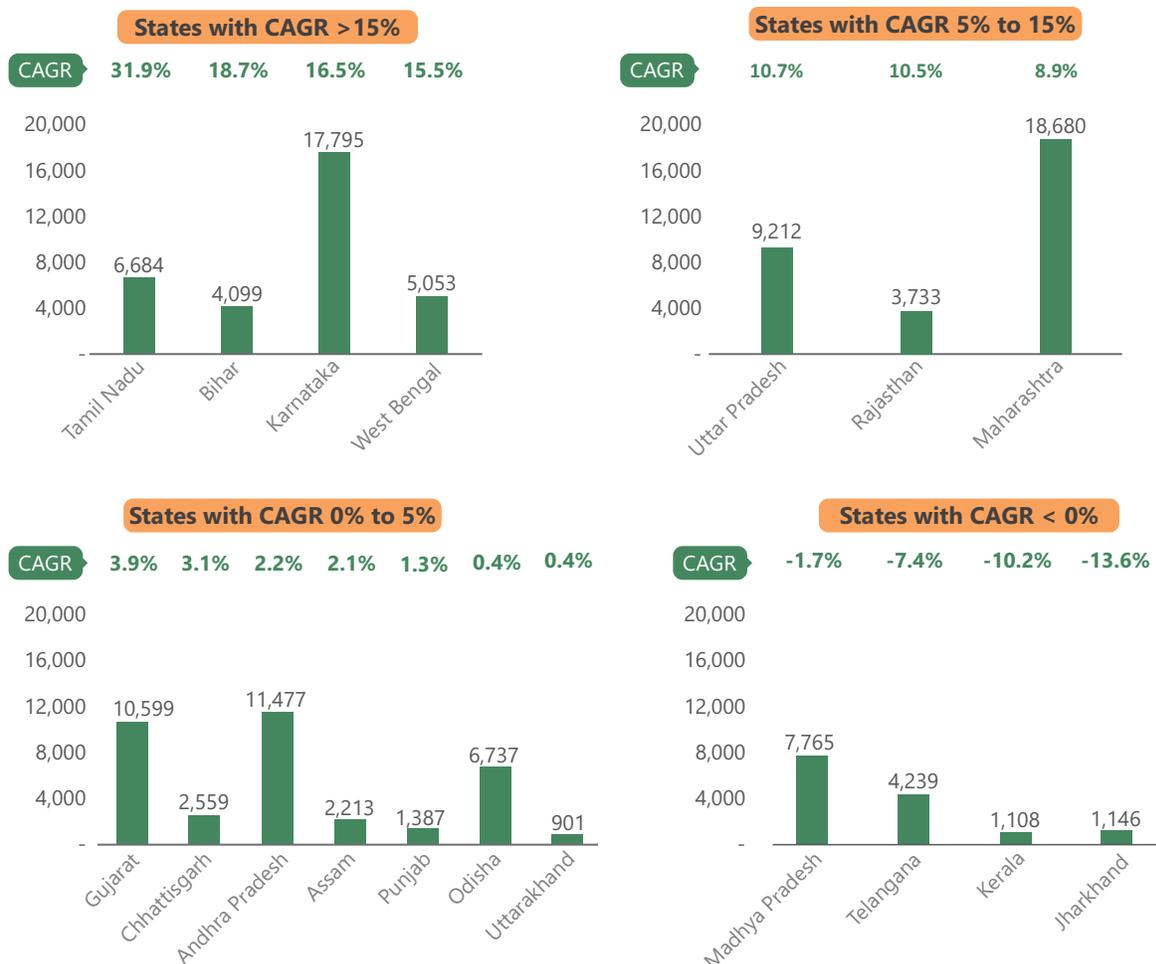
Sources: Expenditure Profile, Union Budget Documents for FY2020, FY2021, and FY2022, Ministry of Finance, Government of India.



2. **Budgets of states:** Nearly ₹5.1 lakh crore in capital expenditure on irrigation, storage, warehousing, other agriculture, and allied sector infrastructure by 18 major states between FY2017 and FY2021 (Figure 2.9).
3. **Extra-budgetary resources:** ₹1.4 lakh crore was raised by the GOI by issuing fully serviced bonds to central public sector enterprises during FY2017–FY2021.³⁷
4. **Bank loans:** Banks must lend a portion of their adjusted net bank credit to priority sectors on

NABARD offers states low-cost funds @ 1.5% below bank rate from RIDF, subject to provisions of Article 293 (3) of the Constitution of India.

FIGURE 2.9: Capital expenditure on agri-infrastructure from state budgets in major states in FY2021 (Budget Estimates; ₹ crore)



Notes:

1. CAGR = Compounded Annual Growth Rate; BE = Budget Estimates; RE = Revised Estimate.
2. CAGR calculated for the period FY2017–FY2021.
3. Capital expenditure on agri-infrastructure includes spends on irrigation, other agriculture infrastructure, storage, warehousing, and allied sector infrastructure.

Sources: RBI (various years), *State Finances: A Study of Budgets* (2018–19, 2019–20, and 2020–21 issues), Reserve Bank of India, Mumbai.

favourable terms (per RBI guidelines) to infuse capital into agriculture, health, renewable energy, and social infrastructure according to emerging national priorities.³⁸

5. Private investments

a. **Public–private partnerships:** In 24 states, warehousing facilities are being built via private participation (under the Private Entrepreneurs Guarantee scheme) alongside Central Warehousing Corporation and state-specific warehousing corporations.

b. **Viability gap funding (VGF):** In FY 2021, the revamped Infrastructure VGF scheme that offers capital subsidy to attract the private sector to invest in economically justified–financially unviable projects since 2004 was extended by the GOI till FY2025.

6. Other innovative financing options for rural infrastructure

a. **Asset monetisation:** A National Monetisation Pipeline of potential brownfield infrastructure assets was proposed in the Union Budget for FY2022, to be rolled out under the Asset Monetisation Programme. Monetisation of some agricultural and rural assets like warehousing or even railway infrastructure could be financed through the asset monetisation route.

b. **Takeout Finance Scheme:** India Infrastructure Finance Company Ltd. offers funding of up to 100% of the residual loan amount to address asset–liability mismatch due to financing of commercially viable projects in sectors such as roads, bridges, cold chains, warehouses, and power.³⁹ It also helps free up capital for new projects.

c. **Pension and insurance funds:** These long-term, low risk–return stable funds have expressed interest in financing infrastructure projects around the world.⁴⁰ Report of the Taskforce on NIP observes that these would be interested in investing in post-construction and operational stages of an infrastructure project.⁴¹

7. **National Bank for Financing Infrastructure and Development (NaBFID):** The NaBFID is envisioned as a DFI to support the development of long-term, non-recourse infrastructure financing in India, including the development of the prerequisite bonds and derivatives markets. The NaBFID is

expected to finance big infrastructure projects in sectors such as power, ports, and airports. However, with pan-India jurisdiction, it could as well be involved in financing high-cost rural infrastructure projects.

2.8 Outlook for infrastructure for a \$5 trillion economy

Post-pandemic recovery will require sustained and graduated measures to facilitate the return of the Indian economy to its long-term growth trajectory. This would entail revival of the infrastructure sector to attain overall economic growth and macroeconomic stability. Investment in rural infrastructure to build rural India may include the following:

- Greater investment in post-harvest infrastructure like storage, cold chains, food parks, logistics, market infrastructure near the farm gates, and expansion and strengthening of e-NAMs in all APMC markets as well as in gramian agricultural markets and WDRA-accredited warehouses.
- Covering all farms under irrigation through Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)–Har Khet Ko Pani and PMKSY–Per Drop More Crop, significantly increasing investment in irrigation, including micro-irrigation.
- Increasing investment in rural connectivity (including roads, bridges, and digital infrastructure) by the GOI, state governments, NABARD, and the corporate sector.
- Preparing a roadmap for investments in solar and wind energy across rural India to achieve net-zero emissions (Box 2.4).
- Ensuring climate- and disaster-resilience of new and existing infrastructure to minimise losses due to extreme events.⁴²
- Spending on social infrastructure by central and state governments and the corporate sector through corporate social responsibility funds.
- Developing high-quality infrastructure to boost regional economic development, reduce poverty and income inequality, and improve quality of life.⁴³
- Financing rural infrastructure through increased central and state budgetary allocations, mobilisation of extra-budgetary resources, and financing under RIDF and NIDA by NABARD, as also NaBFID, VGF, PPP, asset monetisation, take-out financing, and pension and insurance funds.



Box 2.4: Financing green rural infrastructure

India's Nationally Determined Contribution (NDC) under the Paris Agreement builds on its goal of installing 175 gigawatts of renewable power capacity by 2022 by setting a new target to increase India's share of non-fossil-based installed electric capacity to 40% by 2030. The NDC also commits to reducing India's greenhouse gas emissions intensity per unit GDP by 33%–35% below 2005 levels by 2030, and to creating an additional carbon sink of 2.5–3.0 billion tonne of carbon dioxide through expansion of tree cover.^a Considering the targets, there are huge opportunities for investment in green infrastructure in rural India.

^a GOI (2020), *Annual Report 2019-20*, Ministry of New and Renewable Energy, Government of India.

Creating new and upgrading existing rural infrastructure will be key to reviving the rural economy, creating efficiency gains, and improving competitiveness. According to the report of the Taskforce on NIP,⁴⁴ this can help kick in a virtuous cycle of higher investments, growth, and employment generation in the economy. This could enable the achievement of a \$5 trillion economy and a \$1 trillion rural economy by FY2025 and the SDGs by 2030.

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Notes

- Governor, Reserve Bank of India.
- ADB (2017), *Meeting Asia's Infrastructure Needs*, Asian Development Bank, Manila.
- Achieving this goal would be a daunting task post-pandemic period, as we need to accelerate the economy by 8%–9% and agriculture by 4%–5%, annually.
- Summers and Heston, 1991, cited in World Bank (1994), *World Development Report 1994: Infrastructure for Development*, Published for the World Bank by Oxford University Press, New York, <http://documents1.worldbank.org/curated/en/535851468336642118/pdf/131840REPLACEMENTtoWDR01994.pdf>.
- Giovanni Ganelli and Juha Tervala (2015), *The Welfare Multiplier of Public Infrastructure Investment*, *IMF Working Paper* WP/16/40, February 2015, International Monetary Fund.
- Von Thünen and Johann Heinrich (1842), *Der Isolictre Staat*, first edition 1826, second edition 1842, translated with an introduction and notes by C.M. Wartenburg and P. Hall (1966), Pergamon Press, London. |⁶ V.W. Ruttan (1984), *Models of Agricultural Development*, in Carl K. Eicher and John M. Staatz (eds), *Agricultural Development in the Third World*, Johns Hopkins University Press, Baltimore, pp: 38–45. |⁶ John. W. Mellor (1976), *The New Economics of Growth: Strategy for India and the Developing World*, Cornell University Press, Ithaca, New York.
- D. Barnes and H.P. Binswanger (1986), *Impact of Rural Electrification and Infrastructure on Agricultural Changes 1966–1980*, *Economic and Political Weekly*, 21(1): 26–34. |⁷ H.P. Biswanger, P.S.R. Khandkur, and M.R. Rosenzweig (1989), *How Infrastructure and Financial Institutions Affect Agriculture Output and Investment in India*, *Policy Planning and Research Working Paper* No.163, World Bank, Latin America and the Caribbean Country Department II, Washington, DC. |⁷ S. Fan, P. Hazell, and S. Thorat (1999), *Linkages between Government Spending, Growth and Poverty in Rural India*, IFPRI Research Report 110, International Food Policy Research Institute, Washington D.C. |⁷ A. Narayanamoorthy and M.A. Hanjra (2006), *Rural Infrastructure and Agricultural Output Linkages: A Study of 256 Indian Districts*, *Indian Journal of Agricultural Economics*, 61(3): 444–459.
- Ashok Gulati, Ranjana Roy, and Shweta Saini (eds) (2021), *Revitalising Indian Agriculture and Boosting Farmer Incomes*, Springer, New Delhi.
- GOI (2020a), *Report of the Taskforce on National Infrastructure Pipeline*, Ministry of Finance, Government of India, Volume II.
- Constructed using nine rural infrastructure components, viz. irrigation; agriculture and allied activities; rural road connectivity; rural electrification; rural telecommunication; health; education; drinking water, sanitation and housing
- Dennis J. Rajakumar, Vijayata B. Sawant, and S.L. Shetty (2020), *Construction of State-wise Rural Infrastructure Indices*, *Economic and Political Weekly Research Foundation*, Mumbai (sponsored by NABARD).
- Irrigation coverage in parentheses.
- GOI (2018a), *Agriculture Statistics at a Glance 2018*, Ministry of Agriculture and Farmers' Welfare, Government of India, Table 4.5 (b).
- State-wise RII data from study cited in Note 11. |¹⁴ RIDF data from NABARD.
- State-wise RII data from study cited in Note 11.
- GOI (2018a), Note 13.
- Calculation is based on data accessed from GOI (2018a), Note 13.
- GOI (2019), *Basic Road Statistics of India 2016–17*, Ministry of Road Transport and Highways, Government of India.

19. WDRA (2019), *Annual Report 2018-19*, Warehousing Development and Regulatory Authority, Government of India.
20. GOI (2020a), Note 9, all volumes.
21. GOI (2020a), Note 9, Volume I.
22. GOI (2021), *Economic Survey 2020-21*, Volume II, Ministry of Finance, Government of India.
23. GOI (2017), *Report of the Committee on Doubling Farmers' Income*, Volume III, Post-production Agri-Logistics: Maximising Gains for Farmers, Chairman: Ashok Dalwai, Ministry of Agriculture and Farmers' Welfare, Government of India.
24. GOI (2018b), *Agriculture Export Policy 2018*, Department of Commerce, Ministry of Commerce and Industry, Government of India.
25. Debesh Roy (2021), Doubling Farmers' Income: Increasing Agricultural Exports is Key, *Financial Express*, 12 January 2021.
26. GOI (2021), Note 22.
27. GOI (2020b), Fact Sheets-Key Indicators, *National Family Health Survey (NFHS-5) 2019-20*, Ministry of Health and Family Welfare, Government of India.
28. <https://content.github.org/live/media/1718/micro-infra-exec-summary.pdf>
29. Chapter 7 of this report provides details of NABARD's financing to rural infrastructure.
30. Excluding sanctions under Bharat Nirman.
31. IMF (2018), Jordan Schwartz (2018), Infrastructure Investment in Emerging Markets: Trends, Structures, and Challenges, 26 September, *Low-income Countries Infrastructure Seminar Series*, International Monetary Fund. <https://www.imf.org/en/Topics/low-income-countries/LIC-Series/lics-infrastructure-seminar-series>.
32. <https://www.worldbank.org/en/country/china/overview>.
33. Some of the prominent institutions are World Bank, International Monetary Fund, European Bank for Reconstruction and Development, Asian Development Bank, Inter-American Development Bank, and African Development Bank; Asian Infrastructure Investment Bank and ASEAN Infrastructure Fund focusing on emerging market economies in Asia; and New Development Bank, promoted by Brazil, Russia, India, China, and South Africa.
34. Rabah Arezki, Patrick Bolton, Sanjay Peters, Frederic Samama, and Joseph Stiglitz (2016), From Global Savings Glut to Financing Infrastructure: The Advent of Investment Platforms, *IMF Working Paper* WP 16/18, February, International Monetary Fund.
35. FY2025 was the target year announced by Prime Minister Narendra Modi in 2019 for the goal. Recent estimates after the economic slowdown and the pandemic suggest 2029–2032 as the possible timeframe for India to achieve it.
36. <https://www.investindia.gov.in/team-india-blogs/rural-infrastructure-sector-under-national-infrastructure-pipeline>.
37. <https://www.indiabudget.gov.in/doc/eb/stat27.pdf>.
38. https://www.rbi.org.in/Scripts/BS_ViewMasDirections.aspx?id=11959.
39. <https://www.adb.org/sites/default/files/linked-documents/47083-001-ind-oth-02.pdf>.
40. Georg Inderst (2009), Pension Fund Investment in Infrastructure, *OECD Working Paper on Insurance and Private Pensions, No. 32*, Organisation for Economic Co-operation and Development, Paris.
41. GOI (2020a), Note 9, Volume II.
42. GOI (2020a), Note 9, Volume II.
43. N. Yoshino, N. Hendriyetty, and S. Lakhia (2019), Quality Infrastructure Investment: Ways to Increase the Rate of Return for Infrastructure Investments, *ADBI Working Paper* 932, Asian Development Bank Institute, Tokyo, <https://www.adb.org/publications/quality-infrastructure-investment-ways-increase-rate-return>.
44. GOI (2020a), Note 9, Volume II.



APPENDIX TO CHAPTER 2

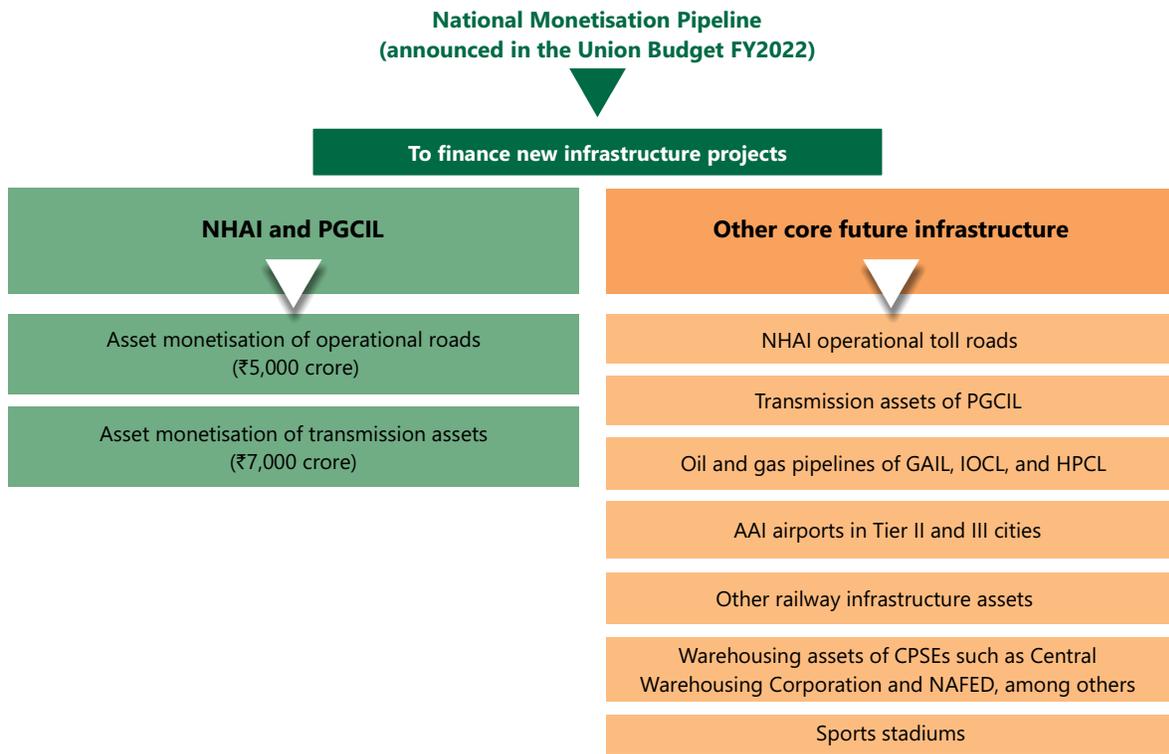
APPENDIX A2.1: Government of India schemes for rural infrastructure

Scheme	Nodal Ministry	Total fund allocation/ outlay (₹ crore)	Highlights
Pradhan Mantri Awaas Yojana–Gramin, 2016	Ministry of Rural Development	2,72,672.5	<ul style="list-style-type: none"> • Housing for All by 2022 • Target 2.2 crore houses • Sanctioned: 2 crore • Completed: 1.4 crore
Pradhan Mantri Gram Sadak Yojana, 2000		2,90,774.8 60:40 sharing by centre and state (90:10 in special category states)	<ul style="list-style-type: none"> • Total road length completed: 6.6 lakh km • PMGSY-III target: 1.3 lakh km • Connectivity to GrAMs, schools, hospitals
S.P. Mukherjee Rurban Mission, 2016		27,844.05 70% through central and state government schemes, 30% critical gap funding by nodal ministry	<ul style="list-style-type: none"> • Develop 300 Rurban clusters in 35 states and UTs
Swachh Bharat Mission –Gramin, 2014	Ministry of Jal Shakti	Phase II: 1,40,881	<ul style="list-style-type: none"> • 6.03 lakh ODF villages • ODF across 711 districts, 35 states and UTs
Jal Jeevan Mission, 2019		3,60,000	<ul style="list-style-type: none"> • 15.7 crore (83%) rural HHs to be provided functional tap water connection by 2024
Pradhan Mantri Kisan Sampada Yojana, 2017	Ministry of Food Processing Industries	6,000	<ul style="list-style-type: none"> • Mega food park • Integrated cold chain • Operation Greens
Deen Dayal Upadhyay Gram Jyoti Yojana, 2015	Ministry of Power	75,893 States are provided grant up to 75% (90% for special category states)	<ul style="list-style-type: none"> • Universal household electrification • Separation of agricultural and non-agricultural feeders • All census villages and all HH electrified
Pradhan Mantri Sahaj Bijli Har Ghar Yojana –Saubhagya, 2017		16,320 States are provided grant up to 75% (90% for special category states)	<ul style="list-style-type: none"> • Universal HH electrification as on 31 March 2019 • 2.63 crore HH electrified

Notes: GrAM = Gramin Agricultural Market; HH= Household; ODF = Open Defecation Free; PMGSY = Pradhan Mantri Gram Sadak Yojana; UT = Union Territory.

Sources: Ministry of Rural Development, Ministry of Jal Shakti, and Ministry of Food Processing Industries, Government of India.

APPENDIX A2.2: National Monetisation Pipeline



Notes: AAI = Airports Authority of India; CPSE = Central Public Sector Enterprises; HPCL = Hindustan Petroleum Corporation Limited; IOCL = Indian Oil Corporation Limited; NAFED = National Agricultural Cooperative Marketing Federation of India; NHA = National Highways Authority of India; PGCIL = Power Grid Corporation of India Limited.

Source: Union Budget FY2022, Ministry of Finance, Government of India.