Maharashtra Economic Advisory Council 2023

Roadmap to becoming a $1 Trillion economy

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Date: 12th July 2023

To,
The Hon'ble Chief Minister, Government of Maharashtra,
The Hon'ble Deputy Chief Minister, Government of Maharashtra,
Mumbai, Maharashtra

Subject: Economic Advisory Council report on "Roadmap for Maharashtra to become a $1Trillion economy"

Dear Hon'ble Chief Minister, Shri Eknath Shinde, Hon'ble Deputy Chief Minister, Shri Devendra Fadnavis and Hon'ble Deputy Chief Minister, Shri Ajit Pawar

At the outset, I would like to thank you for the opportunity to Chair the Maharashtra Economic Advisory Council. It has been a pleasure to work on this strategic initiative along with my colleagues in the council.

Maharashtra is India's leading state level economy, with a GDP of INR 31 lac Cr ($444 Bn) in FY22.Maharashtra is well placed to drive a higher growth ambition to realise our Hon'ble Prime Minister's vision to make India a developed nation by 2047.

We have taken your guidance on working towards an aspirational GDP target of $1Tn by 2028. If we achieve this, Maharashtra's GDP would be comparable with the top 20 countries in the world.

In the Economic Advisory Council of Maharashtra, comprising of 21 eminent leaders from agriculture, industry, services, and the state government, we have worked together cohesively towards evaluating the key opportunities and enablers, needed to achieve the target. Our vision is to achieve the GDP target, while ensuring that we:

- **Identify sustainable and inclusive growth opportunities** to generate a positive socio-economic impact
- **Include all sections of society**, such as farmers, women, skilled and unskilled youth
- **Cover all regions of Maharashtra**
- **Focus on all enterprise types, including startups and MSMEs**

During the exercise, we had a broad engagement with more than 500 stakeholders across multiple districts in the state, who provided us valuable on-ground insights on critical challenges and opportunities in each region. We also consulted more than 75 sectoral experts and industry associations. These inputs were synthesized and supported with data analysis, post which the council ideated to finalize key recommendations.

I am pleased to present this report which provides detailed recommendations across key sectors. Maharashtra should target growing its GDP such that it:

- **Identifies sustainable and inclusive growth opportunities**, **covers all regions of Maharashtra and focuses on all enterprise types.**
- Focuses on **increasing the share of manufacturing** to 21% of state's GDP.
- Retains **leadership position in services sector and ensures sufficient growth in agriculture & allied, construction** and mining sectors to maintain its share in GDP.

- **Creates 15Mn+ new employment opportunities**, increases **GDP per capita to INR 5+ lakhs**, **improves quality of living** across cities and **accelerates economic growth across districts.**

A few key highlights from the report are listed below:

- **Manufacturing:** It is a critical sector contributing towards Gross Value Added (GVA) and driving job growth across skill levels. The state should capitalize on global trends related to global supply chain resilience and addressing large domestic demand. The state can target $182Bn Gross Value Added (GVA) by FY28 (from $64Bn in FY22), by supporting expansion of existing industries, attracting new enterprises in 16 focus industries and 6 sunrise sectors.

- **Services:** Services sector contributes to 59% of state's Gross Value Added (GVA) in FY22. Maharashtra is a leader in financial services and IT & ITeS. The state should retain leadership in these sectors by focusing on growth segments such as back and mid-office hubs, Fintechs, Artificial Intelligence (AI), analytics and data centres. The state should encourage expansion of services sector across regions, especially in Tier 2 cities.

  In **tourism**, Maharashtra is well positioned to leverage its endowments to create global tourist destinations and develop multiple circuits that can attract domestic and global tourists. Tourism can grow 3x to $35Bn Gross Value Added (GVA) in next 5 years and generate 1+ Mn new jobs.

- **Agriculture:** Maharashtra is the 3rd largest agricultural state by Gross Value Added (GVA). It also provides livelihoods to half the working age population of the state. Given this, it is critical to drive growth in the sector as well as improve farmer's income. The state government needs to focus on addressing challenges across the value chains for the 28 key crops identified basis the agro-climactic zones, domestic & international demand and opportunity for value addition. Key recommendations include demand linkage, irrigation effectiveness, crop councils to oversee policy formulation, farm cards to improve crop mix and innovation hub to promote technology.

  To increase farmer's income, the report has segmented the farmers based on agro-climatic conditions and irrigation access available. Specific roadmaps for each farmer segment, including promotion of viable horticulture and allied activities have also been detailed.

- **Construction:** Infrastructure is a key enabler to support industry and services growth and has large employment generation potential. Maharashtra needs to develop a state level integrated infrastructure master plan which aligns with growth of planned economic clusters and urban infrastructure plans. The state should increase the capital outlay on infrastructure to support this master plan. The report also suggests multiple steps to improve process effectiveness to ensure on-time and quality outcomes.

Key enablers: The report provides recommendations on enablers which are critical to support growth across sectors, some of which are highlighted below.

- **Ease of Doing Business:** The state needs to focus on improving the ease and cost of doing business to accelerate investments. The state can achieve rapid improvement in ease of doing business by establishing Udyog Seva Kendras, centres that can support industries acquire licenses, permits, approvals in a timely and predictable fashion. These Seva Kendras should leverage a digital platform to provide transparent and convenient service to industries. Simplifying subsidy payout process, developing a digi-locker for industries are other key initiatives that can help the state improve on this critical enabler.

- **Energy:** Maharashtra needs to double its installed energy capacity and provide energy at a competitive rate. To grow installed capacity, the state needs to focus on renewables, which should contribute to 45%+ of state's capacity, implying a 4x growth in solar. The state needs to encourage renewable installation across multiple use cases, from utility scale solar parks to solar panel installation at farms, improve grid infrastructure especially for EV adoption and encourage renewable energy consumption via norms like Green Open Access.

- **Land:** 1 lakh acre of land will be needed to support industry growth and another 1 lakh acre for renewable energy growth. The state needs to improve land availability and ease of land acquisitions for all types of enterprises, from large bespoke parcels for large enterprises to plug and play small parcels for MSMEs.

- **Skill development:** This roadmap will generate 15 Mn+ new employment opportunities. To enhance employability, it is crucial to partner with industries in developing skills through improved content creation, content delivery and apprenticeship programs. Additionally, as 30%+ of the state's working population is self-employed, state needs to provide avenues to enhance their skillset, which is aligned to market needs.

This report can serve the government, private sector and all other stakeholders in formulating policies and effective implementation to achieve the $1Tn aspiration.

I and all my colleagues in the Maharashtra Economic Advisory Council would like to thank the Hon'ble Chief Minister, Hon'ble Deputy Chief Minister for the opportunity to contribute towards Maharashtra's economic growth. I would also like to thank the state officials and district stakeholders for their cooperation and inputs. I am excited about the potential and am confident that Maharashtra will achieve its stated aspiration.

With warm regards,

N. Chandrasekaran,
Chairperson, Maharashtra Economic Advisory Council
Chairman, Tata Sons

Members of the Economic Advisory Council (EAC) of Maharashtra

N. Chandrasekaran
Chairman, Tata Sons
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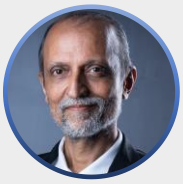

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Executive summary

Maharashtra's vision

India's nominal GDP in FY22 was $3.3 Tn (INR 234 lac Cr). Between FY14-22, India's nominal GDP grew at ~9-10%. India's near-term ambition is to become a $5 Tn economy.

The $5 Tn ambition requires all of India's key states to accelerate their growth. Top 5 states, Maharashtra, Uttar Pradesh, Gujarat, Tamil Nadu, and Karnataka account for ~50% of country's nominal GDP. Of these, Maharashtra is the largest, with a GDP of $444 Bn in FY22, which is ~13% of India's GDP. Hence, to support India's ambition, Maharashtra has decided to take an aspirational target of $1 Tn GDP by FY28.

Maharashtra has had a historic nominal CAGR of ~8-9% during FY14-22, which implies Maharashtra will reach $1Tn GDP by 2031-32 if it sustains historic growth rate. **However, to achieve its target by FY28, Maharashtra will have to accelerate and grow at ~14-15% annually**.

Also, as the state looks to accelerate growth, it must look to reduce existing imbalances. As an example, of its 36 districts, top 7 districts contribute to ~55% of the state's GDP, whereas the bottom 18 districts contribute to <20%. **As Maharashtra takes the $1 Tn GDP target, it must ensure that the growth is inclusive, sustainable, and balanced across all regions**.

Sector-wise GVA mix

In FY22, agriculture, manufacturing and services contributed to 14%, 16% and 59% to Maharashtra's Gross Value Added (GVA) respectively. The remaining 11% is primarily driven by construction & infrastructure (6%), mining, energy & other utilities (5%).

Based on sector-wise analysis, this report estimates that the GVA mix in FY28 will change, key change being manufacturing's share increasing to 21% to keep in-line with India's target of 25% GVA from manufacturing. Agriculture's GVA share will stay at ~12-13%, as it is a critical sector, that employs ~50% of state's working population.

Key opportunities & enablers for Maharashtra

A. Manufacturing: Maharashtra's manufacturing GVA has grown from $46 Bn in FY14 to $64 Bn in FY22 at a 4% annual growth rate. **Increasing manufacturing share is critical due to the multiplier effect it has on economy:** It helps create **jobs across skill levels**, will improve value addition in economy and generate growth in real estate and other services.

This report focuses on the 16 out of 27 key industries that contribute to 90% of Maharashtra's manufacturing GVA. However, Maharashtra has multiple endowments making it an attractive manufacturing destination:

- Maharashtra has a strong industrial base, contributing to ~14-15% of India's manufacturing GVA, and in 6 industries, 15%+ of India's GVA – this has also resulted in a large skilled talent pool across industries
- Maharashtra houses large consumption centres such as Mumbai, Pune
- Maharashtra is top producers of crops such as millets, fruits & vegetables, hence suitable for food-processing

Given its endowments and projected market growth & requirements, **the report captures 40+ opportunities** across 16 key industries and 6 sunrise industries, categorized broadly into 5 themes: **Produce for India, Import substitution, Produce for the world, Value addition, Capitalizing on mega-trends.**

Maharashtra's manufacturing growth will come from:

- **Growth of existing industries** by helping them improve capacity utilization and adding new capacity
- **Attracting new OEs leverage existing clusters –** Each OE will create a multiplier effect (e.g., by developing new vendor ecosystems)

- **Leveraging Maharashtra's natural resources** (e.g., minerals, agri-produce) to **pursue downstream opportunities across the value chain** – For example leverage iron and coal reserves in Vidarbha to develop industry across steel making, fabrication & forging, capital goods, auto & auto components across the state.

To achieve this growth, Maharashtra will need **$200-250 Bn of capital**, **1+ lakh acre of land**, 2x increase in industrial power supply, **competitive power tariffs**, significant **improvement in ease of doing business** and improvement in logistics infrastructure.

B. Services: Financial services, IT, tourism, healthcare, and trade & retail contribute to ~80% of Maharashtra's services GVA, which has been growing at 10% between FY14-22, in-line with India average.

Financial services contribute to 10% of Maharashtra GVA. Maharashtra can focus on 2 types of opportunities:

- **Become a hub for global mid-office or back-office operations**, **fintech startups**
- Increase penetration of financial services, across banking, credit, and insurance, for retail, agriculture and MSME customers across all districts in Maharashtra

IT and ITeS also contributes to ~9% of Maharashtra's GVA. The state should focus on:

- Develop Maharashtra as the Artificial Intelligence (AI) capital of India attracting investments from leading technology startups
- **Growing IT services and Business Process Management services in Tier 2 cities** which have the requisite supply of skilled talent and adequate air connectivity
- **Developing data centres in Tier 2 cities**, where access to low-cost land and power can be provided, along with low latency internet cable connection.
- Developing a hub for advanced IT services such as AI, data analytics and cloud along Mumbai – Pune corridor

Healthcare has 2 sets of opportunities:

- Opportunities that will improve the state's health outcomes, such as **revamping primary care via technology enabled platform**, expanding tertiary care and medical college infrastructure, developing ancillary healthcare services such as geriatric care and veterinary care
- Opportunities that enable Maharashtra to tap into demand for healthcare nationally and globally such as **boosting medical tourism**, developing a hub for skilling nurses, paramedics and doctors.

Tourism: Maharashtra has multiple historic, natural and religious endowments that drive its tourism economy. Maharashtra has 4 UNESCO sites, 350+ forts, 5 Jyotirlingas, 6 national parks, 50 wildlife sanctuaries, ~720 kms of coastline and ~15% of foreign tourists start their journey from Mumbai. **The state can target growing direct tourism GVA from $11Bn to $35Bn by FY28**.

Maharashtra needs to develop circuits with attractive experiences around multiple anchor destinations. One of the key anchor destinations will be **Mumbai, which can be developed as a global tourist destination**, where mega projects such as marina with boardwalk, Bollywood theme park, or integrated resort on the lines of Sentosa can be developed. **Enabling seamless connectivity, cleanliness, ease of developing hospitality and other infrastructure are key enablers needed to ensure Maharashtra can accelerate tourism.**

C. Agriculture: The sector accounted for 14% of the state's GVA in FY22 and Maharashtra is the 3rd largest agricultural state in India after UP and MP. Agriculture is providing livelihoods to ~51 million people or half the working age population of the state. Half the farmers hold less than 1 hectare of land and earn less than INR 70,000 of annual crop income.

This report identified 28 crops & allied activities to focus on to **unlock a 2.4X growth in GVA**. It also identifies key challenges and mitigation measures across each crop's value chains. Top intervention themes include:

- **Farm cards:** New farm level identity which becomes centre point for combining multiple sources of data (like soil health, micro weather information, irrigation, farmer profit and loss) and act as a channel to improve access to credit and direct benefits
- **Farm inputs:** Varietal introduction, last mile irrigation to utilize already developed potential and farm mechanization

- **Farming:** Better crop mix & shift to horticulture, better output e.g., high density plantation, natural farming to control cost and improve soil health
- **Demand linkage:** Strengthen FPOs, crop councils for crop level advisory for governance, export & produce promotion at state level
- **Allied activities:** kick start aquaculture & sericulture, drive penetration of poultry farming and breed & awareness programs for diary
- **Innovation hub:** Coordinates with value chain stakeholders to identify key problems to solve for each crop/allied activity and partners with agricultural universities, start-ups and venture capital to identify solutions
- **Technology:** API framework to enable access to high quality data on the sector
- **Crop councils:** Composed of representative across the value chain of key crops and responsible for providing policy inputs. The councils also enable identification & oversee implementation of right solutions to key challenges across the crop value chains.

For **improving farmer incomes**, it was necessary to classify farmers into 11 segments basis **agro-climatic zones** (soil types, irrigation / drought susceptibility). Within these, **5 segments** representing >80% of small and marginal farmers were prioritized and **segment specific approach for 2-3x growth in incomes has been chartered** including **identification of viable allied activity** for the segment to take up.

In addition to this, for building resilience in the sector, recommendations across soil health, irrigation, agri-energy and biodiversity have been mapped.

D. Construction, infrastructure & real estate: Maharashtra's infrastructure is in-line with India average in multiple metrics such as road and rail density. However, logistics linked infrastructure such as cold storage, inland container depot capacity needs to be augmented.

Maharashtra's capital outlay needs to increase, from $29 Bn spent between FY14 – 22 to around $60 Bn till FY28, to support the growth planned in industry and services. The spend needs to be channelled using a **state level infrastructure master plan that aligns with growth of planned economic clusters and urban infrastructure plans**. To ensure effectiveness of spend and improve efficiency, the report suggests multiple initiatives across land acquisition, project scoping and awarding contracts and project management.

Report also details the key levers to unlocking real estate growth, including how affordability of real estate in Tier 1 cities can be improved, need for integrated urban planning which should include planning for green, open spaces and sports facilities to improve liveability and details incentives needed to develop other asset classes such as warehouses.

E. Energy, renewables & sustainability: Maharashtra needs to increase its installed capacity to cater to $1Tn GDP aspiration, and address growing industrial electricity consumption. Maharashtra needs to grow its installed capacity from 44 GW in FY23 to 73 GW in FY28, with about 34 GW coming from renewables to help Maharashtra achieve NDC targets. **Solar power would need to grow from current ~4 GW to 16 GW.** The new installations will require 1+ lakh acres of land.

Accelerating growth in renewables needs multiple initiatives, such as promoting utility scale solar to enabling solar adoption in agriculture at both feeder and farm level, removing additional charges for renewables, encouraging open access, upgradation of grid infrastructure and developing energy storage solutions.

F. Key enablers

- **Ease of Doing Business:** From all district level and expert interactions, improving ease of doing business has emerged as one of top two areas that Maharashtra needs to focus on, along with competitive power tariffs. **Complex processes for approvals and subsidy payment with unpredictable timelines and delays needs to be addressed**. This report suggests Udyog Seva Kendras, centres akin to Passport Seva Kendra, can be developed, that can help companies, especially MSMEs, manage their approval and subsidy processes. Maharashtra should also look to have a dedicated entity to attracting and executing large projects.

- **Cost of power:** One of the critical factors that impacts the attractiveness of businesses across manufacturing and select services such as hospitality is cost of power. The state must consider several initiatives to reduce power costs and bring it in line with peer states, including focus on renewables.
- **Land:** 2 lakh+ acres of land will be needed for growing manufacturing and setting up target renewable energy capacity. Additional land will be needed for other infrastructure development and services. To facilitate land acquisition, Maharashtra can consider several initiatives such as unlocking state government land, restructuring existing land to suit the needs of businesses, simplify land acquisition process (especially conversion of agricultural land).
- **Other key enablers:** The report captures other key enablers needed such as a need for Common Effluent Treatment Plants (CETPs) and support exporters' participation in marketing activities.
- **Skill development:** Reaching $1Tn GDP by FY28 will need 15 Mn new jobs. Skill development will need to focus on 2 aspects: improving employability and entrepreneurship building. Report focuses on how industry academia engagement can be improved across content creation and delivery, and how apprenticeship program needs to be improved.
- **MSME enablement:** MSME contribute to 30% of India's GDP, and the report details key challenges MSME face. One key issue is managing working capital, that the state can help improve via mandating TReDS, and improving MSME's access to credit.

G. Economic & Social Impact: As Maharashtra capitalizes on opportunities across agriculture, industry and services and accelerates its economy to achieve $1Tn target, multiple economic and social factors will improve such as:

- **Creation of 15Mn+ new jobs**, with increased avenues to drive up women labour force participation
- **Per capita GDP increase** from INR 2.5 lakhs in FY22 to INR 5.3 lakhs in FY28, with 2x increase in farmer income
- **Sustainable growth**, with increased share of renewable energy, 20% reduction in emission intensity
- **Improved financial inclusion**, with greater penetration of insurance and credit
- **Enhanced quality of life**, with improved health, education services, quality of living in large cities
- **Balanced growth** across all regions of Maharashtra

Table of Contents

Introduction

1. Economic Advisory Council: Vision, objectives, and guiding principles

The Maharashtra Economic Advisory Council laid out its vision, objective, and guiding principles:

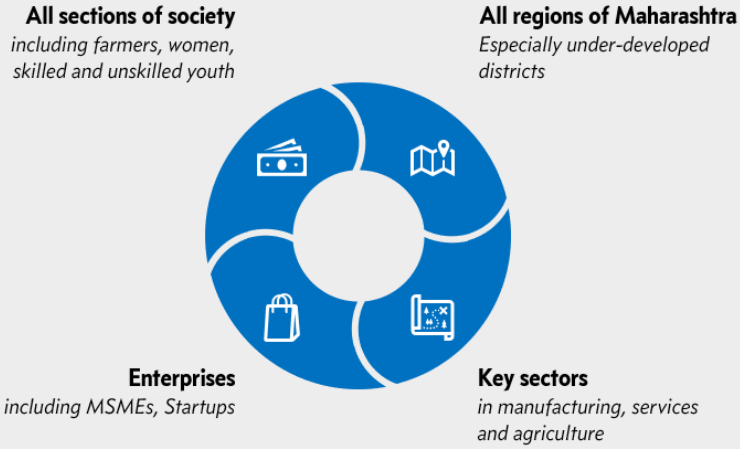
VISION

Become **$1 Trillion economy**, by identifying **inclusive, sustainable economic growth opportunities** and improving **economic well-being** and **quality of life** for all citizens

OBJECTIVE:

Develop **roadmap to achieve the state's vision**, including **key enablers and support needed**

Guiding principles – EAC to identify **economic opportunities that drive growth and cover:**



2. Methodology

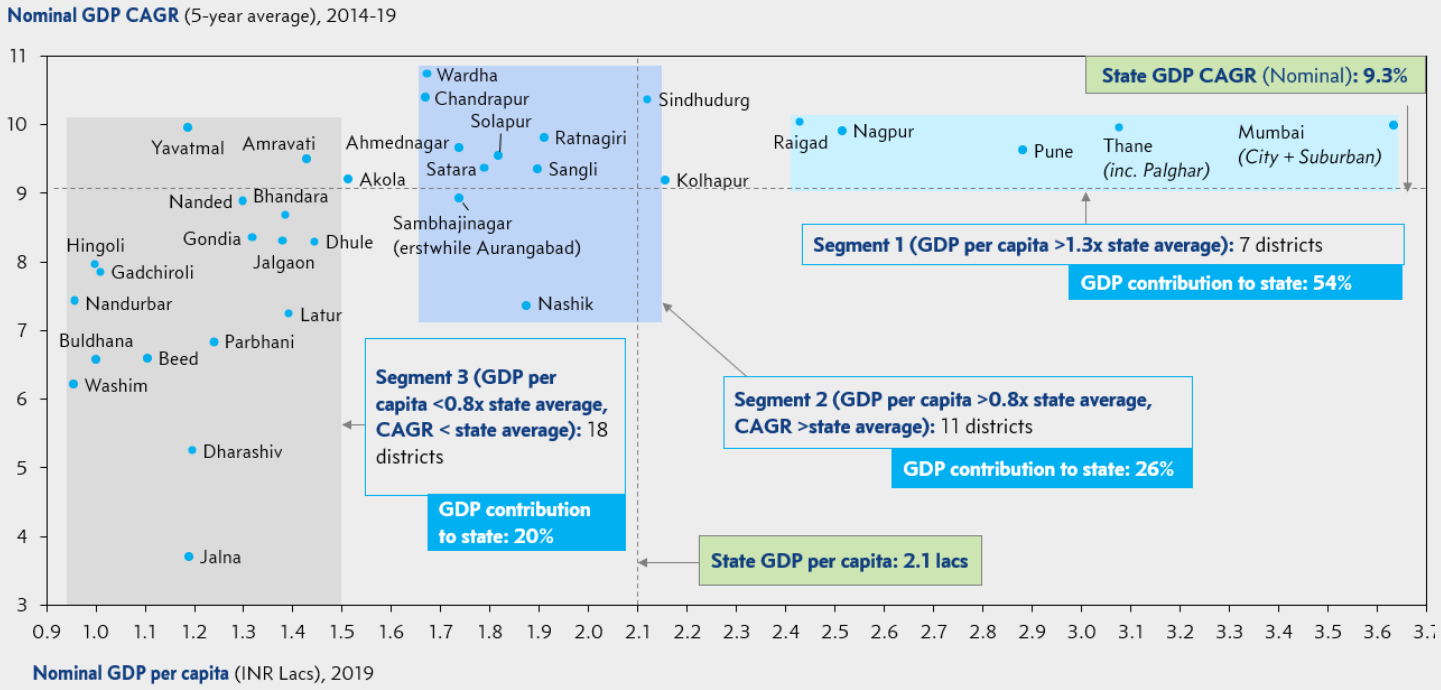
Creation of sub-groups: 8 sub-groups were created, with EAC members focused on specific sectors or topics to help identify opportunities and enablers for the state.

Figure 1: Sub-groups

District immersions: 36 districts in Maharashtra can be segmented into 3 categories, based on district's GDP per capita and growth:

- **Segment 1** districts with GDP per capita greater than state average and growing faster than the state – 7 districts (e.g., Mumbai, Pune, Nagpur), are the most developed in state, with the highest concentration of industry and services. These districts contribute to 54% of state's GDP
- **Segment 2,** with GDP per capita similar to state average. 11 districts (e.g., Kolhapur, Sambhajinagar, Solapur), have an active industrial base, contribute 26% of state's GDP
- **Segment 3**, with GDP per capita and growth lower that the state, are the most under-developed districts in the state. 18 districts in this segment, contributing 20% of state's GDP.

Figure 2: District segmentation basis GDDP per capita and GDDP growth



On-ground feedback from **over 500 stakeholders** from **18 districts** across segment 1, 2, 3 was taken, covering stakeholders from agriculture (Farmers, FPOs), manufacturing (MSMEs, Large Enterprises) and Services (Hospitality, Healthcare, Construction and Real Estate).

Sub-group wise analysis: The approach involved several key steps to assess the current state and set aspirations for growth.

- **Current state assessment:** Involved baselining the share and growth of sectors, identifying state and district level assets, and understanding existing government policies and initiatives.
- **GVA (Gross Value Added) projections and aspirations for key metrics:** FY28 GVA aspirations for agriculture, manufacturing, construction, and services were established. Target for key metrics were also set, such as share of Maharashtra in India's GVA, share of exports, GVA to output ratio, and penetration of services.
- **Opportunities identification** (top-down and bottom-up analysis) based on
  - Key themes and objectives, such as increasing supply to India, growing exports, capitalizing on mega-trends, and promoting import substitution.
  - Benchmarking with peer states and conducting industry-level analysis across key metrics
  - Incorporating on-ground feedback from district immersions and inputs from industry experts
- **Enablers identification to drive GVA aspiration**: Assessed requirement for key enablers (land, labor, energy, infrastructure) and defined **policy interventions for the state** (incentives, subsidies) to facilitate the desired growth trajectory

3. Overview of Maharashtra's economy

With a nominal GDP of $444 Bn in FY22 ($387 Bn in FY21), the state of Maharashtra has the highest GDP in India accounting for ~13% of India's GDP. However, it has grown at a CAGR of 8.2% (FY14-22).

In terms of GDP per capita, Maharashtra's GDP per capita is INR 2.5L, which is higher than India average of INR 1.5L.

Figure 3: GSDP of top 5 states in India

Top 5 states (by GSDP)	Nominal GSDP (FY22)[1]	Contribution to India Nominal GDP FY22 (%)	Nominal GSDP per Capita FY22 (INR Lakhs)
Maharashtra	**₹31.1 TN** ($444 Bn)	13.1%	**2.5**
Tamil Nadu	₹20.7 TN ($295 Bn)	8.7%	2.7
Karnataka	₹20.5 TN ($293 Bn)	8.6%	3.1
Gujarat	₹19.6 TN ($279 Bn)	8.3%	2.8
Uttar Pradesh	₹18.6 TN ($266 Bn)	7.8%	**0.8**
India	**₹237 TN** ($3.4 Tn)		**1.5**
Conversion rate 1$ = INR 70 for FY22		Higher than India	Lower than India

Sector overview of Maharashtra

Maharashtra has higher salience in industry and services and lower salience in agriculture and allied as compared to India. Growth rate across agriculture and industry is lower for Maharashtra than India, especially in manufacturing sector.

Agriculture and allied (14%): Agriculture and allied contributes 14% to state's GVA which is lower than all India share of agriculture at 20%. Though, in terms of overall size, Maharashtra, has the 3rd largest agriculture GVA of all Indian states. It is among the top 5 producers of sugarcane, cotton, oilseeds and fruits and vegetables in the country. The sector has been growing at a rate of 9% in Maharashtra during FY14-22.

Industry (27%): Within industry, manufacturing contributes 16% in state's GVA which is at par with India share of manufacturing at 15%. Manufacturing sector has shown GVA growth of 4% over last 8 years in Maharashtra. 'Construction', with a share of 6% per cent in Maharashtra's GVA grew at 8%. 'Mining and utilities' with a share of 5% in Maharashtra's GVA has grown at a rate of 5%.

Services (59%): Services contribution of 59% is greater than corresponding India share of 53%, reflecting strong financial services and real estate sector with Mumbai as financial and commercial hub of the country.

Maharashtra is also one of the most popular tourist destinations in India (5th most visited state in India), featuring multiple tourist endowments across the state including wildlife sanctuaries, beaches, hill stations, heritage, and religious sites.

Maharashtra also has strong presence of Micro, Small and Medium Enterprises (MSMEs) with ~48 Lakh enterprises (8% of total MSMEs in India)[1] employing ~1 Cr people.

4. Sector wise growth aspirations

In FY22, agriculture, manufacturing and services contributed to 14%, 16% and 59% to Maharashtra's Gross Value Added (GVA) respectively. The remaining 10-11% is primarily driven by construction & infrastructure (5%), mining, energy & other utilities.

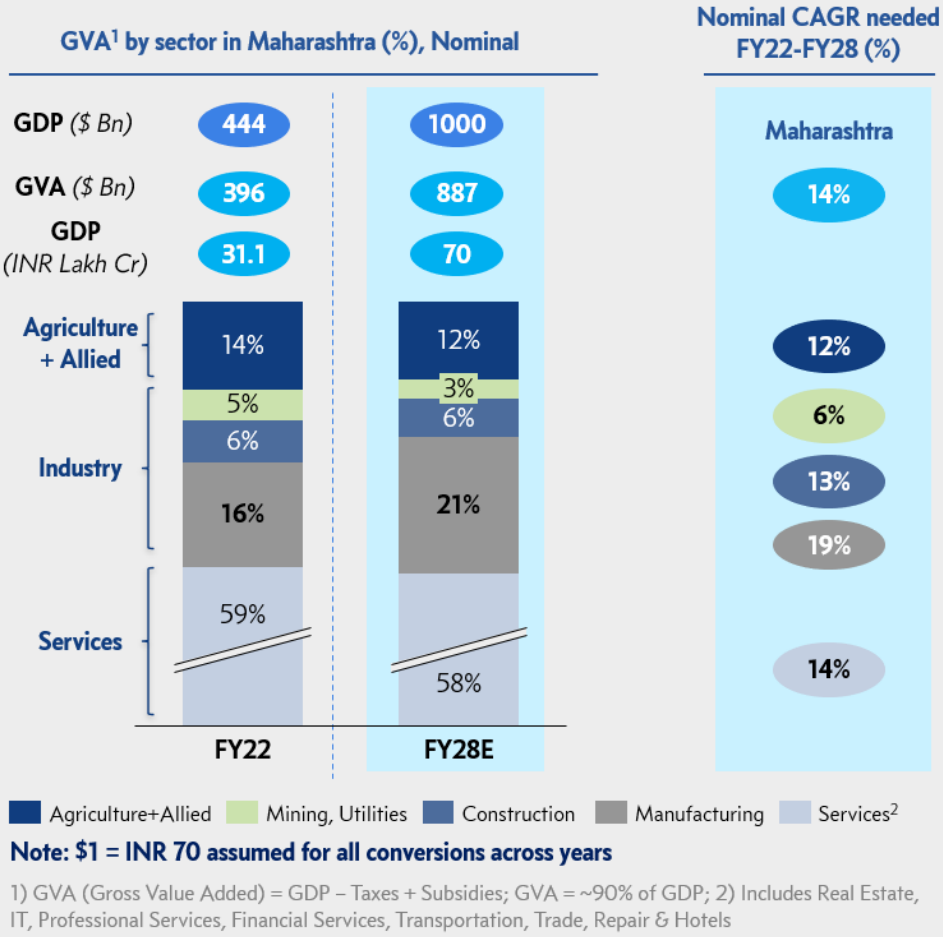
- **Manufacturing contribution to Maharashtra GVA**: India aims to achieve manufacturing contribution of 25% to its total GVA. Maharashtra should take a target of increasing manufacturing contribution to 20+% by FY28. Growing existing industries, capturing growth across value chains, and tapping into sunrise industries can help **manufacturing in Maharashtra will have to grow from ~$64 Bn in FY22 to ~$182 Bn in FY28, at a 19% growth**

[1] MSME annual report 2022-23

rate. Maharashtra's historic growth rate in manufacturing has been 4 - 5% over past 7 - 10 years, which means a significant push is needed to accelerate the sector in state.

- **Services sector** has been the key driver of Maharashtra's growth, with historical growth rate of 9 -10%. Maharashtra can continue to build on its endowments across IT, Financial services, and tourism, capitalise on demand boost from growth of core agricultural and manufacturing sectors (e.g., credit demand) and drive interventions to improve penetration of services (e.g., healthcare) to accelerate services growth to 13 - 14%. This will grow services from $234 Bn in FY22 to $514 Bn GVA by FY28, however, leading to a minor reduction in services GVA contribution, from 59% to 58%. Within services, tourism sector would be a key unlock with potential to grow at >25% and generate 1+ million jobs.
- **Agriculture** is a critical sector, that employs ~50% of state's working population. Historically, agriculture in Maharashtra has grown at 7 - 8%. Agriculture should accelerate to 13 - 14% growth rate, to ensure the prevailing economic opportunities are captured and farmer income levels are materially improved.
- **Construction & infrastructure** must develop across the state to support the envisioned growth. Therefore, construction's GVA contribution will grow as fast as Maharashtra's overall economy to maintain GVA share, from 6% in FY22 to 6% of the GVA in FY28, implying a 13 - 14% growth rate target.

Figure 4: Sector-wise GDP projections, FY28



Conversion rate has been maintained at $1 = INR 70, to remove impact of dollar rate fluctuations on growth rates (historic and projected). Average exchange rate from FY14 to FY22 was $1 = ~INR70.

Report structure: This report consists of sub-group wise sections detailing key recommendations for that sector or topic. Each section focuses on current state, aspirations, and targets, and lays out opportunities and enablers supported by necessary analysis and findings.

Manufacturing

Manufacturing

1. Executive Summary:

Manufacturing sector contributed $64 Bn (16%) to Maharashtra's GVA in FY22 and grew by 4% from FY14 to FY22[2]. 16 industries contributed ~90% of Maharashtra's manufacturing GVA in FY22. Automotive, metals, food processing and capital goods are the 4 largest industries by GVA in Maharashtra contributing ~50% of manufacturing GVA.

Increasing share of manufacturing in overall GVA is critical due to multiplier effect on economy, potential for employment generation and driving value addition in economy. Given India's target to achieve 25% share of GVA from manufacturing by FY25, and Maharashtra's historical share, state should target to increase share from **16**% in FY22 to **21**% in FY28 **(~$182 Bn),** implying growth rate of **~19%.**

Identification of focus industries and specific opportunities for Maharashtra: 16 industries (from 27 industry codes) identified for Maharashtra as high-focus basis **size and growth of industries, endowments** (existing industrial clusters, natural resources, talent availability) and **employment generation potential**.
These 16 industries include metals, automotive, chemicals, food processing, pharmaceuticals, capital goods, cement and ceramics, coke and refined petroleum products, rubber and plastic, electricals, cotton ginning, textiles and apparel, electronics, gems and jewellery and furniture.

40+ specific opportunities are identified across these high-focus industries basis **5 key themes**: Mega trend Led opportunities driven by global trends, opportunity to produce for India, opportunity to produce for world, potential for import substitution and potential for value addition.

Additionally, opportunities have been identified across **6 sun-rise industries** i.e. Electric vehicle manufacturing, semiconductors, healthy food, defence equipment, renewable energy equipment and telecommunication equipment.

Industry-wise detailing of opportunities (market size, growth), rationale for Maharashtra to pursue opportunity and potential districts for each industry has been detailed.

FY28 target by industry and capital investment required:

FY28 GVA target for manufacturing of $182 Bn is split across these high-focus industries **($ 167 Bn)** and sunrise industries **(~$ 15 Bn).**
Industry-wise targets are estimated by computing Maharashtra's output (basis share in India's production for domestic consumption, import substitution potential and share of India export) and GVA to output ratio (basis potential for value addition in each industry).

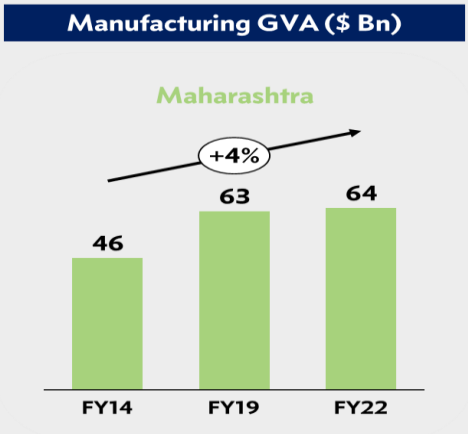
To achieve GVA targets, Maharashtra will need to attract capital investment (public and private) of ~$ 200-250 Bn in next 5 years, while state will need to invest in developing enabling infrastructure (transportation, logistics), improving ease of doing business & land acquisition and reducing cost of power.

[2] Source: Ministry of Statistics and Program Implementation, the data presented for the said period takes into consideration the negative growth experienced during the Covid period. Covid Era defined as a period between April 2020- March 2022

2. Overview: State baseline

Manufacturing contributed 16% to Maharashtra's GVA in FY22 ($64 Bn), growing at CAGR[3] of 4%. Maharashtra has historically been the largest contributor to India's manufacturing GVA. Given manufacturing sector's multiplier effect on the economy, and potential for large employment generation, it is critical for Maharashtra to improve share of manufacturing.

Figure 5: Manufacturing GVA in Maharashtra



2.1 Industry-wise salience and growth in Maharashtra:

Output, GVA data at industry level for Maharashtra and India, used throughout manufacturing section have been taken from Annual survey of Industries published in 2019. 16 industries contribute ~90% of manufacturing GVA in Maharashtra (FY22)[4]. Automotive, Food and Beverages, Metals and Capital Goods account for ~50% of manufacturing GVA in Maharashtra. GVA split by industry for FY21 and FY22, is estimated basis data from by Annual Survey of Industries (ASI) in 2019.

Figure 6: Industry-wise GVA share and historical growth in Maharashtra[5].

Sr. No.	Industry[1]	Maharashtra GVA[2] 2022			GVA CAGR % from 2014-2022
		NIC Code	GVA ($ Bn)	% Total GVA	Maharashtra
1	**Auto** *(2W, 3W, 4W)*	29, 30	9.4	*15%*	*5.7%*
2	**Basic Metals & Fabrication**	24, 25	8.0	*12%*	*1.7%*
3	**Food & Beverages**	10, 11	8.1	*13%*	*9.3%*
4	**Machinery and Equipment**	28	7.2	*11%*	*8.1%*
5	**Chemicals**	20	6.4	*10%*	*0.4%*
6	**Pharma**	21	4.2	*7%*	*-2.9%*
7	**Rubber & Plastic**	22	2.5	*4%*	*-3.6%*
8	**Electrical**	27	2.5	*4%*	*-0.3%*
9	**Non-Metallic** *(Cement, Glass, Ceramics)*	23	2.4	*4%*	*13.9%*
10	**Textiles**	13	2.2	*3%*	*3.7%*
11	**Coke & Petroleum products**	19	1.9	*3%*	*-22.7%*
12	**Electronics**	26	1.6	*3%*	*4.6%*
13	**Gems & Jewellery**	321	0.7	*1%*	*-4.7%*
14	**Apparel**	14	0.5	*1%*	*-4.0%*
15	**Furniture**	31	0.3	*0%*	*0.2%*
16	**Cotton Ginning**	1	0.3	*0%*	*-1.2%*
17-27	**Others**[1]	-	5.9	*9%*	*3.6%*
	Total[3]	-	**64**	**100%**	***4.1%***

1) Top 16 Industries represented contribute ~90% to Maharashtra's manufacturing GVA; other industries include, salt production, tobacco, leather, wood products, paper, media, repair and installation, waste collection
2) GVA data from Annual Survey of Industries captures data for firms with a minimum of 100 employees representing ~53% of Maharashtra manufacturing GVA, ~55% of India manufacturing; data has been scaled up by Industry in same ratio to represent total manufacturing GVA as reported by Ministry of Statistics and Program Implementation. FY22 Manufacturing GVA by industry estimated as data by industry from Annual Survey of Industries is not available
3) Industry Wise growth numbers based on ASI data, total growth numbers basis Ministry of Statistics and Program Implementation data

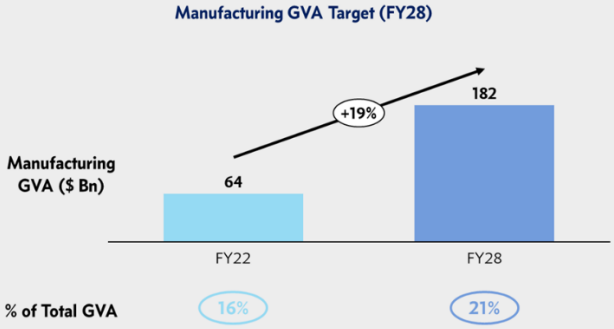
3. Growth Aspiration for Manufacturing in Maharashtra:

As mentioned earlier, increasing share of manufacturing in state GVA is critical due to multiplier effect on economy and potential for employment generation. National Manufacturing Policy aims for 25% share of Manufacturing in overall GVA at India level by 2025, hence an aspirational target of achieving ~21% share of FY28 GVA has been taken. Bottom-up, industry-wise opportunities were identified, and aspirational targets set to enable Maharashtra to increase share to 21%.

[3] Source: Ministry of Statistics and Program Implementation, the data presented above for the said period takes into consideration the negative growth experienced during the Covid period. Covid Era defined as a period between April 2020- March 2022
[4] Source: Estimates basis Annual Survey of Industries (ASI) data, 2019
[5] Source: Estimates basis Annual Survey of Industries (ASI) data, 2019; the data presented for FY14-FY22 period takes into consideration the negative growth experienced during the Covid period. Covid Era defined as a period between April 2020- March 2022

Based on above, Maharashtra should target GVA of ~$182Bn in FY28, which will contribute to 21% of overall GVA. This will necessitate an annual growth rate target of 19%.

Figure 7: Growth Aspiration for Manufacturing



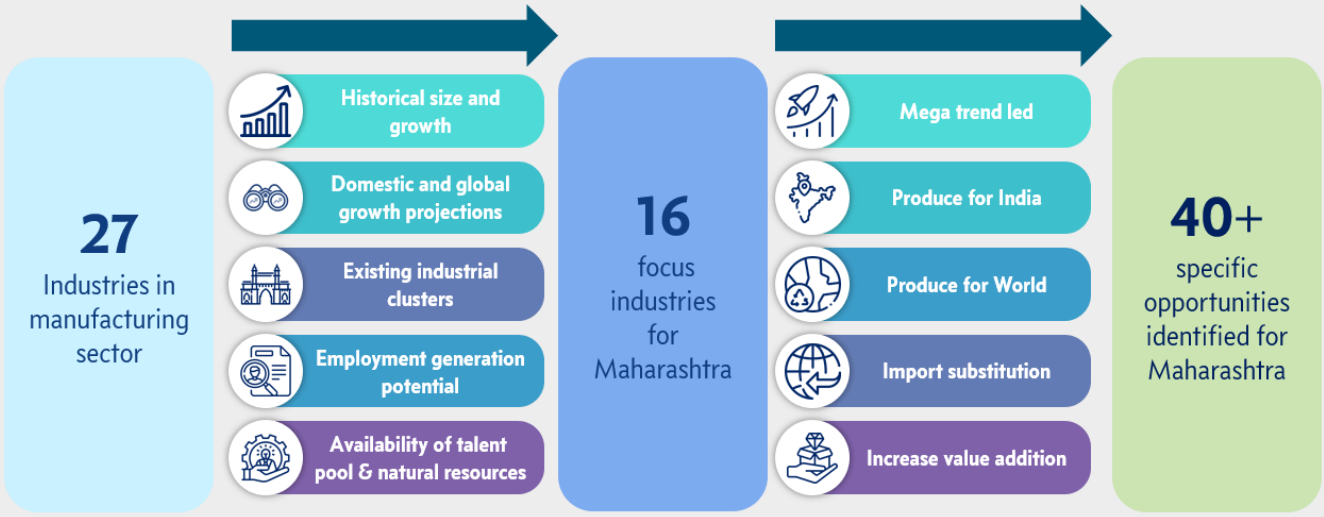
4.Identification of focus industries and opportunities for Maharashtra:

To achieve aspirational target of increasing manufacturing GVA by 3x to ~$182 Bn by FY28, Maharashtra will need to identify focus industries to attract investments in, provide competitive policy support, develop enabling infrastructure and grow share in Indian and global markets.

A detailed approach was used to identify 16 focus industries (from 27 industry codes) for Maharashtra basis **size and growth of industries, endowments** (existing industrial clusters, natural resources, talent availability) and **employment generation potential**.

40+ specific opportunities are identified across these high-focus industries basis **5 key themes**: Mega Trend Led opportunities driven by global trends, opportunity to produce for India, Opportunity to produce for world, potential for import substitution and potential for value addition.

Figure 8: Identification of focus industries and opportunities for Maharashtra



These **16 focus** industries include metals, automotive, chemicals, food processing, pharmaceuticals, capital goods, cement and ceramics, coke and refined petroleum products, rubber and plastic, electricals, cotton ginning, textiles and apparel, electronics, gems and jewellery and furniture.

Additionally, opportunities have been identified across **6 sunrise industries** i.e. Electric vehicle manufacturing, semiconductors, healthy food, defence equipment, renewable energy equipment and telecommunication equipment.

These 16 focus industries and key starting point for Maharashtra across each industry is detailed:

Figure 9: Focus industries and key starting points for Maharashtra

Sr. No.	NIC Code	Industry | All numbers for FY22 in $ Bn	India GVA ($ Bn)[6]	MH Share of India GVA	Key Starting Point for Maharashtra (Existing Industrial Base, Natural Resources)
1	24,25	Basic Metals & Fabrication	63	13%	High generation potential of steel scrap in Tier-1 cities of MH (specifically auto scrap which is most viable for secondary steel production) and availability of iron ore in Vidarbha region
2	29, 30	Auto & Other Transport	56	17%	Auto and auto component clusters in Pune and Sambhajinagar with strong MSME base (~4k MSMEs) and Aurangabad Industrial City (AURIC)
3	20	Chemicals	50	13%	Established industry base and port proximity
4	10,11	Food & Beverages	42	19%	Maharashtra is a leading Agri-producer in India and 2nd largest fruits producer in India
5	21	Pharma	37	11%	Highest number of US FDA approved units (59) in India
6	28	Machinery and Equipment	30	24%	Top producer of capital goods in India India has high dependence on imports (~40% demand of capital goods is met through imports)
7	23	Non-Metallic Products	26	9%	High consumption potential of non-metallic products like ceramics, cement and glass.
8	13	Textiles	24	9%	Highest cotton producer in India (~30% of India's cotton production) and Large cotton ginning cluster in Vidarbha (~7% of total output in India)
9	19	Coke and Refined Petroleum	20	10%	Proposal to set up "Barsu Refinery" in Ratnagiri district of Maharashtra
10	22	Rubber & Plastic	19	13%	Rubber: Strong demand from auto industry in Maharashtra Plastics: Established industry base in Maharashtra
11	27	Electrical	18	14%	Multiple large electrical companies have an established base (e.g., Crompton, Schneider)
12	14	Apparel	12	4%	Highest cotton producer and Cotton ginning cluster in Vidarbha
13	26	Electronics	12	14%	Strong demand, presence of consumer electronics, precision manufacturing industries.
14	321	Gems & Jewellery	4	18%	Existing base with >15% share of India GVA
15	31	Furniture	2	18%	Existing base with >15% share of India GVA
16	1	Cotton Ginning	1	21%	Leading producer of cotton in India (~30% share of India's cotton production)

[6] Source: Estimated basis Annual Survey of Industries Data, 2019

4.1. Identification of specific opportunities with focus industries:

Within each focus industry, multiple opportunities can be targeted to achieve target GVA growth. However, state will need to prioritize high value and high growth opportunities which can help achieve target GVA. These opportunities have been identified across above mentioned **16 focus industries** based on **5 themes**:

Figure 10: Opportunity Themes

Specific opportunities identified across focus industries can provide **incremental GVA growth for Maharashtra**. Opportunities have been tagged to respective 2-digit NIC codes to enable measurement and monitoring in future.

These opportunities will need to be enabled by state government via policy interventions (including fiscal incentives, ease of doing business), relevant infrastructure development, exports promotion and skill development initiatives. Opportunities identified are mapped to potential district clusters across the state to ensure balanced regional development.

4.2. Summary of key opportunities to support aspirational growth rate:

Key opportunities have been identified across conventional industries that can drive the GVA of Manufacturing in Maharashtra. Potential GVA opportunity for Maharashtra has been estimated basis projected growth of domestic consumption in India, potential for import substitution and exports to global markets.

Capital Goods, Food Processing, Metals and Auto industries are estimated to contribute **~$82 Bn (45%)** of the manufacturing GVA in FY28, while sunrise industries are estimated to contribute **$15 Bn (~8%)**

Figure 11: GVA Opportunity Size in FY28 by Industry (1 of 2)

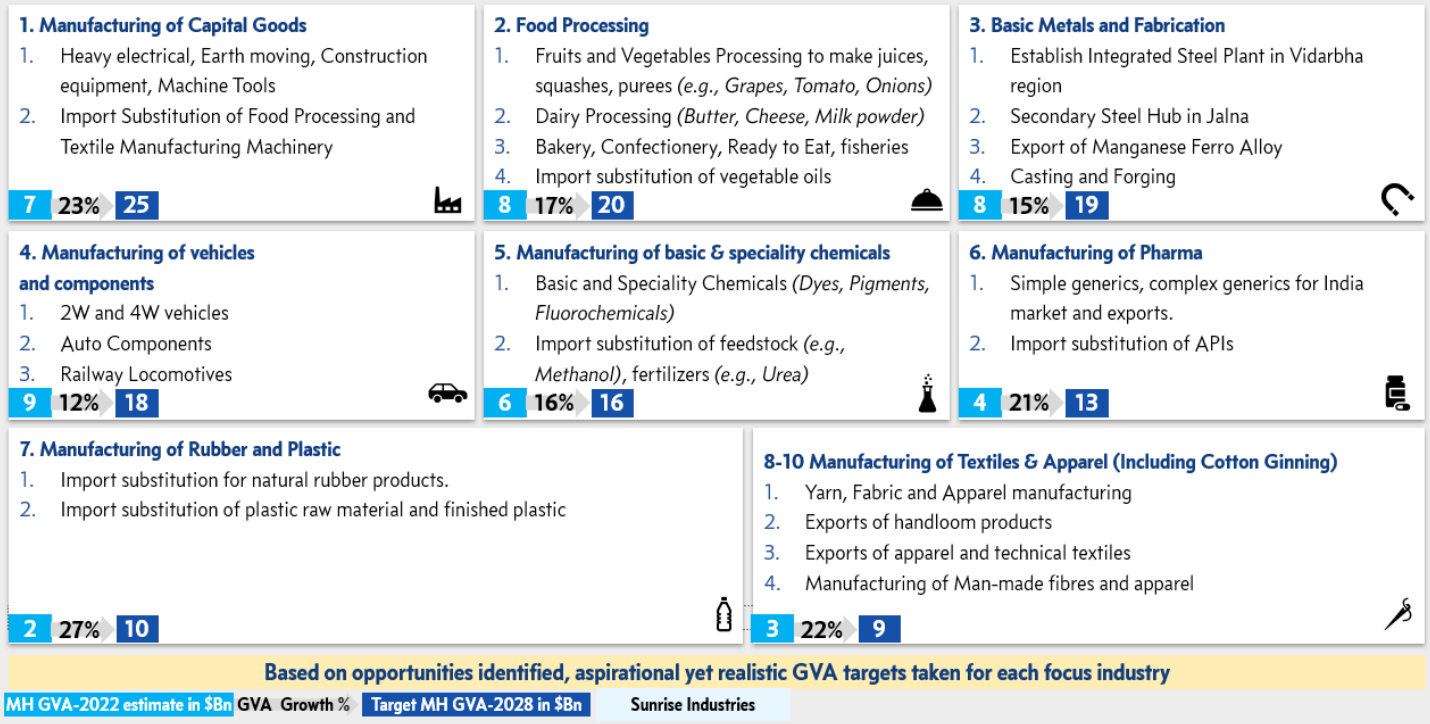
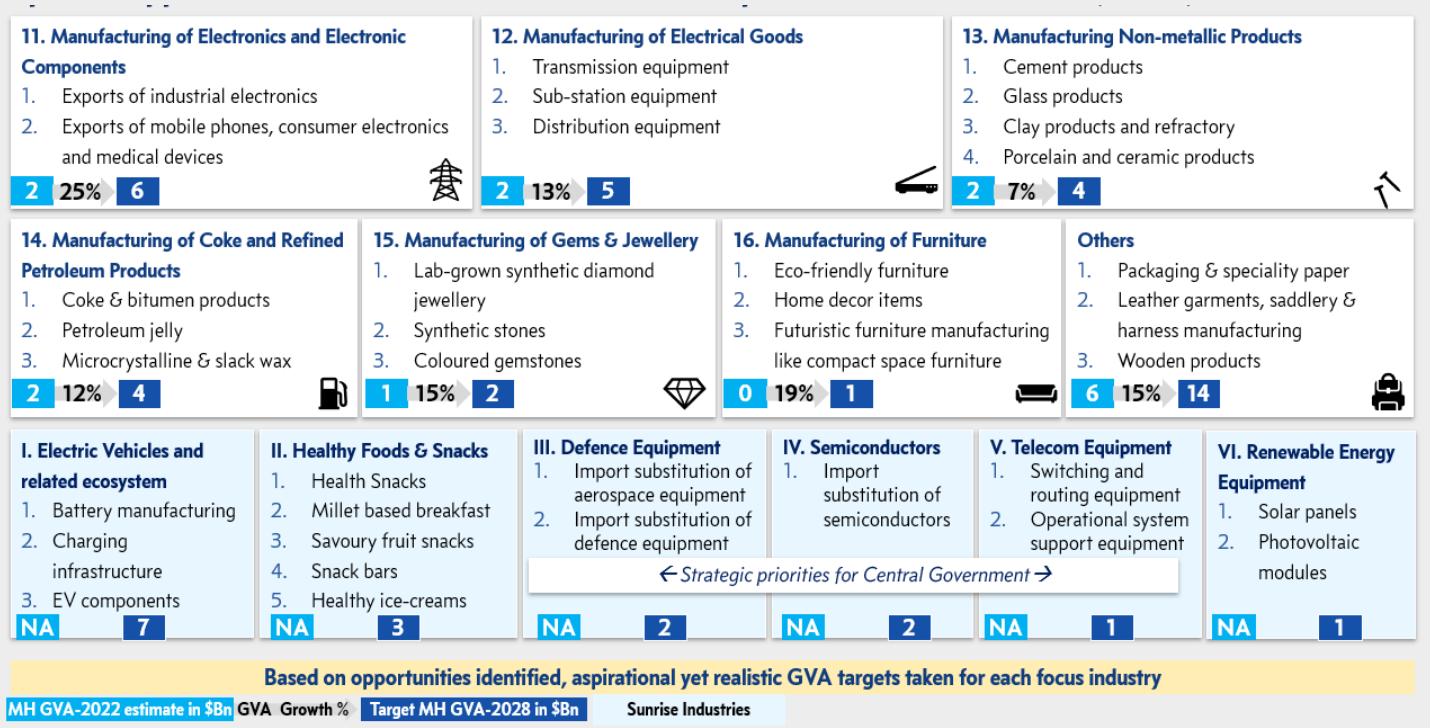
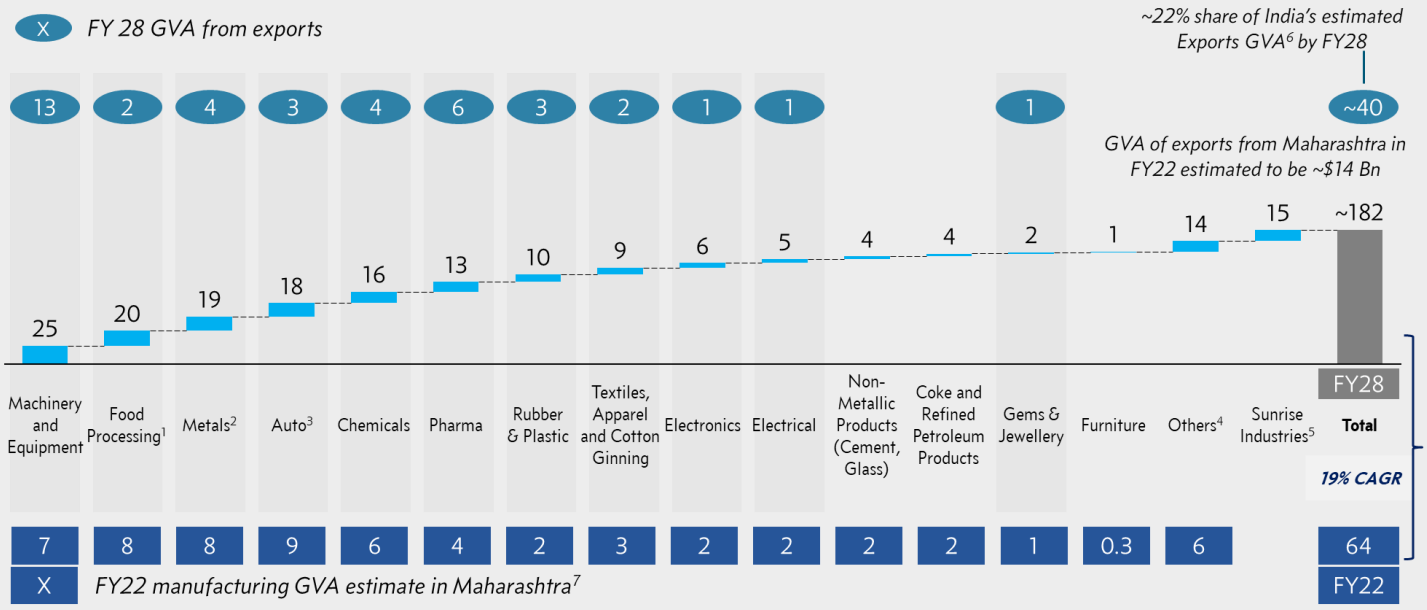


Figure 12: GVA Opportunity Size in FY28 by Industry (2 of 2)



Across each focus industry, opportunities for export potential have also been identified. It is estimated that **~$ 40Bn GVA will be driven by exports** which will contribute ~20-25% to India's manufacturing exports GVA by FY28. These are detailed subsequently:

Figure 13: Potential Exports GVA ($Bn) Opportunity by Industry



1. Food Processing includes Beverages; 2. Metals Includes Fabrication; 3. Auto Includes Other Transport equipment (including 2 wheelers)
4. Others includes Other Manufacturing, Paper, Media, Tobacco, Repair and Installation, Waste Collection, Leather, Wood Products Salt Production and Publishing Activities
5. Sunrise Industries Include Healthy Foods, Electric Vehicles, Battery Manufacturing, Charging Infrastructure, Aerospace & Defense, Semiconductors, Renewable Energy Equipment and Telecommunication Equipment
6. Manufacturing Exports from India expected to reach $1 Trillion, GVA estimated to be ~18% of Exports value, hence Exports GVA estimated at $180 Bn, thus MH share at ~22%.;
7. FY22 Manufacturing GVA by industry in 2022 estimated as data by industry is not available for 2022 from ASI

5. Key enablers required:

Pursuing opportunities to achieve FY28 target of manufacturing GVA, state will need state to provide key enablers. These enablers have been identified across multiple areas as represented:

Figure 14: Key enablers required for manufacturing

5.1 Attracting capital investments and providing working capital support

5.1.1 Attracting capital investments

Capital investments from public and private entities will be required to scale production across industries in Maharashtra. Estimated capital investments of ~$48 Bn were made in manufacturing sector in Maharashtra from FY14-19.

Achieving target GVA of ~$182 Bn manufacturing GVA by FY28 will require state to attract investments of **~$200-250** Bn in next 5 years. This has been estimated basis historical GVA to fixed capital ratios for India.

Attracting fixed capital investments from private and public sources will need state to:

A. **Identify annual industry specific targets for investments:** Industry wise annual targets will need to be driven by state to realize capital investments, these will then need to be mapped with potential investors across industries in India and globally.
B. **Increase and improve engagement with investors:** Relevant large players within India and globally will need to be engaged to source investments for focus industries. State can launch roadshows, leverage national and international investor summits to promote Maharashtra as a key investment destination within India.
A separate investment promotion entity for Maharashtra can be developed (similar to Invest India). Specifically for sunrise industries, state can leverage global investors (PE and VC firms) aligned to key themes like green mobility, clean energy, and sustainability. These interventions have been detailed further in Ease of Doing Business section.
C. **Improve conversion rate of investment proposals:** State needs to focus on realisation of investment proposals in MoU conversion rate for Maharashtra is 30-40%[7] while it is as high as 82% for Tamil Nadu[8]. Maharashtra government had formed event-specific task force and high-powered committees in the past to track these MoUs[9] but there is no institutionalised mechanism for ongoing monitoring.

In addition to attracting capital from large enterprises and global players, Maharashtra will need to attract capital from MSMEs. MSMEs account for ~35-40% of manufacturing GVA in India. MSMEs in India typically face challenges in access to formal credit, and hence enabling access to credit for MSMEs is critical.

The overall addressable debt demand of MSMEs in India is estimated to be $525Bn in 2017 of which Maharashtra accounts for 20% share equivalent to $105Bn[10]. Less than 40% of MSMEs in India avail credit from formal financial systems and therefore depend on costly and unreliable credit[11]. Key interventions to enable credit access include:

- Creation of an **innovation and credit guarantee fund** to promote financial institutions (e.g., NBFC, fintechs) to develop and deliver innovative **sector specific cash-flow based lending solutions** suited to MSMEs' working capital needs
- Leveraging **co-operative banks network** besides NBFCs and commercial banks **to capitalise on MSME credit schemes** such as Credit Guarantee Trust for micro and small enterprises (CGTMSE). Maharashtra's urban co-operative banks contribute 15% of total outstanding credit to MSMEs, which can be grown further.
- Enabling short term **unsecured credit access** to **micro and small enterprises** by driving credit card schemes focused on specific groups like weaver credit cards scheme[12]

These interventions have been further detailed in the MSME enablement section.

[7] Source: Maharashtra govt inks MoUs worth Rs 88,420 crore in Davos, Times of India, Jan, 2023
[8] Source: 82% MoUs with investors turned into actual projects past 10 years: TN govt, Business Standard, December, 2020
[9] Source: Maharashtra government forms committee to track MoUs signed during 'Make in India' week, Economic Times, March, 2016
[10] Source: Source: Financing India's MSMEs - Estimation of Debt Requirement of MSMEs in India, International Finance Corporation, Nov 2018
[11] Source: Strengthening Credit Flows to MSME sector, Standing Committee report, PRS Legislative research, May 2022
[12] Source: Weavers credit card scheme, India filings website; Tamil Nadu State Focus Paper 2022-23, NABARD

5.1.2 Working Capital

An estimated $152Bn i.e., 5.9% of the gross value added (GVA) of India is locked up annually as delayed payments from buyers to MSME suppliers which leads to working capital issues for MSMEs[13]. Achieving target growth from manufacturing, will need state to unlock blocked working capital for MSMEs. Unlocking working capital will allow MSMEs to improve business viability and consider expansion of facilities in Maharashtra. Key interventions include:

- **Timely disbursal of subsidies and refunds to MSMEs from state Government**
- Driving adoption of invoice-based discounting platforms (e.g., GEM Sahay and TReDS)
- Mandating **invoice discounting** of all transactions involving government procurement from MSMEs

These interventions have been further detailed in the MSME Enablement section.

5.2 Develop supporting infrastructure

Growth in manufacturing GVA will require investments in infrastructure development across sub-sectors like transportation, energy, and logistics infrastructure. State will need to develop an integrated master plan to ensure development is aligned to growth of manufacturing clusters (detailed further in Construction, Real Estate and Logistics section of report)

- **Land:** State will need to identify and acquire **land parcels of estimated ~100k-120k acres** to develop large industrial clusters (MIDC has planned to acquire ~98k acres in next 5 years[14]).
- **Connectivity:** Ensuring connectivity of these clusters by road, railway and port network is critical for seamless logistics movement.
- **Exports enablement:**
  - To enable export competitiveness, **port-proximate industrial clusters** will need to be developed by state with plug and play infrastructure (e.g., utility connections, effluent treatment plants), free trade zones and short-term trade protection policies[15].
  - Districts in hinterland which are away from coastline, will need inland container depots for export enablement. **Inland container depots** with capacity of ~5.5 Lakh TEUs[16] required by FY28 (Current capacity is ~2.5 Lac TEUs)[17]
  - Set-up export houses in major manufacturing district clusters to truly leverage One District One Product and enable MSMEs to export.
- **Other infrastructure:**
  - Warehousing capacity of ~3 Mn Tonnes (current capacity is ~1 Mn Tonnes) will be required to support FY28 GVA aspirations in agriculture and manufacturing.[18]
  - Cold storage capacity of additional ~2 Mn tonnes is required for FY28 agricultural GVA.[15]
  - Quality testing and certification labs, cold chains, trade promotion centres need to be established in manufacturing hubs & SEZs.
  - State can explore setting up manufacturing incubators for MSMEs and start-ups in focus industries across 1-2 key districts. Ramp-up factories can facilitate small businesses to use common infrastructure (For example, testing facilities, design software, manufacturing tools), this will enable them to pilot applications without need for large investments, demonstrate use cases to potential investors and foster culture of innovation in Maharashtra. For example, an EV incubator can be set-up in large automotive clusters like Pune.

5.3 Promote Ease of Doing Business in Maharashtra:

Maharashtra ranked **17th** in **2020** in EoDB rankings (as evaluated by DPIIT); top ranked states are Gujarat, Andhra Pradesh, Telangana, and Karnataka. Maharashtra must strive to become the **most attractive state** in terms of Ease of

[13] Source: Unlocking the full potential of India's MSMEs through prompt payments, Global Alliance for Mass Entrepreneurship (GAME), Dun & Bradstreet (D&B), May , 2022
[14] Source: MIDC Website
[15] Source: McKinsey Global Institute Report, 2020
[16] Twenty-foot Equivalent Units
[17] Source: Dry Ports in the Country, Press Information Bureau, Apr 2022
[18] Estimated basis historical ratios

Doing Business (EoDB), which is key to achieving growth aspirations. Key interventions to improve Ease of Doing Business have been identified across Business approvals, Labor regulations, subsidy disbursals, and investor support. These interventions are detailed further in **Ease of Doing Business** section of report.

5.3.1 Business approvals, documentation and land acquisition

- Establish Udyog Seva Kendras: Digitally enabled industry service centers, **managed by professional 3rd party** *(modelled on Passport Seva Kendra)* to address delays in business approvals (e.g., permits, licenses), reduce inefficiencies in inter department coordination.
- **Simplify land acquisition and registration**
  - Process conversion of agricultural land to industrial land via nodal agency (e.g., Udyog Seva Kendra) and leveraging technology (e.g., digitized land records)
  - Increase FSI of agricultural land from the current limit of 0.2 to promote processing and new practices like vertical farming
  - **Develop Digilocker for company documents** with controlled access and digital authentication for expedited approvals, well integrated with existing systems like MAITRI.

5.3.2 Labor regulations

- Review **Welfare Cess Act** for exemption of MSMEs
- Push **central government labor reforms** for higher flexibility to industries and worker benefits.
- Procedural simplification of **labor dispute resolution mechanism**

5.3.3 Subsidy disbursals

- **Simplified subsidy structure** (e.g., production linked) for intended benefit transfer.
- Improve transparency and efficiency in subsidy claims process; explore **direct subsidy payout system** instead of claims-based process.
- Budget subsidies under **planned expenditure**, **prioritise payments to MSMEs**
- Explore **alternate sources to finance** subsidies e.g., multi-lateral organisations
- Maharashtra can offer **additional subsidies to firms availing PLI scheme benefits**, this will reduce administrative burden and time for disbursal. For example, Maharashtra can offer additional incentives to firms in Electronics manufacturing already receiving PLI benefits post approval by Central Government.

5.3.4 Investor support

Dedicated entity and relationship/ investment managers for large enterprises, focused on specific countries, sectors, mega projects, PE, and VC investors. The role of this entity can be investment promotion, **monitoring of investment MoUs** and execution support.

5.4 Deliver competitive cost of doing business in Maharashtra

5.4.1 Power Tariffs

Maharashtra's industrial power tariffs are at INR 9-11 per unit vs. INR 5-8 per unit in Gujarat and Tamil Nadu. Ensuring competitive power-tariffs vs. peer states is critical to grow manufacturing in Maharashtra. This can be enabled by increasing share of renewable energy generation & consumption and other initiatives like upgrading state's grid infrastructure, demand curve shift to match changing supply curve. These interventions have been detailed in Energy and Renewables section of report.

5.4.2 Land Costs

State will need to enable land financing for enterprises and MSMEs. Key interventions are identified subsequently and detailed in Ease of Doing Business section of report:

- Explore developing **structured products** with banks to finance upfront cost, with capital subsidy payments from government transferred directly to the banks subsequently.

- Provision of **flexible payment options** vs. upfront payment for MSMEs and female entrepreneurs
- State can provide **suitable capital subsidies for focus industries to drive initial growth and investments**
- **Provide land on longer-term leases in industrial areas** to improve viability of projects
- Explore **flexible FSI guidelines, and Transfer of Development Rights** to enable firms to use FSI across different projects in the state.

5.4.3 Subsidies, taxes and duty

- Provide **competitive charges** for stamp duty, registration and transfer of land, license approvals and compliances. Benchmarking of subsidies provided by state vs. peers conducted for select industries and presented in Industry wise details section of manufacturing sub group
- Implementation of amnesty scheme for unviable units, revival packages for potentially viable units and setting-up of tripartite agreements to enable revival of sick industries

5.4.4 Water and effluent management

Build **common effluent (CETPs)** to reduce cost for MSMEs, promote **wastewater use and recycling by industries.**

5.5 Facilitate Global Trade for MSMEs

- Work with central government to develop Free Trade Agreements with key destinations
- Leverage Central government's Procurement and Marketing Support scheme to drive MSME participation in global exhibitions and expos.
- Marketing and demand linkages by facilitating exporters to participate in global exhibitions.
- Provide production-linked export incentives, freight subsidies, export credit schemes for MSMEs.
- Improve ease of doing exports by adopting global certification programs in Maharashtra
- Enable access to subsidized testing and quality certification facilities.

5.6 Skill development

Availability of necessary skill sets will be crucial to attract new industries and support existing industries in the state. Maharashtra needs to drive focused skilling initiatives to improve employability and support skill requirement of industries to achieve target growth. This will require enhanced collaboration between industry and academia along content development, content delivery and skill certification and job placement. Key interventions include industry-driven content development, rehaul of industrial training institutes (ITIs) and deepening apprenticeship programs. These have been further detailed in Skill Development section of report.

District-specific enablers: While state Government will need to provide above mentioned enablers through state, certain district specific enablers are critical to unlock growth of manufacturing clusters. These enablers are identified basis district interactions with manufacturing start-ups, MSMEs and large enterprises. Key enablers include:

1. **Improving air connectivity** in Tier-2 districts (e.g., operationalizing airport at Solapur, increasing flights to Sambhajinagar, Nagpur, Kolhapur, Nashik, Pune and developing new airports in districts like Amaravati, Sindhudurg)
2. **Developing relevant logistics infrastructure** for districts basis economic clusters (e.g., cold storage in Nashik and Solapur for horticulture crops, ICDs and export houses in Amravati, Solapur to drive textile exports)
3. **Ensuring CETPs are operational** and accessible to MSMEs in key industrial areas across districts.
4. **Providing public transportation** from residential clusters to key industrial areas (e.g., Electric bus network can be developed from residential areas to MIDCs across districts) and providing **safe working environment** to boost women participation in workforce (e.g., providing safe transportation for women to MIDCs)
5. **Improve public infrastructure** (e.g., street lighting, firefighting, drainage) and internal city road network
6. **Providing incentives for skill development through apprenticeship programs** across conventional and emerging industries (e.g., Electric vehicle and defence industry training in Pune, Nashik and Sambhajinagar, textile and garment training in Amravati and Solapur)

6. Policy benchmarking

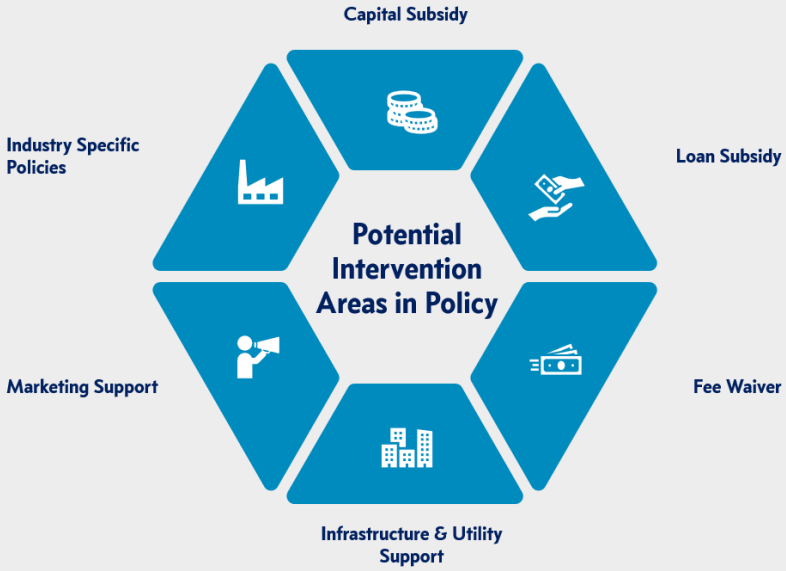
While state will need to provide enablers identified above, industrial policy covering area like subsidies, taxation, promotions support will be critical to drive GVA targets. To understand competitiveness, of Maharashtra's industrial policies, benchmarking vs. peer states is required.

Analysis indicates that Maharashtra does not have a separate Policy for automobile, pharma and semiconductor industries which is available in other large states. For Electric Vehicles, Maharashtra's EV Policy of 2021 focuses on driving penetration of EVs, however other states policies focus on providing incentives for EV Manufacturing (for example Tamil Nadu).

Policies of other states have been studied across key themes of fiscal incentives (capital subsidy, loan & power subsidy, stamp duty waiver), infrastructure – logistics & others, skill development and ease of doing business.

Key observations basis study of industry wise policies show that Maharashtra offers lower fiscal incentives vs. peer states in select industries. Potential intervention areas have been identified as represented:

Figure 15: Potential intervention areas in policy



6.1 Industry specific policies

Maharashtra will need to identify and create dedicated policies for thrust industries. For example, Maharashtra has dedicated policies for food processing, electronics, and textile industry. Other peer states like Gujarat have dedicated policies for pharma and semiconductor industry and Karnataka has dedicated policy for automobile industry.

Extend the current EV policy to include supply side subsidies to incentivize manufacturing in Maharashtra *(current policy focused on driving penetration of EVs from demand side, Maharashtra is planning a new EV Policy)*. For example, Tamil Nadu EV Policy and Haryana EV Policy include provisions like reimbursement of SGST, turnover based subsidy, land cost subsidy and employment incentive to attract EV manufacturers.

6.2 Capital subsidy

Maharashtra will need to provide competitive capital subsides to attract industries. In industries like food processing, Maharashtra offers lower capital subsidies vs. peer states. For example, Gujarat and UP offer capital subsidies upto Rs. 5 Cr while Maharashtra provides capital subsidy upto INR 0.5 Cr for specific investment sizes.

6.3 Loan subsidy

Provide competitive interest subsidies for loans on fixed capital investment. For example, for food processing industry, Telangana offers 75% interest subvention upto INR 2 Cr.

6.4 Fee waiver

Ensure relevant fees are waived off to increase investment in the state. For example, for food processing industries, Karnataka waives off agriculture market fees.

6.5 Infrastructure & Utility support

Existing policies can be amended to include infrastructure support (land and utilities like water, gas, electricity). For example, UP provides land for charging stations on lease for 10 years at revenue sharing model at INR 1 per kWh and Gujarat supports companies with utilities like gas connection.

6.6 Marketing support

Explore extending support for marketing of products through trade fair & exhibition assistance for MSMEs.
For example, Andhra Pradesh reimburses 50% participation cost in International Trade Fairs upto INR 5 Lakhs.

Financial Services

Services - Financial services

1. Executive Summary

Financial services drive GDP impact both as a sector with high value addition and productivity and acts as an enabler for economic growth.

- **High value addition** potential of sector with GVA to output ratio of 72[19] at an India level in FY20
- **High labour productivity** of sector with GVA per person employed of INR 2.7 Mn for financial services vs. total GVA to employment ratio of INR 0.4 Mn for Maharashtra as of FY21
- **Enables credit** to individuals and enterprises driving growth across sectors, **provides insurance** to safeguard against uncertainty, and **facilitates capital raising** in the primary and secondary markets

Current state

- Financial services sector contributes **10-11% of state's GVA**, growing at a **CAGR of 8.2%** (FY14-22)[20]
- State share of 24% in financial services GVA of the country, with Mumbai housing all key financial regulatory authorities, stock exchanges and headquarters of major banks, insurers, and wealth management firms.
- As a percentage of GDP, Maharashtra's credit outstanding is at 87%, deposits at 112%, life insurance premiums at 5.7%, non-life insurance premiums at 1.6%, mutual fund AAUM is 60%, all higher than India average
  - Key challenges regarding access to formal credit, low awareness of insurance and investment products, especially in underpenetrated customer segments and geographies need to be addressed

Aspiration and opportunities

- Target growth of ~14% between FY22 and FY28 reaching $85-95Bn GVA in FY28, in order to maintain sector share of state's overall GVA as well as to enable high target growth of core sectors e.g., manufacturing.
- Potential to strengthen itself as financial hub leveraging existing ecosystem and availability of finance talent
- Potential to increase financial products penetration especially in key focus segments – MSMEs, retail and agriculture and allied, while ensuring risk measures to provide responsible capital.

Summary of key opportunities, enablers and interventions

Opportunity areas		Key interventions and enablers
1. Strengthen Maharashtra as financial hub		
1. International financial centre	**Expand middle, back-office operations** of domestic & international financial services players	• **Financial incentives** *(e.g., power tariffs, employee cost)* to improve all-in cost parity and balance high real estate cost • **Relationship managers** to attract and handhold fintech startups and financial institutions looking to set up mid and back offices • Integrated **residential and commercial development** along Mumbai-Pune corridor and potentially Samruddhi expressway • Support for fast-track regulatory approval and single window business clearances • **Support private sector and university partnerships** to create skilled talent pool e.g., banking and insurance field force, finance professionals for mid and back offices
2. Fintech hub	Capture **growing fintech value pools** by attracting fintech startups in the state	
3. Exchanges for new asset classes	Enable setting up exchanges **of new asset classes** (e.g., social stock exchange, carbon exchange)	

[19] Based on India KLEMS database, RBI

[20] Data presented for FY14-FY22 period takes into consideration the negative growth experienced during the Covid period. Covid Era defined as a period between April 2020- March 2022

Opportunity areas	Key interventions and enablers
2. Boost penetration of financial products in the state	
1. Banking and credit	**Agriculture and allied** • Offer tailored crop loan products in partnership with fintechs • Develop alternative credit scoring for farmers • State level interest subvention schemes leveraging cooperative banks, SHG linkage • Leverage central government and NABARD initiatives e.g., Kisan credit card • **Ease of Doing Business**: Technology implementation in cooperative banks, digitisation of land security, allow mortgage of agricultural land for specific non-agricultural purposes e.g., primary food processing activities **Micro, Small and Medium Enterprises (MSMEs)** • Offer cash flow-based lending products and enable account aggregator use cases in partnership with financial institutions • Leverage co-operative banks to capitalise on central government credit schemes • Mandates for **TReDS adoption** to State PSUs *(e.g., MSEDCL)*, government departments • State level credit guarantee fund in partnership with institutions like SIDBI • Enable short term **unsecured credit access** through **credit card programs** with subsidized interest rates focused on specific groups e.g., weaver credit cards • Trade finance or export credit schemes enabling financial institutions to provide trade financing solution to MSMEs • **Ease of Doing Business**: Formalisation of MSMEs (e.g., via Udyam registration), data and technology infrastructure for seamless KYC (e.g., Digi locker for company documents), digital asset verification and lien marking **Retail** • Drive adoption of products such as gold loan in partnership with fintechs and banks • State level micro-credit programs for low-income segments & women e.g., credit on UPI
2. Insurance	• **Health insurance**: Enhance existing schemes (e.g., higher sum insured, coverage for AYUSH, out-patient cover) and cover wider segment of population and risks • **Agriculture and allied**: Improve existing crop insurance schemes; offer tailored crop insurance based on type of crop, geography, purpose (e.g., export) and risks (e.g., pest, hailstorm); drive existing central schemes for allied activities • **MSMEs**: State level insurance schemes linked to credit guarantee schemes; leverage Udyam and TReDS platform for awareness and distribution • **Other insurance**: Explore state level insurance schemes for products like home insurance (linked to Pradhan Mantri Awas Yojna) and unemployment insurance (benefit linked to job matching and vocational training services) • **Life insurance**: Schemes with higher coverage and affordable premiums; group insurance schemes targeting vulnerable groups like farmers and MSMEs • Distribution: Unlock potential of alternate distribution channels (e.g., cooperatives, self-help groups, common service centres) • Accelerate adoption of IRDAI initiatives and centrally sponsored schemes • Ease of doing business: Enable integration with government databases for underwriting (e.g., database of PMJAY) and identifying uninsured population
3. Investments	• Accelerate adoption of central government initiatives like small savings scheme, tax saving deposits, mutual funds and other investment instrument • Drive financial literacy programs & investment products adoption with private players • Rationalisation of taxes on capital market instruments (central level reform)

2. Overview: Current state and aspiration

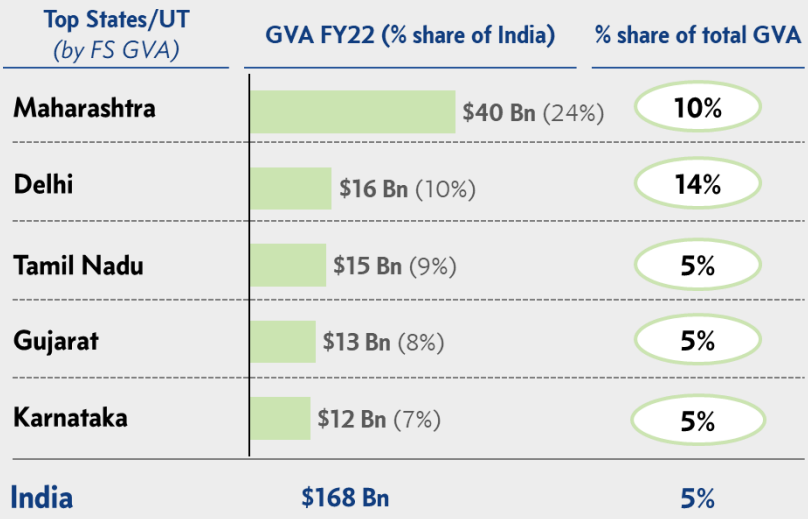
Financial services drive GDP impact both as a sector with high value add and productivity, and as an enabler for economic growth. The sector shows high value addition potential with GVA to output ratio of 72[21] at an India level in FY20. The sector also has high labour productivity with GVA per person employed of Rs 2.7 Mn vs total GVA to employment ratio of Rs 0.4 Mn for Maharashtra as of FY21[22]. Financial services sector enables credit to individuals and enterprises driving growth across sectors, provides insurance to safeguard against uncertainty, and facilitates capital raising in the primary and secondary markets. Emerging technologies, such as payments via Unified Payments Interface (UPI), has facilitated the expansion of the finance industry by making transactions more convenient.

Current state

Maharashtra has the highest share of financial services GVA (24%) of the country, with strong existing base of financial institutions in Mumbai including regulators - Reserve Bank of India (RBI), Securities and Exchange Board of India (SEBI), stock exchanges - National Stock Exchange (NSE), Bombay Stock Exchange (BSE) and headquarters of major banks, insurance companies and wealth management firms.

Financial services sector contributes 10-11% of Maharashtra's GVA, which is greater than peer states contribution at ~5%. The sector has been growing in the state at 8.2% CAGR between FY14 and FY22.

Figure 16: Financial Services GVA baseline

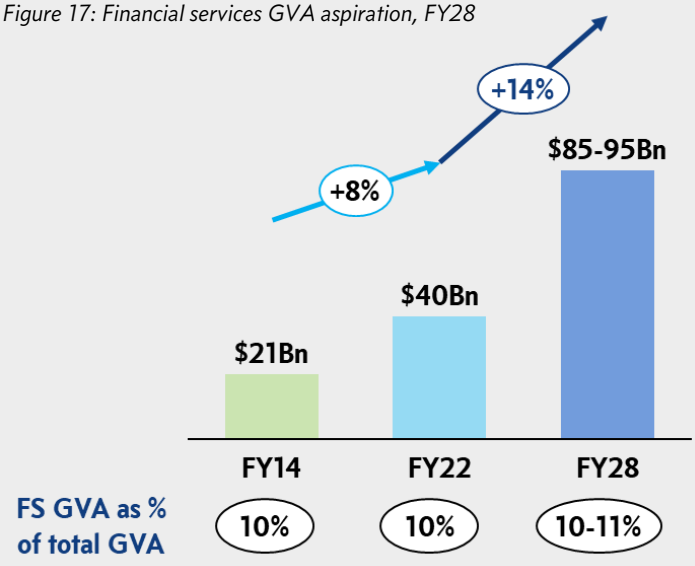


Aspiration

Financial services sector is expected to contribute ~$64Bn of GVA by FY28 if it continues to grow at existing growth rate. However, Maharashtra should aim to grow financial services GVA to $85-95Bn at CAGR of ~14% between FY22 and FY28 to maintain its share of state's overall GVA as well as to enable high target growth of core sectors. For example, manufacturing is targeted to grow at ~19% CAGR between FY22 and FY28 vs historical growth of ~4%.

The State can unlock incremental potential by focusing on two key opportunity themes which have been detailed in the following sections.

Figure 17: Financial services GVA aspiration, FY28



[21] Based on India KLEMS database, RBI
[22] Based on employment distribution by sector from Annual Periodic Labor Force Survey, 2020-21; population projections from Report of the Technical Group on Population Projections, National Commission on Population, Ministry of Health & Family Welfare, July 2020; GVA data from MOSPI

3. Key opportunities and interventions

1 Strengthen Maharashtra as financial hub

- **1. Financial centre** *(Back, middle-offices hub)*
- **2. Fintech hub**
- **3. Exchanges for new asset classes** *(e.g. social stock exchange, carbon exchange)*

2 Boost penetration of financial products in the state

(MSMEs, Retail, Agriculture and allied segments, geographical coverage)

- **1. Banking and credit**
- **2. Insurance**
- **3. Investments**

3.1. Strengthen Maharashtra as financial hub

Historically, Mumbai has been the financial centre of India, hosting headquarters of multiple financial institutions. Pune has also emerged as preferred location for finance KPOs (Knowledge Process Outsourcing) and SSCs (Shared Service Centres). Leveraging existing ecosystem and availability of finance talent, state can plan development of integrated residential and commercial spaces focused on financial sector along the Mumbai-Pune corridor and potentially Samruddhi expressway. State can attract domestic and global financial institutions to set up their back and middle offices, fintech players to set up their headquarters and become destination of choice for exchanges of emerging asset classes.

3.1.1 International Financial centre (IFC)

India exported financial services worth $5.4 Bn in 2018[23], ranked 15 globally. International Financial Centres (IFCs) contribute significantly to their country's economy e.g., Hong Kong IFC contributed ~20% to country's GDP and 8% of the employment and City of London IFCs contributed 10% to UK tax revenues in 2020.

Figure 18: Exports of financial services by major countries

IFCs can be focused on offshore front-office activities such as Dubai, Hong Kong, Singapore, GIFT - Gujarat or middle and back-office support such as Mumbai or both. Mumbai ranks 50 of 119 in the Global Financial Centres Index 31[24] which is highest among other India centres with Delhi at 58 and GIFT city-Gujarat at 71. Major BFSI players like UBS (Union Bank of Switzerland), Barclays, BNY Mellon, etc. have their FP&A (Financial Planning and Analysis) SSCs in Mumbai and Pune. Pune is also home to finance KPOs of SG Analytics, Syntel, CRISIL etc.[25]

Potential opportunities for Maharashtra to explore

Considering its existing strengths and country objectives, **Maharashtra should accelerate development of financial centres focused on middle and back-office operations of domestic and global financial institutions.** This would include Finance KPOs, Global In-House Centres (GICs) or Shared Services Centres (SSCs) for activities such as finance and accounting, claim processing, compliance and risk management, customer support, etc. **State can attract**

[23] Source: Making Money, Moving Money: The World's Financial Services Exports, 2018 (based on World Trade Organisation data)
[24] Source: The Global Financial Centres Index 31, Z/Yen, March 2022
[25] Source: Future of finance centres in India, KPMG, March, 2020

global players looking to move out of international centres such as Hong Kong, London by marketing finance talent and existing ecosystem.

Key enablers and interventions

a. **Infrastructure:** Enable access to land and development of **integrated infrastructure** including commercial and residential spaces, **along the Mumbai – Pune corridor** and potentially Samruddhi Expressway with seamless connectivity to the cities. It is needed to ensure talent acquisition and retention.
b. **Financial incentives:** Provide subsidies and incentives to reduce capital and operational cost for corporates, including **power tariff reduction, capital subsidy, subsided rent, skilling & training subsidies**. Benchmark all-in costs for companies to set up their back, middle-offices and ensure that incentives offered are sufficiently attractive.
c. **Ease of Doing Business** (detailed in Ease of Doing Business section):
   - Dedicated **relationship managers** to attract global financial institutions and support them in expediting necessary **licenses and approvals**
   - Provide support for fast-track regulatory approvals, timely subsidy payout and **dispute resoluton**
   - **Support private sector and university partnerships** to create skilled talent pool e.g., banking and insurance field force, finance professionals for mid and back offices

3.1.2 Fintech hub

India's Fintech market is expected to reach ~$200 Bn in 2030 from $58 Bn in 2022 growing at 17% CAGR [26] (as shown in Figure 20). Key sub-segments include lending with expected share of 61% in total market, insurance -14%, payments - 12% and others including investments, neo-banking, and SaaS contribute remaining 12%. The top 125 fintech companies in India directly employ 80,000 people, and their activities also indirectly generate employment for an additional 2.5 times that number. While most of the fintech ventures are still in their early stages, the total estimated employment generated by the fintech sector in India is over 1.8 million as of 2022[27].

Figure 20: India Fintech market size ($Bn)

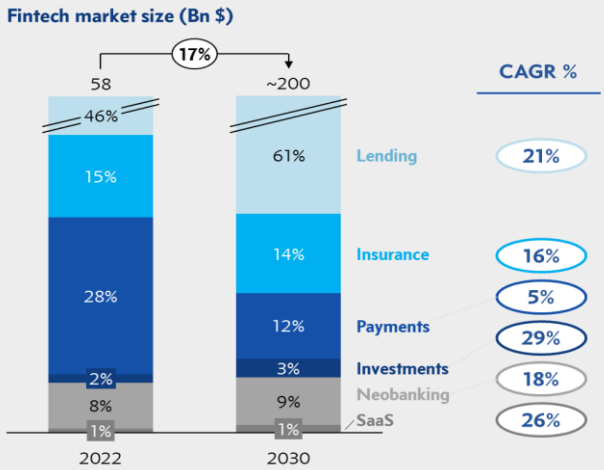


Figure 19: Comparison of key fintech hubs in India

Data as of 2022	Mumbai +Pune	Bengaluru	Delhi NCR
# of fintech startups	~1100	~990	~760
# of unicorn startups	3	11	6
Funding (2014 to Q3'22)	$4.4Bn	$9 Bn	$8.6Bn

A. Potential opportunity for Maharashtra

Maharashtra should aim to capture sizeable share of India's growing fintech value pools by leveraging existing fintech startup base as well as incubating and attracting new fintechs. Mumbai and Pune have the highest number of fintech startups (~1100) in the country with 3 unicorn startups BillDesk (Mumbai), CoinDCX (Mumbai) and OneCard (Pune) and funding flow of $4.4 Bn between 2014 and Q3 2022[28]. However, fintech startups are moving out of Mumbai, as observed when 2 unicorns Acko and PhonePe shifted their headquarters from Mumbai to Bangalore. Key challenges faced by fintech startups in Mumbai include high cost of real estate, lack of technology

[26] Projected based on data from Inc 42 reports, Invest India
[27] Source: Fintech in India: Transforming Payments, Creating Jobs | Xpheno
[28] Source: Blinc insights, Inc42 reports

talent and startup ecosystem. State would need to introduce favourable policies addressing these challenges to retain existing startups as well as attract new ones.

B. Key enablers & interventions: State policy enhancements

Maharashtra government had formulated FinTech policy in 2018 aimed at making Maharashtra one of the top five fintech hubs globally. The key objectives of the policy included incubating at least 300 startups by 2021, attracting venture capital funding of at least Rs 200 Cr by 2021 and providing at least 2 times more co-working space to fintech startups.

Tamil Nadu had also launched a focused FinTech policy in 2021 to transform Tamil Nadu into a leading global destination for FinTech firms by 2025. Other states like Karnataka do not have specific policy for fintechs but offer benefits as part of overall industry or IT policy. Besides improving implementation of existing policy initiatives such as low-cost access to co-working spaces for fintechs, State can also enhance existing policy basis comparison with other state policies such as Tamil Nadu -

Incentives and subsidies

- **Incentives on employee costs** for fintech startups to incentivize local employment. Tamil Nadu government is providing reimbursement of 12%-48% of expenses incurred on Employee provident fund based on core staff employed from the state and geography (tier 1,2,3). Telangana government is also offering recruitment assistance of INR 10,000 per employee to startups for the first year of operations as part of their IT policy.
- **Access to toolkit containing subsidised subscription** to services such as cloud, work collaboration tools
- **Special package of incentives** to attract large fintech firms including relocation incentives. For example, Tamil Nadu fintech policy proposes structured package of incentives for large firms with investment > INR 50 Cr and direct employment for >300 people as well as relocation incentive of 50% of the cost of relocation up to INR 10 Cr to first 5 large fintech firms

Ecosystem development

- **Creation of fintech focused cell** for promotion of fintech startups, organising hackathons, providing sandbox for fintech startups to develop and test prototypes.
- **Partnership with fintechs** to drive state initiatives for financial inclusion and innovation in use cases.

Ease of doing business

- Fast track clearance and business approvals for fintech startups via nodal agencies (e.g., proposed Udyog Seva Kendra as detailed in Ease of Doing Busines section)
- Timely, predictable payout of all subsidies

Real estate and infrastructure

- Enable access to **integrated infrastructure in areas with lower real estate cost** (e.g., Navi Mumbai, Pune). Fintech focused spaces could be located with IT centres or financial centres
- Improve **connectivity of existing hubs** with low-cost residential areas

3.1.3 Destination of choice for exchanges of new asset classes

Mumbai houses all 4 largest national exchanges - National Stock Exchange (NSE), Bombay Stock Exchange (BSE), Multi Commodity Exchange (MCX) and National Commodity and Derivatives Exchange (NCDEX). However, 2 international exchanges – India International Exchange (INX) and India International Bullion Exchange (IIBX) have been set up at GIFT-Gujarat. The exchanges contribute to State's GDP (NSE and BSE generate ~$1.5Bn in annual revenue) as well as enable associated ecosystem of brokers, traders and asset management companies.

A. Potential opportunities for Maharashtra to explore

Leveraging the existing ecosystem, Maharashtra should aim to become a favourable destination for setting up exchanges for new assets (e.g., Social stock exchange, Carbon trading exchange) as these markets mature in India. State should also stay at the forefront of enabling adoption of new asset classes (e.g., social impact bonds, green bonds, municipal bonds) and driving innovation in the industry. Two emerging exchanges are detailed:

a. **Social stock exchange:** Social Stock Exchange (SSE) was proposed in FY20 to help channelise private capital to eligible social enterprises and social impact projects through equity, debt or mutual fund instruments. This can include funding from impact investors, donors, CSR funding among others. NSE has received approval from SEBI to set up SSE as a separate segment on the exchange. Maharashtra should aim to attract any upcoming social stock exchanges to be set up in the state and drive adoption of emerging asset classes such as Social Impact Bonds[29].

b. **Carbon trading exchange**: Globally, carbon trading market has grown almost 10X from $80-100Bn in 2015 to ~$850Bn in 2021 in terms of annual trading value[30]. This has been largely driven by compliance carbon markets due to regulatory mandates on carbon emissions and regulation of carbon markets. Voluntary carbon markets have also grown in recent years due to the Paris Agreement calling for drastic corporate net zero goals.

- **Compliance market:** As detailed in Energy and Sustainability section, Maharashtra also needs to set decarbonization targets in line with its growth ambitions. Maharashtra government can explore setting up carbon compliance market including design of required carbon emission norms and associated processes such as environmental audits.
- **Voluntary market:** India is a significant exporter of carbon credits and has issued 278 million carbon credits between 2010 and June 2022, which is nearly 17% of all voluntary carbon market credits issued globally. The global market for carbon credits is expected to reach ~$100 Bn by 2030[31] which **represents $15-20Bn opportunity in voluntary market for India**, assuming similar share.
  State should aim to attract upcoming voluntary carbon exchanges. For example, India Energy Exchange is exploring setting up of International Carbon Exchange to capture business opportunities in the voluntary carbon market.[32]

B. Key enablers and interventions

Potential enablers needed to ensure exchanges continue to see Maharashtra as the destination of choice -

- **Infrastructure:** Continued access to uninterrupted power supply and high-speed internet for exchange infrastructure
- **Incentives for exchanges:** Subsidies on technology investment cost, power cost, reimbursement of internet expenses to reduce operational cost of the exchange.
- **Incentives for financing:** Drive adoption of innovative instruments such as social impact bonds through incentives such as exemption of listing fees
- **Ease of doing business:** Support for fast-track regulatory approval and single window business clearance

3.2 Boost penetration of financial products in the state

As a percentage of GDP, Maharashtra's credit outstanding is at 87%, deposits at 112%, life insurance premiums at 5.7%, non-life insurance premiums at 1.6%, mutual fund AAUM is 60% which are all higher than India average. However, potential exists to increase penetration up to global and peer state benchmarks especially in key focus segments – MSMEs, Retail and Agriculture and allied, while ensuring risk measures to provide responsible capital.

Further, overall credit penetration is concentrated in Mumbai region, with rest of Maharashtra (outside Mumbai[33]) having penetration of only 30% as against 85% for overall state. However, the difference could be lower in reality as corporate credit may be booked in Mumbai considering it has headquarters of many large enterprises. Additionally, 40% of agricultural term loan flow[34], 70% of MSME credit flow[35] and 65% of deposits is concentrated in Mumbai which reflects concentration of economic activity in the district. In terms of retail credit, penetration is 26% for Mumbai and only 13% for rest of Maharashtra (outside Mumbai). The spread of NSDL investor accounts[36]

[29] Social impact bond is an instrument through which social enterprise raise capital from investors who would get paid by the donor if the intended outcomes are achieved
[30] Source: Carbon markets – The Beginning of the Big Carbon Age, Credit Suisse, 2022 | Treeprint
[31] Source: Carbon credits and India's carbon market, Deccan Herald, November, 2022
[32] Source: IEX Forms Subsidiary Explore Business Opportunities In Carbon Market | Outlook India
[33] Mumbai include Mumbai and Mumbai Suburban
[34] Source: Maharashtra State Focus Paper 2022-23, NABARD
[35] Based on Potential Linked Credit Plan Projection by district for Mumbai and Mumbai Suburban, State focus paper, NABARD
[36] Source: Investor Accounts at NSDL Cross The One Million Mark | NSDL

(percentage of pin codes from where accounts were opened) is at 36% (mainly in Mumbai region) as compared to Kerala and West Bengal at 75% and 53% respectively. This indicates opportunity to increase penetration in under - penetrated districts, which will also be catalysed by interventions to drive economic growth in these districts.

Key metrics across banking and credit, insurance and investments have been indicated in next Figure along with targets based on benchmarks of relevant states and global peers. Some of the parameters like MSME GVA have been estimated due to lack of published data from government sources, especially at state level. The state should aim to set and achieve these targets by introducing focused policies and interventions. A collaborative approach is required with extensive participation from private sector and regulators to develop innovative products tailored to customer needs and distribute them via existing infrastructure and new channels.

Target for key metrics

Figure 21: Targets for key financial services metrics

Product category	Key metrics	Maharashtra		Benchmarks	
		Current	Target (FY28)	India average	Global/State peers
Banking and credit	**Credit outstanding[37] as a % of GDP**	**87%**	**100%**	**52%**	**110%[38]**
	Agri credit outstanding[39] as a % of Agri GVA	50%	100%	50%	100%[40]
	MSME credit outstanding as a % of MSME GVA[41]	58%	80%	28%	>80%[42]
	Retail credit outstanding as a % of GDP	18%	40%	14%	~45%[43]
	Deposits as a % of GDP	**112%**	**130%**	**80%**	**~130%[44]**
	# of deposit accounts per population	1.7	2.1	1.5	2.1[45]
Insurance	**Life insurance premiums[46] as a % of GDP**	**5.7%**	**7.7%**	**3.2%**	**7.7%[47]**
	Life insurance Premium per capita ($)	200	600	70	3300
	Non-life insurance premiums as a % of GDP	**1.6%**	**3.1%**	**0.9%**	**3.1%**

[37] Outstanding credit by Scheduled Commercial Banks (SCBs), FY22, RBI
[38] Global peers: Emerging economies as per BIS data 2021
[39] Outstanding credit by Scheduled commercial banks (FY20), State and district cooperative banks (FY20) and Primary Agricultural Credit Societies (PACS) for 2016
[40] State peers: Average credit penetration for Tamil Nadu, Karnataka and Kerala
[41] Outstanding credit by Scheduled commercial banks, State and district cooperative banks (FY20). MSME credit penetration is estimated to be 65% including credit outstanding from urban-cooperative banks (estimated); MSME GVA estimated based on historical share of Maharashtra in India's MSME GVA
[42] Based on credit gap for Maharashtra, Source: Financing India's MSMEs - Estimation of Debt Requirement of MSMEs in India, International Finance Corporation, Nov 2018
[43] Global peers: Average of retail credit penetration in China, Vietnam and Brazil, Source: India's century, Banking committee report, FICCI-McKinsey
[44] Global peers: Average penetration for Singapore, Malaysia, Thailand
[45] State peers: Average penetration of Tamil Nadu, Karnataka, Kerala
[46] Total premiums for Maharashtra estimated assuming similar share of state in India's New Business Premiums; Source: IRDAI Handbook, 2021-22
[47] Global peers: Average of Japan, South Korea, Singapore, Taiwan; applicable for Life insurance premium per capital and non-life insurance penetration; Source: IRDAI

	Health insurance - Households (at least one member) covered [48]	22%	80%	41%	>80%
	Crop insurance – Area insured/Gross sown area[49]	40%	60%	25%	50%
Investments	**Mutual funds AAUM[50] as a % of GDP**	**60%**	Not set[51]	**12%**	**26%[52]**
	# of BSE[53] registered investors per population	21%		10%	-

3.2.1 Banking and credit

A. Agricultural and allied credit

Maharashtra should aim to increase agricultural credit penetration (Agri credit outstanding as % of Agriculture GVA) from current levels of 50% (FY20) to ~100% in line with southern states of Tamil Nadu, Karnataka and Kerala. Tamil Nadu and Kerala also lead in ratio of crop loan disbursed (by Scheduled Commercial Banks) to gross input cost[54] as per RBI Internal Working Group (IWG) report to review Agricultural credit. In Maharashtra, 30% of outstanding agricultural credit is mobilised by cooperative banks. Improving agricultural credit penetration would require holistic approach with agricultural policies focused on small and marginal farmers, reduced cost of inputs usage (e.g., via input subsidies) and focused collection efforts to make credit available in a sustainable manner.

Key challenges

Agricultural credit has always been a focus area for government and RBI with interventions such as priority sector lending norms, interest subvention schemes, Kisan credit cards, distribution via cooperative banks aimed at improving access to credit for farmers. However, key challenges remain unresolved such as access to unsecured loans, standardised credit scoring mechanism for farmer/farms, managing for repayment risk in crop loans (due to multiple environment factors impacting yield of the crops) among others**.**

Mentioned areas need higher focus from the government and a detailed study is required to identify and unblock implementation challenges in providing credit to farmers.

Key interventions and enablers

a. **Partner with Fintechs to drive innovation in developing tailored crop loan products and government schemes** (i.e., flexible repayment schedules and loan terms taking into account seasonality of cash flows as determined by yield of crops, type of farmer, area under irrigation). State can set up sandbox and **innovation fund** to promote innovation, and integration with government databases can be explored for underwriting such products. For example, flexible crop loan products are being offered by organizations in Kenya to address financing needs of small and marginal farmers. Kenya's State Agricultural Finance Corporation provides flexible repayment product, 'seasonal crop credit' focused on production of cereals and other staple food crops that have low maturity period and a ready market[55].

b. **Collaborate with credit rating agencies** and financial institutions to help develop an alternative credit score mechanism as well as define methodology for incorporating impact of farm loan waivers. As mentioned in the agriculture & allied section, farm cards capturing comprehensive farm level data can be used for credit scoring.

[48] Based on National Family Health Survey 2019-21
[49] Area insured based on data of PM Fasal Bima Yojna (PMFBY) and Restructured Weather Based Crop Insurance Scheme (RWBCIS) FY20; Gross Sown Area from RBI, FY20
[50] Average Assets Under Management based on data from Association of Mutual funds in India, 2023
[51] High penetration of state driven by institutional investors and HNIs base in Mumbai, retail segment penetration need to be measured and used for target setting
[52] Global peers: Average of China, Malaysia, Singapore, South Korea, and Thailand
[53] Bombay Stock Exchange; high penetration driven by investor activity in Mumbai thus needs to track this metric in other districts to improve geographical distribution
[54] Gross Value Output – Gross Value Add
[55] Source: Agricultural Finance Corporation, Kenya website

c. **Drive higher share of long-term investment credit** in agricultural infrastructure (e.g., storage), farm mechanization and allied activities by
   - Introducing **focused interest subvention schemes** that leverage cooperative banks network for crops and areas with high risk and term loans for allied (e.g., poultry, dairy, aquaculture, sericulture), farm mechanization and post-harvest processing activities in specific districts. As highlighted in agriculture & allied section, state should encourage more products like working capital financing secured against MNREGA incomes, especially for members of FPOs.
   - Work with regulator to define guidelines for banks for extending credit to such activities. For example, Priority Sector Lending Guidelines specify the share of bank credit that should go towards agricultural advances but can also explore setting targets for investment credit[56].
   - Setting targets for investment credit under Scale of Finance framework[57] along with input and working capital (e.g., investment required for setting up poultry farm / chicken, farm pond/acre)

d. Leverage **cooperative banks** network (via tech upgradation) to drive adoption of state and central credit schemes
   - Support i**mplementation of technology solution in cooperative banks** to improve efficiency and transparency, enabling greater confidence in cooperative banking channel. State can onboard dedicated solution providers and negotiate discounted prices for offering to a group of users. For example, Odisha government is provdiing funding support for implementation of Core Banking Software (CBS) in Cooperative Banks and computerization of Primary Agricultural Credit Societies (PACS)

e. **Leverage central government and NABARD initiatives**
   - Enable adoption of government of India initiatives such as Kisan credit card and interest subvention schemes (e.g., Agriculture Infrastructure Fund) by improving awareness at ground level and leveraging cooperative banks network
   - Effective utilisation of NABARD funding schemes for agricultural infrastructure projects e.g., Rural Infrastructure Development Fund (RIDF), Special Refinance Facility for Transformation of Primary Agriculture Cooperative Societies (PACS) as Multi-Service Centres (MSC)

f. **Create focused schemes to channelise bank credit to self-help groups (SHG) and Joint Liability groups (JLG).** For example, Odisha government has launched a scheme in association with NABARD to bring unbanked small/marginal/landless farmers into institutional credit. The scheme targets to form 1 Lakh Joint Liability Groups covering at least 5 lakh farmers and banks financing crop loans up to Rs. 1.6 Lakhs per group.

g. **Ease of doing business**
   - Digitisation of land records for farmers & facility of online charge creation for banks to ease credit process
   - Allow mortgage of agricultural land for specific non-agricultural purposes e.g., primary food processing activities

B. Micro, small and Medium Enterprises (MSMEs) credit

Micro, Small and Medium Enterprises (MSMEs) occupy an important position in the state's economy with ~48 Lakh enterprises (8% of total MSMEs in India) contributing ~30% of state's GVA[58]. The overall addressable debt demand of MSMEs in India is estimated to be $525Bn in 2017 of which Maharashtra accounts for 20% share equivalent to $105Bn[59]. However, MSME credit penetration in the state is estimated to be at 58%[60] (excluding credit by urban co-operative banks), representing supply of ~$60Bn formal credit. Thus, the state can target to increase credit penetration to more than 80% to address the financing gap. Historical trend is favourable with annual ground level

[56] In line with the objectives of Priority Sector Lending guidelines as mentioned in RBI Report of Internal Working Group to Review Agricultural Credit (September 2019) "As per the new guidelines, the approach of agriculture under priority sector is to focus on 'credit for agriculture' instead of 'credit in agriculture' in order to give impetus to financing of supply value chain in the sector."

[57] Scale of finance is the finance required (input or working capital) per unit cultivated area for crop or per animal in poultry. The scale of finance for different crops in a district is decided every year by District Level Technical Committee (DLTC)

[58] Estimated based on historical share of Maharashtra in India's MSME GVA

[59] Source: Source: Financing India's MSMEs - Estimation of Debt Requirement of MSMEs in India, International Finance Corporation, Nov 2018

[60] Accounts for credit by commercial banks, State and district cooperative banks based on published data. MSME credit penetration is estimated to be 65% including credit outstanding from urban-cooperative banks (estimated)

credit disbursement to MSME sector in the state growing at a healthy CAGR of 25% between FY15 and FY20[61]. As detailed in MSME enablement section, key challenges faced by MSMEs include **access to formal credit and delayed payments resulting in working capital issues.**

Key interventions and enablers (detailed in MSME enablement section)

a. Collaborate with financial institutions (e.g., NBFCs, fintechs) and MSME focused organisations like GAME to create sector-specific cash-flow based lending products

b. Enable adoption of Account Aggregator framework and Open Credit Enablement framework to deliver data-backed unsecured credit

c. Leverage **co-operative banks network** to capitalise on MSME credit schemes (Credit Guarantee Trust for Micro and small enterprises (CGTMSE), Pradhan Mantri MUDRA Yojana (PMMY) and others)

d. **Policy mandates for TReDS adoption** - Implement State government, State PSUs (e.g., MSEDCL) and Urban Local Body purchases via TReDS; mandate state-based large corporates (> Rs. 500 Cr turnover) to onboard

e. Enable short term **unsecured credit access** to micro and small enterprises though **credit card programs** with subsidized interest rates focused on specific groups like weaver credit cards (along the lines of Kisan Credit card)

f. Set up **state level credit guarantee fund** for focus sectors (e.g., food processing, textile), segments (women owned enterprises), themes (technology upgradation, sustainability) in specific districts in partnership with **development finance institutions** such as NABARD, SIDBI, ADB

g. **Trade finance or export credit schemes** enabling financial institutions to provide trade financing solutions to MSMEs (e.g., credit limits based on export order value). For example, Maersk Trade Finance offers a combination of trade finance and shipping solutions to the MSME sector[62].

h. **Ease of doing business**

- Drive formalization of micro and small enterprises (with GST registration, Udyog Aadhaar) to make financing accessible
- Enable creation of data and technology infrastructure for seamless KYC, onboarding and transferring benefits e.g., creation of Digi locker for MSMEs for easy authentication
- Accelerate digitization of records for various physical assets, such as land, property, and vehicles, to enable digital verification and lien marking.
- Provide skilling support to MSMEs to draft business plans to access credit and enable MSMEs to achieve post-credit business success which would instill confidence in financial insititutions to lend further.

C. Retail credit and banking

Maharashtra retail credit penetration is 18% of GDP which is higher than India average of 14% but significantly low in comparison to global peers' average of ~45% (30% in Brazil and ~60% in China)[63]. State can aim to reach 40% target penetration by improving access in rural and semi-urban areas which only contribute 3% and 8% of total outstanding retail credit respectively. The State can also increase deposit penetration in towns and rural areas by improving access to banking.

Key interventions and enablers

a. **Drive adoption of credit products** such as gold loan in partnership with cooperative banks and NBFCs which are more amenable for rural segment. For example, Equifintech is leveraging credit co-operative societies to offer Sudhan gold loan scheme to people in over 500 villages across 11 districts in Maharashtra. The scheme offers high value loan at low interest rates in just 14 minutes using technology driven procedures[64].

b. Introduce **state level micro-credit programs** at subsidised interest rates to enable unsecured credit access to low-income groups and women. State can partner with FinTechs to develop focused use-cases of micro credit e.g., credit on UPI which capitalises on reach of UPI payments. For example, M-Shwari in Kenya is a savings-and

[61] Source: Maharashtra State Focus Paper 2022-23, NABARD
[62] Source: How structured trade finance solutions help MSME exporters & importers, Economic Times, July, 2019
[63] Source: India century
[64] Source: Innovative Rural startup Sudhan Gold Loan has expanded beyond Maharashtra into four other states, Times of India, December, 2022

credit product from Safaricom and Commercial Bank of Africa (CBA) offering low credit limit with one month repayment period to M-Pesa and Safaricom subscribers[65].

c. Drive **technology adoption** (i.e., digital banking, mobile banking) in state banks and cooperative banks as well as expand network of banking correspondents to improve access to banking.

d. **Ease of doing business**

- Enable adoption of simple and seamless KYC and onboarding process via Community Service Centres, mobile banking, payment apps (e.g., PayTM)
- Digitization of SHGs (for micro-credit) in partnership with NABARD e-shakti project to enable banks to access SHG data and thereby increasebanker's comfort in credit linkage

3.2.2 Insurance

A. Non-life insurance

While non-life insurance penetration in India is less than 1%, the ratio is 1.6% for Maharashtra which can be further increased to 3.1% in line with Asian peers (Japan, Korea, Taiwan, Singapore). Government and private sectors interventions need to drive insurance adoption in key segments – health, crop, business insurance for MSMEs by developing tailored products and enhancing distribution in underpenetrated areas. Key challenges in insurance adoption include low awareness and understanding of insurance products, **unavailability of low-cost tailored insurance solutions** and **lack of focus of existing government sponsored schemes on segments like MSMEs.**

Key interventions proposed – Non-life insurance

a. **Health insurance**: Only 22% households in Maharashtra are covered by health insurance vs greater than 80% coverage in Rajasthan and Andhra Pradesh, thus Maharashtra can target to reach penetration of 80%.

- **Potential to enhance state health insurance schemes** by
  - **improving benefits** including higher sum insured (Rajasthan's Chiranjeevi scheme offers sum insured of INR 25 Lakhs[66] vs INR 5 Lakhs under Maharashtra government's Mahatma Jyotiba Phule Jan Arogya Yojna[67]), coverage for AYUSH, mental health, out-patient treatment, etc.
  - **covering wider segment of population** by upgrading eligibility criteria beyond Below Poverty Line population or providing subsidised coverage for lower middle class
  - **creating specific schemes** for specific vulnerable groups such as women or diseases like cancer

b. **Agricultural and allied insurance**: Maharashtra has healthy coverage of crop insurance with 40% area insured of Gross sown area as compared to 25% for India. It can aim for 60% coverage surpassing India target of 50%.

- **Create state level crop insurance schemes in partnership with private insurers:** Partner with private insurers and insurtechs to design **tailored crop insurance** based on type of crop (e.g., horticulture crops), geography (Nashik, Solapur, etc.), purpose (e.g. export), type of landholding (small, medium) and risks (pest, hailstorm, etc.); additional riders could be offered over standard schemes which can be subsidised by government under crop insurance scheme. Agriculture Insurance Company of India Ltd (AIC) is offering Rainfall Insurance Scheme for Coffee Growers (RISC), to provide insurance cover for yield losses in coffee due to rainfall risks in Tamil Nadu and Karnataka[68], with claims automated based on rainfall data.
- Drive **insurance schemes for allied activities** (e.g., livestock insurance) by creating state level schemes or increasing penetration of centrally sponsored schemes. Under the centrally sponsored Livestock Insurance Scheme, the crossbred and high yielding cattle and buffaloes are insured at maximum of their current market price with premium subsidized to the tune of 50% by the central government.[69]
- **Revamp existing central government crop insurance model** to ensure timely claim settlement[70] and reduce subsidy burden on the state (~Rs. 3,000 Cr per year for crop insurance). For example, in Beed district of

[65] Source: Safari – M-Shwari, Safaricom website
[66] Source: Medical cover under Chiranjeevi health scheme increased, Economic Times, 2023
[67] Hospitalisation cover up to Rs. 5 Lakhs for BPL and specific APL families plus farmers of 14 agriculturally distressed districts of the state
[68] Source: Rainfall Insurance Scheme for Coffee Growers (RISC), Tamil Nadu Agricultural University
[69] Source: Livestock Insurance Scheme, Department of Animal Husbandry and Dairying
[70] Source: Beed model of crop insurance Maharashtra, Indian Express, June 2021

Maharashtra the crop insurance model has cap on profit of insurance companies. If the claims exceed the insurance cover, the state government pays the bridge amount. If the claims are less than the premium collected, the insurance company keeps 20 per cent of the amount as handling charges and reimburses the rest to the state government.

c. **Business insurance for MSMEs** (shop, fire and transit): With currently only 0.1% of business risks for fire, transit covered by SMEs[71], insurance adoption would be critical for resilient business growth of MSMEs.
   - Design **state level insurance schemes for MSMEs** linked to credit guarantee schemes and incentivise adoption of products like export credit insurance considering MSMEs contribute 60% to India's exports
   - Leverage **Udyam portal** and **TReDS platform** for awareness and distribution, recent RBI update (Feb'23)[72] allows **additional offering of business insurance** on TReDS platform.

d. **Other insurance products:** Explore other insurance products in partnership with insurers and central government such as **home insurance** (linked to government schemes like Pradhan Mantri Awas Yojna), **unemployment insurance** (e.g., countries like Japan and Vietnam offer unemployment insurance schemes with benefit linked to job matching and vocational training services[73])

B. Life insurance

India has a total mortality protection gap[74] of $16.5 Tn (as of 2019) with an estimated protection gap of 83% of the total protection need. This represents a significant opportunity to life insurers with an estimated additional life premium opportunity of average $78 Bn annually over 2020-30 and estimated premium CAGR of 23%, driven by 8X growth in retail protection sum assured.

Life insurance penetration of Maharashtra is estimated to be 5.6%[75] in terms of total premiums as a percentage of GDP, which can be increased to 7.7% in line with Asian peers (Japan, Korea, Taiwan Singapore). This would require an increase in number of lives covered out of the total population as well as an increase in sum assured per person.

Key challenges in insurance adoption include low insurance awareness and distribution in towns and rural areas **as well as inadequate coverage by existing central government sponsored schemes** (e.g., sum insured of only Rs. 2 Lakhs under Pradhan Mantri Jeevan Jyoti Bima Yojna).

Key interventions proposed – Life insurance

a. Launch **state sponsored life insurance schemes** offering higher coverage at affordable premiums. The state can explore implementing specific group insurance schemes **targeting vulnerable groups like farmers and MSMEs**. For example, Telangana government has implemented Rythu Bima scheme for farmers in the age group of 18-59 years providing life cover of Rs. 5 lakhs. Similarly, Kerala government has initiated a group life insurance scheme focused on MSME entrepreneurs (who have filed for Udyog Aadhar) providing cover of INR. 2-4 Lakhs.

C. Common across life and non-life insurance

Key interventions and enablers proposed

a. **Leverage alternate distribution channels** such as **cooperative banks, NBFCs, cooperatives** (Farmer Producer Organisations, milk cooperatives), **Common Service centres (CSCs), Self-help groups** to improve insurance awareness and distribution in tier-3 or 4 cities and rural areas. For example, IndiaFirst Life CSC "Insurance Khata" has successfully insured over 62,000 lives as of 2020 under CSC model.[76]

b. **Accelerate adoption of IRDAI initiatives:** IRDAI is collaborating with private insurers (each state has been adopted by a life and non-life insurer) with an objective to achieve Insurance for all by 2047[77]. Key initiatives by IRDAI are *Bima Sugam* (single online portal for all insurance related queries, policy purchase, claim settlement

[71] Source: Insurance for MSMEs is a key ingredient towards nurturing the Atmanirbhar Bharat, SME Futures, September 2020
[72] Source: Statement on Developmental and Regulatory Policies, RBI press release, Feb 2023
[73] Source: Unemployment protection: A good practices guide and training package, International Labour Organisation, August, 2017
[74] Mortality protection gap represents the difference between the cover typically required by a family and the resources they have available should a wage-earner pass away suddenly. Source: Invest India
[75] Total premiums for Maharashtra estimated assuming similar share of state in India's New Business Premiums; Source: IRDAI Handbook, 2021-22
[76] Source: Insuring the unreached – Insurance service through CSC, CSC Monthly Magazine Tarang, May, 2020
[77] Source: IRDAI's Big Guns: What are Bima Sugam, Bima Vahak and Bima Vistaar?, Economic Times, April, 2023

and insurance advice), *Bima Vahak* (women-centric agent distribution channel to sell and service simple parametric bundled insurance products in villages) and *Bima Vistaar* (an affordable and comprehensive cover for rural population in the event of natural disasters, such as floods, and earthquakes, among others).

c. Ease of doing business

- Collaboarate with regulator to unlock any constraints that may require regulatory changes (e.g., unlocking new distribution channels for insurance)
- Enable integration with government databases for underwriting (e.g., database of PMJAY) and identifying uninsured population

3.2.3 Investments

Maharashtra has significantly high mutual fund penetration (Assets under Management as a % of GDP) of 60% as compared to India average of 12% and global peers average of 26%. However, the higher penetration can be attributed to substantial inflow from institutional investors and high net worth individuals in Mumbai. Thus, the target can be set better by tracking penetration of retail segment of mutual funds.

In India, only 3 percent of population is participating in stock market vs 13% in China and 55% in US[78]. Maharashtra has an active investor base with number of BSE registered investors as 21 per 100 population as compared to India average of 10. Mumbai has an active investor base including institutional investors with ~70% share in equity cash turnover on NSE. Interventions are required to enhance investor participation in stock markets and mutual funds, especially in retail segment and in districts apart from Mumbai.

Key interventions and enablers proposed

a. **Accelerate adoption of central government initiatives** like small savings scheme and tax saving deposits, mutual funds and other investment instruments. For example, Maharashtra has 8% share in India Sukanya Samriddhi Account Scheme vs 10% share of Uttar Pradesh[79]

b. **Partner with private players** to drive financial literacy programs and adoption of investment products
   - Partner with industry association like AMFI and fintechs like Zerodha for investor awareness and financial literacy programs.
   - Partner with fintechs like Safegold to drive adoption of digital gold especially in rural segments that invest in physical gold.

c. **Reduction and rationalisation of taxes on capital market instruments (central level reform)[80]:** In India, capital gains are taxed at 10% for listed corporates and 20% for unlisted corporates, whereas, Singapore has zero percent taxes on long-term capital-gains. Similarly, dividends in India are taxed at marginal tax rates ranging from 31% to 43% for population segment with income more than Rs. 15 lakhs, compared with dividend withholding tax rate of 10% in Thailand and zero percent in Malaysia.

[78] Source: Paytm DRHP (Draft Red Herring Prospectus)

[79] Government backed saving scheme targeted at parents of girl child, offering rate of interest 8% with maximum investment of INR 1.5 Lakhs in a year; Source: Sukanya Samriddhi Account Schemes, Ministry of Finance, Press Information Bureau, Jan 2022

[80] Source: India's turning point: An economic agenda to spur growth and jobs, McKinsey, August, 2020

IT and ITes

Services - IT and ITeS

1. Executive Summary

Industry Overview:

- IT and ITeS industry is ~$ 210 Bn industry in India of which Maharashtra contributes ~$40 Bn (19%).
- IT Services, Business Process Management and Data Centres form the key segments in the industry.
- Key emerging segments are Artificial Intelligence (AI), analytics and new functions in knowledge process outsourcing (e.g., legal process outsourcing, education process outsourcing).

GVA baseline and aspiration: GVA from IT and ITeS industry in Maharashtra was $35 Bn in FY22 and targeted to grow by ~13% (in-line with services growth aspiration) to ~$72 Bn by FY28.
Currently Tier-1 cities of Maharashtra (Mumbai and Pune) contribute ~80-90% share of state's IT GVA.
Achieving target GVA by FY28 will need the state to focus on developing IT and ITeS industry in Tier-2 districts.

Key opportunities and enablers are summarized:

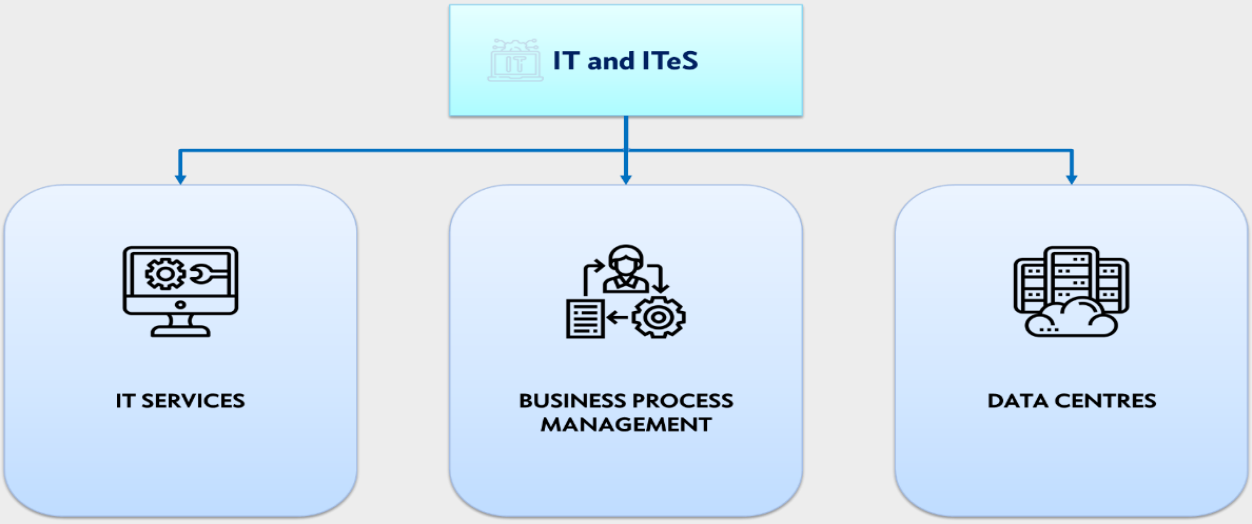
Opportunity areas	Key interventions and enablers proposed
1. Develop Maharashtra as the AI Capital of India	
Artificial Intelligence (AI) and other emerging segments	• Attract investments from Artificial Intelligence (AI) firms and start-ups, leveraging existing strong IT and ITeS clusters in Mumbai and Pune
2. Grow IT Services and Business Process Management in Tier-2 cities of Maharashtra	
IT Services and Business Process Management	• Attract investments from large IT services companies by providing enabling infrastructure, skilled engineering graduates and competitive fiscal incentives. • Incentivize firms to make Maharashtra the leader in Knowledge Process Outsourcing of emerging areas like Legal Process Outsourcing and Education Process Outsourcing • Leverage lower cost of real estate and availability of skilled graduates from regional engineering institutes in Tier-2 cities of Maharashtra to attract BPO investments.
3. Develop data centres in Tier-2 cities of Maharashtra	
Tier 4 data centres	• Invest in infrastructure and provide renewable energy at competitive prices to deliver high-speed internet connectivity in Tier-2 cities and attract investments.

2. Overview

IT and ITeS is a ~$210 Bn industry in India (FY22) of which Maharashtra contributes[81] ~$40 Bn (19%). 80-85% of industry is driven by exports demand, while 15-20% is driven by domestic demand. IT and ITeS industry has been a key driver of Indian exports, and a large employment generating industry (~5 Mn people employed).

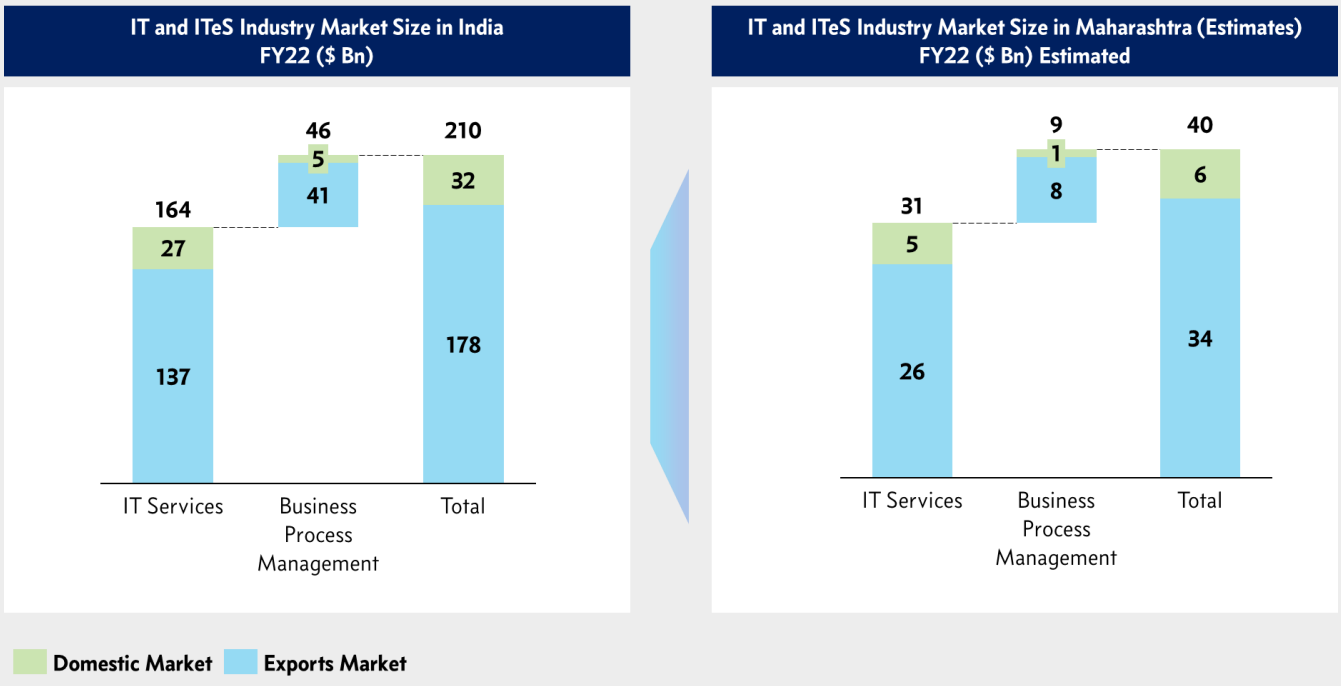
Key segments in IT and ITeS industries are represented in next Figure:

Figure 22: Key Segments in IT and ITeS industries



Market sizes for segments in India and Maharashtra are represented[82]:

Figure 23: Market sizes for segments in India (Reported) and Maharashtra (Estimated)



Additionally, IT and ITeS has emerging segments like Data Centres. Currently, ~900 MW capacity of data centres exist in India, and this is projected to reach 1.8-2 GW in next 5-10 years. Investments of ~$20-25Bn are expected in data centres segment in the next 5-10 years[83].

[81] Source: Estimated basis Maharashtra's share in IT exports of India (~20% share in FY22)
[82] Source: Market size data for India from NASSCOM Strategic Review 2022
[83] Source: Decoding India's Data Centre Revolution, Cushman and Wakefield, Sep 2022, India data centres likely to reach 1,700 MW capacity, Economic Times, May 2023

IT and ITeS is a key industry in Maharashtra contributing **~$35 Bn**[84] (~9% of GVA) in FY22 and **employing ~1 Mn people** (~20% of overall IT Industry in India)[85]

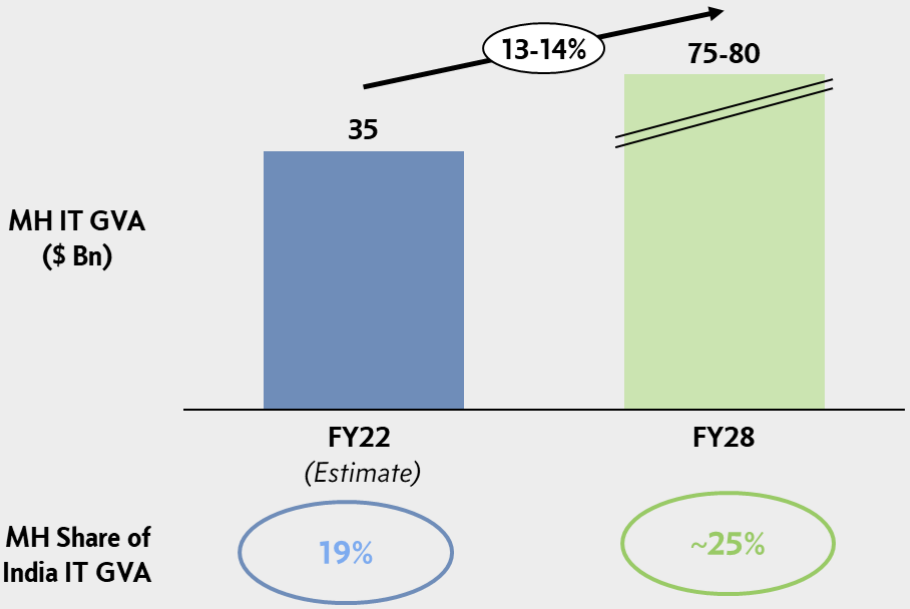
Current geographic distribution of IT and ITeS industry in Maharashtra: Currently IT and ITeS industry is geographically **concentrated in Mumbai and Pune districts** of Maharashtra, with limited development in other districts like Nagpur, Solapur, and Amravati.
Key IT infrastructure in these districts consists of **Private IT Parks** (developed by Private IT Firms) and **Public IT Parks** (developed by state government with nodal agencies)

a. **~205** operational Private IT Parks in Maharashtra employing **~0.8 Mn** people. ~90%+ Private IT parks are in Mumbai and Pune, limited penetration in other regions of Maharashtra (~10%)[86].
b. Public IT Parks have been developed by MIDC, CIDCO[87] and Software Technology Parks of India (STPI). There are **37** operational Public IT Parks employing **~0.3** Mn people.

3. Aspiration for IT and ITeS industry in Maharashtra by FY28:

To achieve $1Tn GDP target by 2028, overall Services Sector will need to grow at ~13-14% and IT Sector GVA will also need to grow at ~13% to ~$75-80 Bn from $35 Bn in FY22.

Figure 24: IT and ITeS GVA target for Maharashtra

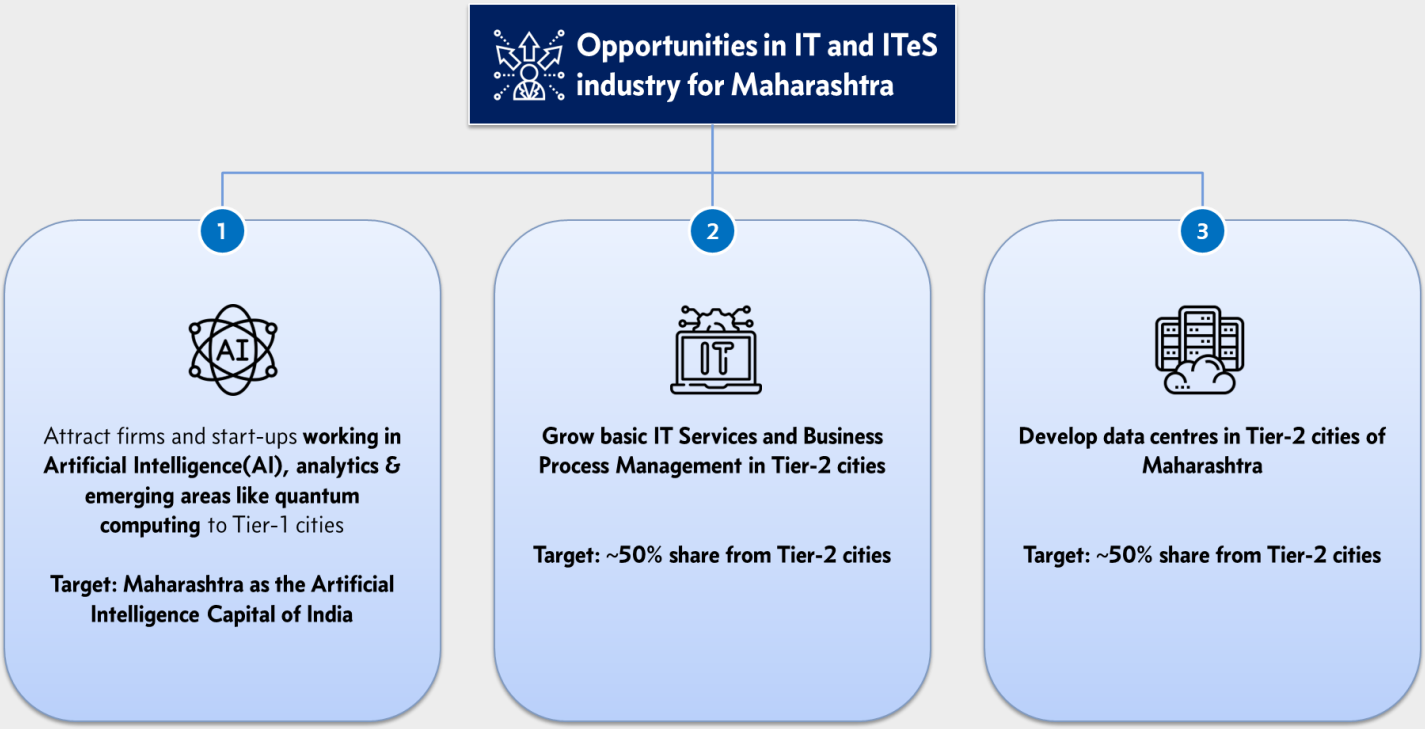


[84]Source: GVA estimated using ratio of India's IT and ITeS industry GVA to market size ratio on IT and ITeS market size in Maharashtra.
[85] Source: Economic Survey of Maharashtra 2021-2022
[86] Source: Estimated basis proportion of approved IT Parks in Maharashtra, Economic Survey of Maharashtra, 2022
[87] Source: MIDC-Maharashtra Industrial Development Corporation, CIDCO-City Industrial Development Corporation of Maharashtra

4. Key opportunities and enablers for IT & ITeS for Maharashtra:

Achieving aspirational target of ~$75 Bn GVA from IT and ITeS industry in Maharashtra will require state to pursue high-growth emerging segments like **Artificial Intelligence (AI) and data centres**, while continuing to develop existing large segments like **IT services and Business Process Management** across districts in Maharashtra.

Figure 25. Key Opportunities in IT and ITeS industry for Maharashtra



4.1 Artificial Intelligence (AI), analytics and emerging technologies:

Artificial Intelligence (AI) is an emerging technology designed to perform activities that typically require human intelligence (e.g., visual perception, problem solving, decision making etc.). Artificial Intelligence has the potential to deliver value unlock in multiple sectors like agriculture, (production planning, crop failure predictions), energy (energy demand prediction, asset utilization rationalization), logistics (road network optimization), healthcare (remote diagnostics), financial services (risk modelling). Artificial Intelligence is projected to add $400-500 Bn to India's GDP by FY25-26 (~10% of aspirational target of $5 Trillion GDP)[88].

Aspirational Target: Maharashtra has the **potential to develop itself as AI and emerging technologies capital of India**, by attracting AI firms (including startups), leveraging existing strong IT and ITeS clusters in Mumbai and Pune.

Key enablers:

Availability of high-skilled talent pool trained in emerging technologies, developed infrastructure and transportation connectivity are key strengths that Maharashtra can leverage to attract AI firms. Maharashtra can attract investments through a dedicated AI and emerging technologies policy. For example, Telangana had launched an AI framework in June 2020 to position Telangana as a hub for AI.
These will need to be augmented by executing improvements in Ease of doing business (licenses and approvals) and providing competitive fiscal incentives vs. peer states (capital, power, and other subsidies)

[88] Source: Unlock value from data and AI report, NASSCOM, Aug'20

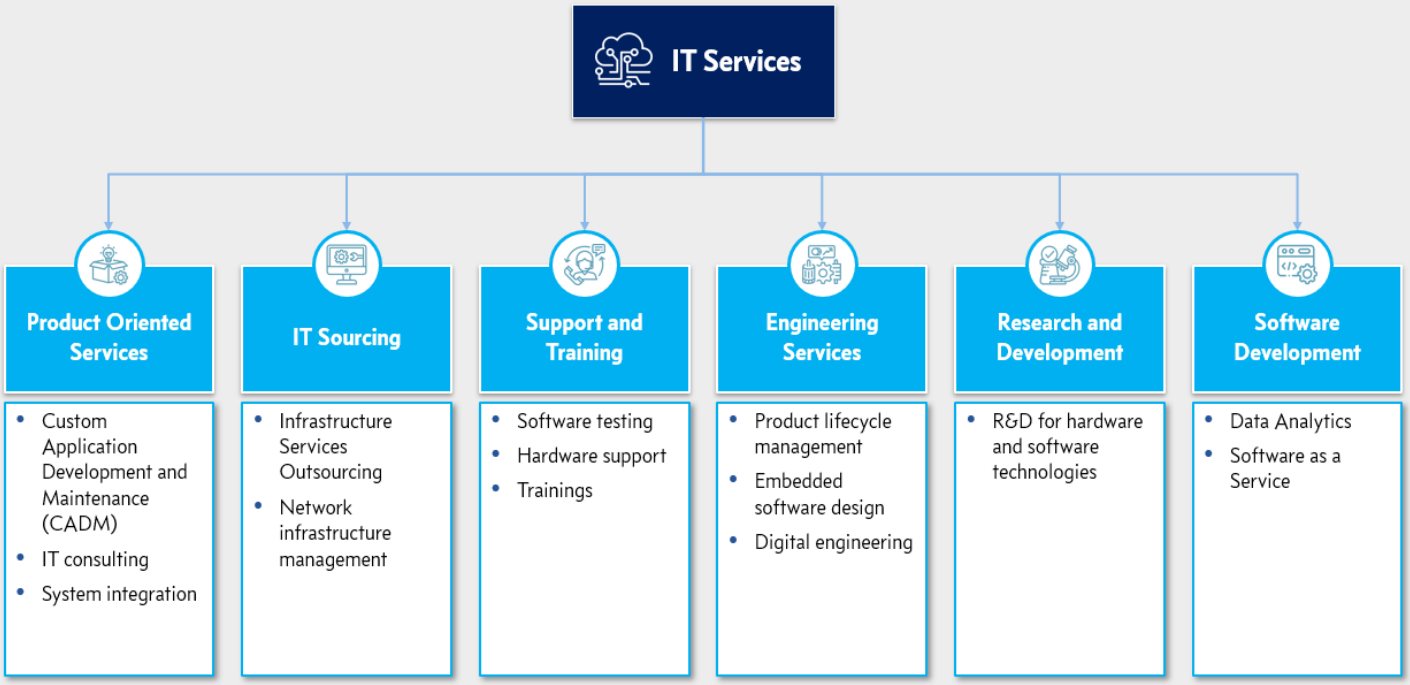
4.2 IT Services and Business Process Management:

IT Services and Business Process Management segments constitute **90-95%** of IT and ITeS market in India currently and are expected to grow by **8-9%** through FY28.

4.2.1 IT Services:

IT Services is the largest segment in IT and ITeS industry ($164 Bn in India, and $31 Bn in Maharashtra in FY22). Segment is growing at a CAGR of 8.7% in India (2014-2022)[89]. Key sub-segments in IT services are represented:

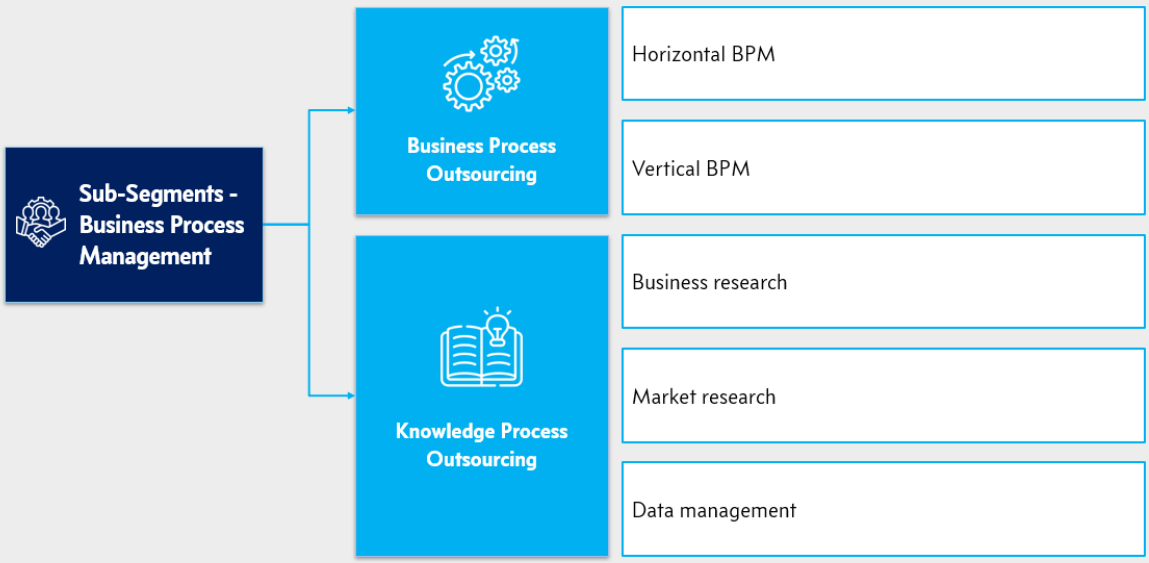
Figure 26: Key sub-segments in IT Services



4.2.2 Business Process Management:

Business Process Management (BPM) is the 2nd largest segment in IT and ITeS industry ($ 45 Bn in India and $9 Bn in Maharashtra in FY22) and growing at a CAGR of 8.8% in India (2014-2022)[90].

Figure 27: Business Process Management Sub-Segments



[89] Source: NASSCOM Strategic Reviews: 2014, 2019, 2021 and 2022.
[90] Source: NASSCOM Strategic Reviews: 2014, 2019, 2021 and 2022.

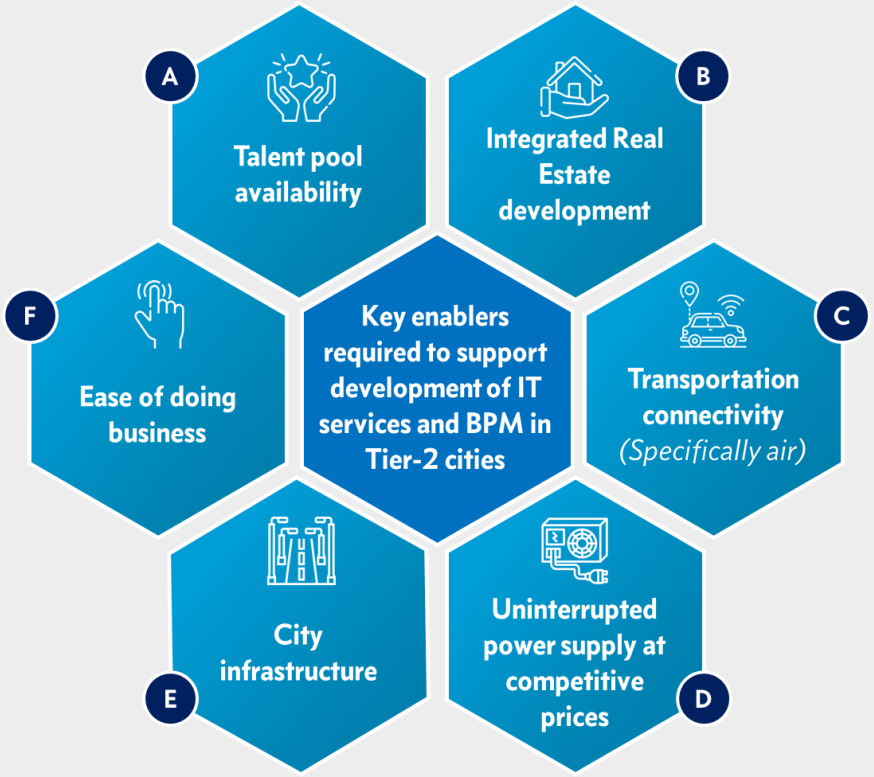
- Business Process Outsourcing (BPO) includes Horizontal Business Process Management (including customer interactions services, finance, and accounting services across industries) and Vertical Business Process Management (e.g., insurance claims processing support)
- Knowledge Process Outsourcing (KPO) includes business research, market research, data management.
- Emerging areas like **Education Process Outsourcing** (e.g., grading of exam papers) and **Legal Process Outsourcing** (given high legal costs in developed economies) offer an opportunity to scale Knowledge Process Outsourcing in Maharashtra.

Currently, IT services and Business Process Management firms are concentrated in Mumbai and Pune. To achieve aspirational growth target and generate higher employment, developing these segments in Tier-2 cities of Maharashtra is essential.

4.2.3 Key enablers required

For growing **IT Services and BPM segments** in Tier-2 cities, the following enablers have been identified basis interactions with leading industry players, and represented in next Figure:

Figure 28: Key enablers for IT Services and BPM to grow in Tier-2 Cities



Key enablers required for IT services and BPM to grow in Tier-2 cities of Maharashtra have been detailed:

Figure 29: Key enablers for IT Services and BPM

A Talent Pool Availability	• Availability of engineering **talent trained on skillset by industry** • IT services require higher skilled talent pool vs. BPM • **Talent pool** for both segments, **can be developed in Tier-2 cities** via collaboration with academic institutions and industry
B Integrated Real Estate Development	• IT campuses need to be developed in integrated manner to **offer urban-like infrastructure** (including retail malls, educational institutes, sports complexes etc.) to **retain skilled talent in Tier-2 cities** • Government of India has also launched **India BPO Promotion Scheme (IBPS)** to promote development of BPO in Tier 2 cities of India. Maharashtra can leverage this scheme to setup BPO infrastructure.
C Transportation Connectivity	• **Air connectivity** with major domestic and global cities. • **Efficient public transportation** for employees (including metros, trains, buses)
D Power Supply	• **Uninterrupted electricity supply** (including provisions for renewable energy use) at competitive prices vs. peer states
E City Infrastructure	• Internet Connectivity: **High speed internet** via fiber network and mobile internet (including 5G) • Availability of **drinking water, sanitation, and public utilities**
F Ease of Approvals and Compliance	• Through **digital single window platform** to reduce time and effort spent by industry players to set-up operations

Developing BPM in Tier-2 cities of Maharashtra has been demonstrated successfully by a firm in Solapur, their **Case Study** is presented in next Figure

Figure 30: Case study on developing BPM in Tier-2 cities of Maharashtra

Key Challenges	• **Attracting & Retaining Skilled IT Talent** in Tier 2 cities • **Limited Connectivity** (Air + Rail + Road) + **Limited Digital Infrastructure** (High-speed reliable internet) + **Unreliable Power**
Proof of Concept in Solapur	• **Jamshri Realty** is a Real Estate Developer based out of Solapur which has created an **IT Complex** – **Mahindra Business Solutions**, **Core Integra** have established operations with **600+ employees in 20k+ Sqft** – Plan to **attract large IT companies** for BPO & KPO operations set-up
Value Proposition for IT Companies	• Solapur is positioned as a **well-connected lower cost alternative for back-end IT, with skilled talent availability** – **Tie-ups with regional engineering colleges** to train students on required skill-sets – **Flexible Pay-per-seat ready-to-use** model pitched to IT companies *(Can start with <10 seats)* – **Build-Operate Transfer Model**: **Off-roll team** managed by Jamshri with **option to transfer to company payrolls** in future – Potential for **~30-35% lower costs** vs. Pune-with lower rental costs, lower employee costs (Incl. lower attrition) – **Hotel, restaurants, sports complex, club house, school & and retail outlets planned** to **attract and retain skilled IT** talent – **New Vande Bharat Train** between Mumbai, Pune and Solapur improves **connectivity**
Validation of Value Proposition	• Developing back-end IT in Tier-2 cities feasible *(Proven at small scale)* with an **integrated approach** from **talent sourcing & training, providing flexible models for IT companies** and creating **surrounding ecosystem to retain talent pool** • **Validate offering value with Large IT Companies** to understand feasibility of replicating model across cities

Data Centres:

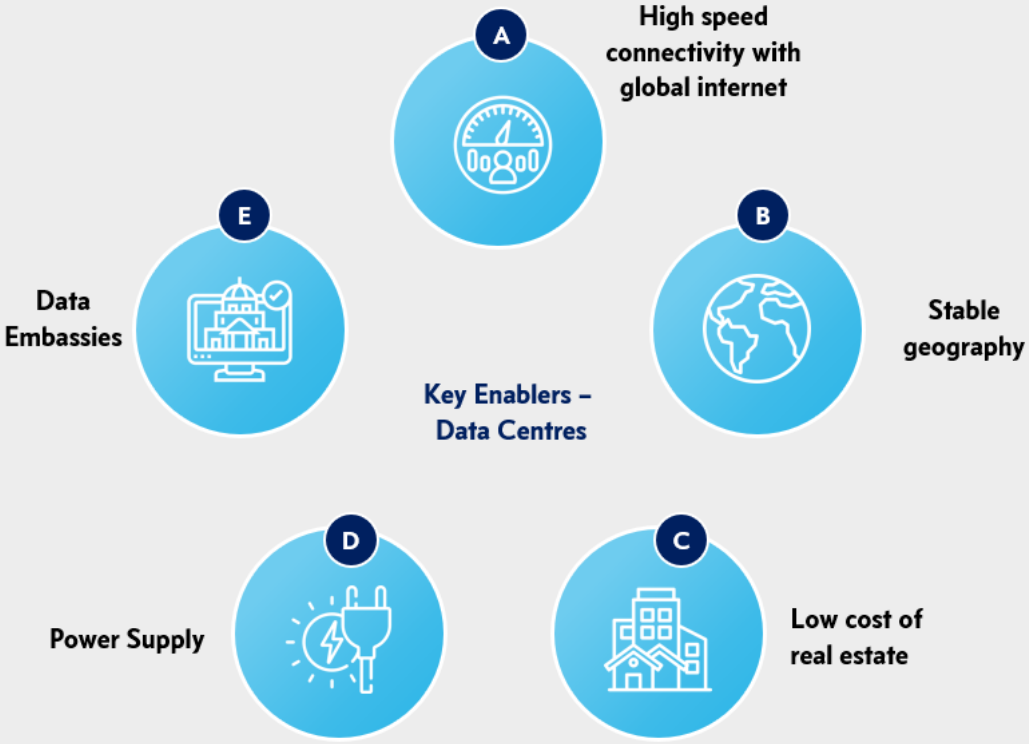
Data centres is an emerging market opportunity in India. Data centres requirement is expected to grow at CAGR of 16% in next 5 years[91] driven by higher cloud adoption, big data analytics, edge computing and regulatory requirements. Data centres can drive high GVA in Maharashtra and can be developed in Tier-2 cities.

Data centres are classified from Tier-1 to Tier 4 basis fault tolerance and uptime guarantee. Tier 4 data centres have lowest fault tolerance and highest uptime of 99.9995%.

[91] Source: Decoding India's Data Centre Revolution, Cushman and Wakefield, Sep 2022

New investments in data centres expected to be towards upgrading existing centres to Tier 4 or developing new Tier 4 centres[92]. Mumbai and Pune currently account for ~**50%** of data centres in India.

Figure 31: Key Enablers - Data Centres

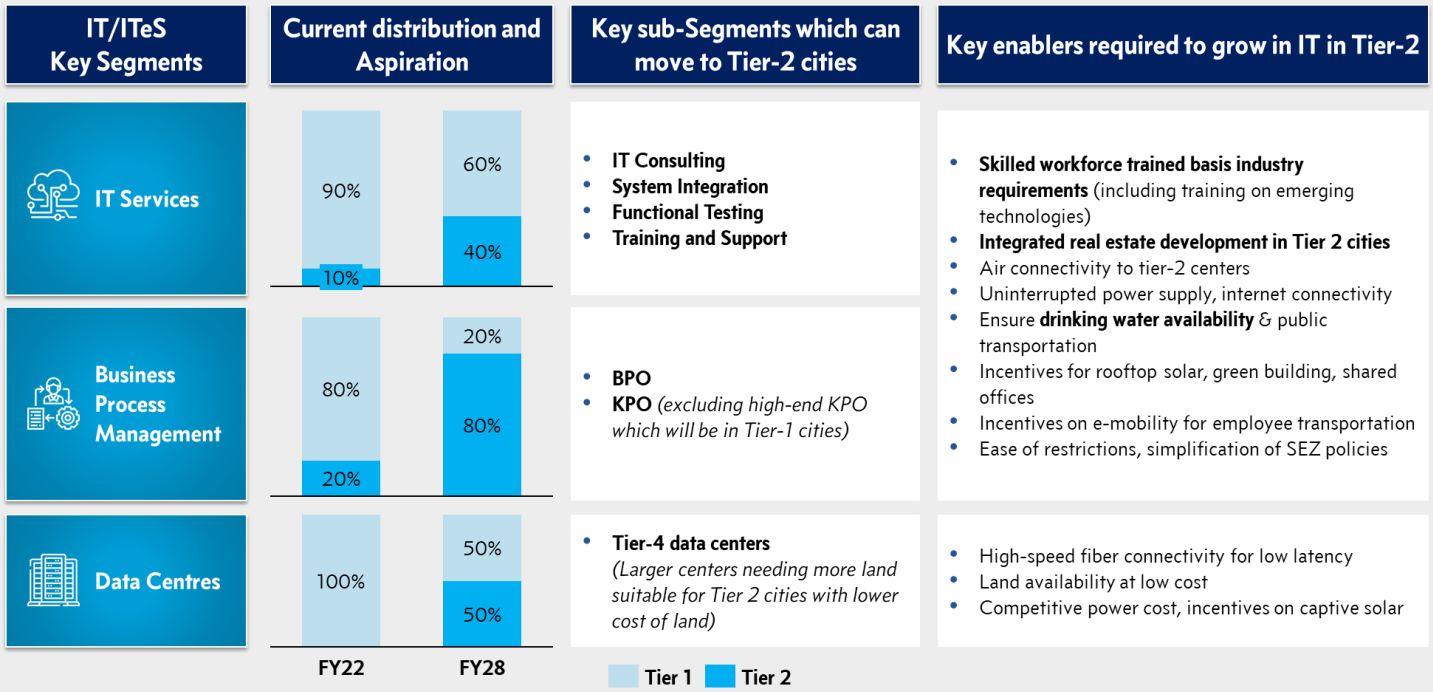


A. Data centres require **high-speed, reliable, and low-latency connections to internet** which is enabled by connecting to submarine internet cables. Coastal cities with direct landing of submarine data cables are chosen to develop data centres (e.g., Mumbai and Chennai) as submarine cables provide superior network performance and connectivity with global internet. Investments will be required to connect Tier-2 cities with these cables to reduce latency in hinterland.
B. **Stable geography** (low vulnerability from natural disasters like earthquakes) is critical to ensure no downtime for data centres.
C. **Low cost of real estate:** Lower cost of real estate in Tier-2 cities can help firms develop large data centres cost effectively.
D. **Power supply at competitive prices** vs. peer states; since power and fuel costs constitute ~30% of operating expenses for data centres, providing power (including renewable power) at competitive rates is critical
E. **Digital data embassy** is a solution implemented to offer diplomatic immunity from local regulations for national and commercial data. Foreign firms can store their commercial data in data centres inside data embassies and gain protection from local data protection regulations. Creating a digital embassy created will help attract global enterprises. Data embassy facility has been offered to foreign investors at GIFT City, Gujarat. Additionally, Central Government of India is planning to release a data embassy policy.

[92] Source: Decoding India's Data Center Revolution, Sep'22

5. IT/ITeS industry in Maharashtra: Current state and aspiration

Figure 32: IT/ITeS industry in Maharashtra: current state (estimate) and aspiration



5.1 Enabling IT Sector development in Tier 2 cities:

Hubs and satellite offices: IT/ITeS firms can set-up large central hubs in Tier-1 cities and develop satellite offices in Tier-2 cities. Airport connectivity, city infrastructure, presence of regional engineering colleges is considered as critical input for Hub selection. Satellite offices can be in radius of ~150-200 kms (travel time of 2-3 hours from Hub locations).

Healthcare

Services - Healthcare

1. Executive Summary

A. Improve health outcomes: Improving health outcomes across the state is critical to achieve inclusive and sustainable economic growth and improve quality of life across citizens. Poor health results in chronic economic drag of up to **-15% lower GDP** from premature death and lost productivity**.** Further, **economic return** of **$2-4** is expected for every **$1 invested in health**[93].

Maharashtra has already reached India **Sustainable Development Goal (SDG) targets in 3 of the 5 metrics** – Maternal Mortality, Under-5 Mortality and Share of children immunized, though there is a shortfall in Tuberculosis case detection and healthcare professionals (physicians, nurses, and midwives) count. In addition, Maharashtra experiences a shortfall in hospital beds count.

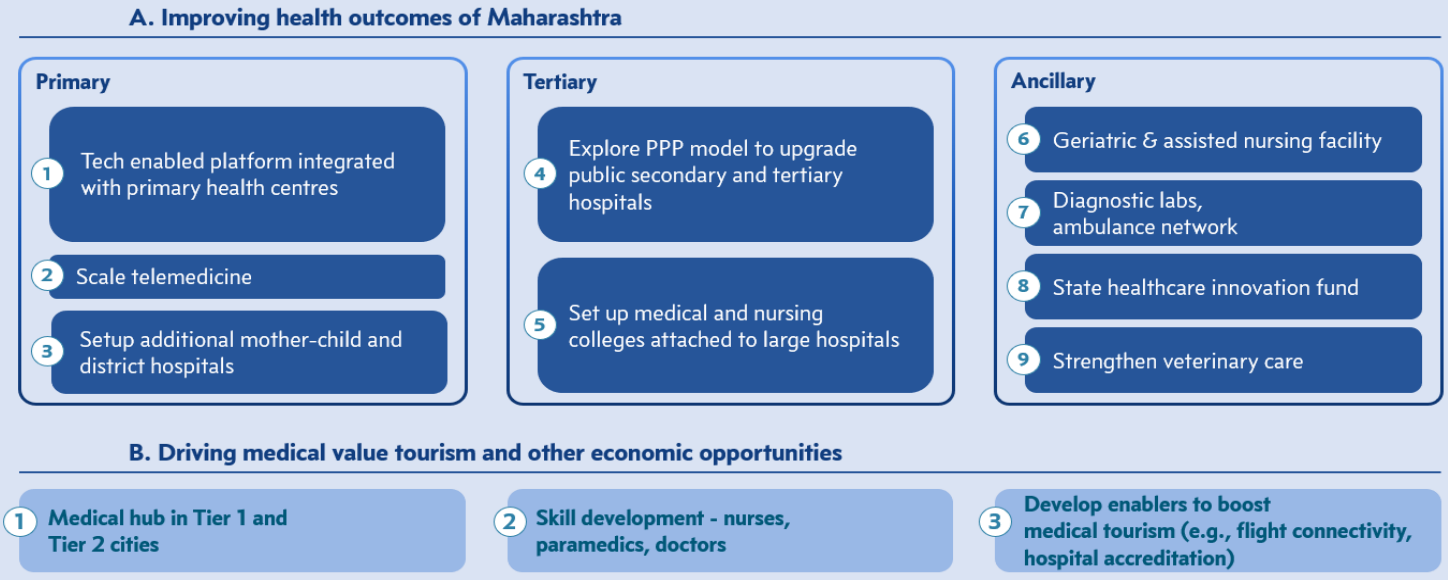
- **Healthcare professionals:** Maharashtra had 43 healthcare professionals per 10,000 population in 2021. To meet SDG goals, Maharashtra will need ~61,000 additional healthcare workers by 2030[94].
- **Hospital beds:** Maharashtra experiences a shortfall in its hospital beds. To meet WHO recommendation, Maharashtra would need ~1.3 Lakh additional beds by 2030[95].
- **Ambulance network:** The state needs additional 192 and 343 ambulances to meet National Health Mission and WHO target respectively.

B. Drive economic opportunities through medical tourism and other initiatives: For FY19, Total Health Expenditure (THE) for India was estimated to be 3.2% of GDP or INR 5,96,440 Cr (INR 4,470 per capita). This comprised of current or revenue health expenditure (90.6% of THE) and capital expenditure (9.4% of total THE).

Maharashtra can drive incremental economic impact from the following additional interventions:

- Establishing an integrated medical hub with tertiary care, alternate treatment, colleges, and accommodations
- Skilling hub for healthcare professionals (e.g., nurses, paramedics, doctors) for India and globally
- Boosting medical value tourism (focus on international tourists)

Proposed interventions



To improve health outcomes of Maharashtra and drive economic opportunities, 13 potential interventions across key healthcare segments are summarized:

[93] Source: How investing in health has significant economic payoff for developing economies, 2020. Estimated as additional healthcare investment vs. projected GDP impact.
[94] Incremental over 2021
[95] Incremental over 2019

Opportunity areas	Key interventions and enablers proposed
Improving health outcomes of Maharashtra	
A. Technology enabled platform, integrated with health centers	**Setup technology enabled and cloud-based platform model, integrated with existing infrastructure.** • Leverage data to target and drive outcomes on key metrics (e.g., infant mortality) • Increase number of healthcare touchpoints, and efficacy of existing touchpoints • Reduce patient out-of-pocket expenses
B. Scale telemedicine	• Leverage central government initiative (e.g., eSanjeevani and National Telemedicine Portal) to expand specialist coverage across Tier 2 and 3 regions.
C. Set up and upgrade district, mother-and-child and sub-district hospitals	• Invest in establishing additional district, sub-district and women and child hospitals[96]. • **Invest in upgrading existing PHC and CHCs:** Only ~22% and ~41% of PHCs and CHCs satisfy Indian Public Health Standard norms.
D. PPP model to upgrade public secondary and tertiary care hospitals	• Scale NITI Aayog recommended PPP model to link new or existing private medical colleges with district hospitals. • This will help augment medical seats and increase healthcare delivery in rural areas.
E. Setup medical and nursing colleges attached to large hospitals	
F. Setup Geriatric and assisted living facilities	• Incentivize private players to set up facilities - explore reserving land parcels to develop facilities in proximity to secondary or tertiary healthcare facilities. • Leverage central government schemes (e.g., Atal Vayo Abhyuday Yojana)
G. Setup diagnostic labs and ambulance network	• Incentivize setup of labs in Tier 3 regions through providing low-cost financing • Encourage accreditation (e.g., NABL, NABH) in Tier 2 and 3 regions. • Provide incentives to expand ambulance network
H. Set up state healthcare innovation fund	• Setup fund on lines of Medical Innovation Fund by Indian Council for Medical Research • Support scaleup of emerging applications across government labs, hospitals and facilitate industry partnerships.
I. Strengthen veterinary care	• Incentivize private capital and PPP participation to establish healthcare facilities (hospital and clinics, labs, ambulances), and training colleges, especially in rural areas. • Setup multi-specialty hospitals at select districts to enable ease of access for farmers. Explore setting up proposed hybrid model (physical and digital) for veterinary care.

[96] >100% bed utilization rates

Driving medical tourism and other economic opportunities	
J. Medical hub in Tier-1 and 2 cities	Setup an integrated hub of tertiary care, alternate treatment (AYUSH), colleges, and accommodation; Solapur (and potentially Miraj in Sangli) are preliminary locations. • Reserve dedicated land parcel of ~200-250 acres. • Attract participants across the healthcare & allied through subsidies and rebates.
K. Skilling for nurses, paramedics, doctors	• Set up training institutes for nurses & midwives, paramedics (e.g., physiotherapists), specialist doctors and attract private investment via PPP and standalone private models. • Incentivize private developers to co-develop nursing and medical colleges.
L. Develop enablers to boost Medical Value Tourism	• Promote hospitals to get accredited by Joint Commission International and NABH. • Explore extending benefits provided to hotels as part of state tourism policy to MVT players (e.g., capital subsidy, interest subsidy). • Increase direct flights to Mumbai, Nagpur, Pune from countries that are a significant source of medical tourists to India (e.g., Afghanistan, Bangladesh, Iraq). • Setup separate kiosks for medical tourists at the airport for immigration clearance, and provide language interpreters, ambulance services at airport. • Provide add-on services on Maharashtra Medical Tourism services portal
Increase government spend	
Government spending	• **Explore increasing health expenditure from** ~INR 21K Cr **(5.3% of net expenditure, FY22) to** ~INR 75K Cr (**8% of net expenditure, FY28**)[97]

[97] In lines with NITI Aayog recommendation

2. Overview: State baseline

This section lays overview of the healthcare sector in Maharashtra. The section is laid out in two points.

- **Improving health outcomes of Maharashtra:** Benchmarking key healthcare metrics, as tracked in the Sustainable Development Goals (SDGs) and comparing the healthcare infrastructure and personnel of Maharashtra with benchmark states. Basis these, interventions pertaining to improving the metrics are proposed separately for Primary, Tertiary and Ancillary healthcare.
- **Economic value of the healthcare market:** Capturing global and domestic demand by focusing on high-growth opportunities such as medical value tourism for global demand and increasing supply of skilled healthcare personnel for domestic demand.

Figure 33: Overview of the objectives and interventions of healthcare section

2.1 Improving health outcomes of Maharashtra

A. Performance on healthcare metrics

Maharashtra's performance in healthcare metrics (tracked basis Sustainable Development Goals) has been amongst the top performing states. The state has already **achieved India targets in 3 of the 5 metrics** for maternal mortality at 46 deaths in 1 lakh births vs a target of under 70, under-5 mortality at 0.22% vs a target of under 0.25% and share of children immunized at 100%. Though, Maharashtra can improve in **tuberculosis case detection** and **government healthcare worker count at 43 per 10,000 population vs the target of 45.**

Maharashtra should aspire to **improve metrics beyond SDG goals**, especially in **doctors & nurses per 10,000 population**, where the state can go from **43 to 100** (China and Japan have 57 and 151 doctors and nurses per 10,000 population respectively)[98].

Improving health outcomes would involve interventions focused on **primary healthcare**. Doing so, not only ensures quality services at the grassroots level but also reduces the chances of ailments requiring secondary or tertiary healthcare services. At India level as well, the government is intensifying its focus on primary and secondary healthcare, directing a larger portion of the overall government healthcare expenditure towards these critical areas.

Maharashtra can improve its healthcare infrastructure, on 3 key parameters - **hospital beds, healthcare workers (and educational institutes) and ambulance network**.

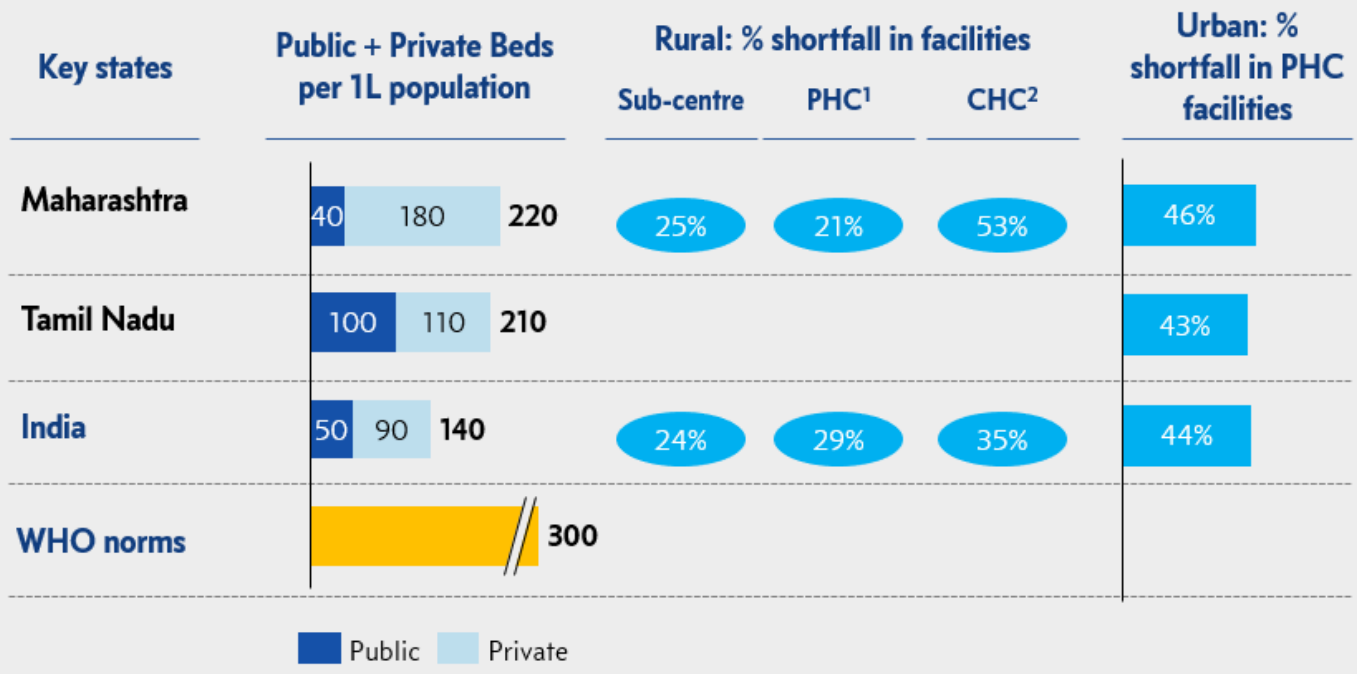
B. Hospital beds

Maharashtra had ~220 beds per 1 Lakh population in 2019. WHO recommends 300 beds per 1 Lakh population. To meet this WHO recommendation, Maharashtra would need ~1.3 Lakh additional beds (between 2019-30). While the number of beds give an aggregate picture, Maharashtra also has deficit of healthcare facilities to be able to serve the entire populations across all villages and talukas in the state, which can be split by[99]:

- **Urban deficit:** 549 facilities (~46% of required facilities) in primary health care
- **Rural deficit:** 478 facilities (~21% of required facilities) in primary health care and 309 (~53% of required facilities) in community healthcare facilities

[98] Source: The World Bank
[99] Estimated as # of facilities (required-existing)/required; As of July 2021; Requirement is calculated using the prescribed norms for rural/urban population estimation

Figure 34: State-wise comparison of healthcare infrastructure[100,101]

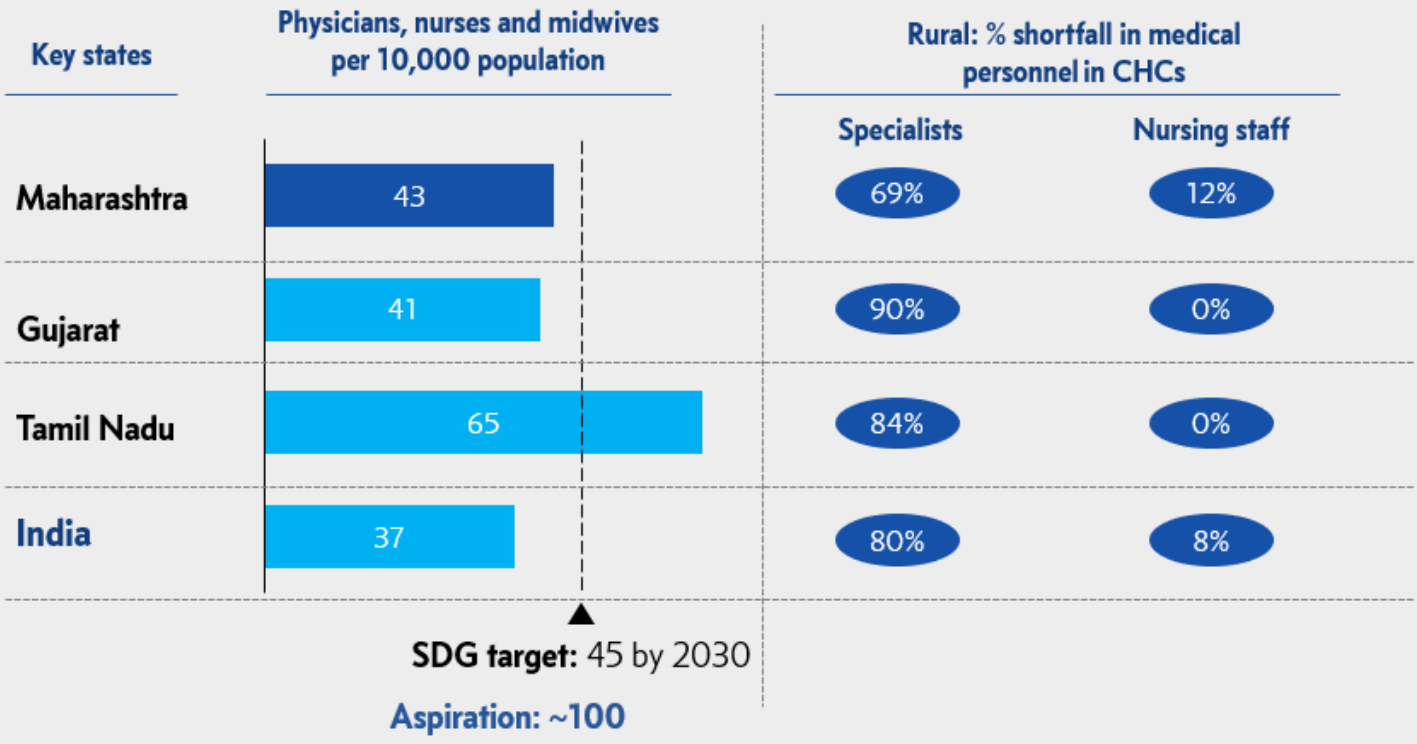


1. Primary Health center 2. Community Health center

C. Healthcare workers

India and Maharashtra had 37 and 43 healthcare workers (physicians, nurses, and midwives) per 10,000 population in 2021. To meet SDG goals, India and Maharashtra will respectively need **~16 lakhs and ~61,000 additional healthcare workers by 2030** (incremental over 2021). Maharashtra can aspire to go beyond SDG goals and achieve **100 healthcare workers per 10,000 population by 2030** along the lines of global benchmarks (China – 57, UK – 123, Japan – 151, USA -160)

Figure 35: State-wise comparison of the health-care workers (2021)[102]



[100] Source: Rural Health Statistics 2020-21
[101] Source: State of Indian Healthcare, Housing research, 2021
[102] Source: *SDG India Index & Dashboard 2020-21, NITI Aayog, Rural Health Statistics 2020-21*

D. Ambulance network

Maharashtra has 937 ambulances[103] with 19 out of 35 districts having 5 or less than 5 ambulances as part of Maharashtra Emergency Medical Services. The state needs additional 192 and 343 ambulances to meet National Health Mission and WHO target respectively[104].

Figure 36: Ambulance count in Maharashtra

	# Ambulance in Maharashtra	National Health Mission target[105]	WHO target[106]
Advanced Life support (e.g., cardiac monitor, IV supplies, ventilator)	233	388	1,280
Basic Life support	704	741	
Total	937	1,129	

Note: Count of private ambulances is not included

2.2 Driving medical tourism and other economic opportunities

Domestic opportunity for healthcare market: The existing supply shortfall of healthcare workers and hospital infrastructure, as highlighted in previous section, presents an opportunity for the state to increase in government spending, especially capital expenditure for ramping up healthcare infrastructure, and generate greater economic value by addressing the unmet domestic demand from Maharashtra and neighbouring states.

For FY19, Total Health Expenditure (THE) for India is estimated to be 3.2% of GDP or INR 5,96,440 Cr (INR 4,470 per capita). Of this, government spend is ~41%. Further the total health expenditure current health expenditure comprises majority ~91% of the total health expenditure[107].

International opportunity for medical tourism market: Indian medical tourism market was valued at **$2.9 Bn** in 2020 and is expected to reach **$13.4 Bn** by **2026**, demonstrating CAGR of **~29%**. India has been ranked 10th in the Medical Tourism Index (MTI) for 2020-21 out of 46 destinations by the Medical Tourism Association[108]. Further, Maharashtra is a key beneficiary of the medical tourism market - **~27%** of medical tourists **visit Maharashtra** of which **~80% visit Mumbai**[109].

2.3 Increase government spending in enhancing public healthcare infrastructure

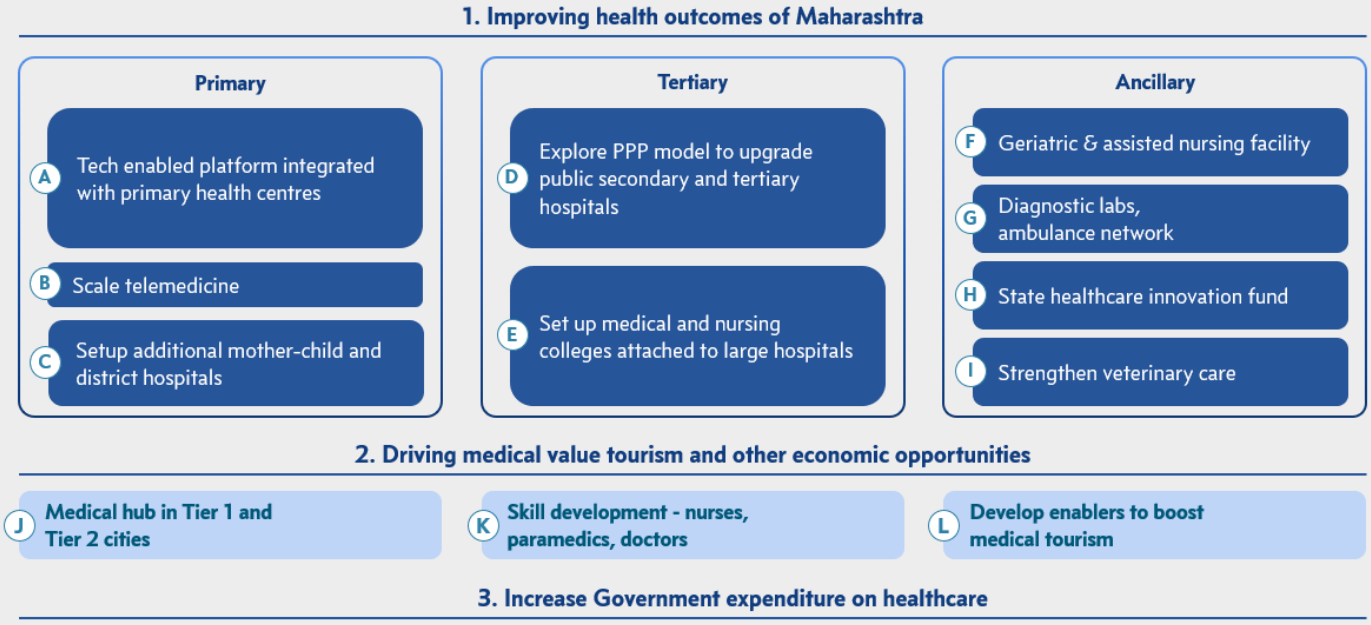
Maharashtra has allotted 4.4-5.3% of its total expenditure on health, over the past 4 years. This is lower than India average and recommended by NITI Aayog of ~8%.

[103] Source: Maharashtra Emergency Medical services
[104] World Health Organization have set a standard for ambulance services in India saying that there should be at least 1 ambulance for 100,000 people.
[105] Maharashtra has met only ~60% of the BLS ambulance; ~95% of the ALS per the targets set by the National Health Mission (NHM)
[106] WHO mandates 1 ambulance per 1 Lakh population. Maharashtra has ~12.8 M people, translating to 1,280 ambulances required.
Source: Average response time of ambulance in India, Ambipalm
[107] Source: Share of Government health expenditure in total health expenditure, PIB, January 2023
[108] Source: Healthcare industry in India, IBEF
[109] Foreign tourists under medical visa; Based on FICCI report.

3. Key challenges and proposed interventions

To improve Maharashtra's performance on these metrics, 13 potential interventions across key healthcare segments along with the current challenges faced are detailed:

Figure 37: Overview of proposed interventions across healthcare value-chain



3.1 Improving health outcomes of Maharashtra

3.1.1 Primary healthcare

A. Technology enabled platform, integrated with primary health centers

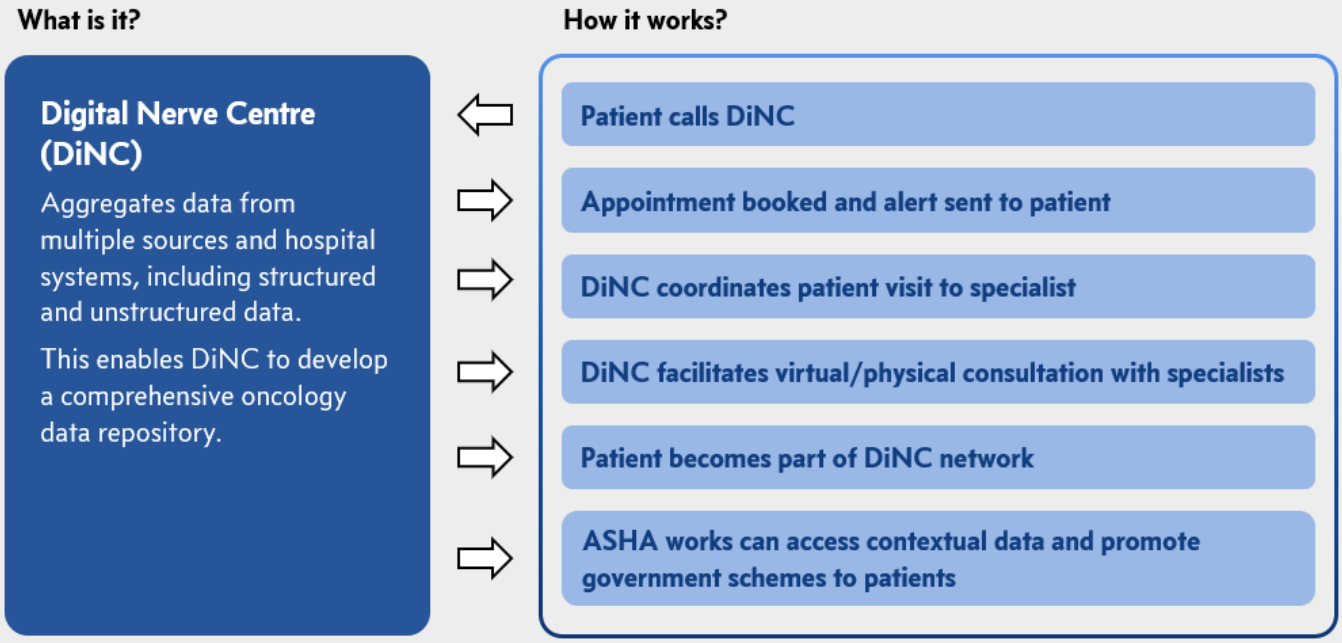
Patients in rural areas face constraints in accessing healthcare facilities, availability of skilled doctors, and affordability of services. To address this, technology platform led models for transforming public healthcare delivery across primary and secondary care can be used.

Technology platforms help to connect public health facilities – primary health centers (PHCs), community health centers (CHCs), district hospital and tertiary care state hospital. This connectivity allows collaboration, knowledge sharing, and coordination among these facilities, ultimately enhancing healthcare delivery.

Key benefits include:

- **Direct patients to appropriate healthcare facilities** (or doctor) at the right time, resulting in improved care availability and reduced cost of care.
- **Leverage data to target and drive outcomes on key SDG metrics** (e.g., reduce infant and maternal mortality rate, eradicate TB); ~90% compliance across maternal health indicators seen in a similar district experiment.
- **Help patients book appointments virtually and share medical alerts with them**. This is especially helpful for mothers and childcare, and non-communicable disease (NCD) patients in maintaining treatment continuity.
- **Enable patient care coordinators to address non-medical queries**, helping both patients and clinicians save time on administrative tasks.

Figure 38: A sample representation of the proposed technology platform to transform rural healthcare is captured through DiNC example[110]



B. Scale telemedicine, with a focus on Tier 2 and 3 regions, and at-home care

Due to lack of medical facilities or specialist availability, patients are forced to travel significant distances for check-ups (e.g., pregnancy, flu, minor ailments, and follow-ups). Video consultation for ailments can help patients avoid this travel and access expert guidance for complicated cases. Also, the lack of specialists can be bridged by connecting rural doctors or healthcare workers at primary centres with specialists from urban centres. This helps in reducing the burden on secondary and tertiary care hospitals.[111]

Maharashtra government can leverage following initiatives:

- Facilitate easy access to doctors and medical specialists from patient smartphone through eSanjeevani (National Telemedicine Service of India)[112]. Patients can also access quality health services remotely via eSanjeevani by visiting Ayushman Bharat Health & Wellness Centre.
- Add a virtual layer of specialty and super specialty doctors from 50 medical colleges across India to provide virtual medical consultation to citizens through National Telemedicine Portal[113], including 3 hospitals from Maharashtra.[114]

C. Invest in upgrading existing infrastructure (primary and secondary)

- **Invest in establishing additional district, sub-district, and women hospitals.**
  Next Figure highlights the bed occupancy rates across various types of hospitals (e.g., regional, women, 100-bed) in Maharashtra as of 2019. Bed occupancy rate of ~80% is considered optimal. As can be observed from the data, over-crowding (i.e., > 100% bed occupancy) is observed across all hospital types. However, this is more pronounced in district, women (maternity and child health) and 100-bed sub-district hospitals. 61%, 77% and 48% of these hospitals respectively are over-crowded (highlighted in figure). **State should place emphasis on establishing additional district, women (maternity and child) and sub-district hospitals.**

[110] Source: Making Healthcare Efficient, Tata Newsroom, Sep, 2018
[111] Source: eSanjeevani consultation, PIB, January 2022; eSanjeevani: How to access governments telemedicine service and other details, Mint, September 2021
[112] Maharashtra PHD plans to roll out telemedicine services at HWCs using a 3-tier architecture and CDAC's "e-Sanjeevani" telemedicine application. Hubs have been set up at district hospitals Sambhajinagar, Bhandara, Nanded, Nashik, and Pune. Each hub will have five medical officers or specialists to provide expert advice to patients
[113] Source: National telemedicine portal, Government of India
[114] Source: 50 medical colleges under NMCN, National telemedicine portal, Government of India

Figure 39: Bed occupancy of government hospitals in Maharashtra in 2019[115]

Hospital type	Number of hospitals	Underutilized and sub-optimal utilized (B0 = <69%)	Optimal (B0:70%–99%)	Overcrowded (B0 >100%)
Regional referral, district, and general hospitals[116]	31	16%	23%	**61%**
Women (maternity and child health) hospitals	13	15%	8%	**77%**
100-bed subdistrict hospitals (CHCs, FRU[117]s)	31	25%	26%	**48%**
30-bed rural hospitals (CHCs, FRUs)	364	69%	14%	**17%**
Total	500	58%	16%	**27%**

- **Invest in upgrading existing Primary Health Centres (PHCs) and Community Health Centres (CHCs)**
  As per Asian Development Bank's study only 22% of primary healthcare facilities and 49% community healthcare facilities in Maharashtra satisfy public health standards[118]. State should focus on upgrading these facilities to reach the Indian Public Health standard norms.

3.1.2 Tertiary healthcare

Proposed interventions can help resolve challenges of inadequate and suboptimal infrastructure (i.e., adequate beds) and shortage of trained healthcare personnel.

D. Explore PPP model to upgrade existing public secondary and tertiary care hospitals (detailed in next point)

E. Build new tertiary care hospitals and medical college

As per NITI Aayog report and NRHM suggestions - There is unmet demand for tertiary care hospitals and specialty hospitals[119]. Further, as per NITI Aayog and NRHM recommendation, PPP model can be scaled to link new or existing private medical colleges with district hospitals. This will help augment medical seats and increase healthcare delivery in rural areas.
In this PPP model, state government provides land and defines key project aspects. These include range of specialties to be offered, number of medical students to be taught, and pricing to ensure affordability for the economically weaker section. Private sets up the hospital with medical college, and services the requirements. When the contract ends, the infrastructure, equipment and services can be handed back to the government.[120]

This PPP model has been piloted in 3 super-specialty hospitals in Maharashtra[121]: Greenfield development of hospital in Nagpur[122], and operation and maintenance of hospitals in Osmanabad and Latur[123].

3.1.3 Ancillary

F. Promote setup of geriatric and assisted living facilities (e.g., Athashri Paranjpe in Pune):
Maharashtra has ~1.5 crore population (~12% of population) over the age of 60[124] in 2021[125]. As per Census of India report, this number is expected to grow at 3.12% CAGR to ~1.7 Crore by 2026. Maharashtra has ~37

[115] Source: Assessment of Maharashtra State Health System, Asian Development Bank, March 2022
[116] District Hospital is a hospital at the secondary referral level responsible for a district of a defined geographical area containing a defined population
[117] FRU: First Referral Unit
[118] Source: Assessment of Maharashtra State Health System, Asian Development Bank, March 2022
[119] Source: Investment opportunities in India's healthcare sector, NITI Aayog
[120] Source: Maharashtra: Cabinet approves PPP model for Govt medical colleges, Times of India, September 2021
[121] Source: Now medical colleges under PPP model, three selected for pilot project, Hindustan Times, April 2022
[122] Dr Babasaheb Ambedkar Super Specialty Institute of Medical Education & Research Nagpur
[123] Government Medical College, Osmanabad and Vilasrao Deshmukh Government Medical College, Latur
[124] The citizens, who have crossed the age of 60 years are described variously as 'senior citizens.
[125] Population projections for India and states 2011 – 2036 – pg 236

state-run old age homes with ~1,135 beneficiaries[126]. These are severely burdened and forced to limit new admissions (similar situation exists at India level).[127]

Private sector is constrained from investing and reducing the demand-supply gap due to following constraints:

- Lack of **large land parcels** at **affordable cost** in metro cities. Large campuses needed with amenities specifically suited for the residents (e.g., temples, gardens, malls, clubs)
- Land parcel must be **near secondary or tertiary care hospitals**, within a radius of 10 km (or accessible within 30 minutes)
- Lack of **skilled manpower** to provide elderly care[128].

Maharashtra government can adopt following initiatives to promote set up of senior living facilities:

a. **Government financing through incentives:** State can reserve land parcels in proximity to secondary or tertiary healthcare and incentivize private players[129] to set up facilities.
b. **Leverage central government schemes** for:
   - **Providing grants to NGOs and voluntary organizations** for running and maintaining senior citizen homes, including paying staff salaries through the Atal Vayo Abhyuday Yojana (AVYAY)[130]
   - **Providing 90% subsidies for maintaining senior citizen facilities** through the Integrated Program for Senior Citizens scheme (IPSrC).[131] Facilities covered under the scheme include continuous care homes for senior citizens afflicted with Alzheimer's, mobile medicare units and physiotherapy clinics.

G. Setup diagnostic labs, ambulance network

a. **Establish accredited (NABL) diagnostic labs, especially in Tier 2 & 3 regions where investments in scaling hospitals are expected:** Indian diagnostics market was ~$10Bn in '21 and projected to grow at ~14% CAGR to reach US$ 20Bn by FY26[132]. This market is segmented into standalone centres (48% share), hospital-based labs (37% share) and national chains (5% share). This **fragmentation poses a challenge in terms of capability, scalability, and quality of labs.**

   Maharashtra government can incentivize set up of diagnostic labs in Tier 3 cities through potentially enabling access to low-cost financing. It can also implement the following additional interventions, based on feedback from industry representatives[133]:
   - Make diagnostics cost-effective with GST exemption on input testing materials (e.g., consumables, testing kits, reagents)[134].
   - Promote investment and research for future diagnostic areas[135] such as computational pathology and teleradiology solutions[136], and use of AI in image processing across radiology and pathology.
   - Encourage accreditation of labs with agencies like NABL[137] and NABH[138] in Tier 2 and 3 cities.
b. **Provide incentives to expand ambulance network:** Maharashtra government can provide incentives for procurement of additional ambulances. Bihar government provides a 50% subsidy (upto 2 lakhs) to beneficiaries to purchasing ambulance under the Mukhyamantri Gram Parivahan Yojana (MGPY)[139].

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[126] Source: Old Age Homes, PIB, December 2021
[127] Source: ANAROCK report on Emerging Asset Class, February 2020
[128] Source: Report on retirement homes in India by Moneylife Foundation for HDFC, Money Life Foundation, October 2019
[129] Example: Athashri Paranjpe
[130] Source: Old Age Homes, PIB, August 2022
[131] Source: National Action Plan for welfare of senior citizens, Government of India
[132] Source: Diagnostics: Unravelling the future, Praxis Global Alliance, July 2022
[133] Source: Union Budget 2023-24: Make diagnostics cost-effective with GST exemption, ET Healthworld, January 2023
[134] Diagnostic equipment, consumables, kits, and reagents are primary inputs to laboratories. These items attract GST whereas diagnostic services are exempt from GST. This creates an issue for diagnostic services as they are then compelled to inflate the cost of the service and transfer it to the consumer. Removal of GST from diagnostic equipment and consumables, at least from Made-in-India products would help.
[135] Source: Diagnostics: Unravelling the future, Praxis, July 2022
[136] Teleradiology was estimated to be a US$ 356M market in 2020 and is likely to evolve into US$ 700M market by 2025 growing at a CAGR of ~15%
[137] Source: NABL India
[138] Source: NABH certified medical labs
[139] Source: 50% subsidy to buy ambulance, Times of India, May 2021

c. **Plan for ambulance network in metro cities:** Work with the state planning department and urban local bodies to evaluate setting up a dedicated helipad network in metro cities for a comprehensive road plus air ambulance network. This will reduce the reliance on road transport in congested areas.

H. Establish a state healthcare innovation fund to support emerging and innovative technologies and applications: The proposed fund would support scaling up of nascent technologies and applications across network of government labs, hospitals and facilitate partnerships with industry. The state fund can be setup on lines of Medical Innovation Fund launched by Indian Council for Medical Research (ICMR)[140].

ICMR fund provides financial support to test and validate novel ideas. Further, the ICMR fund provides support to successful ideas from network of ICMR laboratories and other healthcare universities.

I. Establish veterinary healthcare facilities (hospital and clinics, labs, and training colleges)
India had ~32 Mn pets in 2022 up from ~22 M in 2019, growing at >13% CAGR[141]. However, the pet healthcare industry faces multiple challenges, including limited access to veterinary care (e.g., vaccination) for over 70% of pets[142], a shortage of licensed practitioners (current count at 0.5X of required 1.2 lakh[143]), and inadequate infrastructure facilities (e.g., medicines, labs), particularly in rural areas. The state can adopt following initiatives:

a. **Establish basic healthcare facilities through private capital and PPP incentives for** hospital and clinics, labs for quick diagnostics, ambulances, and training colleges across multiple districts, especially in rural areas. To achieve this the state must increase the off take of central government schemes like National Animal Disease Control Programme (NADCP)[144] for **providing vaccines for cattle, buffalo, sheep, goat, and pigs** and mobile veterinary units with equipment for diagnosis, treatment & minor surgery, audio-visual aids and others.[145]

b. **Set up multi-speciality hospitals** at **select districts** to enable ease of access to advanced healthcare for farmers. This can be on lines of Indian Veterinary Research Institute (IVRI) [146] multi-speciality facility, that setup 1st multi-specialty facility in Bareilly, UP. It is equipped with facilities such as minor OT, delivery room, X-ray, Ultrasound, CT scan and ICU.

3.2 Driving medical tourism and other economic opportunities

J. Set up an integrated medical hub of mega tertiary care, alternate treatment (AYUSH), medical and nursing colleges, and hotels for medical tourists: Solapur, Miraj in Sangli, Sambhajinagar and potentially other locations can be explored to set up integrated medical hub. These tier 2 cities locations could be potential hubs given:

- **Existing ecosystem:** Solapur has significant presence of private hospitals (557) including multi-speciality tertiary care hospitals, and government hospitals (55)[147] as of 2019.
- **Growing medical tourism**[148]: Miraj attracts medical tourists from Middle East, consisting of original residents who migrated. This is supplemented by presence of public, private and a 129-year vintage Mission hospital (Wanless hospital[149]). Sangli also houses medical, paramedic and nursing hospitals.
- **Real estate:** Availability of affordable land, in comparison to Tier 1 cities.
- **International connectivity:** Sambhajinagar has a functioning airport with capability to land international flights.

[140] Source: Medical Innovation Fund, ICMR
[141] Source: Factors responsible for India's growing pet healthcare industry, Times of India, January 2023
[142] Source: India's Pet healthcare industry: from ruff beginnings to pawsome prospects, Economic Times, March 2023
[143] Source: Disparities in veterinary sector needs attention, Press reader, July 2021
[144] Source: Department of Animal Husbandry and Dairying
[145] MVUs will be customized fabricated vehicles for veterinary healthcare with equipment for diagnosis, treatment & minor surgery, audio visual aids and other basic requirements for treatment of animals. These MVUs will provide veterinary services at the farmers' doorstep basis the phone calls received at the Call Centre from farmers.
[146] Source: ICAR – Indian Veterinary Research Institute website
[147] Excludes Primary health-center, Sub center, Dispensary, health clinic and TB hospital. As of 1st Jan 2019
[148] Heard from district interactions
[149] Source: Wanless hospital Miraj, Miraj Medical Center

Maharashtra government can reserve land parcel of ~200-250 acres to develop a campus housing all facilities. It can attract participants across healthcare value-chain through providing land at subsidized prices and tax rebates (e.g., exemptions on stamp duty, registration)[150].

K. Develop enablers to boost Medical Value Tourism (MVT) in Mumbai and other districts (e.g., Pune, Nagpur) by leveraging learnings from Thailand - medical hub for cosmetic and dental surgery.[151] Key source countries of medical tourists to India are Sri Lanka, Bangladesh, Afghanistan, Maldives, Indonesia, and Kenya.[152]
Affordable cost of treatment is one of the **major drivers** of MVT. India has a cost advantage to attract international tourists for multiple medical treatments (e.g., heart bypass, valve replacement, dental implant, IVF treatment) as compared to US, and leading Asian countries (e.g., Thailand, Singapore, Korea). Number of medical tourists to India have increased by 18% CAGR 2017-20. **~27%** of which **visit Maharashtra** of which **~80% visit Mumbai.**[153] Maharashtra government can adopt following initiatives to promote medical value tourism:

a. Leverage central government initiatives for:

- Financial assistance (i.e., interest subsidy) to construct super-specialty hospitals and day care centres through the Champion Service Sector Scheme for Medical Value Travel[154] by Ministry of Ayush.[155]
- Giving incentives to medical tourism service providers to participate in global medical and wellness fairs and conferences through the Market Development Assistance Scheme (MDAS[156]).

b. State policy amendment: State can consider extending benefits provided to hotels as part of state tourism policy (e.g., capital subsidy, interest subsidy, power tariff, electricity duty) to MVT operators. In this way, MVT players can offer treatments at more competitive prices that will attract tourists. For reference, Orissa tourism policy[157] provides following benefits to boost medical tourism:

- Capital Incentive Subsidy (CIS) up to 30% to encourage investment in infrastructure.
- Resorts promoting healing, AYUSH, yoga, meditation along with prescribed accommodation units (15), NABH accreditation, skilled manpower with requisite certification, shall be eligible for the incentives.
- Promote Integrated Developments (comprising of hotel and hospital) in urban areas. For medical tourism, the hospital shall be attached to a hotel of 3-Star and above category.

c. Encourage accreditation of existing hospitals: Promote existing hospitals to get accredited by Joint Commission International (JCI) and NABH. Certification by these agencies signifies quality standards, helps establish trust and thus drives traffic of medical tourists. Maharashtra government could do this by providing incentives on the accreditation cost. The state already has 10 JCI accredited hospitals of which Mumbai has 8, Pune and Nagpur have 1 each.

d. Infrastructure development: State can increase direct flights to Mumbai, Nagpur, Pune airport from countries that are a significant source of medical tourists to India (e.g., South Asia – Afghanistan, Bangladesh, West Asia-Iraq); also ensure direct flights from countries where current patient traffic is low (e.g., US, Japan[158]).

State can setup separate kiosks for medical tourists at the airport for immigration clearance, language interpreters, ambulance services at airport, as these are currently lacking (India-wide issue). Increased efficiency at the overall immigration processes would enhance the experience levels for MVT[159].

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[150] Source: Suggestions basis recommendations from government workshop to develop integrated medical hub in Amaravati, Andhra Pradesh
[151] Thailand has scaled as a medical hub for cosmetic and dental surgery: Thai Hospitals were among the first in Asia to be medically accredited. Due to its first-mover advantage, some of its major private facilities managed to establish itself as popular destination for medical travel e.g., at Bumrungrad hospital, ~50% of patients are foreign. Facility for integrated wellness centres (e.g., massage, spa, and other activities)
[152] Source: Medical tourism in India: top destinations, scenarios and all you need to know, Hindustan Times, December 2022
[153] Foreign tourists under medical visa; Based on FICCI report.
[154] Source: Government to promote AYUSH treatment through health tourism, PIB, March 2023
[155] Recognized under The National Commission for Indian System of Medicine (NCISM) Act, 2020 or The National Commission for Homeopathy (NCH) Act, 2020
[156] Source: Medical Tourism, Lok Sabha, July 2022
[157] Source: Odisha Tourism Policy 2022
[158] Patients travel to Thailand
[159] Source: India: Building best practises in healthcare services globally, FICCI and EY; National strategy and roadmap for medical and wellness tourism, Government of India

e. **Marketing and promotion:** State can leverage the Maharashtra Medical Tourism services portal[160] and provide add-on services:
- Direct contact with healthcare providers for queries
- Visa issuance
- Extensive travel information to ease the trip planning process - hotel, F&B, and cab booking details
- Facilitate travel process by linking to travel agencies
- Events calendar to announce all upcoming conferences, meetings, and workshops
- Learnings from UAE medical tourism portal for international tourists can be leveraged to offer options to book procedures and access tourism services like visa, hotel, and travel bookings.[161]

L. Skilling for nurses, paramedics, doctors

Global shortage of health workers exists, specifically for nurses and mid-wives. These represent >50% of the current shortage in health workers. To meet Sustainable Development Goal (SDG)[162], **additional ~90 Lakh nurses and midwives will be needed by 2030**.[163]

As mentioned in baseline, to meet SDG goals, Maharashtra must add **~61,000 additional healthcare workers by 2030**, though to achieve aspirational target of developed countries, the state must add 7,80,000+ workers.[164]

State has opportunity to set-up training institutes for nurses & midwives, paramedics (e.g., physiotherapists), specialist doctors (surgeons, physicians & pediatricians) to service global and India demand.

Following initiatives announced in Union Budget 2023-24[165] to promote setup of training centers:
- Establish 157 new nursing colleges in co-location with the existing 157 medical colleges across India. Maharashtra specific details are not available.
- Dedicated multidisciplinary courses for medical devices will be supported in existing institutions to ensure availability of skilled manpower for futuristic medical technologies, high-end manufacturing, and research.

Maharashtra government can adopt following additional initiatives:

a) **State policy amendment:** State can incentivize set up of nursing centres, and hospitals to reduce the supply-demand gap. This could be a combination of government centres and attracting private investment through PPP and private models *(NITI Aayog recommended model explained in Point D)*. PPP models help integrate a government hospital with an affiliated academic institution developed by a private partner.

b) **State policy amendment and financing through incentives:** State can enable private sector to set up nursing colleges together with medical colleges, for new constructions.

3.3 Increase government spending in enhancing public healthcare infrastructure.

Maharashtra government should evaluate increasing its healthcare expenditure from **INR 21,067 Crore** (**5.3%** of net expenditure in **FY22 budget**) to ~**INR 75,000 Crore** (**8%** of net expenditure in **FY28 state budget**)[166]. This is in lines with NITI Aayog suggestion - healthcare expenditure should be 8% of the annual budget.

[160] Source: Maharashtra Medical Tourism Services, Government of Maharashtra
[161] Source: Medical tourism portal, UAE
[162] Source: Sustainable Development Goals, United Nations
[163] Source: Nursing and midwifery, World Health Organization, March 2022
[164] Source: The World Bank
[165] Source: 157 new nursing colleges to be established, PIB, February 2023
[166] Methodology for estimation: FY23-28 GSDP to reach $1Trillion nominal GSDP is estimated. Then average of Net expenditure to GSDP ratio of FY21-24 (Budget estimate) is calculated as ~13%. This same ratio is used to estimate Net expenditure from FY24-FY28. Finally, health expenditure to Net expenditure is increased at a constant rate from 4.6% (FY24 Budget estimates) to reach 8% in FY28. This ratio is used to back calculate Health expenditure by year.

Tourism

Services - Tourism

1. Executive Summary

Industry overview and baseline:

- Directly contributes ~3% to state's GVA at ~$11 Bn, though including indirect contribution it makes up ~6.5%.
- Provides employment to more than 5.9Mn people, or more than 11% of state's total working population.
- Foreign tourist arrivals to the state stagnated at ~1% CAGR over last decade (FY10-20), while the proportion of foreign tourists starting their Indian journey from Mumbai declined from ~20% to ~14% during same period.

FY28 Toursim potential:

- Sector's direct GVA contribution can grow ~3X to $35 Bn by FY28 (26% CAGR vs 21% India estimate) by targeting benchmarked growth rates for visitations, spend per visitation and duration of stay.
- Generate 1.5-2Mn new jobs in the tourism industry by FY28 with 8 direct jobs per INR 1 crore of investment
- Contribute ~$9.4 Bn in annual foreign exchange earnings for India, driven by foreign tourists spend in the state.

Strategy to activate visitations, duration of visit, spend per visit:

- **Develop 'anchor destinations'**: Develop new 'crowd-pulling' destinations like Mumbai, Pune and Shirdi through zone-level planning, improved accessibility, world-class hotels, strategic promotions, and diligent upkeep.
- **Develop circuits around anchor destinations:** Create strong association with key tourism themes at nearby destination to develop multi-day circuits and itineraries for extending stay duration as tourists spend 0.3X to 0.6X lesser number of days in Maharashtra as compared to Goa and Kerala.
- **Amplify experiences or 'things to do'**: Encourage experiential activities along the lines of culinary, leisure, adventure, live entertainment, cultural, or wellness instead of passive sightseeing or photo-taking to encourage tourists to spend more. For e.g., 'Explore Chhatrapati Shivaji Maharaj's secret escape route at Raigad fort'.
- **Invest in mega projects:** Develop new iconic attractions to put Maharashtra on the global tourism map and incrementally increase foreign visitations. For e.g., Bollywood theme park or Boardwalk with Marina in Mumbai.
- **Promote Festivals or 'best time to visit'**: Curate yearlong calendar of events and festivals to drive more visitations and ensure that visitors extend stay by 3-4 nights. For e.g., Annual beach Olympics at Malvan beach.
- **Enable digital tourist journeys:** Digitise entire tourist journey from travel inspiration or idea (e.g., movies on Netflix), exploration, validation (via reviews & pictures) and purchase, engage (travel passes), review and share.

Key enablers to achieve potential:

- **Enhance connectivity:** Improve weekly incoming flights at tier-2 airports (e.g., at Nashik, Shirdi), revive non-operational airports (e.g., at Sindhudurg), build marina for water connectivity, invite airlines and cruise companies to set up base and complete existing road and rail connectivity projects across all districts.
- **Promote Maharashtra tourism:** Articulate vision with measurable goals, increase marketing spend and hire agency for online promotions, as Maharashtra tourism website gets 16X less monthly traffic than peer states.
- **Create enabling infrastructure and perform upkeep:** Lease lands for large-scale hospitality projects and develop PPP funds for local projects to address branded hotel rooms shortage (11 per 1 lakh visitations) compared to Kerala (92) and Goa (62). Additionally, offer incentives to hospitality companies to develop basic infrastructure (toilets, signage, parking, guides) and establish beach cleaning programs for maintaining existing assets.
- **Ease of doing business:** Establish a tiered mechanism for project approval, execution, investor invitation, and inter-department co-ordination to streamline processes, supported by the operationalization of a single window system for seamless efficiency and success.
- **Facilitate skill development:** Partner with hospitality companies to set up skill development centres and empower women SHGs at gram level in entrepreneurial ventures like hosting farm stays and producing local handicrafts.
- **Empower execution:** Enable tourism suppliers in the state by providing consumer insights, content, tourism data.

Areas	Key Interventions Proposed
1. Key opportunities	
Develop 'anchor destinations'	Further develop key tourist attracting cities in-line with **global benchmarks by improving their connectivity, constructing top-tier hotels**, increasing marketing efforts, and improving upkeep. e.g., Mumbai can follow benchmark of Singapore.
Develop circuits around anchor sites	Develop circuits around anchor destinations and create strong association with key tourism themes (7 key themes - Agri, Beach, Heritage, MICE, Pilgrimage, Hills, Ecological, and Wildlife) by offering similar themed experience in proximity. **e.g., of priority circuits for vision 2028:** Konkan beach circuit, Sambhajinagar-Nashik-Ahmednagar pilgrimage circuit (following Kashi Vishwanath e.g., for Jyotirlingas along Samruddhi Mahamarg) and fort tourism circuit (following Scotland castle tourism circuit).
Develop 'things to do'	**Develop activities at tourist cities under the themes** of culinary (places to eat or cuisines to try), leisure, live entertainment, adventure, cultural (exploring history), attending festivals or live ceremonies (e.g., artis at temples), or wellness.
Invest in mega project	**Develop a world class tourism facility, in-line with global standards** like a Bollywood theme park, integrated playground resort like Sentosa, Boardwalk with Marina like Ocean city, Ecological Park like 'Gardens by the Bay' and an F1 circuit.
Promote festivals	Develop a **steady calendar of festivals** with coverage across all six division in Maharashtra.
Diversify themes	Leverage **mega trends like wellness tourism, medical tourism**, destination weddings and develop dedicated tourism zones for them. e.g., dedicated wellness zone in Igatpuri
Enable a digital tourist journey	**Digitise entire lifecycle of tourist journey** from travel inspiration or idea, exploration, selection, validation (via reviews and pictures) and purchase, engage, review and share
2. Key enablers and interventions required	
Enhance connectivity	• **2-2.5X increase in incoming flights to Maharashtra,** especially at tier-2 airports (Sambhajinagar, Nashik, Shirdi, Kolhapur). • **Revive non-operational airports** like Sindhudurg and Solapur • **Build multiple marinas** along the Konkan coast to enable cruise tourism • **Invite cruise and airline companies** to set up base in Mumbai • **Increase train connectivity** to all district headquarters. • **Improve quality of intra-circuit roads** and MSRTC bus fleet towards tourist attractions
Create enabling tourism infrastructure and perform upkeep	• Create **tourism zones** - offer underutilized government land on lease for mega projects. • Create special **Tourism Infrastructure Funds via (PPP)** for local tourism projects. • Improve infrastructure (signage, bins) and cleanliness at key tourist sites and beaches • Initiate a **common tourist pass for multiple local attractions**. Like 'Discover Kolkata' • **Establish beach cleaning programs** & increase waste management at key beaches
Ease of doing business (Accelerate decision making and inter-department coordination)	• Set up a layered tourism governance mechanism at state and district cluster level: – **High powered committee under CM**: To ensure timely approval and implementation of major projects above a defined investment and employment threshold. – **District tourism council**: Develop new tourism products, coordinate with departments, provide project management support and address grievances of the private sector. – **Tourism investor cell**: Promote Maharashtra as investment destination, reach out to investors and provide helping hand to bidders. • **Ensure single window clearance** for live events, mega and other projects basis investment size & employment (e.g., Rajasthan avg. time - 67 days for 700+ projects)[167]

[167] Source: Single Window Clearance System, Government of Rajasthan

	• **Increase review meetings' frequency:** Weekly, monthly, and bi-monthly depending on investment size & employment potential and degree of coordination required. • **Establish program management:** Build workplans with milestones and report progress. • **Enable inter-department revenue sharing** from a site with all coordinating departments. • **Others:** Define roles and responsibilities of departments, effective utilization of online portals (e-Samiksha and Gati Shakti), utilization of online portals for annual renewals (like Sakala) and **reward departments for timely and on-budget completion of projects**.
Facilitate skill development	• **Setup skill development task force** with representations from hotel industry, tour guide association, travel operator association, archaeological survey of India (ASI). • **Extend tourism policy** support to hotel management and food craft institutes. • Partner with hoteliers to **set up skill centres and deliver 30-45 days practical courses**. • Give **annual rewards to top customer centric hotels** by district and at overall state level. • Develop women SHG across 10 pilot 'talukas' and train for **entrepreneurial ventures**
Empower on-ground execution	• **Serve as a resource for tourism suppliers** by providing content (pictures & videos), advice, funding, customer insights, suggested itineraries, and marketing toolkits. • **Develop Tourism reports (like Gujarat's Aatithyam dashboard)** for tourist data on visitations, # rooms, duration of stay, avg. spend, # flights and employment generation. • **Bring all tourism associations together under one roof** and engage them in state and district level decision-making like Kerala's - Confederation of Kerala Tourism Industry.
Promote Maharashtra tourism	• **Articulate a compelling vision for tourism** at district and overall state level to ensure inclusive and sustainable tourism growth with measurable goals and defined milestones. • **Orchestrate engaging social media campaigns** via digital marketing agencies and conduct tourism roadshows in prospective domestic and international destinations. • **Create engaging, informative website for tourism** with attractive images, videos, suggested itineraries, verified travel company and other tourism suppliers' details. • **Give additional incentives to hospitality associations** to organize fairs or festivals. • **Develop film & TV promotion funds** to partner with content creators for featuring MH • **Partner with school education and sports departments'** to organize minimum one trip per year for agri and ecological tourism (wildlife parks, bird sanctuaries).

2. Context

Maharashtra is one of the most popular tourist destinations in India (5th most visited state in India with 155Mn annual visitations in FY20[168]) known for its vibrant culture, rich history, beautiful landscapes, and diverse attractions. Located at the western ghats of India, the tourism options in the state can be classified into seven major themes: agriculture, beach & adventure, culture & heritage, hill stations, MICE & urban, pilgrimage and wildlife & ecological:

Figure 40: Key tourism themes in Maharashtra

Source: 1. India Tourism Statistics 2. World Travel and Tourism Council (WTTC) MICE – Meetings, Incentives, Conferences and Exhibitions *All numbers are for FY20*

The state of Maharashtra faces **eight key challenges** in attracting visitations and extending duration of stay in state:

A. Connectivity:

- **Air**: Non-metro major tourist cities have limited weekly incoming flights - e.g., Shirdi (56) vs other pilgrimage cities in India - Varanasi (175), Madurai (112) and Tirupati (91)[169]
- **Rail:** Rail density in Maharashtra is 3.8km per 100 km^2 area vs. UP (6.7km) and TN (5.4km)
- **Road:** Road density in Maharashtra is - 207 km per 100 km^2 area vs. Kerala (669) and Goa (505)

The road and rail density baseline statistics are further detailed in the construction and real estate section.

B. Branded hotel rooms: Maharashtra has **11 branded hotel rooms per 1 lakh visitations** compared to Kerala (92) and Goa (62) – states which attract a higher proportion of outside the state domestic visitations.

C. 'Things to do' or experiences: Average duration of stay of domestic tourists in Maharashtra is 1.3 days vs Goa (5 days) and Kerala (1.5 days) and average duration of stay of foreign tourists is 1.9 days vs Kerala (3.5 days)

D. Multi-destination circuits: Fewer 2-5 day packages or circuits[170] in Maharashtra (~75) vs tourist states in India – Rajasthan (~175), Kerala (~115), Karnataka (~110) and Tamil Nadu (~100)

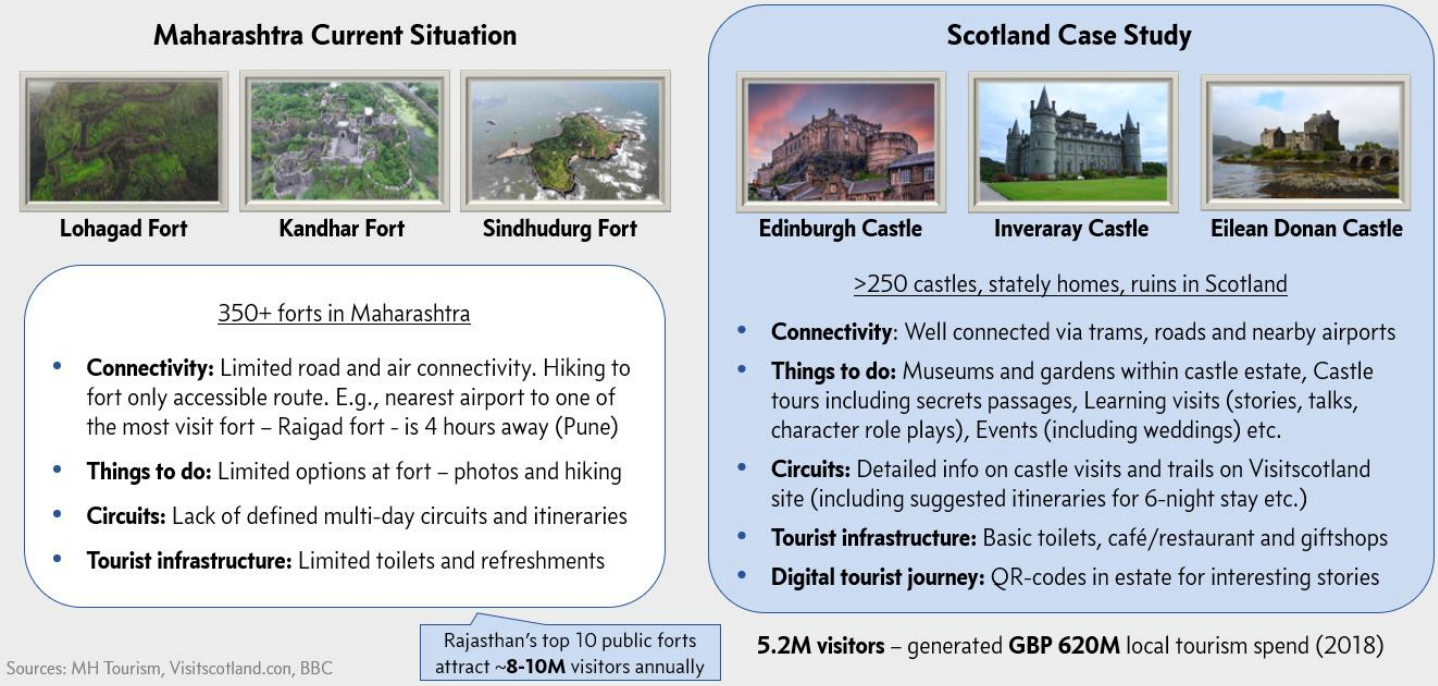
E. Lack of zone and cluster level tourism planning: Absence of a comprehensive and systematic approach to identify and develop tourism zones and clusters at a state, district, and city level, leading to fragmented and uncoordinated tourism development. This has led to tourism concentration and city congestion at certain hotspots (e.g., Mahabaleshwar or South Mumbai), while leaving some regions with untapped tourism potential.

F. Lack of digital tourist journey: Key tourist sites like Ajanta and Ellora caves have separate ticketing counters which is inconvenient for visiting tourists. The state does not offer a city or state pass valid across multiple tourist spots like Hong Kong, London, or Kolkata.

[168] Source: Ministry of Tourism, GOI - Indian Tourism Statistics 2020
[169] Source: Flightconnections.com
[170] On MakeMyTrip, which has more than 50% market share in online travel market

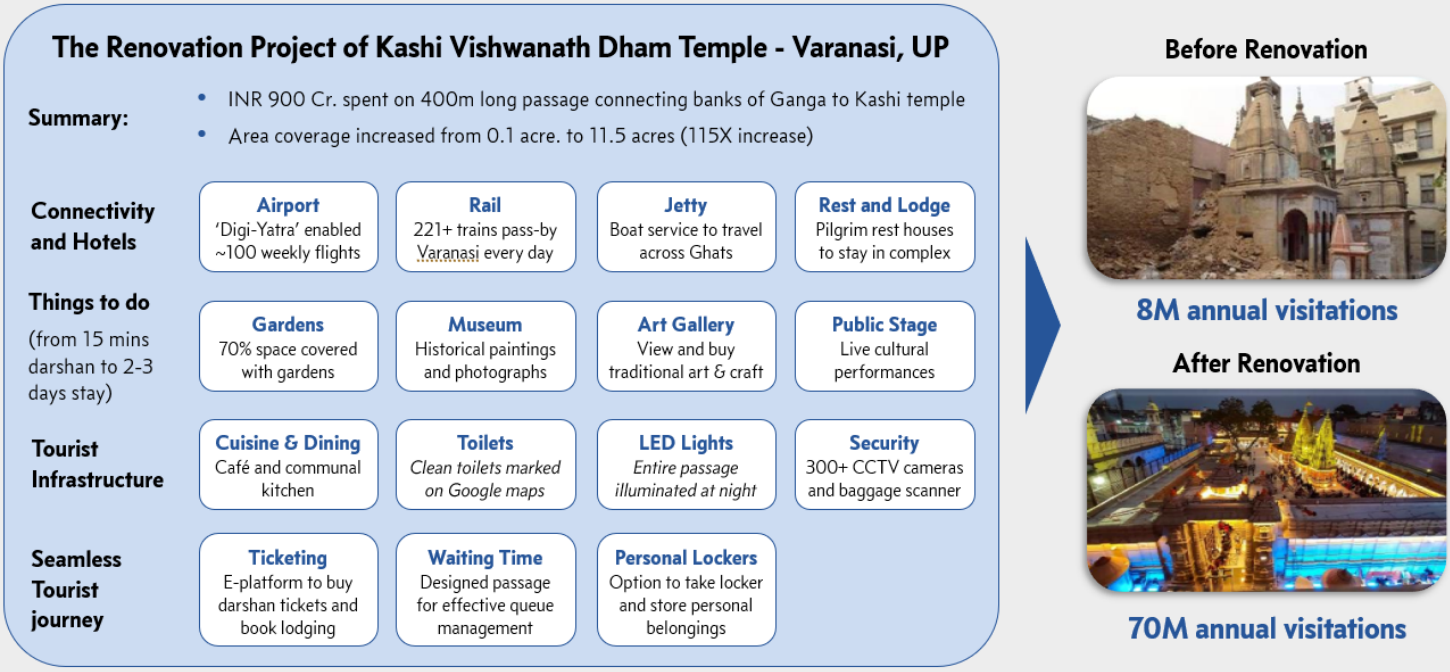
G. Tourism narrative and promotion: Maharashtra must articulate a clear tourism narrative on "Why to visit Maharashtra?" and improve online marketing efforts to communicate that narrative. Maharashtra tourism's website and its content will play a significant role in ensuring that. The website must be further improved as current monthly traffic on Maharashtra tourism's website (~0.75Mn) is 16X less than best in class state – Tamil Nadu and Telangana, 4X less than Kerala and ~2X less than Karnataka.[171]

Figure 41: Significant potential to create more compelling narrative around Maharashtra's fort heritage similar to Scotland's "Castle Tourism"



H. Restoration and maintenance at key tourist sites: Key tourist sites like Elephanta caves in Mumbai, 300+ forts from Chhatrapati Shivaji's era, Alibaug beach or Mahabaleshwar hills need better upkeep and maintenance as per national or international standards, including better signage, dustbins, washrooms, drinking water.

Figure 42: Restoration and renovation of sites critical to boost tourism: Example - Kashi Dham in Varanasi, UP – 9X increase in visitation post renovation.



[171] Source: Semrush.com

3. Baseline GVA

The Indian travel and tourism market is expected to reach $512 Bn by FY28 from a base of ~$112 Bn in FY20, growing at a CAGR of ~21% in the eight-year period[172]. The tourism sector comprises of hospitality, airlines, railways, theme parks and contributes 6.8% to India's GDP including direct and indirect impact.

Maharashtra's tourism industry contributes $26 Bn to state's GVA (~6.5% of total GVA) through three components:

- **Direct contribution:** ~$11B (or ~3% of total GVA) - Direct consumption expenses by tourist on tourism services (hotels, restaurants, transportation – air, railways, road).
- **Indirect contribution:** ~$11B (or ~3% of total GVA) - Consumption expenses by non-tourists (locals) on tourism services and investments made by private sector and government.
- **Induced contribution:** ~$4B (or 0.5% of total GVA) - Expenses made by people working in tourism industry.

The industry is also a major employment generator for the state and provides employment to more than 5.9Mn people (more than 11% of state's total working population).

Tourism industry's GVA is directly proportional to the spend in tourism industry, which can be represented as:

- **Number of visitations:** As per the Indian tourism statistics, Maharashtra ranks 5th amongst all states by domestic visitations at 149M and 2nd by foreign visitations at ~5.5M. The domestic visitations to the state have been growing at 10-year CAGR (FY10-20) of ~12%, but the foreign visitations to the state have remained almost constant with a 10-year CAGR (FY10-20) growth of ~1%. The share of foreign tourists beginning their Indian journey from Mumbai has also decreased from ~19% in FY15 to ~14% in FY20, primarily due to enhanced international connectivity across other cities in India.

  Though, during the same period, Delhi airport's share has only dropped from 30% to 28% on the back of strong commitments from major Indian airlines - Indigo and Air India, to convert Delhi as the biggest transition hub in India.[173]
- **Average spend per day (influenced by visitation type):** Average spend per day in Maharashtra is amongst the top 10 states in India but, is lower than best in class states like Kerala and Goa. The primary contributor to this is the lower proportion of outside Maharashtra domestic visitations, who on average, spend 4-5X more than within the state domestic visitors. The mix of domestic visitations to Maharashtra was 7% from outside the state and 90-93% from within the state, compared to other states like Goa (60% outside Goa and 40% from within Goa) or Kerala (35% outside Kerala and 65% from within Kerala) in FY16.
- **Average duration of stay:** Tourists spend ~1.5-2X lesser days in Maharashtra compared to Kerala and Goa

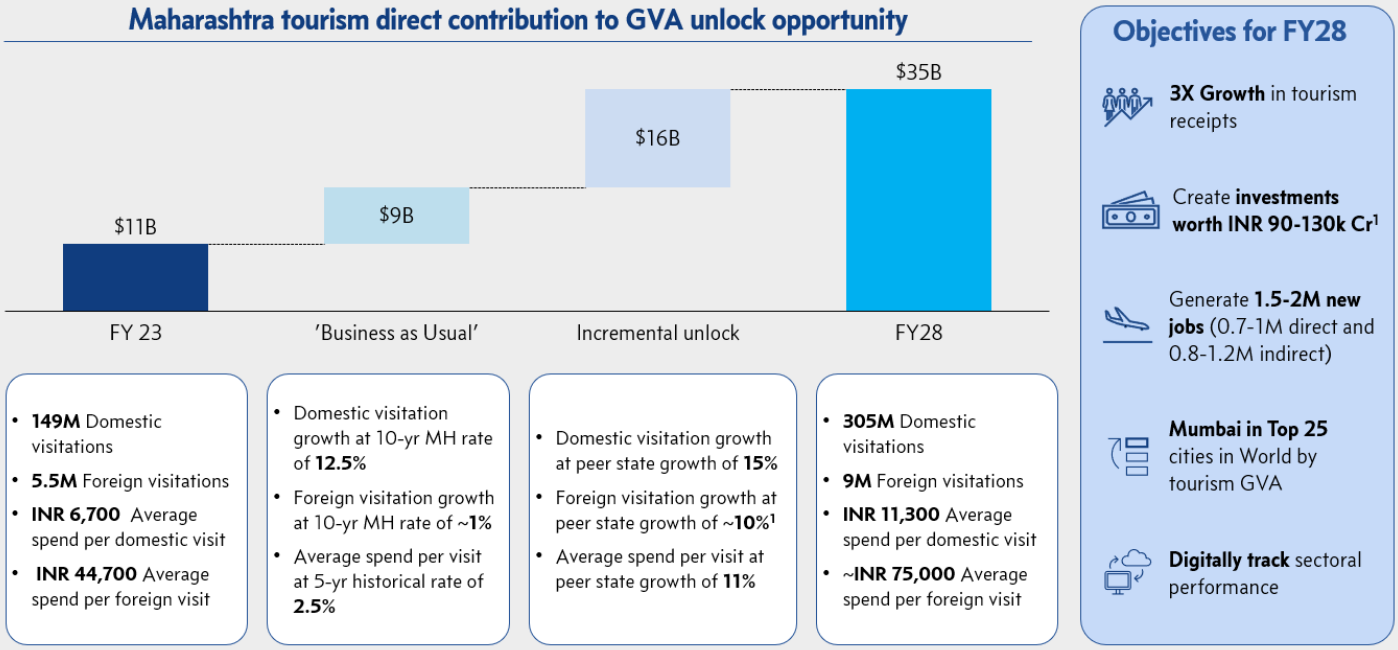
4. Tourism Potential

The tourism industry in Maharashtra can become a significant contributor to the state's economy, while generating considerable employment opportunities. ~80%[174] of employed workforce in the tourism industry learns on the job, highlighting a considerable capacity to **provide job opportunities to unskilled workers and upskill them**.

The direct contribution of tourism industry based on 10-year CAGR (FY10-20) of visitations and spend per visitations has grown at ~13% to reach $11-12Bn by 2023. The industry is expected to directly contribute ~$20Bn by 2028 if it continues to grow at the existing growth rates. However, an incremental potential of $15 Bn can be unlocked by targeting growth rates of peer states for domestic visitations, foreign visitations, and spend per visit.

[172] Source: Tourism & Hospitality Industry in India, Indian Brand Equity Foundation, Nov, 2022
[173] Source: How IGI Airport may emerge as India's first true global hub, Nov, 2022
[174] Source: Skilling up for a Travel and Tourism Recovery Whitepaper, International Air Transport Association (IATA)

Figure 43: Unlock opportunity in Maharashtra tourism's Direct contribution to state's GVA.



Note: 1. Depends on the size of mega project chosen for investment

Sources: 1. India Tourism Statistics, MOSPI 2. National Council of Applied Economic Research 3. WTTC (Average spend per foreign visit taken for FY23 and assumed as 50% of average spend by foreign tourists in India as they travel to multiple states, using bottom spend estimations)

Unlocking additional potential will require the direct contribution of tourism to grow at ~26% in the 5 years (faster than projected India market growth of ~21%) to become 3X of its current size and reach $35Bn by FY28.

5. Strategy to Activate Visitations, Duration of Visit and Spend per Visit

All-rounded approach required to develop mentioned themes in-line with Indian and global benchmarks for driving more visitations, increasing duration of visit, and increasing spend per visit.

A. Further develop 'anchor tourist destination':

- **Definition:** Create and enhance specific locations or attractions within a destination to act as focal points or "anchors" for attracting large number of tourists. For example, Paris is the anchor destination of the most visited country in the world[175], France, and within Paris the Eiffel Tower and Louvre are the anchor attractions.
- **Strategic requirement:** Determine primary tourism theme (business, leisure, cultural and others) that aligns with the destination's unique attributes and target market. Create destination level plans for strong association with the tourism theme by developing mini-cluster or zones.
- **Operational requirement:** Enhance connectivity, increase branded hotel rooms supply, and increase marketing efforts, while ensuring sustainable tourism development by decongesting hot spots and performing upkeep and maintenance activities at key tourist attractions.
- **List of potential anchor destinations in Maharashtra:** Mumbai, Pune, Nagpur, Lonavala, Mahabaleshwar, Shirdi, Nashik, Sambhajinagar, Alibaug, Matheran, Raigad, Kolhapur, Igatpuri, Satara, Ganpatipule, Tarkali, Malvan, Chiplun, Tadoba, Lonar Pench, and Panchgani[176]

B. Develop circuit around anchor sites, centred around key tourism themes: Develop circuits around anchor destinations and create strong association with 7 key tourism themes, agriculture, beach & adventure, heritage, business, pilgrimage, hill stations, wildlife and ecological by offering similar themed experience in proximity (e.g., multiple vineyards in Nashik) for the target audience. Circuits are key to developing multi-day itineraries and enabling incoming tourists to increase number of days spent in the state.

[175] Source: Most Visited Countries 2023, World Population Review

[176] Based on hotel industry inputs and comparative Google search rankings from FY18 to FY23 with respect to the 3rd biggest city in Maharashtra - Nagpur.

Figure 44: Illustrative - Beach Tourism Circuit – How can Konkan transform into 'The Preferred Holiday Destination in India' by offering unique experiences for all types of leisure travellers.

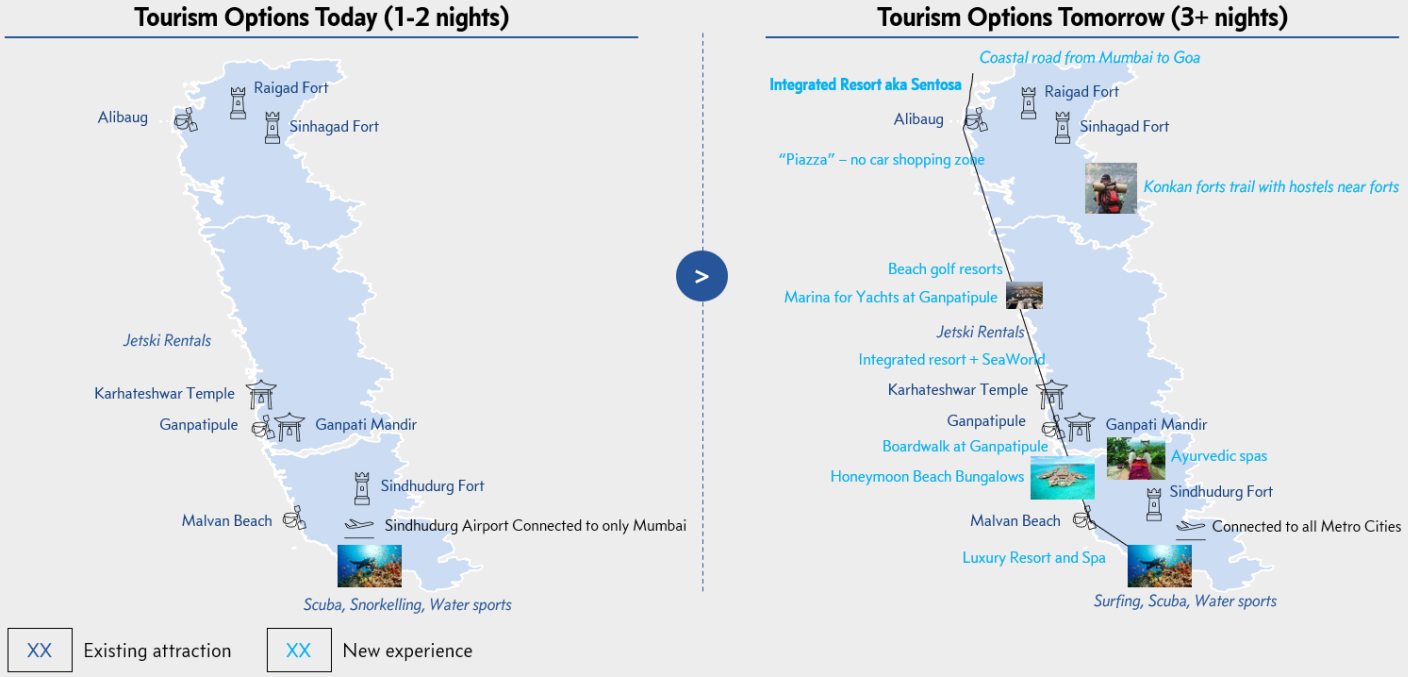
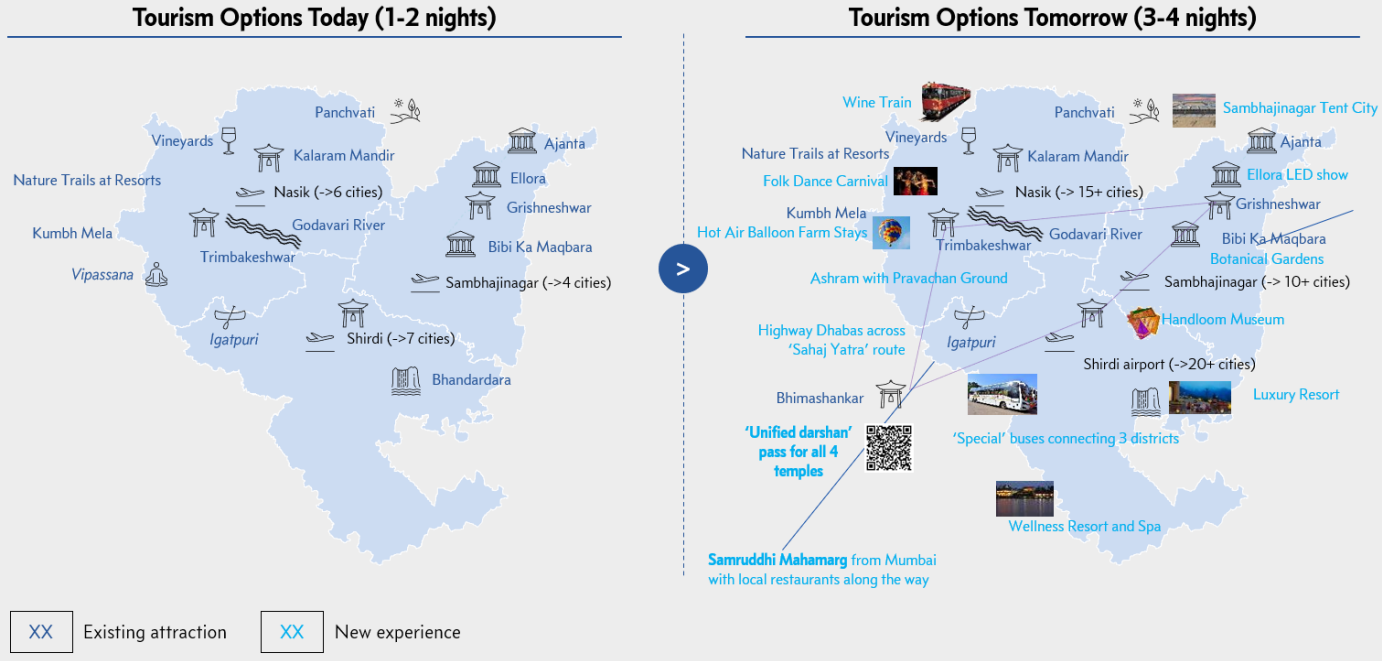


Figure 45:Illustrative - Pilgrimage and Wellness Tourism Circuit - How 'Nashik – Sambhajinagar-Ahmednagar' circuit can become India's biggest pilgrimage and wellness hub.



C. Encourage experiential activities instead of passive sightseeing or photo-taking: Develop more things to do or experiences at destinations to encourage people to visit and spend more, especially to attract more foreign visitations. Experiences to be under the themes of culinary, leisure, live entertainment, adventure, cultural (exploring history), attending festivals or live ceremonies (e.g., aartis at temples), or wellness.

D. Invest in mega projects: Put Maharashtra on the global tourism map and incrementally increase the foreign tourist visitations by investing in world-class tourism attraction. Few examples of such projects

- Integrated Playground Resort ala Sentosa in Singapore
- Bollywood-themed amusement park like Universal Studios or Legoland
- Boardwalk with Marina ala Ocean City in USA
- F1 circuit like Singapore (street circuit) or Dubai (racing circuit)
- Ecological Park like Central Park in New York, Gardens by the Bay in Singapore, or Hyde Park in London

Figure 46: Mega tourism projects to put Maharashtra on world tourism map.

E. Promote Festivals or 'best time to visit': Curate yearlong calendar of events and festivals to drive more visitations and ensure visitors extend stay by 3-4 nights. Tamil Nadu has maximum number of listed festivals on India tourism website with 107 listings, followed by Gujarat at 88 and Karnataka at 37[177].
For e.g., Annual beach Olympics at Malvan beach, inter-district folk dance carnival in Sambhajinagar (to promote Lavani, Gondhal, Tamasha, Povadas, Koli dance) or Shivaji Maharaj theatre month across multiple forts (Panhala, Sindhudurg, Raigad, Shivneri, Pratapgad) and cities to preserve the rich Maharashtrian culture and educate youth about the great accomplishments of Chhatrapati Shivaji Maharaj.

F. Diversify product offerings: Leverage mega trends like wellness tourism, medical tourism, destination weddings, sports tourism, and Bollywood tourism to create dedicated tourism zones and allocate land parcels on lease.
e.g., Leverage Igatpuri's Vipassana centre to convert it into an ecotourism hub with wellness offerings like farm stays, cycling zones, camping sites, yoga parks. The authenticity of tourism zone to be promoted by converting and labelling it as 'plastic-free or carbon-negative zone'.

G. Enable a digital tourist journey: Cover entire lifecycle of the tourist journey from travel inspiration or idea, exploration (research), selection, validation (via reviews and pictures) and purchase, engage, review and share.

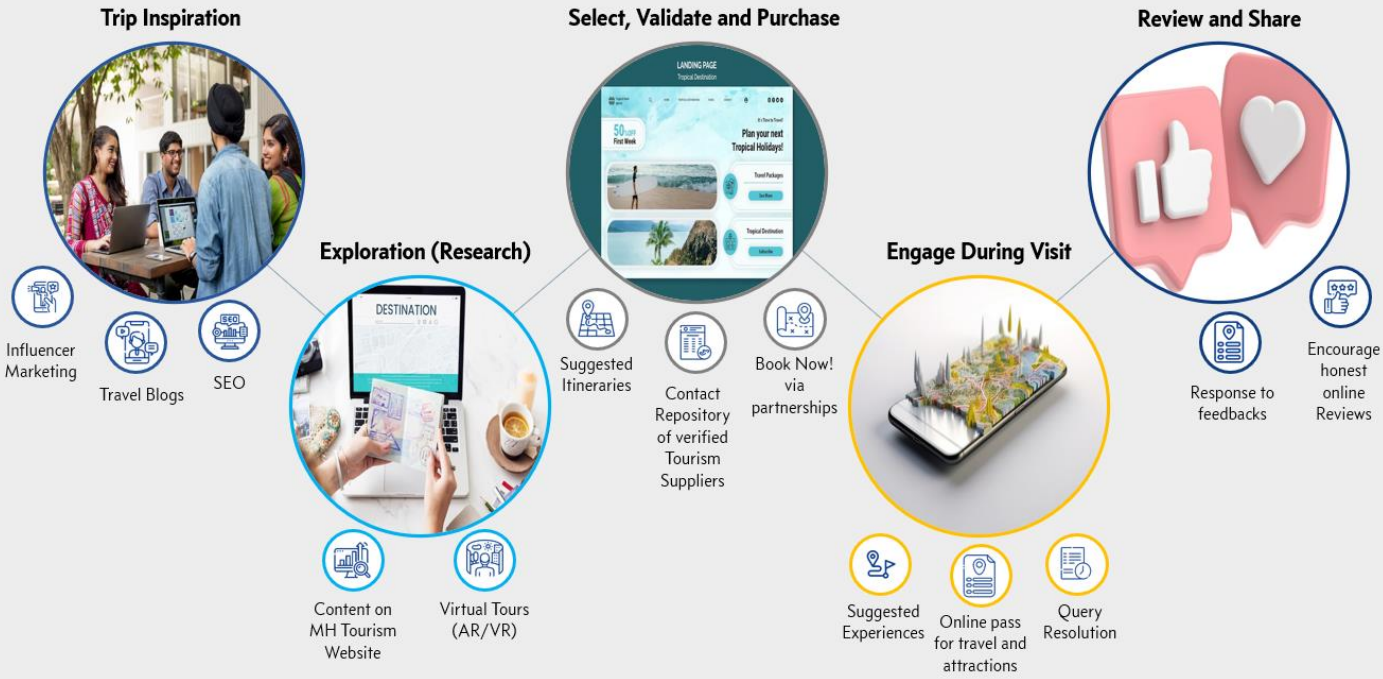
- **Trip inspiration:** Engage in online content creation (in multiple languages with easy to translate services for international travellers) and distribution with the help of marketing agencies across online channels to promote Maharashtra as a tourist destination amongst target audience. For e.g., Karnataka Department of Tourism (KDoT) formed partnership with Social Panga, as its digital marketing partner[178] or Turkey set up a dedicated Türkiye Tourism Promotion and Development Agency (TGA).[179]
- **Exploration:** Develop a content repository (photos, videos, AR/VR/3D tours), like Australia Tourism Data Warehouse (ATDW), and display it on Maharashtra tourism website and a new tourism app to create awareness about various tourism destinations, heritage, and multicultural experiences as part of 'Dekho Apna Desh' and 'Vocal for Local' campaigns. This will help in promoting lesser-known destinations at an India and International level. For e.g., Egypt uses VR technology to promote medical tourism and allow incoming tourists to 'virtually visit the healthcare facilities and evaluate their capabilities' under "We Take Care of You in Egypt" campaign.[180]

[177] Source: Tamil Nadu tourism comes first in number of festivals listed on Union ministry portal, TOI, Nov,2022
[178] Source: One State Many Worlds – Creative Hub
[179] Source: TGA.gov.tr
[180] Source: Egypt uses augmented reality to promote medical tourism, Al-Monitor, Jun, 2023

- **Select, validate and purchase:** Act as the trusted resource for Indian and international travellers where they can discover suggested itineraries, contact trusted tourism suppliers of the state (hotels, travel agents, bus operators, adventure sport guides) and directly book or make bookings. This can be enabled by forming partnerships with 3rd parties and travel agents, promoting MSMEs in the state. For e.g., Goa, Kerala[181], and Cape Town[182] tourism mobile applications allow tourist to book itineraries, hotels, activities, transportation.
- **Engage during visit:** Allow tourists to buy online travel passes covering multiple destinations and suggest local experiences (things to do – art workshops, cycling, restaurants). Additionally, enable online query resolution (via call and chat) through existing Tourist Information Offices, of the state Department of Tourism. For e.g., Goa tourism mobile application allows tourists to join a WhatsApp group for query resolution.[183]
- **Review and share:** Encourage tourists to give honest and constructive feedback on online platforms to generate positive word of mouth or suggest improvement about tourist sites in Maharashtra. Provocatively reply to visiting tourists' feedback on social media channels.

A further deep dive is required here to develop a roadmap, assign ownerships, and select the digital capabilities to be built for Maharashtra Tourism's digital tourist journey initiative.

Figure 47: Enabling a digital tourist journey in Maharashtra.



6. Key Enablers to Achieve Potential

A. Enhance connectivity:

- **2-2.5X increase in incoming flights** to the state and especially at tier-2 airports (Sambhajinagar, Nashik, Shirdi, Kolhapur). Revive non-operational airports at Akola, Amravati, Dharashiv, Gondia, Latur, Jalgaon, Nanded, Sindhudurg, Solapur, Yavatmal. Additionally, the feasibility to add another airport in Ratnagiri must be evaluated, to promote tourism along the Konkan coast as currently Ganpatipule (major tourist attraction in Ratnagiri) is 4-5 hours away from nearest airports at Kolhapur and Sindhudurg.
- **Build multiple marinas** along the Konkan coast to enable cruise tourism.
- **Invite major airlines and cruise companies** to set up base in Mumbai and enable it to serve as regional transit hub for airlines and cruises, following Singapore's example.
- **Increase train connectivity** to all district headquarters.
- **Improve quality of intra-circuit roads** and MSRTC bus fleet towards tourist attractions.

[181] Source: Kerala Tourism Official mobile application
[182] Source: Official Guide to Cape Town
[183] Source: Goa Tourism Travel Guide

B. Create enabling tourism infrastructure and perform upkeep:

- **Create dedicated tourism zones** (monetize land banks) by offering underutilized government land on lease for mega tourist projects.
- **Create special Tourism Infrastructure Development Funds** via public private partnerships (PPP) for local tourism projects at district level.
- **Improve infrastructure and cleanliness** at tourist sites by enabling footpaths, signage, availability of drinking water or vendors, tour guides, toilets, garbage bins. For example, Karnataka tourism policy offers support to private players of up to 20% of the eligible project cost or a maximum of INR 25 lakh for developing complementary infrastructure like roads, sewage disposal, power, and water connectivity.[184]
- **Establish beach cleaning programs** & increase waste management infrastructure investments at key beaches.
- **Initiate tourist travel passes** to allow tourists to discover and easily access local tourist attractions. Like the 'Discover Kolkata' integrated city pass that allows access to 21 tourist sites in the city.[185]
- **Provide additional incentives to hotels to build EV charging facilities** and procure EV buses like UP and Gujarat tourism policies.

C. Accelerate decision making and inter-department coordination (Ease of Doing Business):

- Set up a layered and decentralized tourism governance mechanism at state and district cluster level:
  - **High Powered Committee** to ensure timely approval, including on project deviations (land use restrictions, net worth criteria, project timelines, complimentary infrastructure development) and implementation of major projects above a defined investment and employment threshold.
  - **District Tourism Council under District Collector** and include district heads of respective departments (revenue, forest, tourism, industries, police, transport, irrigation, planning) on a need basis to develop new tourism products, coordinate with departments on new and existing projects, provide project management support on the ground and address grievances of private sector players. The district council must be empowered to approve projects, incentives, subsidies, and concessions up to a pre-defined threshold amount, without escalation to the high-powered committee.
  - **Tourism Investor Cell** to organize conferences to promote Maharashtra as tourism investment destination, reach out to private sector investors (like how Rajasthan government sends proposals), organize bidding processes to channel new investments, valuations & business modelling, and enable carve-outs. Additionally, Maharashtra must evaluate if the cell should be chaired by the CM or the tourism minister.
- **Define roles and responsibilities:** Clearly segregate roles of all departments to avoid any confusion and enable faster decision making.
- **Ensure single window clearance** for mega projects, live events (one stop hassle free licensing approvals) and other tourism projects based on investment size and employment generation requirements. The implementation of single window must follow the example of Odisha government, where the state executes all the clearances and approvals required from all ministries or from Rajasthan government, which has an average decision time of 67 days for 700+ tourism investment projects in the state projects.[186]
- **Effective utilization of online portals:** e-Samiksha and Gati Shakti portals for monitoring and query resolution:
  - New projects - Track status and approvals of application status with estimated time to completion for private sector investors.
  - Existing projects - Track actions taken on key decisions taken during last meeting.
- **Increase decision making and review meetings' frequency:** Weekly, bi-weekly, monthly, and bi-monthly meetings depending on two factors:
  - Investment size and employment potential of the project.
  - Degree of inter-department coordination required.

[184] Source: Karnataka Tourism Policy, 2020-25
[185] Source: Discover Kolkata: QR code-based 'Integrated City Pass' to be introduced, Dec 2022
[186] Source: Single Window Clearance System, Government of Rajasthan

- **Establish program management office:** Build detailed workplans with milestones, follow up on progress, schedule meetings, report achievements and escalate potential risks.
- **Setup rewarding committee:** Set up a committee to give quarterly awards to departments and individuals for timely and on-budget completion of projects.
  - **Group or team rewards:** Give recognition on Maharashtra government's website and give additional travel budgets to select winning departments.
  - **Individual awards:** Reward individual winners with preferred inter-department movements and making them eligible for early promotions.
- **Enable inter-department revenue sharing:** Evaluate giving a pre-agreed percentage of ticket sales and GST collection at major tourism sites with all the co-ordinating departments. For example, Receipts from fort tourism to be shared with tourism, ASI (Archaeological Survey of India), and forest departments.

D. Facilitate skill development:

Facilitate skilling for tourism industry to establish a benchmark for global hospitality industry:

- **Skill development task force:** Overview overall skill development progress and gaps for tourism industry in the state. The task force to have representations from hotel industry, service industry (e.g., JLL or CBRE), tour guide association, travel operator association, archaeological survey of India (ASI).
- **Extend tourism policy support** on capital investments and operating expenditures to hotel management institutes and food craft institutes to encourage setting up of new establishments and upgrading infrastructure of existing institutes. In-line with Uttar Pradesh's Tourism Policy 2022.[187]
- **Partner with hospitality groups** to set up skill development centres and deliver short 30-45 days immersive practical courses. For example, IHCL's partnership with MP Tourism that offers 45-day Bridge Program on basics like communication and personality skills, body language and grooming.[188] Similarly, players like Imagicaa, that trained 6,000+ works till date, can pioneer training for amusement parks.
- **Rewards and recognition:** Give annual recognition and rewards to top-10 customer centric hotels at district and at overall Maharashtra level. For example, Tamil Nadu Tourism gives annual awards under ~50 categories to tour operators, accommodations, travel partners, airlines, restaurants, MICE.[189]
- **Women self-help groups:** Empower women self-help groups across 10 pilot 'talukas' and deliver trainings for entrepreneurial ventures in hospitality services – hosting farm stays, producing local handicrafts, taking cooking classes in local cuisines like Kerala's and Goa's approach.[190]

E. Empower on-ground execution:

- **Serve as a resource for Maharashtra tourism suppliers** by providing content (pictures and videos of nearby experiences like Australia tourism's Digital Tourism Data Warehouse[191]), advice, awards, funding, research, customer insights, suggested itineraries, and marketing toolkits to promote tourism in Maharashtra.
- **Develop quarterly Maharashtra tourism reports** (like Gujarat tourism's Aatithyam dashboard for tourist data[192]) on number of visitations, their place of origin, transport mode, number of rooms, duration of stay, average spend per visitor, number of flights to Maharashtra by each airport, tourism receipts and employment generation. Engage a market research firm to survey tourists and collect visitation data.
- **Foster travel-hospitality partnerships:** Develop business matching programs and organize conclaves for developing new tourism products and pricing packages for the destination. (For e.g., in Dubai, Emirates governs airline industry and provides additional consolidation to the tourism industry, having invested in hotels and tourist attractions)

[187] Source: Invest UP, Tourism Policy 2022
[188] Source: IHCL partners with Tata Strive and Madhya Pradesh Tourism Board for a skill centre in Gwalior, IHCL, Jan, 2023
[189] Source: TN Tourism Awards
[190] Source: Kudumbashree Kasaragod District Mission launches 'Yathrashree', May, 2022
[191] Source: ATDW
[192] Source: Gujarat govt launches Aatithyam dashboard for real-time tourism data, Desh Gujarat, Mar, 2023

- **Bring all tourism associations together** under one roof and engage them in state and district level decision-making like Kerala's – The Confederation of Kerala Tourism Industry[193].

F. Promote Maharashtra tourism:

- **Articulate a compelling vision for Maharashtra tourism** at a district and overall state level to ensure inclusive and sustainable tourism growth with measurable goals and defined milestones.
- **Orchestrate engaging social media campaigns via digital marketing agencies**, conduct Maharashtra tourism roadshows in prospective domestic and international destinations, and allocate budgets to encourage both government and private sector players to attend international tourism promotion conferences.
- **Create engaging, informative website for Maharashtra tourism** with attractive images, videos, suggested itineraries, verified travel companies and other tourism suppliers' contact details and options to book now via partnerships with travel aggregators and IRCTC.
- **Give additional incentives to hospitality associations** to organize fairs and festivals, like Gujarat government's 2021 tourism policy that encourages tourism fairs in rural areas.
- **Develop film and TV promotion funds** to incentivise content creators to feature Maharashtra's key tourist attractions in Bollywood, Hollywood, Tollywood, and film industries popular in the targeted incoming states and countries.
- **Partner with School Education and Sports Department** to organize a minimum of one trip per school in a year to wildlife sanctuaries to encourage biodiversity conservation and promote ecological tourism (for e.g., Jawaharlal Nehru Bustard Sanctuary in Solapur). Maharashtra has a mandatory policy for one farm visit per year to promote agro tourism and can leverage more such policies to boost tourism in the remote locations.[194]
- **Work with government departments for launching new LTC packages** to promote newly developed or existing underutilized tourist destinations in the state. For example, Gujarat government collaborated with IRCTC to launch a 11-day LTC tour package for government employees and initiate a 1-day "Hari Hara Darshan with Statue of Unity" train from Madurai to promote it and other tourist destinations in the state.[195]

[193] Source: Kerala's travel trade unite under one association, Aug, 2020
[194] Source: Maharashtra's Agri-Tourism Push: Over 500 farms recognised as agri-centres, CNBC TV18, Nov, 2022
[195] Source: Hari Hara Darshan with Statue of Unity: Check details of IRCTC's tourism package to Gujarat, News9, Nov, 2021

Proposed Model for Developing 'Mumbai 2.0' - A Top 25 Global City (similar model to be developed for all cities)

As per WTTC, Mumbai was ranked 60th city in the world by tourism's direct contribution to GVA, ~$3.5Bn by FY23[196], comprising ~33% of Maharashtra's tourism industry. For tourism industry's direct GVA contribution to be ~$35Bn by FY28, Mumbai's contribution must also be over ~$12+Bn (to maintain ~33% share). To enable this growth, the following actions are required on top of state-wide enablers:

A. Develop 'anchor destination' by improving connectivity through air, water, rail, and road, while also developing planned leisure and business zones in small and distant clusters, avoiding city congestion, to accommodate new hotels and expand the existing branded hotel room inventory from ~13,600[197] to ~30,000 in FY28.

B. Develop 'things to do' and promote events:

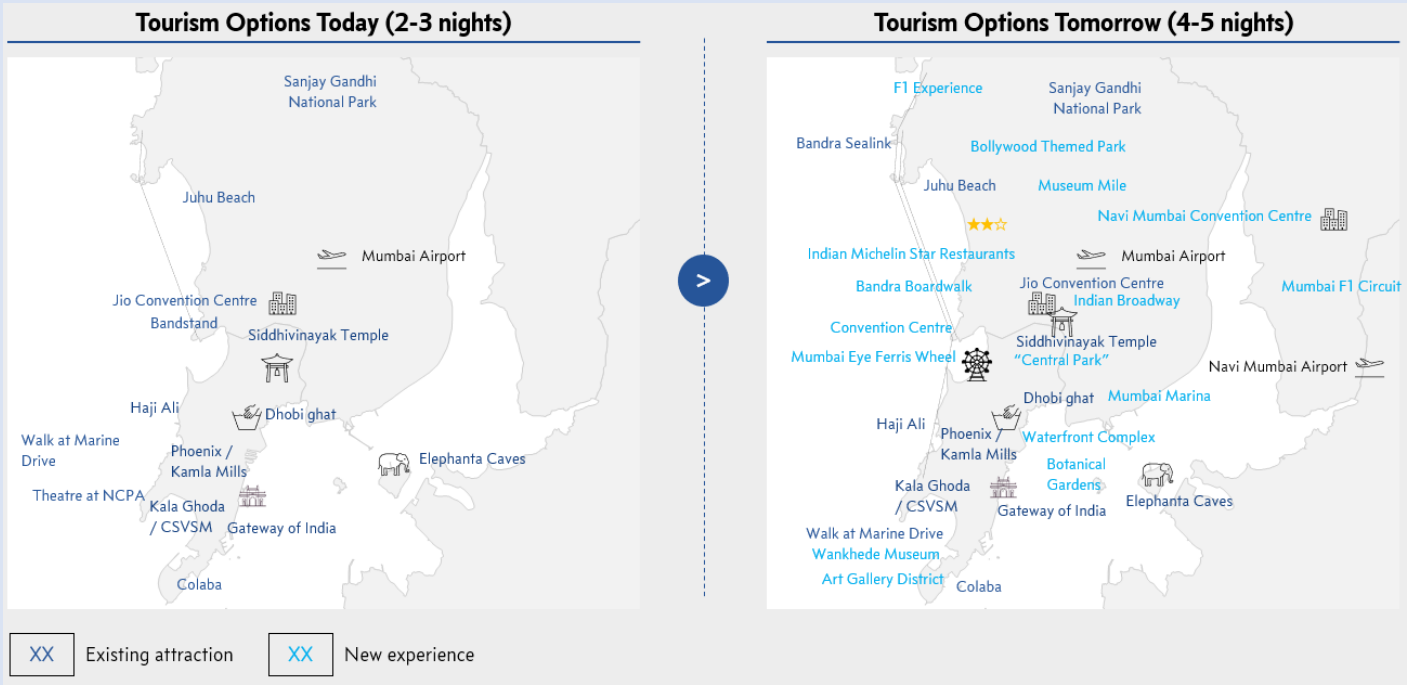
- **Experiences:** Incentivize and enable private sector to develop 'things to do' for culinary (celebrity, Michelin chef restaurants, local cuisines), shopping (zones for homegrown brands and MSMEs), cultural (NCPA, Prithvi), entertainment (boardwalk, Mumbai eye Ferris Wheel).
- **Develop lit up open and green spaces** to encourage locals and tourists to stroll (e.g., used by Singapore to promote as 'Garden City')
- **Calendarized events:** Develop a steady calendar of 50+ annual events ranging from conferences, music festivals like Lollapalooza, marathons, Ganpati festival, and film festivals.

C. Invest in mega tourism attractions to entice international crowd and from other states to visit Maharashtra across 4 major themes with illustrative examples of projects to undertake like Bollywood theme park for leisure, botanical gardens like 'Gardens by the Bay' for wellness, cricket museum at Wankhede for culture, and convention centers like Jio World at Navi Mumbai for business.

D. Enhance tourist experience:

- **Physical experience**: Perform upkeep at key tourist sites (including beaches) and give incentives to existing tourism players to upgrade basic infrastructure like building parking, installing signages, conducting repairs.
- **Digital experience**: Install immersive QR-codes at key sites to function as virtual guides and launch a 'Hop-on Hop-off pass valid across all major destinations and transportation options in the city.

Figure 48: Illustrative - 'Mumbai 2.0 to have a plethora of 'urban leisure', MICE, wellness and cultural tourism attractions and experiences.



[196] In FY19, Mumbai's tourism direct GVA was $2.9 Bn, growing at 3% to reach ~$3.5Bn by FY23. Source: City Travel and Tourism Impact Graphics Report Dec 2019, WTTC

[197] Source: Indian Hotel Industry – Performance review, CARE Ratings, Apr, 2020

7. Investments Required to Achieve Tourism Objectives

Achieving targets set will require sustained efforts, investments, and promotion from the government and private sector stakeholders. The state will need an investment of ~$13-19Bn (INR 90-130k crores depending on the mega projects the state government finalizes) across:

A. **Hotel rooms:** 2X increase in the hotel room capacity of the state from ~110-120k to 230-250k, through an investment of $10-12Bn (INR 80-90k crores) over the next five years. The investments to be led by private sector players and enabled by the government via Public-Private Partnership (PPP) model.

B. **One mega tourism project:** Put Maharashtra on world tourism map by developing a mega tourist attraction. Investment needed to develop a mega project, would vary based on type of project. Examples of potential scale of investments are:

- **Bollywood theme park:** ~INR 2,100 crores[198]
- **F1 circuit**: ~INR 18-20k crores with annual recurring license fee of INR 500 crores[199]
- **Resort town like Sentosa**: Genting Singapore spent S$5.2Bn (S$600 Mn land costs included) in 2007 (an estimated INR 30-40,000 crores in present value) to build resort world including – multiple theme parks including Universal Studios, Maritime Xperiential Museum, amphitheatres, spa centres with 42 villas, 1,800+ room hotel and MICE centre.[200]
- **Ecologic Park**: In 2012, Singapore government spent S$1 Bn (estimated to be INR 6,000-8,000 crores in present terms) to build 'Gardens by the Bay', a 200–250-acre development similar to Central Park in New York, or Hyde Park in London.[201]

Indian examples of mega tourism projects include redevelopment of Ayodhya, estimated to cost INR 30,000 crores by FY47, with 60% spend by state government[202], Statue of Unity built for INR 3,000 crores[203] and Kashi Vishwanath redevelopment estimated to cost INR 1,800 crores for all 27 projects in the area.[204]

A further deep dive is proposed here to evaluate 2-3 suitable mega projects to boost tourism in Maharashtra. The project will require collaboration with central government for budgets, connectivity, and speedy approvals as part of boosting overall tourism in India.

C. **Restoration of forts:** Pilot fort restoration project of five forts in Maharashtra by restoring fort walls, putting up basic infrastructure like information centres, restrooms, dustbins nearby and by adding more 'things to do'. The restoration will be in-line with the ongoing efforts (INR 600 crores) at the Raigad fort.

D. **Boost pilgrimage tourism:** Investments in developing all five Jyotirlingas in the state, starting with a pilot at Jyotirlingas along the 'Samruddhi Mahamarg' expressway - Trimbakeshwar (Nashik) and Grishneshwar (Sambhajinagar) along the same lines as Kashi Vishwanath restoration in Varanasi for INR 900 cr.

E. **Addition of new MSRTC buses:** As per Maharashtra state tourism survey of 2010, ~60-65% of domestic tourist visitations to Maharashtra come via buses. Therefore, to support the growth of domestic visitations and serve ~305M tourists annually, the government needs an influx of additional buses. In FY20, the MRSTC used a fleet of ~3,000 buses operating at a load factor of 50-60%[205]. Hence an estimated ~2,000 more additional buses (assuming 65-75% load factor) are required to support 180-200Mn total domestic tourists traveling via bus with an investment of ~INR 1.5 Cr.[206] per bus, equating to a total of ~INR 3,000 Cr. However, MSRTC and state government have already announced plans to add another 7,000 buses[207] to its fleet and additional deep dive is required here to determine the exact buses to be bought and their respective routes.

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[198] As per similar investments planned in Kandivali, Mumbai for INR 1,700 crores in 2018, whose present value is estimated to be around INR 2,100 crores
[199] Based on INR 9-10k crores spent by Jaypee Group to build Buddh International Circuit and another INR 200-300 crores for hosting race annually in 2011
[200] Source: Singapore Tourism Board
[201] Source: Decision to build Gardens by the Bay not an easy one: PM Lee, Jun, 2012
[202] Source: Rs 30,000 crore to be spent on Ayodhya development, TOI, Oct, 2022
[203] Source: Standing tall in unity, Deccan Herald, Aug, 2022
[204] Source: Public ropeway near Kashi corridor among 28 projects launched by PM Modi in Varanasi, TOI, Mar, 2023
[205] Source: MSRTC Administration Report, 2019-20
[206] Source: BEST inks Rs 3,675 crore deal, India's biggest to get 2,100 e-buses in 12 months, TOI, May, 2022
[207] Source: MSRTC to add over 7,000 new buses to its fleet, Hindustan Times, Nov, 2022

Though, ~80% of these investments (hotels and mega tourism project) will be channelled-in by the private sector, the government (state and central combined) will also need to make an investment of $2-4Bn or (INR 15-30,000 Cr.). During FY22, Maharashtra government spent INR ~2,000 Cr. or 0.4% of its state budget on tourism, with more than 85% of this amount being revenue expenditure. To achieve the growth vision of 2028, the state will need to allocate 2-4X more funds to tourism, in-line with other states (e.g., Gujarat spends ~0.7% of its state budget on tourism with 4X higher capital outlay vs. Maharashtra).

8. Impact of Driving up Tourism GVA

The investments proposed in the previous section of ~$13-19Bn (INR 90-130k crores depending on the type of mega project the state government selects) has a potential to

- **Generate 1.5-2Mn new jobs** in the tourism industry by 2028 with 8 direct jobs per INR 1 crore of investment.[208] (~0.7-1Mn direct new jobs and ~0.8-1.2Mn indirect new jobs). Additionally, it can function as an assured employment option for farmers in rural areas.
- Increase Maharashtra and India's forex earnings by contributing **$8+ Bn in annual foreign tourist spend.**[209]

[208] Based on estimates and MoUs signed by other state governments: e.g., UP government in Feb 2023

[209] Forex earnings refers to the receipts earned from foreign visitors spend in Maharashtra. Annual foreign visitations in Maharashtra expected to be 8 - 9M in FY28 from current levels of 5.5M and average spend per foreign visitor projected to be ~INR 75,000 from the current levels of ~INR 45,000. Hence, if Maharashtra achieves its tourism's objectives, projected forex earnings from tourism can grow to ~$8 - 10Bn from current levels of ~$3 - 4Bn.

Trade and Retail

Services - Trade & Retail

1. Executive Summary

Trade and Retail[210] contributed 9% of state's GVA amounting to $33Bn in FY22, and it has grown at a CAGR of 9% between FY14 and FY22[211]. Further, the sector generates employment for 28 persons per INR Cr of GVA. Retail is dominated by 'Kirana' stores which employ ~4Mn people in Maharashtra. The sector is showing promising growth driven by both strong demand due to rising income levels and consumerism as well as supply side factors such as shift from unorganised to organised retail and emergence of e-commerce platforms. However, traditional retailers are facing headwinds such as shifting consumer preference towards online, adoption of digital solutions, modernization of supply chain and congested retail spaces preventing expansion.

Key challenges

Based on district immersions and discussions with industry experts, key challenges faced by trade and retail participants, especially MSMEs, include:

- **Access to credit:** MSME traders and retailers face challenges in accessing credit from financial institutions due to lack of collateral and lenders' reluctance to extend loans to unorganised segment players.
- **Low technology adoption:** Traditional traders and Kiranas lag in adoption of digital tools and integration with marketplace platforms as they are constrained by lack of capital, technology capabilities and awareness.
- **Inadequate infrastructure:** Lack of affordable land parcels for commercial purposes in major urban centers and limited space for expansion for existing retail spaces combined with inadequate logistics infrastructure.
- **Unexplored export opportunities** due to lack of awareness of export processes and compliances, inadequate support for marketing and demand generation and inefficient processes for export related clearances.
- **Emerging skill gap** in Trade and Retail sector with adoption of technology and emergence of new retail formats (e.g., store operations, accounting and inventory management, usage of digital tools).

Summary of key interventions and enablers

Focus areas	Key interventions and enablers proposed
Access to credit *(detailed in MSME enablement)*	• Promote financial institutions (e.g., NBFCs, fintechs) to **provide retail focused credit products** (e.g., Point-of-Sales linked) • Enable adoption of account aggregator framework and OCEN[212] to deliver data-backed credit • Capitalise on **priority sector lending benefits and credit schemes** via existing network of banks • Develop **credit card programs** for focused groups to provide **short-term unsecured credit** • Drive **adoption of TReDS and invoice financing platforms** • Drive **financial literacy** by partnering with retail associations, leading retail industry players & financial institutions
Technology adoption	• **Adoption of digital tools:** Explore **incentives** to drive adoption of digital tools (e.g., accounting, inventory management solutions) by retail MSMEs and technology providers • **Online marketplaces:** Encourage wholesale and retail trade participants to onboard on national platforms like **ONDC** (Open Network for Digital Commerce) enabling MSMEs and small traders to access online commerce, **GeM portal** for government procurement, **India Business portal** for connecting with international buyers.
Infrastructure	• Ensure **dedicated retail zones** near demand centers in **integrated infrastructure master plan** and urban master plan

[210] Classified as trade and repair services

[211] The data presented above for FY14-FY22 takes into consideration the negative growth experienced during the Covid period. Covid Era defined as a period between April 2020- March 2022

[212] Open Credit Enablement Network

Export facilitation	**Awareness of exports processes and compliances** • Create **information repository** of exports related requirements and and make it accessible via online portals with chatbot or AI powered interface. **Marketing and demand linkages** • **Encourage set up of export houses** in proximity to select manufacturing clusters • Provide financial assistance to organize and participate in export promotion events; enhance state level schemes and accelerate implementation of central schemes **Ease of doing exports** • Drive adoption of **global certification programs** (e.g., AEO Program[213]) and develop **state level certification programs** providing benefits such as faster customs processing & dispute resolution • Enable single window system for all export related clearances along with central government
Skill development *(detailed in skill enablement)*	• **Leverage central government initiatives** i.e. Retail Sector Skill Council, NSQF[214] and **state level skilling schemes** to deliver trade and retail focused training • **Encourage local Trade and Retail associations to partner with training institutes** and offer retail focused training programs

[213] Authorised Economic Operator (AEO) is a programme under World Customs Organization (WCO) to secure and facilitate Global Trade. Source: AEO India
[214] National Skill Qualifications Framework

2. Overview

Trade and retail sector occupies an important position in the national economy contributing 10% to India's GVA. The retail market is primarily unorganized, with estimated 80+% share of overall market (as of 2021) and consisting of around 12 - 13 million 'Kirana' and neighbourhood stores[215]. In addition to employing more than five crore workers in the country, the sector also provides significant indirect employment to adjacent sectors such as warehousing, logistics, construction, and packaging. With CAGR of 9%, trade & retail is one of the fastest growing sectors driven by both strong demand due to rising income levels and consumerism as well as supply side factors such as shift from unorganised to organised retail and emergence of e-commerce platforms. However, traditional retailers are facing headwinds such as shifting consumer preference towards online, adoption of digital solutions, modernization of supply chain, congested retail spaces preventing expansion, among others.

For Maharashtra, GVA of trade and repair services is $33Bn as of FY22 which is 12% of India's trade and repair services GVA and 9% of state's total GVA (vs 12% sector contribution for Gujarat and Tamil Nadu). The sector in the state has been growing at CAGR of 9% between FY14 and FY22, along the lines of overall India growth. Further, the sector generates employment for 28 persons per INR Cr of GVA. Retail is dominated by 'Kirana' stores which employ ~4Mn[216] people in Maharashtra.

Figure 49: Trade and Repair Services GVA at current prices, FY22

Top States	GVA FY22 (% share of India)	% share of total GVA
Maharashtra	$35 Bn (12%)	9%
Gujarat	$28 Bn (9%)	12%
Tamil Nadu	$31 Bn (10%)	12%
Karnataka	$22 Bn (7%)	9%
Uttar Pradesh	$20 Bn (7%)	8%
India	$300 Bn	10%

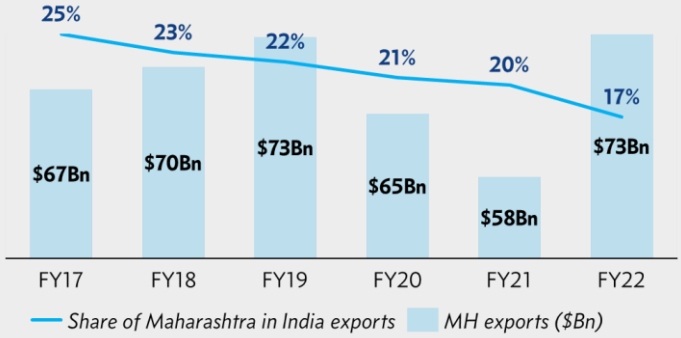
Note: GVA includes wholesale and retail trade in all commodities whether produced domestically, imported or exported; Conversion rate: USD 1 = INR 70; Source: MOSPI

International trade

India aims to achieve exports target of $2 Trillion by 2030, with $1 Trillion in merchandise exports and remaining as services exports, requiring an export growth of 14.5%. To support India objectives and achieve $1Tn GDP target of the state, Maharashtra also needs to increase manufacturing exports at a CAGR of 19% from ~$14Bn in FY22 to ~$40 Bn in FY28 and agricultural exports at a CAGR of 20% from $2Bn in FY21 to ~$8Bn in FY28 (as estimated in manufacturing and agriculture section). While India and the state need to develop competitiveness in production of goods and services, trading activities would need to enable access to global markets.

Maharashtra has strategic advantage in international trade due to its geographical location and houses two major ports - Mumbai Port and Jawaharlal Nehru Port Trust (JNPT). Exports from Maharashtra amounted to $73 Bn in FY22, representing ~17% of India's total exports. However, share of Maharashtra in India exports has declined from 24% in FY17 to 17% in FY22. Thus, Maharashtra would need to strengthen its policies, processes, and infrastructure to boost exports from the state.

Figure 50: Annual exports from Maharashtra



3. Key challenges and interventions

Based on district immersions and discussions with industry experts, key challenges faced by trade and retail participants, especially MSMEs, include:

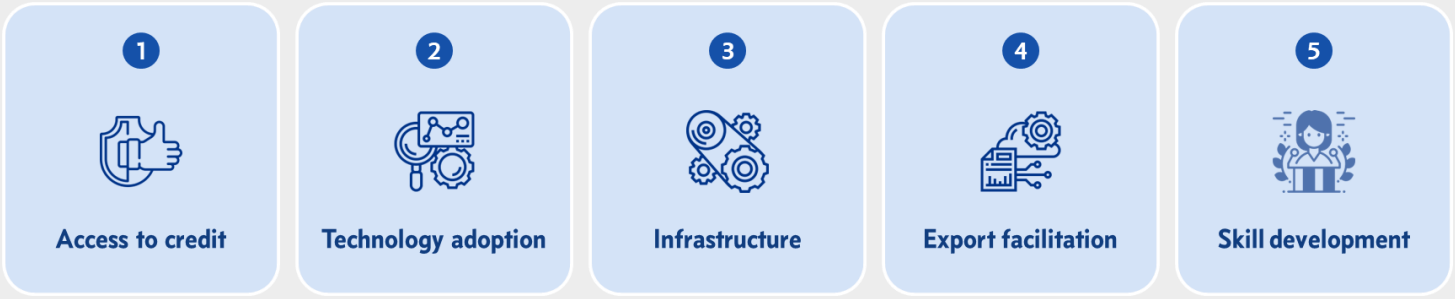
- **Access to credit:** MSME traders and retailers face challenges in accessing credit from financial institutions due to lack of collateral and lenders' reluctance to extend loans to unorganised segment players.

[215] Source: Modernization of Kirana Stores in India, Invest India, April 2021

[216] Assumptions: Maharashtra share of ~10% of India's kirana stores (based on state share in number of MSMEs in India) * average employee count per retailer of ~3 Source: How India's 12M Kirana stores becoming cornerstone of growth plans of Reliance Retail, Amazon, Flipkart, Financial Express, July 2020; MSME Annual report, Government of India, 2022-23

- **Low technology adoption:** Traditional traders and "Kiranas" lag in adoption of digital tools and integration with marketplace platforms as they are constrained by lack of capital, technology capabilities and awareness.
- **Inadequate infrastructure:** Lack of affordable land parcels for commercial purposes in major urban centers and limited space for expansion for existing retail spaces combined with inadequate logistics infrastructure.
- **Unexplored export opportunities** due to lack of awareness of export processes and compliances, inadequate support for marketing and demand generation and inefficient process for export related clearances.
- **Emerging skill gap** in Trade and Retail sector with adoption of technology and emergence of new retail formats (e.g., store operations, accounting, usage of digital tools).

To address the challenges and enable sustainable growth of trade and retail sector, policy interventions have been detailed along five key dimensions – access to credit, technology adoption, infrastructure, export facilitation and skill development.



Detailed in 'MSME enablement'

Detailed in 'Skill development'

3.1 Access to credit

The credit gap for retail sector in India is estimated to be $69Bn (INR ~5 L Crore)[217] based on IFC report. More than **70 percent** of the finance requirement by MSMEs is for **working capital** which is typically required on-demand, has shorter tenures and lower amounts. Less than **15%** of MSMEs are formally registered, with a bulk of them being in the retail sector, making it challenging for banks and other lenders to ascertain creditworthiness and extend loans without collateral or other guarantees[218].

Key interventions

As detailed in MSME enablement section, initiatives to improve access to credit to MSMEs are -

- Partnership with financial institutions (e.g., NBFCs, fintechs) to develop retail focused cash-flow based lending products (e.g., Point-of-sales linked)
- Enable adoption of **Account Aggregator framework** and **Open Credit Enablement Network**[1] to deliver data-backed unsecured credit
- **Capitalise on priority sector lending benefits and credit schemes**[219] leveraging existing commercial and cooperative banks network
- Develop **credit card programs** for focused groups like 'Kiranas' to provide **short term unsecured credit** (e.g., Kisan credit card, weavers credit card scheme)
- Drive **adoption of TReDS** and government invoice financing platforms (e.g., GST Sahay, GeM Sahay)

These efforts should be combined with **formalisation of unorganised retailers** (i.e., GST and Udyam registration) and **financial literacy campaigns** to educate Kiranas about available loan products and benefits of obtaining formal credit. State can **partner with retail associations, leading industry players** (e.g., Hindustan Unilever[220]), financial institutions (e.g., cooperative banks, fintechs like payment aggregators) for driving awareness.

[217] Credit gap for MSME is ~INR 16 L crore of which retail accounts for 30%. Source: International Finance Corporation Intellecap Report 2018
[218] Source: National Retail Policy: to enable the next wave of retail growth, Kearney
[219] Retail and wholesale trade MSMEs were included in definition of MSMEs via notification in July 2021 allowing them to register on Udyam portal for the purposes of priority sector lending under RBI guidelines
[220] Source: The Unilever app helping retailers in India go digital, Unilever

3.2 Technology adoption

Organized retailers and e-commerce players are embracing new-age digital technologies to boost consumer engagement and optimize supply chains, capturing higher share of market. Although traditional retailers (Kiranas) will continue to remain strong with expected market share of 65%, due to inherent advantages such as local presence, credit facilities, distributor-driven stock availability, and personalized customer interactions; they would need to embrace technology to remain competitive.

A. Adoption of digital tools

Traditional traders and 'Kiranas' lag in adoption of digital tools and solutions such as accounting and tax payment solutions, Point of Sale systems for billing, inventory management solutions, customer analytics, which can improve efficiency of their operations. As per Draft National Retail policy, less than **25%** of Kirana stores use **digital platform or tools,** and this is **primarily restricted to** digital payments[221]. They are constrained by lack of capital, technology capabilities, and awareness.

Key interventions

- As suggested in Draft National Retail Policy, state should explore setting up an **integrated portal offering digital solutions** by service providers at affordable prices. State can also provide **incentives for adoption** of these tools to traditional retailers and Kiranas. For this, state can create **focused schemes for retail MSMEs** along the lines of technology upgradation schemes for manufacturing MSMEs[222]. Singapore government has adopted retail focused initiatives to help small retailers digitise their operations.

Case study: Digitisation of retail industry – Singapore government initiatives

- **Retail Industry Digital Plan[223]:** Singapore Government rolled out plan to help small retailers digitize their operations. Retailers got access to digital tools (e.g., e-Payment, Intelligent Concierge Robots, Omni-Channel Engagement, digital advertising), training, specialist advice, and implementation assistance. Subsidy was offered to both retailers and Technology partners. Retailers could purchase solutions at up to ~80% subsidy, and technology partners are provided subsidies and grants.
- **99% SME**: Infocomm Media Development Authority (IMDA), Singtel and DBS launched e-commerce platform to help SME retailers reach consumers with geolocation search. Benefits included - term loans with preferential rates, subsidized technology solutions, training courses.

B. Integration with marketplace platforms

MSME traders can utilise online platforms to scale up their business, gain insight about demand, and serve customers beyond their catchment area. These include both B2C e-commerce platforms connecting sellers to retail customers and B2B platforms connecting business buyers and sellers including raw material suppliers, manufacturers, wholesalers, exporters, retailers and corporate or government buyers.

Key interventions

- **Accelerate adoption of central government initiatives:**
  - **B2C platforms:** Government of India has launched **Open Network for Digital Commerce** (ONDC) enabling MSMEs and small traders to access online commerce (i.e., establish their online stores, manage inventory, process payments, and handle logistics). ONDC provides a common infrastructure based on open protocol where buyers and sellers can be engaged by any network-enabled application (buyer and seller apps). Encourage small traders and retailers to onboard on ONDC by **building awareness about the platform and providing incentives. B2B platforms:** Encourage SME traders and retailers to onboard on **GeM portal for government procurement** and SME exporters to onboard on **Indian Business portal** to connect with international buyers.

[221] Source: National Retail Policy: to enable the next wave of retail growth, Kearney
[222] Technology upgradation incentives for Manufacturing MSMEs are given as part of MSME Champions scheme by central government and Package Scheme of Incentives by Maharashtra government
[223] Source: Retail: Industry Digital Guide for SMEs, EDB Singapore

- **Explore strategic partnerships with private platform players** to promote onboarding of MSME sellers, especially in underpenetrated regions of the state. An example of such private platform player is Udaan, a B2B trade marketplace startup that connects small retailers with wholesalers and traders. It currently serves more than 3 Mn retailers and has onboarded 25,000+ sellers including brands like HUL, P&G, ITC.

3.3 Infrastructure

Rental or real estate costs constitute a significant portion of total cost for retailers (25 to 40% of total expenses for organized retailers). Additionally, the presence of robust logistics infrastructure, encompassing warehousing, cold storage, and connectivity, is crucial for facilitating trade. Interventions and enablers to improve logistics infrastructure and support real estate growth have been laid out in construction & real estate section.

Key challenges

- Limited availability of Government land and zonal restrictions leads to challenges in securing suitable real estate in terms of location and size.
- High real estate cost in key urban centres in cities like Mumbai and Pune
- Residence-cum-store format of many Kirana stores restricts their ability to expand due to limited space.

Key interventions

- **Ensure dedicated retail zones near demand centres in integrated infrastructure master plan and urban master plan** (as detailed in construction section) to encourage retail development. Retail zones would include standard common infrastructure facilities (e.g., electricity, water distribution lines, sewage and drainage, and easy access to road and rail infrastructure for goods transport).
  - State can develop **integrated residential and commercial spaces** in industrial areas (e.g., AURIC) and tier-2 cities (e.g., Nagpur, Nashik)[224] with focus on **organized retail spaces in urban areas**.
  - Additionally, as the state drives initiatives to realize tourism potential, evaluate developing **shopping zones to capture tourist driven demand** for unique native products such as Paithani sarees of Sambhajinagar, terry towels of Solapur, among others.
- **Evaluate** extending similar incentives provided to manufacturing MSMEs in industrial zones (e.g., Zone B, C, D and D+) to trade and retail participants in those zones[225]e.g., power tariff reduction, land and capex subsidies.

3.4 Export facilitation

To boost exports from Maharashtra, it is necessary to provide support to MSMEs to overcome export specific challenges such as lack of awareness of exports processes and compliances, difficulty in accessing export distribution channels and connecting with foreign customers, lack of subsidised quality testing facilities and inadequate logistics infrastructure.[226]

Key interventions

As detailed in MSME enablement and ease of doing business sections, state would need to drive awareness of export processes and compliances, provide support for marketing & demand linkages and improve ease of doing exports. For agricultural exports, Maharashtra has an opportunity to boost horticulture, aquaculture, hatching eggs, refined sugar, maize, and other agriculture produce by setting up a produce promotion council for marketing, ensuring adherence to global standards, conducting varietal research for globally acceptable varieties and making infrastructure investments through green channels and ICDs (as detailed in agriculture section).

A. Awareness of export processes and compliances

- Create **information repository** of product-country wise standards, compliances, and certification requirements and make it accessible via online portals with chatbot or AI powered interface. State should also increase

[224] Source: Smart Cities Mission, PIB Government of India, August 2021
[225] Based on recommendation from Trade and Retail Association representatives from Sambhaji Nagar
[226] Source: Unlocking potential of MSME exports – Strategy Action plan, Government of India, November 2018

awareness about **IndiaXports portal**[227] (launched by Central Government in 2021) which serves as a knowledge base on export potential, potential markets, trends, and procedures.

B. Marketing and demand linkages

- Provide financial assistance to organize and participate in export promotion events by enhancing state level **marketing support incentives** and accelerating **implementation of central government schemes** (e.g., Procurement and Marketing Support scheme[228])
- Design dedicated **promotion and incentive programs** for locally made products at **district level**, especially **GI tagged products** and those included in **ODOP** program.
- Explore State sponsored export promotion programs where industry participants can travel to foreign consulates and avail funding support linked to committed exports order value.
- Work with **central government to develop Free Trade Agreements** (FTAs)[229] with key destinations
- Create an **annual calendar of events** in collaboration with various trade related associations, Export Promotion Councils and **publicize on MAITRI website**
- **Encourage set up of export houses** in proximity to major manufacturing clusters, especially in underpenetrated regions (e.g., Eastern and Central Maharashtra)

C. Ease of doing exports

- Drive **adoption of global certification programs** e.g., Authorized Economic Operator (AEO) Program[230] and **develop state level certification programs** which provide benefits such as faster processing at customs, expedited dispute resolution, financial waivers
- Enable single window system for all export related clearances along with central government

3.5 Skill development

As per the Ministry of Skill Development and Entrepreneurship, the retail industry in India is expected to experience a **shortfall of ~10 million people** within the coming five years due to a skills gap.

Key interventions

As detailed in skill development section, skilling initiatives with enhanced collaboration between industry and academia along content development, content delivery and skill certification and job placement would be required.

- **Leverage central government initiatives** i.e. Retail Sector Skill Council and National Skill Qualilification Framework and state level skilling schemes to develop and deliver trade and retail focused training
- **Encourage local Trade and Retail associations to partner with training institutes** and offer industry-specific programs (e.g., store operations, accounting, inventory management) and internships. State government can incentivize this by providing subsidies. For example, Sambhaji Nagar Trade and Retail body has recently signed a MoU with local University to provide retail-specific training to students.

[227] Source: IndiaXports
[228] Source: Procurement and Marketing support scheme guidelines, Government of India
[229] FTAs are generally agreements that often include clauses on trade facilitation and rule-making in investment, intellectual property, government procurement, technical standards and sanitary and phytosanitary issues and provide a possibility for countries to enhance trade and exports, access to new markets, trade risk diversification, enhancing innovation and competition, better integration of markets and facilitating the transfer of skills and technology.
[230] Authorised Economic Operator (AEO) is a programme under World Customs Organization (WCO) to secure and facilitate Global Trade. Source: AEO India

Energy, renewables & sustainability

Energy, Renewables & Sustainability

1. Executive Summary

- **Energy and renewables**:
  - Key interventions across the value chain identified from power generation, transmission and distribution, and consumption to aid adoption of renewable energy and achievement of committed targets
  - Required capacity & resources, including investments, additional land, and employment generation by FY28
- **Circular economy:** Interventions identified across:
  - **Water**: Water extraction, consumption, treatment, and recycling.
  - **Solid and Others**: Improving collection, segregation, and recycling levels.
- **Decarbonization**: Baseline and FY28 decarbonization targets (e.g., CO2 emission, electrical vehicle penetration) established by sectors (e.g., energy, transport, manufacturing), and proposed initiatives to achieve targets.

A. Energy and Renewables

Overview: Power consumption in Maharashtra was ~126 TWh in FY21, growing at **~3% CAGR** between FY14 - 21. By FY28, consumption is expected to grow at **~7% CAGR** and reach **~200 TWh by FY28**.

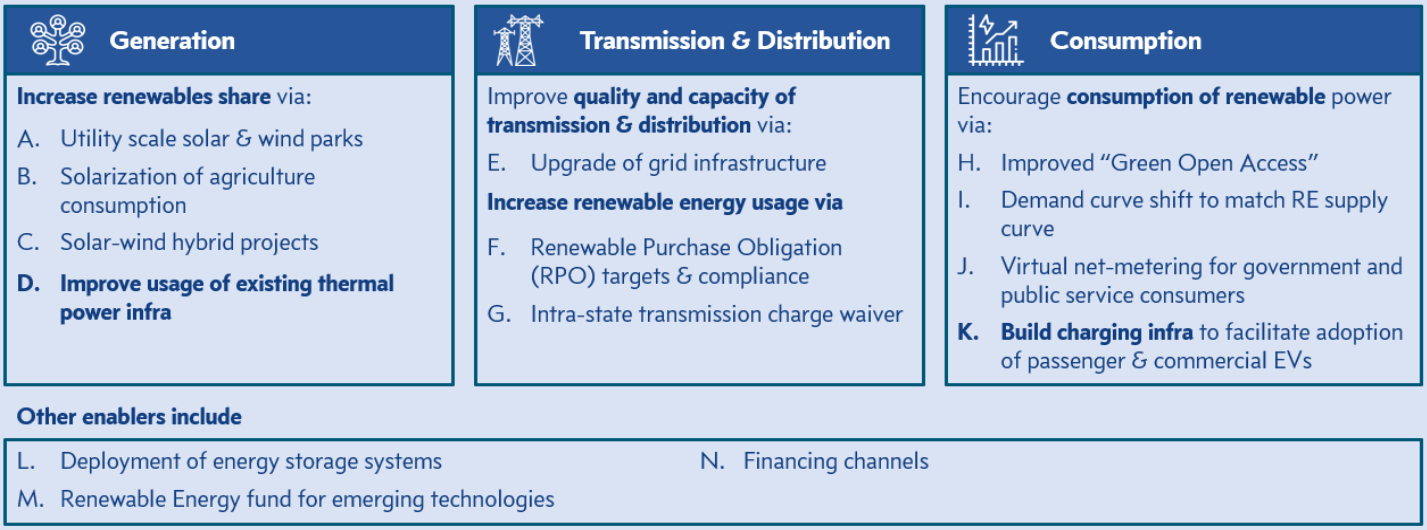
- **Energy generated:** In FY23, **~17%** energy was generated from **renewable** sources; target increase to **~32%** by **FY28**
- **Installed capacity**: In FY23, **~34%** installed capacity from **renewable sources;** target increase to **~45%** by **FY28**.

Current constraints and proposed interventions: Some of the key challenges faced in renewable energy adoption by participants across the value-chain include:

- Challenges in acquiring land parcels for development of renewable energy parks
- Need to accelerate agricultural feeder solarization
- Implementation and procedural hurdles in adopting Open Access (enabling consumers to choose their own power supplier, apart from state DISCOM).
- Lack of state-specific regulatory and commercial framework for solar-wind hybrid projects

14 interventions across generation, distribution, and transmission to achieve projected targets (Nationally Determined Contribution and Renewable Purchase Obligation) are detailed.

Figure 51: Overview of interventions across energy value chain



Summary of key opportunities, enablers, and interventions:

Opportunity areas	Key interventions and enablers proposed
Generation - Increase share of renewable sources in energy generation	
A. Utility scale solar and wind parks	• Facilitate acquisition of waste land parcels or lease of arid, drought prone farmland by renewable energy project developers • Setup sub-station evacuation capacities at identified renewable energy sites
B. Solarization of agricultural power consumption	• Encourage farm solarization through grid integration pilots, enabling farmers to sell excess power back to the grid • Improve adoption of solar feeder program: Additional incentives announced in Mission 2025 (announced in April' 23) for DISCOM, solar developers, gram panchayats to help increase adoption of solar feeder program
C. Solar-wind hybrid project	• Create a state-specific policy (with regulatory and commercial framework) to attract private capital in line with the national solar-wind hybrid policy.
Generation – Capacity utilization	
D. Improve usage of existing thermal plants	• Utilize idle assets: ~5 – 6 GW across 9 power plants are currently idle • Encourage use of CCUS (Carbon Capture Usage and Storage) in state plants
Transmission and Distribution - Improve quality and capacity of transmission & distribution	
E. Grid infrastructure	• Upgrade medium and high voltage line capacities to support increased renewable energy generation.
Transmission and Distribution - Increase renewable energy usage	
F. RPO[231] compliance	• Create compliance targets for Maharashtra Electricity Regulatory Commission to achieve the target of ~39% by FY30 (with penalties and incentives)
G. Intra-state transmission charges waiver	• Waive intra-state transmission charges for renewable energy generators, similar to central government inter-state transmission waiver.
Consumption - Encourage consumption of renewable power	
H. Implement "Green Open Access" at scale; Amend "MERC Open Access"	• Allow monthly banking without restriction of peak/off-peak consumption hours • Allow captive renewable energy producers to sell excess energy on Open Access (vs. current mandate to sell to DISCOM) • Consider rationalizing charges added by DISCOM for renewable power purchase
I. Shift demand curve to match RE supply curve	• Provide day-time rebate provision to help incentivize consumption during solar hours (e.g., for MSMEs, farmers) • Provide rebates during July to September as load is lower vs. other seasons by 5-15%, whereas there is a high wind potential that could be used during this period
J. Virtual net-metering for government and public service consumers	• Set up a dedicated solar power plant for government and public service consumers (e.g., police station, schools) and enable net metering (by providing offsetting credits) against energy procurement from the dedicated solar plant.
Consumption - EV charging infrastructure	
K. Electric Vehicle (EV) charging infrastructure	• Earmark land for EV charging infrastructure in the urban infrastructure master plan (residential and commercial spaces) • Develop battery swapping and charging infrastructure along highways – Leverage land assets owned by state
Other enablers include	
L. Deployment of energy storage systems	• Promote energy storage systems by leveraging central government schemes, multi-lateral financing, green bonds, municipal bonds, innovative PPP models.

[231] RPO = Renewable purchase obligations

M. Renewable Energy fund for emerging technologies	• Set up renewable energy fund to support commercialization and scaleup of emerging technologies and applications (e.g., offshore wind, Agro-Photovoltaics, floating solar, solar thermal storage, solar EVs).
N. Financing channels	• Seek higher commitments from multilateral development banks, foreign investors for renewables and supporting infrastructure & look to mobilize private capital.

B. Circular Economy: Water

Maharashtra has annual extractable ground water of ~30.5 Bn cubic meters (BCM), replenished through rainfall and other sources. Out of this ~16.7 BCM is annually extracted: 15.3 BCM for irrigation & 1.4 BCM for domestic use. Maharashtra's water consumption to availability ratio is 55% and is within safe limits (<=70% as per central government guidelines). However, there is a need to arrest deterioration of this metric. Key reasons for ground water extraction are preference for cultivation of water-intensive crops (e.g., sugarcane, paddy) and availability of subsidized power for irrigation. 6 interventions to aid in sustainable water extraction, ensure efficient consumption by agriculture and industrial sectors, and waste-water treatment are detailed.

Opportunity areas	Key interventions and enablers proposed
A. Micro Irrigation	• **Incentivize investments in drip and sprinkler irrigation**, to reduce high upfront cost. • Promote awareness of water efficient practices for each crop among farmers
B. Wastewater use and recycling	• **Set net-zero water target for water-intensive industries** (e.g., thermal plants, iron and steel) • Mandate industries within distance of STP (Sewage Treatment Plant) to use treated wastewater. • Promote tertiary treatment to enhance re-use of water in in the industrial sector.
C. Water and effluent treatment	• Central Effluent Treatment Plant: Install additional CETPs to provide access to all MSMEs across districts as MSMEs face difficulty to incur upfront cost of installing standalone CETP. • STP: Increase installed STP capacity by ~32% (or ~2,200 Mn Liters per day) • Urban Local Bodies to ensure adequate wastewater treatment capacity built into the urban master plan
D. Jal Jeevan mission for domestic water	• **Provide tap-water connections to ~38L households by FY24 –** Leverage AMRUT (Atal Mission for Rejuvenation and Urban Transformation) scheme for rural areas**.** • Scale IoT pilot to track consumption, quality, and pressure across Maharashtra
E. State water database	• **Create state water database capturing water sources, supply and demand across users**, watersheds, and catchment areas; Andhra Pradesh's APWRIMS[232] provides real-time visibility into water resources and has enabled immediate interventions in 100k+ acres with soil moisture part and improved groundwater levels
F. Emerging technology	• **Provide financial support for scaling alternate water supply technologies** (e.g., desalination, atmospheric water generation).

C. Circular Economy: Solid waste and Others

Maharashtra generates ~22,500 TPD (Tonnes per Day) of waste, of which ~100% is collected. 15,000 TPD (~67%) of generated waste is treated and 1,350 TPD (~6%) of generated waste is landfilled. ~**6,200 TPD (~27%) of the total waste generated is unaccounted for**.

5 interventions to improve recycling levels via incentivizing collection, segregation and setup of recycling units are detailed.

[232] APWRIMS = Andhra Pradesh Water Resources Information & Management System

Opportunity areas	Key interventions and enablers proposed
A. Waste segregation	• **Improve waste collection and segregation efficiency** (wet and dry waste, and further categories of plastic waste)
B. Set up recycling units	• **Incentivize set up of recycling units** for key waste generating industries (e.g., E-waste, plastics, and auto & steel scrap) • **Leverage upcoming circular economy parks** to process waste from neighboring states
C. Construction & demolition waste treatment	• **Incentivize setup of recycling facilities near major infrastructure projects**; adopt a decentralized cluster-based approach for establishing multiple recycling plants. • Mandate use of certain percentage of recycled materials with the new construction materials
D. Waste-to-energy generation	• **Amend "MERC Open Access"** and encourage adoption of "Green Open Access" regulation to ensure consumers procuring power from waste-to-energy plant don't need to pay cross subsidy and additional surcharge. • Provide incentives to **encourage waste-to-energy processing**
E. Greenfield setup of biodegradable ecosystem (e.g., plastic substitutes, dies)	• **Incentivize research, and promote partnerships** with start-ups, OEMs, and industry stakeholders for urban and rural local bodies. • **Foster collaboration between institutes in Maharashtra** (i.e., Indian Institute of Packaging) with academia from other countries.

D. Decarbonisation

To support India objectives under Nationally Determined Contributions (NDCs), Maharashtra should aim to set decarbonisation targets to maintain focus on sustainability. In 2022, Maharashtra emission intensity is estimated to be at 0.21(Kg CO_2/PPP $GDP) which represents ~26% reduction from 2005 levels. State can target carbon emission intensity of 0.16 (Kg CO_2/PPP $GDP) by FY28 (45% reduction from 2005 levels) in line with India NDC target.

To achieve this, interventions by sector are laid out:

- **Manufacturing:** Technology innovation and adoption of carbon alternatives need to be promoted to reduce carbon intensity
- **Transport:** Drive adoption of EV through incentives, mandates for public transport, investment in charging infrastructure, simplified procedures for charger connections and EV subsidies
- **Agriculture:** Aim to transition 1 Mn cereal and pulses farmers to **natural farming and promoting regenerative farming** in sugarcane and citrus.
- **Construction:** Provide incentives for buildings using **green construction materials**, reduced stamp-duty charges for buildings with high energy efficiency, rainwater harvesting systems.

2. Energy and Renewables

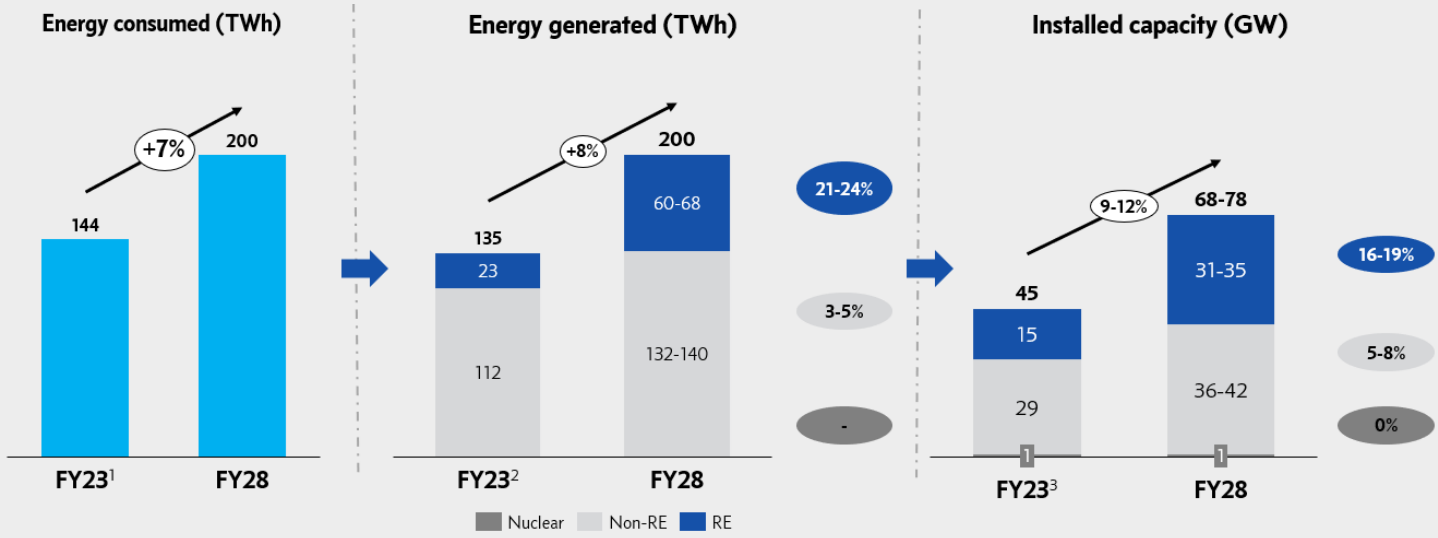
2.1 Baseline and future energy requirements

2.1.1 Energy requirement - Current and projections:

Power consumption in Maharashtra was ~126 TWh in FY21, growing at **~3% CAGR** between FY14 - 21. For the GDP target of $1 Trillion by FY28, which needs 14-15% CAGR from FY22 onwards, power consumption growth rate is expected to grow at **~7%** and reach **~200 TWh by FY28** [233]. Figure shows overview of projected energy consumed, generated and corresponding installed capacity projections based on the following guiding principles:

- **Energy generation should** support changes in GVA mix (manufacturing growth) and growth of domestic consumption.
  - **Cost-competitive energy generation, transmission, and distribution** to support industry growth.
- **Self-sufficiency:** Energy consumption requirements of Maharashtra are entirely generated within the state
- **Nationally determined contribution (NDC) target**: Achieve ~50% installed capacity from non-fossil fuel-based energy sources by FY30.

Figure 52: Energy consumed, generated, and installed capacity historical[234] and FY28 projected for Maharashtra.



1. State-wise consumption not available from CEA dashboard. Projected from FY21 basis ~7% growth rate 2. Denotes capacity as of Feb'23 3. Total energy of ~102 TWh generated from Apr'22 to Dec'22. Is proportioned up to account for entire FY23

Note: This document considers that Maharashtra will continue to add thermal power at historical pace, in case the state does not, then it would need ~44GW of renewable energy capacity by FY28 instead of 31-35GW.

[233] Methodology for estimation:

A. Energy generation from FY23 to FY28 is estimated:

- Ratio of Energy consumption CAGR to GDP CAGR is ~47% in FY14-21. This same ratio is used to estimate energy generation from FY23-FY28 based on projected GDP CAGR of 14-15%.
- Energy generated from Solar, Wind and Other renewable energy sources (small hydro, bagasse, biomass) from Apr'22-Feb'23 is annualized for FY23.
- Installed energy mix (% from Solar vs. Wind vs. Others) in FY28 is estimated to achieve mix mentioned for FY25 in Maharashtra Unconventional Energy Generation Policy 2020. Energy generated by Solar vs. Wind vs. Others from FY23-28 is back-calculated from the installed energy capacity.
- Energy from fossil fuel is estimated as total energy generated minus renewable energy generated.

B. Installed energy capacity from FY23 to FY28 is estimated:

- Installed energy capacity for Solar, Wind and other renewable energy is available as of Feb'23.
- Projected for further years based on the Capacity Utilization Factor (CUF) and installed capacity required to generate energy mentioned in Part A. CUF is assumed to ramp up for wind from observed ~17% in FY23 to 29% by FY28, Solar from observed ~13% in FY23 to ~19% by FY28 and for others kept at ~21%.
- Current ratio of renewable energy installed capacity/ total installed capacity is ~34%. This is increased to 45% by FY28. Rationale is that this ratio must be 50% by FY30 as per NDC commitment, and a fixed increment of ~2.3% YoY is considered.

[234] Source: Central Electricity Authority dashboard

2.1.2 Installed energy capacity - Current and planned expansion

Total installed capacity in the state is 44.6 GW as on Feb' 2023, out of which 15.1 GW (including 3.3 GW of large hydro) is Renewable energy (RE).

~73 GW of installed energy capacity would be needed by FY28 to serve growing energy demand. For Maharashtra to achieve the Nationally Determined Contribution (NDC) goals[235], it should target **31-35 GW from renewable source by FY28**. This translates to increasing share of renewable energy from **34% (FY23) to ~45% (FY28) of total installed capacity**. Split of the renewable energy installed capacity by source is mentioned in Figure:

Figure 53: Installed energy capacity – historical and projections by year and type

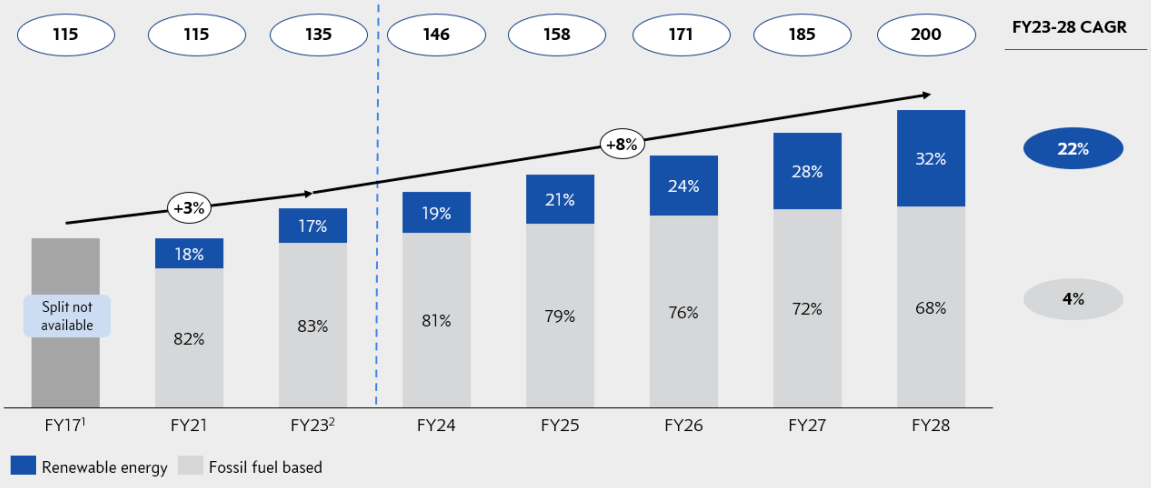
Energy Type		FY23* (GW)	FY25 (GW)	FY28 (GW)	FY23-28 CAGR
Renewable energy	**Sub-total**	**15.1**	**20**	**33**	***17%***
	Wind	5.0	6	8	*10%*
	Solar	3.8	6.5	16	*33%*
	Other RE	3.0	4	6	*13%*
	Large hydro[236]	3.3	3.3	3.3	*0%*
Fossil fuel	Thermal	28.8	36	39	*6%*
Other	Nuclear	0.7	0.7	0.7	*0%*
Total		**44.6**	**~57**	**~73**	***10%***
CUF assumptions[237]:					
Wind		*17%*	*22%*	*29%*	
Solar		*13%*	*15%*	*19%*	
Thermal[238]		*40%*	*40%*	*40%*	

*As of 28th February 2023

2.1.3 Energy generation - Current and planned expansion:

Total energy generated in Maharashtra is estimated to be ~135 TWh in FY23, out of which ~23 TWh (~17%) is from renewable energy sources. Basis the projected installed energy capacity, 200 TWh of energy would be generated by FY28. Out of this ~65 TWh would be from renewable source by FY28. This translates to increasing share of renewable energy generated from **~17% in FY23 to ~32% in FY28**.

Figure 54: Energy generated – historical and projections by year.



1. From Economic Survey of Maharashtra. Source of energy includes Fossil fuel based, RE and Received from Central Sector. Split of received from Central sector into RE and fossil fuel based is not available
2. Total energy of ~102 TWh generated from Apr'22 to Dec'22. Is proportioned up to account for entire FY23

[235] NDC goal: India aims to achieve ~50% cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030.
[236] Hydro power plants with capacity > 25MW
[237] FY28 estimates for renewable energy Source: All about renewables
[238] Average of FY21 and FY22 observed CUF used.

Split of the renewable energy generated from various sources is represented:[239]:

Figure 55: Energy generated (in TWh) – historical and projections by year and type.

		FY21 (TWh)	FY23[240] (TWh)	FY25 (TWh)	FY28 (TWh)	FY23-28 CAGR
Renewable energy	**Sub-total**	**20**	**23**	**33**	**~65**	***22%***
	Wind	6.5	7.5	11	21	*23%*
	Solar	3	4	9	27	*44%*
	Other renewable	5	5.5	7	11	*13%*
	Large hydro[241]	6	6	6	6	*0%*
Fossil fuel	**Thermal**	95	112	125	135	*4%*
Total		**~115**	**~135**	**~158**	**~200**	**8%**

Note: Solar energy generation is projected to grow at significant ~44% CAGR. This is due to ~33% CAGR of installed capacity from solar and an increase in Capacity Utilization Factor.

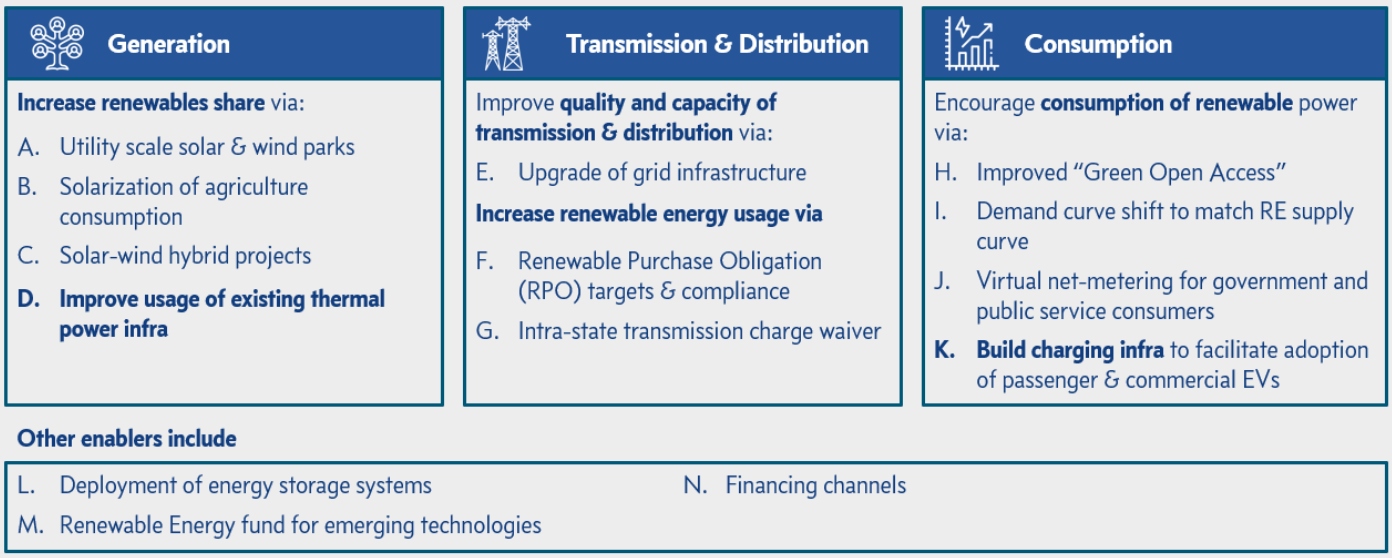
2.2 Key interventions & enablers:

Some of the key challenges faced in renewable energy adoption by participants across the value-chain include:

- Difficulty in acquiring land parcels for developing solar or wind RE parks.
- Sub-optimal infrastructure (e.g., evacuation sub-stations) at potential RE deployment sites
- Sub-optimal implementation of agricultural feeder solarization
- Implementation and procedural hurdles (i.e., delays in getting technical clearance and approval from Discom) in adopting Open Access - enabling consumers to choose their own supplier, apart from state DISCOM.
- Lack of state-specific regulatory and commercial framework for solar-wind hybrid projects
- Insufficient financial viability for emerging technologies

15 interventions to aid renewable generation, distribution and transmission, and adoption by end users to achieve projected FY25 and FY30 targets (i.e., NDC and RPO) - are detailed in this section.

Figure 56: Key enablers and interventions across energy and renewables sector



2.2.1 Generation

A. Incentivize set up of utility-scale solar and wind parks near demand clusters: Maharashtra government can adopt following interventions:

[239] Energy generated from Nuclear is kept 0 from FY21-28. Nuclear energy generation was 0 in FY21. There has been no installed nuclear capacity expansion from FY17 to FY23. Hence, assumed that no net new nuclear energy will be generated.
Note: Difference between electricity consumed and generated in FY21 and later years is attributable to purchase of electricity generated outside state.
[240] Total energy of 101,511 GWh generated from Apr'22 to Dec'22. Is proportioned up to account for entire FY23.
RE excluding Large Hydro generated 15,740 GWh from Apr'22 to Feb'23. Is proportioned up to account for entire FY23.
[241] Includes utility generation only. Large hydro capacity has remained constant from FY21-23. Assumed there will not be additional capacity addition in hydro energy.

- Help acquire land parcels (or facilitate acquisition), develop parcels with requisite infrastructure (e.g., sub-station evacuation capacities around sites) and make them available for bidding to project developers for de-risking private capital participation and ensuring locational certainty for transmission planning.
- Allocate and reserve wastelands for solar and wind parks through leasing arrangements with developers.
- Ensure connectivity by developing approach roads to the solar park and smaller access roads to individual solar plants or plots with the solar park.
- Form partnerships with private developers for requisite infrastructure for construction (water, housing facility for manpower, construction power). [242]

State can also leverage central government initiative: Government of India through Ministry of New and Renewable Energy launched a scheme on development of solar parks and ultra mega solar power projects[243] (40GW coupled with central financial assistance[244] to be setup by 2023-24 across India). Maharashtra must accelerate the implementation of this scheme to commission 1500 MW of the sanctioned solar park capacity for the state.[245]

B. Enable solarization of agriculture power consumption:

Maharashtra government should target **~100% day-time** supply to agriculture through solar feeder program (or PM-KUSUM component A) and standalone pumps. As per Pradhan Mantri Kisan Urja Suraksha Evam Utthan Mahabhiyan[246], 2 lakh solar standalone agricultural pumps have been approved for installation between FY20-26. Against this target, Maharashtra had installed ~**36,000 solar agricultural pumps (~18%)** upto December 2022.

Maharashtra Mission 2025 document aims to solarize > 30% of agricultural feeders by December 2025. This program will take advantage of the low cost distributed solar generation while addressing some of the core challenges. Key advantages are:

- Reduction of cross subsidy on industry
- Better grid integration of solar by shifting demand to distributed daytime deployment.
- No additional requirement of large new transmission lines, which are challenging because of extensive planning, acquisition of rights-of-way and complex engineering & construction process.

The state can adopt following interventions:

a. Installation of stand-alone off-grid solar pumps (KUSUM component B) would help in regions with poor grid connection. **Maharashtra can incentivize farmer adoption by enabling farmers to sell surplus power into the grid.** This can be implemented on a pilot basis, like Gujarat. Under the Gujarat SKY (Suryashakti Kisan Yojana) scheme, the farmers are compensated by the government for surplus energy sold at INR 7 per unit[247]. The compensation is cash or direct benefit transfer to farmers' bank account.

b. Project developer should be given provision to decide where to set up land (decision basis the solar potential), and how to develop it. Government can facilitate land acquisition.

c. Drive aggressive implementation of Mission 2025 (announced in April' 23), that has additional planned incentives to increase adoption of solar feeder program:
   - **Direct financial incentives**: Give grants to DISCOM for sub-station maintenance[248], create a revolving fund for timely payment to solar developers[249], and give grants to gram panchayat to encourage participation[250].

[242] Source: Development of Solar and Ultra-Mega Solar Power Projects, MNRE
[243] Source: MNRE Solar schemes
[244] Central Financial Assistance of Rs. 20 lakhs/MW or 30% of the project cost including Grid-connectivity cost, whichever is lower.
[245] Source: India's century – Achieving sustainable, inclusive growth, FICCI and McKinsey
[246] Source: Economic Survey of Maharashtra, 2022-23
[247] Source: Suryashakti Kisan Yojana (SKY), Gujarat power research and development cell
[248] Upto INR 25 Lakhs per sub-station
[249] Nodal Agency shall set up a separate revolving fund of Rs. 700 Cr. This fund shall be created from Green Energy Cess Fund and shall be used to create a payment security mechanism for enhancing payment security for all projects under MSKVY and KUSUM.
[250] Social benefit grant of INR 5 Lakhs/yr. for Gram panchayat in whose area solar projects are installed.

- **Land incentives**: Lease land for solar development at a fixed rate of INR 1 per year[251] and give exemptions from converting land to non-agriculture land.
- **Awareness**: Leverage existing network of Krushi Sewa Kendras and organize village melas to educate farmers about the benefits and incentives of the program.
- **Flexible project sizes:** Incentivise developers to take projects by allowing grouping approach with multiple distributed projects allocated through a single tendering and PPA process and clustering approach to club nearby projects into a single tender.

C. Create a policy (with regulatory and commercial framework) for development of solar wind hybrid projects: Hybrid solar-wind projects are an attractive option over standalone solar or wind projects due to higher CUF of ~50% vs. 20-30% for standalone. Maharashtra should frame a state specific policy (other states including Rajasthan, Gujarat and Karnataka have drafted a specific policy) to attract private capital.

D. Improve usage of existing thermal power infrastructure: 9 major thermal power plants with **~6.1 GW** capacity, are either closed, decommissioned, or underutilized in Maharashtra. The state government can look to:

- **Facilitate raw material procurement:** Group procurement agreements with variable charges for logistics with state and central government coal PSUs and establish connecting infrastructure like railway tracks from coal plant to power plant.
- **Leverage land assets at existing plants and establish renewable energy plants:** Utilizing pre-existing land and grid connection facilities would reduce the generation cost and bring it to INR ~1.9 and INR 2.7/kWh respectively for solar PV without battery and with battery storage[252]. This is 10-40% better than average solar (INR 2.7-3.1/kWh) and wind (~INR 3/kWh) power generation costs.
- **Reduce carbon emissions:** Encourage usage of Carbon Capture Usage and Storage (CCUS) in power plants.

2.2.2 Transmission and distribution

E. State investment and incentives to upgrade grid infrastructure: Maharashtra government would need to invest in upgrading the grid infrastructure to accommodate additional renewable capacity. The state will need to drive private sector development of transformers, medium and high voltage lines, to help carry power over long distances from renewable energy sources, that are often far from industrial and urban hubs.

F. State initiatives to boost compliance of Renewable Purchase Obligations (RPO)[253]

Maharashtra government can initiate following interventions:

- **Create RPO compliance targets** for Maharashtra Electricity Regulatory Commission (MERC) upto FY28 and FY30. Currently, MERC has renewable energy procurement target of **25%** (13.5% solar and 11.5% non-solar) for **2024-25**. This should be rapidly **increased to reach Ministry of Power targets of ~39% by 2028 and 44% by 2030.**
- **Mandate penalties for non-compliance** or provide incentives for compliance to RPO regulations to ensure RPO compliances by DISCOMS. RPO shortfall against target for Maharashtra Electricity Regulatory Commission has **increased from 0.9% in FY17 to 4.4% in FY20**[254].

G. Waive Intra-state transmission charges for renewable energy

The state government can subsidise the INR 0.4 per KWh within Maharashtra transmission charges between transmission companies along the lines of ISTS (Interstate Transmission System) waiver by CERC (Central Electricity Regulatory Commission) for renewable energy generating stations (REGS) and pumped hydroelectric

[251] The lease rate of Government land for solar power projects has been fixed at Rs.1 per year for a period of 30 years. The lease rate for offering private land is INR 1,25,000/- per hectare per year or 6% of the ready reckoner rate, whichever is higher with a yearly 3% increment on the base rate.
[252] Source: Repurposing Maharashtra's coal plants can deliver benefits, Livemint, Dec 2022
[253] Renewable Purchase Obligation (RPO) is mandated by the Maharashtra Electricity Regulatory Commission (MERC) that certain entities should purchase minimum level of renewable energy out of the total consumption. Obligated entities include Distribution Licensees, Captive users with capacity >5MW, and Open Access users with a contract demand >5MW.
[254] Source: Renewable purchase Obligation and Energy Storage Obligation Trajectory till 2029-30, MNRE and Renewable Purchase obligations, Maharashtra Energy Development Agency

plants, beginning operations by 2025[255]: This will incentivise project developers to commission project within a defined time period to avail the subsidy.

2.2.3 Consumption

H. Incentives for consumers to install and adopt renewable energy

Maharashtra government should strongly encourage adoption of central government proposed renewable energy based "Green Open Access" regulations. There are currently two regulations - "MERC Open Access, 2016" and "Green Open Access Rules, 2022" that provide the framework for consumers to choose their own supplier, apart from state DISCOM.

However, without clarity in the state regulations considering the recent policy change (Green Open Access, '22 and '23 amendment), consumers face implementation and procedural hurdles (i.e., delays in getting NOC from Discom, technical clearance). MERC should amend MERC Open access regulations, and make it compatible to Green Open Access regulations, Maharashtra government can adopt following additional initiatives:

a. State (MERC) policy amendment:

- Monthly banking should be allowed without any restriction of energy injected during peak hours should be set off only against energy consumed during peaks, and same for non-peak hours energy.
- There should not be any constraints to sell renewable energy, for a captive plant if the contract capacity is lesser than the installed capacity. The project developer should be able to sell the excess energy (gap between contract and installed capacity) to an Open Access customer.
- The power producer should be able to sell excess renewable energy (gap between energy generated and contracted) to Open Access customer at prevailing open market price, instead of being forced to sell to a Discom at a lower tariff.

b. State incentive:

- Maharashtra can consider rationalizing cross subsidy and added surcharge on HT open access users of 1.72-2.6/kWh, and on captive and open access users of INR1.2-1.3/kWh. For e.g., Gujarat levies only INR 0.31/kWh additional surcharge for open access users.
- Offer tax breaks and capital subsidies to incentivize captive commercial and industrial users, encouraging them to adopt renewable energy sources for captive use. This can be achieved by including the cost of captive renewable energy plants in the calculation of fixed capital investment, under the existing Maharashtra Industrial Policy.

I. Implement Time of Day (ToD) tariff for restructuring of demand curve: Demand curve would need to be shifted to align with the supply curve to optimize power purchase costs, and better integration of solar and wind sources. Renewable energy sources are projected to be ~32% of total power purchase quantum of Maharashtra.
Figure 57 shows significant increase in renewable energy absorption between 8 am to 5 pm due to solar power generation. As more renewable energy generation sources become operational, the procurement mix would have to accommodate more renewable energy:

[255] Source: CERC Certifies ISTS Charges waiver for Renewable energy projects, March 2023

Figure 57: Source wise projected power purchase of major DISCOMs of Maharashtra in FY 2022-23[256].

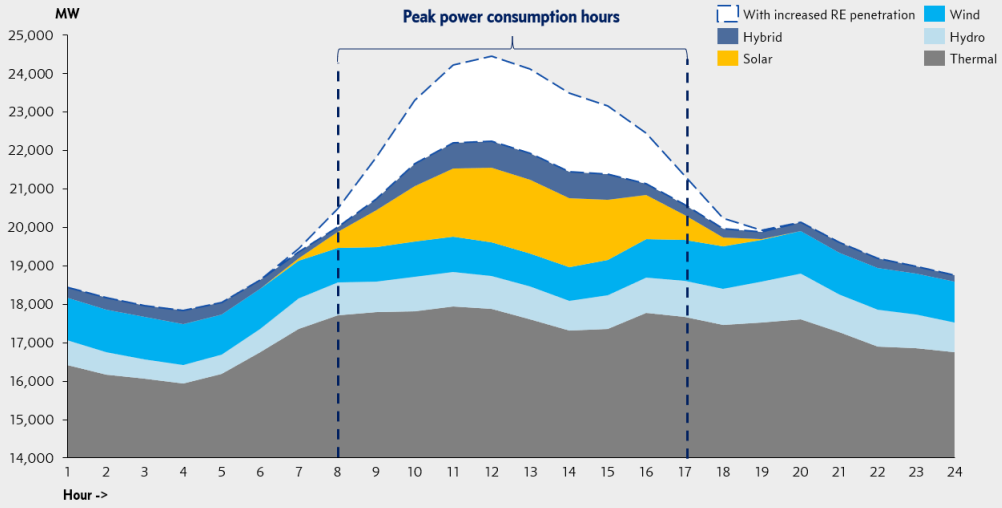


Figure below shows there is 5-15% lower load in July to September as compared to other months.

Figure 58: Seasonal load curve of MSEDCL in Maharashtra (by hour) in FY19-20

Maharashtra could adopt the following time-of-day and seasonal tariff interventions (already suggested by Maharashtra Electricity Regulatory Commission to DISCOMs in Nov'22 study) for better load-demand matching:

- Provision of day-time rebate would help incentivize consumption during solar hours. Implement phased reduction (through planning) of thermal power purchase during solar hours.
- Provide rebates during July to September as load is lower from other seasons by 5-15%, whereas there is a high wind potential that could be used.

J. Virtual net metering for electricity use in public services and government buildings: Delayed electricity bill recovery from government and public service consumers (e.g., public water schemes, gram panchayat offices, streetlights, Zilha Parishad Schools, police stations), contributes to reducing collection efficiency. This potentially strains finances of the DISCOM[257] as 11% of total pending dues for MSEDCL were attributable to these public bodies in FY20.

To address this problem, virtual net metering can be allowed for such public consumers by setting up a community solar plant of for e.g., 100 MW capacity[258] using capital investments from all the community members or public consumers. Each consumer will get a discount on electricity costs against the net energy generated by the

[256] Source: *Maharashtra Electricity Regulatory Commission - Study report on time-of-day tariff structure in electricity tariff in Maharashtra, Nov 2022*
[257] Source: Virtual net metering for Public bodies, Prayas.
[258] Capacity of the plant to be estimated basis the equivalent annual consumption (incl. transmission and distribution losses) for these public services.

common solar plant. Maharashtra government can directly pay for the power procurement from such a plant[259] and respective electricity government.

K. Develop EV charging infrastructure: Maharashtra government can implement following interventions:

a. Reserve land for both public and private owned charging infrastructure in the urban infrastructure master plan, in both residential and commercial spaces.

b. Drive private capital investments to develop battery swapping and charging infrastructure. Highways and idle land assets of State Transport Corporation (e.g., BEST, MSRTC) can be leased out through competitive bidding process. BEST has ~200 acres land in Mumbai (~30 depots with 3L sq. ft. per depot)[260].

2.2.4 Other enablers

L. Enable large scale deployment of energy storage systems: Adoption of grid scale energy storage technologies (e.g., Pumped storage plants, battery energy storage systems) would help provide grid stability, avoid transmission congestion, and improve power supply quality.

To meet central government mandated Energy Storage Obligations, Maharashtra would need ~5 GWh[261] of daily energy storage capacity in 2028. Energy Storage Obligation specifies that the percentage of total energy consumed from solar and/or wind should be **1%** in **2023-24** and rise to **3%** by **2028** and **4%** by **2030.**

Introduce a policy on energy storage systems, with a focus on pumped storage hydropower plants: Pumped storage is a cost effective and durable alternative to battery storage. It helps achieve economies of scale for high capacity and long-duration energy storage. Provisions to be made in the state for development of Pumped Storage Plants e.g., connectivity, site identification, single window clearance, VGF schemes. Maharashtra can play role of a leading state for deployment of such future-ready energy infrastructure through following interventions:

Central government and state incentive:

- Central government has approved Viability Gap Funding (VGF) support for battery storage systems[262]; this can be leveraged to boost procurement of renewable energy projects with energy storage facility.
- In addition, Maharashtra government could provide VGF support for renewable energy projects that are procured through a competitive bidding process (without battery as well). This would help improve commercial viability of initial projects (e.g., 1-3 GW) for both project developers and DISCOMs.

M. Set up a state renewable energy fund to support promising technologies and applications: Maharashtra government can set up a Renewable energy Fund to support emerging and innovative new technologies and applications (i.e., offshore wind, agro-photovoltaics, floating solar, solar thermal storage, Solar EVs). This fund would support scaling up and commercialization of nascent technologies/applications.

Proposals for funding can be chosen on a basis of a transparent and open process, and projects or companies would be supported through equity or debt infusion or partial Viability Gap Funding. The fund could be set up on lines of INFUSE[263] (early-stage venture fund focused on clean energy sector in India. It is established as a partnership between the central government, academia, and private sector).

Maharashtra government can leverage Ministry of New & Renewable Energy (MNRE)'s scheme - "Renewable Energy Research and Technology Development Programme". Scheme encourages research and technology development proposals in collaboration with the industry and provides up to 100% financial support to government/non-profit research organizations and up to 50-70% to industry, start-ups, private institutes, entrepreneurs, and manufacturing units[264].

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[259] By entering a long term (25 year) fixed cost Power Purchase Agreement with solar developers

[260] Source: BEST Bus depots, Mumbai Mirror, May 2019

[261] 63697,992 GWh of RE generation in FY28 * 3% ESO/ 365 (battery sizing is in daily cycle) = ~5 GWh daily requirement

[262] India's national budget provides a viability gap funding of 4,000MWh of battery storage projects; similar support mechanism will be provided for pumped hydro.

[263] Source: Infuse ventures

[264] Source: Government incentivizes local development and manufacturing of renewable energy technologies

N. Financing channels: Maharashtra government should pursue commitments from development banks and financial institutions to further scale their efforts in green finance to mobilize capital, offer risk sharing mechanisms, and divert more finance flows to low-carbon activities in industries where it is difficult to reduce carbon emissions. The state government can undertake following measures to fast-track financing options by:

- **Setting up incubation funds and government grants for upcoming technologies** like carbon capture & storage, industrial process emissions and grid strengthening. Additional commitments from venture capital companies can also be explored on a partnership model.
- **Setting up climate focused asset financing entities for relatively mature technologies** like bioenergy (including ethanol) and electric mobility to fast-track their commercialization in the state.
- **Promoting active debt or bond markets for mature technologies** like **solar and wind** for low yield seeking investors like pension funds and commercial financers.

2.3 Required investments and other resources

2.3.1 Total investment and land estimate

To achieve projected renewable energy capacity of 33.1GW by FY28, Maharashtra would need add additional 17-18 GW of capacity through a phased investment plan of ~**INR 1 - 1.1 Lac Cr (~$15-16Bn)**[265]**,** including investments in renewable energy generation, storage, and transmission infrastructure. Additionally, the state will also need to acquire around ~2.1 lakh acres[266] of land to achieve its renewable target [267], in a phased manner to achieve the installation target by FY28. Land requirement could be optimized further through hybrid (Solar and wind) projects and offshore wind projects.

Figure 59: Renewable energy capacity addition and required investments and land by FY28

Description	MW Addition	Required Investments (In INR cr.)	Required Land (In acres)
Solar	12,200	49,000	61,000
Wind	3,200	22,500	151,000
Others renewable energy[268]	2,250	12,500	-
Sub-total investment in generation[269]	**17,650**	**83,500**	212,000
Additional enablers and investments required			
Battery or storage[270]	1,300	7,800	-
Investment in transmission and distribution	-	15,700	-
Total	**~18,000**	**~107,00**	**212,000**

2.3.2 Total employment creation estimate

Maharashtra will be able to create additional jobs (short-term and long-term) for ~1.7 lakh people by FY28[271] if the projected renewable energy targets for solar and wind energy are achieved, with ~14 jobs per MW of solar energy addition and 1.5 jobs per MW of onshore wind energy addition.

[265] Assumptions for investment calculation: Solar energy: ~INR 4 Crore per MW, Wind energy: ~INR 7 Crore per MW, Other Renewable energy: ~INR 5.5 Crore per MW, Battery storage: ~INR 6 Crore per MW; All batteries estimated to be 4-hour batteries, Transmission infrastructure: ~INR 1 Crore per MW

[266] Additional land will be required for other RE (e.g., Bagasse, biomass), battery storage and transmission infrastructure.

[267] Assumptions: Solar energy: ~ 5 acres per MW, Onshore wind: Direct - ~2-2.5 acres per MW; Indirect (For spacing between turbines, which need not be acquired): 40 – 45 acres per MW Source: Concept Note on Development of Wind Parks/ Wind-Solar Hybrid Park, Ministry of New & Renewable Energy, Nov, 2020

[268] Includes Biomass, Bagasse, Small hydro and waste-to-energy.

[269] Additional investment would be needed in fossil fuel based thermal plants to bridge gap between energy demand and projected renewable energy supply. This is not included in the above analysis.

[270] Note: Calculations done for battery. MW needed estimated as renewable energy generated * Energy Storage Obligation for that year / 365 (battery sizing is in daily cycle)/ 4 (4-hour duration battery)

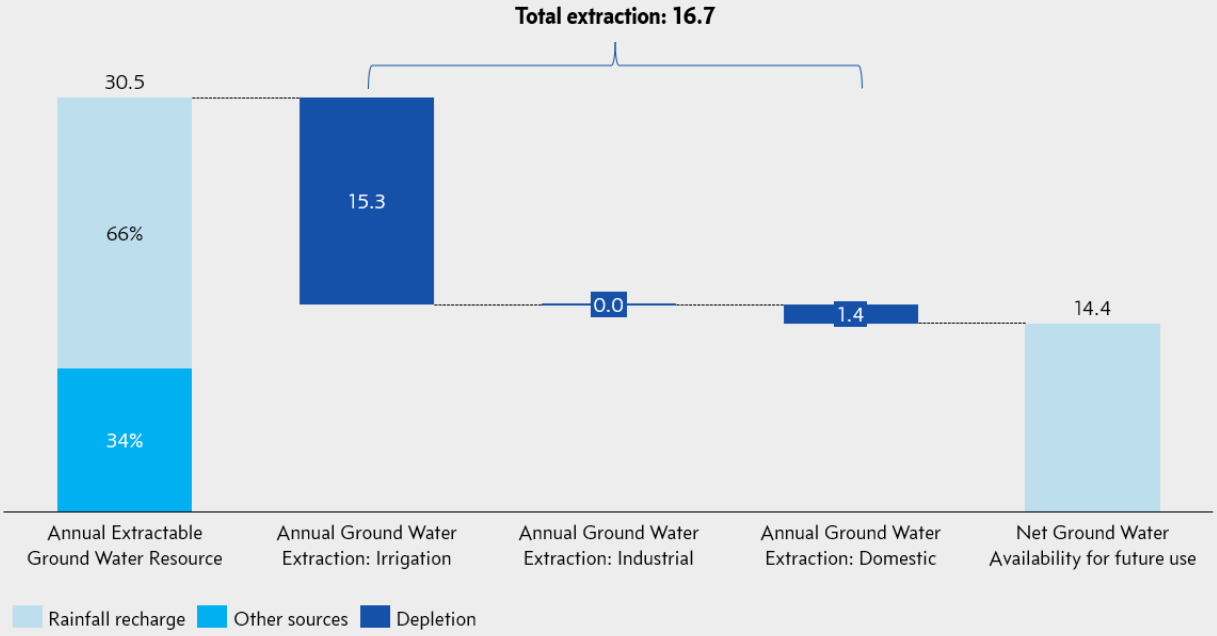
[271] Source: India's expanding clean energy workforce, Skill Council for Green Jobs, Jan 2022 ; Assumptions: Solar energy:~14 jobs per MW & Onshore wind:~1.5 jobs per MW

3. Circular Economy: Water

3.1 Overview: State baseline

Maharashtra has annual extractable ground water resource of ~30.5 Bn cubic meters (BCM), replenished through rainfall and other sources. Out of this, ~16.7 BCM is extracted primarily for irrigation (15.3 BCM), and domestic use (~1.4 BCM), as demonstrated in Figure below. Maharashtra's water consumption to availability is 55% and is within safe limits (<=70%). However, there is a need to arrest any deterioration on this metric – it has marginally increased from 54.2% (2013) to 54.7% (2022)[272] .

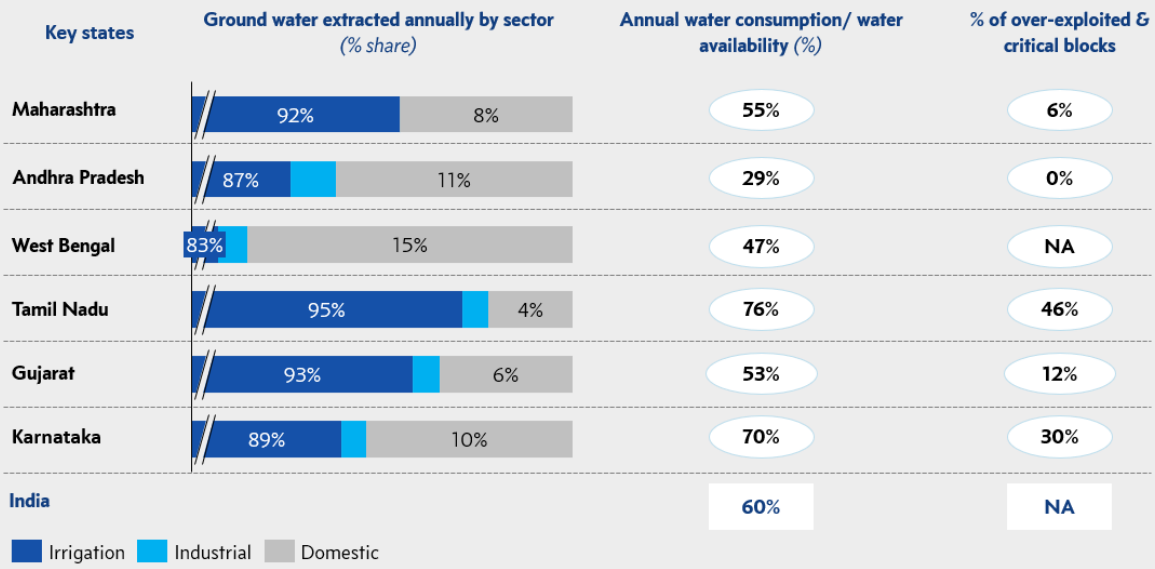
Figure 60: Groundwater usage in Maharashtra in Bn cubic meters in 2022.



Note: Other sources include recharge from canals, surface water irrigation, tanks, ponds and water conservation structures

State-wise comparison is demonstrated in Figure below. Key reasons for ground water extraction in irrigation are preference for cultivation of water-intensive crops (e.g., sugarcane, cotton, paddy) and availability of subsidized power for extracting water for irrigation through tube-wells and motors in Maharashtra.

Figure 61: State-wise ground water extraction in India in 2022



[272] National compilation of Dynamic ground water resources of India, Central Water Commission, 2022

3.2 Proposed interventions

In this section, 6 interventions are detailed to aid in sustainable water extraction.

A. Incentivize investments in micro-irrigation (such as drip and sprinkler irrigation) and collaborate with farmers to adopt water-efficient agricultural practises: Maximum irrigation area of ~56% is possible in Maharashtra (Figure 62, highlighted cell) vs. the India average irrigation potential of ~76.4%[273]. Hence, a need exists to increase the water use efficiency of the agriculture sector by adopting piped distribution for surface irrigation projects, minimizing their conveyance and evaporation losses, and converting last-mile farm application setup into micro irrigation (i.e., drip and sprinkler irrigation).

Figure 62: Incremental potential to increase irrigated area in Maharashtra through conservation efforts[274]

Description	Area	% of Gross sown area
Gross sown area of Maharashtra	233 Lakh ha	
Total cultivable area for irrigation (maximum achievable)	~90 Lakh ha	~39%
Additional irrigated area achievable with conservation efforts	41 Lakh ha	~18%
Total achievable	131 Lakh ha	**~56%**

Maharashtra Water Resources Regulatory Authority act has made it mandatory to adopt micro irrigation for perennial crops in the state from June 2019. ~64% of gross irrigated area has micro irrigation in Maharashtra. Current constraints for sprinkler/ drip irrigation are:

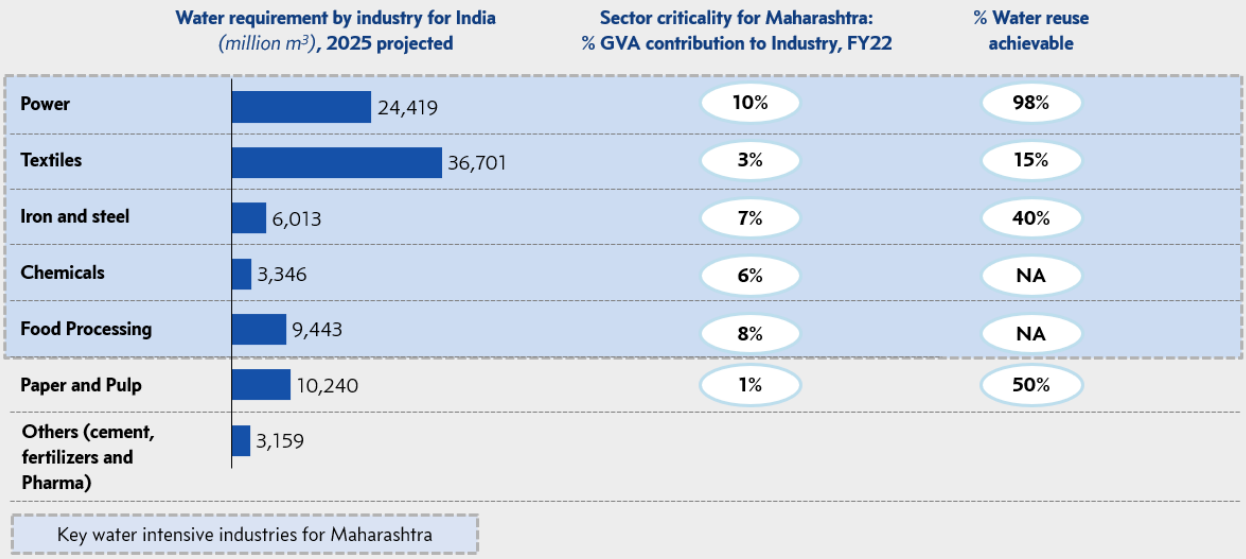
- High upfront costs coupled with non-effective subsidy for certified equipment.
- Lack of awareness of irrigation practises for each crop.

Additionally, to achieve more efficient usage of water in crop cultivation, it is advisable to adopt piped distribution network (PDN) over conventional flow (i.e., open canals) as their conveyance efficiency is ~90% compared to conveyance through unlined open canals with conveyance efficiency of 55-60%. Additionally, piped networks can also solve non-equitable use of water from the farmers in the upper reaches of the canal.

B. Promote wastewater use and recycling in water intensive industries: Water-intensive industries (e.g., thermal power plants, textiles, iron and steel) should be encouraged to set net-zero water targets to drive more efficient water use and achieve savings by taking up advanced zero-liquid discharge projects. These industries and their sectoral criticality for Maharashtra (GVA contribution) is captured in Figure 63. Further, industries within a certain range of a sewage treatment plant should use treated wastewater to reduce the burden on freshwater sources, due to significant potential to reuse water.

[273] Source: Water Source Department, Government of Maharashtra 2020
[274] Source: Agriculture Statistics at a glance, 2022 Government of India; RBI publications on state-wise pattern of land use

Figure 63: Water consumption and reuse by industry in Maharashtra



Note: Textiles include cotton ginning and apparel, iron and steel include metal fabrication, food processing include beverages

C. Build common effluent (CETP) and sewage treatment (STP) plants: At an aggregate level, the current effluent treatment capacity of Maharashtra is ~2,300 Mn Ltrs per day (MLD)[275] and is sufficient for the effluent generated in the state around 2,100 Mn Ltrs.[276] However, the state should evaluate:

- **Setting up CETP at new and existing industrial areas without a CETP facility,** as at present only 9 districts in Maharashtra have CETP units (25): Amravati, Kolhapur, Pune, Nagpur, Raigad, Ratnagiri, Sambhaji Nagar, Solapur and Thane. Three additional CETP are already proposed at Sangli, Nagpur and Thane with capacity of ~53 MLD.
- **Set up dedicated CETP plants to support aquaculture growth** in the state in the Konkan and Eastern Vidarbha (Gondia, Bhandara, Chandrapur, and Gadichiroli) region.
- **Assess the efficiency and cost effectiveness of existing CETPs** by analysing key parameters like treatment efficiency of the CETPs in terms of pollutant removal, compliance with environmental regulations, and the overall impact on water quality.

For sewage treatment, Maharashtra urban centres generate ~9,107 Mn litres per day (MLD) whereas only ~4,242 MLD gets treated. The state should further promote PPP projects, like the 200MLD plant set up in Nagpur by Vishvaraj Environment[277] and set up a program management team to expedite the construction of recently cleared (stuck for 20+ years) INR 26,000 Cr. STP project for adding 17,500+ Mn capacity in Mumbai.[278]

D. Enable tap-water supplies to ~38 Lakh additional rural households, as a part of Jal Jeevan Mission

Maharashtra has enabled 1.08+ Cr households with tap water supply out of a total of 1.46+ cr. household (as of 2023). This implies that it needs to enable tap-water supplies to balance **~38L** households (26% of total) by 2024. The 26% gap in rural household tap water supply is better than all India average gap of 41% but less than 0% gap in rural tap water supply in Gujarat.[279]

Further, IoT devices should be installed for measuring the consumption of water, quality, and water pressure to ensure transparency and efficient planning of domestic water usage. This digital tracking has been implemented on a pilot basis select villages in Maharashtra (i.e., Banvadi, Chorambe, Janori, Pimpalwadi and Tikekarwadi), and can be scaled up across Maharashtra.

[275] CETP: 203 MLD is operational. 52.64 MLD is proposed across 3 districts in Sangli, Nagpur and Thane and 2,100 MLD in ETP is from 16,597 plants, out of which 16,451 are compliant and 146 are non-compliant. Source: Maharashtra Pollution Control Board Annual report 2021-22 and Maharashtra Pollution Control Board (MPCB) website
[276] Source: Maharashtra Pollution Control Board Annual report 2021-22.
[277] Source: Know all about India's 1st & largest PPP to complete waste water reuse project, HT, Mar, 2021
[278] Source: Mumbai set to have network of 7 key sewage treatment plants. Why it took almost 20 yrs,The Print, Jan, 2023
[279] Source: Jal Jeevan Mission Dashboard

E. **Provide visibility of water data:** To drive better data-driven water decision-making, Maharashtra government can evaluate creating a **state water database** (showing both water sources and consumers). **This could include water-consumption tracking system covering all users, watersheds, and catchment areas.** This can be done on similar lines as Andhra Pradesh's portal APWRIMS (Andhra Pradesh Water Resources Information and Management System)[280].

F. **Drive investments in supply and treatment technologies**: Maharashtra government can support scaling up of mentioned technologies by providing financial support:
- Production of supply-altering technologies, such as desalination and atmospheric water generation
- Online monitoring for leakage detection, including advanced analytics for strengthening water distribution networks.

4. Circular Economy: Solid waste and Others

4.1 Overview: State baseline

Maharashtra generates ~22,500 TPD (Tonnes per Day) of waste, of which ~100% is collected. Of this: **15,000 TPD (~67%)** of **generated waste is treated** and **1,350 TPD (~6%)** of **generated waste is landfilled**. ~**6,200 TPD (~27%)** of the **total waste generated is unaccounted for**. In comparison to other states, Maharashtra fares well in waste treatment at ~67% vs. all India average of 50%, though there is some room for improvement compared to best-in-class states like Chhattisgarh at 100%.[281]

Solid waste can be further bifurcated by material type (e.g., paper, glass, organic, plastic, electronic) and amongst this electronic waste is one of the big categories, comprising ~4% of total solid waste in Maharashtra, with very low recycling at 1% in the state[282]. Maharashtra has a shortage of e-waste recycling capacity at only **~14% of generated e-waste.**[283]

4.2 Proposed interventions

Leveraging the principles of reduce, reuse, and recycle, Maharashtra can undertake 5 interventions to improve recycling levels via incentivizing collection, segregation, and setting up of recycling units, and reduce plastic waste generation through biodegradables development and by incentivizing use of sustainable alternative materials like paper cups and straws, cotton bags instead of plastic.

A. Improved collection and segregation of waste.

a. **Segregation at source:** Implement waste segregation policy, requiring households and commercial offices to separate waste into wet (biodegradable) and dry (recyclable) categories.
b. **Strict monitoring and enforcement:** Empower safai karamcharis to levy fines or penalty on unsegregated waste and to refuse collection. Alternately, state-wide enforcement of proposal by BMC (Brihanmumbai Municipal Corporation) that empowers office-bearers of housing societies to penalize non-segregation of waste by residents can be done[284].
c. **Public awareness and participation:** Launch numerous awareness campaigns, potentially involving local celebrities, schools, and religious institutions, to educate the public on the importance of waste segregation and cleanliness.
d. **Door-to-door waste collection:** Ensure 100% door-to-door waste collection, for household and residential complexes; semi bulk and bulk generators can be covered via bulk collection system.
e. **Set up segregation centres** across cities to facilitate secondary segregation of plastic waste into 25-27 categories and assist in recycling of plastic. Some of the techniques for sorting plastic waste, that can be

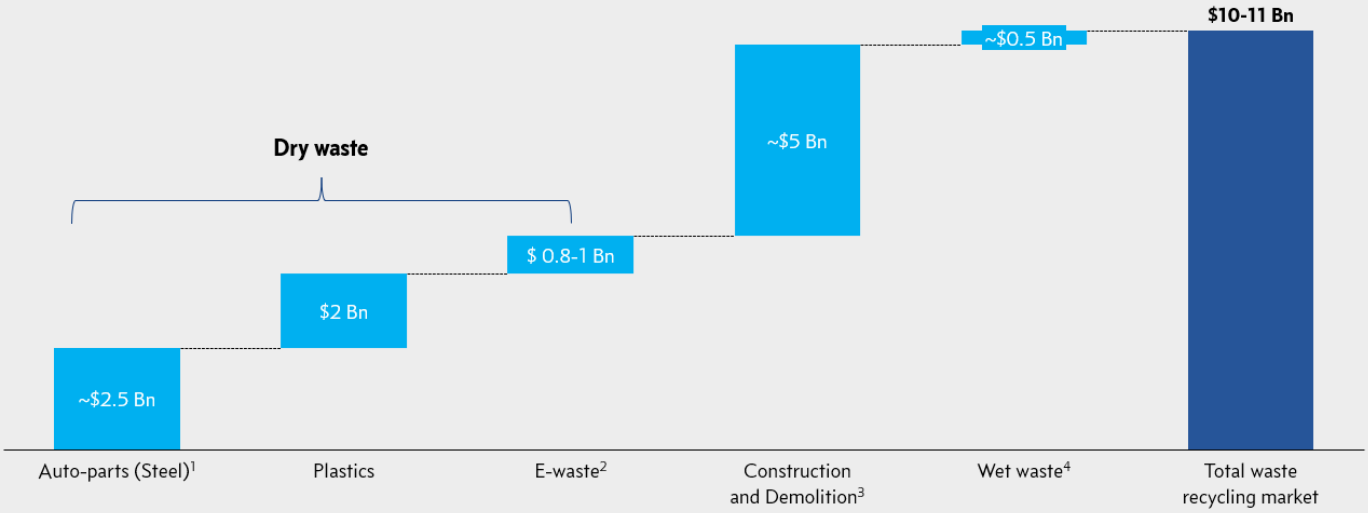
[280] Source: Andhra Pradesh Water Resources Information and Management System
[281] Source: Annual Report 2020-21 on Implementation of Solid Waste Management Rules
[282] Source: Maharashtra recycles only 1% of e-waste it generates: MPCB data, Indian Express, April, 2021
[283] Source: Pollution Control Board, Center for Science and Environment 2020 report
[284] Source: BMC allows housing societies to penalize residents not segregating waste, Sept' 2019

implemented: mechanical sorting (e.g., air classifier, ballistic Separator, and dry and wet gravity separation) and sensor-based sorting (e.g., plastic colour sorting, near infrared).

B. Incentivize set up of recycling units for key waste generating industries (e.g., E-waste, plastics, automobile)

Maharashtra can capitalize on the upcoming circular economy parks in Jalna, Ratnagiri, Pune, and Nagpur[285] to establish itself as the first state with a dedicated circular economy policy (upcoming), to capture economic opportunity across the waste recycling sector. ~$6-11 Bn revenue potential exists across all types. The parks can be leveraged to service waste generated from neighbouring states too.

Figure 64: Revenue potential by waste-type at India level[286]



Note: 1. Embedded steel in vehicles reaching obsolescence in 2025 8.6 Mn Tons X Scrap price $323/ Ton 2. Includes market size from gold extraction; large share of extractable value in e-waste is in precious metals: gold, platinum, and palladium. E-waste generated 1.8 Mn tonnes X Amt. of PCB in e-waste ~3% X % of gold in PCB ~0.04% = $1B opportunity in 2022 3. Concrete, soil, steel, wood and plastics, bricks and mortar and other salvaged building components. 4. Food, fruits and flowers, leaves and others

Maharashtra can implement following additional interventions[287]:

Policy interventions:

- Introduce Extended Producer Responsibility (EPR) framework for other dry waste (e.g., Paper, Textile, Tyres/Rubber, Metal and Glass) as current EPR framework is limited to only plastic and electronic waste and yet to be fully effective.
- Give investment incentives to private sector for setting up pyrolysis treatment plants to facilitate thermal degradation of plastic waste.
- Introduce policy to minimise marine plastic and usage of plastic material near coastal areas to grow and preserve marine population along Maharashtra's ~720 km coastline
- Set up ULB level dashboards for digitally capturing dry waste collection and management records.
- Support scaling up of nascent technologies/applications, and MSME participants (e.g., TPP project in Pune - a pilot initiative in Pune to implement circular model for plastic waste converting plastic waste to plastic flakes and high-value products such as printer filaments)[288]

Laws, mandates, and fines:

- Mandate use of recycled materials (25%[289]) in non-food grade packaging to ensure recycled materials uptake.
- Mandate cement kilns to use 25% non-recyclable combustible dry waste (RDF) replacing coal.
- Set up mechanism to monitor dry waste processing and rejects at the Urban Local Body level to reduce landfilling.

[285] Jalna: Steel Scrap, Ratnagiri: Shipbreaking, Pune: E-waste and auto components, Nagpur: multi-product
[286] Source: Ministry of Housing and Urban affairs, FICCI Circular economy Symposium 2018
[287] Source: Circular Economy in Municipal Solid and Liquid waste, Ministry of Housing and Urban Affairs
[288] The Protoprint Project (TPP) is a pilot initiative in Pune to implement circular model for plastic waste. It consists of waste processing units self-managed by waste-picker members. This setup helps integrate informal waste-pickers into the formal economy. Waste processing units are used to convert plastic waste into plastic flakes, which is sold to end users. Apart from production of flakes, the plastic is also upcycled into high-value products such as printer filaments.
[289] 25% recommended by Ministry of Housing and Urban in its' Circular Economy project.

C. Incentivize set up of recycling units for Construction and Demolition waste (C&D): Current C&D waste generated annually (2020-21) is ~38.5 lakh MT and only **~3% of it is recycled** with a significant ~**92% landfilled** without processing. Also, the current waste processing capacity of ~3.3 lakh MT[290] (at Pune, Thane, and Mumbai districts) constitutes **~9% of the total waste generated**.

Maharashtra can introduce following interventions to improve the recycling levels:

a. **Encourage set up of recycling facilities near major infrastructure projects** and adopt a decentralized cluster-based approach for establishing multiple recycling plants.
b. **Mandate use of certain percentage of recycled waste with the new construction material** for private and government contracts. Current construction & demolition waste management rules 2016 require local bodies to utilize 10-20% material from construction and demolition waste in municipal and government contracts.

D. Incentivize conversion of waste to energy: Maharashtra government has set a target of **200 MW** (as mentioned in the baseline of energy section) for power generation from Industrial waste in Maharashtra renewable energy policy 2015 and Non - Conventional Energy Generation Policy-2020. To ensure effective implementation Maharashtra can implement following interventions:

a. Encourage adoption of "Green Open Access" regulation where consumers procuring power produced from a waste-to-energy plant do not have to pay cross subsidy and additional surcharge.
b. Give financial assistance provided for setting up waste to energy plants[291] (e.g., power generation from bio and agro-industrial waste of INR 40 lakhs/ MW).
c. Revise Maharashtra state policy to offer reimbursement for evacuation expenses, limited to INR 1 Cr [292], boosting private capital participation. For e.g., Telangana introduced a capital subsidy would be limited to Rs. 5 crore or 20% of the project whichever is lower.

E. Reduce hard to recycle waste by introducing biodegradables (e.g., plastic substitutes, dies, pigments and paints) by providing incentives for greenfield setup of ecosystem (e.g., innovation centres, factories): Critical need exists to introduce bio-degradable alternates since the recycling of a virgin plastic material can be done only 2-3 times. After every recycling, the plastic material deteriorates due to thermal pressure and its life span is reduced. Hence recycling is not a safe and permanent solution for plastic waste disposal[293].

Maharashtra can introduce following interventions:

a. **Promote technology-based interventions** by incentivizing research, promoting partnerships with start-ups by organizing business-matching conclaves, OEMs (original equipment manufacturers) and industry stakeholders (e.g., FMCG, paint companies) for urban and rural local bodies.
b. **Foster collaboration with academia from other countries** (e.g., Brazil[294]) for institutes in Maharashtra (i.e., Indian Institute of Packaging[295]).

5. Decarbonisation

India has set ambitious targets under its Nationally Determined Contributions (NDCs) to mitigate climate change. India aims to reduce its emissions intensity of GDP by 45% by 2030 from 2005 levels, increase the share of non-fossil-based power capacity to 50% by 2030, and create an additional carbon sink of 2.5 to 3 billion tonnes of CO_2 equivalent through afforestation. Mumbai has also made commitments under Mumbai Climate Action Plan with interim and long-term targets of 30% emissions reduction by 2030, 44% by 2040 and net-zero by 2050 against base year emissions (2019)[296].

[290] Source: Annual Report on Construction and Demolition Waste Management Rules, 2020-21
[291] Source: Financial incentives by Government for implementation of major renewable energy programs, PIB
[292] Source: Grid connected Industrial Waste to energy projects, MEDA
[293] Ministry of Housing and Urban Affairs – Plastic Waste Management 2019
[294] Scientists based in Brazil and Portugal have developed an environmentally sustainable process to produce biodegradable plastic using pigment extracted from yeast by using green solvents.
[295] The Indian Institute of Packaging (IIP) is a national apex body set up in 1966 by the packaging and allied industries and the Ministry of Commerce, Government of India, to improve the packaging standards in the country. It provides Training and education services.
[296] Mumbai Climate Action Plan 2022

To support India objective, Maharashtra should aim to set decarbonisation targets to maintain focus on sustainability while achieving its growth ambitions. India's emission intensity in 2022 is estimated to be at 0.26 (Kg CO_2/PPP $GDP)[297] which is ~30% reduction from 2005 levels. In the same year, Maharashtra emission intensity is estimated to be at 0.21(Kg CO_2/PPP $GDP) which represents ~26% reduction from 2005 levels. State can target to reduce carbon emission intensity of 0.16 (Kg CO_2/PPP $GDP) by FY28 (45% reduction from 2005 levels) in line with India NDC target.

5.1 Setting accelerated targets for carbon-intensive sectors

Figure 65: Targets for carbon-intensive sectors

Sector	Metric	Current state	FY28 (Target)
Overall	**Emission intensity (Kg CO2/PPP $GDP)**	**0.21** (FY22)	**0.16** (NDC target of 45% reduction from 2005 level)
Energy	**Share of renewables in installed capacity**	**35%** (FY23)	**45%** (NDC target of 50% by FY30)
Manufacturing	**Share of hard-to-abate industries in Manufacturing GVA**	**25%** (FY22)	**22%** (Aligned with manufacturing GVA projections)
Transport	**EV penetration in new vehicle sales**	**2%** (FY22)	**30%** (India NITI Ayog target of 30% by FY30)

- **Energy:** As detailed earlier, government interventions would be required to drive initiatives for renewables transition e.g., utility scale solar and wind parks, solar feeder program in agriculture, capital incentives for captive solar to power-intensive industries, rooftop solar promotion
- **Manufacturing:** While share of hard-to-abate industries (steel, cement, chemicals, refining) is expected to reduce (based on GVA projections), technology innovation and adoption of carbon alternatives need to be promoted to reduce carbon intensity.
- **Transport:** Drive adoption of EV through incentives, mandates for public transport, investment in charging infrastructure, simplified procedures for charger connections and EV subsidies

5.2 Drive focused initiatives for other sectors with specific goals

- **Agriculture:** As detailed in agriculture section, state should aim to transition 1 Mn cereal and pulses farmers to natural farming and promote regenerative farming in sugarcane and citrus.
- **Construction:** As detailed in construction section, provide incentives for buildings using **green construction materials**, reduced stamp-duty charges for buildings with high energy efficiency, rainwater harvesting systems. Specific targets with timelines for net zero should be set for major infrastructure projects like seaports and airports with policy initiatives to drive sustainability. Urban development planning to include green ecological zones for carbon sequestration which could also be developed as key tourist attractions.
- **Water and waste:** As mentioned in water and circular economy section, promote **circular economy** for water and key waste segments (steel, biomass, e-waste, vehicle scrapping) through focused policies.

[297] Based on CO2 emission data from GHG India, Purchasing Power Parity (PPP) data from OECD and GDP from MOSPI data

Construction, Real Estate, & Logistics

Construction, Real Estate & Logistics

1. Executive Summary: Construction

- Construction sector contributes ~**$ 246 Bn** to India's GVA of which Maharashtra contributes **$ 25 Bn** (~10%).
- Growth in construction sector is critical as infrastructure is a key enabler for economic development.
- Construction sector GVA in India is primarily driven by capital outlay by state and central government.

Key opportunities for Maharashtra to achieve target GVA:

- **Integrated state master plan:** Maharashtra needs to define a state level infrastructure and urban development plan to ensure that infrastructure development is linked to growth of economic clusters
- **Increase capital outlay:** Maharashtra's capital outlay is $ 29 Bn from FY17-22 (10% of state spend). Opportunity for Maharashtra to drive Construction sector GVA to $53 Bn by FY28 (13% growth), by increasing capital outlay to $60 Bn in next 5 years.
- **Leveraging emerging technologies and promoting sustainable construction:** Incentivize contractors for use of new-age construction technology by including it as a key technical criterion in project bidding and mandating use of green construction materials in large infrastructure projects to drive sustainable construction.

Key enablers to support realization of opportunities:

a. **Execution process effectiveness:** Construction projects in Maharashtra face significant delays and cost-over runs (66% of large infrastructure projects in Maharashtra are delayed). Key opportunities across project lifecycle are summarized:

- **Planning:** Improving project planning by leveraging international consultants to publish quality Detailed Project Reports (DPRs)
- **Land acquisition:** Facilitating faster land acquisition by record digitization and linkage with registration, land acquisition and bank departments.
- **Project scoping:** Extending scope of large infrastructure projects to include smaller construction works (e.g., landscaping, wayside amenities etc.) to ensure that large contractors develop an entire parcel with high quality.
- **Contract awarding:**
  - Explore awarding lump-sum contracts vs. current process of using unit rate contracts.
  - Empanelment of all construction contractors across state, with periodic ratings (basis performance) audited by 3rd party.
  - Quality cum Cost Based Selection with weightage to technical parameters.
  - Ensure that sub-contracting of work does not exceed specific % of project value.
  - **Dispute resolution:** Adopting **alternate dispute resolution forums** like Arbitration Councils, can reduce time for dispute resolution.

b. **Capital raising:** Maharashtra will need to spend ~$ 60 Bn to achieve FY28 aspirational GVA target and hence leveraging central government schemes, multi-lateral financing, green bonds, municipal bonds, and innovative PPP models is critical for capital raising.

c. **Enabling urban local bodies:** Development of urban infrastructure is managed by Urban Local Bodies which face challenges in terms of capital raising, project management expertise. Hence, state can explore setting up state-level Urban Infrastructure Development agency to help ULBs with project structuring, capital raising.

2. Executive Summary: Real Estate

Real estate sector in Maharashtra is driven by Mumbai and Pune (~50% of new launches in Top-7 cities of India). Key opportunities are identified to resolve challenges and drive growth of real estate in Maharashtra:

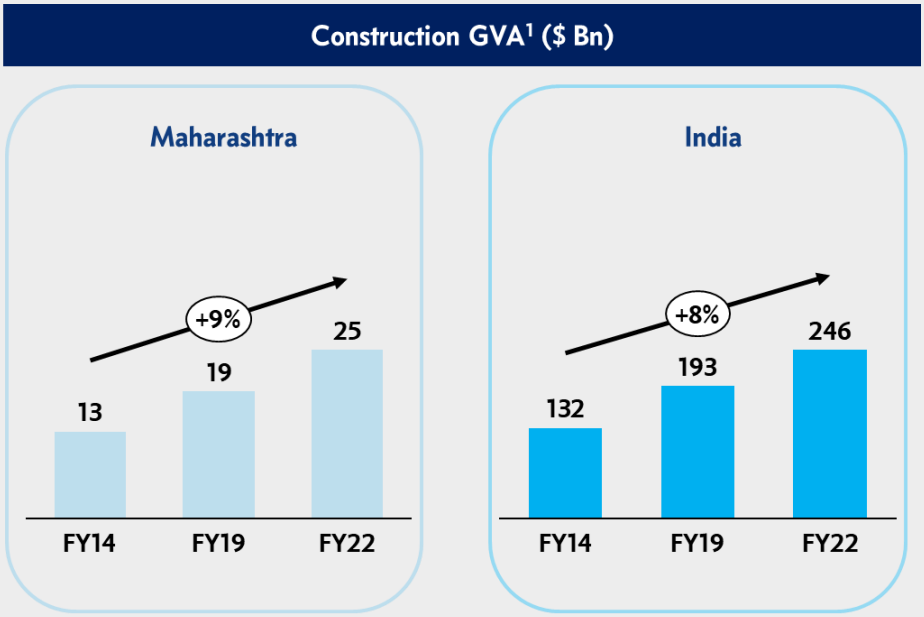
Opportunity areas	Key interventions and enablers proposed
1. Increase supply of land in Tier-1 cities of Maharashtra	
Unlock under-utilized and unutilized government land	• Leverage government land (e.g., Port Trust land), utilize land occupied by non-core infrastructure (jails, zoos, landfills)
Unlock stuck real estate projects	• Create state-level distressed asset fund to facilitate contractors to complete stuck real-estate projects.
Increase offtake of slum rehabilitation projects	• Cluster development (include adjacent areas) to ensure high-quality integrated development with better viability for the project developer. • Develop high-quality rehabilitated apartments with amenities to incentivize slum dwellers to stay at new property.
Develop satellite cities	• Develop satellite cities in radius of Tier-1 cities with integrated development of manufacturing and services sectors.
Review FSI and construction restriction guidelines	• Explore increase of FSI for affordable housing projects • Review development rules prohibiting construction near sensitive establishments (e.g., Central Ordinance Depots)
2. Increase penetration of affordable housing	
Leverage central government scheme (PMAY)	• Increase penetration of PM Awas Yojna in state (currently ~40%)
Provide fiscal and tax incentives	• Rationalization of stamp-duty and registration fees, taxes on prefabricated products and easing of byelaws.
Design standardization and adoption of modern technology	• Promotion of light-weight aluminium formwork, prefab modular structures to build affordable housing apartments.
3. Develop real estate markets in Tier-2 cities of Maharashtra	
Integrated development of Tier-2 cities	• Plan real estate market growth based on development of manufacturing and services sector in area. (e.g., Hospitality segment in high tourism areas, commercial real estate in areas with planned growth of Services.)
4. Provide dedicated zones for warehousing development with enabling transportation infrastructure.	
Warehousing Real Estate Development	• Identify dedicated zones with integrated transportation connectivity • Develop truck parks, affordable housing near warehouses.
5. Improve Quality of Life in Tier-1 cities of Maharashtra	
Develop and maintain public open spaces and green areas	• Convert no-development zones into open public spaces and green areas. • Increase capital outlay on development and maintenance of public open spaces and green areas.

3. Construction: State baseline

Construction sector contributed ~**$246 Bn** to India's GVA[298] (FY22), of which Maharashtra share was ~**$25 Bn (~10%).** Construction sector contributes ~**6%** to Maharashtra's GVA. Growth in construction sector is critical to enable growth in manufacturing and services sectors by developing transportation, logistics and energy infrastructure. Additionally, construction sector is a large employment generator for India and Maharashtra (~58 Mn people employed in construction in 2020).

Construction GVA and its contribution to the overall GVA for Maharashtra:

Figure 66: Construction GVA growth



1. Gross State Value Added=GSVA= GSDP - Taxes + Subsidies

3.1 Capital outlay:

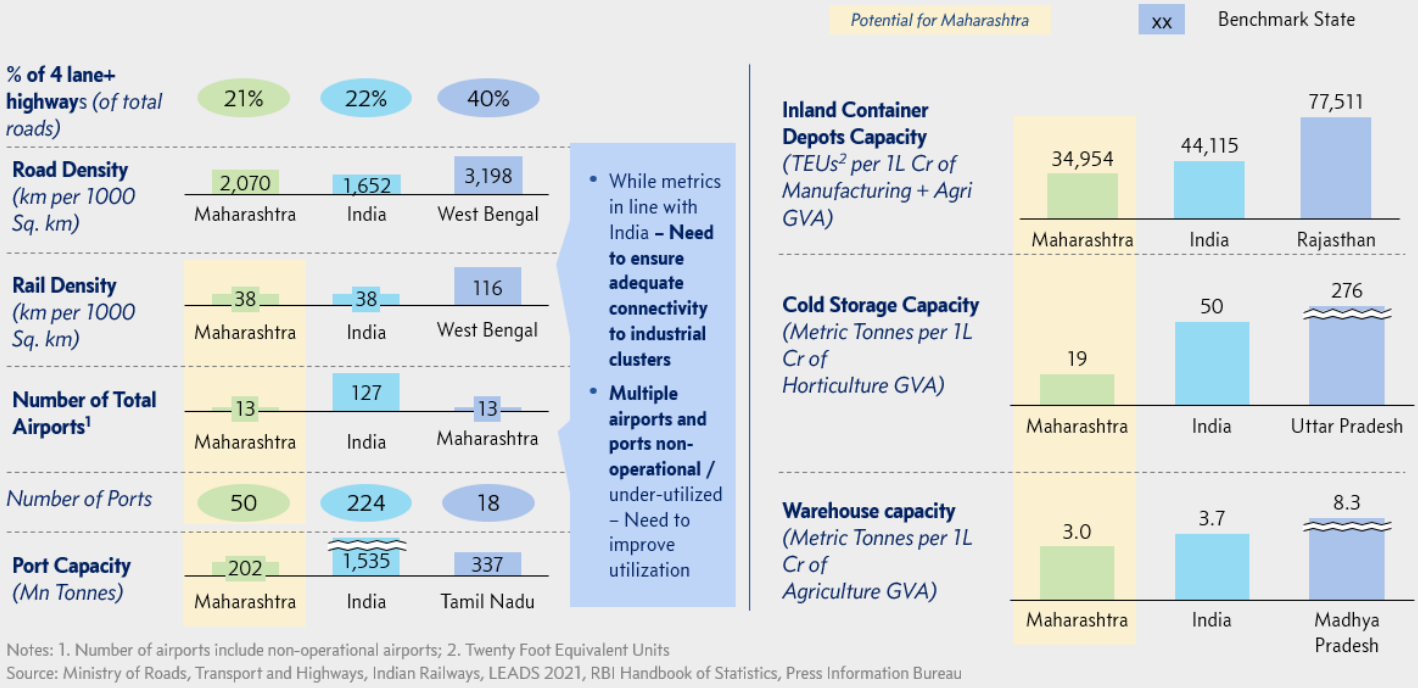
Maharashtra has allocated ~**10%** of its total expenditure as capital outlay ($29 Bn) from 2017-22[299]. Capital outlay from Government drives infrastructure development (~70-75% spend on infrastructure is from State or Central Government), hence higher spending is critical to drive infrastructure development.

3.2 Infrastructure statistics:

Key infrastructure statistics in Maharashtra are compared vs. India and benchmark states to understand potential for improvement. These have been represented in the next figure:

[298] Source: Ministry of Program Statistics and Implementation, Annual Survey of Industries
[299] Source: RBI Report on State of State Finances, Nov'22

Figure 67: Infrastructure Statistics



Notes: 1. Number of airports include non-operational airports; 2. Twenty Foot Equivalent Units
Source: Ministry of Roads, Transport and Highways, Indian Railways, LEADS 2021, RBI Handbook of Statistics, Press Information Bureau

Benchmarking of Maharashtra's infrastructure statistics demonstrates potential opportunity for improvement across:

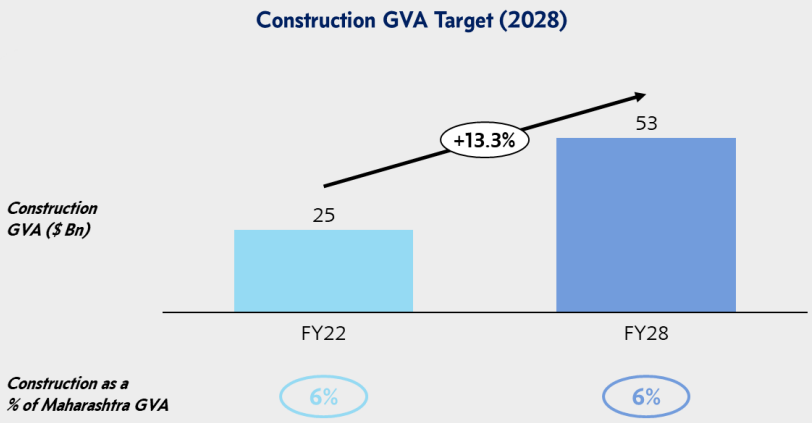
- Transportation infrastructure like road, airport, and port capacity.
- Logistics infrastructure like inland container depots, cold storage, and warehouse capacity vs. national average, which is critical to develop clusters for agriculture.
- While railway density is at-par with national average, ensuring that railway routes are connected to industrial and agricultural clusters is critical (e.g., ports need to be linked by rail to major agricultural and industrial clusters).

  Taking aspirational targets into consideration, development of infrastructure for next 5-10 years needs to be planned by state in an integrated manner: State will need to identify industrial and agricultural clusters which will be developed in next 5-10 years and identify suitable infrastructure to be developed around those clusters.

3.3 Aspirations for Construction GVA:

To support aspirational growth target of achieving $ 1 Trillion state GDP by FY28, Maharashtra needs to build enabling infrastructure across sub-sectors like transportation, logistics and energy. High target growth in core sectors (manufacturing sector growth aspiration at 19% from FY22-FY28), will lead to increased demand for infrastructure assets. Construction sector GVA has the potential to grow from $25 Bn in FY22 to $53 Bn in FY28. This will require growth of ~13% CAGR through FY28.

Figure 68: Construction GVA aspiration for Maharashtra by FY28



Investments required to achieve aspirational target of Construction GVA in FY28: Basis historical GVA to Capital Outlay ratio[300], an investment of ~ $60 Bn will be required from FY23-FY28 to achieve target GVA by FY28.

4. Construction: Key opportunities and enablers

GVA from construction sector is driven by Government spending and hence, to achieve FY28 target of ~$53 Bn GVA from construction sector, state will need to increase capital outlay.
This capital outlay will be needed to be planned across sub-sectors to boost key infrastructure metrics. For example, road and rail density (connected with the right clusters), cold storage capacity per 1 Cr of agricultural GVA.

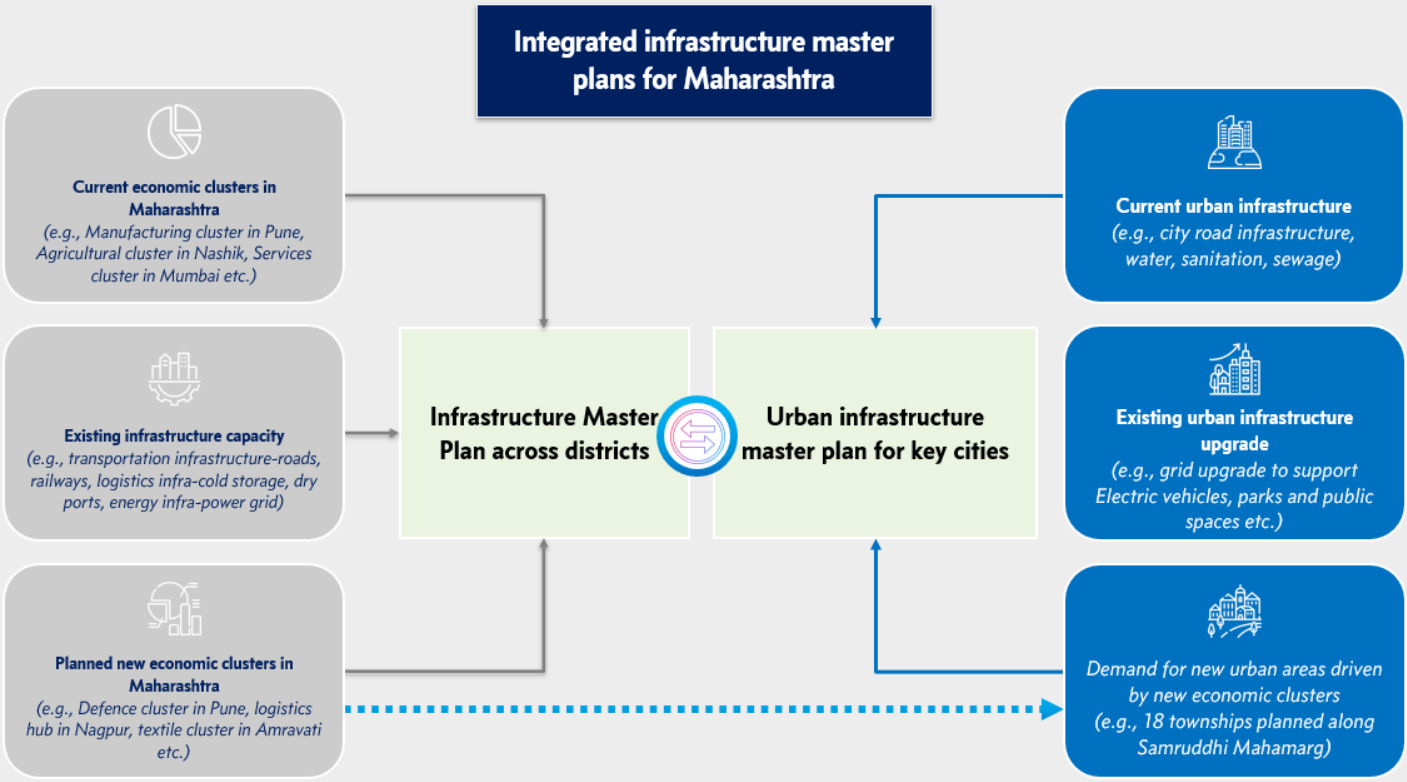
Construction sector faces challenges with delayed projects which have high-cost over-runs. For example, ~**66% of large infrastructure projects** (Value> INR 150 Cr) are **delayed in Maharashtra** resulting in additional costs of INR 20k+ Cr. Hence state will need to ensure effective project execution to ensure timely project delivery while enabling Urban Local bodies to develop Urban infrastructure efficiently.
As state will require ~2X capital outlay to achieve target GVA by FY28, multiple sources will need to be leveraged (e.g., multilateral financing, green bonds etc.). These opportunities and enablers are summarized in the next figure:

Figure 69: Construction - Key Opportunities and Enablers

[300] Historical Ratio of 0.9 used basis average of Benchmark States-Maharashtra, Uttar Pradesh, Tamil Nadu, Gujarat, and West Bengal

4.1 Identifying state level master plan for infrastructure development:

Figure 70: Integrated infrastructure plans for Maharashtra



Capital outlay on infrastructure needs to be aligned with growth of economic clusters to ensure that productive and relevant infrastructure is developed in right locations in the state.

- State can define an **integrated master plan** for development of district level infrastructure by mapping existing and planned economic clusters for the next 5-10 years to create an infrastructure development roadmap.
- **Capital outlay will need to be budgeted across sub-sectors** basis current infrastructure availability, planned growth in clusters, budget and timeline constraints.
- Master plan can **ensure multi-modal connectivity to link economic clusters to the world.** For example, ports need to be connected via railways to ensure smooth transport to ports for exports of agriculture products. (e.g., currently Dighi port in Raigad district is not connected to major industrial and agricultural clusters via efficient railway network).
- Additionally, state will also need to develop an **urban infrastructure plan**, which plans for real estate growth in alignment with provisions for utilities, public and open spaces.

4.2 Increasing state's capital outlay:

Maharashtra's capital outlay (from FY17-FY22) is $29 Bn and capital outlay as a share of total spend is 10% from FY17-FY22 indicating potential for Maharashtra to increase capital outlay across key sub-sectors like Transportation, Logistics and Energy Infrastructure.

4.3 Ensure that Maharashtra enables adoption of emerging trends in sustainability and construction technology

4.3.1 Ensure that sustainable construction practices are adopted for all major construction projects in Maharashtra:

Maharashtra's carbon emission intensity is estimated to be ~0.21 (Kg CO_2/PPP $GDP), which needs to be reduced to 0.16 (Kg CO_2/PPP $GDP) by FY28 to help India achieve Nationally Determined Contribution (NDC) targets. Reduction in carbon emission requires decarbonization of construction sector which has a 22% share in India's CO_2 emissions. Maharashtra government can **mandate use of sustainable practices** for large infrastructure projects:

- Use of **green construction materials** (e.g., slag and fly-ash based concrete, fiber reinforcement and M-Sand) to reduce carbon footprint of construction sector.

- Mandate **minimum use of pre-cast concrete elements** (potential to reduce carbon emissions vs. in-situ cast concrete by ~20-25%). National Highway has mandated a minimum of 25% use of pre-cast concrete elements for projects executed in 100km range of pre-cast factories.
- Mandate EPC companies to **report percentage adoption of green practices in their Sustainability Reports**
- Government can **incentivize recycling of construction waste** (currently only 3% of construction waste is recycled) by developing infrastructure set-up near major projects and mandating a certain percentage of recycled waste. These interventions are detailed further in the Energy and Sustainability section.

4.3.2 Pioneer new-age construction practices in Maharashtra:

Government of India has launched Lighthouse projects to promote emerging construction technologies. Maharashtra can become the pioneer in ensuring high adoption of these emerging solutions in state projects.

Key emerging trends and technologies include:

- **Pre-cast and prefabricated** components (e.g., walls, slabs, beams) which can be assembled on site to reduce construction timelines.
- Higher use of **structural steel** (vs. concrete columns), steel fibers and use of light gauge steel frames to reduce construction cost, improve quality and reduce timelines.
- **LiDAR based project monitoring** and surveys, **smart connected worker solutions** (e.g., wearables) and **collaborative robots** can help improve speed of construction and enable project monitoring.

Maharashtra government can explore the use of suitable emerging technologies in large projects. Appropriate weightage can be attributed during bid evaluation for players demonstrating experience in using such technology.

4.4 Improve execution process effectiveness:

While state needs to improve capital outlay and prioritize development of specific sectors, improving project delivery will be critical. Infrastructure projects in Maharashtra suffer from **delays, cost over-runs and quality issues. ~66% of large infrastructure projects** (Value> INR 150 Cr) are **delayed in Maharashtra** resulting in additional costs of INR 20k+ Cr. **Quality of construction** projects is a key challenge (~40% of roads managed by Public Works Department in Maharashtra are reportedly in poor condition)[301]

Key interventions and enablers have been identified across project lifecycle (from planning to delivery) via interactions with industry stakeholders, industry reports and recommendations from Finance Ministry, Government of India to mitigate challenges faced currently:

Figure 71: Execution Process - Key Interventions and Enablers

Data represented in the next section on execution process effectiveness is sourced from KPMG-PMI study on infrastructure projects supported by Ministry of Statistics and Programme Implementation (2019)

[301]Source: Condition of roads under my department extremely bad: Maharashtra PWD Minister Ravindra Chavan, Indian Express, Sep 2022

4.4.1 Project planning:

~55 - 60% of construction industry stakeholders cite sub-optimal Detailed Project Reports (DPRs) as a primary reason for delay of projects during planning stage in India.

Potential interventions and enablers: State government should ensure high-quality Detailed Project Reports (DPRs), with proper field investigations and surveys. State government can consider leveraging international consultants (Recently Minister of Road Transport and Highways has suggested a similar approach for NHAI projects).

4.4.2 Land acquisition and project approvals:

~75% of Construction Industry stakeholders cite delays in land acquisitions[302] (fragmented land parcels with unclear land titles, local agitations by landowners, challenges in estimating fair value of land are key issues in land acquisition) as a key reason for delay of projects.

Potential interventions and enablers: Key interventions focus on acquiring land before project initiation, land record digitization to enable faster acquisition, alternate models for land use & single-window clearances for approvals.

a. **Land acquisition:**
   - Awarding of contracts only after ~80-90% of land is acquired from landowners.
   - Securing Right of Use, shifting of utilities and removal of physical encumbrances including encroachments before contract awarding.

b. **Land record digitization and linkage:** State Government can target **100% land record digitization with geo-fencing** and unique land numbering system, **linked to registration department, acquisition offices and banking systems** to facilitate faster land acquisition.
   - Karnataka has created a **centralised land records database integrated with the registration department**, Land Acquisition Offices and banking system, resulting in reduction in the time spent initiating ownership record transfer from 31 days to 2 days.
   - Similarly, Maharashtra's SARITA, a web application that centralises the administration and implementation of the registration process of land, can be integrated with land acquisition offices.
   - **Land pooling** is a model in which landowners collectively hand over land to government for infrastructure development and retain ownership of portion of land after development. Benefits of land pooling includes transparent compensation for landowners, resettlement, and rehabilitation to fast-track process
   - Land pooling model **can be adopted for infrastructure projects in Maharashtra to expedite new infrastructure projects.** For example, Punjab Government provides landowners with developed plot of industrial or commercial land in lieu of cash compensation for agricultural land offered under new land pooling policy in 2020.

c. **Project approvals:** State government should ensure that all **requisite permissions** (Environmental, Central government permissions etc.) are taken before project awarding, **through a common single-window system**. All approvals should be given **online to ensure transparency and track timelines**.

4.4.3 Project Scoping:

Scope changes contributed ~5% to delays in project completion[303]. Inadequate detailing during project planning results in scope changes, or scope creep during project execution. For example, incomplete soil investigations, improper material estimation, structures required on ground not being captured in detailed project report.

[302] Source: Revamping Project Management, KPMG-PMI, June 2019
[303] Source: Revamping Project Management, KPMG-PMI, June 2019

Potential Interventions and enablers:

- Clear provisions and clauses in tender documents need to be defined along with fundamental information on technical specifications, drawing and commercial terms.
- Additionally, during planning of large infrastructure projects, scope should include **development of areas in proximity of project** such as development of wayside amenities, water body restoration. Including development of surrounding areas as part of project scope will ensure integrated development by large contractors without need for additional tendering.

4.4.4 Tendering and Pre-Qualification:

87% of respondents to KPMG-PMI study stated that improper contractor selection is the root cause for project performance shortfall. Key opportunities to enable selection of right contractor are detailed:

a. **E-tendering:** 100% online tendering should be conducted to improve project visibility to multiple stakeholders and ensure a transparent process.
b. **Contract Structuring:**
   - Construction contracts in India are typically Unit Rate Contracts (i.e., type of contract based on estimated quantity of materials and labour).
   - State should adopt a **tiered approach for contract structuring**: **Viability of using PPP (BOT) model** of contracting should be checked first**, if not viable, PPP (annuity) model should be checked, followed by EPC (lumpsum) model.**
   - **Unit rate contracts should be limited to smaller projects**, as responsibility of managing project within timelines and cost is with the nodal agencies in such contracts. Transitioning to EPC (lump sum) contracts can be beneficial as responsibility of managing timelines and cost is passed to contractors.
   - NITI Aayog has drafted model contracts as guidelines for awarding of EPC contracts. Model contracts cover multiple key items like obligations of the contractor, obligations of the authority, representation of warranties. Using **model contracts suggested by NITI Aayog** should be mandated for state and urban local body projects in Maharashtra. This will ensure consistency in contracts across projects and districts in the state.
c. **Contractor Empanelment:**
   - State of Maharashtra can pioneer **empanelment of construction contractors** across districts. Contractors across districts can be empanelled on a **common platform developed by state** and list of such contractors should be shared with all project implementation agencies.
   - **Classifying contractors based on work experience, project delivery performance and financial strength** can help the state identify high-quality vendors across districts for specific type of projects.
   - **Performance monitoring and periodic updation** of empanelled list of these contractors can be assigned to an independent 3rd party.
d. **Pre-Qualification: Allowing only contractors with specific work experience and project delivery experience** to bid for large infrastructure projects can be mandated. Scoring of empanelled contractors by 3rd party can be leveraged for pre-qualification.

4.4.5 Bid Evaluation and Contract Awarding:

a. **Quality cum Cost Based Approach:**
   - Historically, **lowest cost bids** (L1) are accepted to optimize project costs. However, lowest cost bids do not ensure high-quality project completion, and contractors claim viability funding during project execution to cover costs.
     Hence, adopting a **Quality cum Cost Based Approach** (QCBS) for infrastructure projects should be considered by State of Maharashtra, where **non-financial parameters** can be assigned specific **weightage** in bid evaluation (Finance Ministry of India recommends upto **30% weightage).**
b. **Single bid assessment:** Finance Ministry of India notes that procuring entities assume that open tenders which result in a single bid are not acceptable and go for retendering. However, rebidding has associated costs namely

cost of rendering, delay in execution of work and possibility of a higher bid during rebidding process. Hence, **absence of multiple bids** for a project should **not be the sole reason for re-tendering/acceptance[304].** If a single bid matches qualification criteria, project should be awarded to that contractor. Re-issue of tenders for such cases should not be mandatory.

c. **Managing Joint Venture Contracts:** In Joint Venture Contracts, small contractors typically partner with larger experienced international contractors and leverage their name to win bids. However, these **larger contractors do not get involved in project execution** which impacts project quality and completion timelines. Hence, in infrastructure projects, larger experienced contractor should be **mandated to demonstrate on-field project involvement.** This should be checked by 3rd party through periodic audits.

4.4.6 Project Management:

a. **Project milestones:** Defining fixed project milestones to facilitate smooth cash flow for contractors and ensuring that excessive front or back-loading is avoided.
b. **Sub-contracting:** Ensuring that principal contractor does not sub-contract more than certain % of work is critical to maintain timelines and project quality.
c. **Timely decision making:** Delays in decision making during project execution (for project scope, material procurement, design finalization etc.) result in ~5% of delays. Hence **empowering project implementing agencies is critical:**
   - Project implementing authorities should be **enabled to take decisions on items which can impact project timelines**; deemed approvals should be enabled from agencies after specified duration.
   - To change contractors in cases of non-performance of appointed contractor.
d. **Leveraging technology:** Using technology like drone monitoring, building information modelling, equipment and labour productivity tracking can be used to efficiently monitor projects.

4.4.7 Dispute Resolution:

Inordinate delays in dispute resolution and litigation result in significant project delays (Dispute resolution is estimated to contribute ~5-6% to project delays)[305].

- **Allowing litigation only post certain threshold of work completion** by contractor and mandating a security deposit before proceeding for litigation can reduce cases where contractors move to courts.
- Adopting **alternate dispute resolution forums** like Arbitration Councils, can reduce time for dispute resolution. Arbitration Councils can be formed with Retired Judges, Subject Matter Experts (like Construction Industry Professionals from other states to maintain impartiality)
- Forming **fast-track courts to settle Infrastructure specific disputes** can be piloted in Maharashtra.

4.5. Leverage multiple sources for capital raising:

Private participation in infrastructure projects is **~25%** (Rest is funded by Central and state government). In Urban Infrastructure Development, private participation is <5%. Municipal Bond Market size in India is only $ 0.6 Bn (1/6th of Municipal Bond Market in South Africa). State of Maharashtra will need to **explore use of multiple sources of funds** to finance infrastructure:

- **Leveraging central government schemes:** Investments from Central government (Indian government has planned investments of $1.4 Trillion in next 5 years for infrastructure development)
- **Multi-lateral Financing:** State can explore financing from international bodies like World Bank, Japan International Cooperation Agency, and Asian Development Bank for which Central Government can provide guarantees basis project requirements.
- **Green Bonds:** Green Bond Market in India is $ ~20 Bn (<4% of overall corporate bond market)[306], which can be leveraged by Maharashtra for infrastructure development specifically renewable energy projects.

[304] Source: Ministry of Finance, Government of India recommendation as part of General Procurement Guidelines, 2021
[305] Source: Revamping Project Management, KPMG-PMI, June 2019
[306] Source: Fitch Ratings Report, Jan'23

- **Municipal Bonds**: Funds raised by Municipal Corporations in India is <$ 500 Mn between 2017-2021[307] , in comparison to the US municipal bond market being ~$ 4 Tn[308]. Repayment of coupons on time is critical to gain confidence of investors, which some municipal corporations have been unable to do.
- **Innovative PPP models:** Private sector participation can be boosted by creating a regulatory sandbox for testing innovative PPP models (e.g., allowing open access to select railway segments and deploying hybrid-till airport models in other sectors).
  Uttar Pradesh government has attracted private investment for development of Integrated Cargo terminal at new Noida airport, by enabling Joint Development Agreements (JDAs).

4.6. Improving Urban Infrastructure via targeted interventions for Urban Local Bodies:

Urban Local Bodies (ULBs) are Municipal Corporations, Municipal Councils and Nagar Panchayats. ULBs are mandated to perform functions like Urban Planning, regulation of land-use, providing services like fire safety.

Key challenges faced in urban infrastructure development:

- Urban Local Bodies are **reliant on state government for funds** (40% funds for ULBs are provided by state and Centre) and hence face challenges in planning and executing large infrastructure projects on their own.
- Urban Local Bodies face **capability issues in managing projects** due to lack of skilled manpower, technical expertise, and limited professional project planning experience.[309]
- Only ~20% of budget[310] allocated from Central government schemes like Smart Cities Mission, AMRUT scheme has been utilized in last 5 years.

Key Interventions and enablers:

Municipal Corporations in Maharashtra should consider leveraging alternative sources of funds:

a. **Municipal bonds:**
   - Municipal Corporations in Maharashtra with an investment grade rating can be enabled by Maharashtra government to raise private financing through bond placement.
   - Suitable risk guarantee frameworks can be developed to support corporations.

b. **Pooled Finance:**
   - Pooled financing operates by creation of a **State Pooled Finance Entity** (SPFE), which can be registered either as a trust or a Special Purpose Vehicles (SPV)[311]
   - Bonds are issued by SPFE, and debt servicing is **financed through the pooled revenue stream** of the participating municipal bodies.
   - Creating a SPFE **lowers the cost of bond issuance** for individual local bodies and enhances the creditworthiness of the bond issued, as the risk gets hedged over all participating municipal bodies.

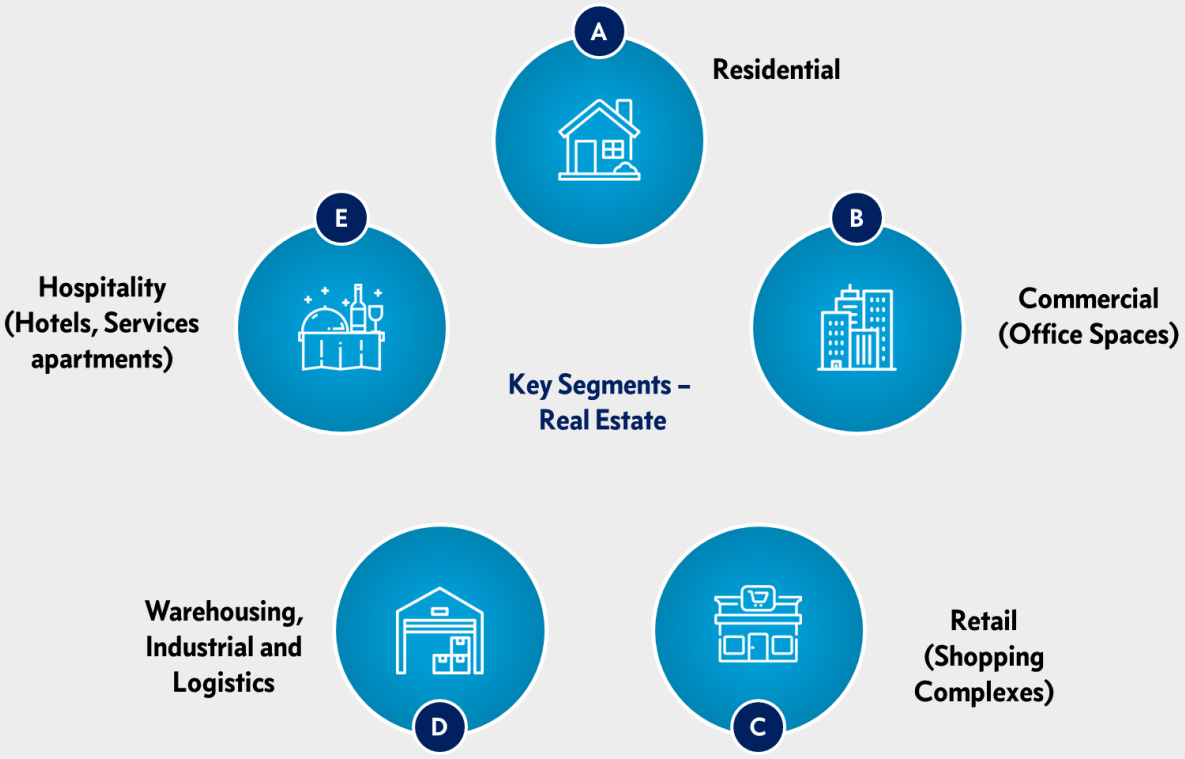
The state will need to invest in **improving capability of Urban Local Bodies**. A state level Urban Infrastructure Development Agency can be deployed which can help smaller ULBs with project structuring, providing payment guarantees etc.

[307] Source: State of ULB Finances, Reserve Bank of India
[308] Source: India's-shallow municipal bond market held back by revenue and planning constraints.
[309] Source: Reforms in Urban Planning Capacity in India, NITI Aayog report, September 2021
[310] Source: Mckinsey Global Institute Report, 2020.
[311] Source: Report on ULB Finances, Reserve Bank of India, 2022

5. Real Estate: State baseline

Mumbai and Pune are in the Top 7 real estate markets in India accounting for ~50% of total launches[312] in FY22.
Key Segments: Real Estate Segment includes **5 key segments**-

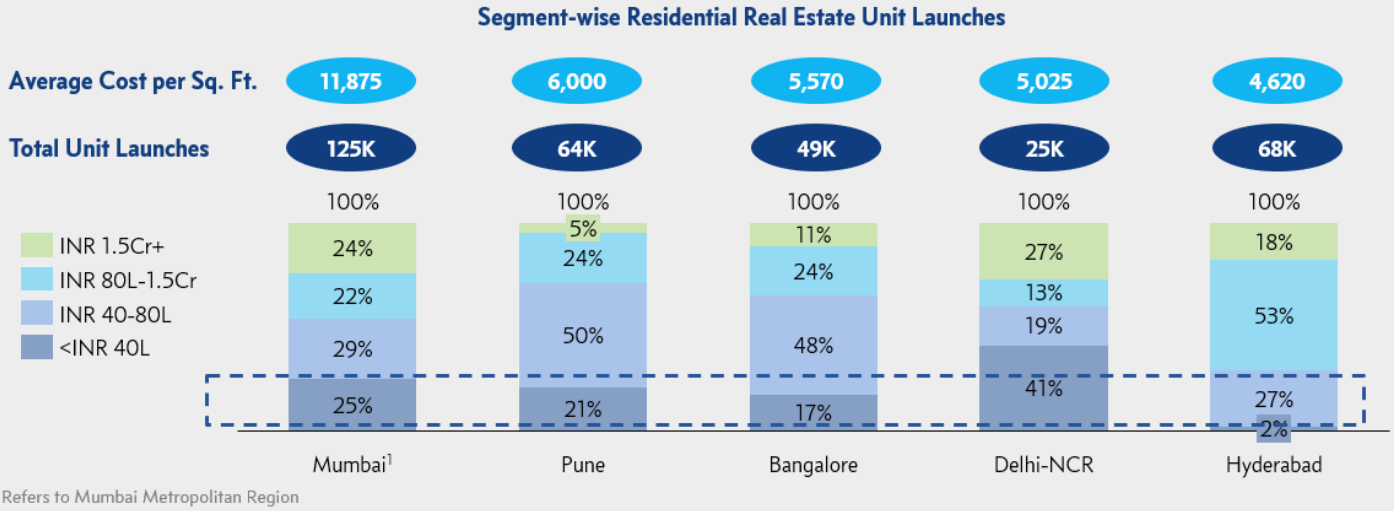
Figure 72: Key Segments in Real Estate



A. Residential Real Estate:

Residential real estate is the largest segment in Real Estate. Mumbai and Pune are key markets. The launch of new residential projects in Mumbai Metropolitan Region (MMR) was ~**1.8x** of Hyderabad (2nd highest) in FY22. Share of units with value <INR 40 lacs was **20-25%** in Mumbai and Pune vs. ~**40%** in NCR. Average price per Sq. Ft in Mumbai is ~**2-2.5x** of Bangalore, NCR, and Hyderabad[313].

Figure 73: Segment-wise Residential Real Estate Launches



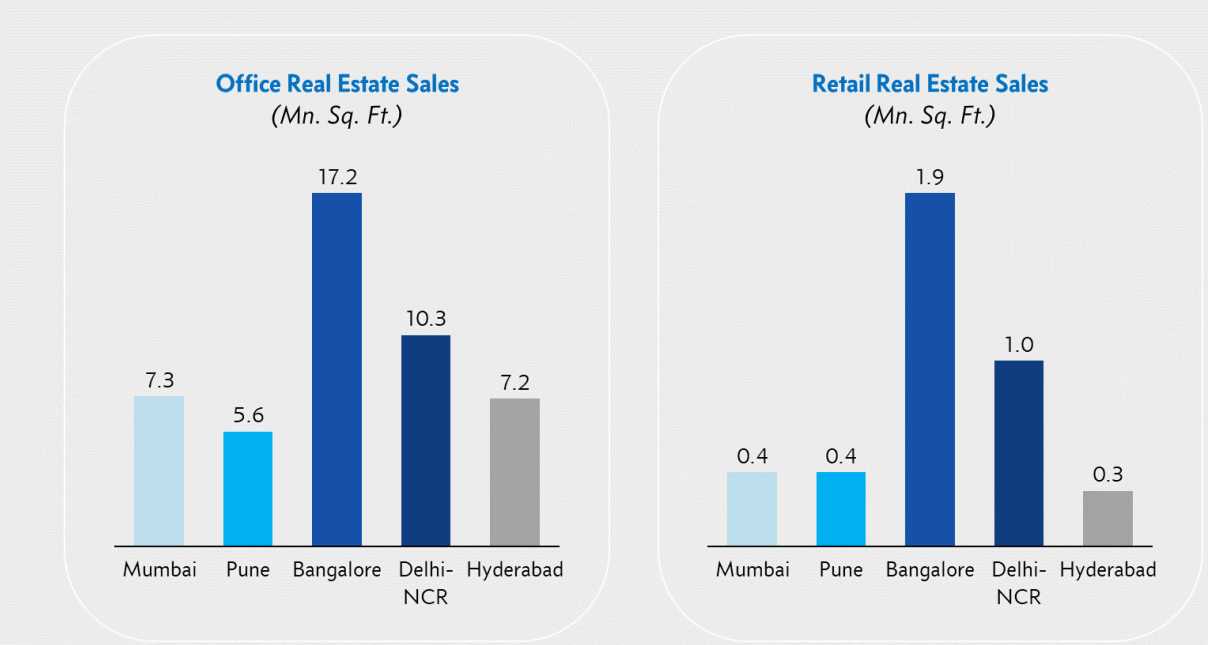
1) Refers to Mumbai Metropolitan Region

[312]Source: Anarock Research Report on Residential Real Estate
[313] Source: Anarock Research Report on Residential Real Estate

B, C. Commercial & Retail Real Estate:

Mumbai and Pune's combined retail and office real estate sales were **~0.4-0.75x** of Bangalore[314] in FY22.

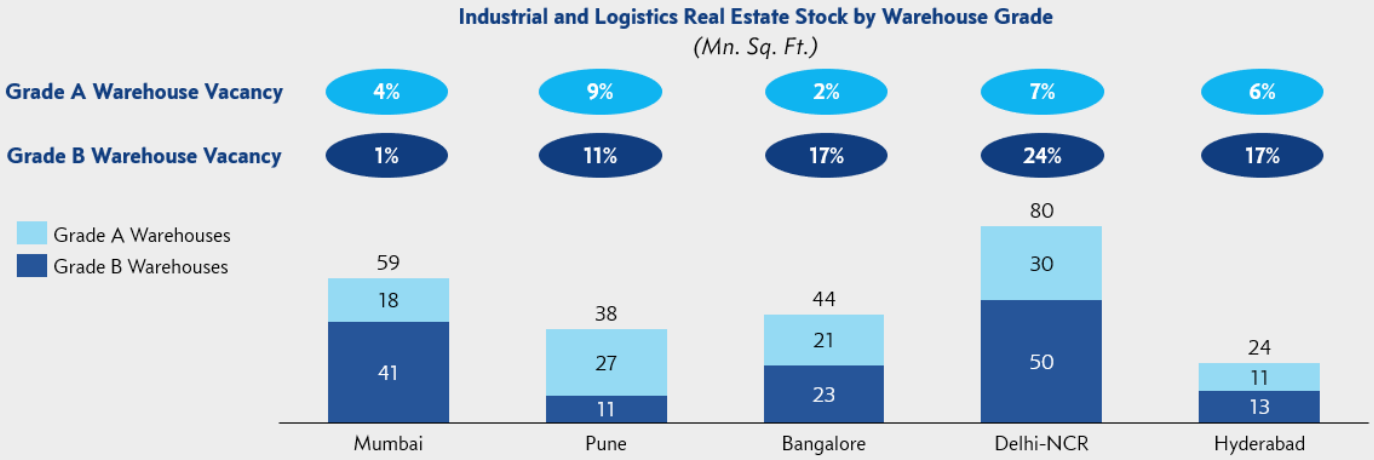
Figure 74: Commercial and Retail Real Estate Sales



D. Warehousing:

- Mumbai has the 2nd highest **industrial warehousing real estate stock** in the country, **~0.75x of Delhi-NCR**[315]
- Warehouses are classified as Grade A or Grade B on the of basis availability of extra height, high-performance flooring systems etc. Share of Grade A warehousing in Mumbai is **30% vs. ~50%** in Bangalore[316], and the vacancy of Grade B warehousing is only 1%, potentially indicating that Grade B warehouses are being used due to shortage of Grade A warehousing stock in Mumbai.

Figure 75: Warehousing Real Estate Stock



E. Hospitality: Tourism directly contributes ~3% to state's GVA at ~$11 Bn. Maharashtra has ~13,000 branded hotel rooms. Baseline of Hospitality sector and key interventions is covered separately as part of Tourism section.

Ease of living: An integrated approach to developing real estate also requires the state to create accessible public open spaces (Parks, gardens, playgrounds) and green areas to maintain ease of living and manage climate changes.

a. **Public Open Spaces:** Development in Tier- 1 cities has resulted in reduction of open areas-

[314] Source: CBRE India Market Monitor Report for FY22
[315] Source: JLL Research Report on Industrial Warehousing 2022.
[316] Source: JLL Research Report on Industrial Warehousing 2022.

- **Open space per capita** in Mumbai is **~1.2 Sq. m vs. 21 Sq. m in Delhi** and 17 Sq. m in Bangalore[317].
- **Open land areas** in Mumbai reduced by **81%, forest cover reduced by 40%** and water body area reduced by 30% in last 30 years.[318]
- Mumbai has **~300 gardens and ~480 recreation grounds** vs. **1200+ parks** in Bangalore[319].

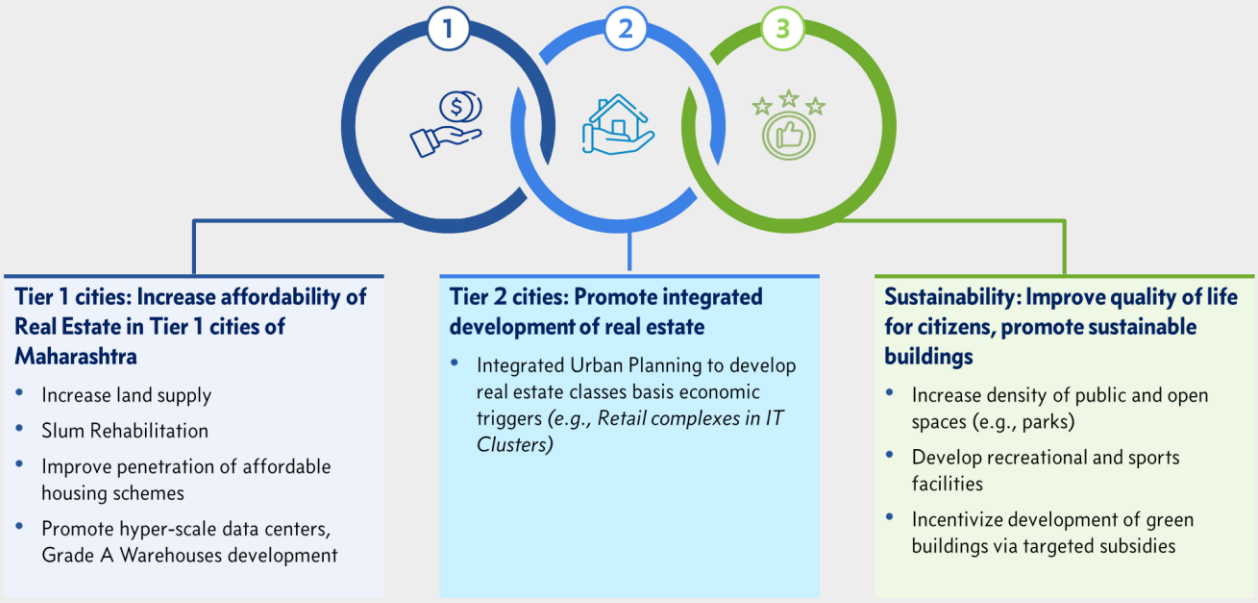
b. Climate:

- Decreasing open areas, forest cover and water body cover has resulted in average temperature increase of 2 degree Celsius in Mumbai in last 25-30 years[320]
- Air Quality Index in Mumbai has fluctuated from Very Poor to Moderate category in 2023 due to heavy construction[321].

6. Real estate: Key opportunities and enablers

GVA from Real estate can grow in Maharashtra by unlocking potential of Tier-1 cities and providing economic triggers for development in Tier-2 cities. Growth of real estate in Tier-1 cities is constrained by availability of land; affecting affordability, while growth in Tier-2 cities requires strong economic triggers like setting up of manufacturing or services clusters to drive demand. While growth of real estate in cities is critical for economic development, ensuring quality of life for citizens and sustainably developing new real estate are essential for social wellbeing of citizens.

Figure 76: Real Estate - Key Opportunities



6.1 Increase supply of land in Tier-1 cities of Maharashtra:

Land availability is a **key constraint in Tier 1 cities of Maharashtra**:
Due to limited supply of land, real estate prices in Mumbai-Metropolitan region (MMR) are ~**2-2.5x** of other Tier-1 cities like Bangalore and Hyderabad[322]. Since, land contributes between **20-40%** of total cost of affordable housing, increasing supply is critical to control real estate prices and ensure affordability[323]. **Potential interventions** and enablers have been identified via interactions with industry stakeholders to increase availability of land in Tier-1 cities

[317] Source: Observer Research Foundation Report on formulating open-space policies for India's cities, 2020.
[318] Source: Research Report by Faculty of Natural Sciences, 2021
[319] Source: BMC Environment Status Report, 2021
[320] Source: In 27 years, Mumbai saw 2-degree C rise in temperature even as built-up area increased 66%, Indian Express, Oct 2021
[321] Source: Indian Express Report, Mar'23
[322] Source: Anarock Research Report for FY22 Real Estate Market
[323] Source: India's Turing Point, McKinsey Global Institute, Aug 2020

6.1.1 Unlock under-utilized and unutilized government land:

Utilizing land occupied by Non-Core Infrastructure: Zoning of land use can be done to **relocate non-core infrastructure** (e.g., jails, zoos, landfills) to the peripheral areas of the city, freeing land for residential, commercial, and retail real estate development[324].

6.1.2 Unlock stuck real estate projects:

~1.8 L real estate units worth **INR 2.3 Lac Crore** are stuck in Mumbai and Pune (~50% of stuck units in Top 7 cities) These units represent almost **~1.5x** the total new units launched in FY22. By unlocking 50% of these stuck units, Maharashtra government can add inventory of almost **~0.75x** the annual sales of units in Mumbai and Pune[325]. **Potential interventions** and enablers identified across creating distressed assets funds, policy interventions to reduce stuck projects and litigation resolution suggested to unlock these stuck real estate projects.

a. **Creating distressed asset funds:** Finance Ministry of India has set up a special fund called **Special Window for Affordable and Mid-Income Housing (SWAMIH)** to **provide debt financing** for completion of stalled real estate projects. SWAMIH fund has enabled delivery of **20k+** apartments till December 2022[326].
   Maharashtra government can create a **state-level distressed asset fund** to facilitate contractors to complete stuck projects. Focus of state-level fund can be **Affordable Housing Projects requiring last-mile funding** for project completion and handover. Maharashtra government has announced an amnesty scheme with a view to restart housing development of stalled projects which can potentially unlock blocked bank loans of ~35k Cr[327].
b. **Strengthening MahaRERA:** Implementation of RERA has improved retail customer confidence in Real Estate sector (~60% of surveyed customers expressed more confidence to invest in real estate post RERA[328]). However, role of RERA is **not clearly defined to act on stalled projects**, as **RERA currently does not have judicial powers**. Enabling RERA with judicial powers can provide credibility to judgements passed.
c. **Setting guidelines for stalled projects: Revoking project registration of stalled real estate projects** if builder does not complete post specified duration, project can then be handed over to allotees for completion.
d. **Utilization of technology for project monitoring:** Adoption of technology (e.g., drone-based surveys, building information modelling) can enable efficient project monitoring by RERA and identify potential high-risk projects before they get stuck or delayed.

6.1.3 Increase off-take of slum rehabilitation projects:

Mumbai has 1.25 Mn slums which house ~6.2 Mn people, these slums occupy ~25% of land in Mumbai (~8k acres)[329]. Slum rehabilitation projects have seen limited offtake with only ~200k replacement apartments constructed in last 23 years[330] (**1.2-1.5 Mn** apartments are **required to rehabilitate all slums in Mumbai**). Slum Rehabilitation projects have historically faced multiple challenges, from getting consent of slum dwellers to transition to a temporary location during construction, identifying reputed quality builders to develop new apartments and ensuring that slum dwellers stay at the new location.

Potential Interventions and enablers:

a. Fiscal incentives:

- Providing **fiscal incentives** to slum dwellers to **compensate for loss of income** due to location change during construction period.
- Providing **public transport subsidy** to enable travel to work locations during construction period.
- Providing increased FSI at subsidized price to incentivize quality real estate developers to participate.

[324] Source: FICCI & McKinsey report: India's Century in 2022
[325] Source: Anarock Research Report for FY22 Real Estate Market
[326] Source: Ministry of Finance in March 2023
[327] Source: Maharashtra govt's slum rehab projects' amnesty to help unlock Rs 35,000 Cr stuck loans, Economic Times, June 2022
[328] Source: BCG report on Five Years On: An Assessment of RERA
[329] Source: What is the Dharavi redevelopment project?, The Hindu, Oct 2022
[330] Source: 27 years on, Mumbai's Slum Rehabilitation Authority (SRA) has failed to deliver, Citizen Matters, Aug 2022

b. **Improved quality of new apartments:** Developing **well-ventilated apartments** with dedicated areas for amenities can be provided to **motivate slum-dwellers** to **stay at the new property vs. current practice of renting** it out.
c. **Regulatory interventions:**
- **Slum Rehabilitation Projects are typically done jointly by 2 parties: Smaller contractor which is responsible for managing** transition of slum dwellers to new location during construction period and larger developer with expertise in real estate development.
- SRA (Slum Rehabilitation Authority) should **provide Letter of Intent (LOI) to both parties of Joint Development Agreement vs. current practice of issuing LOIs to smaller contractors only.**
- **Adjacent co-operative housing societies on private land should also be re-developed with the SRA** project to ensure high-quality integrated layouts and social infrastructure. Such a project should be declared as a PPP project with specific fiscal incentives for large developers.

6.1.4 Development of Satellite Cities:

Large cities face severe paucity of land due to high demand for residential, commercial, and retail real estate. To solve high population density challenges in large cities, satellite cities are developed which are smaller municipalities near large cities and can serve as affordable residential areas for the population working in large cities. For example, Navi Mumbai was developed as a satellite city to reduce congestion in Mumbai and serve as an alternative affordable destination for working population of Mumbai.

Key enablers for development of satellite cities:

- Growth of manufacturing and services sectors, with efficient public transport connectivity to Tier-1 city critical for successful development of satellite townships.
- State government can attract private developers to build townships by offering land and FSI at subsidized prices.
- Integrated view of developing industry, residential areas, and urban infrastructure to enable Walk to Work models should be explored.

6.1.5 Review of Floor Space Index (FSI) Guidelines:

FSI at Mumbai ranges between 1 to 5, depending on the exact location of the plot and land use. Higher FSI on land can improve the unit-economics of construction for developers, thereby aiding in reduction of costs to make housing affordable for low-income groups.

Potential Interventions and enablers: Reform zoning regulations for floor space index

- **Specifically for affordable housing projects, waiving of floor space index restrictions and premium index fees** can be considered to increase affordability. For instance, Hyderabad does not have FSI restrictions and has no premium index fees[331].
- **Zone-wise regulations:** FSI limits can be increased for specific zones with high demand.
- **Regulations for development around government assets:** Ministry of defence has **relaxed permissible construction limits from 500 meters to 50 meters of highly sensitive establishments**[332]. Similar state government restrictions can be identified and relaxed to increase floor area for real estate projects. Integrated infrastructure planning would be required to ensure that revised FSI guidelines do not lead to increase in unplanned growth and deterioration in quality of life for citizens.

6.2 Increase penetration of affordable housing:

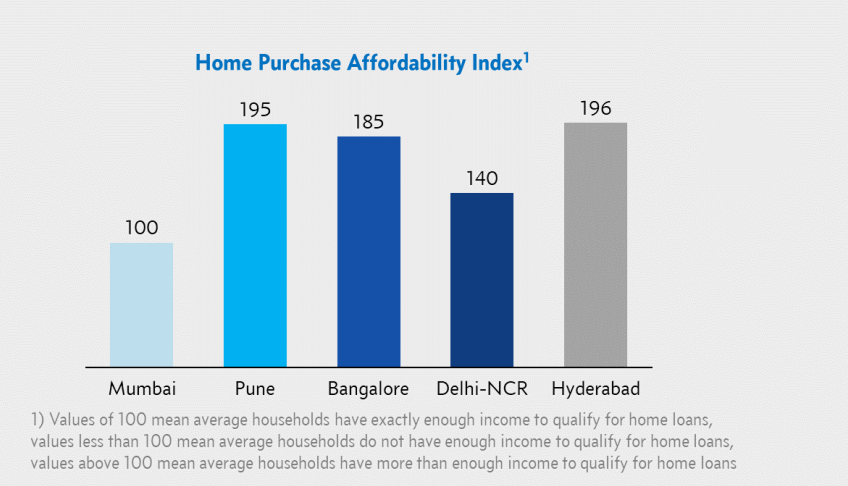
Market reports (JLL) track Home Purchase Affordability Index[333] which is defined as the **ratio of the average household income to the eligible household income**. Eligible household income is defined as the minimum income that a household should earn to qualify for a home loan on a 1,000 sq. ft. apartment at the prevailing market price.

[331] Source: Mckinsey India Global Report, 2020.
[332] Construction restrictions near defence establishments relaxed, Hindustan Times, December'22
[333] Source: JLL Report on Affordability of Home Purchase, 2022

Home Purchase Affordability Index of 100 represents that average households have just enough income to qualify for home loans, values higher than 100 represent enough income to qualify for home loans and values lower than 100 imply households do not have enough income to qualify for home loans.

- **Average households in Mumbai have just enough income to apply for home loans** (Home Purchase Affordability of 100) vs. cities like Pune, where household income levels are sufficient to apply for home loans. (Home Purchase Affordability Index ~2x of Mumbai). **38%** of sanctioned houses have been completed under **Pradhan Mantri Awas Yojna** (PMAY)[334] in Maharashtra.

Figure 77: Affordable Housing Metrics



Potential interventions and enablers:

a. **Leveraging central government schemes:**
- Increase completion of projects leveraging funds from Pradhan Mantri Awas Yojna (PMAY)
- State can improve penetration of **Affordable Rental Housing Complexes** (ARCHs); a sub-scheme under PMAY to provide affordable housing to urban migrants.

b. **Fiscal and tax incentives:**
- **Rationalization of stamp duty & registration fee** can be considered to provide impetus to affordable housing
- **Moderating goods and services tax on prefabricated buildings**, currently 18%, in line with regular buildings with rates between 1% and 5%.
- Provision of **additional FSI at subsidized rates** to incentivize developers to undertake affordable housing projects.
- **Easing bylaws related to parking, setbacks** can facilitate increased availability of land for housing, making it affordable to the middle-income groups.

c. **Standardization of design and adoption of modern technology:**
- **Standardization of design sets for mass housing projects** with customization basis project conditions can reduce the cost of project design by 40-50%[335]
- **Promotion of modern construction practices** (e.g., lightweight aluminium formwork, prefabricated construction, technology-based models) to build large-scale affordable housing can reduce the time taken for project completion thereby reducing the project cost.

6.3 Development of Real Estate Markets in Tier 2 cities of Maharashtra:

Real estate sector in Maharashtra is driven by **key markets of Mumbai Metropolitan Region and Pune**. Developing real estate markets in Tier-2 cities of Maharashtra is a key opportunity which is **linked to growth of manufacturing and services**. **Integrated development with urban planning** can enable Tier-2 cities to grow in Maharashtra.

[334] Source: FICCI & McKinsey report on India's century in 2022
[335] Source: Knight Frank Research Report on Housing for All, 2019

6.4 Key Interventions and enablers on Warehousing and Industrial Real Estate:

Warehousing and Industrial Real Estate is growing at 17% in India. Mumbai and Pune have **40% share of total warehousing in Top 7 cities of India.**

Potential interventions and enablers to drive Warehousing and Industrial Real Estate growth in Maharashtra:

- **Need for dedicated zones:** Dedicated zones for development of warehousing need to be demarcated by State government to ensure availability of land. These zones need to be planned in sync with development of industrial parks in manufacturing clusters. Currently, warehousing zones are not demarcated which leads to unplanned growth in areas where land is available.
- **Standardization of Warehousing Classification:** Warehouses are classified as Grade A or Grade B globally based on total cost of ownership (TOC). Grade A warehouses have lower TOC due to availability of docks, building insulation, feasibility of using mechanization, adopting fire safety regulations etc. However, in India there is no defined industry standard adopted, or certification agency which ranks warehouses as Grade A or Grade B.
- **Offering fiscal and tax incentives:** Offering fiscal incentives like capital subsidies (e.g., Gujarat government provides capital subsidy amount upto INR 15 Cr), rationalization of stamp duty charges (e.g., Andhra Pradesh government provides 100% reimbursement of stamp duty registration)
- **Developing enabling infrastructure:** Government of Maharashtra needs to develop enabling infrastructure like roads, affordable housing, truck parks and provide public transport to warehousing locations.

6.5 Key Interventions and enablers to improve Quality of Life:

Improving ease of living in large cities of Maharashtra is critical to ensure social well-being of citizens and ensure continued economic activity growth. Key interventions identified:

- **Increase capital outlay on development and maintenance of public open spaces and green areas.** e.g., Mumbai Municipal Corporation has budgeted 225 Cr for garden department[336] (~0.7% of total budget).
- Providing **incentives for development of open spaces in residential complexes** and developing green buildings (e.g., energy efficient buildings, use of green building materials, rainwater harvesting etc.
- **Converting areas** currently demarcated as **No-development zones** into **Public open spaces** (e.g., Saltpan land, Port Trust land). e.g., Mumbai Port Trust has proposed opening up ~600 acres for development of which ~200 acres are planned to be open spaces[337]

[336] Source: Observer Research Foundation Report on formulating open-space policies for India's cities, 2020.
[337] Source: Mumbai Port Land Development Committee, Revised Report 2020

Agriculture & Allied

Agriculture & Allied Activities

1. Executive Summary

Industry overview and baseline:

- Contributes ~13% to state's GVA at ~$45 Bn (3.16 lakh Cr) growing at 7% from FY14-FY21
- Maharashtra, accounts for ~12% of India's net sown area and contributes to ~8% of India's agriculture GVA
- Employs ~50% of state's working population and give a crop income of <INR 50,000 annually per farmer

Objectives & Aspiration:

- **2.4X (~13%) agricuture and allied GVA growth** to reach $106 Bn (7.4 lakh Cr.) by FY28 by focusing on high value areas such as horticulture & allied activties which offers headroom for growth and that which can leverage Maharashtra's capabilities. This will entail addressing challenges across specific crop value chains
- **Increase farmer incomes 2-3 times**, with a special focus on small and marginal farmers lacking access to irrigation and favourable agro-climatic conditions. This will entail specific interventions to uplift select segment of farmers

Key challenges: Limited access to inputs especially, assured irrigation (20% gross irrigated area compared to national average of 52%) and ideal crop varieties (lower yield varieties and those suseptabile to pests or diseases). Output reaches inefficient markets through limited supply chain infrastructure (especially storage). ~80% of farmers are small & marginal and they rely predominantly on low income crops which are rainfed (increased draught risk). Increasing cost (agro-chemicals, labour) coupled with slower growth in output, results in low & uncertain incomes

Focused interventions to grow GVA necessary:

- **Demand generation & fulfilment:** Enable 4X growth in exports ($8 Bn by FY28) and efficient domestic channels. Strenghtening FPOs for demand aggregation, supply chain upgrades (storage for horticulture), promoting state's produce across markets, improving production planning & in turn price realization & stability through better data
- **Planning & inputs:** Varietal research to promote agro-climatically suitable, high yielding varieties. Farm cards to capture farm level data and enable efficient planning and better access to credit & insurance products with it.
- **Irrigation:** Quick win irrigation projects like pipelines to improve utilization of existing potential, rejuvination of water bodies, program management to drive completion of initiated projects, improve efficiency of water utilization through canal linings & micro irrigation, access to enablers like day time power & solar pumps
- **Farming:** Undertake crop specific de-bottlenecking by driving awareness on best practices. Focused interventions to increase horticulture and promotion of advanced practices like high density plantation are key (for cotton and fruit crops to improve yields). Use mechanization to bridge labour shortage & rising cost (sugarcane, millets)
- **Allied activities:** Important to kick start aquaculture, promote region-wise clusters for sericulture, model farms across tehsil for poultry, drive farmer awareness on running profitable diary. Additionally, enablers such as improving access to capital, promotion of processing infrastructure industry is necessary to unlock 2.6X growth in the sector to contribute $31 Bn in GVA by FY28

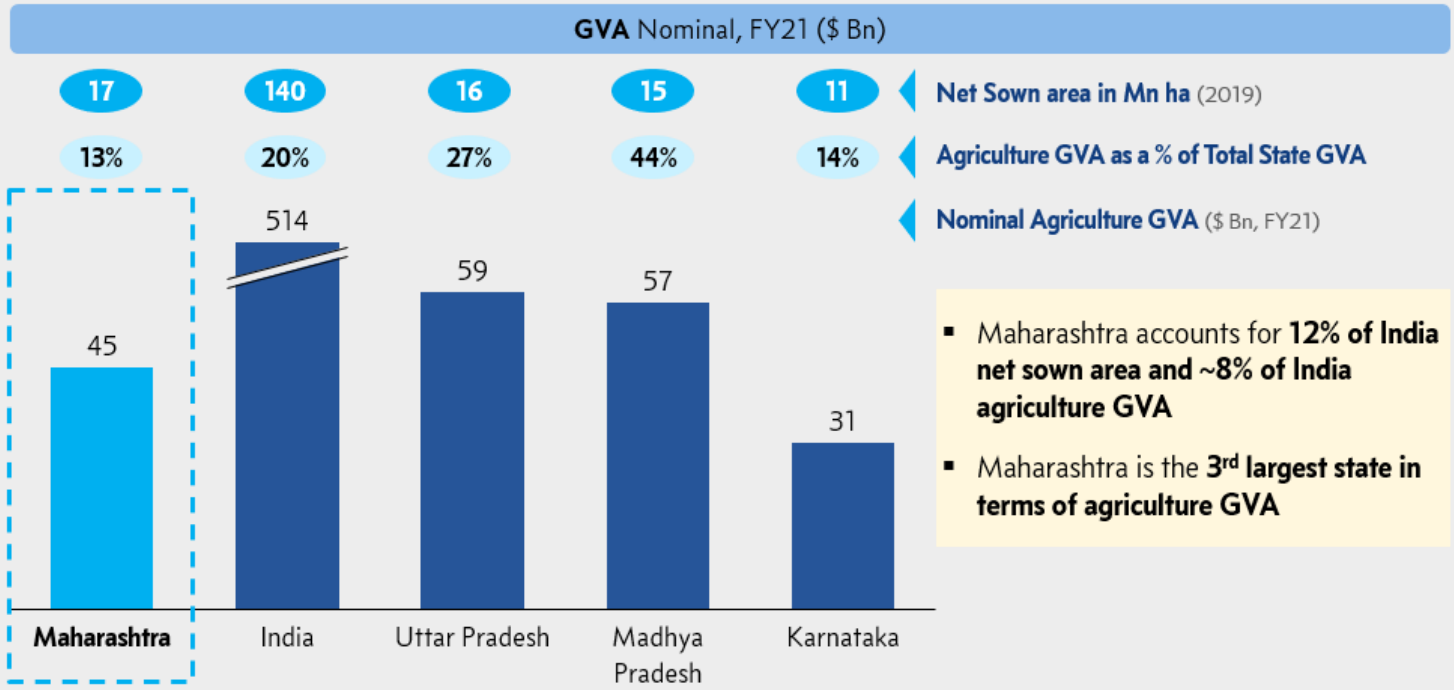
Driving farmer income growth: Focused interventions identified for 5 segments of small & marginal farmers most at risk from low & uncertain crop incomes. Interventions include promotion of viable allied activitiy, transition to better crop mix, intiatives to increase crop output & price realization and cost control (through natural farming).

Build resilience: Interventions across soil, water, biodiversity and agri-power identified to build resilience to the sector. Key interventions include driving of efficient implementation of soil health card scheme, soil and leaf tests to promote scientific fertigation, promoting natural farming where feasible, improving quality daytime power supply through solar investments and forest re-generation intiatives.

2. State baseline

Agriculture is providing livelihoods to ~51 million people or half the working age population of the state[338]. The sector also accounts for 13% of the state's Gross Value Added (GVA) at ~$45 Bn (3.16 lakh Cr.) in FY21[339], making it the 3rd largest agricultural state in India after UP and MP.

Figure 78: Agriculture nominal GVA comparison across major agricultural states in India[340]



Source: RBI handbook of statistics, Directorate of Economics and Statistics, Ministry of Agriculture, Economic Survey of Maharashtra

2.1 GVA by category

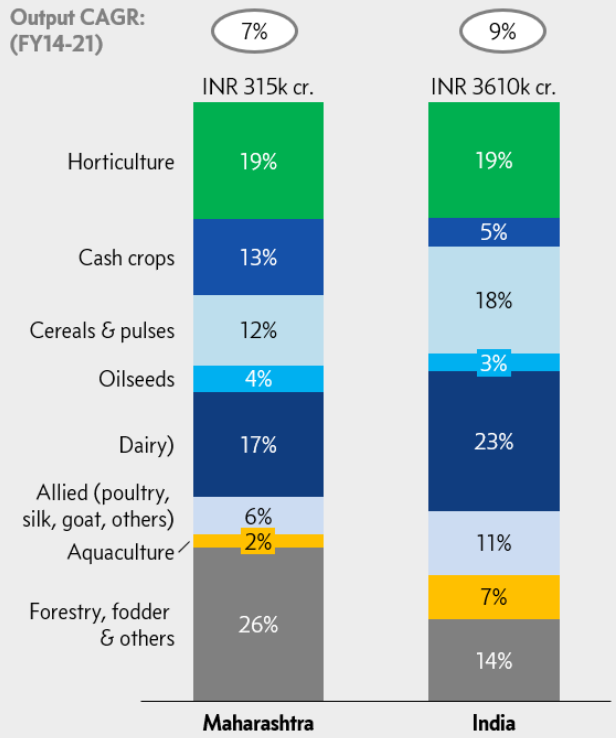
- **Horticulture (Fruit & Vegetables (F&V) and spices):** Maharashtra is rank #4 state in India by total volume of horticulture production (preceded only by Uttar Pradesh, Madhya Pradesh, and West Bengal)[341]. In terms of specific crops, Maharashtra is the biggest producer (or rank #1) of grapes, pomegranates, and onions.
  In terms of exports, Maharashtra is rank #1 state in the country and contributes ~43% of overall horticulture exports from India by value (INR 17,000 Cr.)[342].
- **Cash crops:** Maharashtra's crop mix is indexed towards cash crops at 13% (sugarcane and cotton) compared to rest of India 5%[343]. The primary reason is a developed post-harvest industry – sugar mills - ensuring assured sales at competitive prices in Maharashtra compared to rest of India.
- **Cereals and pulses:** Foodgrains (cereals and pulses) make up 12% of Maharashtra's total GVA. Its contribution is higher for overall India's mix at 18%, primarily due to the low base of paddy and wheat in Maharashtra.
- **Oilseeds:** Soyabean contributes to more than 90% of total oilseeds production in the state and it contributes to ~43% of total soyabean production in India, marginally trailing Madhya Pradesh for the top spot.
- **Allied activities (dairy, poultry, silk, goat, others):** Maharashtra is rank #6 state in India by quantity of milk production (6.5% of total India milk production)[344]. There is a significant headroom for growth in dairy in Maharashtra as the per capita milk consumption is only 115 litres per year, compared to the national average of 162 litres per year and best-in-class state, Punjab at ~465 litres per year.[345] Maharashtra is rank #7 state

[338] Source: Economic survey of Maharashtra FY22, basis extrapolation of FY11 census results
[339] Selected FY21 as the base year for this section as the crop-wise detailed output data was available till FY21 from MOSPI
[340] Source: RBI handbook of statistics, Directorate of Economics and Statistics, Ministry of Agriculture, Economic Survey of Maharashtra
[341] Source: Area and Production of Horticulture crops for 2021-22 (3rd Advance Estimates), Department of Agriculture and Farmers Welfare
[342] Source: Economic survey of Maharashtra 2021-22
[343] Source: State-wise and item-wise value of output from agriculture, forestry, and fishing, MOSPI for FY11 to FY21, Published in April, 2023
[344] Source: Milk Production by States/UTs, FY21, National Dairy Development Board
[345] Source: Per capita availability of Milk by States/UTs, FY21, National Dairy Development Board

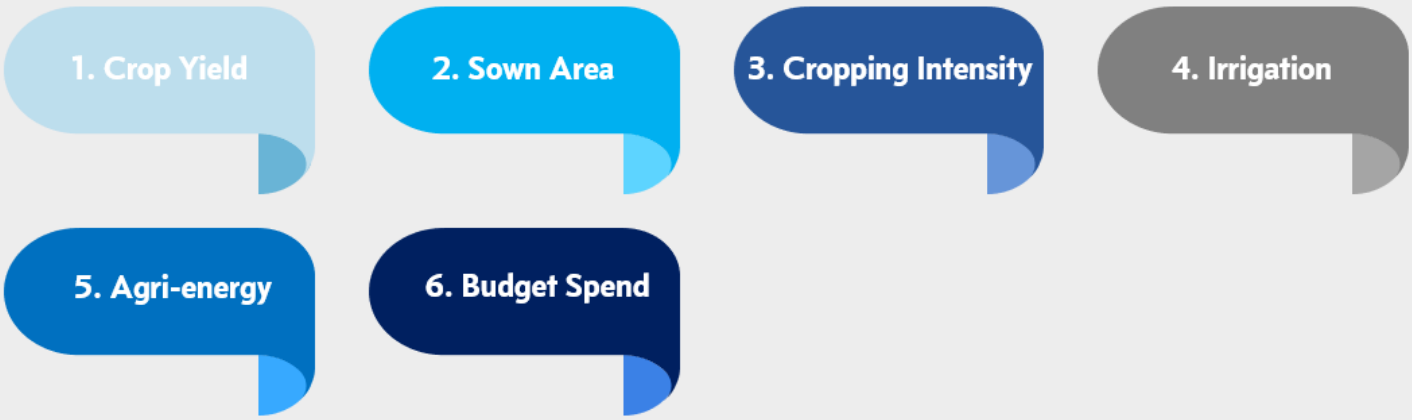
by total egg production in India and rank #6 state by total meat production in the country.[346] However, only 50-55% of egg demand of the state (~2.25 Cr. eggs per day) is produced within Maharashtra.[347] Similarly, sericulture also hasn't realised its full potential in Maharashtra, with state ranking #8 state by total silk production. In goat farming, Maharashtra is the rank #2 state in India, accounting for ~11% of total goat meat production.

- **Fishing and aquaculture:** There is substantial potential to grow as Maharashtra has only utilized ~2% of its total brackish water (marine) potential, used for high-value shrimp production, compared to India average of ~13% and Andhra Pradesh's 35%.[348] Inland aquaculture, making the remaining 20% of aquaculture GVA in the state is quite small in Maharashtra, contributing only ~1% to India's total inland aquaculture production.[349]
- **Forestry, fodder, and others:** Maharashtra is the rank #1 state in India by GVA contribution of forestry and logging industry (~2X the size of nearest state of Rajasthan). By overall growth of the sector, it is growing fastest in India at 14.5%. Maharashtra accounts for only ~7% of total forest area in India[350], while the value of forestry output generated is ~13% of total forestry output of India. Industrial wood (forests and trees outside forest) makes up 75% of the forestry output of the state primarily because of strong sawmilling, plywood, furniture, and paper manufacturing industries in Maharashtra. For fodder as well, Maharashtra is #1 state in India, accounting for ~44% of India's fodder production.

Figure 79: Contribution of crop categories to agricultural output of India and Maharashtra



2.2 Factors affecting GVA



2.2.1 Crop yield

Due to limited water availability, the average yield of crops like rice, wheat, and cotton in Maharashtra is less than the India average.

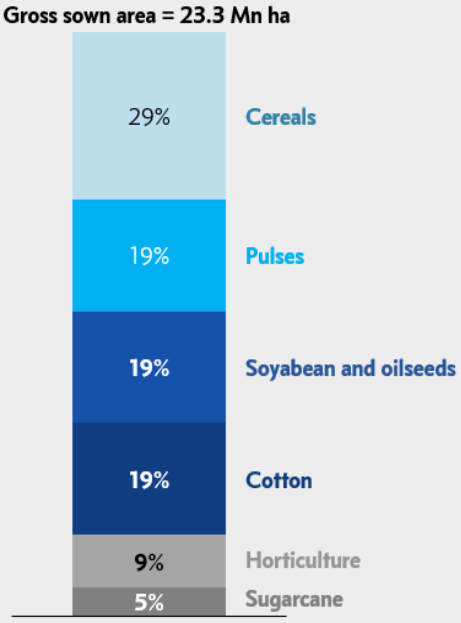
[346] Source: Basic Animal Husbandry Statistics – 2022, Department of Animal Husbandry and Dairying, GOI
[347] Source: Maharashtra facing shortage of 1 crore eggs per day: Official, ET, Jan, 2023
[348] Source: Mission Brackish Water/Saline Aquaculture-2022, Ministry of Agriculture and Farmer Welfare, GOI, 2017
[349] Source: Handbook on Fisheries statistics, 2020
[350] Source: Forest Cover in India – 2021, Environmental Information System (ENVIS), GOI

Figure 80: Comparison of average yield across Maharashtra with India and benchmark states in FY21 (MT per ha)[351]

Crop group	Crop	Maharashtra yield (MT per ha)	India average yield (MT per ha)
Cereals and Pulses	Rice	2.1	2.7
	Wheat	1.8	3.5
	Pulses	1	0.9
Cash crops	Sugarcane	92	84
	Cotton	0.38	0.45
Oilseeds	Soyabean	1.1	1
Horticulture	Fruits	14.2	14.8
	Vegetables	14.8	18.5

Seeds are one of the major contributing factors to improving yield and in turn GVA & farmer incomes. Maharashtra must prioritize the availability of quality seeds and planting material and improve the seed replacement rate.

Figure 81: Maharashtra's gross sown area by crop in FY21



2.2.2 Sown area: Maharashtra has a total geographical area of 30.8 Mn ha and out of that ~55% of area is used for agricultural sowing, making it the 2nd largest state in India by total net sown area (16.8 Mn ha[352]). Out of this net sown area, only 38% is used for sowing more than once during a year, making Maharashtra gross sown area as ~23.3 Mn ha (~12% of India's sown area).[353]

2.2.3 Cropping intensity: Maharashtra's cropping intensity was 138%, in comparison to the Indian average of 142%.[354]

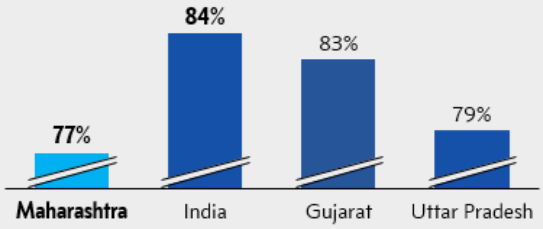
In Maharashtra, the cropping intensity is primarily restricted by the availability of water, as the gross cropped area (excluding horticulture) during kharif or summer season is ~16 Mn ha and it heavily falls to ~5.8 Mn ha during the rabi or winter season[355], on account of no rains during that time of the year and insufficient water availability through irrigation.

2.2.4 Irrigation: Maharashtra's ratio of gross sown area to gross irrigated area was ~20%, compared to all India estimated average of 52% in FY21[356].Maharashtra's irrigation potential through all sources of water (irrigation projects, surface water, and ground water) is ~9 Mn ha, out of which ~7.7Mn ha potential was created between 1st five-year plan in 1951and FY21[357]. This 7.7 Mn ha of created irrigated potential comprises of 5.4 Mn ha by constructing canals and dams and the remainder 2.3 Mn ha of ground water potential.

Despite constructing irrigation potential of 5.4 Mn ha, Maharashtra has been able utilize only 4.1 Mn ha (77% utilization), owing to gaps in construction of pipes & canals from dams to the farm fields and reduction in water holding capacity of dams (due to silt deposition).

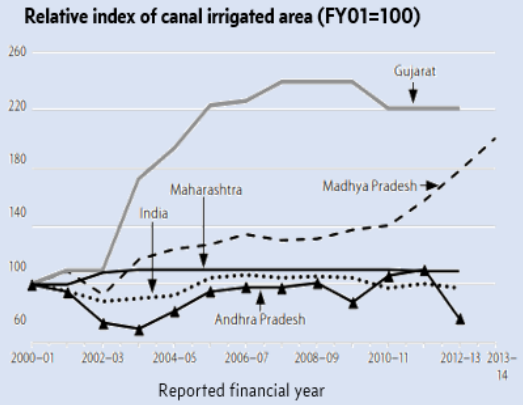
[351] Source: RBI handbook of statistics for cereals, pulses and cash crops, SOPA for soybean and Department of Agriculture, GoI for fruits and vegetables
[352] Source: Net sown area for FY21 taken from Economic survey of Maharashtra 2020-21
[353] Source: State-wise Pattern of Land Use- Net Sown Area, RBI handbook of statistics
[354] Source: State-wise Pattern of Land Use - Gross Sown Area, RBI handbook of statistics
[355] Source: Economic survey of Maharashtra FY22
[356] Last reported India average numbers were from FY19 – 52%, which were extrapolated to FY21 using RBI handbook of statistics
[357] Source: New canal potential added between FY17-21 taken from Maharashtra Economic Surveys of FY18 and FY22 respectively and they were added to the base number taken from FY17 numbers from Annual report of Central Water Commission, 2021-22

Figure 82: Irrigation potential utilization across major states in India in FY21[358]



Source: Maharashtra Economic Survey, Respective Irrigation departments of Gujarat and UP and Ministry of Jal, GOI

Case study: Ensuring tail first irrigation - Gujarat 2001-2016, Madhya Pradesh (MP) 2004-16



Context: During early 2000's, both states prioritized groundwater, quality farm power supply and utilization of irrigation potential over building new dams.

During FY01-16 Gujarat's gross irrigated area increased by 2X from 3.5 Mn ha to 7 Mn ha and MP's gross irrigated area grew by 2.2X from 4.6 Mn ha to 10 Mn ha.

Gujarat:

- **Power:** Revitalised DISCOMs and invested ₹ 1,250 crore in Jyotigram scheme for rural feeder separation to ensure full-voltage, uninterrupted farm power supply for 8 hours daily to farmers.
- **Potential utilization:** Constructed 166,000+ check dams, 260,000+ farm ponds, 122,000+ bori bunds for irrigation and ground water recharge. The government also ensured 25,000 irrigation tanks & reservoirs were desilted.

Madhya Pradesh

- **Power:** Forward contracted power purchase from the national grid for winter season and issued 110-day pump connections per year for wheat. irrigation.
- **Irrigation:** Enforced methodologies like rationalized irrigation schedules, ensuring tail farmers (located near the end of canals) get water before head farmers and operating canals at full water levels by desilting and cleaning 2 months before irrigation.
- **Administration:** A strong leader was appointed as head of irrigation to carry out the execution work while the CM also constantly monitored via weekly videoconferences.

Source: Har Khet ko Pani, Rethinking Pradhan Mantri Krishi Sinchai Yojana (PMKSY), *IWMI-TATA and* Har Khet ko Pani? MP's irrigation reform as a model, BJP Library

2.2.5 Agri-energy: Agriculture sector accounted for ~27% of Maharashtra's total electricity consumption during FY21, consuming a total of ~34,000 MU (million units). Out of which ~10% of energy is generated through renewable energy. [359] The state has rolled out the PM KUSUM scheme with central government's help to achieve:

- Target: 2,00,000 standalone solar pumps during FY20 to FY26.
- By FY23, ~37,000 solar pumps were installed, i.e., an achievement of 18% of the target in the last 3 years. [360]

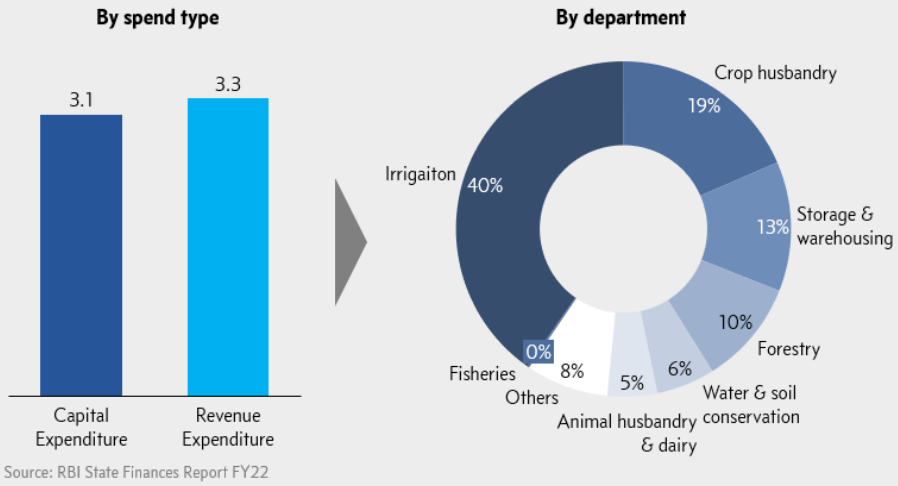
2.2.6 Budget spend on agriculture: Over the last 3 years (FY20-22), Maharashtra has spent $5-6.5Bn annually on agriculture and allied sector (excluding the spend on irrigation). The primary spend areas for the state basis FY22 budget of $6.4 Bn (~INR 44,000 Cr.) are: irrigation (40%), crop husbandry (19%), food storage & warehousing (13%) and forestry (10%).

[358] India numbers have been extrapolated for FY21 from FY19 data from Ministry of Jal, GoI for irrigation potential created and RBI handbook of statistics for gross irrigated area. UP numbers have been sourced from respective UP water department extrapolated from FY18 to FY21 and Gujarat from state water department

[359] Source: Economic Survey of Maharashtra FY22

[360] Source: Economic Survey of Maharashtra FY23

Figure 83: Maharashtra agriculture budget spend by type and departments in FY22 ($Bn).[361]



2.3 Farmer income

The average income per agricultural household in Maharashtra as reported by Ministry of Statistics and Programme Implementation (MoSPI) and National Statistical Office (NSO) was INR 138,000 per annum. In comparison, the Indian average is ~INR 122,000 per annum, for peer states like Karnataka is INR 161,000, Madhya Pradesh is INR 100,000, Uttar Pradesh is INR 97,000 per annum and for best-in-class states - Punjab (INR 320,00) and Haryana (INR 274,000) is ~2-2.5X of Maharashtra.[362] Out of their total average annual income, farmers earn only INR 50-55,000 from farming and allied activities. While the remaining income comes from other sources like labour wages, land lease, setting up local shops, and pensions.

2.3.1 Income from crop:

The income of farmers in Maharashtra is heavily dependent on the type of crops they grow. Crop-wise income levels are detailed. Two-thirds of the state's gross sown area is under cereals, pulses and oil seeds as detailed in earlier section. This points towards the low crop incomes across state.

The wide variation in farmer net profit across crops highlights crop mix as an important lever to improve farmer incomes. Increase in share of horticulture and allied activities is key as detailed in subsequent sections.

Figure 84: Average income per acre for major crop groups in Maharashtra in FY21 per harvest[363]

Crop group	Crop sub-group	Crop name	Farmer net profit INR 000' per acre
Horticulture (F&V)	Vegetables	Onion - Kharif	**27.5**
		Onion - Rabi	**15**
		Potato	**35**
		Tomatoes	**36**
	Fruits	Bananas	**112**
		Cashew nut	**45**
		Citrus	**45**
		Grapes	**159**
		Mango	**125**
		Pomegranate	**157**
Cash crops	Cash crops	Sugarcane	**37**
		Cotton	**15**
	Cereals	Paddy	**6.3**

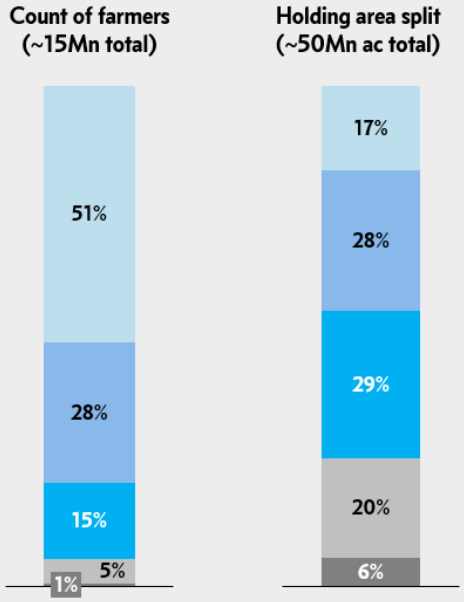
[361] Source: RBI State Finances, A Study of Budgets FY22
[362] Source: Income of Farmers, MoSPI and NSO, Dec, 2022
[363] Source: Collection of Farm Activities Data and Other Related Studies 2018-19, Government of Maharashtra and validated with 350+ farmers through primary interviews

Agri crops (excluding F&V and cash crops)		Wheat	**7.9**
		Millets	**1.5**
		Maize	**6.3**
	Oilseeds	Soyabean	**7**
	Pulses	Tur and Gram (average)	**9**
Allied activities	Aquaculture	Marine aquaculture	**300-350**
		Inland aquaculture	**80-90**
	Sericulture	Silk	**200**
	Dairy	Milk + manure	**40 per cattle**
	Poultry	Broiler poultry	**400-600 per 5,000 birds**
	Goat farming	Goat meat	**200 per 50 goats**

2.3.2 Average land holding per farmer: The land holding in Maharashtra, is heavily skewed; more than 50% of farmers (marginal farmers, as per the definition of state and central government) in the state hold a smaller sized land than the state's average of 3.3 acres or 1.3 ha.

Farmer size	Holding area	Remark
Marginal	<2.5 acres	51% of farmers in the state holding 17% of agri land
Small	2.5-5 acres	28% of farmers holding 28% of agri land
Small-medium	5-10 acres	Minimum criteria to obtain a farm mechanization term loan begins[364] from 4-5; Represented by 15% of farmers in the state
Medium	10-25 acres	Point from where average farmer net income becomes >INR 3 lakh as per MoSPI and NSO 2019 survey
Large	>25 acres	1% of farmers holding 6% of agri land

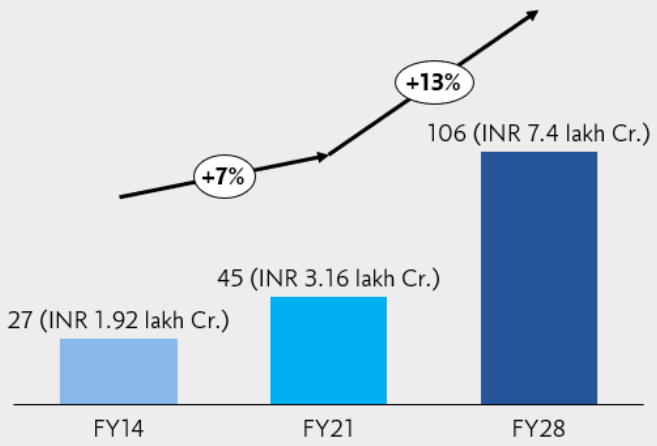
Figure 85: Distribution of farmers and agricultural land by size of land holding in Maharashtra in FY19



3. GVA growth aspiration

Agriculture sector can target to grow at 13% CAGR from FY22 to FY28 in Maharashtra basis our bottom-up crop wise estimation and demand outlook. The growth rate is comparable to Madhya Pradesh (Agri GVA at INR 410k Cr. in FY21) which has sustained a growth rate of 16% during the period of FY14-21.

Figure 86: Agriculture GVA baseline and target for $1 Trillion economy of Maharashtra ($ Bn)



[364] Source: Farm mechanization loan, Bank of Maharashtra

Objectives:

Drive **focused interventions across crops & allied activities** with high potential for GVA

Increase and stabilize net incomes, especially for small & marginal farmers

In addition to these two objectives, the state must also ensure building resilience in the agriculture sector.

Value chain approach for meeting objectives

To meet the growth objective of the agriculture sector in Maharashtra, careful attention needs to be given to development of end-to-end value chains for each crop.

The value chains approach includes crop type, geographic clusters, and all players from farmers, processing industries, financiers, infrastructure providers and the like. The idea is to build organized value chains for each crop, like those for sugarcane today, with a focus to produce higher-quality product which improve realization.

This requires creating linkages between farmers, processors, wholesalers, retailers, exporters, and providing them with technical and financial support. Essentially each crop should eventually be treated as an industry.

4. Growing the GVA

For GVA growth of the sector, potential must be aligned with demand headroom (demand is unmet or is growing within the state and rest of the world) to prioritize key focus areas for the state. The approach that has been followed is detailed subsequently, which involves identifying specific produce where Maharashtra holds a competitive edge. A comprehensive framework has been developed and employed for this purpose. As a result, 28 key products have been identified to focus for growth.

A crop-by-crop deep dive approach was taken to understand challenges and craft interventions for unlocking growth across these 28 crops. Given the complexity and differences across the value chains of the different crops, over 40 farm leaders, FPOs & industry experts and 350+ farmers were consulted for inputs. In addition to the crop-by-crop view, a pan category view was developed by brainstorming with the EAC members and experts.

4.1 Approach

The demand perspective was evaluated under four major themes:

Figure 87: Maharashtra can grow agriculture & allied sector by fulfilling demand opportunities from 4 areas

1

Grow for Maharashtra

Cater to state's demand for high value produce efficiently

- **Consumption growing** at ~8% and fruits at 10% r[1]
- **Gain self-sufficiency** in high-value agri-products
- **Cover shortfall** - 3Mn MT in F&V, 2 Mn MT in dairy and ~2 crore eggs per day in poultry by FY2028

2

Grow for the World

Seize opportunities that Maharashtra can serve competitively

- Significant **export potential especially for horticulture & aquaculture**: consumption growth 7-10% growth for F&V, shrimp ~7%[4]
- Target 50% share of India's F&V exports
- Kick start aquaculture

3

Contribute to Atmanirbhar Bharat

Feasible opportunities to substitute imports

- **52% of India's agri-imports** (150k cr.) is vegetable oil[3]; its increasing at 7.5% since 2008[3]
- Target – **soybean, groundnut**
- **Silk, raisins and cashew nut** offer additional import substitution opportunities

4

Seize Megatrends

Multiple emerging but proven demand trends

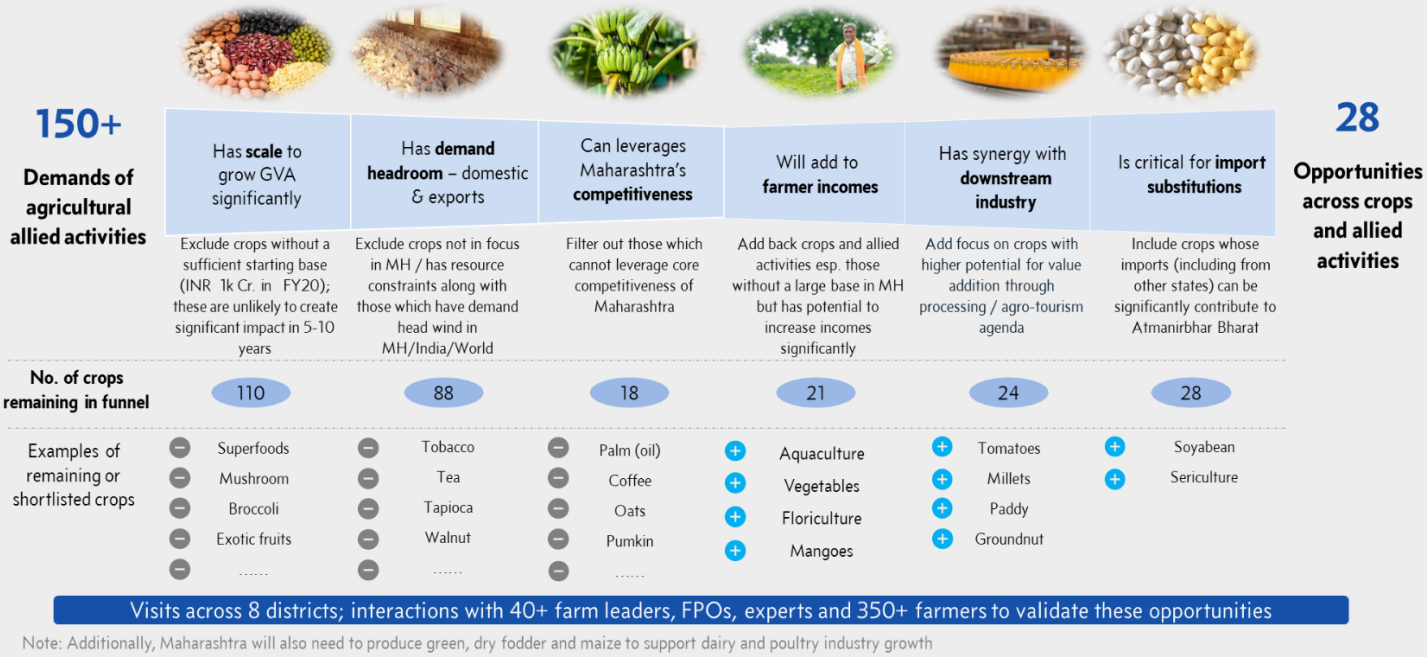
- **Food processing is growing**
- **Health-conscious diets:** protein, F&V, millets
- **Environment consciousness:** water efficient farming
- **Waste reduction & hygiene:** F&V storage, meat handling
- **Natural and organic farming**

Source: 1. NSS consumption survey 2005-2012, 2. FAO.org 3. Ministry of Commerce. 4. Growing India's agricultural exports through crop specific, state led plans, July 2020

Framework for shortlisting focus crops and allied activities

Factoring the objectives and demand perspective, a 6-part framework was developed to shortlist crops and allied activities to propel the growth of agriculture sector in Maharashtra:

Figure 88: Framework leveraged for shortlisting demand opportunities for Maharashtra to achieve growth vision.

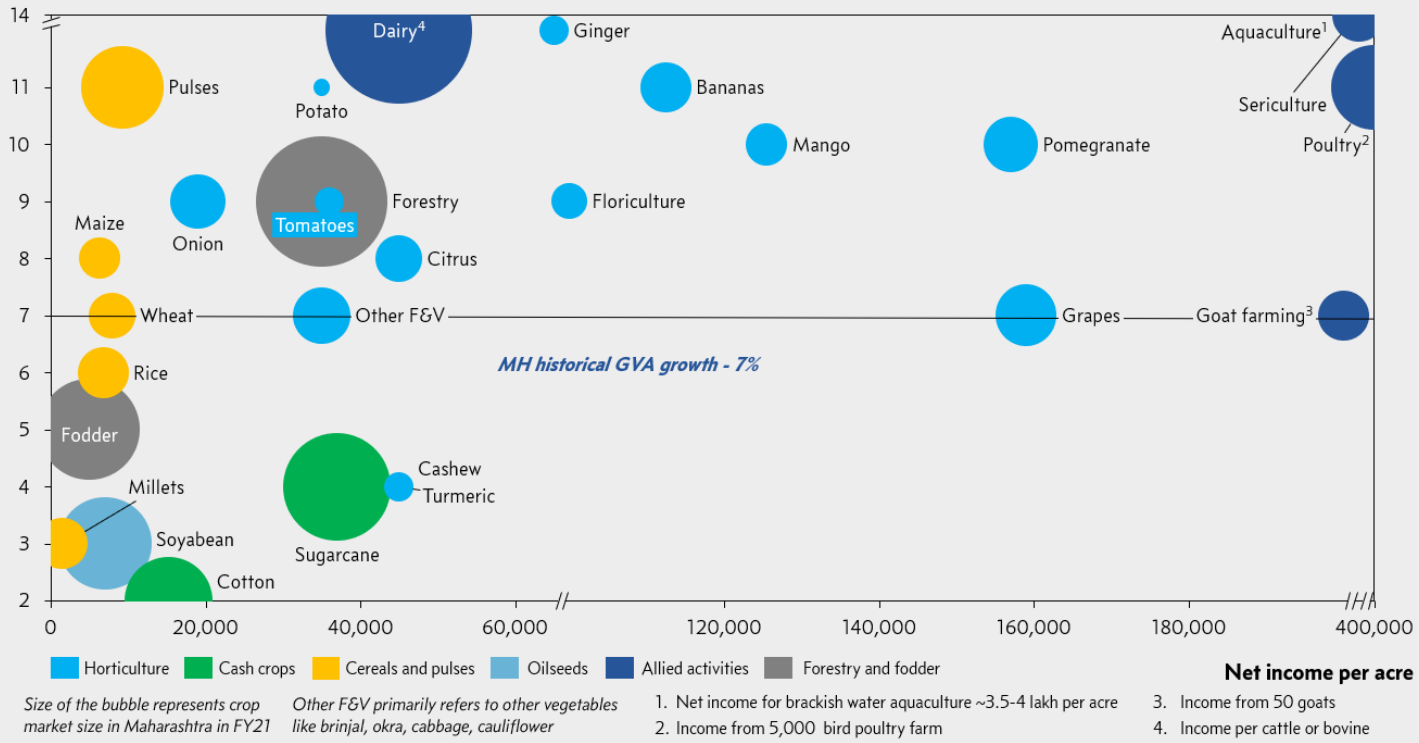


Note: Additionally, Maharashtra will also need to produce green, dry fodder and maize to support dairy and poultry industry growth

4.2 Focus areas for growth

The 28 selected opportunities fall under 5 groups:

Figure 89: Market growth rate, net income per acre and industry size of 28 shortlisted opportunities in FY21.



Size of the bubble represents crop market size in Maharashtra in FY21

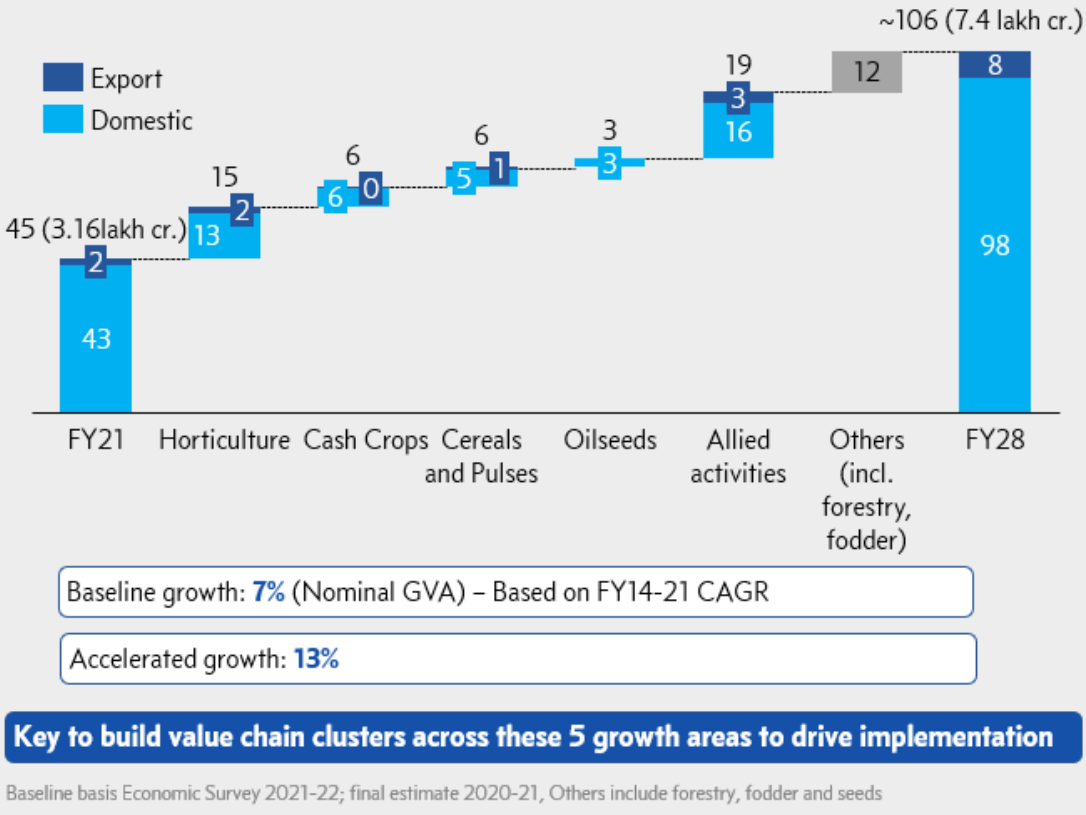
Other F&V primarily refers to other vegetables like brinjal, okra, cabbage, cauliflower

1. Net income for brackish water aquaculture ~3.5-4 lakh per acre
2. Income from 5,000 bird poultry farm
3. Income from 50 goats
4. Income per cattle or bovine

A. **Horticulture:** High-growth and high-income opportunity capable of propelling the state's growth rate beyond the current 7%. Simultaneously, holds the potential to elevate the average income of farmers across the state .
B. **Cash crops:** Low growth but good income opportunity that will require setting up value-adding downstream infrastructure to spur growth, like, ethanol production from sugarcane. Additional growth in the sector can also be spurred by production side interventions. Example, improve yields of cotton to match best in class states through improved inputs and farming techniques (high density plantation).
C. **Cereals and pulses:** Low-income crops which have scale and impact majority of farmers in the state. So, interventions across them will be key in improving the net income of farmers.
D. **Oilseeds:** Opportunity that is important for 'Atmanirbhar Bharat' to encourage import substitution. Need to spur growth through interventions across value chain from inputs (to match global yields) to demand channels and post-harvest processing.
E. **Allied activities (aquaculture, poultry, sericulture, and dairy):** Quick wins with high growth and high net income**.** Need focus to on scale opportunities by developing end-to-end value chain clusters across districts, increasing awareness, and providing access to capital in next five years.

4.3 Target for GVA growth

Figure 90: Agriculture GVA baseline and target for Maharashtra ($ Bn)



Baseline basis Economic Survey 2021-22; final estimate 2020-21, Others include forestry, fodder and seeds

Crop/activity specific contribution for GVA growth

#	Crop	Maharashtra Baseline[1]				India and Global Trade Baseline			Target for FY28				
		$ Bn	FY14-21 CAGR	% by value	000 ha	$ Bn	FY14-21 CAGR	$ Bn	$ Bn	FY21-28	$ Bn	% by value	*000 Ha*
		MH GVA 2021	**MH growth**	**MH % share in India**	**Gross sown area**	**India market size**	**India market growth**	**Global trade[2]**	**MH 2028 GVA**	**Target growth FY28**	**Absolute GVA growth**	**MH % share in India**	**Change in area**
1	Onion – Rabi	1.2	8%	34%	400	7.1	9%	30	2.3	9%	1	34%	-
2	Onion - Kharif	1.2			300				2.3		1		
3	Bananas	0.9	7%	8%	90	11.4	11%	14.3	2.7	18%	1.9	12%	+70
4	Mango	0.6	6%	5%	170	11.4	10%	4.3	1.9	18%	1.3	8%	+60
5	Citrus	0.7	4%	10%	210	6.4	8%	20.0	1.4	12%	0.8	13%	+52
6	Wine Grapes	0.0	6%	57%	4	0.0	7%	-	0.0	18%	0.0	93%	+75
7	Table Grapes	1.1	6%	79%	116	1.4	6%	11.4	3.6	18%	2.4	95%	
8	Pomegranate	1.0	10%	48%	175	2.1	10%	4.3	2.4	15%	1.4	59%	-
9	Tomatoes	0.2	7%	4%	60	5.7	9%	11.4	0.4	12%	0.2	5%	+10
10	Potato	0.1	16%	1%	22	11.4	11%	3.6	0.3	16%	0.2	1%	+5
11	Cashew Nut	0.3	1%	29%	191	1.0	4%	5.7	1.0	20%	0.7	70%	+200
12	Floriculture	0.3	5%	6%	11	5.0	9%	20.0	0.7	15%	0.4	8%	-
13	Turmeric	0.2	11%	16%	60	1.1	4%	0.4	0.4	15%	0.3	28%	-
14	Ginger	0.3	11%	14%	10	2.1	12%	3.6	0.6	12%	0.3	13%	-
15	Other F&V	0.9	1%	2%	285	35.7	7%	-	3.4	22%	2.6	6%	+800
	Total	**8.7**	**7%**	**8.5%**	**2,100**	**102.1**	**9%**	**101.9**	**23.9**	**15%**	**15.1**	**~13%**	**+1,250**

Sources: 1. State-wise and item-wise value of output from agriculture, forestry, and fishing, MOSPI – FY21 GVA taken as 0.85xGVO 2. Tridge.com
Other F&V refers to all vegetables except onion and tomato, like brinjal, cabbage, okra and all other fruits like guava and watermelon

#	Crop	Maharashtra Baseline[1]				India and Global Trade Baseline			Target for FY28				
		$ Bn	FY14-21 CAGR	% by value	000 ha	$ Bn	FY14-21 CAGR	$ Bn	$ Bn	FY21-28	$ Bn	% by value	*000 Ha*
		MH GVA 2021	**MH growth**	**MH % share in India**	**Gross sown area**	**India market size**	**India market growth**	**Global trade[2]**	**MH 2028 GVA**	**Target growth FY28**	**Absolute GVA growth**	**MH % share in India**	**Change in area**
Cash Crops													
1	**Sugarcane**	2.6	5%	18%	1,140	14.3	4%	-	5.9	12%	3.3	30%	-80
2	**Cotton**	3.1	4%	22%	4,500	11.4	2%	-	5.6	9%	2.4	42%	-190
	Total	**5.7**	**~5%**	**20%**	**5,640**	**30.7**			**11.4**	**~10%**	**5.7**	**34%**	**-270**
Cereals and Pulses													
1	**Pulses**	2.4	9%	14%	4,500	17.9	11%	68	6.0	14%	3.6	15%	+600
2	**Rice**	1.1	4%	3%	1,500	42.9	7%	2.1	2.0	8%	0.9	3%	-170
3	**Millets**	0.9	1%	14%	3,000	4.3	3%	19.3	1.7	10%	0.9	22%	+100
4	**Wheat**	0.4	~5%	2%	1,100	23.6	7%	40.3	0.9	~8%	0.4	2%	-
5	**Maize**	0.6	6%	9%	1,200	6.4	8%	37.3	1.4	12%	0.9	12%	-
	Total	**5.3**	**6%**	**5%**	**11,300**	**96.4**		**108.9**	**11.7**	**12%**	**6.4**	**6%**	**+550**
Oilseeds													
1	**Soybean & others**	**2**	**4%**	**13%**	**4,600**	**15.7**	**3%**	**57.1**	**5**	**14%**	**3**	**23%**	**+200**
Seeds													
1	**Seeds**	**0.6**		**13%**		**30[4]**	**13%**	**97**	**2.1**	**20%**	**1.5**	**21%**	

Sources: 1. State-wise and item-wise value of output from agriculture, forestry, and fishing, MOSPI – FY21 GVA taken as 0.85xGVO 2. Tridge.com
Other oilseeds refer to groundnut, safflower, rapeseed

#	Crop	Maharashtra Baseline[1]			India Baseline			Target for FY28			
		$ Bn	FY14-21 CAGR	% by value	$ Bn	FY14-21 CAGR	$ Bn	$ Bn	FY21-28	$ Bn	% by value
		MH GVA 2021	MH growth	MH % share in India	India market size[1]	India market growth	Global trade[2]	MH 2028 GVA	Target growth FY28	Absolute GVA growth	MH % share in India
Allied Activities											
1	Dairy	7.9	8%	7%	128.6	12%	78.6	15.9	12%	8.7	6%
2	Broiler Poultry	1.7	12%	9%	21.4	12%	28.6	5.3	12%	3.3	11%
3	Egg Poultry	0.4	~8%	5%	7.1	11%	4.3	1.0	~11%	0.7	9%
4	Aquaculture	0.9	7%	3%	38.1	14%	85.7	5.7	14%	4.7	5%
5	Goat farming	0.7	10%	5%	17.9	7%	7.1	1.9	7%	1.0	7%
6	Sericulture	0.03	11%	2%	1.7	12%	2.1	0.2	32%	0.1	5%
7	Other allied	0.3	15%	2%	12.9	8%	56.4	0.7	8%	0.4	3%
	Total	**11.7**	**9%**	**5%**	**228.6**		**264.3**	**31.0**	**15%**	**19.3**	**6%**
Forestry, Fodder and Others											
1	Forestry	5.7	12%	13%	44.3	9%	142.9	12.6	12%	6.9	16%
2	Fodder	3.9	7%	44%	7.9	5%	40.7	8.6	12%	4.7	60%
3	Others	1.9	3%	16%	4.3	3%	-	2.3	3%	0.4	16%
	Total	**11.4**		**18%**	**56.4**		**183.6**	**23.4**		**10.3**	**21%**

Sources: 1. State-wise and item-wise value of output from agriculture, forestry, and fishing, MOSPI – FY21 GVA taken as 0.85xGVO 2. Tridge.com

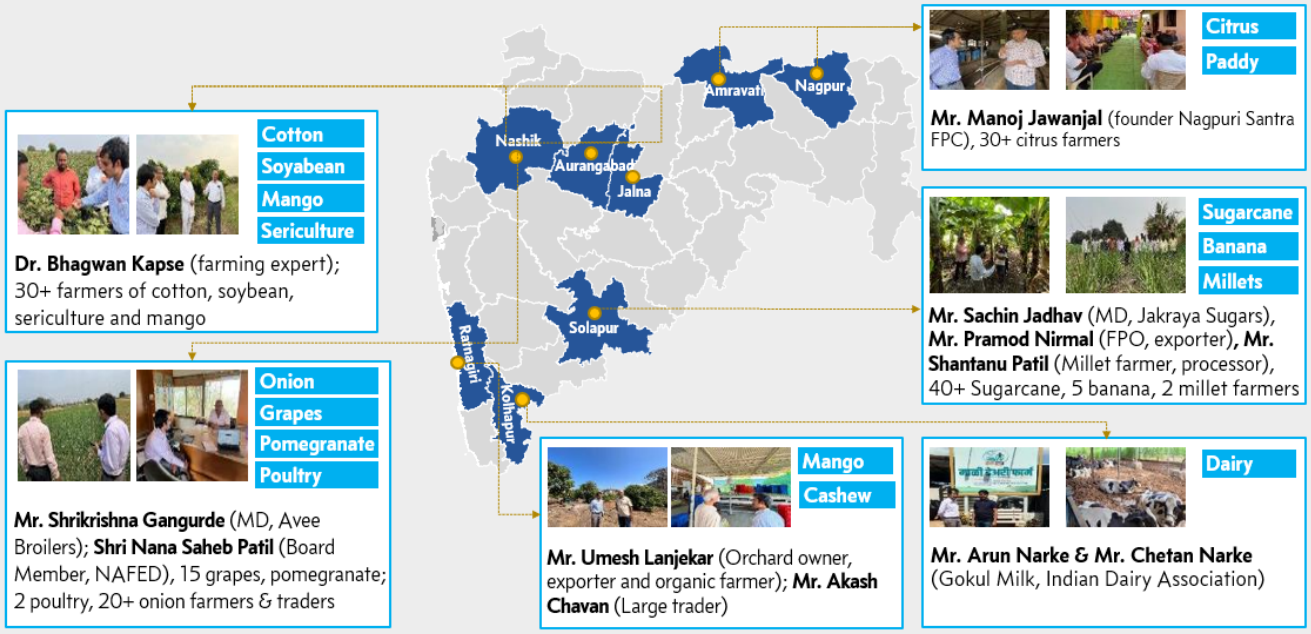
Note: Sericulture includes raw silk and honeybees; Other allied includes beef and meat byproducts like hides and skins; Forestry includes industrial wood, firewood and non-timber forest products; Others includes crops for which central government doesn't report data

5. Challenges

Deep dive on each of the 28 crop/activity was done by conducting visits across 8 districts, interviews with 350+ farmer, 40+ agriculture experts, 10 traders, 5 FPOs and companies, 5 cooperative banks, 4 dairy representatives, 4 aquaculture representatives, 3 poultry cooperatives and 2 sericulture representatives. Discussions were also done with stakeholders of enabling institutions from agricultural universities, banks, and agriculture input providers.

Every aspect of the value chain from input supply, farming, post-harvest handling, processing, marketing, and distribution were analysed to identify bottlenecks, inefficiencies, and potential opportunities for the state.

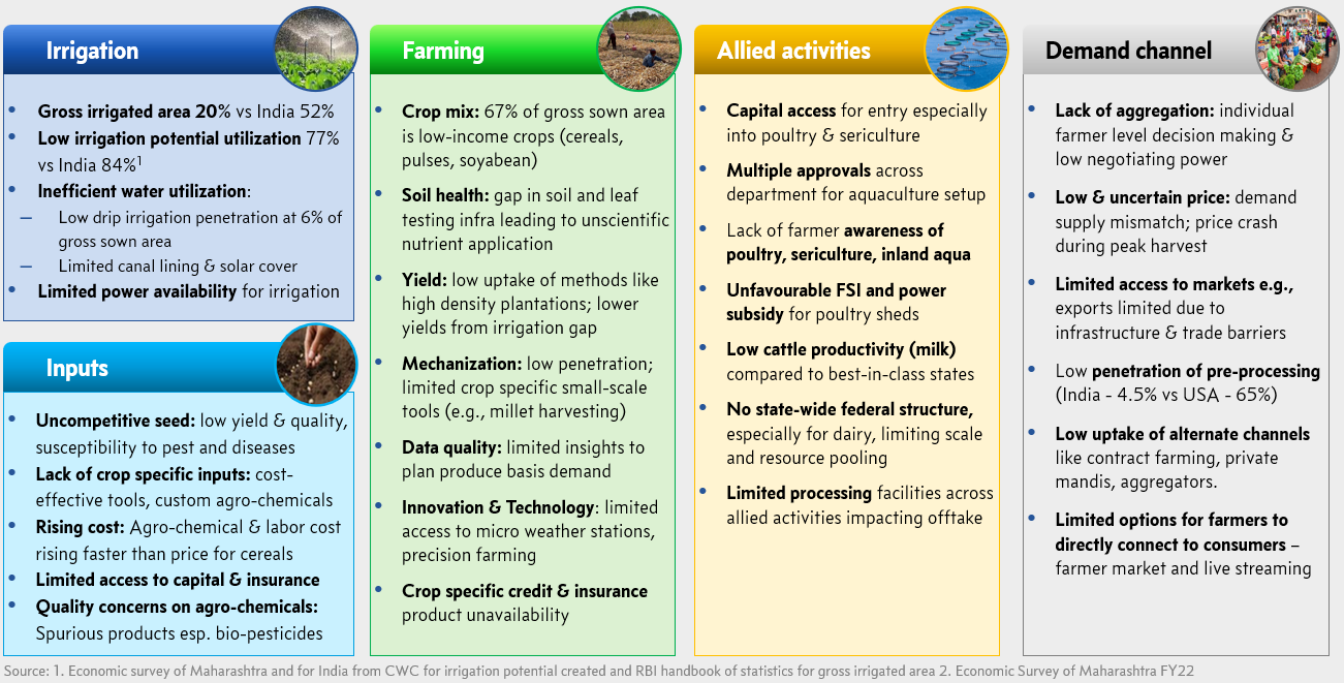
Figure 91: Details of key districts visited and select crops & discussions conducted to identify challenges.



5.1 Challenges inhibiting growth & farmer incomes

The key challenges across Maharashtra's agriculture and allied sector can be clubbed under five broad buckets:

Figure 92: Summary of key challenges across the agriculture value chain in Maharashtra



Source: 1. Economic survey of Maharashtra and for India from CWC for irrigation potential created and RBI handbook of statistics for gross irrigated area 2. Economic Survey of Maharashtra FY22

While a range of challenges are common across the crop categories like above, few are specific to the crop or allied activity as a category; they are more effectively solved at that level. Following are category-level challenges:

5.2 Deep dive of crop category wise challenges across the value chain:

Crop / activity	Inputs	Farming - Practice	Farming - Infrastructure	Demand Channels
 **Horticulture**	• **Gap in demand visibility** (especially for onions during Rabi season) • Lack of **varietal research for export varieties** (e.g., citrus and mango) • Lack of **disease resistant varieties**, especially for pomegranate and banana • Limited **standards and testing for bio-fertilizers / pesticides** • Inadequate **insurance policy coverage** across districts and weather conditions • Limited **financial products for building up orchards**	• Limited access to **information on crop & pest specific solution** • **Awareness gap on standards for residue free** / export requirement	• Limited **regional facilities for soil & leaf testing** to plan fertigation • Inadequate number and gap in functioning of **pre-processing infrastructure** for fruits (e.g., mango) closer to clusters • Inadequate **storage infrastructure** e.g., onion • Limited opportunity to leverage **railways for transport** • Inflated selling price of subsidised **drip irrigation systems vs local systems** • **Limited leadership and business skills** availability for FPOs • **Water availability** limits growing area especially for banana	• Limited **promotion of state's produce** to actively manage demand • Limited **direct channels for farmers** to reach consumers • No **mechanism to indicate fair procurement price** across regions e.g., for banana at Solapur • Limited support to service **institutional demand** e.g., banana for correctional facilities. • Low **processing of onion, tomatoes, and citrus** in India (4.5% vs 65% in USA)[365] • Delays in clearing containers & **infrastructure** gaps for export at **ICDs and ports**
 **Cash crops**	• Sugarcane consumes 60-70% of water used for irrigation in the state; **irrigation** is a key limiting factor for growth • Inflated prices for equipment & delays in securing subsidy for **drip irrigation** • Farmers get irrigation **power only during the night** for Sugarcane • Limited **innovation in planting material** for sugarcane – yield	• **Shortage of labour** during sugarcane harvest season • **Frequent pest attacks**, which have developed resistance to BT cotton seeds • Inefficient cotton harvesting season as **crops do not flower at the same time** (non-determinate varieties), making **harvesting machines not viable** on account of scale	• Limited **mechanized harvesting of cane** which is already cost neutral to manual harvesting • Limited measures at APMCs / farm level to **separate seed from lint of cotton**	• **Cane un-availability** to utilize sugar mills for more than ~120 days in a year • Limited farmer confidence in **weighment & recovery measurement accuracy** • Farmers get MSP for raw cotton with a fixed lint weight of 32%, even if actual lint weight is higher • **Stagnant MSP of sugar** resulting in limited avenues for sugar mills

[365] Source: Study to Determine the Level of Food Processing in India, Ministry of Food Processing in India, 2021

Crop / activity	Inputs	Farming - Practice	Farming - Infrastructure	Demand Channels
	improvement & **early maturing varieties still fall behind peer states** • **High cost of hybrid seeds** in cotton is a **burden for farmers** • Difficult to **access credit** for small farmers with no CIBIL score			to support higher FRP[366] for sugarcane farmers • Insufficient promotion of Indian cotton varieties in the world cotton market
 **Cereals and Pulses**	• Limited access to **quality native seeds and nurseries** • **High input costs** labour and fertilizer costs (make up ~50% of overall revenue earned by selling produce) • **Low availability of mechanization** for harvesting	• Lack of farmer **awareness on best practices** for crop rotation • Millets are highly **labour intensive** (high cost) during harvesting season	• Low penetration of millet **processing facilities** in the state	• **Lack of branded varieties** of rice grown in the state that can fetch 20-30% extra premium • Low price realization for millets leading to **decline in gross sown area** in Maharashtra (60% fall from 2000 to 2021) • Low **international marketing of millets** as healthy alternative
 **Oilseeds**	• India is amongst top 5 producers of soybean in the world and its **yield is 0.3-0.5X** of the other four countries (USA, Brazil, Argentina, and China)[367] • **Insufficient varietal research** for Maharashtra specific lesser irrigated conditions	• Insufficient promotion of Soybean as a nitrogen fixing **rotation crop**	• Lack of **sufficient storage** infrastructure to allow farmers to wait for **volatile market prices** to stabilise	• High **price volatility** for farmers due to weather conditions, demand-supply dynamics, and **global trends**[368] • Inadequate focus on **value added products** e.g., soya chunks[369] • Current **exports comprise of low value add products** like soya meals • Compete against low cost de-oiled cake imports which may even be of GM soya

[366] FRP = Fair and remunerative price
[367] Source: Soybean yields, 2021, Food and Agriculture Organization of the United Nations
[368] Source: Soybean Value Chains and Market Efficiency: Lessons from a Field Visit to FPOs in Latur, Cornell University
[369] Source: Soy Month 2021: Soy Protein to Bridge India's Protein Gap, ET HealthWorld

Crop / activity	Inputs	Farming - Practice	Farming - Infrastructure	Demand Channels
 **Allied Activities**	• Difficulty in **acquiring initial capital** for setting up an allied activity • Lack of **research on higher heat and disease resistant** breeder stock, cattle breeds, mulberry and cocoon varieties • **Low water and green fodder availability** in dry and arid regions of Maharashtra to support poultry and diary • **Low brackish water utilization** (2%) compared to India average • **Unfavourable FSI** for poultry facility built on agri land • **High power costs** & lack of awareness on electricity subsidy for poultry farming	• **Low farmer awareness on profitable practices of diary** and in general **on viability and assured incomes from poultry** • High temperature during summers leading to low diary yield	• Lack of sufficient **milk collection infrastructure** in non-native districts • Low **village level local processing facilities** to provide assured monthly wages to farming households • Low **hygiene control** and access to storage to improve price stability	• Majority (>95%) of trade for poultry happening in the form of **'live birds' resulting in non-resilient supply chains** which cannot absorb any demand supply shocks • Lack of **minimum support price for milk during high supply** (due to yield) season • Low production of aqua feed closer to demand centres (Konkan), adding to lower cost of production • **No large state-wide federal structure like Amul in Maharashtra for diary** • Limited opportunity for poultry & diary export on account of disease concerns and **non-competitive cost of feed**

6. Key interventions across the value chain

The devised interventions also follow a similar value chain approach to solve the challenges faced across all crops and crop groups for demand linkages, farming, irrigation, inputs, and allied activities.

6.1 Driving growth headroom through demand channel growth

Individual farmers in Maharashtra have access to several demand channels for selling their produce. That said, the prominent channels are APMCs, FPOs, institutional demands, aggregators, exporters and traders

These diverse channels provide farmers in Maharashtra with opportunities to expand their market reach and optimize their selling strategies. However, the state has witnessed farmer protests on account of low-price realization (most recently in 2023 from Onion) – highlighting need for price stability driven primarily by stronger demand channels. Hence, to push towards growing the sector GVA, key opportunities across demand generation and fulfilment were identified that will play a key role to handle higher volumes and prices.

The opportunities discovered through farmer, FP, EAC and other farming community interactions for boosting demand channels can be summarised into three key categories for the state to grow generation and fulfilment for agriculture and allied sector.

Figure 93: Three key categories to focus for strengthening demand channels

A detailed account of the following three interventions by crop group and allied activity is given in the subsequent table and sections.

Demand generation and fulfilment - deep dive of key initiatives required by category

Focus areas for growth highlighted in blue

Crop Category	Export	Domestic			
		APMC/Other Traders	Marketplaces	Processors	Others
Horticulture **Channel mix** ~75% APMCs[370] 5-7% exports currently 4-5% processed[371]	• Strengthen FPOs to drive exports & promote produce • Conduct state sponsored marketing • Work with central government for FTAs • Digital export platform • Residue testing, standards • Green channel for exports	• State-wide mechanism for setting fair price for procurement across each cluster • Establish cold supply chain at APMCs • Provide market information to farmers, including prevalent prices & demand	• Set up local farmer markets, melas and festivals • Develop live streaming platforms to brand and sell produce • Promote fresh delivery startups for setting up village collection centres	• Increase public and private investments for: pre-processing, packhouses, ripening chambers • Promote fruit and juice processing[372] • Promote cut fruit exports • Develop PPP food park policy, e.g., Andhra Pradesh	• Contract farming • Promote fruits in schools (Jeevan Amrut Yojana) • Minimum support pricing • Institution demand via FPOs • Planned PDS procurement • Promote health benefits of horticulture produce. (e.g., citrus for diabetes)
Allied activities **Channel mix:** ~80% private buyers for both poultry and dairy[373] ~20% dairy is processed and ~11% poultry[40] 28% exports and ~15% processing[40] for aqua	• Set up hatching eggs export program • Aqua processing infrastructure – deveining (shrimp), packaging • Brand ghee (A2) and Shrikhand to countries first with Indian diaspora	• Set up hygiene zone and dressing plants for poultry • Promote silk – retail chains (e.g., Jharkhand khadi board) • Evaluate milk's[374] fair remunerative prices (FRP) • Set up regulated markets for calf trade (like APMCs)	• Develop an outreach program to invite online and offline marketplaces for fish, shrimp, ice cream, cheese (including feta) and meat to the state. • Encourage offtake of ONDC (when the platform gets ready) • Promote sustainable sourcing and traceability marketplaces	• Attract private investment in poultry for processing and contract farming • Promote value addition (boneless, frozen meats) • Promote local women dairy SHG[375] for curd and sweets • Promote Omega-3 (catla fish) for thyroid patients	• Promote aqua restaurants for building habit & taste • Drive institution demand for silk (e.g., uniforms) • Processed protein & quality products for armed forces • Promote physical activity and milk consumption for school going children[376]

[370] Based on onion procurement data available at agmarknet.in
[371] For fruits and ~3% for onions, source: Study to Determine the Level of Food Processing in India, Ministry of Food Processing of India, 2021
[372] Further detailed in the food processing section of the manufacturing industry
[373] Source: Why farmers are demanding a fair and remunerative price for milk, Hindu Business line, Dec, 2021
[374] Will be difficult as ~95% of the procurement market is controlled by private and cooperative players and they reported heavy losses during 2019 and 2020
[375] SHG = Self-help groups
[376] 1 out of 10 Indians suffer from Thyroid, Source: One in 10 Indians have thyroid problem, says doctor, The Hindu, 2021

Crop Category	Export	Domestic			
		APMC/Other Traders	Marketplaces	Processors	Others
Cash crops Sugarcane - ~100% by mills and for cotton – ~90% by CCI[377] and MHCGA[378]	• Encourage forward contracts for refined (premium) sugar	• Establish small-scale ginning machines at APMCs	• Market place for cotton products (e.g., like Khadi movement)	• Promote post-harvest processing (ethanol, dyeing, weaving) • Promote organic certified sugar and related products	• Promote downstream industry for cotton as suggested in textile section of the report
Soyabean and oilseeds **Current mix:** 90% traders/APMC ~5% government ~5% processors[379] Ultimately ~90% is processed[380]		• Connect farmers to spot exchanges to transparently gauge prices	• Develop an outreach program to invite domestic & export marketplaces offering soybean oil, soy proteins, soy milk and tofu to the state	• Give incentives to enable domestic processors to effectively compete with oil imports; • Enable forward contracts between farmer & processor • Promote model farms for contract farming • Enable tertiary processing	• Evaluate import restrictions to enable domestic industry to scale • Promote vegan campaigns
Cereals and pulses **Current mix** 70-80% local traders, 10-15% APMCs, 5-10% processors, 5% government	• Promotion of millets as healthy food like Quinoa • Facilitate farmer participation in global buyer seller meets	• Attract private capital to upgrade infrastructure • Biomass selling at APMC	• Promote B2B startups for agri-commodities, connecting farmers with processors and international buyers (e.g., arya.ag) • Promote direct from farmer organic cereals and pulses startups	• Promote ethanol blending (using Maize, sweet sorghum)[381] • Promote food processing startups selling maize and millet products • Enable commodity trading and forward buying contracts for wheat, paddy	• Promote millets in public distribution systems • Enable payment price & transparency at private mandis

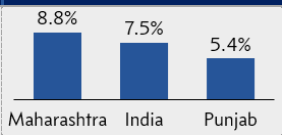
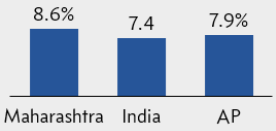
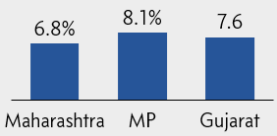
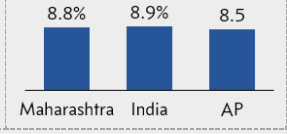
[377] Source: Cotton Corporation of India opens more than 450 Procurement Centres in all Cotton Growing State During 2020-21, Ministry of textiles
[378] Source: Maharashtra govt gives nod to loan guarantee for cotton federation, Indian Express, Jan,2021
[379] Source: Situation assessment of agricultural household and land holdings in rural India, 2019
[380] Source: Study to determine the level of food processing in India, Ministry of Food Processing Industries, 2021
[381] Source: Maize Summit: Maharashtra Govt invites private sector to set up ethanol blending units in the state, April, 2023

6.1.1. Demand & Supply Aggregation

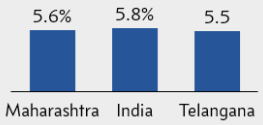
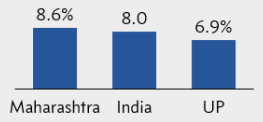
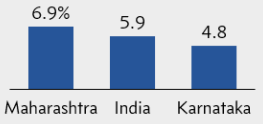
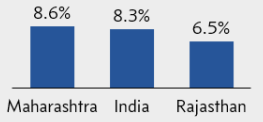
Alternate demand channels for horticulture: There is a strong need to establish alternate selling channels (like startup aggregators, retail chains that directly source from farmers, contract farming) for horticulture, given its perishable nature and importance in driving both GVA and farmer income growth. To spur this growth in alternate demand channels, Maharashtra government can consider:

- Promoting Maharashtra produce among buyer companies and invite them to set up sourcing operations within the state - a dedicated outreach program and well evaluated incentive structure to be rolled out.
- Developing regulatory frameworks and model contracts for supporting growth in contract farming.
- Developing dispute resolution mechanism to maintain trust between the buyer and the seller.
- Inviting enablers including startups & logistics providers to build capability in Maharashtra. Agri-innovation hub can potentially host this capability and gain access to related stakeholders to grow their business.

Minimizing post-harvest losses: As per NABARD and Ministry of Food Processing of India's study conducted in 2022, Maharashtra experiences an average post-harvest wastage of 5-10% (by quantity) across all major agricultural commodities. The commodities that experience highest losses (by quantity) in the state are marine fish, citrus and soybean all at 8.8% and sugarcane at 8.6%.

Crop group	Crop	Post-harvest loss benchmark[382,383]	Challenges	Interventions
Horticulture	Citrus		• Limited number of waxing plants compared to Punjab • High losses during sorting and grading process	• Drive investment in high performance automated sorters to increase capacity in existing facility • Ensure quality wax availability (especially in Amaravati) • Regular calibration and maintenance of sorting equipment
	Mango		• High transportation losses • High losses during sorting and grading process	• Promote investment in distributed / compact private ripening chambers to ensure competition & upkeep • Develop standardized machine designs & SOPs for pre-processing
	Onion		• Supply greater than demand – limited accuracy data for planning • Sub-optimal storage infrastructure	• Improve data quality level & dissemination to farmers • Control supply – alternate crop, seed supply and planning advisory • Set up scientific storage structures for onion
Allied activities	Marine fish		• Few scientifically designed deep sea fishing vessels	• Promote deep sea fishing vessels as prescribed in PMMSY

[382] Source: Quantity of produce lost from Study to determine post-harvest losses of agri produces in India, NABARD and Ministry of Food Processing, GoI, 2022
[383] Benchmark selected basis reported benchmark state by the Ministry of Food Processing's study in FY21

Crop group	Crop	Post-harvest loss benchmark[382,383]	Challenges	Interventions
			• Lack of cold storage facilities at fishermen level (especially inland fish)	• Promote PPP policy for cold supply chain and drying centres near production
	Eggs		• Smashing of eggs in manual collection • Poor farm level storage • Poor packaging • High power cost	• Develop egg handling SOPs like UP government[384] • Promote solar panel subsidies for poultry sheds
Cash crops	Sugarcane		• Insufficient cane availability during season; resulting in early harvest and poor recovery • Labour shortage for harvesting cane	• Mechanization for harvesting • Develop streamlined logistics and scheduling processes from farm to mills
Cereals & pulses	Toor dal		• Shattering of pods and spillage during harvesting • High losses during threshing	• Train farmers on timely harvesting & proper threshing • Promote reapers for small-scale mechanized harvesting
Oilseeds	Soyabean		• ~80% of losses during farm leg of operations & storage	• Encourage PPP and low interest loans for storage infrastructure • Train farmers on timely harvesting and proper drying

Strengthen infrastructure in existing markets:

a. **APMC infrastructure:**
- Attract private capital to upgrade and operate storage and cold storage facilities. These to have best in class stacking and retrieval with automated warehouse receipt generation systems, reliable cooling & ventilation, pest control measures.
- Onboard 3rd party for setting up state of the art testing infrastructure.
- Facilitate setting up of dedicated area for grading, sorting, and packaging of produce.

b. **Increase private investments:** Give capital subsidies and enable PPP (Public Private Partnerships) investments:
- **Dedicated private mandi** for each major crop in the state. Increase competition and options for farmers at the same time ensure fair trade practices and quality of agricultural commodities.
- **Mandate set up of quality testing infrastructure and dispute resolution mechanism** between buyer and seller to drive adoption and further growth of trade in private mandis.
- **Post-harvest processing centres:** 4-5%[385] of F&V and animal meat is processed before sale, which is less than western countries like USA and EU. Government must promote food processing by leasing out underutilized government land or invite bids by local owners to give land for setting up mini food parks by offering capital subsidies and loan interest rate subsidies, like Andhra Pradesh's FY20-25 food processing policy.[386]
- **Increase cold storage:** The state must ensure growth in cold storage network in line with growth in horticulture (except onion) and aquaculture. To support that Maharashtra government must encourage PPP investments in supporting infrastructure like connecting roads, availability of electricity including solar, warehousing and

[384] Source: UP government issues new guidelines for storing eggs, TOI, Apr, 2023
[385] Source: Study to Determine the Level of Food Processing in India, Ministry of Food Processing, 2021
[386] Source: Andhra Pradesh Food Processing Policy – 2020-25

market infrastructure. This can be encouraged through individual farm level investments as well by enabling bank credit at subsidised rates and working capital financing secured against MNREGA incomes.

Strengthen FPOs: To help farmers pool resources and collectively bargain for better market prices, Maharashtra is promoting FPOs. It currently has ~40% of FPOs in the country, but the key challenge today is that they are relatively sub-scale and need strengthening to access larger markets. [387]

Among 1,690 FPOs operating in Maharashtra, only 104 have a turnover of more than ₹ 5 million, and 1,048 have no turnover as of 2021 as per the analysis of ADB Food Security. Most of them are still at an early stage of the development, and their marketing and value chain management capacities remain quite limited[388]. Hence it is important to strengthen FPOs leveraging learnings from successful examples.

Key factors that distinguish a successful FPO

A. Right equity and entity structure for the FPO: Majority holding of the FPO with a close set of farmers who are progressive and keen to take risks to further the cause of the FPO.

B. Right approach to scale the FPO

- Focus on selling produce which most farmer members are comfortable to harvest. Minimal mandates to change farming practice from the members in the initial stages (1-3 years) of the FPO's journey.
- Secure equal or better price for existing harvest to establish value addition and income streams for the FPO
- Continuously map demand in detail and identify opportunities for securing higher value.
- Leverage the capital build up over 2-3 years of operations for strengthening capabilities to access lucrative markets (e.g., horticulture exports to EU)
- Work with farmers to help them adopt best in class inputs and farming practices.

C. Work towards building an eco-system for inputs: Securing access to right varieties, scale benefit to get better prices for inputs.

- Bring value by investing in technologies across the value chain and create marketable competitive advantage.
- Have strong community linkage to support sustainability and social upliftment of the community.

Key enablers for FPOs: Considering these key distinguishing factors and basis discussion with stakeholders, following are few suggested enablers which the state can take up to support the FPO eco-system.

Enablers	Action required
Set up an aspirational rating system for recognition	• Establish an independent rating system (akin to Maharatna for PSUs) to bring recognition especially among investors and financial institutions. • Build a sense of healthy competition to foster growth with clearly identified milestones for each rating. • Rating to be basis a composite scale of farmer income growth, FPO profitability, revenue, social, and environmental (e.g., natural farming) impact
Milestones based incentives & capital	• Give specific incentives and capital infusion options with rating related milestones assisted by the state. • Develop formal funding evaluation process similar to start up incubators
Single window for benefits of members	• Single window for accessing policy benefits across agricultural value chains for FPO member farmers
Build capability of leadership team	• Training to develop management and people skills basis the size of the FPO • Drive 1st wave of training for FPOs which are established and are clocking annual revenue between 5-10 Cr and growing at more than 15-20%
Digital stack for FPO	• Provide a standard MIS solution to the FPOs to enable them to record field, market, storage area, and meeting data properly. • Guide auditors and function leaders of FPO on MIS related duties

[387] Source: Farmer Producer Organisations (FPOs), Ministry of Agriculture and Farmer Welfare, 2021
[388] Source: Farmer Producer Organisations: Experience in Maharashtra, Asia Development Bank

	• Provide platform to share best practices - technical advisory on seeds, pesticide, fertilizers & data streams – weather, soil testing, production & demand data
Farming and inputs infrastructure	• Offer capital investment subsidies to FPOs for setting up testing labs and farming inputs store to leverage scale • Roll out quality standard & operating procedure requirements across the labs and stores
Set up FPO incubator at a state level	• Partner with professional 3rd parties for setting up incubation cell to bring together an eco-system, including VCs and mentors to shortlist right FPOs and fast-track their growth • Target creation of 1 batch of 20 successful FPOs every year • Create e-platform and processes for shortlisting FPO candidates for incubation program • Create regular physical meet up events for batches to re-connect
Promote effort for resilience build	• Give annual recognition and awards, highlighting FPOs making significant contribution to causes - water, biodiversity & varieties, carbon offsets, renewable adoption, skilling, and soil health improvement
Formal training for FPO staff and for student aspiring for FPO placements	• Training on entrepreneurship, business planning, financial management, marketing, and market research • Facilitate access to knowledge portals (e.g., market size publications) and network with enabling institutions like banks & insurers. • Collaborate with agri-innovation hub (one of the recommendations by EAC for encouraging agriculture innovation in Maharashtra, detailed in section 5 of agriculture sector) to seek point solutions to challenges
Link FPO, innovation hubs & other mentorship channels	• Link FPOs to innovation hubs, agri universities, management institutions (for recruitments), agriculture department

Promote aggregators: Maharashtra government must support and promote both direct to consumer and business to business aggregators for farm produce (e.g., bigbasket, ninjacart, bijak, Reliance fresh), meat (licious), fish (captain fish) and milk (e.g., milkbasket) as they can develop more efficient post-harvest supply chain as compared to individual farmers. For example, Amazon Fresh operates a network of 6 collection centres in Maharashtra where it has installed a temperature-controlled supply chain with machines for sorting, grading, geotagging, and packaging.[389] The measures that government can consider taking to promote such aggregators in Maharashtra are:

- **Policy support:** Develop policies to provide investment (e.g., village collection centres) based tax benefit incentives and streamline regulatory process for aggregators.
- **Financial assistance:** Offer financial assistance programs, grants, and loans to aggregators with collateral substitutes for setting up and expanding their operations, including promotion of locally procured produce.
- **Farmer awareness campaigns:** Launch campaigns to educate farmers about the benefits of selling to the aggregators, highlighting factors like higher income and premium for quality.

6.1.2 Market & Price Discovery:

Improve data quality and transparency:

- **ONDC or unified trade platform:** Maharashtra can be the pioneer state and can leverage ONDC to develop a unified platform for agricultural trade. It can integrate with UPI to enable 100% transparency of agricultural trade in Maharashtra, with trackable and traceable transactions. The platform can enable open data sharing (for example, daily procurement quantity and prices by region) between all the APMC and private mandis in the state for transparent dissemination of information to all the participants of the value chain.
- **Data quality improvements:** It is also key to improve the data quality to improve planning and market efficiency. Following are key steps to evaluate and undertake:

[389] Source: Amazon launches 11th Farmer Collection Centre in Pune, Agro Spectrum, Dec, 2022

- Digitally map entire value chain data across all crops starting from high value horticulture.
- Drive APMCs, private market and direct market licensees to integrate with eNAM for easy price discovery for buyers and sellers. Advise and work with central government and mandi boards to upgrade software, improve system's acceptance and usability for farmers to drive adoption.
- Incentivize traders and farmers to conduct and record digital transactions via the eNAM mobile application.

Promote contract farming: Simplify contract farming regulations and streamline documentation to grow the practice as well as ensure adequate protection of the interests of both farmers and buyers:

- Develop simple, easy to understand (especially for farmers), and enforceable legal framework with rights and obligations of both farmer and buyer.
- Streamline and simplify the documentation and registration processes for agricultural service providers.

Break through innovation (including forward contracts): Break through innovations like commodity trading, hedging and forward contracts open opportunities for driving increased transparency and efficiency in market operations.

- Facilitate forward contracts as part of the existing commodity exchanges (NCDEX) or set up new dedicated institutions where farmers can enter into forward contracts with buyers.[390]
- Promote risk management tools like insurance and natural hedging to help farmers mitigate price and production risks associated with forward contracts.[391]
- Educate farmers about forward contracts, their benefits, and associated risks through local trade fairs.

On top of the existing MSP (Minimum Support Price) and viability gap funding programs, Maharashtra government can evaluate following means to improve price stability and its impact on farmers especially for seasonal produce:

- **Establish a centralized market intelligence service** (as part of Maharashtra State Agricultural Marketing Board), which collates high quality market, production and inventory related information, analyses it, and prepares market alerts, supply-demand forecasts (for internal government use only) and works as the single point of contact for information services to the farmers, FPOs, governments and other stakeholders.
- **Additional support for at risk farmers:** Additional direct financial support may be given to small and marginal farmers in drought prone regions.
- **Timely MSP announcement by government and evaluate a mechanism to announce fair procurement prices** for horticulture commodities as well across specific regions For e.g., banana in Solapur
- **Government led MSP procurement** for crops with limited processing and exports opportunities
- **Include susceptible commodities under PDS** for crops like millets with lower net income for farmers

6.1.3 Trade Promotions

The agricultural community must be driven by a demand-and market-oriented approach for planning production. Besides crop council (detailed in subsequent section), the following measures are essential for evaluating and establishing an agile market orientation for the sector.

Produce promotion council: Dedicated government backed council which will promote produce of the state domestically as well as at export destination. It will work towards de-bottlenecking trade barriers, market produce at a scale as a state and introduce right policy support.

- Establish systems to collect, analyze, and **disseminate market information and intelligence to farmers**, including data on prevailing market prices, demand trends, and consumer preferences.
- **Improve marketing of state's produce in domestic and global markets** (for example, creating domestic demand by running campaigns like healthy millets or one egg per day), and especially for agricultural products included in One District One Product (ODOP) programme
- Propose and support central government to sign **free trade agreements (FTA)** in key markets and to reduce trade barriers in prospective countries (for example, citrus duty in Bangladesh[392])

[390] Source: Origo to reach Forward Contracts worth Rs 1500 crores per year within next three years, ET, Oct, 2021
[391] Source: Futures and Derivatives: Can Farmer Producer Organisations Take Some of the Risk out of Farming?, The Wire
[392] Source: Bangladesh crushes Indian orange farmers' hopes by trebling import duty, Hindu Businessline, Dec, 2022

- Develop and effectively communicate **quality standards and certifications**, while facilitating their adoption through FPOs and existing export channels such as traders and farmers to ensure that agricultural produce aligns with national and international quality requirements.
- Develop **new market linkages** by organizing trade fairs, buyer-seller meets, and exhibitions for direct interactions between farmers and retailers, exporters, processors, and institutional buyers.
- Import **seeds/planting material of internationally preferred varieties of** table fruits (e.g., Tommy Atkins in mangoes), processed fruits (e.g., Valencia in Citrus), and breeds for allied activities like aquaculture, diary (e.g., hybrid Holstein Friesian adopted to Maharashtra's climatic conditions).

Enabling farmers to directly sell to consumers:

- Promote farmer markets and farm melas near demand hotspots, providing dedicated spaces, transportation, quality testing tools, and information on customer preferences.
- Enable QR-code based produce traceability by providing QR-generating applications to farmers and conducting gram-level trainings to promote effective usage.
- Support farmers in self-promotion through live streaming and videos on government-supported channels.
- Encourage agri-tourism by conducting training for customer service, product development, and promotions. Give additional capital investment subsidies for setting up farm stays and activity centres in villages with a strong food processing base like honey processing in the Manghar village.

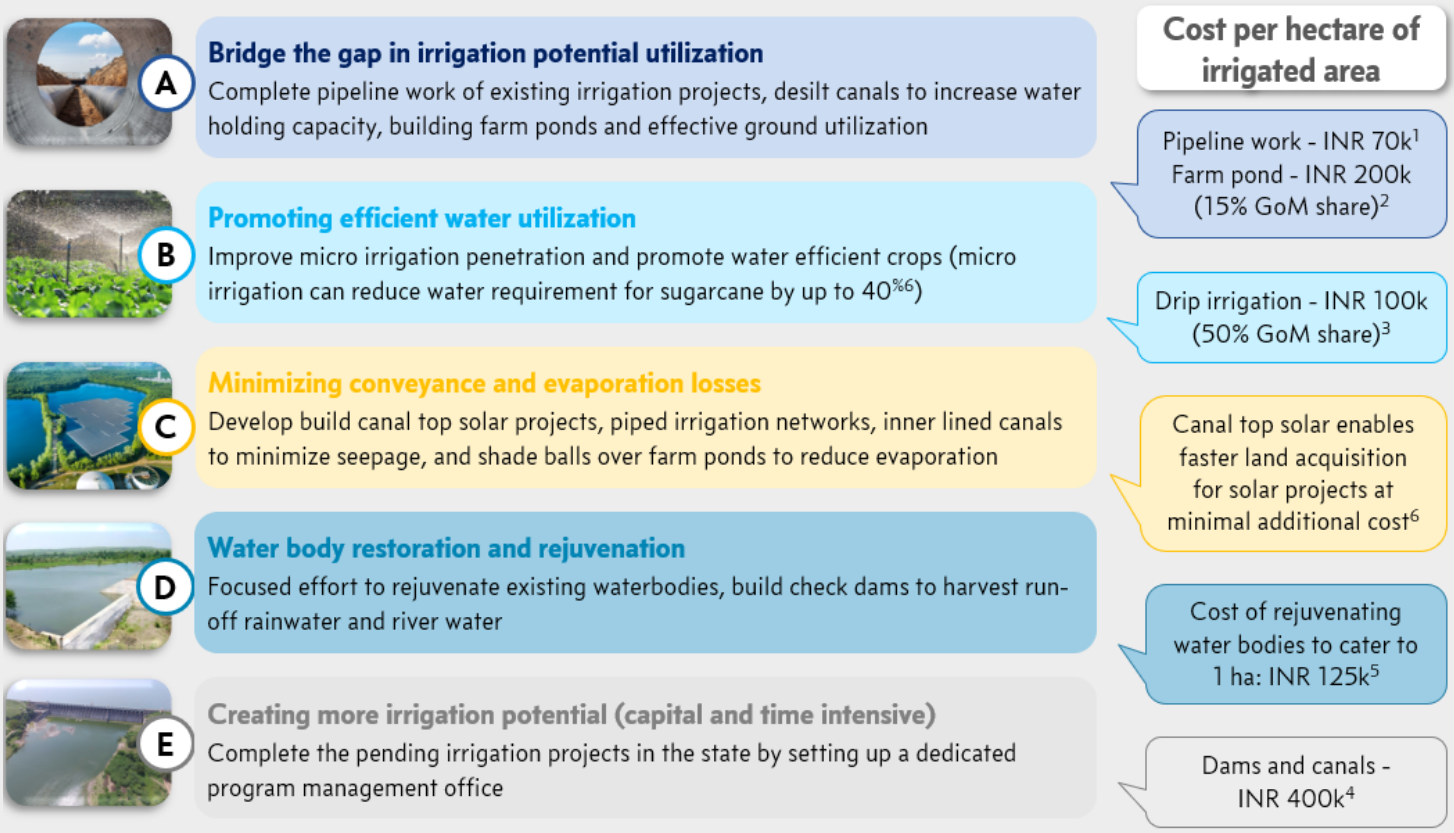
Promoting branding of State's produce:

- Branding produce can significantly increase the value realization potential especially in mature markets including metros/cities domestically and in export destinations.
- Establishing brands can be through value addition (e.g., quality certified, traceable), specific varietal branding and geographical tagging (e.g., Solapur pomegranate), improved product packaging (e.g., uniform appearance & advanced materials to enable efficient logistics), and retail & online advertising to help communicate the differentiation and favorable attributes (e.g., aroma) and drive sense of pride in purchase (e.g., Miyazaki mangoes in Japan)
- Promoting events (e.g., auction events) to build brand awareness and communicate favorable attributes like color, odor, sweetness, texture, and taste of produce

6.2 Solving for irrigation in Maharashtra

Assured irrigation is the single biggest lever which can improve agricultural productivity as well as resilience.

Figure 94: Levers for growing gross irrigated area of Maharashtra.



Source: 1. Niti Aayog and Karnataka State Water Policy 2019 (taken as present value) 2. Magel Tyala Shettale Farm Pond Subsidy Scheme 3. State agri dept 4. Based on current government spend 5. Repair, Renovation and Restoration (RRR) of Water Bodies scheme under PMKSY 6. Maharashtra makes drip irrigation mandatory for sugarcane cultivation, Mint, July 2017

A. Bridge gap in potential created vs utilized (focus on last mile interventions)

a. **Command area completion (pipeline work) of existing dams:** Immediate focus for irrigation should be towards high ROI effort like utilization of already created irrigation potential. This involves construction of pipeline / canal (last mile) system from dam area to beneficiary farms. Along with this, conducting necessary regular maintenance activities is key.

b. **Ground and rainwater utilization via farm ponds**: Prioritize districts where groundwater utilization is lower than the annual recharge from rainfall, like eastern Vidarbha districts (Bhandara, Chandrapur, Gadchiroli, and Gondia) with less than 30% groundwater utilization and more than 750 mm of annual rain, as required for the PMKSY - Har Khet Ko Paani - Ground Water scheme[393]

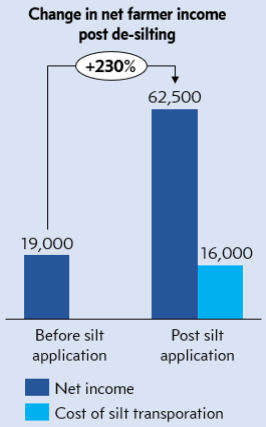
c. **Consistent power supply to improve utilization of ground water potential**: Reliable solar pumps, connection of agri-feeders with solar plants to support operation of irrigation pumps (further details in agri-energy section and energy and renewables section)

d. **Desilting of water bodies** (increasing water holding capacity and using silt to supplement crop fertilization): Gap in design vs live storage of major and medium projects in Maharashtra was estimated at ~8% due to silting of water bodies, as reported by Maharashtra Engineering Research Institute in FY17.[394] Accelerate implementation of existing government scheme like Jalyukt Shivar Abhiyan 2.0 to rejuvenate functional water bodies.

[393] Source: PMKSY - Har Khet Ko Paani (HKKP) – Ground Water (GW), Ministry of Jal Shakti
[394] Source: Average 8% silt in 90 major dams in state, TOI, Sep, 2016

Case study: Restoring irrigation potential of water bodies through desilting[395]

- **Context**: Desilting of water body in Moha village of Beed district via Jalyukt Shivar Scheme (JYS)
- **Intervention:** The farmers were given access to digging machines and fuel to carry out the desilting work to remove excess sand from the bottom. Farmers incurred an expense of INR 16,000 per farmer to transport 1.5 acres of silt back to the farm.
- **Result:** The desilting work helped materially increase surface water storage, while also raising the water table through ground water recharge.
- The excavated silt was utilized by the farmer to grow soyabean and cotton in kharif and groundnut in rabi season, resulting in ~230% increase in net income.



B. Efficient water utilization

a. **Drip irrigation**: Despite having maximum area under drip irrigation amongst all states (1.41 Mn ha in FY22), current penetration as a % of gross sown area in Maharashtra is ~6% in FY22.[396] The state must further promote and ensure efficient uptake of micro irrigation schemes through supportive reforms (as detailed in reforms recommended section) and by providing stable day-time power supply to efficiently run the drip irrigation systems.

b. **Promoting water efficient crops**: An analysis conducted by NABARD in 2018 revealed that the output generated in INR per m^3 of water used is highest for potato (vegetables) compared to paddy and sugarcane (which are utilizing 70-80% of state's irrigation water). The state must identify alternate crops and create a plan to transition farmers to more water efficient crops, especially for regions that are at risk of unpredictable rains.

C. Minimise evaporation and conveyance losses (improve water utilization efficiency): At present ~12% of the water stored in the surface irrigation projects (dams and canals) is lost due to evaporation, and ~15-20% of water is lost during conveyance from storage to farms. These losses can be minimized through:

a. **Piped distribution network:** In 2017, Maharashtra government had set a target to improve water efficiency by 20% by converting open canals to piped irrigation networks. Its execution must be fast tracked.[397]

b. **Inner lining of canals:** Release guidelines and encourage existing contractors to include canal lining work in the scope of irrigation projects as 60-80% of water lost through seepage can be saved through lining.[398]

c. **Canal-top solar panels:** The evaporation losses from surface irrigation projects can be minimized by installing canal-top solar panels. A study by University of California and UC Santa Cruz found that ~80% of evaporation losses can be reduced through canal-top solar panels, with ~1km of solar panels saving enough evaporation losses to irrigate 8 acres of land.[399]

d. **Shade balls on farm ponds:** Promote use of shade balls on top of farm ponds and enable their easy access.

D. Water body restoration and rejuvenation: Maharashtra has a total of 97,000+ water bodies. The state and central government are already taking measures to improve the sustainable water usage through multiple components of the central government's PMKSY (Pradhan Mantri Krishi Sinchayee Yojana) scheme. Over next five years, the state must encourage and ensure effective implementation of:

a. **Watershed management using contour bunding, diversion drains, farm ponds, percolation tanks, recharge wells, and rooftop harvesting system**. The districts with depleting groundwater table must be prioritized, including Ahmednagar, Amravati, Sambhajinagar, Jalgaon, Pune and Solapur.[400]

b. **Repairing and strengthening of existing structures** by appointing a 3rd party monitoring and repairing team.

c. **Building minor irrigation structures over existing water bodies** like check dams.

[395] Source: ATE Chandra Foundation, a philanthropic interest of Chandra Family and A.T.E Group
[396] Source: Agricultural statistics at a glance 2022, Ministry of Agriculture and Farmer Welfare, GoI
[397] Source: Pipe distribution network for irrigation, Water Resources Department, Government of Maharashtra
[398] Source: Guidelines for lining of irrigation canals, Water Resource Department, Orissa
[399] Source: First-in-the-nation project will cover canals with solar panel canopies, The Hill, Feb, 2022
[400] Source: Dynamic Ground Water Resources of India, Ministry of Jal Shakti, 2022

Figure 95: Case study on how access to irrigation through a check dam can propel farmer income by 8X.

Kadwanchi Watershed

What was done on top of check dam?

1. **Soil treatment and water disposal:** Bunded cropped area and installed ceramic pipes to drain excess run-off water to natural drain
2. **Controlling water velocity:** Installed gully plugs and gabion to control erosive velocity of water
3. **Water harvesting** wastelands liable to come under submergence were utilized for water harvesting by making earthen embankment across the waterways.

Case study: Kadwanchi watershed in Jalna, Maharashtra

Summary:
- 1.2 Cr. check dam build during 1997-2001 by MH government to benefit 450+ farmer families
- Farmer annual income increased from **INR 40K in 1997 to INR 320K in 2011**
- Provided access to irrigation via 400 farm ponds and enabled horticulture in drought-prone region

	Before (1996-2001)	After (2017-18)
Investments	Upfront investment by government for building check dam: 1.2 Cr.	• **State spent 12 Cr. in next 15 years on 400 farm ponds** • **40+ Cr.** invested by farmers (40% enabled by banks) on grape plantation, well excavation, tractors, drip irrigation
Area Utilization	• Net cultivated area: 1,366 ha • Two season irrigated area: 256 ha • Cropping intensity: 132%	• Net cultivated area: **1,517 ha** ⬆ • Two season irrigated area: **897 ha** ⬆ • Cropping intensity: **175%** ⬆
Cropping Pattern and Yields	• **Major Crops:** Millets: 900 ha, Cotton: 200 ha and Pulses: 150 ha • **Crop Yields:** Millets (0.7MT/ha), Cotton (0.6MT/ha) and Pulses (0.4MT/ha)	• **Major Crops: Grapes: 480 ha, Other F&V: 150 ha**, Pulses: 200 ha, Millets, 600 ha and Cotton 350 ha • **Crop Yields:** Millets (1MT/ha) - 30% ⬆ Cotton (0.7MT/ha) - 11%⬆ and Pulses (0.6MT/ha) - 40% ⬆
Allied Activities	• **Count:** Hybrid cows (161) & poultry (109) • **Productivity:** 2.4 litres per day per cow	• **Count:** Hybrid cows (236) & poultry (309) • **Productivity:** 3.2 litres per day per cow

Source: Inputs from Mr. Vijay Anna Borade, KVK, Jalna, MSSM Project Reports and IIMA RIM Reports

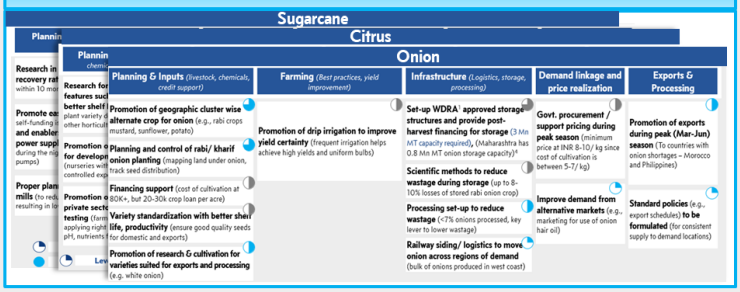
E. Complete planned irrigation projects to create more potential (capital and time intensive):
The state must expedite the construction of ongoing irrigation projects by **setting up a dedicated programme management office** to accelerate the implementation and transparent reporting.

6.3 Crop category wise interventions across the value chains

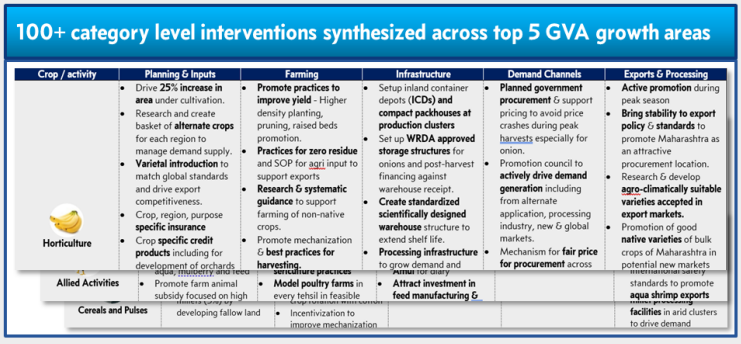
Apart from the system improvements discussed above, it was also important to identify key interventions required to unlock GVA at a crop category level and at crop level across the value chain. By examining the entire crop value chain, specific pinpoint areas where interventions could unlock GVA and farmer incomes were identified.

Figure 96: Interventions necessary across inputs, farming practice and in allied activities to unlock GVA.

500+ crop level interventions mapped & prioritized basis interaction with 350+ farmers, 40+ agri experts & FPOs across top crops



100+ category level interventions synthesized across top 5 GVA growth areas



Top interventions required

Inputs
- **Promote competitive crop varieties**: channel via FPOs to farmers; research to help in adapting international varieties to climate
- **Credit & insurance products:** crop, cluster and purpose specific insurance products, loan products for specific application
- **Develop application specific mechanization & agro-chemicals**: Incentivize private sector for development & commercialization

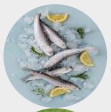
Farming
- **Better crop mix:** shift to horticulture & allied
- **Increased output:** promote high density plantation; drive irrigation
- **Natural farming:** control costs, improve soil health
- **Farm by farm transformation:** granular farm level data collection, hand holding and tracking for structured transformation

Allied
- **Single window & council** for scaling new allied activities in select clusters e.g., marine **aquaculture**, sericulture in drylands
- **Cattle**: **breed program** & skilling drive in strong clusters
- **Poultry**: hygienic processed **supply chains, model farms** for awareness, capital access
- **Sericulture**: **cluster development & micro loans**

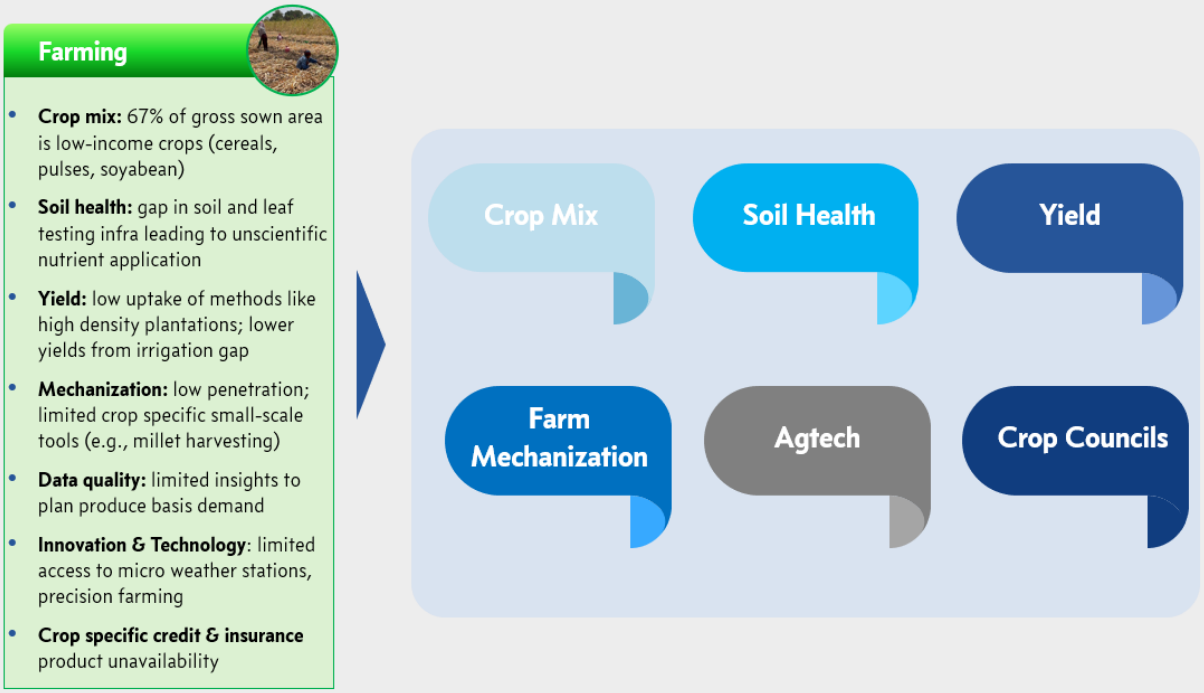
Crop group wise key interventions to unlock growth across the value chains:

Crop / activity	Planning & Inputs	Farming - Practice	Farming - Infrastructure	Demand Channels	
				Traditional	Exports & Processing
 **Horticulture**	• Target **25% increase in area** under cultivation. • Research and create basket of **alternate horticulture crops** for each region to manage demand / supply / price stability. • **Introduce varieties** to match global standards and drive export competitiveness. • Develop crop, region, purpose (e.g., hailstorm) **specific insurance** • Crop **specific credit products** including for development of orchards & value addition facility. • Digital platform to **map demand & supply** • **Create end-to-end value chain** across geographic clusters for top crops	• **Promote practices to improve yield** - Higher density planting, pruning, raised beds promotion. • **Promote practices for zero residue** and develop SOP for agri input usage for exports • **Research & systematic guidance** to support farming of non-native crop (e.g., Kesar mango) • Promote mechanization & **best practices for harvesting** (e.g., onion stem cutting & drying) • Promote **best practices for intercropping** during orchard development. • Drive penetration of **micro irrigation and farm ponds**	• Set up inland container depots (**ICDs) and compact packhouses at production clusters** • Set up **WRDA approved storage structures** for onions and post-harvest financing against warehouse receipt. • **Create standardized scientific designs for warehouse** which will help extend shelf life. • **Develop processing infrastructure** to grow demand and mitigate price fluctuations	• **Planned government procurement** & support pricing to avoid price crashes during peak season, especially for onion. • Set up promotion council to **actively drive demand generation** including alternate application, processing, penetrating new & global markets. • Develop mechanism for **fair procurement price** across regions & crops • **Enable FPOs to fulfill institutional demand** (armed forces, schools) • **Conduct state level brand build** and promotion of premium products (e.g., banana)	• **Active promotion** during peak demand season • **Bring stability to export policy** & **standards** to promote Maharashtra as an attractive procurement location. • Research & develop **agro-climatically suitable varieties acceptable in export markets.** • Promote good **native varieties** of bulk crops of Maharashtra in potential new markets (e.g., red onions to GCC) • **Ensure data availability to evaluate opportunity & single window** for attracting private sector investments
 **Cash crops**	• Develop sugarcane varieties which have **higher recovery and are early maturing cane** • Pre-planning to drive efficiency harvest & logistics for sugarcane	• Promote best practices of **drip irrigation for sugarcane** • Promote **mechanized harvesting** of sugarcane • Use sugar mill spent wash byproduct which are rich in	• **Promote value addition in sugar industry - ethanol** • Promote cotton storage and **warehouse receipt**	• Promote organic certified sugar and related products to drive demand • **Establish small scale ginning machines at**	• **Promote exports of value added products** (e.g., organics) from sugar industry as against intermediates such as molasses

	• Introduce '**determinate cotton varieties'** which flower at the same time for efficient harvest • Develop high yielding **pure line seeds of cotton** to reduce hybrid seeds burden especially in rainfed regions • Promote **high lint varieties of cotton** • Evaluate **direct subsidy for rainfed cotton farmers** who do not receive irrigation & use limited quantum of subsidized fertilizers	potassium & phosphorus for **regenerative farming of sugarcane** • Promote **banana in rotation to sugarcane** • **Encourage high density plantations** and regulating plant height for **cotton** for yield improvement. • Promote small scale harvesting and **farm level ginning machines** for cotton	**financing** for better price realization • Promote cotton processing and textile infrastructure in the state	**APMCs** to separate seed and lint to devise pay per weight.	• **Promotion of native varieties** like 'Suvin' - world's longest and finest cotton fiber that is grown exclusively in India
 **Cereals and Pulses**	• Introduce varieties to match global yields (including **GM Maize**) • **Add incremental area under pulses** 5-6 lakh ha (13% of existing) through irrigation and millets 1 lakh ha (4% of existing) by using fallow land • **Improve pulses' seed replacement rate,** especially mung	• **Promote natural farming in cereals** to reduce costs • Improving availability of **mechanization of harvesting for millets** • Draft SOP for millets crop rotation with cotton • Incentivize mechanization in the form of operational subsidy for harvesters & other farm equipment	• Set up maize and **millet dryers** at all mandis • Create dedicated seed cold storage for hybrid seeds with power tariff subsidy	• Promote millets in public distribution system (model successful in Orissa and AP)	• Promote international demand for value added millet products by creating awareness on millet benefits (like quinoa) • Promote **millet processing facilities** in arid clusters to drive demand certainty
 **Oilseeds**	• **Introduce high yield varieties** including GM Soya suited to Maharashtra's dry conditions • **Improve seed replacement rate** for	• Promote **high density plantations** and **micro irrigation** for better yield • Promote intercropping with Maize or Tur to improve soil fertility	• Set up storage structures of produce and enable **warehouse receipt-based financing** through banks	• Connect farmers to spot exchanges to **transparently gauge prices** (Similar to pilot done by ADM in Latur)	• Incentivize private sector for entry into **value-added product from soyabean** such as soymilk, soya chunks and alternate protein

	oilseeds, especially groundnuts	• Promote regular soil testing scientific fertilization – both micro and macro nutrients			
   **Allied Activities**	• Increase ease to **capital access for setting up poultry, silk, aqua and goat farming** • **Provide MNREGA** support for setting up poultry, sericulture farm • Create empowered crop council to **kickstart cluster formation** for aquaculture for export-oriented shrimp & domestic inland fish • **Set up research institute** for silkworm, cattle, aqua, mulberry, feed • Promote farm animal subsidy focused on high performing dairy districts • Promote deep sea fishing vessel subsidy	• Give subsidies **for solar power systems** for poultry sheds and dairy farms • Provide trainings to ensure farmer awareness on cattle nutrient requirements and profitable dairy farming • Drive awareness and promote **farm pond aquaculture and sericulture practices** • **Develop model poultry farms** in every tehsil in feasible regions	• Attract investment in **hygienic poultry processing infrastructure** to increase resilience of supply chains • **Improve storage infrastructure** of key input materials of poultry feeds • Set up of a **state-wide federal structure, like Amul** for diary • **Attract investment in feed manufacturing & export infrastructure** to support aquaculture	• Set up sericulture clusters in arid regions for value addition activities - Rearing, dyeing • Evaluate feasibility of **fair remuneration price for milk** procurement in the state	• Promote of **hatching eggs exports** given India is competitive and has right breed for regions like GCC • Enable government institutes to work with women SHGs and **small scale industries in villages for diary value addition** (e.g., milk based confectionery) • Increase adherence to international safety standards to promote **aqua shrimp exports** • **Continue 'honey village' development** under Project Honeybee and give additional agro-tourism subsidies in them

6.4 Deep dive on farming interventions



A. Crop mix: Currently, 67% of Maharashtra's gross sown area is being used for growing cereals, pulses, and oilseeds, while their overall contribution to the GVA is only 16%. These also bring in inadequate income per acre for the farmers. Steering farmers towards high-income crops & diversification is crucial as:

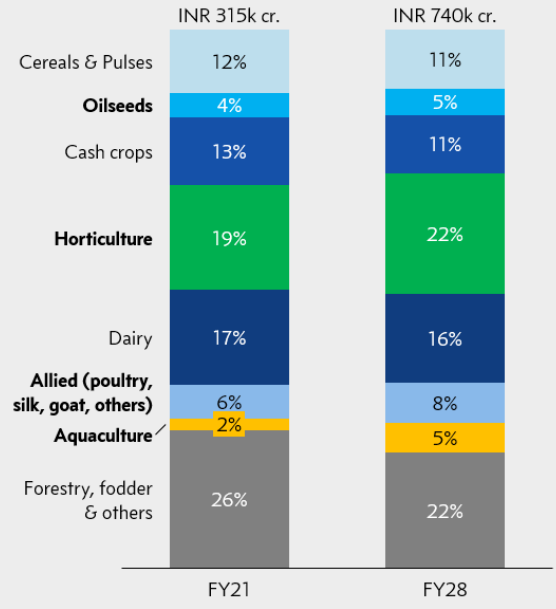
- An alternate high value crop offers the easiest transition route to higher income for farmer.
- A synergistic allied activity will additionally improve income stability providing cover against risks induced by climate, market fluctuations.

Two focus areas driving growth towards a better crop mix are horticulture and allied activities:

a. **Horticulture:** Growth to be driven by developing end-to-end value chain clusters and 'miniratna' FPOs (see section on FPOs for rating systems) for each major horticulture crop. Additionally, Maharashtra must aspire to increase its share (currently 2%) in overall India's vegetable production to 5-6% by FY28, given the size of population and headroom for demand.
This will be enabled by focusing on all aspects of the value chain - drip irrigation penetration, agri-solar subsidies for electricity to run drip irrigation, farm ponds for assured supply of water, varietal research for locally suitable varieties, leaf testing infrastructure, strengthening supply chain, establishing alternate channels for demand linkages, and enabling exports among others.

b. **Allied activities:** Poultry, aquaculture, and sericulture to be key focus areas for growth and the government must promote cluster development for all these opportunities. For poultry, the state must invite more private players to promote contract farming, drive awareness and encourage processing.

Figure 97: Maharashtra's current crop mix vs proposed crop mix based on opportunities.



For aquaculture, Maharashtra must kickstart the industry in the state. Key will be to establish an export-oriented shrimp industry by setting up an empowered council for decision making on brackish water allocation and coordination between departments (mangrove cell, forestry, fisheries). Additionally, Maharashtra has a huge potential for inland aquaculture, especially in the Eastern Vidarbha region, Nanded, and Yavatmal with high

capacity of unutilized ground water (~3BCM – annually recharged through rain)[401], which can sufficiently support the development of 2-4 lakh farm ponds.[402]

B. Soil health: Soil health is key to build resilience for the sector. Over the years, nutrient uptake through commercial farming along with unscientific application of fertilizers have degraded it. Following are key for Maharashtra to focus on:

a. **Leaf testing:** Soil testing must be supported with regular leaf testing, especially for horticulture crops, as soil tests might indicate sufficient levels of growth elements in the ground, while the plant may fail to uptake them effectively. Leaf testing can enable foliar applications to meet the plants' exact needs at each stage of growth.

b. **Soil testing and scientific application of fertilizers to compensate for nutrient deficit:** Despite accounting for ~15% of soil testing laboratories in the country, Maharashtra (587 labs) has lesser soil testing labs than Andhra Pradesh (951 labs), highlighting a need for an infrastructure ramp-up.[403] Setting up new labs along with advisory support via Krushi Vigyan Kendras, SHGs, NGOs are key in educating farmers on which fertilisers are best suited based on their soil conditions. Additionally, there are some measures that the government can take to increase the efficiency of soil testing as suggested in the SHC (Soil Health Card) scheme:

- Strengthening and upgrading at least one state-of-the-art soil testing lab per district, equipped with world class infrastructure, and accredited by internationally recognized agencies. The cost of construction of one unit is ~INR 4-5 Cr.[404]
- Ensure availability of mobile soil testing kits, skilled personnel, and chemicals across all testing facilities.

Case study: Soil testing as convenient as testing blood sugar at home[405]

- **Context:** Dr. Patkar, an IIT Bombay professor, developed a compact and mobile hardware device equipped with paper-based sensor strips to assess 6 crucial soil parameters - pH, electrical conductivity, nitrate, phosphate, and potassium.
- **Product:** The product comprises of an easy-to-use mobile app and mobile testing kit, that is priced at INR 35,000 and can perform ~3,000 tests in a year. With proper guidance and knowledge, a farmer can conduct one test in 5 minutes.
- **Result:** Soil testing can be reduced from 1-2 weeks (lab test results) to 5 minutes using mobile testing, which can also advise farmers on which fertilizers to use and in what quantity.

c. **Drip irrigation and fertigation**: The average efficiency of fertilizer application across all major soil nutrients (N, P, and K) increases by up to 2X by using a drip fertilization technique compared to normal broadcasting technique as per the National Committee on Plasticulture Applications in Horticulture (NCPAH). Though, electrification of farm fields along with a continuous 8-hour high quality power supply is necessary for effectively implementation.[406] Hence the government should:

- Ensure accelerated and efficient uptake of drip irrigation scheme (PMKSY)
- Conduct regular farmer trainings on the amount, time, concentration of fertilizer to be used with drip irrigation
- Work towards ensuring quality power supply for the sector

C. Yield: Promote adoption of advanced agricultural techniques, such as high-density plantations (e.g., for cotton, Mango, Citrus), Saguna Rice Technique, no-till crop sequence. This holds significant potential for enhancing crop yields in Maharashtra. High-density plantations involve the strategic planting of crops at closer spacing, thereby maximizing land utilization and optimizing resource allocation. This technique facilitates efficient nutrient uptake, reduces weed competition, and promotes optimal light interception, resulting in increased productivity.

[401] Source: Dynamic Ground Water Resources of India, Ministry of Jal Shakti, 2022
[402] Considering 10% of annually recharged water rainwater can be utilized for a farm of 40x40x3 size.
[403] Source: Soil Testing Laboratory, Farmers' Portal, Department of Agriculture & Cooperation and Farmers Welfare
[404] Source: Impact assessment of Soil Health Card Scheme, National Institute of Agricultural Extension Management, MANAGE
[405] Source: Pune Scientist's Portable Device Helps Farmers Check Soil Health in Just a Few Minutes, The Better India, May, 2023
[406] Source: Precision farming development centres findings on fertigation techniques, Department of Agriculture and Farmer Welfare, GoI

Case study: Mango high density plantation in Sambhajinagar [407,408]

- **Context:** An ultra-high-density plantations of Kesar Mango was set up in Sillod, Sambhajinagar basis guidance from an expert, Dr. Bhagwanrao Kapse, over a 3.5 acres field - 666 mango trees in one acre (1.5 X 4 meter).
- **Results:** The crop was harvest ready from the 3rd year with a yield of 2-3 MT per acre. The full yield expected is 8-10MT per acre against the state average of 1.8-2 MT per acre.

With increase in density, it will be key to improve awareness on pruning practices to improve yields and ensure adequate solar irradiance is made available to all the plants in the field. Additionally, cropping techniques like Saguna Rice Technique[409] & no-till crop sequence.[410] that are environment and cost friendly must be promoted.

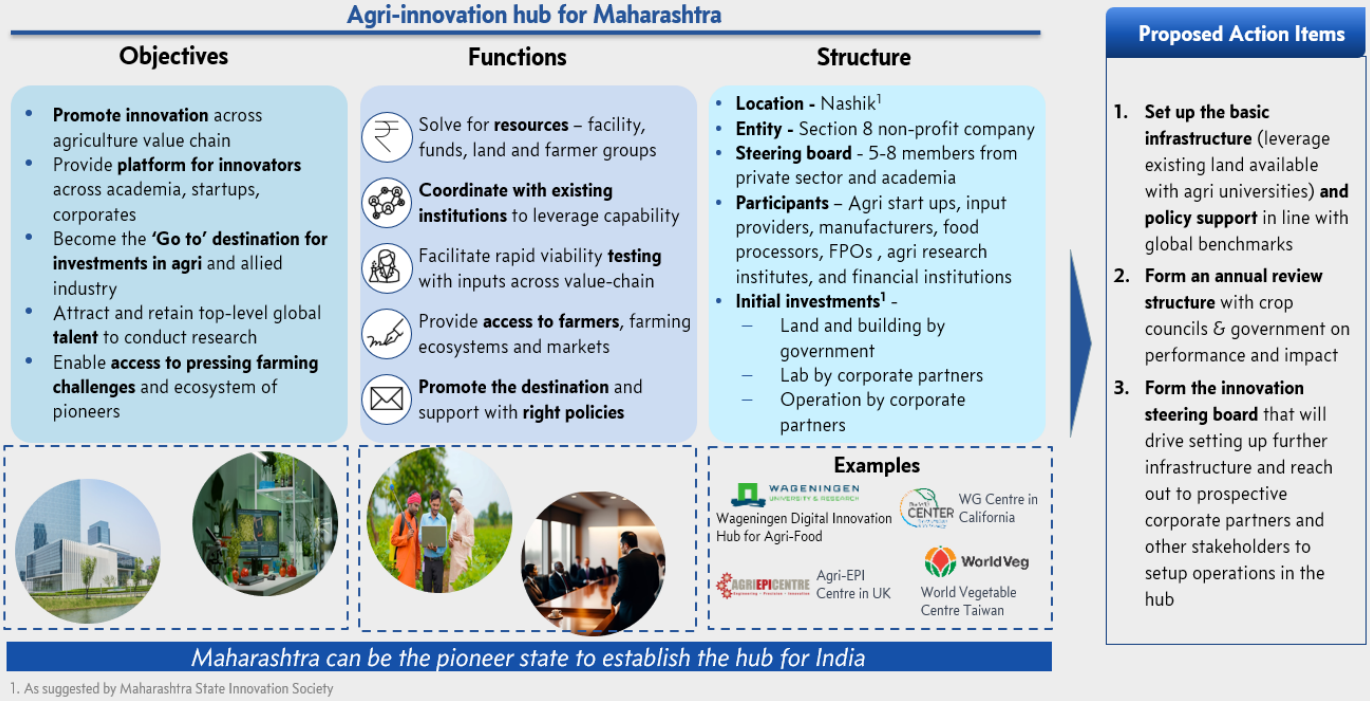
D. Farm mechanization

a. **Farm power availability,** which refers to the capacity of farmers to access and utilize different forms of power, such as mechanical, electrical, or animal power was ~1.2 kW/ha for Maharashtra in FY17, while all India reported average was ~2kW/ha as per Ministry of Agriculture and Farmer Welfare, government of India. In addition to this, there is a variation in mechanisation levels among the different phases of crop value chain (with lower penetration in seeding and harvesting) and across districts within Maharashtra (Nashik highest at 2.6kW/ha vs Akola and Sindhudurg at ~0.6kW/ha)[411].
b. **Demonstration & training on existing and new technologies of farm mechanization**: Scale up existing agri machinery centres through better fund allocation.
c. **Develop Custom Hiring Centres (CHCs) to offset high cost of individual ownership:** CHCs can enable farmers to farm machinery at a lower rate than private players and Maharashtra government must work with FPOs, cooperatives and rural credit agencies to increase the CHC penetration in the state.
d. **Incentivize development of mechanization solutions for crop specific needs:** Key will be for the agriculture department to work with private sector to incentivize creation and roll out of crop specific solutions. Case in point millet harvesting where manual harvesting is labour intensive and current solutions are inadequate.

E. Agtech

a. **Build agricultural innovation hub:** Policy support to form a platform for academia, private and public sector R&D, universities, start-ups, and venture capitalists to work together for solving agriculture problems. The hub should be the center of focus for agriculture innovation requirements for India.

[407] Source: Interview with Dr. Bhagwanrao Kapse in Sambhajinagar
[408] Source: Area and Production of Horticulture crops for 2020-21 (Final Estimates), Department of Agriculture and farmers welfare
[409] Source: Saguna rice technique, Department of agriculture, Government of Maharashtra
[410] Source: Searching for Successful No-till Crop Sequences, Hudson Valley, Farm Hub, Jul, 2022
[411] Source: Monitoring concurrent evaluation and impact assessment of sub-ission on agricultural mechanization, Ministry of Agriculture and Farmers Welfare



1. As suggested by Maharashtra State Innovation Society

Key next steps:

- Set up the basic infrastructure (leverage existing facilities available with agri universities to form a network of innovation hubs or leverage ecosystems like TCS DISQ in Nashik to form a centralized facility) and policy support in line with global benchmarks.
- Form an annual review structure with crop councils and government on performance and impact.
- Form the innovation steering board that will drive setting up further infrastructure and reach out to prospective corporate partners and other stakeholders to set up operations in the hub.
- Develop alternative channels for funding innovation to monetize unutilized lands of agricultural universities for activities like developing seed or use IP rights of developed varieties and other research.

b. **Technology:** To fulfil the objectives of GVA growth, farmer income improvement and building resilience in the sector, the state should take projects to promote five high priority innovations:

- **Micro weather stations:** Micro weather stations can enable farmers to assess localized weather data, including temperature, humidity, rainfall, wind speed, and direction along with soil health data for making informed cropping decisions. The state must promote the utilization of micro weather stations and the development of innovation in this space.
- **Vertical farming:** Vertical farming provides an avenue for agricultural innovation by utilizing vertical space to cultivate crops in a controlled and efficient manner. By implementing advanced technologies such as hydroponics, aeroponics, and vertical stacking systems, vertical farming can potentially optimize resource utilization, minimize water usage, and mitigate the impact of climate change on crop production.
- **Precision agriculture:** State can undertake projects to develop precision agriculture model farms to utilize technology and data-driven techniques at scale for optimizing productivity, efficiency, and sustainability. Precision farming at scale can enable farmers in Maharashtra to manage their scarce resources, like water, fertilizers, and pesticides, more efficiently. The state must also encourage more startups to take up work in this area through hackathons and incubation programs at the agri innovation hub.
- **Residue testing:** Maharashtra is known for its agricultural exports, including fruits and grains. Many importing countries have stringent regulations regarding maximum residue limits. Fast and high-quality residue testing helps farmers and exporters ensure their produce meets these requirements, enabling smooth trade and access to international markets and for domestic consumers, it ensures food safety and health.

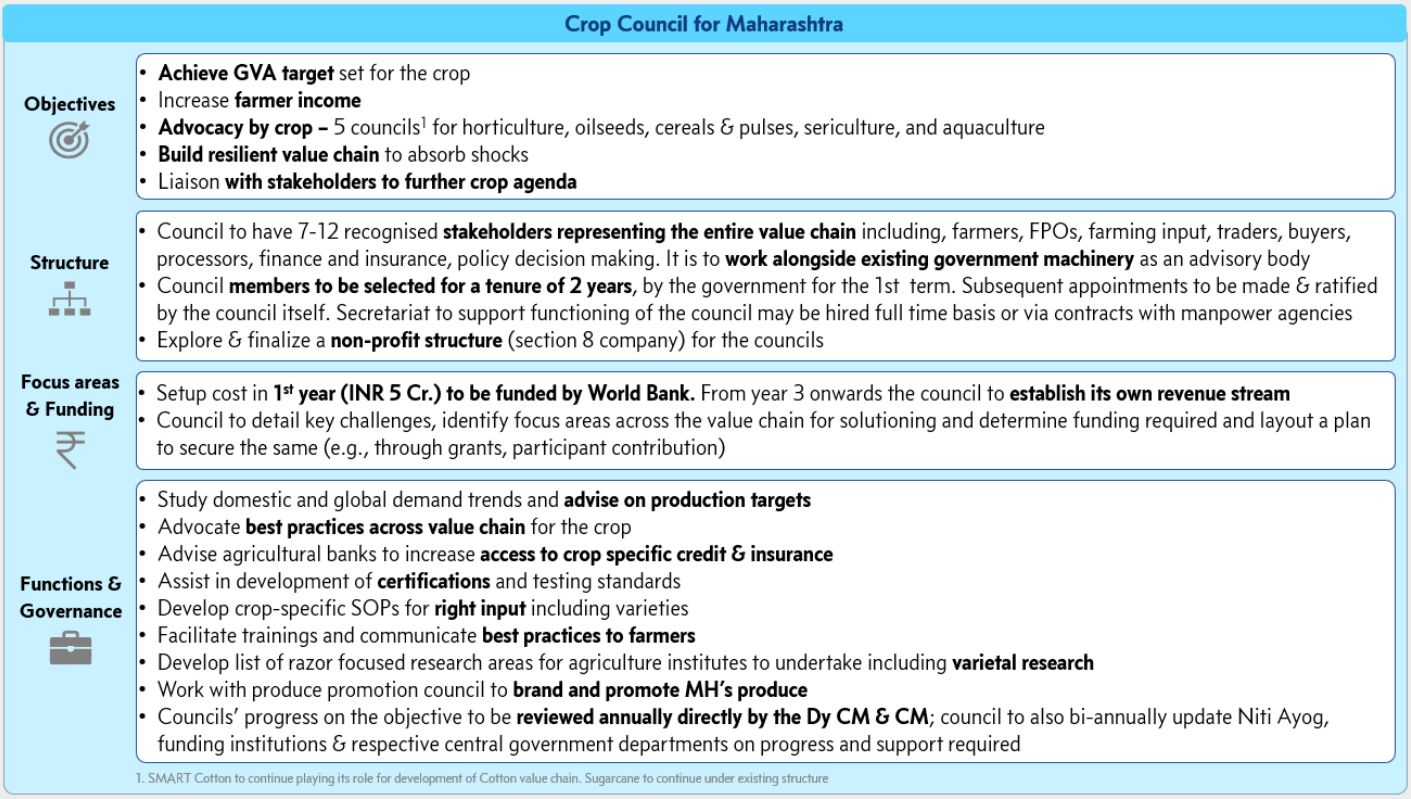
Case study: Technology-based quality testing pilot at Reliance Fresh[412]

- **Context:** Reliance fresh retail store in Mumbai assessed visual quality of agricultural produce using pictures, near infra-red technology for testing for residue and an automated sorting tool for quality assessment.
- **Tracking solution:** Allowed handlers to capture images using app, where AI platform grades the produce based on colour, size, and visual defects.
- **Residue solution:** Used a handheld infra-red scanner to detect brix, pH, TSS, dry matter, moisture, pesticide residue.
- **Sorting solution:** After testing, an automated machine segregate produce based on colour, size, and visual defects.

- **Produce traceability**: The current use of traceability in the state is restricted to fruits exports, setup by APEDA (e.g., grape net and pomegranate net) and the recently launched dairy traceability by Solidaridad consortium to put QR codes on milk pouches.[413] Maharashtra government can consider establishing IT systems, standards, and processes for produce traceability to ensure transparency and accountability throughout the supply chain. This will boost consumers' confidence in the quality, safety, and ethical standards of products.

F. Crop council: Crop or allied activity value chains require detailed planning for transformation with well-informed, crop specific decision making. This can ideally happen if a crop council, which has representatives from the entire crop value chain, advise governance and drives the objectives set out for the crop. Maharashtra should evaluate setting up such councils and mechanisms to incorporate its input in governance.

Figure 98: Objectives, structure, and functions of the proposed crop council for Maharashtra.



Key next steps:

- Identify stakeholders and form crop councils for five crop categories - horticulture, oilseeds, cereals & pulses, sericulture, and aquaculture by end of 2023 in addition to any existing councils like SMART for cotton.
- Provide policy support such that the inputs from the crop councils are integrated into governance of the respective crop in the agriculture sector of Maharashtra.

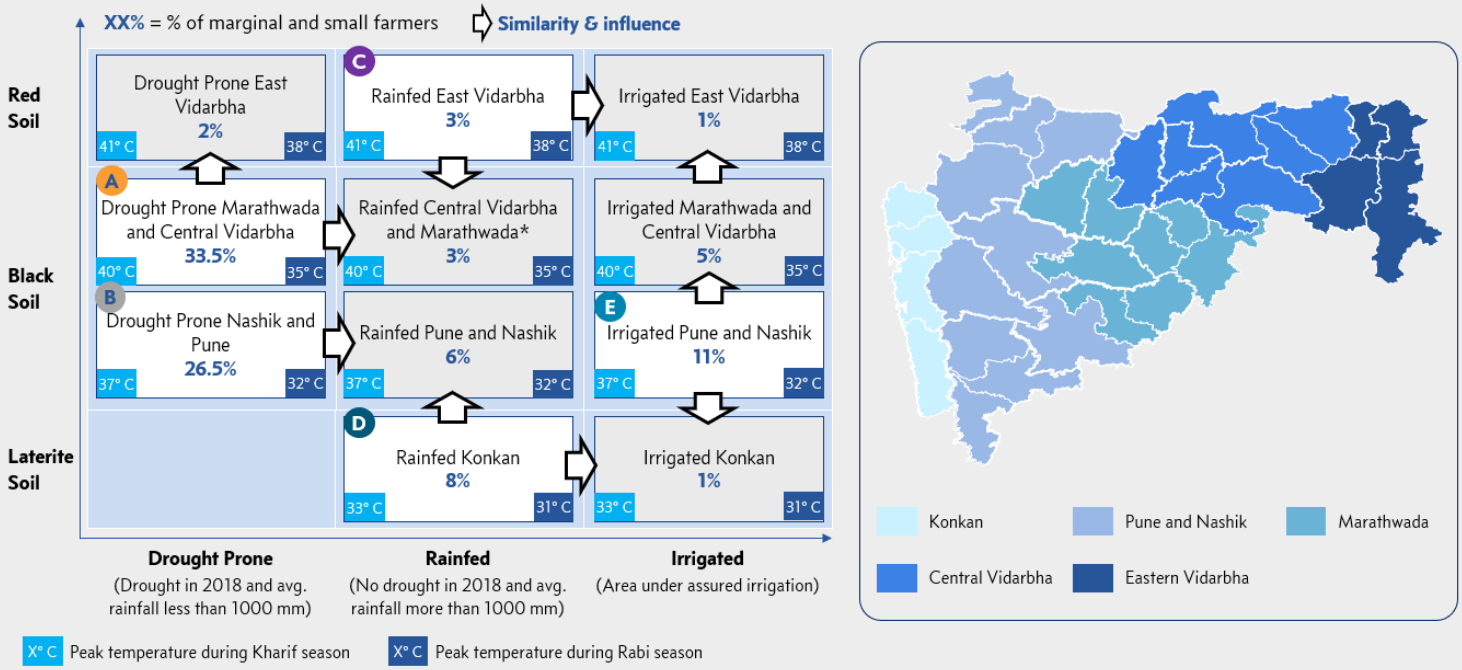
[412] Source: Reliance Industries annual report, 2019
[413] Source: Trust Dairy: Launching traceability in dairy farming in Maharashtra, Jun, 2022

7. Farmer income growth

In Maharashtra ~50% of farmers hold less than 1 ha (or 2.5 acres) of land and earn an average annual crop income of less than INR 30k.[414] Small & marginal land holding farmers are the most stressed and within this large segment, farmers in drought prone area and those with poor soil and agroclimatic conditions should logically receive attention.

7.1 Prioritization matrix: A method to segment small & marginal farmers (out of total 15+ Mn farmers in the state) by water availability & soil type was developed and the numbers of farmers across the segments were mapped. Profiles across top 5 segments representing more than 80% of small & marginal farmers were shortlisted and a deep dive was done to understand what could unlock income growth and certainty for them.

Figure 99: Farmer segmentation matrix basis soil, weather conditions and water availability



Sources: 1. Land holding data from Selected Indicators for Districts in Maharashtra 2018-19 2. Soil data from National Atlas and Thematic Mapping Organization 3. Drought in 2018 based on relief declared by CM of Maharashtra in 2018 4. Temperature from timeanddate.com 5. Taluka-wise average rainfall data from Maharashtra State Data Bank

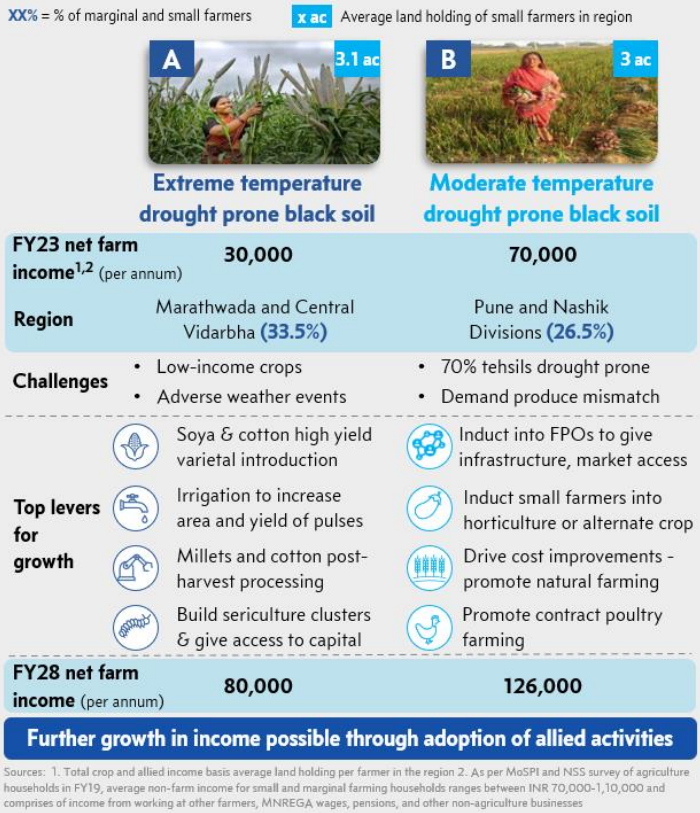
*Note: Includes only 1 taluka from Hingoli under rainfed Marathwada

A. **Drought prone black soil with extreme temperature:** High rainfall uncertainty with drought in every 3-5 years. Major crops: soybean, cotton, pulses, and millets.
B. **Drought prone black soil with moderate temperature:** Droughts every 3-4 years. The climate allows for horticulture and allied activities like poultry. Major crops: cotton, millets, pulses, and onion
C. **Rainfed red soil with extreme temperature:** Soil deficient in Nitrogen to support large scale horticulture. Scope for allied activities due to availability of rainwater. Major crops: cotton and kharif paddy.
D. **Rainfed laterite soil:** Area under cultivation in the zone is only ~25% of the total geographical area. High scope for allied activities due to availability of water, favorable temperatures for animals and unutilized brackish waters.
E. **Irrigated black soil with moderate temperature:** Soil contains enough amount of major nutrients and is primarily used to sow single rainfed and irrigated crop - sugarcane. Other crops in the region include wheat and onions.

[414] Source: Situation assessment of agricultural households and land holding FY19, NSS and MoSPI

7.2 Key interventions required for growing farmer income

Figure 100: Shortlisted profiles of drought prone farmers and top levers for increasing their income by FY28.



- The majority of small and marginal agricultural households, in drought prone area in Marathwada earn an annual crop income of less than INR 30,000 per annum and in drought prone area Nashik earn less than INR 70,000 per annum.
- The primary reason for such low crop incomes is limited access to assured irrigation, which restricts the crop mix sown by these farmers to low-income crops like cotton, millets, and some pulses.
- Even the crops that are sown have lower yield compared to national averages (except soyabean) and have high input costs of labour and fertilizer / agro chemicals.
- The top levers to unlock growth in these regions are increasing 'last mile irrigation', varietal research for growing crop more suitable to the region, and natural farming to reduce input costs.

- Most of small and marginal agricultural households, in rainfed regions of Eastern Vidarbha and Konkan earn an annual net income from crops of less than 50,000.
- These farmers are primarily dependent on low-income paddy crop during the Kharif season, which have lower yields compared to national averages.
- These areas are devoid of a major cash crop and require processing infrastructure to provide farmers a stable and assured income source.
- The top lever to unlock growth is to transition into aquaculture and related activities.
- Promoting higher yield and native varieties can unlock higher revenue.
- Cashew holds a significant potential and must be supported with market linkages and pre-processing infrastructure. This is in-line with state's decision to announce - Cashew Development scheme and a cashew board in FY24 budget.

Figure 101: Shortlisted profiles of rainfed farmers and top levers for increasing their income by FY28.

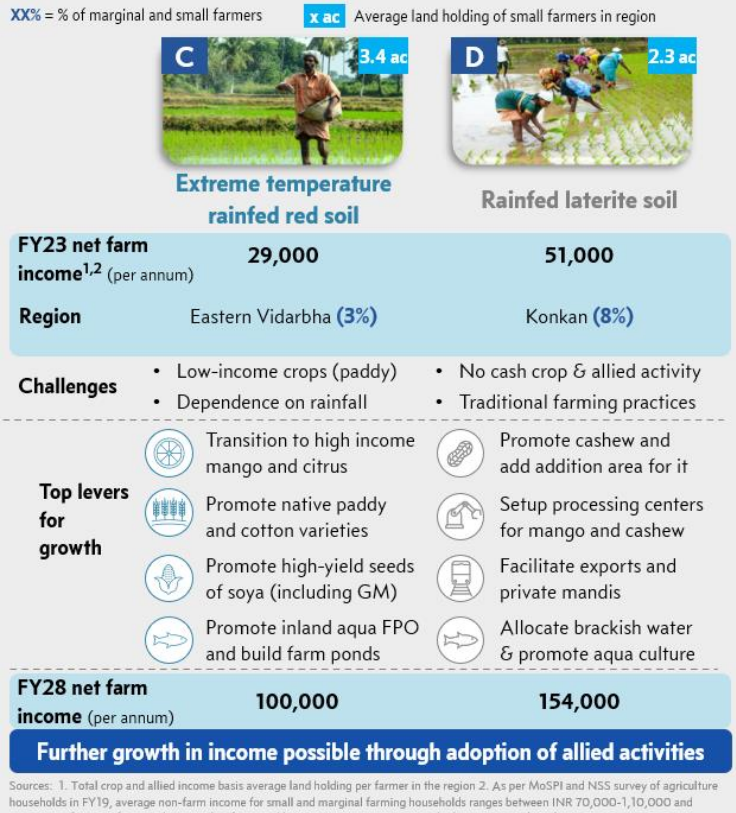
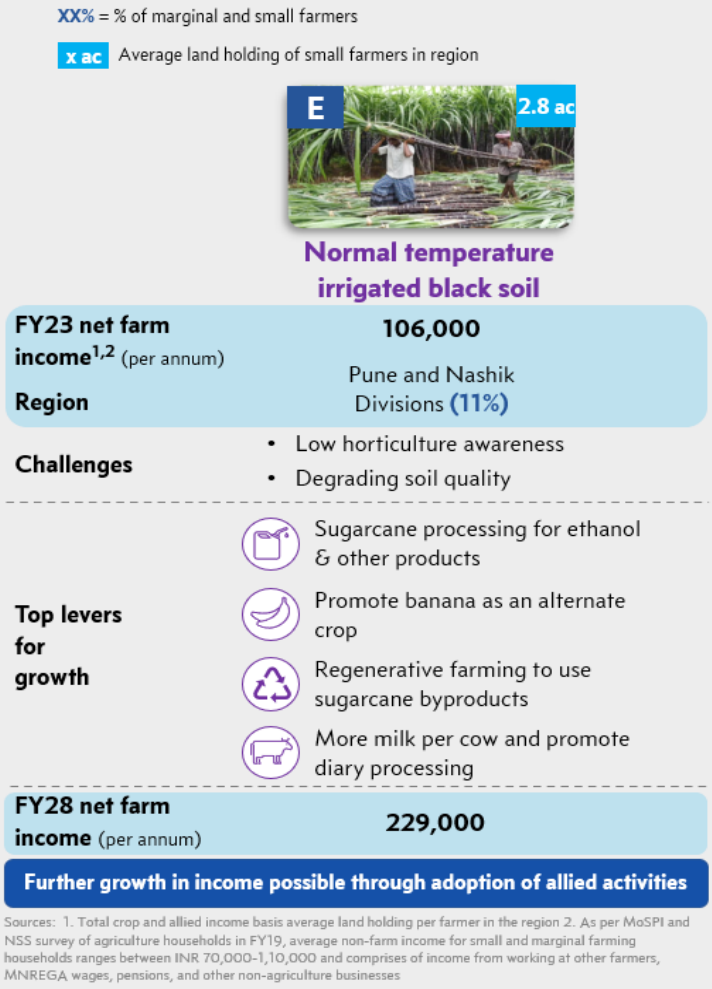


Figure 102: Shortlisted profile of irrigated farmers and top levers for increasing their income by FY28.



- Most of small and marginal agricultural households, in irrigated regions of Pune and Nashik division earn an annual net income from crops of just over INR 100,000.
- These farmers are primarily dependant on sugarcane and are able to take up horticulture over a small portion of their land, and hence the most better-off of all the small and marginal farmers in Maharashtra.
- Average availability of cattle per farmer is also highest in this region and hence, a majority of small and marginal farmers can take up an allied activity.
- The top levers to unlock growth in these regions are setting up more organized value chains for sugarcane processing (including ethanol production) to support FRP[415] growth, educate farmers to start practicing more profitable horticulture crops like banana, and using regenerative methods like utilizing by-products of sugarcane to improve soil fertility.

7.3 Allied activities for income growth and stability

The allied activities can elevate the net farm income of farmers beyond INR 2,30,000 per annum and must be promoted in clusters (to develop sustainable FPOs) and across suitable regions basis demand outlook and availability of existing infrastructure.

The allied activities to be promoted with indicative net incomes and key required enablers are mentioned on the next page:

[415] FRP = Fair remunerative price

Figure 103: Key allied activities to be promoted and their required enablers

Allied activity	Marine aquaculture	Dairy + women SHGs	Goat and sheep farming
			
Potential income (INR per year)	**3 lakhs per acre**	**1.2 lakh per female member of SHG**	**2 lakhs per 50 goats**
Enablers required	• **Aqua stewardship council:** apex body for promotion , land allocation, set up fishers, and protect environment • **Form aqua clusters:** promote feed manufacturing, hatcheries and FPOs for shrimp exports	• **More milk per cow:** map and research right breed - climate adjusted hybrids • **Health awareness:** drive to educate farmers • **Setup local facilities** in villages for value added products including sweets for Women SHGs	• **Access to capital:** 2-3 lakh loan, backed by future MNREGA • **Promote trainings:** to breed, raise, manage and market goats • **Setup market linkages:** form an FPO to market and sell to processors or retailers

Key to promote adoption of allied activity in clusters considering demand of the produce, linkage infrastructure and agri-climatic conditions

- **Marine aquaculture:** Maharashtra has 80k ha of brackish water, with ~2% utilization rate vs Andhra Pradesh at 35% and Odisha at 50%[420]. The brackish water aqua produce (shrimps) has high export demand across USA, China, and European Union. If the state targets similar utilization rates of 35-40% by FY28 by kickstarting the industry, it can provide assured income to 25-30k farmers. [421]
- **Dairy:** average cattle yield in Maharashtra is ~5-6 kg per day compared to 9-10kg per day in Kerala and Gujarat[422]. The state must promote hybrid cattle (adapted to Maharashtra weather), to increase yield by 1.5-2X by FY28. Additionally, state must accelerate its fodder development program, currently running with Mother Dairy.
- **Goat and sheep farming:** accelerate implementation of Balasaheb Thackeray agribusiness and rural transformation project to increase goat and sheep numbers by animal husbandry department. [423]
- **Sericulture:** India is a net importer of raw silk and imports average annual quantity of 3,000MT[416]. Basis the existing yields 2,000 farmers can sufficiently fulfil this quantity without any disruption in the market prices.
- **Poultry farms:** Maharashtra's animal husbandry department highlighted a daily shortage of 1-1.25 cr. of eggs[417], projected to rise to 1.5-1.75 cr. by FY28. To address this, the state can facilitate the establishment of 4-5k new poultry farms (for eggs) through contract farming in targeted clusters.
- **Inland aquaculture:** 4 districts in Eastern Vidarbha, Nanded and Yavatmal have an unutilized capacity of 3 BCM of ground[418]. This water resource can provide inland aqua culture allied income to 2-3 lakh farmers via inland farm ponds. [419]

Figure 104: Key allied activities to be promoted and their required enablers

Allied activity	Sericulture	Poultry farms	Inland aquaculture
			
Potential income (INR per year)	**4 lakhs per 2-acre sericulture farm**	**4-6 lakhs per 5k bird farm**	**1.5 lakh per farm pond**
Enablers required	• **Develop clusters -** combined marketing, inputs & distribution • **Access to capital:** 3 lakh loan, secured against MNREGA incomes for land preparation • **Research on higher yield** mulberry and cocoon • **Value addition:** setup treading and dyeing	• **Provide capital financing:** 8-11 lakh secured loans • **Promote contract farming:** invite private players for poultry collection and processing	• **Promote inland FPO:** access markets, inputs, and technology • **Build farm ponds** • **Setup fish fry centres:** ensure regular supply of high-quality fish fry

Key to promote adoption of allied activity in clusters considering demand of the produce, linkage infrastructure and agri-climatic conditions

[416] Source: Functioning of central silk board and performance of Indian silk industry
[417] Source: Maharashtra faces one crore daily egg shortage: Here's what the state plans to do, CNBC TV18, Jan, 2023
[418] Source: Dynamic ground water resources of India, 2022, Ministry of Jal Shakti
[419] Assuming an average size of farm pond to be 20x20x3 and only 10-20% of the rainwater (3 BCM) will be captured by them
[420] Source: Mission Brackish Water – 2022, Ministry of Agriculture and Farmers Welfare, GoI
[421] Assuming average 1 hectare per farmer after brackish water land allocation
[422] Source: Livestock scenario, Kerala Livestock development board and survey report on estimates of major livestock products for the year FY15, Gujarat
[423] Source: To increase goat, sheep meat production, state launches scheme, Hindustan Times, Dec, 2020

8.Building resilience

Building resilience from stresses such as climate change, natural disasters (e.g., floods) and pest and disease outbreaks for the agriculture sector involves several aspects but chief among them is creating provision for assured irrigation (already covered in previous sections), promoting natural farming to improve soil health, improving access to electricity for irrigation and maintaining biodiversity.

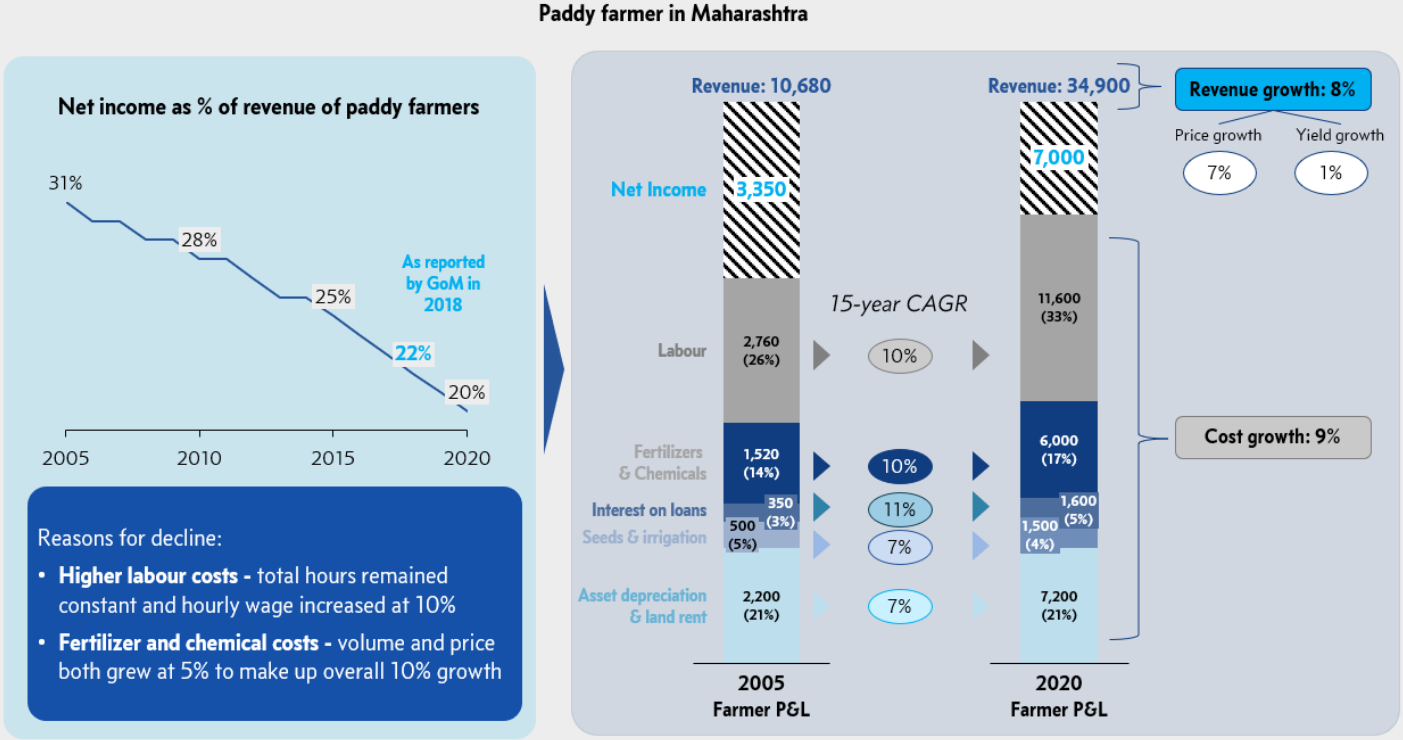
8.1 Natural farming

Analysing the trend of net farmer income from FY05 to FY20 (15-year period) reveals that the farmer income has been on a continuous downward trend. This is on account of the rising cost from labour and agro-chemicals not being sufficiently compensated by the improvement in crop revenue (price and production).

Cost indicators:

- **Labour costs:** ~4-5X increase in hourly labour wage rate (from INR 8/hour in 2005, INR 22/hour in present value terms, for paddy to INR 32/hour in FY20), while the degree of farm mechanization has also not resulted in the reduction of average number of hours worked by farm labour in Maharashtra.[424]
- **Chemicals and fertilizers costs:** During the same period, the unit cost of fertilizers have also gone up from INR 13/kg to INR 32/kg (10-11% CAGR in 15 years), and the volume of application has also gone up, increasing the total spent by farmers on fertilizers and chemicals.

Figure 105: Comparison of net income per acre and growth rates of revenue, costs of paddy farmers during FY05-20.



Natural farming may be promoted to help control the farmer's spend on pesticides and fertilizers. The natural farming practice also brings down the dependence on farm loans for procuring inputs. From a government standpoint, reduction in spend on agro chemicals will also bring down the outlay for subsidy.

The model of zero budget natural farming can also be promoted to help farmer better manage cash flows. This involves covering the soil for 365 days a year and growing short-duration and long-duration crops (main crop) together so that the cost of raising the main crops will be recovered from the income generated from the short-duration crops resulting in "zero" expense in main crop.

[424] Source: By analysing annual farmer data from FY05 to FY20 - 'Cost of Cultivation and Related Data' published by Ministry of Agriculture and Farmers Welfare, GoI

Figure 106: Case study on how natural farming is impacting the net income and agricultural output in AP.

Case study: Impact of natural farming in Andhra Pradesh

Summary

- In FY16, AP[1] established **section 8 company, Rythu Sadhikara Samstha**, to promote natural farming
- **Objectives of company:** enhancing farmer welfare, consumer welfare & conservation of environment
- Number of farmers practicing natural farming increased from **1.8 lakhs in FY19 to ~6 lakhs in FY22**
- Net value added to the state at **INR 840 cr. at an expense of ~INR 650 cr. in FY20[2]**

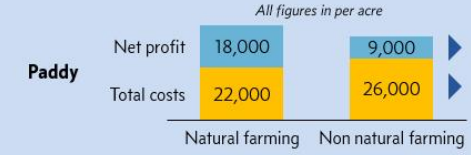
What is done?

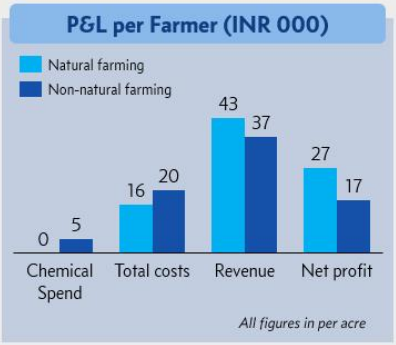
- Growing **specified short and long-duration crops** together for 365 days a year
- **Seed treatment** using cow dung and cow urine from native cow species to protect from diseases
- **Promoting microbial activity in soil** by applying a mixture of cow dung, urine, jaggery, and pulses
- **Increasing water retention using mulching** - covering topsoil with crop wastes

How its done?

- Provide 5-7-year support to a Gram Panchayat (400-500 farmers) with outlay of INR 1.2 Cr. each
- Spend is used for capacity building, institution building, **tracking and monitoring, and marketing**
- Appointed 2-3 master farmers per 5-gram panchayats to motivate, support & handhold villagers

Illustrative results





Note:1. Department of Agriculture and Andhra Pradesh Government 2. Funds received from Rashtriya Krishi Vikas Yojana, Paramparagat Krishi Vikas Yojana, AP Government and Azim Premji foundation

8.2 Agri-energy

a. **Solar powered agriculture**: The installed solar power capacity of Maharashtra is 3,300+ MW (including for agriculture and industrial applications) in February 2023 compared to 14,500+ MW in Rajasthan and 7,600+ MW in Gujarat[425]. Accelerating existing scheme implementation (Mukhyamantri Saur Krishi Vahini Yojana) by employing best practices for subsidy disbursement and work completion will be key to grow the installed base and further the utilization of solar energy. In this scheme, agricultural land will be taken on lease for 30 years for solar power generation, speeding up land acquisition for solar. In turn this gives the farmer an income of INR 1.25 lakh per ha per year. The scheme is expected to add additional 7000 MW in solar capacity.[426]
   For ensuring efficient plant operation from this scheme, the state government may evaluate giving incentives based on power generated (like Gujarat government buying left-over electricity from farmers for INR 7 per unit under the Suryashakti Kisan Yojana or SKY scheme[427]).

b. **Solar pumps:** Effective and time-bound implementation of solar power capital subsidy scheme Pradhan Mantri Kisan Urja Suraksha Evam Utthan Mahabhiyan is key to improving uptake.
   Maharashtra has announced target installation of 2 lakh solar pumps in between FY20-26. As of FY23, ~18% of the target was met and the state must install ~1.5 lakh solar pumps in the next three years.

c. **Agrovoltaic** - Maharashtra already has two agrovoltaic sites in Jalgaon and Dhule (under construction) and should encourage further investments for dual usage of land to solve the growing crops and generating electricity. The steps that Maharashtra government can take are[428]:
   - Develop policy framework including identification of key crops to target and set capacity addition and electricity generation targets for FY28.
   - Ensure coordination among relevant government departments, such as agriculture, energy, and rural development, to facilitate the integration of Agrovoltaic into existing frameworks.
   - Encourage PPP investments through financial support, grants, subsidies, and low-interest loans.
   - Develop streamlined processes for obtaining permits, licenses, and approvals for Agrovoltaic projects.
   - Offer incentives such as feed-in tariffs, net metering, or power purchase agreements to encourage farmers to produce clean energy through Agrovoltaic.

[425] Source: 65,862 MW of Renewable Energy Capacity added since 2017-18 with Solar Energy accounting for 51649 MW, Press information bureau, GoI
[426] Source: Maharashtra solar generation scheme will bring down power cost, help farmers: MSEB official, ET, Apr, 2023
[427] Source: Suryashakti Kisan Yojana (SKY), Gujarat power research and development cell
[428] Source: Status of Agrivoltaics in India, PMKUSUM

- Establish training programs and workshops to educate farmers (including the need to switch crops to accommodate Agrovoltaic), agricultural extension workers, and relevant stakeholders about the concept, benefits, and implementation of Agrovoltaic.

8.3 Biodiversity

Develop district, soil, and animal breed specific SOPs[429] and conduct farmer trainings to ensure:

A. Breeding programs: Research to create agro- climatically suitable breeds for cattle to improve productivity.

B. Varietal research: Develop quality root stocks, especially to propagate non-native varieties (horticulture) and reduce pest attacks (for example, pomegranate in Maharashtra experiencing pest issues).

C. GI tags: Identify and promote super foods and crop candidates for GI tags. (e.g., In 2022 Bihar introduced GI tag for Hajipur Banana[430])

Scan for Kampot Pepper Case Study Video
(Source: Insider Business)

D. Crop diversification:

- Crop rotation: increasing the number of crops grown on a farm and rotating them between the fields to control the growth of pests and diseases.
- Intercropping: enabling access to ploughing tools and animals for preparing beds to sow synergic crops together. This helps in reducing losses, disease incidents, pesticide costs, and increasing yields.

E. Forest conservation: Maharashtra's forest cover, at 16.5% of the state's geographical area and encompassing 50,800+ sq. km, falls short of the 33% target set by the National Forest Policy.[431] The area under forests has remained almost constant since FY14 at 50,600+ sq. km.[432] The state must accelerate its efforts to conserve forest through focused interventions like:

- **Reforestation** by providing financial incentives, technical support, and community participation to ensure the success and sustainability. Additionally, Maharashtra can actively participate in voluntary carbon markets by implementing reforestation and regenerative farming projects (e.g., Indigo Ag's sustainable crop program[433]) that sequester carbon dioxide from the atmosphere and generate carbon credits. These carbon credits can then be sold to businesses and individuals seeking to offset their own carbon emissions voluntarily. The revenue generated from the sale of carbon credits can be reinvested in further reforestation initiatives or increasing farmer income, enabling Maharashtra to expand its forest cover and biodiversity while promoting sustainable livelihoods for local communities. (Opportunity of carbon exchange markets in Maharashtra is detailed further in the Financial Services section)

Scan for regenerative farming / carbon credits case study
(Source: CNBC)

- **Riverbank vegetation restoration** by planting native species, grasses, and shrubs to stabilise the banks and removing encroachments in a phased manner to reduce the impact of floods.
- **Encourage agroforestry** by integrating trees (e.g., neem, banyan) with agricultural crops to provide income opportunities and improve soil health.
- **Planting mulberry along roadsides** to harvest leaves for protein-rich fodder for milch animals and sericulture.

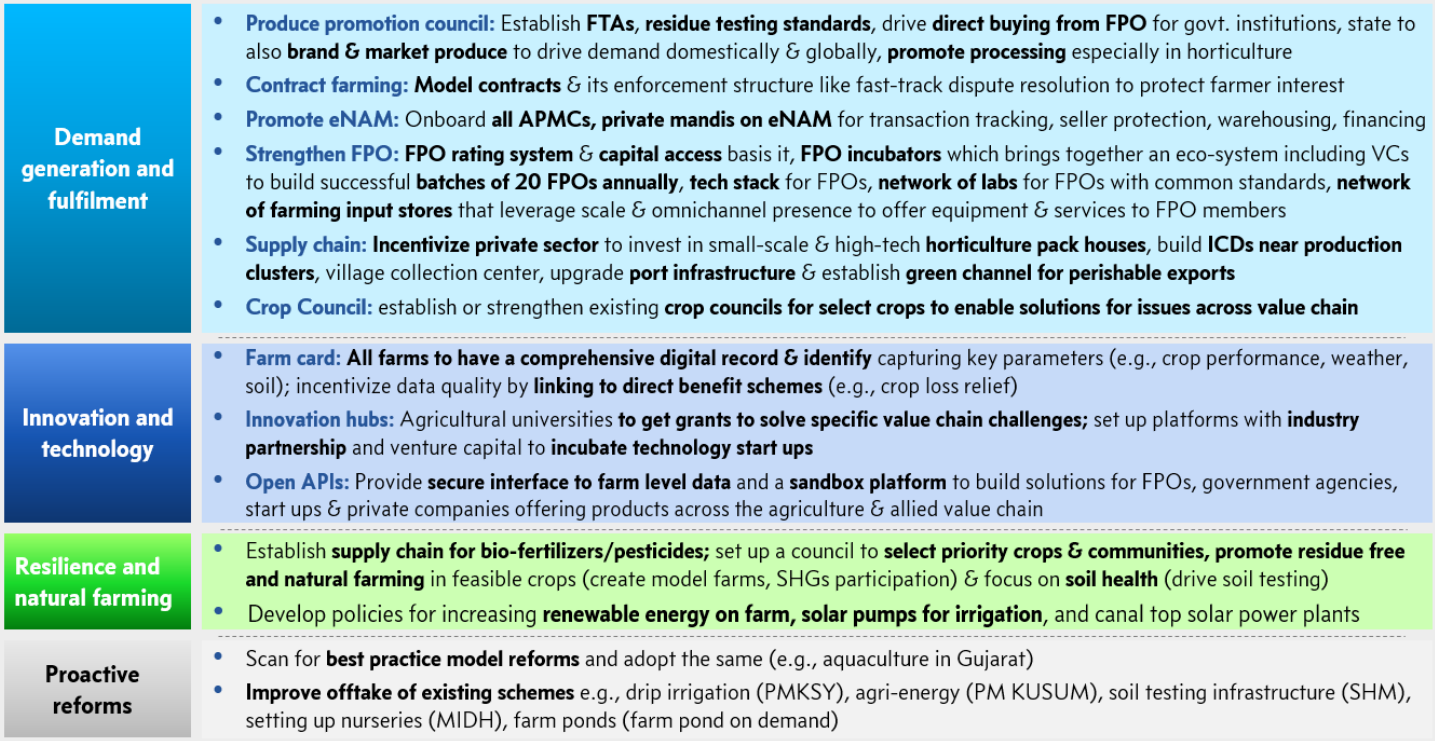
F. Bio energy: Set up government backed bio pelleting plants to convert agriculture and allied activities' waste to fuel, especially near food-processing industry clusters.

[429] Source: Like package of practices developed by Andhra Pradesh Community managed natural farming (APCNF)
[430] Source: To promote exports, Bihar identifies six local products for GI tag, APEDA, Jun, 2022
[431] Source: Maharashtra's forest cover expands, but way short of 33% target, TOI, Mar, 2023
[432] Source: Economic Survey of Maharashtra FY22 and Forest Cover in Indian States and Union Territories (1987-2013)
[433] Source: Enrich Your Soil, Improve Your Profit Potential with Carbon by Indigo

9. Reforms recommended

To achieve the GVA and income growth objectives and for building resilience for the sector, Maharashtra government must take necessary next steps, including building demand generation & fulfilment, creating a platform for innovation and technology, and promoting natural farming. For this the key areas where government must introduce focused reforms are represented:

Figure 107: Key actions and next steps for the government.



PMKSY (Pradhan Mantri Krishi Sinchayee Yojana) PM KUSUM (Pradhan Mantri Kisan Urja Suraksha evam Utthan Mahabhiyan) SHM (Soil Health Management) MIDH (Mission for Integrated Development of Horticulture)

9.1 Demand generation and fulfilment

- **Strengthen FPOs:** Set up an independent rating system (akin to Maharatna for PSUs) to bring recognition, set rating milestones & provide capital infusion related incentives to FPOs, and establish a mentorship & training program to enhance the managerial, technical, and entrepreneurial skills of FPO leaders.
- **Set up produce promotion council:** Set up a council to serve as a dedicated team tasked to strategize, coordinate, and implement initiatives aimed at increasing the international and domestic demand of Maharashtra's agricultural produce consumption.
- **Promote contract farming:** Develop and enact a policy framework to attract both farmers and buyers, providing clarity on rights, obligations, and dispute resolution mechanisms. Handhold and develop model contracts across key clusters to ensure off-take.
- **Mandate eNAM:** Onboard all APMCs and private mandis on to the eNAM platform
- **Build supply chain:** Increase government spend and incentivize private sector (through PPP) to invest in small-scale & high-tech horticulture pack houses, build ICDs (inland container depots) near production clusters, upgrade port infrastructure & establish green channel for perishable exports, set up cold supply chain and village collection centers for horticulture and allied produce. Give additional incentives for setting up infrastructure for products included under One District One Product (ODOP) programme across all districts. For example, storage, railways, and pre-processing centers for rice exports from Gondia and Bhandara.
- **Increase FSI of agricultural land:** Raise the FSI limit of 0.2 in agricultural zones of Maharashtra to promote FPOs and cooperative groups to set up more efficient and higher capacity processing facilities, warehouses, cold storages, and practice innovative techniques like vertical farming.

- **Crop Council:** Establish or strengthen existing crop councils for select crops to enable solutions for issues across value chain.

9.2 Innovation and technology

Farm cards: To improve the data availability and quality for agriculture in Maharashtra, it is proposed that a farm card system be set up. This will be a farm level identity and associated database that integrates multiple sources of data about a farm referencing this identify. This data set can include:

- **Historical performance of a farm**: crops planted, harvested yield, input used including irrigation, output & realization, income estimates
- **Information on capital / assets**: Land records, loans availed, farm machinery in use, irrigation infrastructure including micro irrigation
- **Natural endowments**: soil health, micro weather station data, orchard health including leaf test results
- **Dependence on subsidy/government outlay**: net subsidy through inputs like fertilizer, access to capital investment through irrigation, subsidized power, scheme specific benefits (e.g., solar pumps)

This consolidated data set along with an Open API detailed subsequently can be a rich source of information to

- To take real time decisions to support crop planning across regions
- Act as insights for financial institutions to evaluate performance and extend credit to individual farms as well as for large scale transformation projects

Developing a farm card database would involve a large exercise leveraging the existing network of Talathi, Asha workers and Kisan Seva Kendra workers to capture all farm related parameters from field. It will also involve significant effort to create an Open API framework as detailed subsequently to enable utilization of this data.

Directly linking direct benefits to farm cards can be one of the ways to improve data quality and ease of collection of data.

Open API framework: Open API development by the government is advised. This can better leverage the farm card database and can support innovation in the sector. The API will give a common starting point and help standardize development of applications which can safely, securely exchange information.

Key next steps: Define scope and kick start development of an Open API framework for agriculture. Maharashtra can be the pioneer state for developing the API for use across India. Examples of such innovative API frameworks are Open Ag Data Alliance (OADA), and Food and Agriculture Organization (FAO) APIs.

Innovation hub: As detailed in 'Key interventions across the value chain section' of this report, an Innovation hub is necessary to identify solutions to specific value chain challenges, build industry partnerships and drive access to venture capital to incubate them. The government can evaluate taking following actions in this regard.

- Agriculture universities and institutes to be given grants to solve specific value chain challenges (pinpoint and not exceeding a pre-specified number of challenges).
- Set up a platform for industry and agriculture university to partner, leveraging existing institutions like innovation societies, private & university efforts
- Give faster approvals for agricultural technology starts ups to conduct field trials (e.g., easier limited scale trial approval for IoT based storage solutions for horticulture).
- Conduct bi-annual investor pitch competitions and incubator programmes.

NGO aggregator platform: Set up a government backed platform which lists various NGOs and shares details of their work across regions and functional areas. Individuals and companies can give donations and direct CSR funds to a single agriculture NGO or a portfolio of NGOs (like mutual fund). Such platforms will encourage NGOs to publish the impact of their work and in turn help them secure funding for their projects through an additional channel. Global examples of such platforms are GlobalGiving in USA and Benevity in Canada.

9.3 Natural farming: Like in neighboring state of Andhra Pradesh, set up an initiative to cover at least 20%[434] of small and marginal cereals, farmers in the state by FY28. To ensure target achievement, the government must:

- Drive the initiative through the agriculture department or evaluate setting up a section-8 company (like Rythu Sadhikara Samstha in AP) to select priority crops, village clusters and plan out roll out.
- Establish supply chain for bio-fertilizers and pesticides in those villages.
- Develop an implementation roadmap, including setting up model farms in each village to allow farmers to witness the benefits of natural farming.

9.4 Proactive reforms: Update existing policies to ensure availability of key enablers for achieving the GVA and farmer income growth objectives:

A. Best practices from other states: Scan for best practice model reforms and adopt the same (e.g., aquaculture in Gujarat, PPP food park policy in Andhra Pradesh and agriculture entrepreneurship promotion scheme in Odisha)

B. Improve offtake of existing schemes to ensure timely target achievement, especially for:

- Drip irrigation (PMKSY - Pradhan Mantri Krishi Sinchayee Yojana). In FY22, against a target of 1.8 lakh ha under drip irrigation, the state achieved 0.8 lakh ha (~45% achievement).
- Agri-energy, including solar pumps and panels (PM KUSUM - Pradhan Mantri Kisan Urja Suraksha evam Utthan Mahabhiyan) – by FY23 18% of the target for 2 lakh solar pumps was achieved in 50% of time.
- Soil testing labs and infrastructure (SHM - Soil Health Management)
- Infrastructure projects led by private players across agriculture value chain through Public Private Partnership for Integrated Agricultural Development (PPP-IAD) under Rashtriya Krishi Vikas Yojana (RKVY)
- Set up high-density plantations, rejuvenate orchards, construct pre-processing pack houses & ripening chambers establishing high-tech nurseries (MIDH - Mission for Integrated Development of Horticulture)
- Farm ponds (farm pond on demand scheme)
- Weather based crop insurance scheme for fruit crops (~37% of total fruit area in state was insured in FY22)

C. Ensure effective micro irrigation subsidy roll out: It is necessary to empanel more manufacturers for the subsidy eligible drip irrigation equipment, establishing more competition amongst suppliers to encourage cost innovations.

D. Irrigation mega project: Fast-track high ROI (lower cost per irrigated area, including creation and utilization of irrigation potential) projects like pipeline network development of underutilized irrigation projects in the state.

[434] Within first 4 years of inception the RySS covered ~12% small and marginal farmers of Andhra Pradesh

10. Structure for transformation

Supercharging the growth of agriculture which is an income source for more than half of the working age population in the state from current 7% to 13% (see section 2) is a humongous exercise. Close coordination across stakeholders of each crop value chain, leverage of technological advances and taking support from existing enabling eco-systems & communities will be critical.

To drive the massive change management agenda significant hand holding is required for farmers. It will also require setting up a strong data base for real-time farm level insight generation which is necessary for effective agricultural planning, tracking and policy formulation.

The existing administrative mechanisms of the Agriculture and Allied department (including district, taluka and gram level officers and workers) will also need to be strengthened to drive both data collection and dissemination.

It is proposed that a structured approach be taken for transformation which keeps the following elements at its core:

Farm Card

What is it? Farm level identity which is referenced to combine data from several sources. Basic information to capture include:

- Location (GPS mapped boundaries linked to land records)
- Crop (plantation health, land use history)
- Farm performance (input costs, capital costs, subsidies availed, selling price, net income)
- Natural endowments - soil (soil topography, soil health)
- Natural endowments - weather (macro and micro weather data)
- Irrigation: quantity of water available, last mile irrigation resources – wells, ponds
- Inputs & subsidies: (seeds, fertilizers, pesticides, machinery, loans & grants)

Gramm Sheti Sevak

They will capture the data for Farm Cards: While part of data will be captured from existing databases via APIs (like weather and land records), rest need to be collected by a village-level on-ground team of empowered Talathi (with mobile tablets), Asha workers, and Krushi Vikas Kendras works to go farm to farm across all ~46k villages in Maharashtra.

What are their other responsibilities?

- Information dissemination: information from government & crop councils to the famers
- Outreach events: organize local camps and melas to engage with farmer communities.
- Touch point for support: address individual farmer queries and provide technical assistance.
- Capacity building: enhance farmer skill, best practice awareness and capabilities in farming.
- Monitor and evaluate: track progress, gather feedback and evaluate effectiveness.

Open API

Secure, scalable data platform that provides following benefits to key stakeholders

- **Government**: Provides real time insights for decision making and for tracking progress
- **Finance & insurance:** Enables effective credit scoring to craft unique farm level products
- **Crop councils:** Generate insights to understand, prioritize and quantify challenges
- **Innovation hubs:** Database to simulate scenarios of solutions among others
- **Promotion council:** Allows supply estimation and prioritizing of which crop needs demand push across domestic and international markets

11. Summary and prioritization of focus areas

High Medium Low

Recommendation	Scope	GVA Impact	Capital Intensity & Drivers (in 5 years)[435]	Time to Result	Execution Risk
 Promotion of **allied activities**	Promote poultry, inland & marine aqua, sericulture & breeds in cattle	**$18-19 Bn**	Model poultry farms, effluent treatment plants for aqua, value chains for sericulture, subsidy for cattle	2-3 years	• Adoption challenges - IT system • Delays in infrastructure • Dynamics from other markets
 Shift to **horticulture**	1.25Mn ha additional area; improve yields & price realization	**$15 Bn**	Investments in varietal research, farm ponds, drip irrigation, credit access, FPO strengthening	3-4 years	• Price stability in peak season • Pests and varietal gap • Supply chain infrastructure
 **Demand generation and fulfilment**	Access to export markets & alternate channels for price stability	**$5-6 Bn**	Promotion through council & FPO, set up API & data stack, supply chain & processing infrastructure	3-5 years	• Export restrictions on India • Awareness gap on ground • Demand volatility of produce
 **Natural farming** and soil health	20% cereal farmers (1 Mn) in natural farming by FY28	**$1-1.5 Bn**[436]	Supply chain for natural fertilizers & pesticides; strengthening SHGs & NGO for handholding	4-5 years	• Unavailability of natural of fertilizers and pesticides • Change management effort
 Assured **irrigation**	25% increase in irrigated area; improve last mile irrigation & water utilization	NA (indirect)	Pipe/canal network strengthening, water body rejuvenation, solar pumps, and micro irrigation	4-5 years	• Limited private participation • Delay in permits and land • Insufficient designs
 **Strengthen FPOs** & exports	10+ profitable FPOs with 1,000+ Cr. top line	NA (indirect)	Structured rating system & access to credit for setting up infrastructure, mentoring operations & team skill	2-3 years	• Limited competition amongst FPOs • Inadequate skills of leadership team
 **Agri-innovation** hub	Hub which drives innovation in research & furthers start up eco-system	NA (indirect)	Grants to solve specific challenges across the agriculture value chain; initial hub infrastructure	3-4 years	• Creating stakeholder interest • Financial sustainability • Knowledge and skills gap
 **Crop council**	5 crop councils to improve coordination across the crop category value chains	NA (indirect)	Initial grants for setting up via world bank; legislative support to ensure acceptance of council recommendation	<1 year	• Involvement of right representative • Limited share of voice in decision making of the government

[435] High, medium, and low defined based on 1. Historical expenditure made by Maharashtra government on these initiatives. 2. Availability of centrally funded schemes to reduce burden on state 3. Requirement of high-capital investments to build long-term assets
[436] Increased farmer revenue by INR 6-8k per annum and decreased subsidy by INR 4-5k per annum for every 1Mn to be converted to natural farming basis Andhra Pradesh case study mentioned in building Resilience section and MANAGE

MSME enablement

MSME enablement

1. Executive Summary

Micro, small and medium enterprises occupy an important position in the state's economy with ~48 Lakh enterprises (**8% of total MSMEs in India**)[437]. Of these ~20 Lakh[438] enterprises are registered with Udyam, which generated ~1 crore employment in the state. MSMEs in Maharashtra are estimated to contribute 28-30% of State's GVA and corresponds to ~17% of total India's employment from MSMEs in this period.

Key challenges

Based on district immersions, key challenges faced by MSMEs include,

- **Access to financing**
  - **Access to credit:** Less than 40% of MSMEs in India avail formal credit; issues due to lack of ability of MSMEs to provide collateral and limited MSME focused credit products.
  - **Delayed payments:** ~$152Bn (~6% of India GVA) locked up annually as delayed payments to MSME suppliers
  - **Equity capital:** Limited awareness, understanding and support for raising equity capital through private investors as well as exchanges
  - **Subsidy payments:** Significant, unpredictable delays in payment of subsidies due to complex processes and budget constraints creating cashflow challenges for MSMEs
- **Trade promotion and exports:** MSMEs contribute 45-50% of total exports in India, however there is unexplored exports and domestic market potential. This is due to lack of awareness of export processes and compliances, inadequate support for marketing and demand linkages and lack of subsidised testing facilities.
- **Capability gap**: Lack of expertise across multiple areas that restricts ability to scale up businesses such as business skills, financial awareness, technical skills.
- **Ease of doing business:** Challenges across business lifecycle (i.e., starting, scaling and closing business) due to **inefficient processes** and **limited availability and unattractive cost of key resources** (i.e., issues in land availability for MSMEs in industrial areas, sick assets, high cost of effluent treatment)

Summary of key interventions and enablers

Focus areas	Key interventions and enablers proposed
Financing and payments	
Access to credit	• Promote financial institutions (e.g., NBFCs, fintechs) to develop **cash flow-based lending products for MSMEs** (e.g., Point-of-Sales linked) • Enable adoption of **Account Aggregator framework** and **Open Credit Enablement Network** to provide data backed unsecured credit • Leverage **co-operative banks network** to capitalise on MSME credit schemes • Develop **credit card programs** for specific groups to provide **short-term unsecured credit** • Evaluate setting up **state level credit guarantee funds** for focus sectors and segments • Explore creating **trade finance or export credit schemes** for MSMEs
TReDS adoption	• **Government buyers:** Mandate all state PSUs (e.g., MSEDCL, MIDC) to onboard on TReDS; implement all purchases by state government entities and urban local Bodies via TReDS • **Corporate buyers:** Mandate state-based large corporates (turnover > INR 500 Cr) to on-board on TReDS within specific time-limit • **Financiers:** Encourage insurers to participate to help financier provide loans, especially to buyers with low credit rating**;** develop **state level business insurance schemes** for MSMEs and distribute via TReDS; encourage platforms to provide **detailed credit report** of buyer • **MSME suppliers:** Ease KYC norms to enable seamless onboarding on TReDS

[437] Source: MSME Annual report 2022-23, Government of India
[438] Registered with Udyam

Equity financing	• Establish an **equity fund dedicated for SMEs** focused on specific sectors and themes • Drive **adoption of SME exchanges** by increasing awareness and offering listing benefits
Subsidy payments	• Create **simplified and transparent subsidy structure** to ensure realisation of subsidy benefits • Digitise process for claiming subsidies; explore direct benefit transfer model • Budget subsidy expenditure under planned expenditure and prioritising MSMEs for payments
Trade promotion and exports	
Awareness of export processes and compliances	• Create **information repository** of exports related requirements and and make it accessible via online portals with chatbot or AI powered interface. • **Facilitate** local industry and trade associations to **conduct international trade seminars**
Marketing support and demand linkages	• **Events and exhibitions:** Provide enhanced financial assistance to MSMEs to organize and participate in export promotion events • **Encourage set up of export houses** and **export facilitation centres** in proximity to major manufacturing clusters • **Online marketplaces:** Encourage MSMEs to onboard on national platforms like **ONDC** (Open Network for Digital Commerce) enabling MSMEs and small traders to access online commerce, **GeM portal** for government procurement, **India Business portal** for connecting with international buyers. • **Public procurement from MSMEs:** Explore providing **price preference** to MSMEs and **mandating certain share of MSMEs** in government procurement
Subsidized testing facilities	• Incentivize **private players to set up testing labs** in proximity to MSME clusters • Increase awareness of schemes providing **financial assistance for quality certification**
Capability building	
Training and assistance programs	• **Provide domain-specific training to MSMEs** by partnering with industry associations, agencies and non-profit organisations; financial assistance can be offered to partners or MSMEs • Provide **subsidised access to professional services** via empanelled vendor network
Training infrastructure	• **Leverage existing state infrastructure** (e.g., DICs, trade associations) to deliver training • **Set up new institutes** leveraging **central government sponsorship; explore PPP model**
Technology upgradation support	• **Enhance incentives for technology upgradation to MSMEs** in state level schemes • **Facilitate transfer of technology from academia and industry to MSMEs**
Self-help groups (SHGs)	
Self-help groups enablement	• **Market linkages:** Schemes to link SHG producers with e-commerce platforms • **Access to credit:** Schemes to channelise bank credit to SHGs (e.g., Odisha' BALARAM scheme) • **Digitisation:** Digitise SHG accounts leveraging NABARD's e-shakti initiative • **Capability building**: Foster collaboration between women SHGs/JLGs and industry, academic institutions and social sector organisation to mobilise training of employable women.
Ease of doing business and governance	
Ease of doing business	• Setting up proposed **Udyog Seva Kendra** for business approvals along with MAITRI portal and developing a **DigiLocker for business documents** for easy access and document authentication • Make **power available at competitive tariffs**, provide **smaller sized land parcels and plug and play infrastructure** for MSMEs in industrial parks, connect MSMEs to **common effluent treatment plants**, and facilitate **resolution of MSME sick assets**
Institution and Governance	• Consider setting up government driven MSME **focused body** with responsibilities including promoting trade, investments and exports, monitoring performance, enabling dispute resolution • Formulate **MSME focused policy** covering all aspects of MSME enablement including access to financing, subsidies and incentives, trade promotion and capability building

2. Overview: Current state and key challenges

Micro, small and medium enterprises (MSMEs) occupy an important position in the state's economy with ~48 Lakh enterprises (8% of total MSMEs in India)[439]. Of these, ~20 Lakh enterprises are registered with Udyam generating ~1 crore employment in the state as of June 2020 and contributing INR ~2.4 Lakh Crore of cumulative investment (Oct 2015-Mar 2020).

At an India level, MSMEs contributed ~30% of GDP, 45-50% of exports and ~40% of manufacturing GVA between FY20 and FY22[440]. MSMEs in Maharashtra are estimated to contribute 28-30% of State's GVA and corresponds to ~17% of total India's employment from MSMEs in this period.

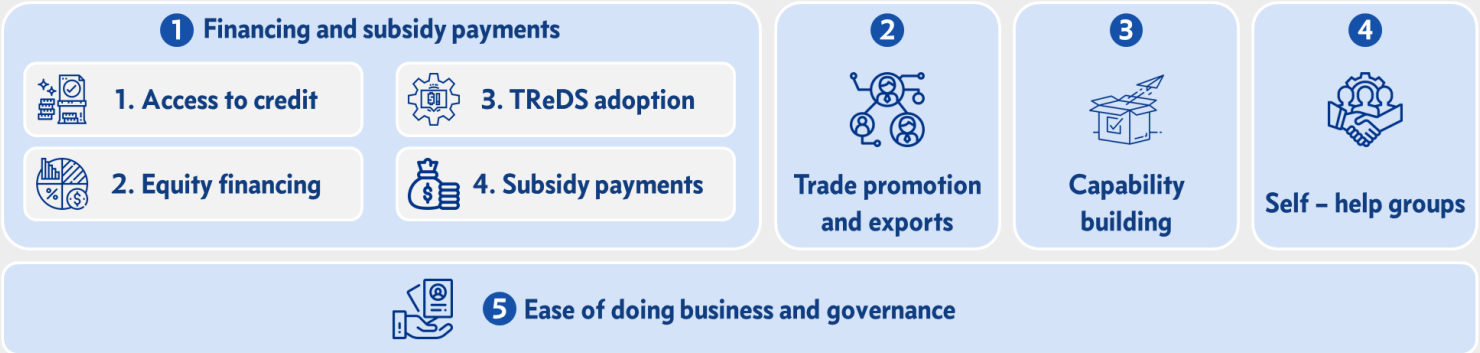
Key challenges

Based on district immersions, key challenges faced by MSMEs include,

- **Access to financing**
  - **Access to credit:** Less than 40% of MSMEs in India avail formal credit; issues due to lack of ability of MSMEs (especially women MSMEs) to provide collateral and limited MSME focused credit products.
  - **Delayed payments:** ~$152Bn (5.9% of the GVA of India) locked up annually as delayed payments to MSME suppliers creating working capital management issues.
  - **Equity capital:** Limited awareness, understanding and support for raising equity capital through private investors as well as exchanges
  - **Subsidy payments:** Significant, unpredictable delays in payment of subsidies due to complex processes and budget constraints creating cashflow challenges for MSMEs
- **Trade promotion and exports:** MSMEs contributes 45-50% of total exports in India, however there is unexplored exports and domestic market potential. This is due to lack awarness of export processes and compliances, inadequate support for marketing and demand linkages and lack of subsidised testing facilities.
- **Capability gap**: Lack of expertise across multiple areas that restricts their ability to scale up businesses – business skills (e.g., drafting business plan), financial awareness (e.g., filing GST returns, information on available incentives and schemes), technical skills (e.g., upgrading to new technologies).
- **Ease of doing business** – MSMEs face challenges across business lifecycle (i.e., starting , scaling and closing) due to **inefficient processes** (lack of single-window clearances for approvals, delays in subsidy payments, unresolved sick assets), **low attractiveness in availability and cost of key resources** (high power cost, limited availability of land, high capital cost of effluent treatment, inadequate logistics infrastructure).

3. Strategic focus areas and interventions

In order to address the challenges faced by MSMEs and enable them to capture a proportionate share in the projected economic growth, focused initiatives are required by State along five key areas – financing and payments, trade promotion and exports, capability building, Self-help groups enablement and overall ease of doing business.



[439] Source: MSME Annual report, 2022-23, Government of India
[440] Source: Contribution of MSMEs and Cottage industry to GDP, PIB, December 2022

3.1 Financing and subsidy payments

3.1.1 Access to credit

The overall addressable debt demand of MSMEs in India is estimated to be $525Bn in 2017 of which Maharashtra accounts for 20% share equivalent to $105Bn[441]. Less than 40% of MSMEs in India avail credit from formal financial systems and therefore depend on costly and unreliable credit[442]. As highlighted in financial services section, State can target to increase MSME credit penetration[443] from current estimated level of 58% (excluding credit by urban co-operative banks) to more than 80% to address the financing gap. As mentioned earlier, key issues in accessing formal credit by MSMEs include lack of collateral and limited MSME focused products.

Key interventions

a. **Strategic partnership with financial institutions** (e.g., NBFC, fintechs) to drive product innovation and adoption of **sector specific cash-flow based lending provisions**: MSME loan providers could create differentiated products based on sector-specific cash-flow patterns. State can consider setting up **innovation fund** to promote financial institutions to develop and deliver such products. NBFCs and fintech startups can leverage alternate data captured from Point of Sales (PoS), GST payments, mobile device, bank statements, and social apps to assess credit worthiness and offer customised credit products to SME trade and retail participants. For example, Udaan Capital has provided credit of Rs 1,600 crore to grocery stores registered on the Udaan platform by building alternate data underwriting capabilities.
b. **Enable adoption of Account Aggregator framework and Open Credit Enablement Network** (OCEN) to provide credit leveraging data (e.g., GST, utility bills, online transactions) and offer tailored products (cashflow based lending) suited to their working capital needs. State can **partner with Fintechs** to innovate on use cases and solutions for MSMEs.
c. Leverage **co-operative banks network** besides NBFCs and commercial banks **to capitalise on MSME credit schemes** such as Credit Guarantee Trust for micro and small enterprises (CGTMSE), Pradhan Mantri MUDRA Yojana (PMMY) and others. Maharashtra has unique advantage to leverage its cooperative bank network with dominant presence of urban co-operative banks. Urban co-operative banks in Maharashtra contribute an estimated ~15% of total outstanding credit to MSMEs in the state.
d. Enable short term **unsecured credit access** to **micro and small enterprises** by driving credit card schemes focused on specific groups like weaver credit cards scheme implemented in Tamil Nadu[444]
e. Evaluate setting up **state level credit guarantee funds** for focus sectors (e.g., food processing, textile), segments (women owned enterprises), themes (technology upgradation, sustainability) in specific districts in partnership with **development finance institutions** such as NABARD, SIDBI, ADB.
f. Explore **trade finance or export credit schemes** enabling financial institutions to provide trade financing solution to MSMEs (e.g., credit limits based on export order value). For example, Maersk Trade Finance offers a combination of trade finance and shipping solutions to the MSME sector[445].

3.1.2 TReDS adoption: Working capital

An estimated $152Bn (5.9% of the GVA of India) is locked up annually as delayed payments from buyers to MSME suppliers which leads to working capital issues for MSMEs[446]. Issues in managing working capital can be resolved by providing upfront payment against unpaid invoices (i.e., invoice-based discounting).

Trade Receivables Discounting System (TReDS) is an invoice based discounting platform set up by RBI to facilitate the financing of trade receivables of MSMEs. The invoice is traded on the TReDS platform and is purchased by a

[441] Source: Financing India's MSMEs - Estimation of Debt Requirement of MSMEs in India, International Finance Corporation, Nov 2018
[442] Source: Strengthening Credit Flows to MSME sector, Standing Committee report, PRS Legislative research, May 2022
[443] Credit outstanding to MSMEs by commercial and cooperative banks as a percentage of MSME GVA (estimated)
[444] Source: Weavers credit card scheme, India filings website; Tamil Nadu State Focus Paper 2022-23, NABARD
[445] Source: How structured trade finance solutions help MSME exporters & importers, Economic Times, July, 2019
[446] Source: Unlocking the full potential of India's MSMEs through prompt payments, Global Alliance for Mass Entrepreneurship (GAME), Dun & Bradstreet (D&B), May 2022

financier. The trade receivable is discounted by the financier, and the MSME can select the best bid to avail immediate payment. The buyer owes money to the lender, and there is no recourse on the MSME seller[447].

State should drive adoption of TReDS along with other central government driven invoice-financing marketplaces (e.g., GST Sahay and GeM Sahay[448]) that provide working capital loans to MSMEs against unpaid invoices. These loans can be paid back to lender by MSMEs as they receive payment from the buyer. Availability of multiple lenders on the platform provide bargaining power to MSMEs to access the competitive discounts.

- GST Sahay is an invoice-financing marketplace by SIDBI and iSPIRT where GST-registered MSMEs can avail on-top invoice-based finance from formal lending institutions.
- GeM Sahay[449] is an invoice-financing marketplace where MSMEs selling on GeM can avail financing against their GeM purchase orders. No additional charge is applicable to the MSME sellers, apart from the interest charged by financial lenders on the platform.

Current issues in achieving scale of invoice discounting platform - TReDS include limited adoption by all participants - government entities, corporate buyers, financiers and MSMEs.

Key interventions

a. Government buyers

- **Mandate all the state PSUs (e.g., MSEDCL, MIDC) to onboard on TReDS**. This would be on lines of central government directive mandating all central Public Center Enterprises (CPSEs) to be onboarded on TreDS in 2018 update[450,451].
- **Implement all purchases by state government entities and urban local Bodies via TReDS platform** while improving efficiency of invoice approval process: Current adoption by Public Sector Enterprises of TReDS is not significant. A key challenge for the lack of adoption is the slow invoice approval process[452] - PSUs often take 45-60 days to approve invoices or post the due date. For TReDS to be effective, it requires expedited approval of invoices – private companies typically approve invoices within 5-15 days on the platform.

b. Corporate buyers

- State can mandate all corporates based in Maharashtra with revenue greater than INR 500 Crore to onboard the platform within a time limit. It can leverage central Ministry of MSME directive mandating all large corporates onboard on TReDS[453]

c. Financiers

- **Adoption by insurers**: Encourage insurers to onboard on TReDS platform and provide insurance offerings encouraging financiers to participate especially in cases of buyers with low credit rating. State can also develop **state level business insurance schemes** for MSMEs and leverage TReDS platform for distribution
  As per RBI – "*This will encourage financing / discounting of payables of buyers irrespective of their credit ratings. Accordingly, insurance companies will be permitted to participate as a "fourth participant" on TReDS, apart from the MSME sellers, buyers, and financiers*".

[447] Source: iSPIRT
[448] Source: Standing Committee on Finance, Seventeenth Lok Sabha, Dec' 2022
[449] Source: GeM Sahay; According to GeM portal, GeM SAHAY is an initiative launched by GeM that aims to bring a complete financing solution to its proprietorship partners by assisting proprietorships to avail instant, frictionless financing to serve the Government orders without any hassle
[450] Source: Onboarding of CPSEs on TreDS platform, Government of India, November 2018
[451] Source: 92 CPSEs (out of 255) that did not onboard TreDS platform were directed to onboard in 2022 update, Financial Express, Oct' 2022
[452] Source: Setback for MSMEs, state-run companies hesitant of adopting TReDS despite Government diktat, Economic Times, July 2021
[453] Source: Enterprises with over INR 500 Cr turnover required to onboard TReDS platform to improve cash flow to MSMEs, Ministry of MSME, Sep' 2020

- **Credit report** – Encourage platform operators to provide a detailed credit report of buyers on the platform, so that financiers can better underwrite corporate buyers. In the current setup, financiers can see a buyer credit score on the platform; however, a detailed credit report and scoring mechanism is provided separately outside the platform[454].

d. MSME suppliers

- **Easing of KYC norms for MSMEs**: In the current onboarding process, TReDS platforms in addition to asking for working capital or current account details of the MSME, are also mandated to undertake KYC of the MSME. Allowing sharing of the MSME KYC between the bank and TReDS platform could enable faster MSME onboarding (recommendation to centre).

3.1.3 Equity financing

Though MSMEs globally are largely dependent on debt finance, equity financing plays an increasingly important role especially for relatively young, high-growth and technology-based SME. The overall demand for equity financing by MSMEs in India has been estimated at $283 Bn as per IFC report[455]. MSMEs, especially in the core manufacturing sector lack support in long-term equity financing and may use alternative finance such as friends and family equity.

Key interventions

a. Establish an equity fund dedicated for small and medium (SMEs) focused on specific sectors and themes: Maharashtra government can establish an equity fund to support SMEs with long-term equity financing and early-stage funding. Government can seek partnership from financial institutions and private sector (e.g., industries, private investors). For example, Karnataka government plans to set up Equity fund for SMEs in manufacturing sector with a corpus of INR 100 Crore with 75% funds from government and balance from financial institutions and private investors.

The state fund can be setup on lines of Government of India fund – Self Reliance Fund of India (SRI)[456] worth INR 10,000 Crore for MSMEs under Aatma Nirbhar Package, of which INR 1,572 crore has been deployed[457]. Maharashtra government also has existing funds e.g., Maharashtra Defence and Aerospace Venture Fund (INR 330 Crore), Maharashtra Social Venture Fund (INR 120 Crore, *fully invested)*[458] and Dr. Babasaheb Ambedkar Fund for SC/ST Entrepreneurs (INR 80 Crore).

b. Drive adoption of SME exchanges for capital raising: BSE and NSE had established SME exchanges in 2012 to facilitate equity financing for meeting their business requirements[459]. State can partner with exchanges to drive awareness of SME exchanges providing information on listing and post-issue reporting requirements including relaxations. State can also facilitate the fundraising process by enabling advisory support through private service providers. As part of PSI 2019, Maharashtra is offering refund of listing expenses up to INR 6 lakhs to first 250 SMEs based in state for getting listed on SME exchange.

3.1.4 Subsidy payments

Total subsidy of INR 690 Cr was disbursed to MSMEs in FY22 under Package Scheme of Incentives (PSI). Challenges and interventions related to subsidy payments have been detailed in Ease of doing Business section. Key areas relevant for MSMEs have been highlighted subsequently.

Key challenges and interventions

a. Subsidy structure: In the current structure, incentives are paid out in multiple components linked to capital investment – GST refund, power subsidy, interest subvention, employment generation subsidies which may not

[454] Source: NITI Aayog 2022 report on Digital bank - Proposal for Licensing & Regulatory Regime for India; Interaction with TreDS platform official
[455] Source: Financing India's MSMEs - Estimation of Debt Requirement of MSMEs in India, International Finance Corporation, Nov 2018
[456] Source: Government's SRI Fund commits INR 5000 Cr to help MSMEs, Economic Times, November 2022
[457] Till 30 June 2022. Source: Over INR 1500 Cr invested in MSMEs through Self-Reliant India Fund, Financial Express, August 2022
[458] Source: SIDBI – Maharashtra State Social Venture Fund
[459] Source: SME Exchanges in India: Empirical Analysis of Firm Attributes and IPO Characteristics, RBI, 2022

help achieve the intended benefits. For instance, micro and small enterprises are not able to realise the benefit from GST refunds because their turnover value is below the GST exemption limit.

- **Create simplified and transparent subsidy structure for intended benefit transfer:** State can explore production linked incentives as they could prove advantageous for micro and small enterprises. Considering the benefit is provided based on incremental turnover, it not only encourages greater production but also addresses GST applicability concerns

b. Claims and payout process: Inefficient and non-transparent processes where applicant needs to submit **manual application, coordinate with multiple departments** to get approvals and wait in **queue** post submission**.**

- **Implement simplified online and offline system for claiming incentives/subsidies** as part of MAITRI portal and proposed Udyog Seva Kendra project. State should endeavour to implement **direct subsidy payment system** that eliminates the need for industries to claim subsidies through an approval process.

c. Subsidy financing: Currently, subsidy payment is categorized as unplanned expenditure, and allocation has not grown. **Delays in subsidy pay-outs** due to budget constraints creates working capital issues for MSMEs, diluting the benefit of actual subsidy

- **Streamline state finances** by budgeting subsidy expenditure under planned expenditure, prioritising subsidy payments to MSMEs and exploring financing from multi-lateral organisations.

3.2 Trade promotion and exports

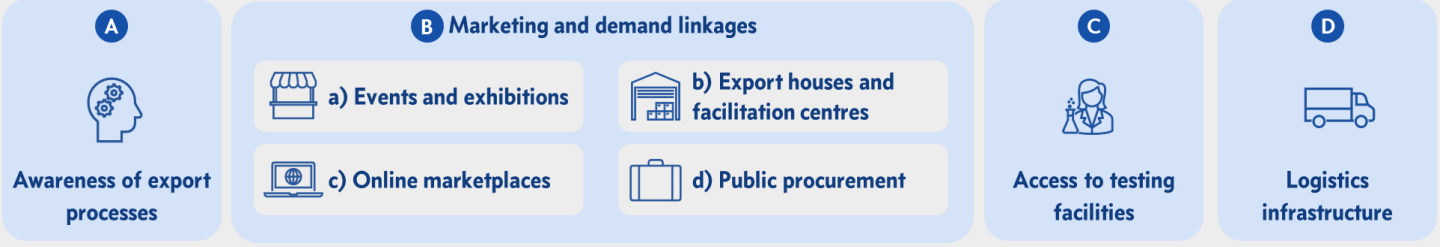
As estimated in manufacturing opportunities, Maharashtra needs to increase exports at a CAGR of 19% from $14Bn in FY22 to $40 Bn in FY28. MSME exports would also need to be scaled up to support this growth ambition. Based on data from Ministry of MSME, MSMEs contributes 45-50% of total exports in India. MSME share of exports is even higher in certain sectors like readymade garments, leather goods, processed foods, engineering items, sports goods.[460]

Based on district immersions, key constraints in realizing trade and export potential of MSMEs include:

- **Lack of awareness of export process**: Unaware of the compliance requirements, IPR (Intellectual Property Rights) issues, trade agreements by country, products and services in demand, and export promotion programs offered by the government.
- **Inadequate support for marketing and demand generation**: Require support for branding and marketing their products and connecting with corporate & government buyers to drive higher volume and margins.
- **Lack of subsidized quality testing facilities** required to receive export certifications and grading. Certified products are an important criterion for exports; however due to lack of affordable testing facilities, MSMEs face difficulty in meeting export quality requirements [461]
- **Inadequate logistics infrastructure** - As highlighted in manufacturing and construction sections, additional capacity of Inland Container depots and cold storage will be required to support agricultural and manufacturing growth along with world-class linkages to the ports, land customs stations, quality testing and certification labs, trade promotion centers.

Key interventions

Interventions have been detailed in 4 key areas – awareness of export processes and compliances, marketing and demand linkages, access to subsidized quality testing facilities and logistics infrastructure.



[460] Source: MSMEs' share in India's exports till August in current fiscal nears FY22 level: Govt data, Financial Express, Dec, 2022
[461] Ministry of MSME, Government of India

A. Awareness of export processes and compliances

- Create **information repository** of product-country wise standards, compliances, and certification requirements in association with sector specific export promotion councils and make it accessible via online portals. State can also explore creating a interface powered by chat bot or AI to address queries.
- **Facilitate** local industry and trade associations to **conduct seminars on international trade** in collaboration with regional offices of DGFT[462] (Directorate General of Foreign Trade).

Marketing support and demand linkages

a. Events and exhibitions

- Enhance state's **marketing support incentives** to MSMEs & startups to organize and participate in state and national exhibitions. State is offering incentives on stall rent for participating in exhibition but can also consider additional incentives like subsidies on pariticipation fees of export promotion events (e.g., Rs. 4.5 Lakh participation fees by Cloth Association in Dubai).
- **Drive implementation of central government schemes** e.g., International cooperation scheme and Procurement and Marketing Support scheme (PMS)[463] provide marketing support to MSMEs by providing benefits such as:
  - Subsidies for Participating in and organizing exhibitions
  - Reimbursement of Registration-cum-Membership Fees paid by the first-time MSE exporters.
  - Reimbursement of export insurance premium paid by MSEs
  - Awareness programs on trade fairs, digital marketing
- Create an **annual calendar of events** in collaboration with various trade related associations, Export Promotion Councils and **publicize on MAITRI website**.
- Design dedicated **promotion and incentive programs** for locally made products at **district level**, especially **GI tagged products** and those included in **ODOP** (One District One Product) program.
- **Infrastructure development**: Establish exhibition-cum-convention centres at select district clusters for MSMEs and exporters to conduct exhibitions and display their products. Three International Exhibition Centres are already being established in Moshi, Pune-Nashik, in Shendra Industrial Estate, Sambhajinagar and in Ambazari Garden, Nagpur[464].

b. Export houses and export facilitation centres: Encourage set up of export houses and export facilitation centres[465] in proximity to major manufacturing clusters, especially in underpenetrated regions (e.g., Eastern and Central Maharashtra). Export houses play an important role in facilitating exports for MSMEs who may not be able to export themselves due to lack of market understanding, resources and understanding of compliances. Central government is also planning to set up National level Export house to facilitate exports by cooperatives.[466]

c. Online marketplaces: As detailed in trade and retail section, State can focus on accelerating adoption of marketplace platforms by MSMEs by leveraging **central government initiatives like Open Network for Digital Commerce (ONDC)** enabling MSMEs and small traders to access online commerce, **GeM portal** for government procurement, **India Business portal** and **MSME Global Mart[467]** for connecting with international buyers. State can also explore **strategic partnerships with private platform players** to promote onboarding of MSME sellers.

[462] Located in Mumbai, Navi Mumbai, and Pune
[463] Source: Procurement and Marketing support, Government of India
[464] Source: MAITRI Export promotion initiatives
[465] Source: Support to small businesses, PIB, February 2022
[466] Source: Centre to set up a multistate export house to export India-made products in world market, The Print, September, 2022
[467] Source: Support to Small businesses, PIB, February, 2022

d. Public procurement from MSMEs

Preferential pricing benefit and annual procurement targets are provided to micro and small enterprises to compensate them due to non-availability of economies of scale, poor resource base, poor access to raw material as compared to the larger scale enterprises[468].

- State can provide **price preference to goods** manufactured by **micro and small enterprises** located in Maharashtra for state government and PSU purchases. For example, Karnataka government offer 15% price benefit to SME goods in government procurement[469].
- **Explore mandating certain share of government procurement from MSMEs** along the lines of Central government mandate (dated 2012)[470] which requires 25% of the total annual procurement by central government ministries, departments and public sector undertakings to be made from micro and small enterprises. Major procuring ministries and PSUs can also train MSE vendors on their requirements for better cooperation and efficiency.

Case study: Public procurement from MSMEs – Central government initiatives

Key challenges faced by MSMEs in public procurement[471]	Central government initiatives undertaken[472]
• Inadequate opportunities for buyer-seller interactions in the form of meets and events	• Central government Ministry or PSUs organize Vendor Development Programmes for micro and small enterprises (MSEs) for procurement via GeM portal
• Absence of a feedback portal and a timely grievance redressal mechanism	• Setup of Grievance Cell - "CHAMPION Portal" by Ministry of MSME
• Few government departments and PSUs impose mandatory eligibility clauses – e.g., minimum turnover limit and number of purchase orders previously executed for the procurement of materials. • Lengthy procedures and delays in procurement process	• All Micro and small enterprises (MSEs) registered under Udyam are eligible to participate in procurement. • Reduced transaction cost of doing business through: – Free of cost tender sets – Exempt MSEs from payment of earnest money deposit. – Adopt e-procurement for transparency in tendering process.
• Restricted communication about central government contract opportunities	• Ministry /department/CPSUs shall prepare their annual procurement plan to be uploaded on their official website

C. Access to subsidized testing facilities

Ability of MSMEs to invest in R&D and develop innovative and quality-certified products is significantly dependent on their access to affordable testing facilities in proximity. Quality certified products are also essential for MSME units to participate in exports and public procurement and become potential suppliers to core industries[473]. 50% - 60% of innovative small and medium firms in India did not have access to adequate test labs and see it as a barrier to innovation[474]. Further, MSMEs do not have sufficient financial base to invest in the development of in-house testing laboratories.

[468] Source: Policy of reservation, Government of India
[469] Source: Karnataka Industrial Policy 2020-25
[470] Source: Public Procurement policy for MSEs, Government of India, March 2022
[471] Source: Public Procurement policy: what's holding back Govt to help MSMEs sell more, get more customers, Financial Express, December 2019
[472] Source: Revised FAQs in respect of Public procurement policy for MSEs, Government of India, January 2022; Public Policy for MSEs Order, 2018, Ministry of MSME
[473] Source: Ministry of MSME, Government of India
[474] Source: Barriers to innovation in Indian small and medium-sized enterprises, ADBI working paper, July 2016

- **Testing facilities:** State can incentivise private players to set up testing labs in proximity to MSME clusters[475] to ensure quick access to testing.
- **Financial assistance for quality certification**: State can increase awareness and drive implementation of state and central government schemes (e.g., International cooperation schemes, Zero Defect Zero Effect[476] and MSME Champions scheme[477]) that provides financial assistance to achieve quality certification and implement lean manufacturing techniques.

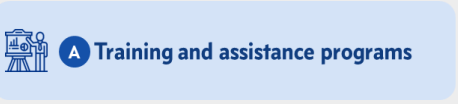
D. Logistics infrastructure: As detailed in manufacturing and construction section, **additional capacity** of ICDs, warehousing and cold storage would be required along with connectivity to ports, stations, and trade promotion centres. State can also consider providing **freight subsidies** to MSMEs in regions away from the port.

3.3 Capability building

As mentioned earlier, MSMEs lack expertise across multiple areas that restricts their ability to scale up businesses – business skills (e.g., drafting business plan), financial awareness (e.g., filing GST returns, information on available incentives and schemes), technical skills (e.g., upgrading to new technologies). MSME face challenges of inadequate exposure and access to best practises and affordable technologies.

Key interventions

Interventions have been detailed across 3 key areas – training and assistance programs, infrastructure for training and support for technology upgradation. Interventions for capability building of MSMEs have also been detailed in 'Skill development' section.



A. Training and assistance programs

- **Provide domain-specific training to MSMEs** by partnering with industry associations, agencies and non-profit organisations (e.g., Global Alliance for Mass Entrepreneurship - GAME) to develop content customized to MSME needs
  - Create **industry/product specific self-learning modules**, customised in local language, containing information such as business pre-requisites, existing suppliers of raw materials and equipment, technological development, market research and other important elements.
  - **Create centralised repository of information** on central and state government schemes for MSMEs, export specific compliances and other business-related approvals developed (MAITRI portal can be used for disseminating information)
- Provide **financial assistance to partners or offer subsidies on program fees** to MSME entrepreneurs, with enhanced focus on women entrepreneurs. State should drive implementation of central government schemes providing incentives for MSME training such as Design clinic scheme, Trade Related Entrepreneurship Assistance and Development Scheme- Scheme for Women, Procurement and Marketing Support Scheme (detailed in MSME enablement section). State can also partner with banks to **link credit schemes** (especially unsecured financing) with training programs i.e., MSME is enrolled into a training program when taking a loan.
- Provide **subsidised access to professional services** such as taxation and accounting, market research, product branding, process improvements. For example, Lean Manufacturing Competitiveness Scheme of Government of India provides financial support up to 80% of consultant fees for a mini MSME cluster. State can also have empanelled list of service providers that MSMEs can use.

[475] Heard in context of district interactions from Kolhapur and Nashik
[476] Source: Operational Guidelines for Zero defect Zero effect scheme; 50% to 80% Subsidy for MSMEs towards ZED Certification
[477] Source: Technology upgradation and quality certification, MSME Champions, Government of India

B. Training infrastructure

- **Leverage existing state infrastructure** of District Industries Centres (DICs), district-level rural entrepreneur networks, trade associations for delivering training programs and promoting entrepreneurship development, especially in rural areas.
- **Utilise Centre of excellence and training institutes:** State should aim to effectively utilise centres of excellence[478] and MSME training institutes (e.g., Indo German Tool Room, Sambhajinagar)[479] set up by central government. These provide technical courses training, have a tool room for product design and development, and technical testing and laboratory facilities. State can also initiate partnership with industry associations and academic institutions to offer relevant courses and workshops customized to MSME needs.
- **Set up new institutes** leveraging **MSME cluster development program** in which central government provides funding support for establishing common facilities like design and incubation centre and skill centre. State can also explore **partnerships with large corporates** to set up institutes under PPP model.

C. Technology upgradation support

- **Incentives for technology upgradation**
  - **Drive implementation of central government schemes[480]**: State can increase awareness and drive implementation of schemes (e.g., MSME Champions scheme[481]) providing funding support to upgrade technology, apply patents, and conduct pilot studies.
  - **Enhance state level schemes:** Maharashtra government provides incentives to MSMEs to upgrade technology from recognized domestic and foreign institutions. State can drive awareness of this scheme and explore enhancing the scheme incentives in line with peer states like Gujarat which provides up to 65% of the cost payable for acquisition of technology.
- **Facilitate transfer of technology from academia and industry to MSMEs.:** State can leverage central government initiative (i.e., ASPIRE[482]) that has created a database of technologies available with government and private agencies. Further it can utilize existing technology business incubators, set up to facilitate technology transfer to MSMEs. These include Ramdeobaba Engineering College, Yashwantro Chavan College of Engineering, and MITCON in Nagpur and Pune[483].

3.4 Self-help groups (SHGs)

Self-help groups comprise a small group of people who come together to make regular monetary contributions. SHGs provide women entrepreneurs with micro-loans to sustain their businesses, while also creating an environment for them to develop greater agency and decision-making skills.

SHGs such as Mahila Arthik Vikas MahilaMandal[484], UMED Abhiyan[485] under Maharashtra's State Rural Livelihood Mission have proven beneficial in the development of women entrepreneurship.

Key challenges faced by Self-help groups in Maharashtra are[486]:

- Lack of capital financing resulting in unviable operating model - Many public sector banks and micro-finance institutions are unwilling to provide financial services due to high cost of servicing.
- Lack of technical and business-related skills (i.e., purchase of raw material and machinery, access to market linkages, market intelligence)

[478] Source: CII Naoroji Godrej Centre of Manufacturing Excellence at Mumbai
[479] Source: MSME Training institutes
[480] Source: MSME Schemes, Govt. of India
[481] Source: Technology upgradation and quality certification, MSME Champions, Government of India
[482] Source: A Scheme for Promotion of Innovation, Rural Industries & Entrepreneurship, MSME Annual report 2022-23, Government of India
[483] Source: ASPIRE, Ministry of MSME
[484] Source: Mahila Arthik Vikas Mahamandal, Government of Maharashtra
[485] Source: Umed, Maharashtra State Rural Livelihood Mission
[486] Source: Maharashtra's microfinance self-help groups fail to support Dalit women at time of greatest need, The Wire, March 2021

Key interventions

State can leverage its initiatives (Mahila Arthik Vikas Mahamandal[487] and Umed Abhiyan[488]), and implement following interventions to assist SHGs:

- **Access to credit:** State can create focused schemes to channelise bank credit to self-help groups (SHG) and Joint Liability groups (JLG). This can be on lines of BALARAM scheme[489] by Odisha Government, that aims to bring unbanked small and marginal farmers into institutional credit through forming joint liability group.
- **Market linkages:** State can drive programs to **link SHGs with e-commerce platforms and local markets**. For example, NRLM's Mahila Kisan Shashaktikaran Pariyojana helps women farmer producers and clusters by linking them with e-commerce majors and local domestic markets and promoting ecological practises to bring down input costs[490].
- **Digitsation of SHGs:** State can leverage e-shakti project[491] of NABARD and digitize all SHG accounts, thus helping SHGs access wider range of financial services and increase the financiers' comfort in credit linkage.
- **Capability building:** Mobilise training of employable women in rural and urban areas by fostering partnership betweeen women SHGs/JLGs and industry, academic institutions and social sector organisations. Maharashtra government can consider revitalising Skill Sakhi programme[492] which was launched in 2016 in collaboration with United Nations Development programme (UNDP).

3.5 Ease of doing business and governance

As detailed in Ease of doing Business section, MSMEs face challenges across business lifecycle i.e., starting, scaling and closing business due to **inefficient processes** (lack of single-window clearances for approvals, delays in subsidy payments, unresolved sick assets), **limited availability and unattractive cost of key resources** (high power cost, limited availability of land, high capital cost of effluent treatment, inadequate logistics infrastructure).

Key interventions

a. **Process reforms:** As detailed in ease of doing business section, MSMEs can be serviced effectively by setting up proposed **Udyog Seva Kendra** for business approvals along with MAITRI portal and developing a **DigiLocker for business documents** for easy access and document authentication. These efforts should be combined with **formalisation of MSMEs** and registration on Udyam portal to enable them to access benefits of government schemes and formal credit.

b. **Provide enabling infrastructure and reduce cost of doing business:** – As detailed in ease of doing business section, State interventions would be required to make **power available at competitive tariffs**, provide **smaller sized land parcels and plug and play infrastructure** for MSMEs in industrial parks, connect MSMEs to **common effluent treatment plants**, offer **freight subsidies** to exporters in regions far from port and facilitate **resolution MSME sick assets**.

c. **Institution and governance**

- **MSME focused body:** Maharashtra government can setup a state level MSME focused body with the following responsibilities:
  - Promote trade, investments and exports in MSMEs
  - Smoothening clearance processes and enabling dispute resolutions (e.g., on credit facilities)
  - Analyse performance of MSMEs by using available data (e.g., Udyam Portal, MSME census)

  For example, Tamil Nadu government has setup FaMe TN (erstwhile MSME Trade and Investment Promotion Bureau)[493] in September 2019 to promote trade, investments, and exports in MSMEs. The organization supports MSMEs in various aspects related to their business, including discovering new market opportunities

[487] Source: Mahila Arthik Vikas Mahamandal: Nodal agency established to build employment opportunities, entrepreneurial capabilities, and market linkages among women, Government of Maharashtra
[488] Source: UMED, Maharastha State Rural Livelihood Mission; Setup for poverty elimination through social mobilisation, institution building and financial inclusion.
[489] Source: Scheme for financing joint liability groups/ share croppers – BALARAM, Govt of Odisha, July 2020
[490] Source: Technology, financial literacy and mentoring: the way ahead for self-help groups, The Forbes, December 2022
[491] Source: Project for digitization of SHGs- EShakti, NABARD
[492] Source: India Filings website
[493] Source: Facilitating MSMEs of Tamil Nadu, Government of Tamil Nadu

in exports, smoothening Government clearance processes, providing new and innovative solutions for bottlenecks in technology, finance and management. The bureau is headed by the Secretary of MSME Department (Micro Small and Medium Enterprises) as its chairman.

State government can also leverage Micro and Small Enterprise Facilitation Council (MSEFC)[494] to settle disputes on delayed payments and explore providing additional offerings.

- **MSME focused policy** – State should formulate MSME focused policy covering all aspects of MSME enablement including access to financing, subsidies and incentives, trade promotion and capability building. The policies should also specifically lay out specific initiatives and incentives for women-owned enterprises. For example, states like Tamil Nadu and Madhya Pradesh government have formulated MSME focused policies which are governed by MSME department of respective states.

[494] Source: MSEFC Council address, Ministry of MSME

Ease of Doing Business

Ease of Doing Business

1. Executive Summary

Maharashtra must strive to become the **most attractive state** in terms of Ease of Doing Business (EoDB), which is key to achieving its growth ambition. State can improve on EoDB by simplifying procedures, improving attractiveness in terms of availability and cost of key resources such as power, land, labor, infrastructure and implementing favourable policies and incentives.

Current state and key challenges

- Maharashtra ranked **13th** in **2019** in State EoDB rankings (as evaluated by DPIIT); top ranked states are Gujarat, Andhra Pradesh, Telangana, and Karnataka
- **Power**: High Industrial tariffs in Maharashtra **Rs. 9-11 per unit** vs. **Rs.5-8 per unit** in **Gujarat and Tamil Nadu**
- **Land: >1 Lakh acres needed to support manufacturing growth**; only <0.5 lakh acres of MIDC land is vacant

Feedback from district immersions indicates multiple challenges for businesses in the state including

- **Inefficient processes** (lack of single-window clearances for approvals, manual verification of documents, delays in subsidy payments)
- **Low attractiveness in availability and cost of key resources** (high power cost, limited availability of land, labor related issues, inadequate logistics infrastructure)

Summary of key interventions and enablers

Enablers	Key interventions
Ease of Doing Business (EoDB) – Processes	
Business approvals	• **Udyog Seva Kendra:** Digitally enabled industry service centers, **managed by professional 3rd party** *(modelled on Passport Seva Kendra)* to address delays in business approvals (e.g., permits, licenses), reduce inefficiencies in inter department coordination
Document verification	• **Digilocker for company documents** with controlled access and digital authentication for expedited approvals, well integrated with existing systems like MAITRI
Subsidy payments	• **Simplified subsidy structure** (e.g., production linked) for intended benefit transfer • Improve transparency and efficiency in subsidy claims process; explore **direct subsidy payout system** instead of claims-based process • Budget subsidies under **planned expenditure**, **prioritise payments to MSMEs** • Explore **alternate sources to finance** subsidies e.g., via multi-lateral organisations and development finance institutions like SIDBI for financing MSME credit guarantee fund
Investor support	• **Dedicated entity and relationship/ investment managers for large enterprises** focused on specific countries, sectors, mega projects, PE and VC investors – **Role:** Investment promotion, **monitoring of investment MoUs** and execution support
Key resources and enablers	
Power	**Industry – Increase renewables adoption:** • Incentivize set up of captive renewable power plants by industries and utility scale parks by power sector players • Explore **waiving intra-state transmission charges** for Renewable energy • Amend **MERC Open Access** to allow: – Monthly banking without any restriction of peak or off-peak hours – Renewable energy generator to sell excess energy generated to open access (at market rate) **Agriculture - Reduce cross-subsidy burden:** • Promote solarization of agriculture feeders and setup of solar pumps at farm level **Others power sector interventions** • Enable **demand curve shift** to match changing supply curve with increase in daytime power generation especially due to solar energy

	• Install smart meters in cities to improve collections from domestic consumers
Land	• **Identify and develop new land parcels** aligned with integrated infrastructure master plan *(e.g., creation of industrial zones around Samruddhi Mahamarg nodes)* • **Unlock unutilized government land** (e.g., land under State PSUs, Port Trusts) for development • **Optimal utilization of available land** – Restructure and allocate smaller land parcels in MIDCs to MSMEs – Utilize low-cost land available in Vidarbha region to attract new projects • **Simplify land acquisition and registration** – Process conversion of agricultural land to industrial land via nodal agency (e.g., Udyog Seva Kendra) and leverage technology (e.g., digitized land records) – Increase FSI of agricultural land from the current limit of 0.2 to promote processing and new practices like vertical farming • **Facilitate liquidation of sick assets** – Facilitate **tripartite agreement** between asset promoter, MIDC and lender or consider recovering allotted land by MIDC if not utilised, rationalise land valuation via third party – Explore setting up **Asset reconstruction companies** for rehabilitation of units; execute **amnesty scheme** for unviable/closed units; consider **revival scheme** for viable units • **Land financing to improve business viability** – For MSMEs, provide **flexible payment options** vs. upfront payment – Explore **structured products** with banks to finance upfront cost, with capital subsidy payments from government transferred directly to the banks subsequently
Labour	• Push **central government labor reforms** for higher flexibility for industries and worker benefits • Procedural simplification of **labor dispute resolution mechanism**
Water and effluent management	• Build **common effluent (CETPs)** to reduce cost for MSMEs, promote **wastewater use and recycling by industries**
Logistics infrastructure	• **Improve logistics infrastructure – Develop integrated master plan, with district or cluster level plan for infrastructure development (e.g., multi-modal connectivity from clusters to ports)** • **Digitization and automation:** Incentivize investment in port automation and cargo handling; **Smart enforcement** through modernisation of check posts (e.g., Automatic plate recognition system, smart weigh bridges) to minimise physical checking
Exports enablement	• Work with central government to develop Free Trade Agreements with key destinations • Marketing and demand linkages by facilitating exporters to participate in global exhibitions • Provide production-linked export incentives, freight subsidies, export credit schemes for MSMEs • Improve ease of doing exports by adopting global certification programs in Maharashtra • Enable access to subsidized testing and quality certification facilities

2. Overview and current state

In order to capitalise on growth opportunities identified across sectors, state would need to attract significant investment and participation from private sector players. And, they will be able to set up and grow only if policies and administrative procedures make it favourable for them to do business in the state. Ease of doing business (EoDB) is affected by multiple factors such as time and cost of procedures and compliances; availability and cost of resources such as power, land, labour, infrastructure; and attractiveness of incentives and benefits.

Country level assessment

World bank has assessed country level ease of doing business for chosen 190 countries based on evaluation of 10 parameters in terms of number, time required, and cost incurred on procedures and compliances. India has improved significantly in **doing business ranking** (measured based on evaluation of Mumbai and Delhi) from **142 in 2014 to 63 in 2019** by simplifying processes for construction permits (rank 184 to rank 27), getting electricity (rank 137 to rank 22) and resolving insolvency (rank 157 to rank 52).

However, India continues to trail in parameters such as ease of starting business (rank 158 to rank 136), registering property (rank 154), paying taxes (rank 115), and enforcing contracts (rank 163). It takes roughly 58 days and costs on an average 7.8 per cent of a property's value to register it, and 1,445 days for a company to resolve a commercial dispute through a local first-instance court.

Figure 108: India EoDB rankings

Parameters	2014	2019
Ease of starting a business	158	136
Dealing with construction permits	184	27
Getting electricity	137	22
Registering your property	121	154
Getting credit for your business	36	25
Protecting minority investors	7	13
Paying taxes	156	115
Trading across borders	126	68
Enforcing contracts	186	163
Resolving insolvency	137	52
Overall rank	**142**	**63**

State level assessment

Ease of doing business (EoDB) for states has been measured based on implementation of **Business Reforms Action Plan (BRAP)**, which was launched by Department for Promotion of Industry and Internal Trade (DPIIT) in 2014. BRAP aims to simplify and streamline regulatory processes and reduce the time and cost involved in starting and operating a business in India. The plan includes measures such as the **implementation of a single-window clearance system, simplification of labor laws, and digitization of land records among many others**.

Since its launch, Maharashtra government has undertaken many initiatives, one of which is launch of **MAITRI** (Maharashtra Industry, Trade and Investment Facilitation Cell) which would act as one stop shop for industrial information and services including online single-window clearance system for approvals.

However, as compared to other peer states, Maharashtra does not feature among top 10 states in EoDB rankings as evaluated under BRAP. Maharashtra ranked **13th in 2019 in EoDB rankings** while top ranked states are Gujarat, Andhra Pradesh, Telangana, and Karnataka. States are currently in process of implementing BRAP 2022 with pending reforms for Maharashtra in key areas of land administration, payment of taxes and online single window system for specific licenses and approvals.

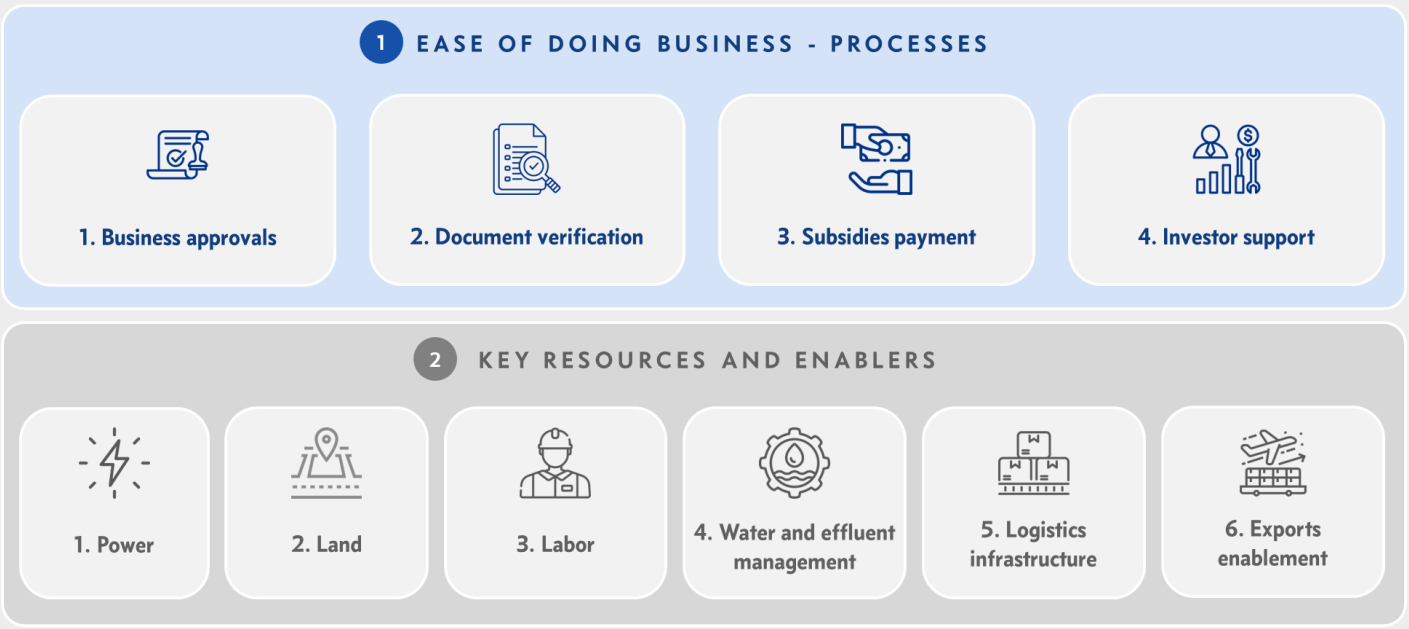
3. Key challenges and interventions

Maharashtra must strive to become the **most attractive state** in terms of ease of doing business, which is key to achieving its growth ambition. This would require taking proactive steps to address on-ground challenges.

Feedback from district immersions indicates multiple challenges for businesses in the state including

- **Inefficient processes** (lack of single-window clearances for approvals, manual verification of documents, delays in subsidy payments)
- **Low attractiveness in availability and cost of key resources** (high power cost, limited availability of land, labor related issues, inadequate logistics infrastructure)

Key challenges based on district immersions and expert discussions along with associated interventions have been detailed in subsequent sections along the key areas represented:



3.1 Ease of doing business - Processes

In order to improve its attractiveness in ease of doing business, Maharashtra not only needs to accelerate the implementation of BRAP reforms in an effective manner but also pioneer transformational reforms.

3.1.1 Business approvals

Current process and key challenges

On-ground feedback from district immersions indicates multiple challenges -

- Lack of single window clearances across various compliances and approvals (e.g., land permits, utility permits, sectoral licenses), delays experienced from 6 months to one to two years
- Low uptime of MAITRI portal (state's online single window clearance system)
- Enterprise applicant is required to coordinate with multiple departments for obtaining various approvals and permissions, along with lack of clarity on exact steps involved and timelines for each step
- Committee approvals take time due to infrequent meetings (e.g., Coastal Regulation Zone committee)
- Lack of support (e.g., explaining the process including documentation) and administrative delays at government department offices and District Industrial Centres (DICs), requiring multiple visits and external agents support to complete required formalities
- Inconvenience and poor access to services for remote districts, especially when there is a requirement to visit government departments and administrative officials for approvals

Key intervention proposed: Udyog Seva Kendra (Industry Service Centres)

Udyog Seva Kendra (USK)[495] can be envisaged as **digitally enabled industry service centres** that would augment MAITRI portal. These would serve as **offline channel for delivery of services** (approvals, licenses, inspections, compliances) to industries across the lifecycle (from pre-establishment to operationalisation to possible business closure), integrated with state's online, single window portal. This is critical to ensure seamless services as all businesses, especially MSMEs may not be adept at using online services, requirement of physical documentation is not eliminated, and online systems may face technical issues.

Udyog Seva Kendra project can be launched under the **Public Private Partnership (PPP) model** along the lines of Passport Seva Kendra (PSK) project under Build Operate Own Transfer framework. While the government

[495] The nomenclature is illustrative

departments handle all sovereign functions, a professional third-party provider(s) would act as implementation partner(s) managing multiple aspects including front end services, application processing, IT infrastructure along with active involvement in reengineering processes for faster throughput. It would operate on key principles of customer centricity, accessibility, convenience, transparency, and reliability to deliver best-in-class experience to the industries for business approvals and grievance redressal.

Alongside, government departments would also need to **simplify sovereign processes** (e.g., reduce number of approval steps for environmental clearance) and **minimise regulatory compliances** (may require Act amendments). BRAP has already been focusing on reforms related to simplification of processes such as elimination of the requirements of renewals of certificates/ approvals/ licenses, implementation of computerized central random inspection system. Professional third party provider can work closely with government departments to accelerate BRAP implementation and reengineer associated processes.

Case study: Modelling Udyog Seva Kendra on Passport Seva Kendra: An illustration

Passport Seva Kendra project was launched under PPP model under Build Operate Own Transfer framework with Tata Consultancy Services (TCS) as implementation partner. PSK revamped the complete passport issuance process and transformed the delivery of passport services.

Key characteristics of PSK that can be incorporated in USK

- **Improved access and availability:** 93 Passport Seva Kendra (PSKs) and 428 (Post Office PSKs) serve as extended arms of 36 Regional Passport Offices processing an average of 1.5-2 Cr passports annually. Similarly, USKs would serve as **extended arms of 6 Regional Offices of Directorate of Industries** (and other relevant government departments) and can **build on existing District Industries Centre (DIC) infrastructure**.
- **Service excellence:** Highest level of service standards maintained at centres - trained service professionals, best-in-class amenities (waiting halls, cafeteria, information kiosk, photocopying machine), supported by online systems - **appointment based queue management**, application tracking, multi-lingual call centre. USK can strive to adopt such standards, thereby shifting away from the current inconvenient experience at government offices and DICs.
- **State-of-the-art technology solutions:** PSK has been supported by state-of-the-art technology end-to-end including digitisation of documents, robust data management and information security. Technology solutions would be key to the design of USK such as using **artificial intelligence for fraud detection, integration with Digi locker, advanced data analytics**, dashboards etc.

- **Integration with associated departments:** As PSK's 3rd party provider, TCS integrated with various departments to streamline application processing e.g., regional passport offices, police department (sending data electronically for verification), central passport printing facility.
  As part of Udyog Seva Kendra project, 3rd party provider, would also need to integrate with 15+ departments (e.g., Energy, Revenue, Urban development, Labour, Pollution Control Board) and facilitate multiple steps involved in getting business approvals such as field visits, inspections, etc.
- **Managing for exceptions:** Customisation was built in for specific use cases e.g., distinct queue management for senior citizens, tatkal passports at higher fees. Further, additional initiatives were introduced to address key limitations e.g., passport melas on weekends to accommodate for higher demand, passport adalats to resolve pending and complex cases, etc. Such customisations can also be implemented for USK e.g., women MSMEs specific counters, Udyog adalats for resolving complex cases.

3.1.2 Document verification

Current process and key challenges

- Retrieving and submitting physical documents is inconvenient for the applicant
- Manual verification using stamped and signed documents
- Physical documents sharing with multiple departments for approvals leads to delays and inefficiencies

Key intervention proposed: Digi locker for company documents

Document and records digitisation initiatives (e.g., digitisation of land records) are being implemented as part of BRAP. In order to supplement these initiatives and drive adoption of digitised documents, Maharashtra government can take the lead in developing a digital document management system for industrial documents similar to DigiLocker initiative for citizens launched by the Government of India.

It will be designed to manage business documents such as licenses, permits, tax certificates, registration certificates and can be potentially linked to identifiers such as GSTN, Udyam registration number for MSMEs. Digi-locker (with controlled access to departments) can be integrated with MAITRI systems (including proposed Udyog Seva Kendra) to help expedite approval process and reduce waiting times.

Key features of Digi locker would include secure and centralized storage of digital documents, authentication and verification of documents, easy integration with other government systems and services, accessibility from anywhere and anytime, mobile app and web-based access.

The Government of India has also announced setting up of Entity DigiLocker for MSMEs, large businesses and charitable trusts in Union Budget 2023-24 to enable storing and sharing of documents online securely, whenever needed with various authorities, regulators, banks, and business entities.

3.1.3 Subsidy payments

Maharashtra government provides incentives to industries under Package Scheme of Incentives (PSI) and industrial policies to support MSMEs and encourage private investment. However, on-ground feedback suggests need to simplify subsidy structure, improve effectiveness, and bring transparency in the process.

A. Subsidies and incentive structure

Current process and key challenges

- In the current structure, incentives are paid out in multiple components linked to capital investment – GST refund, power subsidy, interest subvention, employment generation subsidies which may not help achieve the intended benefits. For instance, micro and small enterprises are not able to realise the benefit from GST refunds because their turnover value is below the GST exemption limit.

Key interventions proposed

- Create **simplified and transparent subsidy structure for intended benefit transfer.** State can explore production linked incentives as they could prove advantageous for micro and small enterprises. Considering the benefit is provided based on incremental turnover, it not only encourages greater production but also addresses GST applicability concerns. For example, Madhya Pradesh provides subsidies with the basic incentive tied to capital investment[496] (percentage based on size of the enterprise) plus an additional production linked incentive as a multiple of basic incentive. There are additional incentives related to employment generation and exports (as a % of production) which are provided as a multiplier on the base incentive.
- Besides, **subsidies need to be made competitive** as compared to peer states to attract industries in alignment with industrial master plan. As detailed in the manufacturing section, Maharashtra needs to provide competitive subsidies and incentives to attract industries. For example, Gujarat and Uttar Pradesh offer capital subsidies up to Rs. 5 Cr in food **processing while Maharashtra provides capital subsidy up to Rs. 0.5 Cr.**
- State should also conduct an exercise to **rationalise the incentives**[497] (i.e., assessing utilisation of existing schemes, removing overlaps of benefits across multiple policies, ensuring coherence of policies among activities across value chain e.g., agriculture and food processing industry, cotton ginning and textile industry) **offered across various state and Central level schemes**
- Ensure **higher utilisation of Central government schemes:** As highlighted in interventions across industries, there is potential to leverage multiple central government schemes like Jal Jeevan Mission for water infrastructure, National Health Mission for public health infrastructure, PM Awas Yojna for housing, Credit guarantee schemes for MSME credit, PLI scheme in manufacturing among others.

B. Subsidy claims and pay-outs process

Current process and key challenges

- The applicant enterprise needs to submit the application manually along with supporting documents at District Industries Centre or Directorate of Industries office
- The applicant is required to coordinate with various government departments (e.g., revenue department, labor department), agencies (e.g., MIDC) and financial institutions (e.g., banks for documents related to interest proofs) to provide requisite approval documents which make the process prone to administrative obstacles
- Once the application is submitted, there is lack of transparency in status and timelines of receiving subsidy.

Key interventions proposed to improve efficiency, transparency and on-time payments

- **Simplified online and offline system for claiming incentives/subsidies:** BRAP has recommended online single window system for incentives however it is yet to be implemented by Maharashtra. The incentive system can be implemented as part of proposed Udyog Seva Project, where third party provider would manage the application process and build integrated system for internal departmental verification and status tracking. Madhya Pradesh government has implemented online subsidy claims system[498] which has digitised the entire application process.
- **Direct subsidy payment without claims**: In long term, state should endeavour to implement direct subsidy payment system that eliminates the need for industries to claim subsidies through an approval process. For example, in case of power subsidy, electricity provider can create a bill minus subsidy to the industry and a separate bill equivalent to subsidy amount to the relevant government department. Similarly, in case of exports related subsidy, a subsidy payment request can be created when the export bill is generated. Direct pay-outs are commonly observed in benefit transfer to citizens e.g., LPG subsidy where the consumer gets their LPG cylinder at full market price and subsidy is directly transferred to bank account.

[496] Source: Madhya Pradesh Industrial Promotion Policy, 2019
[497] Source: Note on Rationalisation of Schemes, Development Monitoring and Evaluation Office, 2019
[498] Source: User Manual, Madhya Pradesh State Electronics Development Corporation

C. Subsidy financing

Current process and key challenges

- Subsidy expenditure is not budgeted under planned expenditure; thus, payout is subject to budget constraints
- **Delays in subsidy pay-outs due to budget constraints** creates working capital issues for MSMEs, diluting the benefit of actual subsidy

Key interventions

- **Streamline state finances** by
  - budgeting subsidy expenditure under planned expenditure
  - prioritising subsidy payments to specific groups e.g., MSMEs, farmers
  - identifying areas where subsidy burden can be reduced e.g., revamp cross insurance model (as detailed in financial services section)
  - aligning payment duration of subsidies with the budget scope (e.g., subsidies can be paid over a period of 7 years instead of 6 years reducing the annual subsidy burden)
- State can also **explore alternative financing for subsidies and incentives** e.g., via multi-lateral development finance organisations or institutions. A dedicated pool of funds focused on specific purpose or segment can be created for which funding can be raised by relevant multilateral institutions. For example, funding for State level Credit guarantee fund for MSMEs as suggested in financial services section can be raised via development finance institutions like SIDBI.

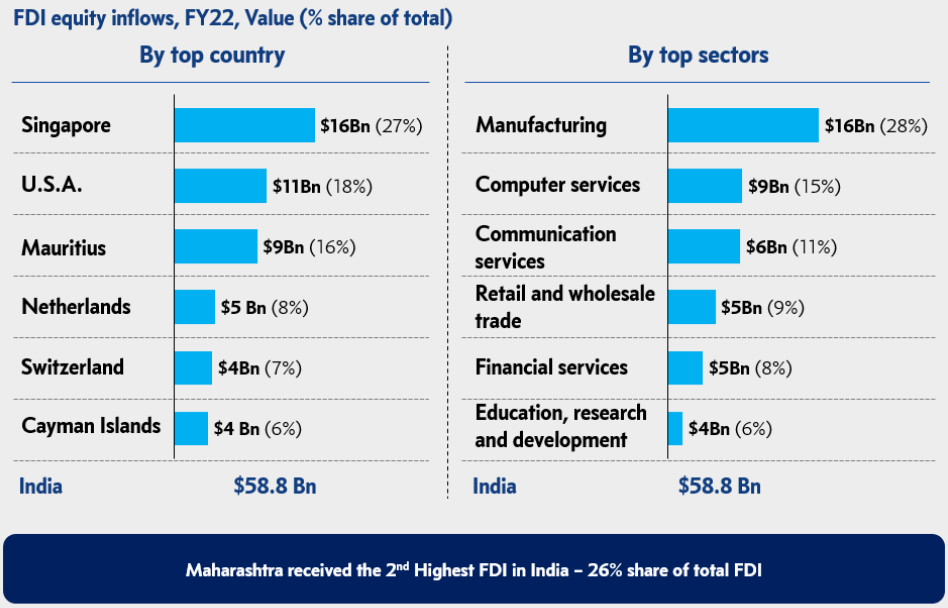
3.1.4 Investor support

As mentioned in manufacturing section, the state will need to attract investments of ~$ 225-250 Bn over next 5 years to achieve aspirational growth target of manufacturing (~5X of investments received from 2014-2019). Besides, private investments in infrastructure and services sector would also need to be significantly boost up to achieve required growth.

Foreign Direct Investment (FDI) scenario in India

Foreign Direct Investment (FDI) inflows to India totalled $84.8 Bn in FY22, including FDI equity inflow of $58.8Bn (12% CAGR from $24.3Bn in FY14). Private Equity (PE) and Venture Capital (VC) investors account for 50-60% of Foreign Direct Investment (FDI) flow in India. Singapore (27%), USA (18%), Mauritius (16%), Netherland (8%) and Switzerland (7%) emerge as top 5 countries for FDI equity inflows. Karnataka received highest 37% of total FDI equity flow to India, followed by Maharashtra which received 26%.

Figure 109: FDI equity inflow in India - top countries and sectors



Source: RBI, DPIIT

Key challenges and improvement areas for Maharashtra

- **No single point of contact for large investors,** e.g., PE-VC have multiple investee companies, thus need dedicated support for coordinating with government across investee companies and communicate their needs and grievances
- **Lack of execution support** for large enterprises to navigate through government related approvals and compliances once they decide to invest
- **Potential to improve conversion rate of investment proposals -** Government runs many initiatives including investor summits and roadshows which result in MoUs (Memorandum of Understanding) and investment proposals from domestic and foreign investor. For example, Maharashtra government signed MoUs worth Rs. 1.37 lakh crore[499] in 2023 World Economic Forum, Davos Summit. However, realisation of investment can be further improved. MoU conversion rate for Maharashtra is 30-40%[500] while it is as high as 82% for Tamil Nadu[501]. Maharashtra government had formed event-specific task force and high-powered committees in the past to track these MoUs[502] but there is no institutionalised mechanism for ongoing monitoring.

Key intervention proposed: Dedicated entity and relationship or investment managers for large enterprises

Maharashtra government should create a dedicated entity and nominate dedicated relationship managers for large enterprises and investors as being done at India level under Invest India entity.

Role of relationship or investment managers

- Pitching investment opportunities to prospective investors/enterprises
- Tracking committed investments or MoUs to conversion
- Ensure speedy response on investor queries and investment proposals
- Advisory support for investors e.g., suitable location for the project, available incentives, resources
- Mediating with government for tailor-made incentive offers
- Provide implementation support for projects including day to day issue resolution, escalation in case of delays, across all licenses (state level, municipal, panchayat level etc.)

Dedicated relationship/investment managers for key sources of investment

- **Country focused:** Maharashtra can identify focus countries based on existing investment pipeline and focus sectors and nominate relationship managers for proactive reach-out and support. Gujarat iNDEXTb and Invest India has nominated relationship managers tagged to specific countries which will act as single point of contact for all government related queries and approvals.
- **Private equity, Venture Capital focused:** Private equity and Venture Capital funding accounts for 50-60% of FDI inflows of India and plays a significant role in develop startup ecosystem. Dedicated relationship managers would help smoothen investment process by coordinating between PE/VC and multiple investee companies. This would be important as Maharashtra needs to attract PE/VC funding to support investment requirement across sectors including strengthening startup ecosystem in the state (e.g., fintech hub)
- **Mega projects focused:** As mega projects require higher involvement from government agencies for customised incentive packages and fast track clearances to reduce execution risk, dedicated relationship manger should be nominated to provide end-to-end support for mega projects (for example, projects with investment greater than Rs. 5000 Cr[503]) from proposal finalisation to successful implementation. This can be supported by additional team depending on the size and complexity of the project. For example, MoU signed with US-based New Era Clean Tech Solution for setting up coal gasification in Chandrapur with investment of Rs. 20,000 Cr can be supported by focused team for ensuring realisation of investment.

[499] Source: MoUs worth Rs 1.37 lakh cr signed in Davos for investments in Maharashtra, says CM Shinde; calls it 'big achievement', Economic Times, January, 2023
[500] Source: Maharashtra govt inks MoUs worth Rs 88,420 crore in Davos, Times of India, Jan, 2023
[501] Source: 82% MoUs with investors turned into actual projects past 10 years: TN govt, Business Standard, December, 2020
[502] Source: Maharashtra government forms committee to track MoUs signed during 'Make in India' week, Economic Times, March, 2016
[503] Source: Uncertainty, Complexity, and Risk in Indian mega projects, pmi.org,in

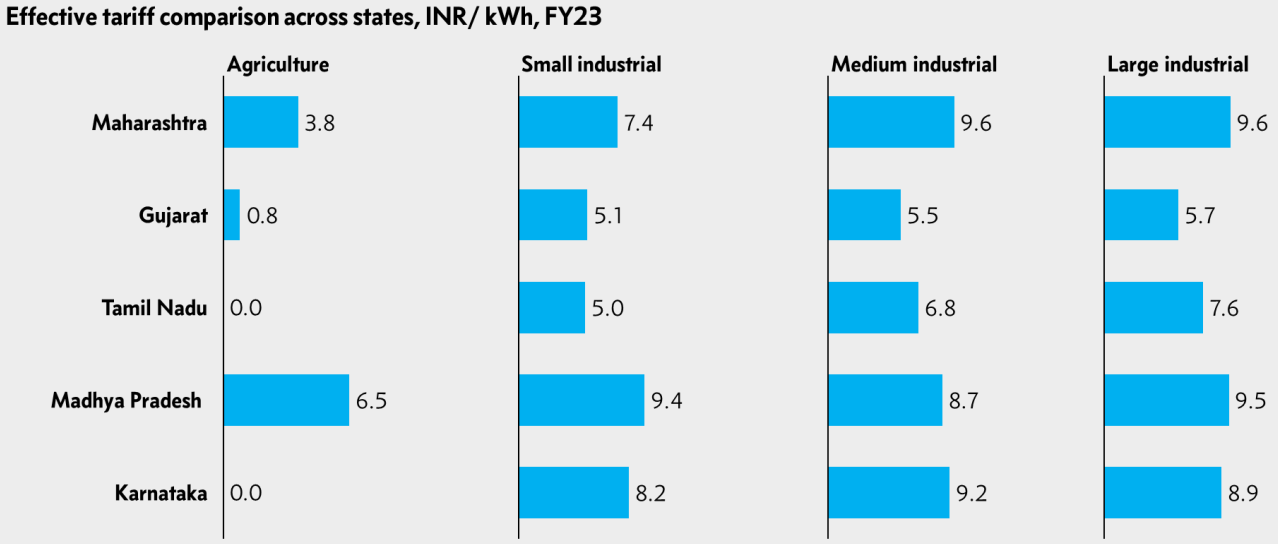
3.2 Key resources and enablers

3.2.1 Power

Power is a significant operational expense for many industries impacting profitability, competitiveness, and sustainability of industries. Based on ASI data for Maharashtra, electricity cost as a percentage of GVA for power intensive industries ranges from 40-45% for Basic metals, 28-30% for Textiles, 18-20% for rubber and plastics to 10-13% for other industries like wood and paper, non-metallic minerals, and auto components.

Power tariffs: Power tariffs for Medium and Large Industrial consumer segments are **~70-75%** higher in Maharashtra as compared to Gujarat. Additionally, Maharashtra State Electricity Distribution Company (MSEDCL) has proposed an additional hike of ~INR 1 (8-10%) for FY24.

Figure 110: Comparison of power tariffs across key states

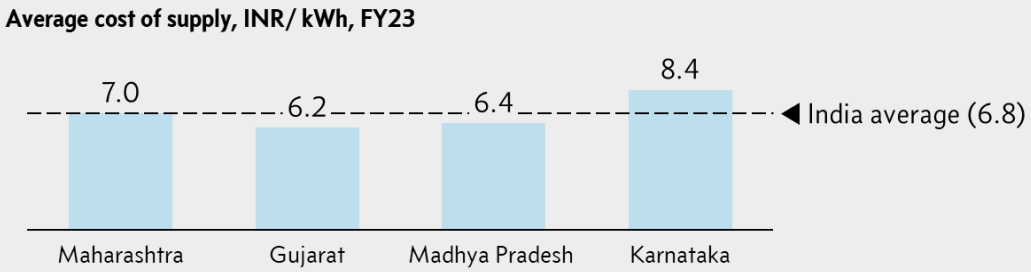


Small industrial: 10KW, 20% LF, 1460 Units per month; Medium industrial: 50 KW, 30% LF, 10950 Units per month; Large industrial: 1000KW, 40% LF, 365000 Units per month
Source: Ministry of Power, Government of India

Key contributors to high power tariff in Maharashtra

High cost of power supply: As per data from Ministry of Power[504], Maharashtra's average approved cost of supply (FY22-23) is higher than Gujarat, Madhya Pradesh and national average indicating higher cost of generation.

Figure 111: Comparison of average cost of power supply across states



Other supply factors: Along with high cost of power supply in the state, the factors contributing to high power tariffs in the state include:

- **Inefficiency in distribution and tariff collection:** High Aggregate Technical & Commercial Losses[505] (AT&C) in the state at 26% vs 11% in Gujarat and 14% in Tamil Nadu. MSEDCL, the state distribution company, has accumulated losses of more than INR 26,000 Cr and has inefficient collection with 216 receivable days[506].

[504] Source: Key Regulatory Parameters of Power Utilities on 30th June 2022, Ministry of Power
[505] Aggregate Technical & Commercial Losses = Technical Losses + Thefts + Defaults in payment+ Collection inefficiency
[506] Source: MSEDCL financials

- **Slow growth in industrial consumption**: Maharashtra share of High Voltage Power consumption has been stagnant at 25% and number of power-intensive factories[507] have de-grown by 4% in Maharashtra, potentially due to high power tariffs, putting further burden on existing industries.
- **Slow adoption of solar in agriculture**: Maharashtra has announced target installation of 2 lakh solar pumps by FY26 of which ~18% have been installed as of FY23. Significant efforts are still required to ensure that solar power becomes accessible to approximately 15 million farmers in the state.

Key interventions

Detailed list of initiatives to boost renewable energy across the value-chain is presented in "*Renewables and Sustainability*" section.

a. **Industry - Increase renewables adoption:** Renewable energy has a lower cost of generation (solar – INR 2.7-3.1/ kWh and wind ~ INR 3/kWh) vs thermal (INR 5.9-6/kWh)[508].
   - Provide **capital subsidies to power intensive industries** (e.g., textiles, metals) to set up captive solar capacity
   - Explore **waiving intra-state transmission charges** for Renewable energy, on lines of central government Inter State Transmission Charges waiver
   - **Amend MERC Open Access** to allow -
     - Monthly banking without any restriction of peak or off-peak hours
     - Renewable energy generator to sell excess energy generated (above contracted quantity) to open access (at market rate) vs discom at lower tariff

b. **Agriculture**
   - **Improve implementation of solar feeder program** via focused schemes and capital subsidies: Target ~100% day-time supply to agriculture through solar feeder program and installation of standalone pumps via Mission 2025 and Kusum scheme.
   - **Promote set up of solar pumps at farm level** by enabling farmers to sell surplus power into the grid.

c. **Others power sector interventions**
   - **Enable demand curve shift** to match **changing supply** curve, due to renewables (especially solar) by implementing time of day tariffs
   - **Virtual net metering** for electricity use in public services and government buildings
   - Install **smart meters** in cities to improve collections from domestic consumers

3.2.2 Land

Maharashtra will need to significantly increase land supply to facilitate infrastructure, industrial and power projects, housing, services hubs, etc. to realise investments in line with stated GDP growth objective.

- **Industry:** ~ **1 Lakh acres of industrial land** needed to achieve stated manufacturing GVA growth *(as estimated in manufacturing section)*, however, less than 0.5L acres (~30%) of Maharashtra Industrial Development Corporation (MIDC) land is vacant[509]
- **Power – renewable:** ~2 Lakh acres land will be required in a phased manner for renewable power projects to achieve the installation target by FY28 *(as estimated in energy and renewables section)*. Agri and fallow land can be used to generate renewable power.

Key challenges

- **Limited land availability and high cost** in industrialised areas like Nashik, Pune with limited scope for expansion
- **High cost of land acquisition** with ongoing disputes on MIDC land parcels
- **Complex procedure to convert agricultural land into industrial land**, with approval required from district collector

[507] Power Intensive Industries = industries with higher electricity cost to input cost ratio than state average for manufacturing
[508] Estimated costs in 2020. $=70 INR. Source: Projected costs of generating electricity, IEA, December, 2020
[509] Source: Maharashtra: MIDC updates 90% of its land records over 6 years, Times of India, Jun, 2022

- **Land blocked under sick assets or reserved but not being utilised for industrial purposes**: Based on district immersions[510], the reasons behind sick units could be attributed to various factors that impact the viability of business such as lack of credit support, high cost of power, technological redundancy, lack of demand linkage and marketing support, viability issues without subsidies. As mentioned in Industrial Policy 2019, accumulated dues and penalties of government bodies and financial institutions, labour dues and issues, and reluctance of companies to dispose-off their lands are the major hindrances in unblocking unviable/closed units.
- **Issues in land allocation for micro and small enterprises** in MIDCs due to lack of small sized plots

Key interventions

a. **Identify and develop new land parcels** aligned with integrated master plan which focuses on the development of key infrastructure assets and industrial clusters, such as the creation of industrial zones around Samruddhi Mahamarg nodes.

b. **Unlock unutilized government land**: State would need identify all available land parcels held by government agencies and make them available for redevelopment. In certain cases, this may require change in use of the land for suitable redevelopment. Potential sources of land available with government include -

- Land available with State Public Sector Undertakings, e.g., Maharashtra State Farming Corporation (MSFC) currently has 62,826 acres of land[511], of which 42,316 acres are surplus
- Land available with other government agencies such as Port Trusts (~2.5 Lakh acres across India)
- Land no longer required for their original purposes, such as decommissioned irrigation projects

c. **Simplify land acquisition and land use conversion:**

- Alter **procedure for conversion of agricultural land to non-agricultural land** (can included under USK project)
  - In the short term, establish nodal agency to review and assess applications for conversion of agricultural land to expedite the process, de-bottlenecking reliance on district collector for approvals
  - Eventually, provide online single window clearance by leveraging technology (e.g., Geographic Information system for mapping land, digital land records for ownership)
- **Increase FSI of agricultural land from the current limit of 0.2** to promote FPOs and cooperative groups to set up higher capacity processing facilities and warehouses and practice innovative techniques like vertical farming (as detailed in agriculture and allied section)
- Adopt measures such as **land pooling** along with transparent compensation, resettlement, and rehabilitation.
- Accelerate procedural reforms such as **land records digitation and its integration** with registration department, land acquisition offices and banking system to facilitate faster approvals.

d. **Optimal utilization of available land:**

- With land supply in regions like Thane and Pune approaching saturation and associated higher costs, there is an opportunity to **tap into under-utilised regions like Vidarbha that offer lower costs**. The state can leverage their competitive advantage in terms of lower cost to attract new businesses and drive economic growth.
- **Smaller land parcels** available in MIDCs that may not be suitable for large industrial units can be **restructured and allocated to MSMEs.** Large companies can be allowed to acquire land parcels and lease out small plots from those parcels on a long-term lease. Additionally, plug and play infrastructure can be provided for MSMEs to ease setting up of business.

e. **Unblock MIDC land under sick units or reserved but unutilised:** MIDC land blocked under sick units could be freed up for industrial usage. Additionally, land that has been reserved but not being developed for economic use can be recovered. State can set up a nodal agency to identify and evaluate underutilised assets, potential options to consider include -

- **Facilitate tripartite agreement** between asset promoter (existing or new promoter), state government or its agencies and lender, as suggested in Madhya Pradesh Industrial policy.

[510] Interactions with 500+ stakeholders across 17 districts, covering stakeholders from agriculture, manufacturing (MSMEs, Large Enterprises) and Services
[511] Source: Farming Corporation: Bill allowing Maharashtra govt to withdraw land passed, Indian Express, March, 2017

- **Consider recovering allotted land** if the land is not being utilized for industrial purposes or no investment has been made in a specified timeframe, **rationalise valuation of land** via third party evaluation
- **Explore setting up Asset reconstruction companies** or asset health company (e.g., Telangana Industrial Health Clinic) to support revival and rehabilitation of sick and incipient SMEs
- Execute **amnesty scheme for unviable or closed units** (as mentioned in Industrial policy 2019) and **consider revival scheme** for potentially viable units. Central government schemes can also be leveraged to provide credit facility to promoters of stressed MSMEs

f. **Land financing to improve business viability**

- For MSMEs, design **land financing schemes** to provide flexible payment options vs upfront payment for better cash flow management, especially in industrial areas with high land prices (e.g., AURIC)
- Explore **structured products with banks** to finance upfront cost, with capital subsidy payments from government transferred directly to the banks or financing institution subsequently. Currently, state government provides capital subsidies on land which is paid to the enterprise over a specified period but the enterprise needs to pay upfront cost to MIDC to buy/lease land. The subsidy is claimed by the enterprise from the government. State can evaluate creating a SPV that provides land financing to the enterprise adjusting for the subsidies and then directly claim subsidy from the government.

3.2.3 Labour

A. Other labour related reforms

Key challenges and improvement areas

- Legacy labour laws providing inadequate worker benefits and poor flexibility to industries
- Industry anxiety due to lack of clarity on implementation of central labor reforms
- Ineffective processes for labor dispute resolution and grievance redressal
- Lack of skilled talent across existing and emerging industries (e.g., skilled textile labour required in Solapur, electric vehicles related skills required in Pune and Sambhajinagar)

Key interventions

- **Review labour laws** to ensure rightful protection of labour while balancing ease and cost of doing business for industries.
- **Review Welfare Cess Act[512] to exempt MSMEs**[513] engaged in manufacturing but are not registered under Factories Act (due to number of workers less than the stipulated under the Act). The Welfare Cess Act provides for the levy and collection of a cess of 1% on the cost of construction incurred by an employer (calculated by MIDC as per ready reckoner rate), however manufacturing units registered under Factories Act are exempted from cess to encourage investment. As MSMEs with less than stipulated number of workers under Factories Act are not required to register, they end up coming under purview of "Welfare Cess Act".
- **Push central government labour reforms**: In 2019 and 2020, Central labour laws were rationalised, simplified and updated and draft rules under the Labor codes were published by the centre as well as States. The key reforms include – allowing firms employing more than 300 workers (from existing limit of 100) for layoffs, retrenchment and closure without obtaining government permission, increasing daily limit on overtime working hours, removing requirement of minimum service for payment of gratuity, review of minimum wages every 5 years with guarantee of timely payments, and equal remuneration to male and female workers. States have started implementing these changes. Rajasthan had brought labour reforms such as amending 100-worker limit to make it 300, in 2014-15, which translated into growth in industrial activity. Following the reforms, the average number of factories with more than 100 employees grew faster than in the rest of India. These factories grew by 3.7 percent in Rajasthan before the amendment, and by 9.3 percent afterwards, compared to

[512] The Building and Other Construction Workers Welfare Cess Act, 1996
[513] Suggestion based on inputs from Deccan Chamber of Commerce Industries & Agriculture Pune

growth rates of 4.6 percent and 5.5 percent, respectively, in the rest of India. The number of workers per factory in Rajasthan grew faster by 4.2 percent compared to 2.6 percent in the rest of India[514].

- **Procedural simplification of Labour Dispute Resolution** including improving effectiveness of industrial courts and establishing a channel for industry associations or bodies to highlight labour related concerns.
- **Skill development:** As detailed in Skill development section, focused interventions would be required to address skill gaps including strengthening of apprenticeship program, enhanced collaboration between industry and academia to create industry driven curriculum, rehaul of Industrial Training Institutes for better quality and infrastructure and entrepreneurship building for MSMEs, startups and self-employed individuals.

3.2.4 Water and effluent management

Key challenges

- **High capital cost of installing captive effluent treatment plant** for industries, making it unviable especially for MSMEs. Thus, industries need to be connected to Common Effluent Treatment Plant to maintain environmental standards while ensuring cost effectiveness.

Key interventions (detailed in renewables and sustainability)

- **Evaluate building CETPs in industrial areas**, while connecting industries (especially MSMEs) to existing CETPs where possible in order to reduce cost of effluent treatment for MSMEs. State can explore PPP model for building new CETPs based on cost effectiveness and feasibility assessment.
- Besides, **promote wastewater use and recycling in water intensive industries** (e.g., thermal power plants, textile) by setting targets and driving favourable policies. Maharashtra, similar to other states like Gujarat and Karnataka, does provide incentives for MSMEs for water recycling and conservation i.e., reimbursement of cost incurred in water audits (75% of cost incurred) and capital incentives on projects for conserving/recycling water (50% of cost of capital equipment up to Rs. 5 Lakhs).

3.2.5 Logistics infrastructure and services

In order to assess and rank the efficiency of the logistics ecosystem in various States and Union Territories, the Ministry of Commerce and Industry (MoCI) initiated a study called "Logistics Ease Across Different States (LEADS)" in 2018. The index evaluates the import-export (EXIM) logistics ecosystem within each State, considering the feedback and perceptions of key logistics stakeholders at the state level. As reflected in Maharashtra's LEADS 2021 scores (rank 5th), there is a potential to improve across 3 dimensions - **logistics infrastructure, logistics services and operating and regulatory environment.** Key challenges based on LEADS report and industry feedback and associated interventions have been detailed across the three dimensions.

A. Logistics infrastructure

Key challenges and improvement areas

- **Road and rail:** As highlighted in *construction section*, potential to improve road and rail density in Maharashtra including connectivity to agricultural and industrial clusters and port for freight movement. Based on LEADS score, there is scope for Maharashtra to improve quality of road and rail infrastructure up to level of Punjab (benchmark state).
- **Sea port:** Poor road and rail connectivity to gateway port, congestion at port terminals and inadequate storage capacity resulting in long queuing of trucks and high clearance time. Based on study under India EoDB assessment[515], it was found that a shipment takes up to 4 days in queue for entry into ship at Jawaharlal Nehru Port Trust (JNPT) in Maharashtra vs 6-7 hours at Mundra port in Gujarat.
- **Airport:** High congestion at Air Cargo Complex in Mumbai, issues in package identification and ineffective stacking arrangement due to space constraints at the Mumbai Courier Terminal. In the same EoDB study, Bangalore airport was found to be world-class, where a shipment takes only about an hour to enter the exports terminal and spends another 2-6 hours in customs and examination process.

[514] Source: India's turning point: An economic agenda to spur growth and jobs, McKinsey, August, 2020 and Nourishing dwarfs to become giants: Reorienting policies for MSME growth, in Economic Survey 2018–19, Volume 1, Ministry of Finance, July 2019.
[515] Source: Targeting Ease of Doing Business in India, in Economic Survey 2019-20, Volume 1, Ministry of Finance, January, 2020.

- **Warehousing:** As highlighted in manufacturing and construction sections, additional capacity of Inland Container depots and colds storage will be required to support agricultural and manufacturing growth along with world-class linkages to the ports, land customs stations, quality testing and certification labs, trade promotion centres.

Key interventions and enablers

- **State master plan:** As highlighted in construction section, state needs to define an **Integrated Master Plan** for development of infrastructure by mapping existing and planned manufacturing and agriculture clusters. This will require coordination with all relevant departments and ministries and would help in creating integrated budget view for better capital deployment.
- Ensure multi-modal connectivity to link clusters (e.g., Ports will need to be connected via railways to ensure smooth transport to ports for exports of agriculture products)
- Expand cold storage and warehouse capacity to support agricultural development
- Identify dedicated zones with integrated transportation connectivity to develop warehouses.
- Develop enabling infrastructure like truck parks, affordable housing near warehouses.

B. Logistics services

Key challenges

- **Concerns around high cost of freight and services:** Based on LEADS report, Maharashtra has score of 2.23 on reasonableness of road freight, which is lower as compared to Gujarat at 2.36 and Tamil Nadu at 2.54. On-ground feedack suggested concerns of higher freight cost incurred by units in regions away from port impacting their export competitiveness. Similarly, the state scores 2.22 in reasonableness of prices of terminal services as compared to Tamil Nadu at 2.62, for which high buffer yard charges at JNPT has been indicated as one of the reasons.
- **Low digitisation and automation:** Lack of automation in cargo handling and manual recordkeeping at seaport and airports is leading to inefficiency and delays in cargo clearance.
- **Labour and governance issues:** Issues due to labor unions, entry restrictions and lack of an effective grievance redressal mechanism have been highlighted in LEADS report.

Key interventions and enablers to enhance availability and reliability of logistics services

- **Provide incentives for transportation cost** for regions away from port to improve their export competitiveness e.g., Uttar Pradesh offers freight reimbursement and transportation subsidies for specific regions in its exports promotion policy
- **Digitisation and automation initiatives** – Maharashtra government needs to drive and incentivise investment in port automation and cargo handling infrastructure to improve efficiency
- **Labour reforms** – As detailed in 'Labour' section above, labour related issues need to be resolved by reviewing existing labor laws to improve ease of doing business for industries.

C. Operating and regulatory environment

Key challenges

- Low ease in obtaining logistic related approvals as reflected in Maharashtra score of 3.22 vs 3.46 in Gujarat
- Poor enforcement at check-post - Unwarranted stoppages by RTO and enforcement agencies, non-acceptance of documents via Digi locker by police officer are some concerns identified in LEADS report.

Key interventions

- Enable **single window clearance** for all logistics related approvals
- Implement **smart enforcement** through modernisation of check posts (e.g., smart weigh bridges, sensors, automatic plate recognition system) to minimise physical checking and ensure smooth flow of good vehicles

3.2.6 Exports enablement

As estimated in manufacturing opportunities, Maharashtra needs to increase exports at a CAGR of 19% from ~$14Bn in FY22 to ~$40 Bn in FY28.

Key challenges and improvement areas

- Low awareness of export processes and compliances, especially in MSMEs
- **Inadequate logistics infrastructure** to enable exports (i.e., Inland Container depots, port connectivity) and lack of subsidized quality testing facilities
- Concerns around higher freight cost incurred by units in regions away from port impacting their export competitiveness
- **Ease of doing exports:** Currently, India ranks 68 in trading across borders parameter in World EoDB rankings. While it takes 60-68 hours in border and documentary compliance for exports in India, it takes only one hour in Italy (top ranked country). Moreover, the cost of compliance is zero in Italy while it costs $260-280 in India.

Figure 112: Comparison of time and cost of exports compliance - India vs Italy

Exports	Time (hours)			Cost ($)		
	India (Rank 68)		Italy (Rank 1)	India (Rank 68)		Italy (Rank 1)
	Delhi	Mumbai		Delhi	Mumbai	
Border compliance	54	50	0	195	231	0
Documentary compliance	6	18	1	65	50	1

Key interventions and enablers (detailed in MSME enablement and trade and retail sections)

a. **Enable marketing and demand linkages**
   - **Increase awareness** – Enable information dissemination and training on product-country wise standards, compliances, and certification requirements in partnership with sector-specific export promotion councils
   - **Demand generation** – Provide incentives to encourage exporters to organize and participate in exhibitions and marketing activities.

b. **Work with central government to develop Free Trade Agreements (FTAs)[516] with key destinations in focus sectors**: FTAs give better access to new markets and facilitate exports by addressing tariff and non-tariff trade barriers such as technical standards, quality requirements, labour issues among others. India's merchandise exports to countries/regions with which India shares trade agreements such as FTAs registered a growth of ~21% in between FY16 and FY21[517].

c. **Develop adequate infrastructure** for port connectivity (as detailed before) and enable **access to subsidized testing facilities**, especially for MSMEs

d. **Provide incentives** to promote and enable exports as part of industrial policy or focused export promotion policy
   - **Production linked incentives**, e.g., Madhya Pradesh provides additional incentive to a manufacturing unit based on percentage of production exported
   - **Transportation subsidies** for **specific regions** e.g., Uttar Pradesh offers freight reimbursement and transportation subsidies in its exports promotion policy as it is farther from the port; and for **specific products** e.g., Madhya Pradesh provides reimbursement of freight costs for perishable food products in order to promote their exports

[516] FTAs are generally agreements that often include clauses on trade facilitation and rule-making in investment, intellectual property, government procurement, technical standards and sanitary and phytosanitary issues and provide a possibility for countries to enhance trade and exports, access to new markets, trade risk diversification, enhancing innovation and competition, better integration of markets and facilitating the transfer of skills and technology.

[517] Source: A preferential route: Effectiveness of FTAs in Indian exports, Economic Times, May 2022

- **Trade finance or export credit schemes,** especially for MSMEs, to enable financial institutions to provide trade financing solution (e.g., credit limits based on export order value). For example, Maersk Trade Finance offers a combination of trade finance and shipping solutions to the MSME sector[518].

e. Ease of doing exports

- Drive **adoption of certification programs** e.g., Authorized Economic Operator (AEO) Program[519] which provide benefits such as faster processing at customs, expedited dispute resolution, financial waivers
- Introduce **state level certification program for exporters** with appreciable track records. For example, Uttar Pradesh government has introduced green card scheme which provides eligible exporters benefits such as priority clearance, minimum inspections (trucks carrying cargo of certified exporters will have minimum inspections at check posts) and expedited grievance redressal.
- **Single window system for all export related clearances** – As central government implements single window system for all export related clearances[520], state needs to accelerate its adoption and integrate with its own systems to reduce time and cost of border compliance.

[518] Source: How structured trade finance solutions help MSME exporters & importers, Economic Times, July, 2019
[519] Authorised Economic Operator (AEO) is a programme under World Customs Organization (WCO) to secure and facilitate Global Trade. Source: AEO India
[520] Source: Govt likely to unveil single window clearance system for exports next year: Report, ET Now, November, 2022

Skill Development

Skill Development

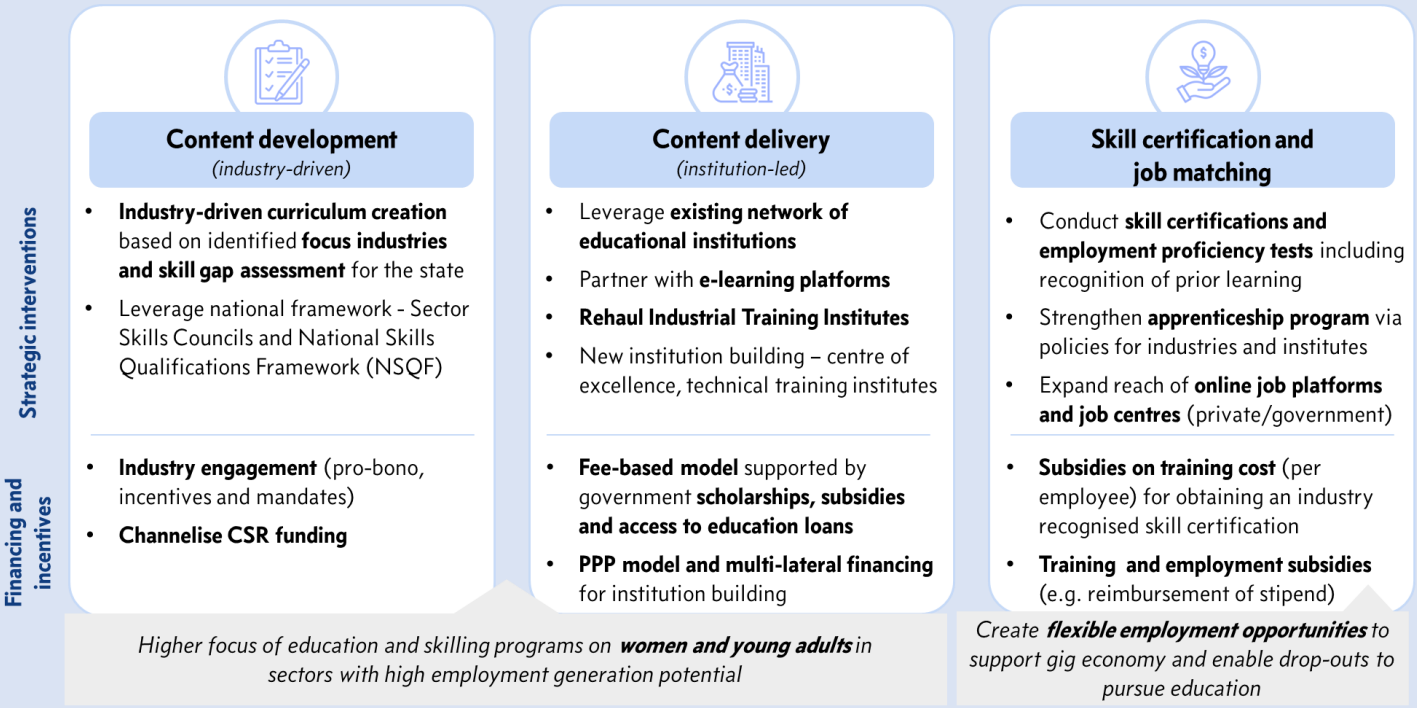
1. Executive Summary

Overview: Aspiration and key priorities

- To achieve $1Tn GDP target, an estimated 15 Mn+ new jobs will be created between FY22 and FY28 implying ~30 Lakh annual job creation.
- Potential **annual workforce addition (15+ age)** is estimated to be **65 lakhs** distributed by various education and skill levels. Almost 80% of the candidates drop-off between secondary education (starting Class IX) and higher education (i.e., undergraduate programs) and 64% of graduates are employable.
- **Target for key metrics**
  - Increase Gross Enrolment Ratio (GER) of 72%[521] in higher secondary (Class XI-XII) to 100% and from 32%[522] in higher education (18-23y) to 50% in line with NEP targets.
  - Increase coverage of vocational training from 6.2% of working age persons to 20% in line with peer states
  - Improve employability of graduates, currently at 64% as per Wheelbox National Employability Test

Key strategic focus areas and interventions for skilling

- **Skilling to improve employability: Vocational education** via **enhanced industry-academia collaboration** in alignment with National Education Policy



- **Agriculture and allied:** Focus areas for agriculture and allied training include FPOs (Farmer Producer Organisations) training in business skills, farmer technical training in precision agriculture and new practices like vertical farming; building capability for allied activities –sericulture, aquaculture, poultry operations.
- **Entrepreneurship building**:
  - **MSMEs**: Provide business skills training, industry or product-specific self-learning modules, create information repository for compliance and regulations to help MSMEs scale up their businesses
  - **Family business:** Enhance curricular focus and create structured training programs to groom next generation of family business owners
  - **Startups:** Embed entrepreneurship courses in formal education and enable ecosystem for startup development through incubation and mentorship programs

[521] Source: Unified District Information System For Education Plus (UDISE+) report 2021-22
[522] Source: All India Survey on Higher Education 2019-20

- **Self-employed individuals** - Drive skilling programs and certification-based courses for occupations such as event managers, banking correspondents and insurance agents.

Key enablers for skilling

- **Integrated skill master plan:** Create skill development plan aligned with integrated master plan and streamline initiatives across government departments and implementing agencies
- **Integrated skill development policy:** Formulate skill development policy linked with sectoral policies incorporating skill development interventions and competitive incentives for training
- **Dedicated funding plan:** Consider creating a dedicated Skill development fund which pools resources from multiple sources and allocates to different programs. Effectively utilise various funding sources including improving implementation of centrally sponsored schemes, boosting private sector participation, channelling CSR funding, raising money by social impact bonds and multi-lateral financing, and improving access to loans for vocational education

Economic opportunity

Higher education hub: Maharashtra can strive to develop India's first higher education hub containing large multidisciplinary universities including foreign university branches by leveraging existing strength in higher education infrastructure and NEP 2020 vision. State can draw learnings from global models for both domestic institutions cluster such as universities in Europe and US (e.g., Carnegie Mellon University) and foreign institutions cluster such as Dubai International Academic City

Key enablers:

- Policy to accelerate clustering of institutions via accreditation framework proposed under NEP 2020
- Develop integrated infrastructure including commercial and residential spaces.
- Provide financial Incentives (e.g., exemptions on stamp duty, registration) to attract universities and faculty
- Improve ease of doing business via single window clearance and dedicated relationship managers

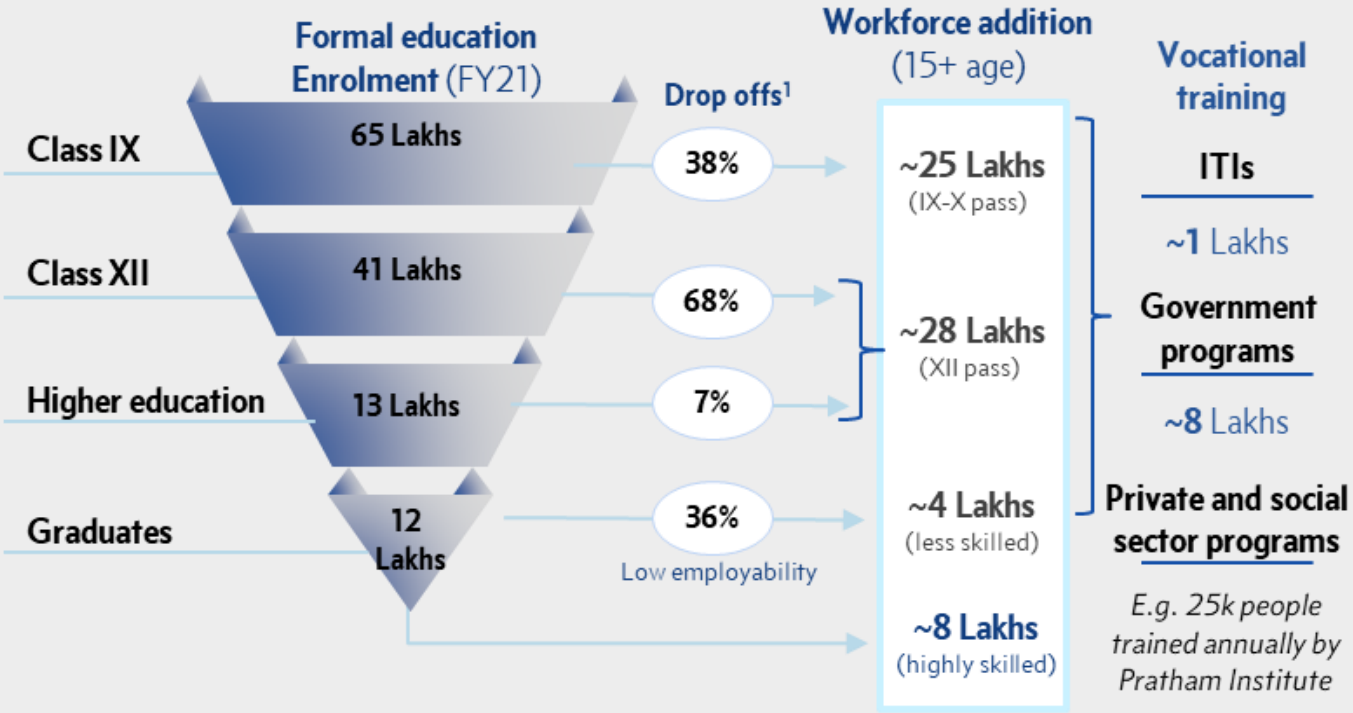
2. Overview: Aspiration and key priorities

GDP target of $1Tn is expected to drive **15 Mn+ new job creation**[523] between FY22 and FY28. This implies Maharashtra would need to ensure supply of skilled workforce to match **~30 Lakh annual job creation[524].**

Based on current enrolment in formal education[525], potential **annual workforce addition (15+ age)** is estimated to be **65 lakhs** distributed by various education and skill levels. Almost 80% of the candidates drop off between secondary education (starting Class IX) and higher education (i.e., undergraduate programs) and only 64% of graduates are employable[526] (36% with low employability). Thus, interventions are required to enhance enrolment in formal education along with coverage of vocational training programs aligned with economic growth opportunities.

The state has a total of 958 Industrial Training Institutes (ITIs) with an annual intake capacity of ~1.4 Lakh students (~1 Lakh students admitted)[527]. In addition, ~8 Lakh candidates benefit annually in the state (FY22)[528] for training and placement under centrally sponsored skilling schemes like Pradhan Mantri Kaushalya Vikas Yojana (PMKVY) and state sponsored schemes like Pramod Mahajan Kaushalya va Udyojakata Vikas Abhiyan (PMKUVA). Besides, skilling programs are also run by private and social sector organisations, e.g., Pratham Institute (non-profit organisation) annually trains 25,000 young people in India and helps them get placed in entry-level jobs or start their own businesses.

Figure 113: Potential annual workforce supply



1. Gross enrolment ratio of 32% in higher education and 72% in higher secondary (XI-XII), average annual dropout rate of 13% for Class (IX-X)
Source: Maharashtra Economic Survey 2020-2021, SDG India Report 2020-21

[523] Assumes productivity (GDP/employment) growth of 10% between FY21 and FY28
[524] Adjusted for estimated 20 Lakh job creation in FY23 based on actual GDP in FY22
[525] Gross enrolment ratio of 32% in higher education and 72% in higher secondary (XI-XII), average annual dropout rate of 13% for Class (IX-X)
[526] Based on Wheelbox National Employability Test (WNET), Source: India Skills Report 2021
[527] Source: Economic Survey of Maharashtra 2021-22
[528] Source: Mahaswayam Dashboard

Target for key metrics

Incoming candidates in workforce with different education and skill levels need to be tackled differently by encouraging enrolment in higher secondary and higher education (IX-X pass and XII pass), increasing coverage of vocational education (XII pass and graduates), and improving employability (graduates). State should set targets for key metrics and drive focused initiatives to achieve these targets.

- **Enrolment in higher secondary and higher education:** Maharashtra has Gross Enrolment Ratio (GER) of 72%[529] in higher secondary (Class XI-XII) and 32%[530] in higher education (18-23y), potential to improve it up to 100% and 50% respectively in line with other states and National Education Policy (NEP) 2020 targets. Maharashtra can take an aspirational target of 70% for GER in higher education considering global benchmarks - 58% in China, 69% in UK and 88% in USA[531].
- **Coverage of vocational education:** 6.2% of working age population (15+) of Maharashtra has received formal vocational training (as per Labor Bureau report 2013-14) as compared to more than 20% for Kerala. The metric needs to be measured and tracked on an annual basis to monitor coverage of vocational training. Similar indicator (percentage of workforce in age group of 19-24 with formal vocational education) is 24% in China and as high as 52% in USA, 75% in Germany and 96% in South Korea[532]. Maharashtra can increase coverage of vocational training (percentage of working age population with formal vocational training) to 20% by driving focused interventions. NEP 2020 recommends having at least 50% of learners through the school and higher education system exposed to vocational education by 2025 and suggests developing clear action plan with targets and timelines to achieve this. It also suggests including vocational education as part of Gross Enrolment ratio in higher education.
- **Employability:** Based on evaluation of 3.75 lakh candidates in Wheelbox National Employability Test (WNET), Maharashtra is the benchmark state with employability of 64% as compared to 46% for India. Government should explore tracking employability metric periodically by conducting State level employment proficiency tests.

Figure 114: Key target metrics for skill development

		Maharashtra Current	Maharashtra Target (FY28) *(preliminary)*	India Current
Formal education *(secondary and tertiary)* **and vocational training**	**Gross enrolment ratio (%) – Higher secondary (XI-XII)[1]**	72%	100% (NEP target)	58%
	Gross enrolment ratio (%) – Higher education (18-23 y)[2]	32%	50% (NEP target)	26%
	% of working age persons (15+) with formal vocational training[3]	6.2%	20%	6.8%

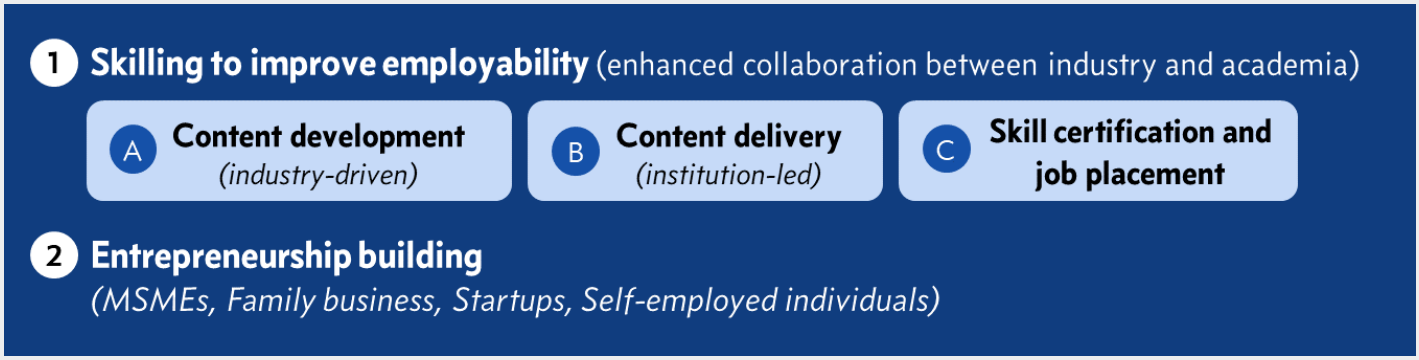
1. Unified District Information System For Education Plus (UDISE+) report 2021-22
2. All India Survey on Higher Education 2019-20
3. Education, Skill Development and Labour Force report, Labour Bureau 2013-14

Note: Targets have been taken based on benchmarks of peer states and in line with national level targets

[529] Source: Unified District Information System For Education Plus (UDISE+) report 2021-22
[530] Source: All India Survey on Higher Education 2019-20
[531] Source: World Bank data
[532] Source: National Education Policy 2020

3. Strategic focus areas and interventions for skilling

Key interventions and initiatives have been detailed across 2 key themes identified - 'Skilling to improve employability' and 'Entrepreneurship building'.



3.1. Skilling to improve employability

Availability of necessary skill sets will be crucial to attract new industries and support existing industries in the state. Maharashtra needs to drive focused skilling initiatives to improve employability and support skill requirement of industries to achieve target growth.

This will require enhanced collaboration between industry and academia along content development, content delivery and skill certification and job placement. **Content development** should be based on industry requirements while **content delivery** should be done by leveraging institutional infrastructure (existing or new set up), along with programs for **skill certification and job placement.**

a. Content development *(industry-driven)*

a. **Create industry-driven curriculum development plan**: Based on identified focus sectors and industries (e.g., 16 focus industries identified in manufacturing), a curriculum development plan should be created assessing skill requirements at district or cluster level. Discussions with district stakeholders suggest lack of skilled talent across existing and emerging industries (e.g., skilled textile labour required in Solapur, electric vehicles related skills required in Pune and Sambhajinagar).

b. **Leverage existing curriculum developed under national framework** of Sector Skills Councils[533] and National Skills Qualifications Framework (NSQF) and customise it for State requirements (e.g., language translation)

c. **Partner with private players to develop curated courses to address state specific requirements across sectors** - Develop technical training curriculum in emerging and high-growth sectors to build State's competitiveness. Technical training requirement has been illustrated in next Figure, as identified and detailed in respective sector sections. Additionally, business, and soft skills training courses will be required across sectors and roles e.g., training of FPOs in agriculture.

Figure 115: Illustrative requirement for technical training

Sector	Technical training requirement
Manufacturing	Courses for **new technologies** in traditional sectors e.g., protein extraction in food processing and **sunrise sectors** e.g., manufacturing of healthy foods, electric vehicles, semiconductor fabrication
Agriculture and Allied	**Crop:** Farmer training program in areas of precision agriculture, vertical farming, traceability tools **Allied:** Training programs in hatchery operations (e.g, sex identification in chickens/eggs), sericulture, dairy farming
Services	**Healthcare:** Training program for nurses and midwives, paramedics, and specialist doctors considering Maharashtra will need ~61k additional healthcare workers by 2030 **IT:** Courses in emerging technologies and their use cases - Artificial Intelligence, Blockchain

[533] Autonomous industry-led bodies set up by National Skill Development Corporation to identify skill development needs, develop sector level skill development plan, determine standards, conduct certifications and facilitate training

b. Content delivery *(institution-led)*

a. **Leverage existing network of educational institutions to deliver courses**. State can explore **market-driven, fee-based** model where educational institutions can purchase relevant courses from industry body or platform and offer them for a fee to the students (structured as add-on or part of overall tuition fee). Government sponsorship can be provided in form of merit and income-based scholarships to students or as incentives to educational institutes for adoption of these courses. These would need to be supported with 'Train the Trainer' programs to equip facilitators in educational institutions with the necessary knowledge and tools. State can also incentivse trainers or faciliators to upskill themselves.

b. **Utilise technology to enhance accessibility of training courses**, **especially in tier-2 cities and rural areas**

- **Partner with EdTech platforms** to deliver vocational courses for specific skills and geographies, customised in local language. For example, Microsoft and education SaaS platform Ed4All has partnered[534] with National Institute of Open Schooling (NIOS), a body under Union Education Ministry, to implement virtual school with access to digital courses on technologies like artificial intelligence, cloud computing, cyber security and data sciences among others
- State should also endeavour to leverage **AI platforms** (e.g., OpenAI's chatGPT) to deliver personalised self-learning courses, interactive simulations accompanied with automated skill certifications.

c. **Rehaul of Industrial Training Institutes (ITIs)** to improve quality of courses and infrastructure (e.g., better machines); expand training capacity for high demand skills such as welding, metal fabrication among others.

- **Effective upgradation under PPP model:** Government of India had launched a scheme (2007-2012) of upgradation of ITI under PPP model which included setting up of industry COEs or complete adoption of a government ITI. In Maharashtra, 250 ITIs [535] were upgraded with industry partners such as Mahindra & Mahindra, Bharat Forge, Bajaj Auto, CEAT Tyres, Tata Motors among others. However, there were challenges around availability of teachers for new courses and ineffective utilisation of funds under the scheme[536]. Additionally, teaching effectivness of new courses can be improved by conducting 'Train the Trainer' programs, expert interactions and industry visits.
  - Karnataka government has seen success in turning around 150 ITIs into technology hubs[537] in partnership with Tata Technologies (and 20 other companies) with ~84% of project cost contributed by private partners. These hubs have potential to produce 1 lakh skilled manpower every year
- **Assistance from multilateral organisations** can be explored for ITIs not associated with PPP projects. Government of India had run World bank assisted Vocational Training Improvement project between 2007 and 2018 under outcome-based funding model[538] . The scheme objectives included enhancement of knowledge and skills of ITI instructors, strengthening facilities, strengthening curriculum development, capacity building.

d. **New institution building** (centre of excellences, skill development institutes, technical training institutes) **via strategic partnerships with private players**. Private players can develop these institutes utilising their CSR funds, or state can also evaluate providing capital subsidies in specific cases. These institutes can be relevant for industries with high employment of unorganised workers and lack of nodal agencies (e.g., construction, retail, cement) or those requiring expensive setups (e.g., jewellery). Some examples of industry-led initiatives are mentioned in next figure.

[534] Source: Microsoft, Ed4All to deliver govt's virtual school initiative, Mint, September, 2021
[535] Source: Evaluation study report of upgradation of 1396 govt. ITIs through PPP, GoI
[536] Source: Maharashtra fails to utilise Rs 458 Cr given by centre for upgrading ITIs, Hindustan Times, November, 2016
[537] Source: 150 technology hubs PM opened in Karnataka to be also accessible to startups for a fee, Economic Times, June, 2022
[538] Source: Schemes for upgradation of ITIs, Ministry of Skill Development and Entrepreneurship website

Figure 116: Examples of industry-led institution building and skill development initiatives

Industry	Initiatives by industry players
Metals	Bharat Forge has set up centre of excellence in partnership with Kolhapur foundry cluster to upgrade skill in metal industry
Power	Tata Power has set up 5 training hubs including 2 in Mumbai with employability centric courses (ranging from 2 to 12 weeks) aligned with NSQF[539]
Auto	Tata Motors offers courses like auto service technicians (as approved by Automotive Skill Development Council) in partnership with ITIs as well as provides on-job training leveraging its dealer and service stations network[540]
Tourism	IHCL has partnered with Madhya Pradesh Tourism to establish hospitality focused skill centres with courses aligned with National Skills Qualification Framework (NSQF)[541]
Retail	Future group drives an initiative to train candidates in logistics and supply chain management[542]

c. Skill certification and job placement

Interventions in skill certification and job placement should complement degree courses and skill development programs for benefit of both industries and candidates. Currently, skill certification and apprenticeship programs are not being utilised effectively to address mismatch in skill demand and supply.

a. Strengthen skill certification program including certifications linked to employability-centric courses

- **Leverage national level Recognition of Prior Learning (RPL) programme** (under PMKVY) **to improve employability quotient of existing workforce**, especially contract labour. State can improve adoption of RPL by enhancing collaboration with Sector Skill Councils, Industry Associations, training partners[543], government body, NGOs, corporates, and Assessment Agencies. Maharashtra should design state level plan[544] for RPL including setting specific targets and providing policy support e.g. incentives to industries for certifications and encouraging wage premiums to certified candidates.
- Enable **conduction of employment proficiency tests in partnership with private players** to assess quality of candidates. This can include psychometric tests that assess interest and fitment of candidates to specific kind of roles and industries which can be used for better job matching. It can also include assessment tests linked to employability centric courses focused on specific skills (e.g. financial derivatives, AI) or industries (e.g. Banking and Financial Services, IT).
- Create **verifiable training certifications** where firms should be able to verify credentials of training programs completed by candidates, especially those outside formal education system

b. Deepen apprenticeship program: India has only 3 lakh apprentices while Germany has 30 lakhs, Japan has 1 Crore and China has 2 Crore. Only 25,000 employers in India appoint apprentices vs 2 lakhs in UK. Apprenticeship act was amended in 2017 to increase apprenticeships limit in an establishment to 25% of total workforce from earlier limit of 10%. In order to capitalize on enhanced limits, State needs to strengthen flow of apprenticeships from education institutes to industries (along the lines of German dual education system).

- **Leverage NEP 2020** and **UGC guidelines 2020**[545] to introduce **state level guidelines and policy incentives for education institutions** to embed internships/apprenticeships as part of degree programs
  - NEP 2020 recommends having at least 50% of learners through the school and higher education system exposed to vocational education by 2025 and suggests developing clear action plan with targets and timelines to achieve this.
  - UGC released guidelines in 2020 for Higher Education Institutions (HEIs) to offer Apprenticeship/ Internship embedded Degree Programmes, wherein any recognized UG programme can embed at least one

[539] Source: Tata Power website
[540] Source: Tata Motors website
[541] Source: IHCL partners with Tata Strive and MP Tourism to develop skill centre in Gwalior, ETHospitalityWorld, Jan, 2023
[542] Source: NSDC retail sector study
[543] Refers to sector wise empaneled training partners approved by National Skill Development Corporation (NSDC)
[544] Source: Developing an Implementation Strategy for the Recognition of Prior Learning (RPL) System in the state of Karnataka, India
[545] Source: UGC Guidelines for Higher Education Institutions to offer Apprenticeship/Internship embedded Degree Programme, July, 2020

semester of apprenticeship/internship as part of the degree programme without altering the total duration of the programme.

- **Introduce schemes incentivizing industries to engage trainees and industry associations to facilitate apprenticeship program**. This would also help address industries address skill gap. For example, Tamil Nadu government is providing training subsidies to industries across emerging fields such as ESDM (Electronics System Design and Manufacturing) and Electric vehicles. State can also leverage National Apprenticeship Promotion Scheme[546] which includes employer incentive of 25% of stipend upto Rs. 1,500 per month per apprentice and basic training cost up to Rs. 7,500 per apprentice.
- **Scale up apprenticeship program in government** departments, agencies and State Public Sector Undertakings. Besides traditionally focused manufacturing sector, internships can also be provided in policy making and services sector (e.g. IT and tourism department)
- **Leverage PPP model for integrated apprenticeship and skilling program** as seen in National Employability through Apprenticeship Program (NETAP), which is a PPP of Ministry of Skill Development and Entrepreneruship, TeamLease Skills University (a PPP with Gujarat Government), CII and NSDC. The program had cumulatively enrolled 1.3 Lakh candidates (from 2014 till Jan 2019) and placed about 40 percent of the enrolled candidates into formal employment across industries[547].

Case study: German dual education system - A model for vocational training and apprenticeships

In Germany, the dual education system was formally launched in 1969 via the Vocational Training Act, before which training was organized by the various guilds through apprenticeships. The Act codified and standardized this system across Germany, serving as the foundation upon which the state, the private sector, and trade unions could effectively coordinate to deliver the dual system for a modern Germany.

Key characteristics of German dual education system are:

Dual structure

- A dual education system combines apprenticeships in a company and vocational education at a vocational school in one course; it acts as a transition between school and the workplace
- The structure ensures close integration between industry and formal education institutions and ensures high coverage of vocational training. Around half of all school leavers go into the dual education system and more than 400,000 German companies[548] offer vocational training positions.

Recognized certifications and employment

- Over 50 percent of Germans enter dual education system as a route into employment. They can choose from 326 professional trades that include diamond cutters, aircraft mechanics and even chimney sweeps[549].
- Training typically lasts around 2-3 years, post which students will often gain an industry recognized qualification.
- Around two-third of the companies tend to offer students employment contracts at the end of the apprenticeship, which in turn means that Germany enjoys a low youth unemployment rate.
- Companies employ the student after their dual education time, get an employee who knows the company's workflow and the student benefits from the knowledge of more experienced co-workers and assess job suitability before exams.

Standardised and regulated

- The dual studies system is regulated by the government's vocational policies; learners spend 70% of time in the workplace and 30% at college
- The system is standardized throughout Germany so that a young person completing a placement in one state can ensure that its qualification will be recognized in another
- High standards are upheld by several organizations working together including the government, public colleges, universities, states, trade unions, chambers, and the companies

[546] Source: MSDE website
[547] Source: Teamlease Services Trains 1.3 Lakh Candidates Since Inception, Business World, January 2019
[548] Source: German dual apprenticeship system, Expatrio.com
[549] Source: What is Germany's dual education system?, DW, June, 2018

c. **Expand reach of online job platforms and job centres** to improve job placement rate. Only 36% of trained candidates were placed under PMKVY short-term training programs.

- **Explore partnership with online job platforms** (like Naukri.com) to enable placements of **candidates with skill certifications and vocational education** and **fresh graduates** (especially those who may not get placed via in-house placement agencies of colleges)**.** This would be important as employability centric courses become more prevalent and candidates require specific job roles aligned with their skills.
- Set up **job centers** that connect candidates with industries, especially in **regions with low reach of online platforms**. These job centres will provide employment services such as support to industries in understanding skill requirements and support to job seeking candidates with pre-hiring training, recruitment and conducting interviews.
  - Expand the network of **model career centres**[550] under National Career Services (NCS project)
  - **Enhance collaboration of job centres with in-house placement agencies of educational institutions** to leverage their systems and industry connects for external job-seekers.

d. **Enhance focus of government skilling programs on women and young adults** with **strong employment linkages**

- **Women** (especially adolescent girls in 11-20 years age) who drop out of schools require support for skilling, with linkage to sectors that have high employment generation potential for women (e.g., textile, jewellery, handicrafts, salon services, healthcare).
  - Maharashtra government can revitalise Skill Sakhi programme[551] which was launched in 2016 in collaboration with United Nations Development programme (UNDP) to mobilise training of employable women in rural and urban areas. MSSDS can also partner with women SHGs/JLGs for skill training initiatives.
- **Young adults** (15+ age, school drop-outs, financally constrained) can be skilled in blue collar jobs like plumbers, carpenters, electricians mainly in urban and sub-urban areas via partnership with private players and platforms like Urban Company.

e. Introduce **dedicated mentorship programs** to provide support to students -

- Develop **institutionalised mentorship programs with strong linkages between industry and academia** e.g. introducing credit course on mentorship by industry in educational institutions and every mapping employees at middle management level to a student
- Mobilise the reach of **social sector and central agencies driven mentorship programs**. For example, Lighthouse project is a non-profit organisation that connects working professionals and college students to children from under resourced communities. Another example is Niti Ayog's Mentor India program where skilled professionals provide pro-bono mentoring to young innovators under Atal Innovation mission, focusing on future skills such as human centric design approach, computational thinking.

3.2. Entrepreneurship building

32% of the working population of the state is self-employed[552] (excludes helpers in household enterprise). Entrepreneurship building initiatives catering to various self-employed segments would help scale these businesses and drive GDP growth and employment generation for the economy.

A. Micro, Small and Medium Enterprises (MSMEs)

As mentioned in MSME enablement section, MSMEs lack expertise and face challenges across multiple areas that restrict their ability to scale up businesses – business skills (e.g., drafting business plans), financial awareness (e.g., filing GST returns, information on available incentives and schemes), marketing and branding (e.g., understanding of export compliance processes), technical skills (e.g., upgrading to new technologies).

[550] Model Career Centre | Government of India : National Institute of Electronics & Information Technology (nielit.gov.in)
[551] Source: India Filings website
[552] Source: PLFS Annual report, 2020-21

a. **Partner with industry associations, agencies and non-profit organisations** (e.g., Global Alliance for Mass Entrepreneurship (GAME)) to develop content customized to MSME needs and **leverage existing infrastructure** (i.e., DICs, MSME training institutes, Centre of excellence) **for delivery**.
   - Create **industry/product specific self-learning modules**, customised in local language, containing information such as business pre-requisites, existing suppliers of raw materials and equipment, technological development, market research and other important elements.

b. Provide **financial assistance to partners or offer subsidies on program fees** to MSME entrepreneurs, with enhanced focus on women entrepreneurs. State should drive implementation of Central government schemes providing incentives for MSME training such as Design clinic scheme, Trade Related Entrepreneurship Assistance and Development Scheme- Scheme for Women, Procurement and Marketing Support Scheme (detailed in MSME enablement section). State can also partner with banks to **link credit schemes** (especially unsecured financing) with training programs i.e., MSME is enrolled into a training program when taking a loan.

c. **Create centralised repository of information** on central and state government schemes for MSMEs, export specific compliances and other business-related approvals developed (MAITRI portal can be used)

d. Provide **subsidised access to professional services** such as taxation and accounting, market research, product branding, process improvements. For example, Lean Manufacturing Competitiveness Scheme of Government of India provides financial support up to 80% of consultant fees for a mini MSME cluster. State can also have empanelled list of service providers that MSMEs can use.

B. Family business:

Family businesses in India account for 79 percent of India's GDP[553] (including both SMEs and large family business). Thus, it will be important to enable these businesses to grow further and remain resilient to market changes.

a. Enhance **curricular focus and create structured training programs** to groom next generation of family business owners that -
   - Incorporates key priorities of family businesses[554] - expansion and diversification, innovation and digital transformation, sustainability
   - Provides key skills including leadership capabilities, industry exposure, understanding of new technologies

C. Startups

Based on identified opportunities (e.g., fintech hub), the State aims to strengthen startup ecosystem in Tier-1 and Tier-2 cities. State should promote startups in categories with existing strengths e.g., fintech, SaaS, healthcare as well as emerging categories like agritech, green technology, etc.

a. **Drive implementation of State policy initiatives** - IT policy and Innovative Startup Policy 2018[555]
   - Enable startup ecosystem by allowing for a gap year for students to work full time on their startups
   - Set up innovation hubs and incubation centres to promote start-ups on the lines of T-hub in Telangana
   - Support promising startups to expand into international markets by devising market exchange programmes with its Indian and global partners

b. Enable schools, higher education, and training institutions to **embed entrepreneurship mindset courses** which include live projects where students can get access to seed-funding by investors.

D. Self-employed individuals

These would include professionals like doctors, chartered accountants, lawyers which require specific qualifications and degree. While other professionals such as photographers, event managers, social media marketers/influencers, banking and insurance agents may not necessarily require intensive degree programs but can benefit from certification-based courses.

a. **Drive skilling programs and certification-based courses** for occupations such as event managers, banking correspondents and insurance agents.

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[553] Source: Ushering India's Family Businesses into a New Era of Endless Possibilities, Economic Times, February, 2022
[554] Based on 10th Global Family Business Survey India report, PwC, 2021
[555] Source: Startup India website

- **Partner with private players**, industry associations or regulators, for example, IRDAI is introducing 'Bima Vahak' initiative to increase insurance penetration in rural areas of India with focus on creating women-centric insurance agent force[556].
- **Drive implementation of central government schemes**, for example, craftsmen training scheme[557] aimed at creating skilled workers in domestic industry trades such as drivers, beauty professionals.
- **Explore introducing new courses as part of existing skilling programs** such as video editor, social media marketer, in line with evolving digital and gig economy.

4. Key enablers for skilling

In order to drive strategic skilling interventions and initiatives, there are three key enablers – integrated skill master plan, integrated skill development policy and dedicated funding plan which have been detailed.

4.1 Integrated skill master plan

Skill development plan should be **aligned with integrated master plan** with interventions and incentives focused on specific industries in relevant geographical clusters (e.g., textile cluster in Amravati). Key features of the integrated skill development plan and policies would include -

a. **Creation of curriculum development plan** based on identified focus sectors and industries and skill requirements at district or cluster level (as highlighted in previous section)

b. **Integrated sector and district/cluster level plan** to incorporate economic opportunities for absorbing existing skills and address gaps in employment generation, for example,
   - **Local employment opportunities** in sectors with skill availability e.g., Solapur has 30,000 IT graduates working in IT companies in other cities due to lack of local IT jobs[558]
   - **Alternative employment opportunities** for workers moving out of traditional jobs or declining industries (e.g., 70,000 women employed in Bidi industry in Solapur)
   - **Flexible employment** opportunities to
     - Support young uneducated population in working age (i.e. drop-offs from higher secondary education) who may be unable to pursue higher education due to financial constraints and other responsibilities.
     - Cater to **increasing demand for gig work**, Indian gig economy is expected to grow at 17% per year to reach ~$450bn by FY23

c. **Streamline initiatives across government departments and implementing agencies** such as Directorate of Vocational Education, Maharashtra State Skill Development Society (MSSDS), Maharashtra State Innovation Society (MSINS) for effective utilisation of existing capacities.
   - **Bring synergy and convergence across multiple initiatives** across skill development, employment promotion, employment generation, and entrepreneurship development such as central and state sponsored vocational training schemes like Pradhan Mantri Kaushlya Vikas Yojana (PMKVY), Pramod Mahajan Kaushalya va Udyojkta Vikas Abhiyan (PMKUVA), Maharashtra State Rural Livelihood Mission (MSRLM)
   - **Develop a robust monitoring and evaluation mechanism** to track progress down to local bodies level (gram panchayat, urban local bodies)

[556] Source: IRDAI's Big Guns: What are Bima Sugam, Bima Vahak and Bima Vistaar?, Economic Times, April, 2023
[557] Source: MSDE website
[558] Source: Based on survey conducted by regional IT player in Solapur

4.2 Integrated skill development policy

a. **Formulate state level skill development policy** to ensure focused efforts and effective implementation of strategic interventions and achieve desired targets for key metrics (as detailed in previous sections). Karnataka government has created a focused skill development policy 2017-30[559] to realise the vision of National policy for Skill development and Entrepreneurship 2015

- **Skill development policy to be linked with sectoral policies incorporating skill development interventions and providing competitive incentives for training**. While Maharashtra policies focus on development of new courses across emerging fields of ESDM (Electronics System Design and Manufacturing) and Electric vehicles, other states like Tamil Nadu also provide training subsidies to industries in these fields. Maharashta has policies in sectors like logistics but they do not include incentives on skill development vs other states offering training subsidies in these sectors.

4.3 Dedicated funding plan

Maharashtra government spent 17% of its budget on education in FY22[560], which is higher than peer states average of 14%. However, the state needs to improve effectiveness of spend to achieve better outcomes. The international norm is to allocate 6% of GDP on general education, and 15% out of the same on vocational education and training considering its impact on workforce employability. In FY22, Maharashtra spent ~2.1% of GDP on education[561] (general and technical) of which less than 5% was towards technical education. Adequate funds need to be allocated for skill development to **improve workforce employability**, especially in manufacturing sector considering target growth of 19% between FY22-28.

Maharashtra can consider creating a dedicated **Skill development fund** which pools resources from multiple sources and allocates to different programs, as suggested in Karnataka skill development policy.

Maharashtra should effectively utilize various funding sources to support its skill development initiatives,

- **Central government funding** – Effectively utilise central funds by improving implementation of centrally sponsored schemes such as scheme for upgradation of ITIs, skill missions like PMKVY, National Apprenticeship Promotion Scheme among others.
- **Private sector participation -** Boost private sector participation in curriculum development, training delivery and institution building e.g., upgradation of ITIs under PPP model.
- **CSR funding** – Encourage private corporations to invest their CSR funds in skill development initiatives in alignment with their business objectives. Government of Karnataka tied up with Samsung Semiconductor India Research (SSIR) to enhance technological skills in Internet of Things (IOT) and Artificial Intelligence (AI) for more than a thousand students and teachers in 37 polytechnic colleges under company's CSR program.
- **Social impact bonds:** Government can create specific projects and raise money directly via social impact bonds or empanel social sector organisations as implementation partners who can be enabled to raise funds via social impact bonds. NSDC launched Skill Impact Bond[562] in 2021 to mobilise $14 Mn+ funds for skill development, benefitting 50,000 young Indians over 4 years, 60% of whom would be women.
- **Multi-lateral financing:** Leverage multi-lateral institution like Asian Development Bank to access low-cost financing for initiatives such as upgradation of ITIs.
- **Improve credit access for vocational education –** Maharashtra can encourage banks to provide credit access to vocational education programs by creating a **credit guarantee fund** along the lines of Credit Guarantee Fund for Skill Development and skill loan scheme launched by central MSDE[563]. This fund can provide a partial guarantee to banks for the loans they disburse to vocational education programs. Besides, linked initiatives to provide employment for candidates coming out of programs would also reduce repayment risk for banks.

[559] Source: Karnataka Skill Development policy
[560] Based on State Finances FY22
[561] Excludes expenditure on agriculture research, medical education which are recognised under Agriculture and Health expenditure respectively
[562] Source: NSDC website
[563] Source: MSDE website

5. Economic opportunity: Higher education hub

Maharashtra can strive to develop **India's first higher education hub** containing large multidisciplinary universities including foreign university branches by leveraging -

- **Existing strength in higher education infrastructure:** The state has 65 universities, 4,494 colleges and 2,393 standalone institutions, with 13 of India's top 100 universities[564] including IITs, IIMs and renowned state universities in regions such as Mumbai, Pune, Nagpur.
- **National Education Policy 2020** envisions building multidisciplinary higher education clusters (3000+ students) to deliver high quality holistic education. High performing foreign universities (e.g., world's top 100 universities) will be facilitated to set up branch campus in India.

A. Proposed model based on learnings from international examples

Multidisciplinary higher education clusters are observed globally delivering high quality holistic education while driving economic impact and employment generation. These are mainly driven by domestic institutions while branches of foreign institutions are scattered.

- **Domestic institutions cluster:** Education hub will bring together best-in-class domestic institutions providing high quality education. It would also enable access to high quality shared infrastructure facilities to students while reducing investment required by individual institutions.
  Most universities across the globe, especially US and Europe, are large multi-disciplinary universities creating significant impact on local economy. For example, Carnegie Mellon university generates $2.3 Bn economic impact, $72 Mn tax revenue and ~20k jobs annually across Pennsylvania region.
- **Foreign institutions cluster**: Branch campuses of foreign universities can **offer an alternative destination to Indian students going abroad for studies** and attract foreign students. ~5.9 Lakh Indians went abroad for studies in 2019, of which 11% students were from Maharashtra[565]. Key reasons for students going abroad include - high quality of education (33%), and pursuing niche courses (17%) besides attractive salary packages (44%) and international exposure (6%)[566]. Branch campuses can provide exposure to global education including access to advanced and niche courses at reduced living and tuition cost in the country.
  Dubai has created Dubai International Academic city which is a dedicated free zone for higher education with foreign university campuses. Special benefits are being given to foreign institutes including 100% foreign ownership, 100% repatriation of capital and profits, exemption from corporate tax.

B. Key interventions and enablers

- **Policy interventions:** Formulate state level education policy with specified targets and milestones to drive clustering of institutions[567] in the state through accreditation framework[568] as suggested in NEP 2020.
- **Infrastructure:** Large parcels of land to develop integrated infrastructure including commercial and residential spaces. Additionally, creation of Education SEZs with special benefits would attract foreign universities as observed in Dubai International Academic City
- **Incentives:** Subsidies on land and tax rebates (e.g., exemptions on stamp duty, registration), tax breaks, incentives to attract quality faculty for higher education institutions, rewards based on number of seats to promote expansion
- **Ease of doing business:** Dedicated relationship managers to attract domestic and foreign universities, and for providing support for fast-track clearances and approvals.

[564] As per NIRF 2022 rankings
[565] Source: 71,769 Indians go overseas for study abroad in 2021 so far, y-axis.com
[566] Source: A Deep Dive into the Number of Indians Studying Abroad (2022 Statistics) - OI Digital Institute
[567] Source: State to push clustering of colleges in same locality, Times of India, November, 2022
[568] Framework aims at achieving 3 types of institutions over time - Autonomous degree granting College (AC) focused on undergraduate teaching; Research-intensive Universities with equal emphasis on teaching and research; Teaching-intensive universities with greater emphasis on teaching but still conduct significant research.

Way forward

Government of Maharashtra's initiative to formulate an Economic Advisory Council (EAC) comprising of Business, Government and Social sector leaders in order to assist GOM on chalking out Maharashtra's 1 Trillion USD economy plan is both unique and exemplary. This would perhaps be one of the only such exercises currently being conducted by a State Government in the Country.

Over the last few months, all members of EAC have collaborated to come up with key sectoral inputs and have drawn out a decisive list of opportunities and recommendations to drive economic growth. To support this growth, various enablers, such as formulating new policies or making updates to existing policies, strategy and resource planning, budgetary planning to support incentive structures and rigorous execution of initiatives identified across areas, will be needed.

We at EAC believe, Maharashtra Government is committed to realising this roadmap and propel Maharashtra's GDP to $1 Trillion by FY28. State government should work with stakeholders across districts, industry associations, private sector enterprises, other public sector bodies on the implementation. An effective Governance framework should be established including a mechanism to track and review key initiatives to ensure effective implementation.

We believe that with a proper execution framework and regular review, this path of taking Maharashtra towards a 1 Trillion dollar economy by FY28 is achievable.

We once again thank State Government under the Leadership of Hon. Chief Minister Shri. Eknath Shinde and Hon. Deputy Chief Minister's Shri. Devendra Fadnavis and Shri. Ajit Pawar for formulating EAC and wish them success in the execution.

Acronym glossary

AAUM	Average Assets Under Management
ADB	Asian Development Bank
ADM	Archer-Daniels-Midland Company
AEO	Authorized Economic Operator
AI	Aritifical Intillegence
AIC	Agriculture Insurance Company of India Ltd
AMFI	Association of Mutual Funds in India
AMRUT	Atal Mission for Rejuvenation and Urban Transformation
AP	Andhra Pradesh
APEDA	Agricultural and Processed Food Products Export Development Authority
API	Active Pharmaceutical Ingredients
APMC	Agricultural Produce & Livestock Market Committee
APWRIMS	Andhra Pradesh Water Resources Information & Management System
AR	Augmented Reality
ARCH	Affordable Rental Housing Complexes
ASI	Archaeological Survey of India
ASPIRE	A Scheme for Promotion of Innovation, Rural Industries & Entrepreneurship
AT&C	Aggregate Technical and Commercial
ATDW	Australia Tourism Data Warehouse
AURIC	Aurangabad Industrial City
AVYAY	Atal Vayo Abhyuday Yojana
AYUSH	Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homeopathy
AYUSH	Ayurveda, Yoga, Naturopathy, Unani, Siddha, and Homeopathy
BALARAM	Bhoomihina Agriculturist Loan & Resources Augmentation Model
BCM	Billion cubic meters
BEST	Bombay Electric Supply & Tramway Company Limited
BFSI	Banking, Financial Services and Insurance
BMC	Brihanmumbai Municipal Corporation
BNY	Bank of New York
BOT	Build Operate Transfer
BPM	Business process management
BPO	Business Process Outsourcing
BRAP	Business Reforms Action Plan
BSE	Bombay Stock Exchange
BT	Bacillus thuringiensis
CAGR	Compounded Annual Growth Rate
CBA	Commercial Bank of Africa
CBRE	Coldwell Banker Richard Ellis
CBS	Core Banking Software
CCI	Cotton Corporation of India
CCUS	Carbon Capture Usage and Storage
CERC	Central Electricity Regulatory Commission
CETP	Common Effluent Treatment Plant
CGTMSE	Credit Guarantee Trust for Micro and small enterprises
CHAMPION	Creation and Harmonious Application of Modern Processes for Increasing the Output and National Strength
CHC	Community Health Centers
CIBIL	Credit Information Bureau (India) Limited
CIDCO	City and Industrial Development Corporation of Maharashtra
CII	Confederation of Indian Industry
CIS	Capital Incentive Subsidy
CO2	Carbon Dioxide
COE	Center of Excellence
CPSE	Central Public Center Enterprises
CPSU	Central Public Sector Undertaking
CRISIL	Credit Rating Information Services of India Limited
CSC	Common Service Centres
CSR	Corporate Social Responsibility
CT	Computed Tomography Scan
CUF	Capacity Utilization Factor
DBS	Development Bank of Singapore Limited
DGM	Deputy general manager
DIC	District Industries Centres
DiNC	Digital Nerve Centre
DISCOM	Distribution Company
DISQ	Digital Impact Square
DPIIT	Department for Promotion of Industry and Internal Trade
DPR	Detailed Project Reports
EAC	Economic Advisory Council
eNAM	e-National Agriculture Market
EoDB	Ease of Doing Business
EPC	Engineering, Procurement and Construction
EPR	Extended Producer responsibility
ESDM	Electronics System Design & Manufacturing
EU	Eurpoean Union
EV	Electric Vehicle
EXIM	Export-Import
EY	Ernst & Young
FAO	Food and Agriculture Organization
FDA	Food and Drug Administration
FDI	Foreign Direct Investment
FMCG	Fast-moving consumer goods
FP&A	Financial Planning and Analysis
FPO	Farmer Producer Organisations
FRP	fair remunerative prices
FRU	First Referral Unit
FSI	Floor Space Index
FTA	Free trade agreements
GAME	Global Alliance for Mass Entrepreneurship
GCC	Gulf Cooperative Council
GDDP	Gross District Domestic Product
GDGS	Galmukt Dharan, Galyukt Shivar
GDP	Gross Domestic Product
GEM	Government e-Marketplace
GER	Gross Enrolment Ratio
GI	Geographical indication
GIC	Global In-House Centres
GIFT	Gujarat International Finance Tec-City
GSDP	Gross State Domestic Product
GST	Goods and Services Tax
GSTN	Goods and Services Tax Network
GSVA	Gross State Value added
GVA	Gross Value Added
GW	Gigawatt
HEI	Higher Education Institutions
HT	High Transmission
HUL	Hindustan Unilever Limited
IAS	Indian Administrative Services
ICAR	Indian Council of Agricultural Research
ICD	Inland Container Depots
ICMR	Indian Council of Medical Research
ICU	Intensive Care Units
IFC	International Finance Corporation
IFSC	Indian Financial System Code
IHCL	Indian Hotels Company Limited
IIBX	India International Bullion Exchange
IIM	Indian Institute of Management
IIT	Indian Institutes of Technology
IMDA	Infocomm Media Development Authority
iNDEXTb	Industrial Extension Bureau
INX	India International Exchange
IOT	Internet of Things
IP	Intellectual Property
IPR	Intellectual Property Rights
IPSrC	Integrated Program for Senior Citizens scheme
IRCTC	Indian Railway Catering and Tourism Corporation
IRDAI	Insurance Regulatory and Development Authority of India
iSPIRT	Indian Software Products Industry Round Table
ISTS	Interstate Transmission System
IT	Information Technology
ITC	Imperial Tobacco Company of India Limited
ITI	Industrial Training Institutes
IV	Intravenous therapy
IVF	In vitro fertilization
IVRI	Indian Veterinary Research Institute
JCI	Joint Commission International
JDA	Joint Development Agreements
JLG	Joint Liability groups
JLL	Jones Lang LaSalle Incorporated
JNPT	Jawaharlal Nehru Port Trust
KDoT	Karnataka Department of Tourism
KPI	Key Performance Indicator
KPO	Knowledge Process Outsourcing
KUSUM	Kisan Urja Suraksha evam Utthan Mahabhiyan
KYC	Know Your Customer
LEADS	Logistics Ease Across Different States
LiDAR	Light Detection and Ranging
LOI	Letter of Intent
LPG	Liquefied petroleum gas
LTC	Leave Travel Concession
MAITRI	Maharashtra Industry, Trade and Investment Facilitation
MCX	Multi Commodity Exchange
MDAS	Market Development Assistance Scheme
MERC	Maharashtra Electricity Regulatory Commission
MGPY	Mukhyamantri Gram Parivahan Yojana
MH	Maharashtra
MHCGA	Maharashtra State Cooperative Cotton Growers Marketing Federation

MICE	Meetings, Incentives, Conferences and Exhibitions
MIDC	Maharashtra Industrial Development Corporation
MIDH	Mission for Integrated Development of Horticulture
MIS	Management Information Systems
MITCON	Maharashtra Technical Consultancy Organisation Limited
MLD	Million Litres per Day
MMR	Mumbai Metropolitan Region
MNRE	Ministry of New & Renewable Energy
MNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MoCI	Ministry of Commerce and Industry
MP	Madhya Pradesh
MRSTC	Maharashtra State Road Transport Corporation
MSC	Multi-Service Centre
MSDE	Ministry of Skill Development and Entrepreneurship
MSE	Micro and small enterprises
MSEDCL	Maharashtra State Electricity Distribution Co. Ltd.
MSEFC	Micro and Small Enterprise Facilitation Council
MSFC	Maharashtra State Farming Corporation
MSINS	Maharashtra State Innovation Society
MSME	Micro, Small & Medium Enterprises
MSP	Minimum Support Price
MSRLM	Maharashtra State Rural Livelihood Mission
MSRTC	Maharashtra State Road Transport Corporation
MSSDS	Maharashtra State Skill Development Society
MT	metric ton
MTI	Medical Tourism Index
MVT	Medical Value Tourism
MW	Megawatt
NABARD	National Bank for Agriculture and RuralDevelopment
NABH	National Accreditation Board for Hospitals
NABL	National Accreditation Board for Testing and Calibration Laboratories
NADCP	National Animal Disease Control Programme
NAFED	National Agricultural Cooperative Marketing Federation of India Ltd.
NBFC	Non-Banking Financial Company
NCD	non-communicable disease
NCDEX	National Commodity and Derivatives Exchange
NCLT	National Company Law Tribunal
NCPA	National Centre for the Performing Arts
NCPAH	National Committee on Precision Agriculture and Horticulture
NCS	National Career Services
NDC	National Development Council
NEP	National Education Policy
NETAP	National Employability through Apprenticeship Program
NGO	Non-Governmental Organization
NHAI	National Highways Authority of India
NIC	National Industrial Classification
NIOS	National Institute of Open Schooling
NITI	National Institution for Transforming India
NOC	NO OBJECTION CERTIFICATE
NRHM	National Rural Health Mission
NRLM	National Rural Livelihood Mission
NSDC	National Skill Development Corporation
NSDL	National Securities Depository Limited
NSE	National Stock Exchange
NSO	National Statistical Office
NSQF	National Skills Qualifications Framework
OADA	Open Ag Data Alliance
OCEN	Open Credit Enablemenet Network
ODOP	One District One Product
OEM	Original Equiment Manufacturer
ONDC	Open Network for Digital Commerce
OT	Operation Theatre
PACS	Primary Agriculture Cooperative Societies
PAT	Profit After Tax
PDN	Piped Distribution Network
PDS	Public Distribution System
PE	Private Equity
PHC	Primary Health Centres
PLI	Production Linked Incentive Scheme
PMAY	Pradhan Mantri Awas Yojna
PMJAY	Pradhan Mantri Jan Arogya Yojana
PMKSY	Pradhan Mantri Krishi Sinchayee Yojana
PMKUVA	Pramod Mahajan Kaushalya va Udyojkta Vikas Abhiyan
PMKVY	Pradhan Mantri Kaushlya Vikas Yojana
PMMSY	Pradhan Mantri Matsya Sampada Yojana.
PMMY	Pradhan Mantri MUDRA Yojana
PMS	Procurement and Marketing Support scheme
PPA	Power purchase agreements
PPP	Public Private Partnership

PSI	Package Scheme of Incentives
PSK	Passport Seva Kendra
PSU	Public Sector Undertakings
PV	Photovoltaic
QCBS	Quality cum Cost Based Approach
RBI	Reserve Bank of India
RDF	Non-Recyclable Combustible Dry Waste
RE	Renewable Energy
REGS	Renewable Energy Generating Stations
RERA	Real Estate Regulatory Authority
RIDF	Rural Infrastructure Development Fund
RISC	Rainfall Insurance Scheme for Coffee Growers
ROI	Return on Investment
RPL	Recognition of Prior Learning
RPO	Renewable Purchase Obligations
RTO	Road Transport Office
SARITA	Stamp And Registration with Information Technology Application
SBI	State Bank of India
SC	Schedule Cast
SDG	Sustainable Development Goals
SEBI	Securities and Exchange Board of India
SEZ	Special Economic Zone
SGST	State Goods and Services Tax
SHC	Soil health cards
SHG	Self help group
SHM	Soil Health Management
SIDBI	Small Industries Development Bank of India
SKY	Suryashakti Kisan Yojana
SMART	State of Maharashtra Agribusiness and Rural Transformation
SME	Small and medium-sized enterprises
SOP	Standard operating procedure
SPFE	State Pooled Finance Entity
SPV	Special purpose vehicle
SRA	Slum Rehabilitation Authority
SRI	Self Reliance Fund of India
SSC	Shared Service Centers
SSE	Social Stock Exchange
SSIR	Samsung Semiconductor India Research
ST	Schedule Tribe
STP	Sewage treatment plants
STPI	Software Technology Parks of India
SWAMIH	Special Window for Affordable and Mid-Income Housing
TB	Tuberculosis
TCS	Tata Consultancy Services
TEU	Twenty-foot Equivalent Units
TGA	Türkiye Tourism Promotion and Development Agency
THE	Total Health Expenditure
TN	Tamil Nadu
TOC	Total Cost Of Ownership
TPD	Tonnes per day
TPP	The Protoprint Project
TReDS	Trade Receivables electronic Discounting System
TSS	Total suspended solids
TWh	Terawatt-hour
UAE	United Arab Emirates
UBS	Union Bank of Switzerland
UG	Under Graduate
UGC	University Grants Commission
UK	United Kingdom
ULB	Urban local bodies
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UP	Uttar Pradesh
UPI	Unified Payments Interface
US	United States
USA	United States of America
USK	Udyog Seva Kendra
VC	Venture Capital
VGF	Viability Gap Funding
VR	Virtual Reality
WHO	World Health Organization
WNET	Wheelbox National Employability Test
WRDA	Warehousing Development and Regulatory Authority
WTTC	World Travel and Tourism Council

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