



Methodology for Assessing Skill Shortages and Gaps

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June 16, 2025

Outline

- Objectives
- Skill Shortage and Skill Gap
- Broad Framework of Assessing and Anticipating Skills Shortage
- Sector-wise Analysis
- Policy Recommendations

Objectives

- Create a dynamic framework for skill gap assessment that can be regularly updated to predict skill requirements in line with the evolving economic landscape.
- Develop a uniform and standardised methodology for conducting demand assessments at both sectoral and state levels has been developed.
(Analysis of 7 high growth sectors based on the methodology)
- States/UTs are expected to adopt the framework

Skills Shortage & Skill Gap

- The study develops methodology to
 - Assess & anticipate skills shortage at sectoral level and
 - skill gap at the worker level in a particular sector
- **Skills Shortage** describes the situation where a job vacancy is hard to fill because of a lack of applications with the needed skills.
 - For example, you need 20 plumbers but you are only able to find 2 plumbers.
- **A skill gap** occurs where an employee's competence to do the job is called into question (typically by his/her manager). One can apply this concept to prospective employees. Employers find that the prospective employees have the appropriate qualifications but not the desired skill sets.
 - For example, you need 20 plumbers and you are able to find all 20 with appropriate qualifications but,
 - They do not have the appropriate skills set that you need for the job

Broad Framework of Assessing and Anticipating Skills Shortage

7 Components

1. Macro-analysis of sectoral shares & workforce, identification of geographical clusters and sectoral workforce characteristics

2. Simulations of anticipated growth over the medium run using input-output analysis

3. Occupational-wage employment survey of non-agricultural enterprises (proposed)

4. Survey of non-agricultural enterprises for vacancies and skills (proposed)

5. Big Data Analysis of Non-agriculture sectors (proposed)

6. District-level analysis of jobs in the agriculture & allied sectors (proposed)

7. Stakeholder Interactions

Selected Sectors and Sub-sectors

- I/O analysis, Income & emp. Multipliers, %GVA & workers; ranking of sectors, sunrise sectors
- Data sources: PLFS, National Accounts Statistics (NAS)

S.No.	Sector	Sub-sector	Sub-Sectors
1	Primary	Agriculture	Growing of Cereals, Leguminous Crops and Oilseeds
2	Primary	Livestock	Raising of Cattle and Buffaloes
3	Tertiary	Trade	Retail sale of food, clothing, footwear and leather articles in specialised stores and maintenance & repair of MVs
4	Tertiary	Computer related services	Computer Programming Activities
5	Secondary	Manufacturing of Textiles plus cotton ginning	Weaving of textiles
6	Secondary	Manufacture of Transport	Manufacturing of motor vehicles, parts & accessories of motor vehicles
7	Secondary	Electricity	Electric Power Generation using solar energy and other non-conventional sources

Data Sources: NAS and PLFS

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**Manufacturing of motor vehicles
(MVs), parts & accessories of
motor vehicles and repair &
maintenance of motor vehicles**

Top 5 Geographical Clusters in ‘Manufacturing of MVs, Parts & Accessories of MVs and Repair & Maintenance of MVs’

S.No.	Geographical Clusters*			Share of Workers (PLFS)		
	<i>Manufacture of Motor Vehicles (MVs)</i>	<i>Manufacture of Parts & Accessories of MVs</i>	<i>Repair and Maintenance of MVs</i>	<i>Manufacture of Motor Vehicles (MVs)</i>	<i>Manufacture of Parts & Accessories of MVs</i>	<i>Repair and Maintenance of MVs</i>
1.	Maharashtra	Maharashtra	Maharashtra	Maharashtra	Gujarat	Tamil Nadu
2.	Haryana	Tamil Nadu	Tamil Nadu	Tamil Nadu	Maharashtra	Maharashtra
3.	Karnataka	Uttar Pradesh	Uttar Pradesh	Madhya Pradesh	Tamil Nadu	Gujarat
4.	Tamil Nadu	Haryana	Kerala	Rajasthan	Haryana	Karnataka
5.	West Bengal	Gujarat	Gujarat	Andhra Pradesh	Karnataka	Uttar Pradesh

Notes: *Based on locations.

Source: NCAER Analysis from Various Sources.

Projected jobs (in lakh) across top NCO codes-V

Manufacturing of MVs, Parts & Accessories of MVs and Repair & Maintenance of MVs

NCO 2015 Code	Name	Description	PLFS (2022-23)		Projections (2026-27)	
			Share in Total Jobs (%)	Total Jobs (lakhs)	Scenario 1 Projections (lakhs)	Scenario 2 Projections (lakhs)
723	Machinery Mechanics and Repairers	Motor Vehicle Mechanics and Repairers	58.5	18.3	26.0	30.8
932	Manufacturing Labourers		6.9	2.2	3.1	3.6
112	Managing Director and Chief Executive		4.2	1.3	1.9	2.2
821	Assemblers	Mechanical Machinery Assemblers, Electrical and Electronic Equipment Assemblers	3.5	1.1	1.6	1.9
312	Mining, Manufacturing and Construction Supervisors	Manufacturing Supervisors	2.7	0.9	1.2	1.4
311	Physical and Engineering Science Technicians	Electrical Engineering Technicians, Electronics Engineering Technicians, Mechanical Engineering Technicians	2.4	0.8	1.1	1.3

Note: Projections was done for the whole sector namely, 'Retail sale of food, clothing, footwear and leather articles in specialised stores and maintenance & repair of MVs' but occupation-wise projections for maintenance & repair of motor vehicles are added here.

Stakeholders Survey: Job Roles that are facing and will face skills shortage in the 'Manufacturing of MVs, Parts & Accessories of MVs and Repair & Maintenance of MVs'

- Machine/CNC operator; Turner; Grinder; Tool and die maker
- Technician / Mechanic; Motor mechanic
- Power / Micro electronics engineers; AI/ML expert
- Embedded Software Engineers; Vehicle Software Developer
- AI Data Science Engineers; Automotive Cybersecurity Specialist

Note: [Detailed Description](#)

Policy Recommendations

- Improve methodology to assess skills shortages and skill gaps
 - Map NIC sectors to sectoral sub-sectors
 - Update mapping of NCO 2015 job roles with job roles identified with the Sector Skill Councils and new emerging job roles in consultation with industry
 - Capture emerging sectors and job roles in PLFS
 - Capture NCO job roles in ASI and ASUSE surveys
 - Design Occupation-wage-employment survey

Policy Recommendations

- **Strengthen supply side**

- Upgrade teachers, curriculum and books
- Hands-on-training and practical curriculum
- Learning TVET is a necessary condition but not a sufficient condition for landing a job and career progression
- Provide hostels for females
- Strengthen academia-industry collaboration at the skilling eco-system

- **Demand-side**

- Counselling and guidance for addressing aspirations
- Wages mismatch
- Encourage female labour force participation by providing transport; having role models etc.
- Change work conditions

Thank You!

Agriculture: Growing Cereals (including rice), Leguminous Crops and Oilseeds

Top 5 Geographical Clusters in ‘Growing Cereals (including Rice), Leguminous Crops and Oilseeds’

S.No.	<i>Geographical Clusters*</i>	<i>Share of Workers (PLFS)</i>
1.	Uttar Pradesh	Uttar Pradesh
2.	Maharashtra	Madhya Pradesh
3.	Rajasthan	Bihar
4.	Madhya Pradesh	Maharashtra
5.	Gujarat	Chhattisgarh

Notes: *Based on four parameters- institutional, business infrastructure, human resources and government support

Source: NCAER Analysis from Various Sources.

Projected jobs (in lakh) across top NCO codes-II

Growing of Cereals, Leguminous Crops and Oilseeds

NCO 2015 Code	Name	Description	PLFS (2022-23)		Projections (2026-27)	
			Share in Total Jobs (%)	Total Jobs (lakhs)	Scenario 1 Projections (lakhs)	Scenario 2 Projections (lakhs)
611	Market Gardeners & Crop Growers	Cultivator, Tree and Shrub Crop Growers, Gardeners, Mixed Crop Growers, Agriculture Information Management	69.4	1,116.6	1,433.3	1,496.6
921	Agricultural, Forestry and Fishery labourers	Crop Farm Labourers, Livestock Farm Labourers, Garden and Horticultural Labourers,	19.6	315.9	406.0	423.9
631	Subsistence Crop Farmers	Tree Trimmer and Pruner	8.9	143.4	184.3	192.4
613	Mixed Crop and Animal Workers	Seed Grower/Quality Seed Grower, Seed Processing Worker	1.0	15.4	19.18	20.7
633	Subsistence Mixed Crop and Livestock Farmers		0.4	6.9	8.9	9.3

Stakeholders Survey: Job Roles that are facing and will face skills shortage in the Agriculture Value Chain

- Drone Operator
- Agriculture Advisor/Crop Advisor (Agri-tech)
- IT-GIS Specialist (Agri-tech)
- Metal Inert Gas (MIG)-Welding Operator
- Farm -Machinery Service Technician

Note: [Detailed Description](#)

Livestock: Raising Cattles and Buffaloes

Top 5 Geographical Clusters in ‘Raising Cattle and Buffaloes’

S.No.	<i>Geographical Clusters*</i>	<i>Share of Workers (PLFS)</i>
1.	Karnataka	Uttar Pradesh
2.	Maharashtra	Gujarat
3.	Rajasthan	Bihar
4.	Gujarat	Tamil Nadu
5.	Bihar	Madhya Pradesh

Notes: *Based on four parameters- institutional, business infrastructure, human resources and government support

Source: NCAER Analysis from Various Sources.

Projected jobs (in lakh) across top NCO codes-III

Raising of Cattle and Buffaloes

NCO 2015 Code	Name	Description	PLFS (2022-23)		Projections (2026-27)	
			Share in Total Jobs (%)	Total Jobs (lakhs)	Scenario 1 Projections (lakhs)	Scenario 2 Projections (lakhs)
612	Animal Producers	Livestock and Dairy Producers, Animal Producers Not Elsewhere Classified	87.3	209.1	226.4	211.2
521	Street and Market Salespersons	Stall and Market Salespersons, Street Food Salespersons (Milkman)	4.0	9.7	10.5	9.8
632	Subsistence Livestock Farmers		3.8	9.2	10.0	9.3
613	Mixed Crop and Animal Workers	Artificial Breeding Technician, Mixed Crop and Animal Workers, Other	2.8	6.7	7.2	6.7
611	Market Gardeners & Crop Growers	Mixed Crop Growers, Agriculture Information Management	0.6	1.5	1.6	1.5

Stakeholders Survey: Job Roles that are facing and will face skills shortage in the 'Raising of cattle and buffaloes' sub-sector

- Veterinary Technician/Assistant
- Mechanic-Refrigeration and Air Conditioning
- Dairy Technologist
- Manager-Dairy Farm

Note: [Detailed Description](#)

Weaving of Textiles

Top 5 Geographical Clusters in ‘Weaving of Textiles’

S.No.	<i>Geographical Clusters*</i>	<i>Share of Workers (PLFS)</i>
1.	Tamil Nadu	Tamil Nadu
2.	Uttar Pradesh	Assam
3.	West Bengal	Gujarat
4.	Andhra Pradesh	Andhra Pradesh
5.	Gujarat	West Bengal

Notes: *Based on locations.

Source: NCAER Analysis from Various Sources.

Projected jobs (in lakh) across top NCO codes-IV

Weaving of Textiles

NCO 2015 Code	Name	Description	PLFS (2022-23)		Projections (2026-27)	
			Share in Total Jobs (%)	Total Jobs (lakhs)	Scenario 1 Projections (lakhs)	Scenario 2 Projections (lakhs)
731	Handicraft Workers	Handicraft Workers in Textiles, Leather and Related Materials	66.8	13.3	17.7	15.5
815	Textile, Fur and Leather Products Machine	Fibre Preparing, Spinning and Winding Machine Operators, Weaving and Knitting Machine Operators, Sewing Machine Operators, Bleaching, Dyeing and Cleaning Machine Operators	12.4	2.5	3.3	2.9
753	Garment and Related Trades Workers	Garment and Related Pattern Makers and Cutters, Sewing, Embroiderers and Related Workers,	8.0	1.6	2.1	1.9
112	Managing Directors and Chief Executives	Director Manufacturing	3.6	0.7	1.0	0.8
632	Manufacturing Labourers		2.0	0.4	0.5	0.5

Stakeholders Survey: Job Roles that are facing and will face skills shortage in the 'Weaving of textiles' sub-sector

- Weaver-Handloom
- (Jacquard/ Loin loom)
- Weaver- Power loom
- Weaving Assistant (Handloom)

Note: [Detailed Description](#)

Electric Power Generation using solar energy and other non-conventional sources

Top 5 Geographical Clusters in ‘Electric Power Generation using Solar Energy and Other Non-conventional Sources’

S.No.	<u>Geographical Clusters*</u>		<u>Share of Workers (PLFS)</u>	
	Generation of Solar Energy	Generation of Wind Energy	Generation of Solar Energy	Generation of Wind Energy
1.	Gujarat	Gujarat	Maharashtra	Maharashtra
2.	Karnataka	Tamil Nadu	Tamil Nadu	Tamil Nadu
3.	Rajasthan	Karnataka	Karnataka	Gujarat
4.	Tamil Nadu	Maharashtra	Delhi	Lakshadweep
5.	Andhra Pradesh	Rajasthan	Gujarat	

Notes: *Based on locations.

Source: NCAER Analysis from Various Sources.

Projected jobs (in lakh) across top NCO codes-VI

Electric Power Generation using solar energy and other non-conventional sources

NCO 2015 Code	Name	Description	PLFS (2022-23)		Projections (2026-27)	
			Share in Total Jobs (%)	Total Jobs (lakhs)	Scenario 1 Projections (lakhs)	Scenario 2 Projections (lakhs)
541	Protective Service Workers	Fire Fighters, Security Guards	25.4	0.2	0.3	0.4
413	Keyboard Operators	Typists and Word Processing Operators, Data Entry Clerks,	10.1	0.1	0.1	0.1
741	Electrical Equipment Installers and Repairers	Electrical Mechanics and Fitters, Electrical Line Installers and Repairers	9.7	0.1	0.1	0.1
932	Manufacturing Labourers		9.5	0.1	0.1	0.1
411	General Office Clerks		7.8	0.1	0.1	0.1

Stakeholders Survey: Job Roles that are facing and will face skills shortage in 'electric power generation using solar energy and other non-conventional sources'

- Solar Project Manager; Solar Installer; Solar PV Installer and O&M Technician (Surya Mitra)
- O&M Technicians- Mechanical and Electrical
- Engineers; Electrical engineers- Power Systems Design; Civil and Electrical Engineers; Project Engineers
- Resource Assessment; Site Surveyor; Resource Analysis
- Site Managers / in-charge /supervisor; Construction / Project Managers
- Asset Management; Quality & Vendor Management Engineers

Note: [Detailed Description](#)

**Retail sale of food, clothing,
footwear and leather articles in
specialised stores**

Top 5 Geographical Clusters in ‘Retail Sale of Food, Clothing, Footwear and Leather Articles in Specialised Stores’

S.No.	<i>Geographical Clusters*</i>	<i>Share of Workers (PLFS)</i>
1.	Maharashtra	Uttar Pradesh
2.	Karnataka	Bihar
3.	Uttar Pradesh	West Bengal
4.	West Bengal	Maharashtra
5.	Tamil Nadu	Tamil Nadu

Notes: *Based on locations.

Source: NCAER Analysis from Various Sources.

Projected jobs (in lakh) across top NCO codes-VII

Retail sale of Food, Clothing, Footwear and Leather Articles in Specialised stores

NCO 2015 Code	Name	Description	PLFS (2022-23)		Projections (2026-27)	
			Share in Total Jobs (%)	Total Jobs (lakhs)	Scenario 1 Projections (lakhs)	Scenario 2 Projections (lakhs)
522	Shop Salespersons	Shopkeepers, Shop Supervisors, Shop Sales Assistants,	76.5	173.6	281.2	291.6
521	Street and Market Salespersons	Stall and Market Salespersons, Street Food Salespersons,	8.3	18.9	30.5	31.7
112	Managing Directors and Chief Executives	Director, Retail Trade, Working Proprietor, Retail Trade/Proprietor, Retail Trade	7.2	16.3	26.4	27.4
952	Street Vendors (Excluding Food)	Hawker, Street Vendors, Non-Food Products, Other	2.3	5.1	8.3	8.6
524	Other Sales Workers		2.0	4.6	7.4	7.7

Note: Projections was done for the whole sector namely, 'Retail sale of food, clothing, footwear and leather articles in specialised stores and maintenance & repair of MVs' but occupation-wise projections are only shown for retail sale in this slide. In 2022-23, 8% of total jobs in this sector belonged to repair and maintenance of motor vehicles. Occupation-wise projections are done based on 92% of the total sector's jobs.

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Stakeholders Survey: Job Roles that are facing and will face skills shortage in 'retail sale of food, clothing, footwear and leather articles in specialised stores'

- Customer service representative/Sales Associate/Sales person/e-Commerce Marketing Assistant/Manager
- Merchandising Manager/ Associate
- Logistics manager/ Associate
- ICT Personnel/ Computer operator

Note: [Detailed Description](#)

Computer Programming Activities

Top 5 Geographical Clusters in 'Computer Programming Activities'

S.No.	<i>Geographical Clusters*</i>	<i>Share of Workers (PLFS)</i>
1.	Maharashtra	Telangana
2.	Tamil Nadu	Tamil Nadu
3.	Karnataka	Maharashtra
4.	Uttar Pradesh	Karnataka
5.	Gujarat	Andhra Pradesh

Notes: *Based on four parameters- institutional, business infrastructure, human resources and government support.

Source: NCAER Analysis from Various Sources.

Step 5: Projected jobs (in lakh) across top NCO codes-VIII

Computer Programming Activities

NCO 2015 Code	Name	Description	PLFS (2022-23)		Projections (2026-27)	
			Share in Total Jobs (%)	Total Jobs (lakhs)	Scenario 1 Projections (lakhs)	Scenario 2 Projections (lakhs)
251	Software and Application Developers, and Analysts	System Analysts, Software Developers, Web and Multimedia Developers, Applications Programmers	77.4	19.6	33.8	32.6
133	Information and Communications Technology Services Manager	Information and Communication Technology Services,	5.0	1.3	2.2	2.1
112	Managing Directors and Chief Executives		2.1	0.5	0.9	0.9
216	Architects, Planners, Surveyors and Designers	Graphic and Multimedia Designers,	2.1	0.5	0.9	0.9
413	Keyboard Operators	Typists and Word Processing Operators, Data Entry Clerks,	2.0	0.5	0.9	0.8

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Stakeholders Survey: Job Roles that are facing and will face skills shortage in 'Computer Programming Activities'

- Data Engineering
- Business Analyst- Technical
- Data Security
- Functional/ Domain Analyst

Note: [Detailed Description](#)

Study Team



- **Project Leader:** Bornali Bhandari
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