11. Policy Recommendations and Way Forward

11.1 Introduction

This last chapter is divided in three sub-parts. The first presents a table which compares the different methodologies of assessing skills shortages and skill gaps. The second section presents the assessment methodology and the last section presents policy recommendations for improving the skilling eco-system.

11.2 Comparison of Methodologies

Table 11.1 presents the comparisons of methodologies between States, sectors and districts. While sectors have used vacancy data and surveys to assess skill shortages and gap, States have focused on assessing skill shortages for youth, most at the entry level jobs. They have done a survey of the youth and stakeholder surveys or firms' surveys at the State/district. Some States have gone on to identify occupations also at the beginning of their work which they then have tracked at State/district levels. A World Bank study has also assessed skills gap assessing skills demand and supply of training seats at the district level. Each study has its own advantages and disadvantages. The challenge is that the policymaker at the central level is not able to compile and compare the numbers together because they are derived from various methodologies.

Table 11.1: Comparison of methodologies

	NCAER	***NASSCOM***	***RASCI***	***World Bank***	***States***
Key Objective	Assess skill shortage of 7 high growth sectors	Mapping of employment scope and skills gap in retail	Mapping of employment scope and skills gap in retail	Local skill gaps at the district level for the youth	Assess skill shortages in States/Districts
Multiple objectives	Jobs forecasting both using macro methods and sectorally; Skills gap—medium or hard to fill both now and in the future; skills gap—extensive or intensive in nature	Estimate talent skills gap Talent Supply refers to the installed tech talent for the given year. Talent Demand is defined as "Fulfilled Demand (Installed Talent) + Unmet Demand (Open Job Postings)"; only includes unfilled jobs at present and excludes met job postings over the previous 12-month period.	Jobs forecasting; incremental job requirements, identification of growing job roles & spatially too and Intensive skills gap	Assessed skills gaps in terms of differences between local opportunities and local skilling capacity	Jobs forecasting
Methodology Used	Input-output analysis; Primary Assessment, estimate demand at sectoral level	Used proprietary database; AI/ML data used and CAGR technique for forecasting	Survey-based method but sampling size not statistically significant	Economic mapping and stakeholder consultations-Survey	Secondary data analysis, survey and stakeholders' analysis
Sectors covered	7 sectors	IT	Retail and Allied sectors	Not applicable	All districts

	NCAER	*NASSCOM*	*RASCI*	*World Bank*	*States*
Locations covered	All-India	All-India	All-India	1 district per state across 6 States	Districts
Job Projections	Yes (I-O analysis) gives quantitative forecasts about jobs and occupations	No; gives projections about workers across broad categories	No; gives projections about workers across broad categories	No	Gives projections for NSQF job roles
Skill Shortage	Yes; Stakeholder consultations (feasible to be scaled up if national survey done)	Yes	No	No	Yes, but only for youth and the definition of youth differs across States
Skill Gap	Yes	Yes	No	No	No
Advantages	Simultaneous forecast of jobs for all sectors using IO; direct plus indirect job creation using IO	Closest to identifying gaps	De-compose retail sector and identify growing jobs; identify high growth cities	Good bottom-up approach; can be scaled up at the State-level	Good bottom-up approach; compute shortage
Disadvantages	Mismatch in wages not estimated	Cannot be applied to other sectors especially the traditional ones; only captures technical skills; mismatch in wages not estimated	Not statistically significant; should have had a sample size of at least 1,600; extensive skills gap assessment missing; mismatch in wages not estimated	Does not assess skills gaps in terms of jobs in demand and number in supply; Skilling capacity does not translate to number of people available because aspirations change; mismatch in wages not estimated; labour stock	Hard to compare across the country Focussed on one demography may result in missing systemic issues

Sources:

1. Ministry of Education and Strengthening Teaching-Learning and Results for States. 2024. Jobs at Your Doorstep: A Jobs Diagnostics for Young People in Six States. https://documents1.worldbank.org/curated/en/099611211222442291/pdf/IDU-38279e6c-c3f8-4b1a-8b80-5e93677bc046.pdf. November 22.
2. NASSCOM, Indeed.com and Draup. 2023. India Tech Industry Demand and Supply Analysis 2023. https://nasscom.in/knowledge-center/publications/india-tech-industry-digital-talent-demand-and-supply-2023. March 2.
3. Wazir Advisors and Retailers Association's Skill Council of India(RASCI). 2024. Mapping of Employment Scope & Skill Gaps in Retail till FY26. https://www.rasci.in/pdf/RASCI%20Skill%20Gap%20Report%20upto%202026.pdf. Mumbai, India.
4. Various States PPT Presentations made at the MSDE-NCAER Regional Workshops, March 11 and March 13, 2025.

11.3 Methodology

The objectives for the Central (State) Government are to give the overarching design to assess skill shortages and gap. The Central (State) Government has to carry out five key objectives:

1. Macro Analysis of sectoral shares of GVA workforce at the All-India level and State-level.
    a. The State governments should carry out this analysis at the district level.
2. Macro Analysis- simulations to forecast jobs. This is a strongly recommended approach to be implemented by the policy planner to assess the direction of the economy.
    a. The Central Government should do this for all sectors at the disaggregated level. The State governments should do this exercise using State-level data.

3. Demand projections of jobs of non-agricultural sectors using occupational–wage–employment survey of non-agricultural enterprises
    a. The Ministry of Skill Development and Entrepreneurship (MSDE), Ministry of Labour and Employment (MoLE) and Ministry of Statistics and Programme Implementation (MoSPI) should design questionnaires, sampling strategy based on universal company data sourced from Ministry of Corporate Affairs/Goods & Services Tax Network to assess skill shortages and gaps.
    b. The State governments should assess by collecting data representative at the district level.
4. Assess skill shortages and gaps of non-agricultural sectors using survey of non-agricultural firms for data on vacancies and skills
    a. The Central Government should develop the template for questionnaires and sampling strategy.
    b. The State governments may implement this too in their States.
5. Design of district-level analysis of jobs in the agriculture and allied sectors
    a. A bottom-up approach should be adopted here.
    b. The Central Government may develop a template for district analysis.
    c. The State governments should analyse the available secondary data from situation analysis of farmers, agriculture census, soil and water statistics, production and exports data of agricultural and allied products and States' own publications. This is to be combined with surveys, Focus Group Discussions with farmers, cooperatives, other stakeholders in the value chain, etc.
6. Design of stakeholder interactions
    a. The Central Government should design the stakeholder interactions.
    b. The Sector Skills Council should implement this and share the results with the States too via the MSDE.

The focus of all the exercises is providing occupation. Therefore, the macro analysis exercise has to start from that point.

11.3.1 Mapping Occupations

Step 1

a. Map the occupational skills of National Classification of Occupations (2015) with the occupations identified in the Sector Skill Councils and appropriately classify them at the 8–digit level.
b. Work backwards and identify the occupations at the 3-digit level too.

Step 2: Ensure that all the databases, the Periodic Labour Force Survey (PLFS), the Annual Survey of Industries (ASI) and the Annual Survey of Unincorporated Sector Enterprises (ASUSE) are all using, capturing and using the same NCO codes. The ASI and ASUSE may capture occupations at the 8–digit level (as mentioned earlier both the surveys are not capturing NCO codes at all).

Step 2: Identify the occupations that will be tracked at the 3-digit and 8-digit levels.

a. The 3-digit level occupations will be used in macro analysis and simulations as the Periodic Labour Force Survey, the national household survey data tracks data at the 3-digit NCO level.

b. The 8-digit level occupations will be used in demand projections using the occupational–wage–employment survey (OWES).

11.3.2 Map the Industries

"The National Industrial Classification (NIC) is an essential Statistical Standard for developing and maintaining comparable data base according to economic activities. Such classifications are frequently used in classifying the economically active population, statistics of industrial production and distribution, the different fields of labour statistics and other economic data such as national income. Comparability of statistics available from various sources, on different aspects of the economy, and usability of such data for economic analysis, are prerequisite for standardisation of a system of classification." They go from 2-digit to 5-digit depending on the level of disaggregation. However, the NIC classifications itself may not match the more modern sub-sectors like renewable energy and information technology.

c. Mapping of NIC industrial classification codes with the sub-sectors, especially of the new sectors.
    i. For example, the wind energy sector is a new and upcoming sector in India. But it is not captured separately. The NIC code, 35106 captures, Electric power generation using other non-conventional sources and therefore the wind energy sector is subsumed within this.
    ii. Similarly, the IT sector has one key NIC code, 6201 named as 'computer programming activities'. But it has several other sub-sectors- ITeS, BPM, Er&D, SPD, Future Skills, which are subsumed under the NIC code 6201. The IT sector can also be divided across broad skill sets of data and cloud, software development and IT and product management.

11.3.3 Macroeconomic Analysis

a. Annual macroeconomic analysis of sectors computing the sectoral shares of Gross Value Added (GVA).[1] This is to be done from Chapter 8 of the National Accounts Statistics (NAS) that are published annually by industry. The latest National Accounts 2024 are published here: https://www.mospi.gov.in/publication/national-accounts-statistics-2024. Share of GDP is computed by the following formulae.

$$Sectoral\ Share\ (\%) = 100 \times \frac{Nominal\ Gross\ Value\ Added\ of\ Sector\ in\ a\ particular\ year\ at\ All-India\ (State/District)}{Nominal\ All-India\ (State/District)\ Gross\ Value\ Added\ in\ a\ particular\ year}$$

a. Compute sectoral share of labour force using the annual Periodic Labour Force Survey data.

[1] Central Statistical Organisation, Ministry of Statistics and Programme Implementation, Government of India. National Industrial Classification 2008. https://www.ncs.gov.in/Documents/NIC_Sector.pdf.

$$Sectoral\ Share\ (\%) = 100 \times \frac{No.of\ workers\ employed\ in\ a\ sector\ in\ All-India\ (State/District)\ in\ a\ particular\ year}{All-India\ (State/District)\ workers\ employed\ in\ a\ particular\ year}$$

b. Using I-O analysis, compute the output, income and employment multipliers at the All-India (State) level.[2] For the same years and same 64 sectors, compute the sectoral shares of GDP and employment using the above-mentioned formulae. The national I-O tables are derived from the Supply-use Table (SUTs) produced by the MoSPI at that level of aggregation. Input-output analysis is a technique invented by Professor Wassily W. Leontief in 1951. It is used to analyse inter-industry relationship in order to understand the inter-dependencies and complexities of the economy and thus the conditions for maintaining equilibrium between supply and demand. The advantage of this methodology is that it captures the interlinkages and the indirect jobs created across the economy due to output change in a particular sector.
   - An income multiplier is defined as total income generated in the economy due to one unit of output generated in the said sector. Income is measured by the Gross Value Added (GVA).
   - An output multiplier is defined as total output generated in the economy due to one unit of output generated in the said sector. Output in an economy is measured by the Gross Value of Output (GVO).
   - An employment multiplier is defined as total direct and indirect employment generated in the economy due to change in one unit of final demand in that sector.

c. Selection of Sectors: Ideally one should carry out the remaining analysis for all the sectors. However, if the choice is to carry out the analysis for selected sectors, the selection process is mentioned below step-wise.
   i. As mentioned above, the income and employment multipliers are estimated and then ranked. If I-O analysis cannot be implemented, then this step can be skipped and one can directly go to step (iv) using disaggregated data from Chapter 8 of NAS.[3]
   ii. Other variables examined, which can support the above analysis and give a holistic perspective, are:
      - GVA
         - Ten-year average share of Gross Value Added (GVA)
         - Ten-year average growth rate of GVA
         - Ten-year average ratio of GVA to Gross Value of Output (GVO)
      - Gross Capital Formation
         - Ten-year average growth of Gross Capital Formation (GCF)
         - Ten-year average share of GCF to GVA

[2] Munjal, P., Siddiqui, K.A., Pratap, D., Baruah, P. and Alam, A. 2022. Input-Output Transactions Table 2017-18 Himachal Pradesh. https://ncaer.org/publication/input-output-transactions-table-2017-18-himachal-pradesh/. NCAER, New Delhi, India. July 1.

[3] "The National Industrial Classification (NIC) is an essential Statistical Standard for developing and maintaining comparable data base according to economic activities. Such classifications are frequently used in classifying the economically active population, statistics of industrial production and distribution, the different fields of labour statistics and other economic data such as national income. Comparability of statistics available from various sources, on different aspects of the economy, and usability of such data for economic analysis, are prerequisite for standardization of a system of classification." Central Statistical Organisation, Ministry of Statistics and Programme Implementation, Government of India. National Industrial Classification 2008. https://www.ncs.gov.in/Documents/NIC_Sector.pdf.

    - Ten-year average share of GCF to GVO
- Labour
    - Five-year average share of workers (Periodic Labour Force Survey is available from 2017–18 onwards on an annual basis)
    - Five-year average share of labour inputs to GVO
    - Percentage share of female workers
    - Average intensity of work (average hours worked in a week)
- Forecasting
    - Auto-regressive integrated moving forecasting model.
- One could additionally look at trade (exports & imports data–DGCIS) and FDI (DPIIT & RBI). However, there are many challenges with the above variables. They are:
    5. While data on merchandise trade are available from the DGCIS, data on service exports by region, either State or district are not available. The methodology would not be consistent across sectors and therefore these variables were dropped.
    6. FDI data are not mapped to the National Industrial Classification (NIC) code and therefore hard to classify and map with the data provided by the National Accounting System. The available data are mapped at the State-level but not district level.
    7. Data on GCF are not available at the regional level, either State or district.
    8. ARIMA forecasting can give erroneous results given the rapid technological changes and various transitions involved like transition to a green economy.

iii. Therefore, two variables are chosen—the percentage share of GVA and percentage share of workers in the economy and that also for the latest year for which both sets of numbers are available (and it should correspond to the years used in the I-O analysis, in case that is being used too). Then sectors are ranked separately based on the above two indicators. The top 25 sectors are chosen that appear in both the separate lists.

iv. The top 25 sectors which have the highest share of GVA are ranked first. The rankings of these sectors regarding share of jobs, GVA, and employment multiplier are mapped.

v. Sunrise/key future sectors from policy documents are identified and mapped to the sectors being used for analysis.

vi. Then steps iv and v are integrated. Ideally the broad sectors of primary, secondary and tertiary should contain at least one sector from the above-mentioned process and one sunrise sector.

vii. The last step involves taking in the policymakers' inputs on the selected sectors in order to finalise the sectors.

viii. The identified sector may be very broad. Therefore, it was recommended to narrow them down further into sub-sectors. Data on GVA are not available at a disaggregated basis. Therefore, share of labour force was used to select the largest sub-sector (using NIC codes) within each of the above seven sectors.

d. Identify the value chain, stakeholders of the identified sector/s at that particular NIC level and the job roles.
e. Identify usage of technologies at various stages of the value chain in that sector/sub-sectors.
f. Sector-wise time series (5–10 years) analysis of workforce characteristics for either all or selected sectors across
    i. Categories
        1. State
            - This will also help in identification of geographical clusters based on workers' data.
        2. Educational qualifications (general, technical and vocational education)
        3. Engagement
        4. Occupation (NCO 3-digit or whatever level of disaggregation is available) and
        5. Gender of workers
    ii. Data Sources are various publications of the MoSPI including PLFS, Annual Survey of Industries (ASI) and Annual Survey of Unincorporated Sector Enterprises (ASUSE). All the surveys to the extent feasible should capture occupations data at the 8-digit level.
    iii. This may also be supplemented by sectoral reports or reports from that Ministry wherever available/applicable. For example,
        1. In the 'weaving of textiles' sector, handloom census may supplement MoSPI publications.
        2. There are various other publications by MoSPI in the agricultural sector like 'Agriculture Census', 'Situation Assessment of Farmers' that also gives insights.
        3. For 'raising cattle and buffaloes', Animal Husbandry Statistics and Livestock Census are also useful.
        4. The important thing is to use publicly available, verifiable, and credible data sources.
        5. In some sectors, where detailed statistics are not available, this analysis may be supplemented by market intelligence reports, etc.
    iv. Big Data analysis across sub-sectors within NIC codes also may shed light on the location of workers across States. Multiple websites may be used.
    v. There would be differences across data sources, which needs to be reconciled to get policy insights.
g. Identification of sector-wise geographic clusters: Given sectoral variations, paucity in data, a sectoral methodology has to be adopted. Simple and replicable approaches are suggested with sources of data from publicly available, verifiable, credible sources following a standard methodology. Ideally either the Porter (1990) or the Delgado (2014) definitions should be used to define clusters. The definition should be clear and stated right in the beginning.

i. Primary Sector: The framework to identify geographical clusters was adapted from Sutawi et al. (2022)[4]. Look at Chapters 4 and 5 for methodology. A step-wise ranking method is used to compute clusters.
ii. Secondary Sector: Chapters 6, 7, and 8 show how the Porter definition of agglomeration of production units are used to compute clusters.
    1. Number of plants across States are counted to estimate clusters across NIC codes. Data are sourced from both ASI and ASUSE.
    2. For the energy sector: Clusters of plants dedicated to generating electricity using either of the renewable sources is governed by the renewable energy potential of the geographic region. For instance, potential for solar and wind electricity will be higher in regions with greater duration and intensity of sunlight and wind.

        With solar and wind, plants will be set up only in places where there is ample sunshine and wind to generate energy. Firms will bid for tenders for setting plants of a particular installed capacity. Size of firms cannot be linked with size of plant. Stakeholders (industry associations, SSC) connect geographical clusters, i.e., no. of projects, with State-level installed capacity.
iii. Tertiary Sector: Chapters 9 and 10 show the different methodologies used in each sector depending on the data availability.
    1. Specialised retail in food and clothing: Data on the number of units were used. This is available only for the unorganised sector in the ASUSE database. Then for the organised sector, memberships by State are taken from the Retailers Association of India. Lastly to measure innovation, one takes the data on number of start-ups from the DPIIT.
    2. Computer Programming Activities: Using the same framework as in agriculture and livestock (Figure 4.9), there are four pillars—infrastructure, innovation, business environment, human resources (skills) (Table 10.3). Similar to other sectors, a simple rank was computed for each indicator and then a step-wise average was computed resulting in a final averaging of all the rankings from each pillar.
iv. Geographical clusters of workers may also be computed using the PLFS. However, this may be supplemented by other databases like the NASSCOM has used the Draup database.
v. Comparison between geographical clusters and workforce clusters: This helps in identifying spatial mismatches, if any. Looking at one or the other gives an incomplete picture.

11.3.4 Simulations: Forecasting of Jobs and Occupations

i. Using input-output methodology this can be implemented. It is deemed to be an optional step.

[4] Sutawi, Prihartini I., Zalizar L., Wahyudi A., Hendraningsih L. 2022. "The Success Indicators of a Dairy Farming Cluster in Indonesia: A Case in Malang Regency of East Java Province". *Asian Journal of Dairy and Food Research*, 41(1): 22-27. doi: 10.18805/ajdfr.DR-242.

ii. The advantage is that it is a simultaneous process across sectors. It captures the interlinkages across sectors and can show the direction a country is going towards. However, a linear forecasting methodology may give biased results. For example,

iii. The I-O analysis is used to project the total number of jobs in 2026–27 and the top five occupations that will find maximum employment.

iv. Base year numbers are derived from the PLFS.

v. Steps for projecting employment

1. National Accounts data (gives GVO data) are available till 2022–23
2. Gross value of output (GVO): Value of the total sales of goods and services + Value of changes in the inventories.
3. 2018–19 Input-Output (I-O) analysis is used.
4. GVO/Output multiplier
   - Output generated in the entire economy due to one unit of output generated in the said sector.
   - 2018–19 I-O was used to estimate the output multiplier.
5. Employment multiplier
   - Number of (direct & indirect) jobs created in the entire economy due to one unit of output generated in the said sector.
   - 2018–19 output multiplier was multiplied with 2022–23 labour-output ratio to estimate the employment multiplier for 2022–23.
6. Number of jobs are projected over the next 3 years (2026–27) for the seven high-growth sectors.
7. Make sectoral GVO assumptions
8. Use average annual growth rates to make forecasts.
   - Alternative growth scenarios may be developed.
     a. Alternative growth assumptions may be made
     b. Another way is how Chaudhary, Pratap and Pohit (2024) use the alternative NITI Aayog assumptions to simulate the impact of net zero transition on employment.[5] Similarly, if assumptions, policy priorities, goals and targets have to be modelled for either all 64 or selected sectors, one can tentatively estimate both the overall and sectoral impact on jobs and occupations.
9. Estimate number of (direct and indirect) jobs.
10. Estimate jobs for the sub-sectors by taking the job shares of the sub-sectors in the main sectors.
11. The same shares are used to estimates jobs for 2026–27.
12. Distribution across occupations of ***ONLY direct jobs*** based on share of occupations for the year base year.
13. Using the same shares, projections for occupations may be done.

[5] Chaudhuri, C., Pratap, D. & Pohit, S. 2024. "Effect of Energy Transition Under Net-Zero Target on Employment." *Ind. J. Labour Econ*. https://doi.org/10.1007/s41027-024-00528-y. November 30.

11.3.5 Demand Forecasts using Occupational-wage-employment Survey for Non-agricultural Firms

The MSDE, MoLE along with MoSPI should carry out occupation–wage–employment survey. They should do the following (Table 11.2):

1. Occupations and sectors need to be identified which will be followed over time.
    a. As a starting point, one can start with the occupations already identified by the MSDE and Sector Skills Council.
2. The sampling strategy has to be designed. Firms should be sampled across size, ownership and region and sub-sectors.
3. The designations of respondents are also critical and quality checks need to be maintained.
4. The Ministry of Corporate Affairs/Goods & Services Tax Network/Economic Census data has to be the universe because no other data are available.
5. The sectoral data and the estimates have to be representative across all-India, States, districts, urban, rural and Tier 1 cities.
6. It should capture the following details on the identified occupations
    a. Job Roles
    b. Number of people employed
    c. Wage rates across different geographies
    d. Qualifications
    e. Skills required
    f. Technical skills
    g. Anticipated demand for number of jobs at a particular job role

Table 11.2: Representative questions for OWES

Job Role	NCO/NSQF Code	Stage of Value Chain	Tasks	Educational Qualifications sought by the firm	Knowledge (technical and theoretical knowledge relating to the job role)	Technical Skills (Computer applications and software)	Years of Experience	Skills (Full list of Skills-Annexure 2.3)	Geographic identifier

Source: NCAER conceptualisation.

11.3.6 Assess Skill Shortages and Gaps of Non-agricultural Sectors Using Survey of Non-agricultural Firms for Data on Vacancies and Skills

The Centre should design sampling strategy and questionnaires for Sector Skill Councils to assess skill shortages and gaps. This is for non-agricultural sectors which can collect the data on vacancies and skills. Firms should be sampled across size, ownership and region and sub-sectors.

The Economic Census/Ministry of Corporate Affairs database/Goods & Services Tax data may be used as the universe. Proper replacement strategy should be used because otherwise the responses suffer from selection bias.

The Centre should define as to what is a skill shortage? If vacancies last for more than three months, then it should be defined as a skill shortage. Using this definition, the SSCs can use a common assessment framework to feed into MSDE policymaking.

The following questions may be asked.

a. How many employees do you have currently? _____
b. How many job roles are currently vacant that you are actively looking to fill? ____
c. Please fill in the details about the current vacant position/s (shown in Table 11.3)

Table 11.3: Details about vacancies

Job Role	Name	No. of positions that are vacant	Years of Experience 1. 0 years 2. 1 to 5 years 3. 5 to 10 years 4. 10 to 15 years 5. More than 15 years	How long have these job roles being vacant? 1.≤3 months; 2.>3 months & ≤ 6 months 3.>6 months & ≤9 months-3 4.9 months & ≤12 month; 5.> 12 months-5	Qualifications required	Skills Required	Please give us the reasons for vacancy. 1. We advertised only recently. 2. We(firm) didn't try much; if we get someone that is fine but otherwise it is okay 3. We wanted to try out the market 4. Wages did not match-expectations of wages were higher by prospective employees 5. Didn't find people with the required qualification 6. Find people but they do not have the skill set that we require for the job 7. Others

Source: NCAER conceptualisation.
Note: You can add more rows if required.

11.3.7 District-level Analysis of Jobs in the Agriculture and Allied Sectors

The States can use the secondary data analysis using Agriculture Census, Livestock Census, Situation Assessment Survey, Animal Husbandry Statistics, soil health, land use statistics, rainfall & groundwater statistics and their own statistics, etc. to undertake a district level analysis to assess the labour market situation in their district. Using this information, the labour market clusters for each agriculture & allied sector in the district can be identified. The Centre may use the secondary analysis from the States.

The States should design a survey and focus group discussions of farms, cooperatives, other stakeholders in the value chain, etc. Since value chains for each product will be identified, the stakeholders can also be identified. All of them should be interviewed in a structured manner to assess and anticipate the evolving jobs.

11.3.8 Design of Stakeholder Interactions

The MSDE should design for detailed stakeholder interactions including FGDs and structured questionnaires. This will inform not just about jobs but also about economic, technological changes that the sector is undergoing, the firms' own practices in hiring, skilling, etc. and perceptions about the sector.

Table 11. 4 presents a summary of all the approaches.

Table 11.4: Objectives and methodology

S.No.	*Type of Analysis*	*Study Lead in Design*	*Objectives and Methods*	*Implementing Agency*		*Frequency of Analysis*
1.	Macro Analysis of sectoral shares and labour force	MSDE	• Descriptive data analysis from secondary data • Identification of geographical clusters • Input-output analysis	MSDE	All-India and State-level analysis	Annual Basis
				State	District-level analysis	
2.	Macro Analysis (optional)	MSDE	(3 to 5 year) forecasts of occupations accounting for stated policy goals, technological changes (and simulations for scenario building)	MSDE	All-India	3 to 5 years
				State	State-level analysis	
3.	Demand projections of jobs of non-agricultural sectors	MSDE & MoLE (design of questionnaires, sampling strategy based on universal company data sourced from MCA)	Occupational-wage-employment survey of non-agricultural enterprises (panel data)	MoSPI with district-level participation		3 to 5 years
4.	Assess skill shortages and gaps of non-agricultural sectors	MSDE (design of questionnaires, sampling strategy based on universal company data sourced from MCA/GSTN/Economic Census)	Survey of non-agricultural firms for data on vacancies and skills	Sector Skill Councils		Annual
5.	Analysis of jobs in sub-sectors of non-agricultural sectors	Sector Skill Councils	Big Data Analysis	Sector Skill Councils		Annual
6.	Analysis of agriculture & allied sectors	State Government	District-level secondary data analysis	State Skill Missions		Annual
		MSDE (design of questionnaires, identification of stakeholders, etc.)	Survey, FGDs of farms, cooperatives, other stakeholders in the value chain, etc.	State and District Skill Missions		Annual
7.	Stakeholder Interactions	MSDE	FGDs and structured interviews for anticipating economic & technological changes	Sector Skill Councils		Annual

Source: NCAER Conceptualisation.

11.4 Policy Recommendations

11.4.1 Stakeholders

In the skilling eco-system, there are four stakeholders—prospective workers and current workers, firms who demand workers, training providers, and statistical systems. Training providers may belong to the public sector. Statistical systems also belong to the government sector. All of them have to work hand-in-hand to address the skills shortage and gaps.

11.4.2 Limitations of Current Statistics

From the perspective of assessing skills, the Periodic Labour Force Survey suffers from some key limitations. It only captures job roles at the 3-digit NCO code. Specific examples are:

- Some job roles like the solar panel technician are not consistently captured.[6]
- 731 is the NCO code for handicraft workers. Code for a power loom weaver is 7318.5500 and that for a handloom weaver is 7318.5800. Since PLFS gives data at the 3-digit level, it is impossible to decipher which specific occupation is going to increase or decrease. Further, the power loom weaver code captures four different types of technologies (plain loom, semi-automatic loom, automatic loom and shuttle-less loom)

The Annual Survey of Industries and Annual Survey of Unincorporated Sector Enterprises does not capture NCO codes at all. Further, databases do not always match in terms of numbers. Chapter 6 especially discusses the issues of the differences between PLFS, Enterprise Survey and Handloom Census data. The National Classification of Occupations also has major challenges that have repeatedly come up in the sectoral chapters.

- Existing job roles are also not intuitive because the data are published at the 3-digit NCO code whereas occupations are identified at the 8-digit NCO code.
- Difficult to match new and emerging job roles
- Job roles not capturing different skill sets
- The Skill India Digital Hub and National Career Services need to ramp up their integration and communication with each other to improve the effectiveness of both.

The methodology above outlines a step-by-step process to reconcile these issues of industries and occupations, and discusses the urgent need for an updated survey, which will have an unified methodology—the Occupations Wage Employment Survey (OWES). Vacancy data analysis may be implemented using the existing National Career Services database and asking the Sector Skill Councils to conduct regular surveys with the MSDE appropriately designing the template. Big Data Analysis by Sector Skill Councils is another suggested approach.

11.4.3 Mismatch between Employers and Employees

The mismatch between employers and employees arise because of both supply and demand-side issues, which are specified here. The source for all these are the

[6] Dayal and Bhandari, 2025; https://www.downtoearth.org.in/renewable-energy/expansion-in-renewable-energy-implies-an-employment-expansion-in-the-sector-too-are-we-undercounting-green-jobs)

stakeholder surveys, which were done across the seven sectors and there were some common issues. They are:

1. Poor foundational skills that cannot be improved by skill training programmes (ITIs or other short-term training programmes): Improve the quality of schools to improve digital and financial literacy, active listening, active learning, reading, writing, speaking, math, attitude, flexibility, adaptability, working in a cooperative manner, conflict resolution, empathy, openness, gender diversity, patience and calmness. Digital courses which address these specific skill gaps could also be introduced with the cooperation of the Ministry of Education.
2. Poor quality of Higher Education Systems: Above the skills, upgrade curriculums, improve pedagogy, appoint quality teachers; industry-academia partnerships at all levels of education; encourage apprenticeships and internships; applied fields like agricultural machinery, dairy, engineering need to have mandatory on-field experience in every course they take; practical classes need to be taught by professors; introduce new courses; offer courses in the evening so that working professionals can update themselves.
3. Improve the Quality of the Training Providers especially the ITIs: Update curriculum to match latest industry needs (this needs to happen every three years), make practical training an important part of the curriculum, internships and apprenticeships to be made mandatory, improve pedagogy, periodically upskill teachers and master trainers. Industry partnerships with ITIs need to happen—every ITI should be partnered with an industry partner. Placement agencies need to be strengthened. Counselling and mentoring offered to students.
4. Local Skilling mismatch: District Magistrates need to facilitate cooperation such that local skilling eco-system works in close coordination with local market needs.
5. Traditional sectors' firms/farms need:
    - Awareness: MSMEs made aware about government skilling initiatives in Tier 2 & 3 cities
    - Re-orientation: Adopt digitisation, adopt technology, gains from hiring skilled workers; pay more; aim retention, teach what are perceived traditional taught in families to others; teach traditional employees new skills in the same sector like textiles; provide on-the-job training
    - Re-skilling and up-skilling: Existing employees need to be trained
    - Attitude changes: Firms need to pay more at the prevailing local minimum wages; at the minimum, use government welfare to provide social welfare benefits; recognition that old style of working needs to change
    - Other interventions—outreach to market: Need help with marketing, forecasting, basically reaching the market, etc.—either teach traditional firms those skills or provide them with help; Government extension programmes of departments have key roles to play; teach entrepreneurship skills—financial, personnel, materials management
6. Youth Aspirations: There is mismatch between what firms are offering and what the youth wants. Counselling and placement right from school level becomes important.
7. Retention problem: Offer mentoring, guidance, information about career path, better wage, and better social welfare nets.
8. Wage mismatch: Wages information needs to be captured; firms need to be willing to pay for skilled workers and that recognition is missing. Youth need to be mentored too. Chapters 7 and 8 compare the wage gaps between a fresh entry job for a motor mechanic and food delivery platform worker.

9. Identify the level of gap and fill that—Fresh or intermediate: Policy interventions will differ—auto has need for both fresh and intermediate but literature and Big Data analysis shows there is a shortage at the intermediate level. This is the problem that plagues the states too. They are focussed on the youth but the challenge may not exist there.
10. Jobs that are demanded across sectors—IT, Sales, Accounts/Finance: Recognise that certain jobs are demanded across skills; demand and, therefore, wages are more.
11. Technological Changes: New job roles are emerging and old ones are becoming obsolete. These need to be captured by stakeholders' survey and regularly updated in the National Career Services portal.
12. Recognise that MSMEs need multi-skilled workers. They need to be mapped and people need to be trained accordingly.
13. Digital Skills: Start from school onwards to including it in every phase of training.
14. Socio-emotional Skills: Start from school onwards to including it in every phase of training.
15. Advanced Cognitive Skills needs to be taught.
16. Firms need to offer avenues for re-skilling and upskilling. Like the employment linked incentive, skilling-linked incentive could make firms more invested in skilling. The apprenticeship/internship schemes could be made more popular.

11.4.4 Low Female Labour Force Participation

Across sectors, the common policy recommendations to increase female labour force participation are:

1. Establish Role Models: It is important to have positive role models both in the education and the Technical & Vocational Education and Training Systems especially from the local community.
2. Counselling and mentoring are important at all levels of education starting from secondary education and even at firms.
3. Construct female hostels near ITIs and industrial clusters.
4. Provide transport to female students and workers: Security at education and work and while travelling to schools/ITIs and work.
5. Change in gender attitudes at schools/ITIs: Both men and women need to be taught about gender diversity; set aspirations that women can do all kinds of job roles including seemingly those roles which require physical skills. Dhar, Jain and Jayachandran (2022) evaluated the 'Taaron ki Toli' programme implemented in Haryana.[7] The programme was centred around classroom discussions about gender equality in secondary schools. The authors found that that improved gender attitudes persisted even after two years of the programme. Other States like Odisha and Punjab are also introducing gender equity programmes in schools.[8]
6. Change the conditions of work: Create flexible jobs, offer them better pay or 'permanent' jobs; lifts for climbing windmill. The Code on Social Security Bill 2020, when implemented would recognise gig work and this should help in

[7] Dhar, D., Jain,T. and Jayachandran, S. 2022. "Reshaping Adolescents' Gender Attitudes: Evidence from a School-Based Experiment in India." *American Economic Review*. 112 (3): 899–927.

[8] Abdul Latif Jameel Poverty Action Lab website. https://www.povertyactionlab.org/evaluation/impact-school-based-gender-attitude-change-program-india.

formalising part-time job contracts thereby encouraging female labour force participation.[9]

7. Providing digital, financial, and entrepreneurship skills to women will help them attain better labour market outcomes.
8. Social Security Schemes: Generate awareness and leverage current government schemes to provide benefits to traditional workers.

11.5 Summary

A combination of methodological changes is proposed in this report along with demand-supply interventions to overhaul the system.

[9] Dev and Sahay (2025) pointed to the need of formalising part-time job contracts to increase female labour force participation rate.

Dev, A. and Sahay, R. 2025. "Unlocking Women's Workforce Potential in India:

Quantifying the Labour Market Impact of Formalising Part-Time Employment and Gender Equality in Unpaid Care Work. *NCAER Working Paper No. 178*. https://ncaer.org/wp-content/uploads/2025/01/NCAER-WP-178-Aakash-Ratna.pdf. January.