POLICY BRIEF: WOMEN IN INDUSTRY

What gender gaps in India's industrial sector mean for air pollution and health — and what we can do to close them.

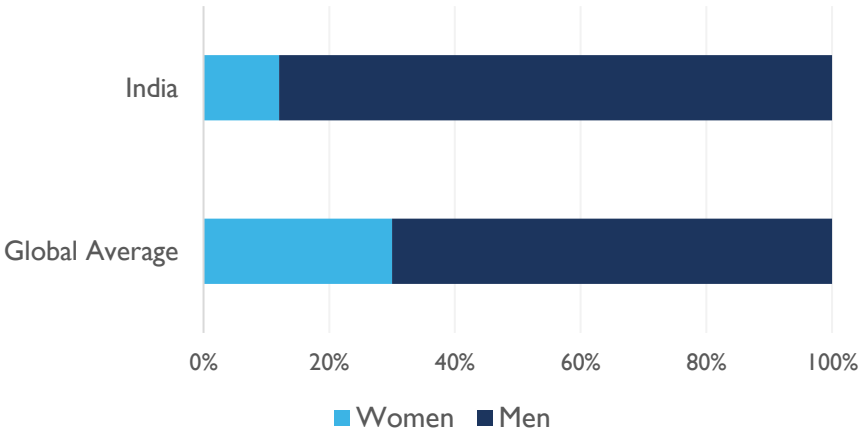
The Indian Industrial Sector's gender problem

The manufacturing sector makes up 16-17 percent of India's GDP, but a clear gender gap exists in this industry. Women comprise just 12 percent of the workforce, well below the global average of 30% (see Figure 1). Participation rates have hardly changing in recent years, according to the Annual Survey of Industries (ASI).

Women in the organized industrial sector mostly work in textiles, garments, handicrafts, and food processing sectors, and in jobs that are associated with lower pay. Low-skilled, low-paid roles such as stitching, packing, and assembling products are perceived as extensions of domestic skills and are deemed more suitable for women. Otherwise, women are mostly employed in administrative roles like data entry and record keeping, or in support services such as cleaning and canteen staff, which are among the lowest-paid positions in the sector.

In contrast, men tend to occupy higher-skilled, higher-paying roles such as engineers, technicians, supervisors, and managers. These positions require specialized training, technical expertise, and often advanced education and offer higher wages due to the skill level and technical knowledge required.

Figure 1: What % of industrial workers are women?



Key points

- **Women form just 12% of India's manufacturing workforce** - well below the global average of 30%.
- **Industrial air pollution threatens women's reproductive health,** raising rates of miscarriage, developmental issues in newborns, and neurological impacts from heavy metals.
- **Nearly all employment and air pollution data is not broken down by gender,** masking women's specific needs.
- **Gender disaggregated data is needed** to understand the health needs of women in the workforce.

What pollutants most commonly affect Indore residents?

Women represent a relatively higher proportion of the micro, small and medium enterprises (MSME) workforce at 24%; and they own approximately 20% of all MSME enterprises. But these are much more likely to be micro enterprises that are informal in nature, and therefore likely lack income security, fringe benefits, and adequate safety protections from pollutants.

As part of its drive to improve awareness of various air pollution sources in Indore, the Clean Air Catalyst surveyed 39 operational industries in the city. About half of the industries surveyed in the Indore Municipal Corporation (IMC) area belonged to the pharmaceutical, medical, and metal sectors. Other manufacturing industries represented included food product, rubber, and chemical production, as well as plastic manufacturing, all of which contribute significantly to the sector's fossil fuel consumption and associated emissions.

> **"My colleagues and I have frequent skin rashes and respiratory problems**, we don't have masks or gloves, and no one has explained how this could impact our health over time."
>
> - **Female post mill worker, Indore**

Consistent with national survey findings, the Catalyst's survey found that men comprise 82% of the workforce in both the pharmaceutical and medicinal products industries in Indore. The gender gap is even more pronounced in industries such as metal casting and rubber product manufacturing, where women represent only a negligible proportion of the workforce. In textile and paper product manufacturing, there are no women at all: men make up 100% of the workforce. There is a significant way to go to achieve gender parity within India's industrial sector.

Gendered Dimensions of Industrial Air Pollution Exposure – Evidence from neighboring countries

Industry is a major air polluter with two primary emission sources: fugitive emissions, such as through gas leaks and industrial discharge, and tailpipe/chimney emissions. These processes expose workers to elevated levels of pollutants. While specific exposure studies in India are scarce, global research indicates that long-term exposure to industrial pollutants leads to severe health effects. These include chronic respiratory diseases (asthma, bronchitis), cardiovascular diseases (heart attacks, strokes), and cancers (lung cancer).

Neurological impacts from heavy metals like lead and mercury cause cognitive impairments and developmental delays, with increased risks of Alzheimer's and Parkinson's diseases. Men, who often work in roles with direct exposure to emissions, are at a higher risk of chronic respiratory diseases, cardiovascular issues, and cancers.

Women, particularly those in lower-paid roles where exposure is higher, face significant risks to their reproductive health, including increased rates of miscarriage, developmental issues in newborns and neurological impacts from heavy metals.

The industrial sector needs gender data and exposure studies to address disparities and health risks

Occupational gender segregation leads to disparities in workers' exposure to industrial pollution. While local data on this subject is limited, global evidence suggests that men typically hold technical roles with higher pollutant exposure, such as engineering. In contrast, women in lower-skilled, repetitive tasks are also exposed to harmful pollutants, but their exposure often goes unrecognized, according to the Institute for Women's Policy Research.

The absence of gender-sensitive policies and facilities, such as separate restrooms and childcare services, further marginalizes women in the industrial workforce. The United Nations Environment Programme (UNEP) found women in informal sectors often lack access to safety equipment and training, increasing their vulnerability to hazardous chemicals and waste. Even in formal industry jobs, women often do not receive safety equipment that fits properly.

Most personal protective equipment (PPE) is designed and sized to fit men, leading to a poor fit, which can reduce its effectiveness and increase the risk of injury. Studies have highlighted that ill-fitting PPE, such as gloves, helmets, and protective clothing, can hinder women's ability to perform tasks safely and comfortably. This issue is particularly prevalent in industries like construction, manufacturing, and firefighting, where safety gear is crucial. It is equally significant in sectors where women are more prevalent, such as healthcare, garment manufacturing, food processing, where safety gear is crucial.

Studies on occupational health and safety in industrial sectors globally found that women are less likely than men to receive training on hazardous materials and safety protocols. For instance, in Bangladesh's garment industry and India's chemical industry, women often work in poorly ventilated environments without proper safety equipment, leading to high exposure to pollutants.

Anecdotal evidence from a Dal Mill worker in Indore highlighted the same issues. In China's electronics manufacturing sector, women are exposed to hazardous chemicals on assembly lines, where they represent the majority of workers. Research from the United States has shown that increased air pollution correlates with higher absenteeism among women, partly due to their caregiving responsibilities.

> "I started experiencing persistent coughs and severe itching on my skin. **But no one ever told us how these exposures could affect our health** or provided us with safety gear."
>
> - **Female confectionary factory worker, Indore**

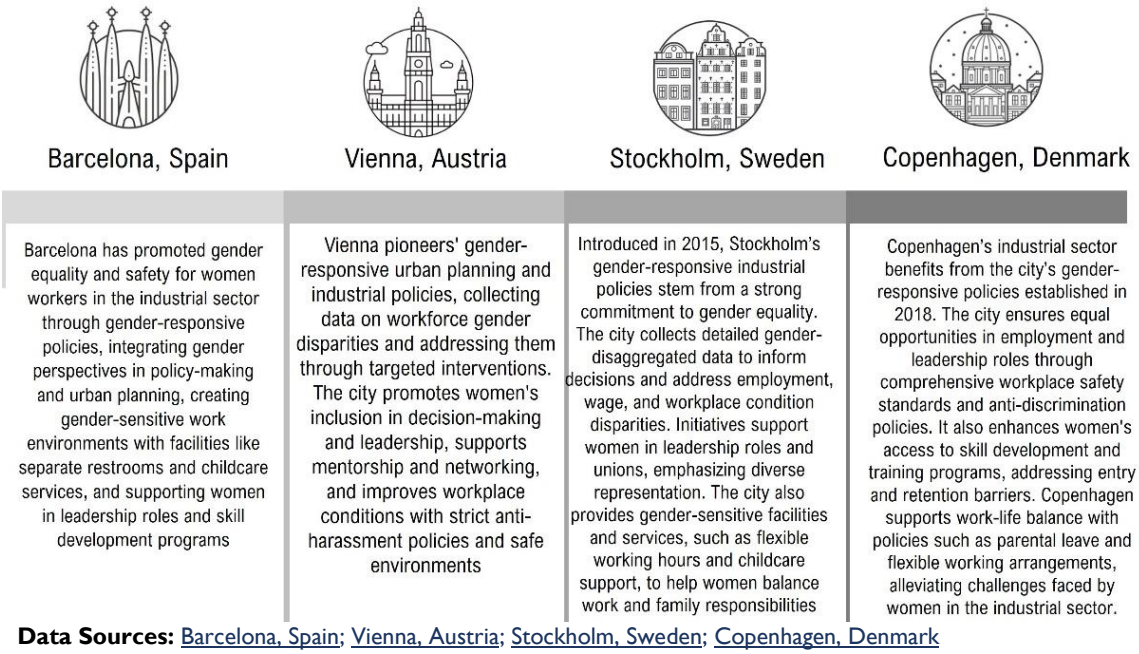
Digging into Data Gaps - India's challenge

The lack of detailed statistics on men's and women's employment in various industrial sectors at both the national and local (e.g., Indore) levels presents a significant barrier to addressing occupational hazards and gender disparities. Current data deficits encompass roles, positions, and wage disparities, obstructing effective policy development. To formulate inclusive policies that address gender disparities and improve air quality in India's industrial sector, it is essential to close critical data gaps.

Comprehensive, gender-disaggregated data is necessary to understand the unique challenges faced by women in the industrial workforce and to develop targeted interventions. For example, the European Union's SHE Figures (2021) framework provides detailed gender statistics in science, technology, and industry, informing policy decisions to improve gender balance. Sweden's gender equality index (see Figure 2 below) demonstrates the efficacy of gender-inclusive data collection. It identifies specific sectors where women face the greatest disparities, guiding targeted policy interventions.

Barcelona, Vienna, and Copenhagen have advanced gender equality in the industrial sector through gender-responsive policies. Barcelona focuses on gender-sensitive work environments and leadership support, while Vienna uses data to address workforce disparities and improve workplace safety and Copenhagen promotes equal employment opportunities, safety, and skill development (see Figure 2).

Figure 2: How cities have promoted gender equality in the Industrial workforce



Data Sources: Barcelona, Spain; Vienna, Austria; Stockholm, Sweden; Copenhagen, Denmark

In India, several policies and reports provide crucial data on employment and air pollution in the industrial sector:

- The **Annual Survey of Industries (ASI)**, managed by the Ministry of Statistics and Programme Implementation (MoSPI), offers detailed employment and wage data.
- The **Industrial Statistics** report from the Ministry of Commerce and Industry covers industrial output and employment metrics.
- The **State of India's Environment Report** by the Centre for Science and Environment (CSE) highlights industrial pollution impacts, while the
- **National Air Quality Monitoring Programme (NAMP)** by the Central Pollution Control Board (CPCB) provides air quality data, including pollution from industrial sources.
- The **CPCB's Annual Report** and **National Clean Air Programme (NCAP)** outline strategies for managing industrial pollution.
- The **Labour Bureau Reports** and **National Sample Survey Office (NSSO)** surveys offer insights into workforce trends.

However, data collected by these various bodies and institutions are **gender-blind**, lacking both gender-disaggregated statistics, and information on the distribution of roles, wage disparities, and exposure risks across different demographics. This omission hinders the development of inclusive policies that address both employment conditions and pollution exposure effectively. Reports from the Central Pollution Control Board (CPCB) and other agencies provide general insights into air quality but frequently fall short of connecting pollution data with specific industrial practices and their differential impacts on gender and socioeconomic groups.

Additionally, while policies like the Industrial Policy Framework and the National Ambient Air Quality Standards (NAAQS) set important regulatory parameters, they often overlook nuanced factors such as occupational segregation and the varying exposure risks faced by different worker groups. The lack of intersectional data on access to training, finance, and decision-making positions further impedes the creation of targeted interventions that could better protect vulnerable workers and enhance overall policy inclusivity.

Indore's Data Gaps

The Catalyst team has consulted widely with IMC and Industry players in Indore. Based on our research, we have identified the following key data gaps for the city's industrial sector:

Figure 3: Key gender data gaps for Indore leaders to focus on

Call to Action – Policy Recommendations

Collecting and analyzing gender-responsive intersectional data is critical for understanding the nuanced impacts of air pollution on different populations and informing effective public health policies. Without detailed data on how industrial air pollution affects various genders, socio-economic groups, and age cohorts, we lack insights into how these factors influence productivity and health outcomes. We need to prioritize the collection of gender disaggregated and intersectional data on India's industrial sector, to develop policies that protect all workers and address their specific challenges.

What data should be collected?

A multi-faceted approach to data collection is essential to comprehensively understand exposures in the industrial sector. Key data points include:

- **Labor force participation rates** to gauge workforce distribution by gender and age.
- **Detailed occupational and age segregation data** to identify which age groups and genders are concentrated in specific roles.
- **Wage and income disparity data**, including household income, to assess economic inequities.
- **Data on access to training, education, finance, and credit** to highlight barriers faced by key groups.
- **Data on representation in decision-making positions** to evaluate gender equity in leadership roles.
- **Information on working hours**, exposure beyond working hours (including access to workplaces, household environments, cooking fuels, and residential locations), and the type of facilities and jobs (e.g., boilers, hazardous work) will aid in developing targeted policies for exposure reduction.
- **Data on tenure in current jobs**, health issues, dietary habits, leave policies, and facilities at the site.
- **Personal exposure assessments** and how wages correlate with exposure risk.

Integrating gender-responsive and intersectional data in industrial sector policies offers significant benefits:

- **Enhanced worker protection and health outcomes** - Linking social welfare schemes to high-exposure populations, introducing safety equipment and tailored training, and implementing rotation-based services with improved facilities like childcare.
- **Fosters a more equitable and productive industrial sector** – Creating technological advancements and upskilling opportunities, including ITI certifications, improve job prospects and career advancement, boost productivity while also reducing health risks to workers.

Who should collect the data, and at what intervals?

In the Indian context, effective data collection on gender-responsive industrial sector exposures require a coordinated effort among various stakeholders.

- The Ministry of Labour and Employment, the National Statistical Office (NSO), and state labour departments can lead the collection and analysis of this data.
- Local industrial associations can play a crucial role by gathering data from their member organizations and providing sector-specific insights, which helps in capturing localized variations and challenges.
- Local governments should work with state and national agencies to integrate local data into their databases.
- State governments could facilitate the process by setting up regional data collection units and ensuring that data collection protocols are standardized and adhered to.
- National agencies should establish guidelines and provide support to local governments to ensure consistency and accuracy in data collection.

Regular intervals for data collection, such as an initial comprehensive survey followed by updates every two to three years, will help in monitoring trends and evaluating policy impacts. Additionally, using digital platforms and real-time data collection methods can improve the efficiency of data gathering and ensure that local-level information is effectively shared and utilized across all levels of government.

As the Catalyst works with the IMC to reduce air pollution in the city, filling these data gaps will be critical to ensuring the benefits of its clean air actions are equitably distributed among all Indore's residents and workers - regardless of gender, socio-economic circumstances, or any other identity marker.

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