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IMPACT OF AI AND CLIMATE CHANGE ON LABOUR AND INDUSTRY IN INDIA WITH RELATION TO LABOUR LAWS

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Abstract

Artificial Intelligence (AI) and climate change are two transformative forces reshaping labour and industry in India. As AI-driven automation advances across sectors such as manufacturing and retail, concerns regarding job displacement and workforce restructuring have emerged. Low-skilled workers are particularly vulnerable to job loss, while AI-powered platforms have contributed to the rise of the gig economy, raising challenges related to employment security, wages, and social protections. Simultaneously, the demand for highly skilled workers is increasing, necessitating a focus on upskilling programs like the Pradhan Mantri Kaushal Vikas Yojana. However, existing labour laws, including the Factories Act of 1948, are outdated, prompting the need for regulatory reforms. New labour codes like the Code on Wages, 2019, offer some updates, yet further adjustments are necessary to address AI-driven shifts.

In parallel, climate change is disrupting traditional labour sectors, particularly agriculture, where erratic weather patterns, floods, and droughts result in job losses and workforce migration to urban areas. The emergence of green jobs in renewable energy and environmental sectors offers potential for growth, yet health and safety concerns are rising due to extreme weather conditions in labour-intensive industries. Current labour regulations, such as the Occupational Safety, Health and Working Conditions Code, 2020, require enhancement to accommodate these climate-induced risks. Additionally, corporate sustainability initiatives are intersecting with labour practices, demanding a rethinking of corporate responsibility within the environmental context.

Key labour law reforms are essential to address the dual impacts of AI and climate change. These reforms include redefining employment to recognize gig, platform, and climate-vulnerable workers, enhancing health and safety standards, and promoting continuous

reskilling to facilitate worker transitions to new roles. As India navigates the evolving workforce, a balance must be struck between automation and human labour, with a focus on ensuring a just transition to a green economy. The future of labour in India will depend on proactive government policies and corporate responsibility to ensure fair, sustainable labour practices in an era of rapid technological and environmental change.

Keywords:

Artificial Intelligence (AI), Climate Change, Labour Laws, Automation, Job Displacement, Gig Economy, Skill Gap, Reskilling, Health and Safety, Green Jobs, Sustainability, Labour Codes, Employment Redefinition, Occupational Safety, Just Transition, India Labour Industry.

Introduction

In the 21st century, two of the most significant forces reshaping economies and societies worldwide are Artificial Intelligence (AI) and climate change. While these phenomena appear distinct, their combined effects are already transforming labour markets, industries, and regulatory frameworks. AI is revolutionizing industries by automating tasks, optimizing processes, and creating new types of jobs, while climate change is disrupting traditional industries, particularly those reliant on natural resources and environmental stability.

For a country like India, with its vast and diverse labour market, these changes are creating both opportunities and challenges. AI-driven automation is enhancing productivity but also causing job displacement, especially in sectors like manufacturing and services, where low-skilled workers are at the highest risk. Meanwhile, climate change is impacting agriculture, water resources, and urban labour markets by increasing the frequency of extreme weather events and shifting patterns of employment. These developments demand an urgent re-evaluation of India's labour laws, many of which are outdated and fail to address the new forms of employment and workplace risks introduced by AI and climate change.

The purpose of this article is to explore how AI and climate change are reshaping labour and industry in India, with a focus on their implications for labour laws. By examining the changes in job markets, skill demands, employment relationships, and health and safety risks, we will argue for the need to modernize India's labour laws to meet the challenges posed by these twin forces. This article also proposes key labour law reforms to ensure that the future of work in

India is fair, sustainable, and resilient.¹

Impact of AI on Labour and Industry

1. Automation and Job Displacement

AI has emerged as a key driver of productivity improvements across industries. The most visible impact of AI in the labour market is its role in automating repetitive tasks, which were traditionally performed by human workers. In sectors like manufacturing, retail, and logistics, AI-powered machines and software are increasingly replacing human labour for routine tasks such as product assembly, data entry, customer service, and inventory management. For example, robots now handle assembly-line operations in the automotive industry, while automated checkout systems are becoming the norm in retail stores.

While this automation enhances efficiency and reduces operational costs for businesses, it has also led to significant job displacement, especially for low-skilled and semi-skilled workers. In India, where millions of people are employed in labour-intensive sectors such as textiles, manufacturing, and agriculture, the rise of automation threatens to render many traditional jobs obsolete. The workers most at risk are those with limited educational qualifications and skill sets that do not match the demands of the evolving job market.

The displacement caused by automation is not just a matter of numbers; it raises profound questions about the social and economic consequences of technological change. With a large portion of India's workforce reliant on jobs that are vulnerable to automation, the risk of increased unemployment, poverty, and social inequality looms large. To mitigate these risks, the government and businesses must work together to develop strategies for reskilling displaced workers and creating new employment opportunities in AI-driven industries.

2. Rise of the Gig Economy

Another significant impact of AI on labour is the rise of the gig economy, which refers to a labour market characterized by short-term contracts or freelance work rather than permanent jobs. AI-powered platforms such as Uber, Ola, Zomato, and Swiggy have revolutionized industries such as transportation, food delivery, and logistics by creating new types of jobs. These platforms use AI algorithms to match workers with customers, optimize service delivery,

¹ M P Jain Indian Constitutional Law, Publisher, LexiNexis Edition, Eighth, Publication Date, 4 February 2018

and provide real-time data on performance.

In India, the gig economy has grown rapidly, providing employment to millions of people, especially in urban areas. Gig work offers flexibility and opportunities for individuals to earn income on their own terms, often as a supplement to other jobs. For young people and those without formal qualifications, gig work has become a valuable source of income. However, this type of employment also presents several challenges.

One of the most pressing concerns is the lack of legal protections for gig workers. Since gig workers are often classified as "independent contractors" rather than employees, they do not have access to many of the rights and protections that traditional employees enjoy. This includes the right to a minimum wage, social security benefits, health insurance, paid leave, and protection from unfair termination.² The absence of these protections leaves gig workers vulnerable to exploitation and economic insecurity. The classification of gig workers as independent contractors has also raised questions about their employment status under Indian labour laws. The current legal framework does not adequately recognize the unique nature of gig work, which straddles the line between self-employment and traditional employment. This gap in the law has led to calls for new labour legislation that specifically addresses the rights and protections of gig workers. The introduction of such laws is essential to ensure that the gig economy can grow in a way that is fair and sustainable for workers.

3. Skill Gap and Reskilling

As AI continues to transform industries, it is creating a growing demand for workers with advanced technical skills. AI technologies, such as machine learning, data analysis, and robotics, require specialized knowledge and expertise that many workers, particularly those in low-skill jobs, do not possess. This has led to a significant skill gap in the labour market, where the supply of workers with the necessary skills is not keeping pace with the demand from employers.

In India, this skill gap is particularly pronounced. While the country produces a large number of engineers and IT professionals, many of its workers lack the training and qualifications needed to participate in the AI-driven economy. This mismatch between the skills of the

² Labour and Industrial Laws, Publisher, Commercial Law Publishers (India) Pvt Ltd. Publication Date 1 January 2023

workforce and the needs of industries is a major barrier to economic growth and job creation. The workers most affected by this skill gap are those in low-wage, low-skill jobs, who are at risk of being displaced by automation and unable to transition into higher-paying, AI-driven roles.

To address this challenge, the Indian government has launched initiatives aimed at reskilling and upskilling the workforce. One of the most prominent of these initiatives is the Pradhan Mantri Kaushal Vikas Yojana (PMKVY), which provides vocational training and skills development programs to millions of workers across the country. The goal of these programs is to equip workers with the skills needed to succeed in the evolving job market, particularly in sectors such as IT, data science, and renewable energy.

However, the scale of these efforts must be expanded to address the specific challenges posed by AI. In addition to technical training, workers need access to continuous learning opportunities that allow them to adapt to changing technologies and industries. Public-private partnerships, involving both the government and businesses, could play a key role in providing the resources and infrastructure needed to support lifelong learning and skill development.

4. Regulatory Challenges

India's labour laws were largely designed in a different era, one that was characterized by industrial manufacturing and manual labour. For example, the Factories Act, 1948, which regulates working conditions in manufacturing units, was drafted at a time when factories relied on human labour for most tasks. Today, with the rise of AI-driven industries and the gig economy, many of these laws are outdated and do not adequately address the realities of the modern labour market.

One of the key regulatory challenges posed by AI is the need to redefine employment. Traditional labour laws assume a clear employer-employee relationship, where the employer provides a job, sets working conditions, and offers social security benefits. However, in the gig economy and AI-driven workplaces, this relationship is often more ambiguous. Workers may be employed on a freelance basis, work for multiple employers, or perform tasks that are mediated by AI algorithms rather than human supervisors.

In response to these changes, India has introduced new labour codes, such as the Code on

Wages, 2019, and the Industrial Relations Code, 2020. These codes aim to simplify and modernize labour regulations by consolidating multiple laws into a more streamlined framework. The Code on Wages, for example, establishes a national minimum wage and extends its application to a wider range of workers, including those in informal sectors.

However, these reforms are not without limitations. The new labour codes still do not fully address the unique challenges posed by AI and the gig economy. For example, the question of how to classify gig workers remains unresolved, and there is little guidance on how to regulate AI-driven workplaces where human oversight may be minimal. As AI continues to reshape industries and employment relationships, further regulatory reforms will be necessary to ensure that labour laws remain relevant and effective.

Impact of Climate Change on Labour and Industry

1. Job Losses in Agriculture and Other Sectors

Climate change is having a profound impact on labour markets in India, particularly in sectors that are dependent on natural resources and environmental stability. Agriculture, which employs nearly half of India's workforce, is especially vulnerable to the effects of climate change. Erratic weather patterns, rising temperatures, and extreme weather events such as floods and droughts are reducing agricultural productivity and threatening the livelihoods of millions of farmers and agricultural workers.

For example, changes in monsoon patterns and increasing temperatures have led to declining crop yields in many parts of India. This has not only reduced the incomes of farmers but also led to a decline in agricultural jobs. The workers most affected by these changes are those who are already economically vulnerable, including smallholder farmers, landless labourers, and women who rely on agriculture for their livelihoods.³

The impact of climate change is not limited to agriculture. Other sectors, such as forestry, fisheries, and textiles, are also experiencing job losses due to changing environmental conditions. For instance, rising sea levels and ocean temperatures are affecting fish populations, leading to a decline in jobs in the fishing industry. Similarly, the availability of raw materials such as cotton, which is heavily dependent on stable weather patterns, is becoming less

³ Taxmann's Labour Laws, Publisher, Taxmann Publications Pvt. Ltd. Edition 2023 Edition Publication Date 3 January 2023

predictable, leading to job losses in the textile sector.

These climate-related job losses are contributing to a broader pattern of migration from rural to urban areas. Many displaced workers are moving to cities in search of employment, leading to increased competition for jobs in already crowded urban labour markets. This rural-to-urban migration is creating new challenges for policymakers, as it exacerbates issues such as unemployment, poverty, and inadequate access to housing and social services in cities.

2. Emergence of Green Jobs

While climate change is causing job losses in some sectors, it is also creating new employment opportunities in others, particularly in the emerging "green economy." The green economy refers to industries that focus on sustainability, environmental protection, and the transition to renewable energy sources. As India seeks to reduce its carbon emissions and meet its commitments under international climate agreements, the demand for green jobs is expected to grow.

One of the most promising areas for job creation is renewable energy. India has set ambitious targets for expanding its solar and wind energy capacity, and the renewable energy sector is expected to create millions of jobs in areas such as solar panel installation, wind turbine maintenance, and energy-efficient construction. Similarly, jobs are emerging in sectors such as waste management, water conservation, and environmental restoration, as businesses and governments invest in sustainability initiatives.

The growth of green jobs presents an opportunity to offset some of the job losses caused by climate change. However, to fully realize this potential, workers need to be equipped with the skills and training required for green jobs. This includes both technical skills, such as those needed to install and maintain renewable energy infrastructure, and broader knowledge of environmental issues and sustainable practices. Government programs and public-private partnerships will be crucial in providing the necessary training and support for workers transitioning to the green economy.

3. Health and Safety Concerns

Climate change is also having a direct impact on worker health and safety, particularly in labour-intensive industries such as construction, agriculture, and manufacturing. Rising

temperatures and extreme weather events are creating hazardous working conditions, especially for outdoor workers who are exposed to the elements.

For example, heat stress is becoming an increasingly serious issue in many parts of India, where temperatures regularly exceed 40°C (104°F) during the summer months. Workers in agriculture, construction, and other outdoor industries are at risk of heat-related illnesses, including dehydration, heatstroke, and exhaustion. Prolonged exposure to high temperatures can also reduce worker productivity and increase the risk of accidents.

In addition to heat stress, extreme weather events such as floods, storms, and landslides are posing new safety risks for workers. These events can disrupt transportation and supply chains, damage infrastructure, and create dangerous working conditions in industries such as mining and construction. Workers in these sectors need access to adequate protective equipment, training, and safety protocols to minimize the risks associated with extreme weather.

India's labour laws must be updated to reflect these new health and safety challenges. The Occupational Safety, Health, and Working Conditions Code, 2020, is a step in the right direction, as it consolidates and modernizes health and safety regulations across industries. However, more specific provisions are needed to address the unique risks posed by climate change, including guidelines for managing heat stress, improving workplace ventilation, and ensuring that workers have access to adequate rest breaks and hydration during extreme weather.

4. Corporate Responsibility and Sustainability

As businesses and industries adapt to the challenges of climate change, there is increasing pressure on companies to adopt sustainable practices and reduce their environmental impact. This trend is being driven not only by government regulations and international agreements but also by consumer demand for environmentally responsible products and services.

Corporate sustainability initiatives are closely linked to labour practices. For example, companies that invest in renewable energy and energy-efficient technologies are often able to reduce their operating costs, which can lead to higher wages and better working conditions for employees. Similarly, businesses that prioritize waste reduction and recycling can create new jobs in areas such as waste management and environmental restoration.

However, there is also a risk that the push for sustainability could lead to job losses in industries that are dependent on fossil fuels and other environmentally harmful practices. For example, the coal industry, which has been a major source of employment in India for decades, is facing significant job cuts as the country transitions to cleaner energy sources. To ensure a just transition to a green economy, labour laws must be updated to protect workers in industries that are being phased out, while also promoting job creation in sustainable sectors.

Key Labour Law Reforms for AI and Climate Change

1. Redefining Employment

One of the most pressing labour law reforms needed in response to the rise of AI and the gig economy is the redefinition of employment. Current labour laws are based on a traditional model of employment, where workers are hired by a single employer, work fixed hours, and receive benefits such as health insurance and retirement plans. However, this model no longer reflects the reality of the modern labour market, where gig workers, freelancers, and AI-driven platforms play a significant role.

To address this gap, labour laws must be updated to include new categories of workers, such as gig workers, platform workers, and freelancers. These workers should have access to basic rights and protections, including minimum wage guarantees, social security benefits, and protection from unfair dismissal.⁴ The introduction of a legal framework that recognizes the unique nature of gig work is essential to ensure that workers in the gig economy are not exploited or left vulnerable to economic insecurity.

Additionally, labour laws should consider the inclusion of climate-vulnerable workers, such as those in agriculture or other sectors impacted by climate change. These workers require special protections, including income support and social security, to mitigate the risks posed by environmental disruptions.

2. Improving Health and Safety Standards

AI-driven industries and climate-affected sectors both present new health and safety challenges. In AI-powered industries, job-related stress, mental health issues, and the impact

⁴ Introduction to Labour and Industrial Laws by [Avtar Singh and Harpreet Kaur](#), Publisher: Lexis Nexis Edition: 1st Edition, 2022

of surveillance technologies on worker privacy are emerging concerns. In climate-sensitive industries, the physical risks posed by extreme weather events and rising temperatures are significant. Labour laws must be updated to reflect these new realities, ensuring that both physical and mental health risks are adequately addressed.

Provisions for heat safety, workplace stress management, and the use of protective equipment in hazardous environments should be incorporated into existing labour codes. Furthermore, workers should be given the right to refuse unsafe work conditions in industries that are vulnerable to climate-related hazards.

3. Promoting Reskilling and Transitioning to New Roles

The rapid pace of technological change, coupled with the need for a green economy, has made reskilling and upskilling critical for workers. Government programs such as the Pradhan Mantri Kaushal Vikas Yojana (PMKVY) are already providing training for millions of workers, but these efforts must be scaled up. Public-private partnerships could play a key role in expanding reskilling programs, ensuring that workers displaced by automation or climate change are prepared for new roles.

Continuous learning should become a central component of India's labour policies, with incentives for businesses to invest in their workers' skill development. Labour laws could be reformed to mandate corporate contributions to worker training funds, ensuring that businesses take responsibility for the reskilling of their employees.

The Future of Labour in India

The future of labour in India will be shaped by two major forces: AI and climate change. The rise of automation will require a careful balancing act between maximizing efficiency and protecting jobs, while the transition to a green economy will create new opportunities in emerging sectors. The role of the government, businesses, and workers themselves will be critical in navigating these changes.

The government must take the lead in ensuring that labour laws are modernized to reflect the realities of AI and climate change. Businesses, too, must adopt sustainable labour practices and take responsibility for the well-being of their workers. Workers must be empowered to adapt to these changes through access to education, training, and legal protections.

Conclusion

The impact of AI and climate change on labour and industry in India is profound and far-reaching. These forces are reshaping the economy, displacing traditional jobs, and creating new opportunities in green industries and AI-driven sectors. However, to ensure that these changes lead to fair and sustainable outcomes for workers, India must reform its labour laws to protect vulnerable workers, promote reskilling, and improve health and safety standards. The need for proactive, comprehensive labour law reform is urgent, and the future of India's workforce depends on the steps taken today to adapt to these transformative forces.

