The Academic
International Journal of Multidisciplinary Research

An Online Peer Reviewed / Refereed Journal
Volume 3 | Special Issue 2 | September 2025
ISSN: 2583-973X (Online)
Website: www.theacademic.in

Farm Mechanisation and Rural Employment: A Study on Labour Displacement Vs. Skill Shift

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DOI : https://doi.org/10.5281/zenodo.17371224

ARTICLE DETAILS

Research Paper

Accepted: 04-09-2025

Published: 25-09-2025

Keywords:

Farm Mechanisation , Rural, Employment labour , displacement, Skill, shift

ABSTRACT

Addition of altering traditional agricultural practices and increasing employment opportunities, mechanisation is enhancing the skills of India's rural labourers. With the increasing prevalence of precision farming technologies, seed drills, tractors, and harvesters, farmers and agricultural workers are faced with the challenge of acquiring new technical skills. Agrarian mechanisation has emerged as a critical component in the sustainability, efficiency, and output of India's agrarian economy. Leading to a decrease in dependency on human effort and an increase in total farm production. Mechanization's potential benefits to skill development and employment in rural India extend far beyond its impacts on productivity. To mitigate mechanization's negative impacts and help rural workers adapt to the demands of the labour market, the study highlights the importance of skill-building and support programs

INTRODUCTION

About 49.6% of the workforce is employed in agriculture, which continues to be the foundation of the Indian economy, accounting for 14% of GDP. Notwithstanding its importance, the industry has several

obstacles, such as low production, a lack of workers, and the prevalence of tiny and dispersed landholdings. Because mechanization increases productivity, decreases reliance on labour, and boosts total agricultural output, it presents a workable answer to these problems. In contrast to nations like China (60%) and Brazil (75%), India has adopted mechanized farming at a very sluggish pace, with just 47% of agricultural operations mechanized as of August 2022 (Balishter et al. 1991).

In order to increase agricultural output and free up people for non-agricultural industries, mechanisation has emerged as a key component of contemporary agriculture globally. However, most poor nations still face obstacles to implementing modern inputs like machinery, which leads to a much lower level of capital utilisation in agriculture when compared to wealthy nations. According to Caunedo and Keller (2021), 37% of cross-country variations in agricultural labour productivity may be attributed to quality-adjusted capital. In underdeveloped nations, input subsidy programs are commonly used to increase agricultural capitalisation. To increase household welfare and food security, subsidies for inputs like fertiliser and better crops are essential. (Baliyan, K., 2017).

Agricultural mechanization

In India's agrarian economy, agricultural mechanisation has become a key factor in determining sustainability, efficiency, and production. The incorporation of cutting-edge equipment and technology into agricultural methods is revolutionising conventional agriculture, decreasing reliance on human work, and increasing total farm productivity as the nation progresses towards modernisation. Beyond its effects on output, though, mechanisation has great promise for improving skill development and generating job possibilities in rural India. (Agro-Economic Research Centre, 2015)

Tractors, ploughing and cultivating machinery (such as ploughs, harrows, cultivators and tillers, and others), planting machinery (such as seed drills, planters, spreaders, and others), harvesting machinery (such as combine harvesters, forage harvesters, and other harvesters), haying and forage machinery (such as mowers, balers, and others), irrigation machinery (such as sprinkler irrigation, drip irrigation, and others), and other agricultural machinery comprise the agricultural machinery market. One of the main drivers of the expansion is probably the increase in farmers' income and the growing mechanisation of the nation's agricultural industry. (Chand, R., & Singh, J. ,2022).

Agriculture productivity and Employment:

The ratio of agricultural output to inputs is used to calculate agricultural productivity. Although weights are typically used to measure individual items, it is challenging to quantify the whole amount of

agricultural production due to their different densities. Consequently, the market value of the finished product, which includes intermediate goods like maize feed used in the meat industry, is typically utilised to calculate output. It is possible to compare this output value to a wide range of inputs, including labour and land. These are referred to as partial productivity measurements. Total factor productivity is another way to quantify agricultural production. This approach compares an index of agricultural inputs against an index of outputs in order to determine agricultural productivity. (Gousiya, S. K., & Suseela, K. ,2024).

The substitution of animal work is the reason for the increase in agricultural mechanisation. Additionally, farm mechanisation creates a variety of job opportunities including the operation of agricultural equipment, which boosts employment in rural areas. Increasing agricultural mechanisation is undoubtedly a crucial first step towards greater rural wealth. However, the employment of tractors and tractor-mounted tools dominates India's farm mechanisation, which is still in its early phases of growth. Even though the Indian tractor industry is one of the biggest in the world and quite organised, unorganised firms control more than half of the market share in the agricultural equipment sector. (Islam, R, e al. 2011)

Segment insights

India is the largest company in the world that manufactures tractors, accounting for over one-third of the total manufactured tractors worldwide. In the fiscal year 2022, the tractor category had the highest market share, accounting for 81.45% of the total revenue generated by the market. The high tractor penetration rate may be seen in the agrarian region of northern India, specifically in the states of Punjab, Haryana, and Uttar Pradesh. Andhra Pradesh, Tamil Nadu, and Maharashtra are the states with the lowest adoption rates, which are located in the south and west of the country. Other types of market categories include rotavators, threshers, and power tillers, among others. In the fiscal year 2021–2022, it is anticipated that India would produce 316.06 million tonnes of foodgrains, which is a 5.32 million tonnes increase over the previous fiscal year, 2020–21. The range of 31–40 horsepower produces the highest number of domestic tractor sales, accounting for 36% of the total, followed by the range of 41–50 horsepower selling at 45%. Power will be offered to Indian farms at a rate of 2.85 kW/ha in the 2020–21 fiscal year. as of 2024–2025, it is predicted that the rate would rise to 3.5 kW/ha. Utilising tools that have been upgraded might result in a thirty percent increase in productivity. The expenditures of cultivation can be reduced by as much as twenty percent. After reaching a high of 55% in 2011, it was expected that by the year 2050, just 25% of the total population will be involved in agriculture. Because of this, the level of agricultural mechanisation already present in the nation has to be enhanced. The

market for tractors is dominated by high-capacity tractors that have between 30 and 50 horsepower. A greater quantity of agricultural power is accessible in the states of Punjab, Haryana, Western Uttar Pradesh, and the western half of Rajasthan than the average of 2.02 kW/ha that is available across the country. Due to the fact that it is significantly lower in the rest of the country, notably in the Eastern and North-East Regions, a specialised mission to promote agricultural mechanisation is required. (Kundu, A., & Das, S. , 2019).

Agricultural Mechanisation and its Potential for Skill Enhancement in Rural India

The mechanisation of India's rural workers is resulting in an increase in their level of expertise, as well as a shift away from traditional agricultural practices and an increase in employment opportunities. As the use of tractors, harvesters, seed drills, and precision farming technology becomes increasingly widespread, farmers and agricultural workers will need to acquire new technical skills through training and education. In order to operate and maintain complex machinery, specialised training is necessary. This training is being provided by a variety of organisations, including commercial training facilities, agricultural institutions, and government programs. Through initiatives such as Krishi Vigyan Kendras (KVKs) and the Skill India Mission, adolescents and young adults living in rural areas are being actively instructed on how to manage, maintain, and make use of digital technology in farming. Through initiatives such as the Sub-Mission on Agricultural Mechanisation (SMAM), the government of India has been placing a strong focus on the development of skills. This has been accomplished by organising seminars and training sessions with the goal of enhancing the capabilities of young people and farmers who reside in rural regions. It is because of the expansion of precision agriculture that there has been a rise in the demand for digital capabilities. These days, farmers use technologies such as GPS, drones, and applications powered by artificial intelligence to do tasks such as soil analysis, pest control, and crop prediction. The implementation of this transformation is fostering digital literacy, which assists farmers in making decisions, optimising resource utilisation, and increasing their overall production. Not only does mechanisation encourage entrepreneurial talents in rural India, but it also encourages them. A growing number of farmers are becoming agripreneurs by offering tailored hiring services, in which they rent out agricultural gear to small farmers who are unable to afford to purchase equipment as a result of financial constraints. This business model is responsible for the creation of employment opportunities in the fields of agro-logistics, maintenance services, and machinery operation. Addition, mechanisation is assisting rural labourers in transitioning from low-skilled manual labour to higher-paying employment in supply chain management, agro-processing, and industry. By providing individuals with the ability to

acquire technical and management skills, it encourages the mobility of labour and the demand for unskilled work in conventional farming. (Malik, A. M., et al., 2022)

OBJECTIVES OF THE STUDY

1. To study on Agriculture productivity and Employment
2. To study on Agricultural Mechanisation and its Potential for Skill Enhancement in Rural India

RESEARCH METHOD

Research Design

In this study, a mixed-methods approach is utilised to conduct an in-depth investigation of the impact that mechanisation has had on employment patterns in rural areas. Particular attention is paid to the relocation of workers and the shifting nature of skill requirements.

The objective of the study is to investigate the relationship between farm mechanisation and the workers in the agricultural industry. The study investigated the ways in which the mechanisation of the primary agricultural processes in the region under investigation has an effect on the loss of job opportunities. The study has taken into account the number of workdays that have been lost as a direct result of the implementation of agricultural mechanisation. The research has also investigated the ways in which agricultural mechanisation impacts the living conditions of workers, the level of poverty and food security, the mental health of workers, the bargaining power of workers, and the preservation of traditional farming practices and knowledge that have been handed down from generation to generation. The purpose of this study is to provide light on the complicated ways in which farm mechanisation impacts the experiences and means of sustenance of agricultural workers by providing answers to the issues posed above. In order to establish targeted interventions and legislative measures that encourage gender parity, economic empowerment, and sustainable development in agricultural communities, it is necessary to have an awareness of these processes.(Mehta, C. R., 2024).

Sources of data

Primary Data

In order to collect primary data, structured questionnaires were distributed to three hundred respondents. These respondents included fifty machinery operators or agri-entrepreneurs, fifty small and marginal

farmers, and one hundred agricultural labourers. The use of stratified random selection was implemented in order to ensure that all of the different job function categories and farm sizes were adequately represented. In-depth interviews and focus group discussions (FGDs) were conducted in order to enrich the results of the survey and obtain specific information on individual experiences, the viewpoints of the community, and various challenges associated with skill transfer.

Secondary data

Secondary data were gathered from official publications such as the Agricultural Census, NSSO surveys, and NABARD publications. This was done in addition to the relevant scholarly study that was conducted.

Statistical Analysis

The degree of mechanisation, job status (both before and after mechanisation), income trends, skill level (from unskilled to skilled), and training opportunities were the main variables that were analysed. To find patterns and relationships, quantitative data were examined using regression models, chi-square tests, paired t-tests, and descriptive statistics. To identify recurring themes on worker perspectives, socioeconomic effects, and technological acceptability, qualitative data were coded and subjected to thematic analysis. All participants provided informed permission, and ethical approval was acquired, guaranteeing that the study was carried out in compliance with accepted research procedures.

DATA ANALYSIS

Table - 1 Key Mechanised Agricultural Activities in the Research Area Impacting Employment Loss

Agricultural Operation	Small & Marginal Farmers (n=150)	Agricultural Labourers (n=100)	Machinery Operators (n=50)	Total (N=300)
Land Preparation	65 (43.3%)	50 (50%)	15 (30%)	130 (43.3%)
Sowing/Seed Drilling	45 (30%)	35 (35%)	10 (20%)	90 (30%)
Weeding/Inter-cultivation	25 (16.7%)	30 (30%)	5 (10%)	60 (20%)
Harvesting/Threshing	80 (53.3%)	70 (70%)	25 (50%)	175 (58.3%)
Transportation	35 (23.3%)	25 (25%)	20 (40%)	80 (26.7%)

Source: Computed from Primary Data.

In accordance with the figures, 58.3 percent of all respondents stated that the harvesting and threshing operations were the most mechanised and had resulted in the largest perceived loss of jobs. It is interesting to note that seventy percent of agricultural workers named this stage as the leading source of job losses. This suggests that mechanised harvesters have largely replaced human labour at times of high demand. According to 43.3% of those who participated in the survey, the use of mechanisation in the land preparation phase has resulted in a reduction in the requirement for human labour, making it the second most affected operation. It is quite likely that the excessive use of rotavators and tractors was the cause of the direct impact that was experienced by fifty percent of the agricultural workforce. To add insult to injury, thirty percent of the respondents stated that tasks such as sowing and seed drilling were excessively mechanised. A bigger number of the respondents were workers, thirty percent were small and marginal farmers, and thirty-five percent were workers. This is a direct result of the growing use of seed drills and precision sowing instruments in agricultural settings. An intriguing fact to take into consideration is that just 20 percent of respondents claimed that mechanisation had an effect on weeding and inter-cultivation, both of which are normally labour-intensive tasks. This indicates that either mechanical weeders were not commonly employed during this time period or that manual labour was still utilised during this time period due to economical or geographical constraints. Not only has the demand for traditional manual loaders and bullock carts decreased, but transportation mechanisation (via trolleys, micro trucks, and other means) has mostly impacted machinery operators, which accounts for forty percent of the total. These operators have profited from new employment categories. In general, the data indicates that there will be a significant shift in the dynamics of rural employment. This shift will be characterised by the increasing mechanisation of core field jobs, which will lead to the displacement of workers in some categories and the establishment of specialist roles in the areas of machine operation and transportation services.(Senthilkumar, 2014)

Table 2: Employment Measures Before and After Mechanisation

Indicator	Pre-Mechanisation	Post-Mechanisation	% Change
Average Labourers per Farm	6.2	3.8	↓ 38.7%
Average Daily Wage (INR)	280	320	↑ 14.3%
Average Workdays per Season	90	65	↓ 27.8%

Source: Computed from Primary Data.

Based on the facts presented, it is evident that mechanisation has a significant impact on several employment metrics in rural areas, including the following:

An average of 3.8 workers were recruited by each farm, which is a 38.7% decline from the previous average of 6.2 people. The fact that this is the case indicates that there would be a significant decrease in the need for labour, which would undoubtedly result in the loss of employment opportunities, particularly for agricultural workers who are seasonal or lack expertise. Ploughing, planting, and harvesting are all examples of tasks that have been mechanised and make manual labour redundant. Other examples include harvesting and planting. Despite the fact that the average daily wage increased by 14.3% (from ₹280 to ₹320), the increase appears to be focused within a smaller group of individuals. This group is most likely comprised of individuals who possess the ability to manage machines or possess higher levels of expertise. As a consequence of this, even though salaries from skilled jobs may have grown, there are less possibilities for work overall, which may possibly make the income gap far more pronounced. Even among those who are still employed, the average number of workdays that each season consists of has reduced by 27.8%, which indicates that the length of employment may be decreasing. The cyclical decrease in work availability may result in underemployment or relocation in the quest of employment during the off-season. Both of these outcomes are possible possibilities. Each of these two possibilities represents a potential conclusion. In conclusion, the table presents an illustration of a pattern of labour displacement, which is characterised by a competent minority that is able to reap the benefits of fewer people working for shorter periods of time at somewhat higher daily pay. The existence of this dilemma highlights how essential it is to have programs and policies that involve retraining and mechanisation in order to guarantee that the rural workforce is not left behind during the process of agricultural transformation. (Kumar et al. 2024

Table 3 Farm mechanization's effect on rising poverty levels

Opinion of Respondents	Number of Respondents	Percentage (%)
Strongly Agree	100	33.3%
Agree	50	16.7%
Neutral	80	26.7%
Disagree	70	23.3%
Total	**300**	**100%**

Source: Computed from Primary Data.

Based on the information that was acquired from the perspectives of the respondents, it appears that they had different perspectives about mechanisation and its influence on rural jobs and how people make their

living. In all, fifty percent of those who participated in the survey expressed their agreement with mechanisation (33.3% strongly agree and 16.7% agree). It is possible that this is due to the fact that they discovered that mechanisation led to increased productivity, decreased work force, and increased efficiency. This category may include individuals who own land, young people who have received training in the operation of machines, or those who are employed in the agricultural industry. A negative attitude towards mechanisation was held by more than one-fourth of the respondents, as seen by the 23.3% of respondents who voiced their disagreement with the statement. Mechanisation may be responsible for salary reductions, workforce relocations, or the marginalisation of unskilled employment, particularly among older workers and women. This may be the case due of the aforementioned factors. It should be brought to your attention that 26.7% of respondents did not have an opinion. This may be due to the fact that they were uncertain, experienced ambivalence, or were affected by the indirect consequences of mechanisation on their means of survival. Those that fit into this category include seasonal workers, semi-skilled labourers, and individuals who are in the process of transitioning careers but have not yet really experienced the repercussions of the situation. From a general standpoint, the findings suggest that although fifty percent of people living in rural areas believe that mechanisation is beneficial, a sizeable proportion of them are either not convinced by it or are not influenced by it. Because of this, it is of the utmost importance to place a strong focus on the requirement of social safety nets, skill-development efforts, and inclusive agriculture policies in order to guarantee that mechanisation will lead to rural change rather than isolation.

Table - 4 Farm Mechanization's Negative Effect on Food Security Levels

Opinion of Respondents	Number of Respondents	Percentage (%)
Strongly Agree	50	16.7%
Agree	70	23.3%
Neutral	80	26.7%
Disagree	100	33.3%
Total	**300**	**100%**

Source: Computed from Primary Data.

According to the opinion statistics, opinions on mechanisation in rural areas are mixed and lean more towards scepticism or worry: The majority of responders (33.3%) did not think that mechanisation improves employment in rural areas. This suggests that a sizable section of the rural populace—likely including agricultural labourers and disadvantaged workers—feel adversely impacted, mostly as a result

of losing their jobs, having their wages suppressed, or not being able to participate in mechanised operations. Uncertainty or ambivalence was indicated by the neutral responses of 26.7% of respondents. This category might include those whose livelihoods are impacted indirectly or who aren't convinced if mechanisation has more advantages than disadvantages. They could also be underinformed or uninformed about the results of mechanisation. However, just 40% of those surveyed had positive attitudes, suggesting support for mechanisation (16.7% strongly agree + 23.3% agree). Farmers who have access to machinery, younger responders who use machinery, or those who are seeing increases in productivity and labour savings are probably included in this section. According to the general distribution, 60% of respondents were either indifferent or disagreed, indicating a cautious or critical attitude towards mechanisation. This emphasises the necessity of inclusive measures to prevent mechanisation from exacerbating economic gaps in rural areas, such as skill development, fair access to technology, and social protections. (Memon, 2015)

Table 5 adverse effects on mental health of job displacement brought on by farm mechanisation

Opinion of Respondents	Number of Respondents	Percentage (%)
Strongly Agree	50	16.7%
Agree	150	50.0%
Neutral	60	20.0%
Disagree	40	13.3%
Total	**300**	**100%**

Source: Computed from Primary Data.

According to the findings of the study, respondents from rural regions had a generally positive attitude towards mechanisation: In the survey, fifty percent of respondents were of the opinion that mechanisation had a beneficial impact on agriculture and employment chances. This suggests that many individuals have directly benefited from increased production, less physical effort, or new options such as running machines. There was a rise in the proportion of respondents who strongly agreed, which reached 66.7%. This reveals that two-thirds of the people who live in rural areas feel that mechanisation will enhance agriculture, particularly in terms of boosting production, reducing the amount of physical strain, and increasing the potential revenue. Twenty percent of those who participated in the survey did not provide an opinion, which may be a result of a lack of information or an insufficient amount of first-hand experience with the effects of mechanisation. There is a possibility that workers who are seasonal or semi-skilled and who have not been significantly influenced, either positively or negatively, might be

included in this group. Mechanisation is perceived as a threat by a relatively small percentage of the population, which is likely comprised of those whose jobs have been eliminated or who do not have access to new opportunities that need technical abilities. This is seen by the 13.3% of respondents who did not agree with this statement. Taking everything into consideration, the interpretation reveals that the majority of respondents have a favourable attitude towards mechanisation and are in support of its implementation. Even so, the presence of both neutral and negative reactions, on the other hand, underscores the necessity of inclusive implementation. This is a process in which social safety nets, skill development, and equitable access help guarantee that no group is left behind when agriculture experiences a technological revolution. (Singh, 2017)

Table - 6 the Effects of Farm Mechanisation on the Loss of Bargaining Power

Opinion of Respondents	Number of Respondents	Percentage (%)
Strongly Agree	80	26.7%
Agree	130	43.3%
Neutral	70	23.3%
Disagree	20	6.7%
Total	**300**	**100%**

Source: Computed from Primary Data.

The information makes it abundantly evident that a sizable majority of respondents (70%) (26.7% strongly agree + 43.3% agree) think that job displacement brought on by agricultural mechanisation has negatively impacted mental health. This implies that a large number of people—particularly those from labour-intensive backgrounds—are experiencing emotional stress, worry, and insecurity as a result of fewer employment options and unstable economic conditions. The 23.3% of respondents who expressed no opinion can be those who are unsure of how mechanisation has damaged their psychological health or who are indirectly impacted. They can be people waiting for new job possibilities or moving into different positions. Very few rural residents believe that job loss due to mechanisation is unconnected to mental health problems, as evidenced by the 6.7% who disagreed with the assertion. Those who have effectively adapted, such as those who operate machinery, own property, or get government assistance programs, may be included in this small fraction. The results indicate a significant relationship between rural residents' mental health issues and job relocation. It emphasises the necessity of skill development initiatives, community involvement, and psychosocial assistance to assist vulnerable workers in adjusting to the changes brought about by agricultural mechanisation.(Kaur, 2019)

Table 7: Skill Transition and Training Needs

Indicator	Percentage of Respondents (%)
Unskilled to Semi-skilled Transition	21%
Attended Machine Operation Training	14%
Rural Youth Interested in Mechanised Jobs	35%

Source: Computed from Primary Data.

A notable skills gap in the rural workforce during the transition to mechanised agriculture is shown by the data: The fact that just 21% of respondents said they had moved from unskilled to semi-skilled positions suggests that most rural workers still lack the skills necessary to adjust to the shifting demands of mechanised farming. This restricts their capacity to hold onto their jobs in the changing agricultural landscape. The fact that just 14% had taken any machine operating training highlights how few people have access to official training courses or skill-building activities. This low number indicates a pressing need for institutional or governmental assistance to deliver accessible and reasonably priced training. Positively, if appropriate training options are made available, 35% of rural youngsters indicated interest in mechanised occupations, suggesting great future potential for a technically skilled workforce. Public-private collaborations, apprenticeships, and focused vocational programs are effective ways to capitalise on this young enthusiasm. Rural youngsters clearly want to work in mechanised agriculture, but the existing obstacles include delayed skill transfer and inadequate training. In order to guarantee that mechanisation results in inclusive and long-lasting rural employment, these issues must be addressed through organised skill development initiatives.

Table 8: Regression Model Summary

Predictor Variable	Standardized Beta (β)	Significance (p-value)
Mechanisation Level	–0.48	< 0.01
Landholding Size	+0.31	< 0.05
Access to Skill Training	+0.21	< 0.05
Model R^2	**0.62**	

With a value of 0.62 for the coefficient of determination (R2), the regression model possesses a pretty substantial explanatory power and identifies the primary elements that have an influence on job outcomes in the context of rural mechanisation. This suggests that the overall influence of the amount of mechanisation, the size of the landholding, and the availability of skill training explains for 62% of the

variation in employment outcomes. There is a correlation between higher levels of mechanisation and a decrease in employment opportunities in rural regions. This is demonstrated by the negative and statistically significant impact of mechanisation level ($\beta = -0.48$, $p < 0.01$). This is in line with the findings of previous studies that have been conducted on the effects of work migration, particularly with regard to agricultural labourers who have not had any official training. An correlation that is both positive and strong between the size of landholdings and employment ($\beta = +0.31$, $p < 0.05$) implies that larger landowners have a tendency to preserve or generate a greater number of jobs. This might be due to the fact that they have the financial means to expand into other related industries or strike a balance between mechanisation and human labour. One more positive predictor ($\beta = +0.21$, $p < 0.05$) is the availability of skill training, which emphasises the significance of skill development in mitigating the negative consequences of mechanisation. It is more likely that people will operate machines, move into semi-skilled roles, or find other employment in mechanised systems if they have received training. In conclusion, the size of landholdings and the availability of skill training are variables that act as protective or enabling factors, despite the fact that mechanisation has a significant tendency to reduce work opportunities. This recommends that policy interventions should focus on aiding smallholders and boosting access to training in order to create a more fair rural employment environment. This is in light of the fact that mechanisation is rising at an increasing rate.

Discussion

The current study explores the dual implications of agricultural mechanisation on rural employment patterns, with a particular emphasis on worker displacement and the increased requirement for skill transformation. The findings indicate a convoluted and contradictory scenario in which mechanisation has been beneficial to the rural work force while also providing challenges throughout this time period. Mechanisation has resulted in a significant reduction in the number of job opportunities available in rural areas, as seen by the 38.7% fall in the average number of workers employed by each farm and the 27.8% decrease in the number of workdays every season. Only a smaller and more competent section of the workforce is able to benefit from the 14.3% increase in daily earnings, despite the fact that it appears to be advantageous otherwise. In particular, the impact of displacement is particularly obvious among unskilled and marginal agricultural workers who do not possess the qualifications necessary to transition into other professions. This results in underemployment and diminished job security. Furthermore, this conclusion is corroborated by the regression analysis, which suggests that the degree of mechanisation has a large unfavourable influence on employment outcomes ($\beta = -0.48$, $p < 0.01$). Nevertheless, positive factors such as the availability of skill training ($\beta = +0.21$) and the size of landholdings ($\beta = +0.31$)

suggest that skilled people and larger farms are in a better position to benefit from mechanisation. This exemplifies the uneven distribution of the benefits that mechanisation brings, by demonstrating that those who have greater economic and educational advantages are able to adjust more successfully, while others fall more and further behind. It is also important to note that the paper sheds light on the mental health concerns that are related with job migration. All things considered, seventy percent of those who participated in the survey either agreed or strongly agreed that their mental health has deteriorated as a consequence of the mechanisation of the labour market. With this, the social cost of technological advancement is brought to light, which is something that is typically overlooked in talks about development. In spite of these challenges, the data reveals a promising trend among young people living in rural regions, with 35 percent indicating an interest in working in mechanised agriculture. The actual availability of skill-building programs, on the other hand, does not match this excitement. Only 21% of respondents reported switching from unskilled to semi-skilled jobs, and only 14% had attended training for machine operation. This suggests that there is a considerable gap between the opportunities available and the desires that people have, which limits the prospect of growth that is inclusive among all people. The total R2 value of the regression model is 0.62, which indicates that it has a relatively good explanatory power. This value indicates that a combination of landholding size, skill training availability, and mechanisation level may be able to explain a considerable percentage of the employment inequalities that exist in rural regions. According to the findings of the study, mechanisation is a double-edged sword: it causes certain individuals to lose their jobs, particularly those who are landless and unskilled, while simultaneously enhancing the productivity and wages of other people. The future of rural employment will be determined by the capacity to close the skills gap, increase the availability of training, and provide assistance to underprivileged groups through the implementation of targeted policies and inclusive mechanisation approaches. (Yoganandham, G., 2021).

CONCLUSION

Mechanisation has a detrimental effect on living conditions, with particular focus placed on problems with social dislocation, financial insecurity, and restricted access to essential resources. Concerns over socioeconomic inequities and hazards to livelihoods are reflected in the widespread recognition of the role that mechanisation plays in increasing the levels of poverty in rural regions. In spite of the fact that some respondents expressed concerns regarding this matter, the vast majority of respondents are of the opinion that mechanisation has very few to no adverse effects on food security. The significance of this highlights the need of doing a full study that takes into consideration the many factors of context. It is believed that the displacement of jobs brought about by mechanisation has a significant negative

influence on mental health, brought to light the emotional misery and uncertainty that individuals who are affected by this phenomenon experience. Concerns have been voiced by the majority of respondents regarding the deterioration of ecological resilience and cultural heritage. These individuals realise the negative consequences that mechanisation has had on the loss of traditional agricultural knowledge and practices. Policies that are designed to promote equitable benefit distribution and inclusive growth in the agricultural sector ought to be given the highest priority by those who create policy. In order to do this, it may be necessary to enact legislation that protects the rights of workers, provides assistance to smallholder farmers, and promotes agricultural practices that are beneficial to the environment. Investments in programs that encourage the development of skills are absolutely necessary in order to equip workers with the knowledge necessary to adapt to altering labour needs and to take advantage of new opportunities in mechanised agriculture. Local communities, stakeholders, and legislators may be able to work together to manage the advantages and difficulties brought about by farm mechanisation if these proposals are put into effect. This will help to create fair and sustainable development in agricultural landscapes.

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