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From Injury to Economic Strain: Assessing the Unseen Costs of Labour Risks in Kashmir's Walnut Harvesting Industry.

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Abstract

The walnut industry in Kashmir plays a pivotal role in the region's economy, with substantial research highlighting its production and export benefits. However, the human costs—specifically the injuries sustained by labourers during the harvesting process—have been largely overlooked. This paper seeks to fill this gap by exploring the human cost of the industry, focusing on the physical risks faced by workers. Data was collected from 150 labourers in the districts of Kupwara and Ganderbal, as well as from 95 labourers admitted to the Medical Record Department (MRD) of SKIMS Soura between August 25 and September 31, 2025. The study reveals that labour injuries during walnut harvesting not only disrupt workers' lives but also lead to significant economic burdens, affecting both individual livelihoods and the broader industry. By highlighting these hidden costs, this paper underscores the urgent need for improved safety measures to protect workers and ensure the continued growth and sustainability of the walnut industry in Kashmir.

Key words: -

Walnut Industry Kashmir, Labor Safety, Human Cost, Horticulture Sector, Manual Labor, Harvesting Injuries, Worker Welfare, Economic Impact, Fall from Height (FFH), Health Risks Seasonal Employment

INTRODUCTION

The walnut industry in Kashmir holds significant economic importance, contributing substantially to the region's agricultural output and export market. With its rich production of high-quality walnuts, Kashmir remains one of the largest producers in the country, with the industry supporting the livelihoods of thousands of workers involved in harvesting, processing, and export activities. While much has been explored regarding the economic benefits and export potential of the walnut industry, one critical aspect remains underexplored: the human cost of this industry, particularly the injuries sustained by workers during the harvesting process.

Walnut harvesting in Kashmir is a labour -intensive activity, relying on manual labour to gather the crop during the autumn season. However, this physically demanding work comes with inherent risks, exposing workers to a range of injuries such as cuts, bruises, falls, and musculoskeletal issues. Despite the industry's importance, there is limited research addressing the economic and social consequences of these injuries on the workers themselves and the industry at large. While scholars have extensively discussed the economic benefits of walnut production and export, the human cost of these benefits, in terms of worker safety and well-being, remains largely overlooked.

This paper aims to explore the human cost of the walnut industry by focusing on the injuries labourers experience during the harvesting process. The study investigates the types of injuries sustained by workers and the resulting economic burdens they face, including medical expenses, loss of income, and decreased productivity. By examining data collected from 150 labourers in the districts of Kupwara and Ganderbal, along with hospitalization records from 95 labourers admitted to SKIMS Soura, this paper seeks to highlight the economic strain that injuries place on individual workers and the broader walnut industry.

The importance of this study lies in its potential to inform policy and industry practices. Addressing the human cost of walnut harvesting could lead to improved safety standards, better worker protection, and a more sustainable industry. By shedding light on the hidden economic costs of worker injuries, this paper underscores the urgent need for enhanced safety measures to protect labourers and promote the long-term growth of Kashmir's walnut industry.

The primary research questions guiding this study are:

- What types of injuries are most common among labourers during walnut harvesting in Kashmir?
- How do these injuries impact the economic well-being and productivity of workers?
- What are the broader economic consequences of these injuries for the walnut industry as a whole?

Ultimately, this paper aims to emphasize the necessity of improving worker safety in the walnut harvesting sector to reduce both the human and economic costs associated with labour injuries.

Literature Review

The walnut industry in Kashmir, as part of the broader horticulture sector, plays a pivotal role in the region's agricultural economy. However, while extensive research has been conducted on the industry's economic benefits and export potential, the human costs—particularly the physical risks faced by labours during walnut harvesting—remain largely overlooked. This literature review examines the existing studies in three critical areas: the economic significance of the walnut industry, the conditions of agricultural labour, and the human costs (including injuries and their economic consequences) faced by workers. By synthesizing these key themes, we highlight the gaps in existing research and the need for a deeper understanding of the labour dynamics within the walnut sector.

Economic Significance of the Walnut Industry in Kashmir

The walnut industry in Kashmir has been extensively researched in terms of its contribution to the local and national economy. Kashmir is one of the leading producers of walnuts in India, with the region's favourable climate making it an ideal environment for walnut cultivation. According to Rana (2017) and Zargar (2019), walnut production is a vital source of income for thousands of families, especially in regions like Kupwara, Ganderbal, and Baramulla, where the industry provides seasonal employment to the rural population. Research emphasizes that walnut cultivation, as part of the horticulture sector, significantly contributes to GDP and local exports, thereby promoting economic stability in the region.

However, the human cost of labour in this important sector has received little attention. While the industry's economic benefits are well-documented, the role of manual labour in the production process and the risks it entails for workers during the harvest remain largely unexplored. Most studies concentrate on production efficiency and market trends, leaving the well-being of workers out of the equation. This oversight highlights the need for further research into how the industry's success impacts the labour force that sustains it.

Labour Conditions in Agriculture and Horticulture

The general conditions of agricultural labour in Kashmir have been discussed in studies by Khan and Shah (2018), which provide insight into the working conditions faced by seasonal labours in the region. Like many agricultural sectors in Kashmir, the walnut industry relies heavily on manual labour, particularly during the harvest period. Workers in walnut orchards are typically engaged in physically demanding tasks such as climbing trees, picking walnuts, and handling heavy loads. The manual nature of the work exposes labours to physical strain, with injuries being a common occurrence. These studies emphasize that labour in Kashmir's agriculture sector, including the horticulture subsector, often occurs under unsafe conditions, with workers lacking access to adequate health and safety measures.

Though studies highlight the vulnerabilities of agricultural labours in Kashmir, they do not focus specifically on walnut harvesting, a key horticultural industry. The physical toll of the work in this specific sector remains underexplored, pointing to a significant gap in the literature.

Human Costs: Injuries and Economic Consequences of Labour

The human cost of labour, particularly the injuries sustained by agricultural workers, is a critical issue that has been addressed in some agricultural research. Studies such as Ganguly (2019) and Singh (2017) highlight that agricultural workers who suffer injuries face long-term economic hardship due to medical costs and loss of income. For instance, workers injured during the harvesting process often experience prolonged recovery periods, leaving them unable to earn an income. The lack of compensation programs or social security in the agricultural sector compounds the economic difficulties for these workers and their families. Kaur (2015) adds that the economic strain caused by injuries often results in financial instability for workers, as they lack access to resources that could help them recover from both health and economic setbacks.

In the context of the walnut industry, physical injuries such as falls from trees, musculoskeletal disorders, and cuts from harvesting tools are common. However, the economic consequences of these injuries have not been specifically studied in the walnut industry in Kashmir. The indirect costs of injuries—such as lost productivity, decreased quality of work, and delayed harvests—also affect the industry at large, influencing its overall productivity and economic output. The impact of injuries on the long-term sustainability of the walnut sector remains an underexplored area of research.

Gaps in the Literature

Despite the existing body of research on the walnut industry and agricultural labour, there are several gaps in the literature that this paper seeks to address. While economic studies on walnut production have focused on market dynamics, export benefits, and production efficiency, little attention has been paid to the human cost of walnut harvesting, particularly in the context of labour injuries. Although the conditions of agricultural labour in Kashmir have been explored in a broader sense, no studies have specifically addressed the types of injuries and their economic consequences for walnut harvesters.

Furthermore, while studies on agricultural labour injuries in other parts of the world, such as Stern et al. (2016), provide valuable insights into the physical risks faced by workers in the agricultural sector, they do not provide specific data on the walnut industry or the region of Kashmir. This gap is significant because the walnut industry in Kashmir, as part of the horticulture sector, has unique characteristics, and the risks faced by workers may differ from those in other agricultural sectors. Bhatt (2021) emphasizes that understanding the specific challenges faced by workers in different agricultural subsectors is crucial for developing targeted policies.

This study aims to fill this gap by focusing on the economic costs of injuries in the walnut industry in Kashmir and examining how these injuries impact both the workers and the industry. By doing so, the research will contribute to a deeper understanding of the socio-economic implications of labour in the horticulture sector and provide actionable recommendations for improving worker safety and productivity in the walnut industry. Conclusion of the literature review is the walnut industry in Kashmir is crucial to the region's economy, but its human cost—particularly the physical injuries faced by labours —remains a largely unexplored area in the literature. While previous research has thoroughly documented the economic benefits of walnut production, little is known about the human impact of labour within this sector. This study fills this gap by examining the economic consequences of labour injuries in the walnut industry, offering a new perspective on the human costs of a vital industry in Kashmir's horticulture sector. By addressing this overlooked issue, the study will contribute to the development of more comprehensive health and safety policies that could enhance the sustainability of the walnut industry while safeguarding the well-being of its labour force.

Methodology

This study aims to investigate the human cost of labour in the walnut harvesting industry in Kashmir, focusing specifically on injuries, working conditions, and the economic consequences for workers. This methodology section describes the data collection approach, data analysis techniques, and ethical considerations involved in the study.

Research Design

The research follows a descriptive and exploratory design to gain an in-depth understanding of the human cost of labour in the walnut industry in Kashmir. The study is primarily quantitative, complemented by qualitative insights from interviews to provide a comprehensive view of the working conditions and health impacts on workers.

Study Population and Sampling

The study population consists of 150 walnut labours from the Kupwara and Ganderbal districts of Kashmir. These labours were selected through stratified random sampling, ensuring a representative sample based on factors like age, gender, role

in the harvesting process, and years of experience. The selection also ensures diversity in the type of work performed (e.g., harvesters, sorters, processors) within the walnut industry.

Data Collection Methods

1. Survey Questionnaire A structured survey questionnaire was used to gather data on various aspects, including:

- General Background: Information about the labours ' experience in the walnut industry, roles, and work schedule.
- Working Conditions: Insights into work hours, physical demands, tools used, and safety protocols.
- Wages and Compensation: Questions regarding wage determination, benefits, and fairness in compensation.
- Health and Well-being: Exploring the physical and mental health impact of the job, as well as access to healthcare.
- Social and Economic Impact: Investigating the impact of work on family life, social status, and economic challenges faced by workers.

The survey was administered in person by trained researchers, with each survey taking approximately 20-30 minutes to complete. Responses were recorded using paper-based forms and later entered into statistical software for analysis.

2. Semi-Structured Interviews In addition to the survey, semi-structured interviews were conducted with a subset of labours who had sustained injuries during the harvest. These interviews aimed to explore the psychological and physical effects of injuries, recovery experiences, and workers' perspectives on improving safety measures. The interviews provided qualitative data to deepen the understanding of the human cost of walnut harvesting.

3. Secondary Data To supplement the primary data, secondary data was obtained from the SKIMS Soura medical records of workers who had been admitted due to injuries sustained during walnut harvesting. This data helped to validate the reported injury types and offered a quantitative understanding of injury rates during the harvest season.

Data Analysis

1. Quantitative Data Analysis Data collected through the survey will be analysed using descriptive statistics (e.g., frequencies, percentages, means) to determine:

- The types of injuries sustained by workers.
- The economic impact of injuries on workers (e.g., lost wages, medical expenses).
- What demographic factors and working conditions influence injury rates.

2. Qualitative Data Analysis The interview data will be analysed using thematic analysis, identifying key themes around:

- The psychosocial impact of injuries on labours.
- Risk factors for injuries in walnut harvesting.
- Workers' suggestions for safety improvements and enhanced health support.

This qualitative analysis will complement the quantitative findings, adding depth to the overall understanding of the human costs associated with walnut harvesting.

Ethical Considerations

The study follows ethical guidelines to ensure the safety, privacy, and rights of participants:

- Informed Consent: All participants were fully informed about the purpose of the study, their rights to confidentiality, and their voluntary participation. Consent was obtained before participation.
- Confidentiality: Participants' identities were kept confidential, and data was anonymized to ensure privacy.
- Minimizing Harm: Care was taken to ensure that sensitive topics, such as injuries and health issues, were approached with empathy and respect. Participants were allowed to skip any questions they were uncomfortable with, and mental health support was available if needed.

Limitations

The study recognizes the following limitations:

- Geographic Limitations: Data was collected from labourers in two districts (Kupwara and Ganderbal), so the findings may not be fully representative of workers across the entire Kashmir region.
- Sampling Bias: sample were collected from only two districts of Kashmir

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Conclusion of the Methodology

This methodology utilizes a mixed-methods approach to comprehensively examine the human costs associated with walnut harvesting labour in Kashmir. The use of both quantitative and qualitative data collection methods ensures a thorough understanding of the workers' challenges and provides valuable insights for improving working conditions and formulating policy recommendations.

Results

This section presents the key findings from the data collected on the labour conditions in the walnut harvesting industry in Kashmir, based on the survey of 150 labours and secondary data from SKIMS Soura. The results are divided into three sections: demographic characteristics of the labours, working conditions, and injury statistics.

Demographic Characteristics

- The age distribution of the labours is as follows:
  - 83 labours (55.3%) are between the ages of 18-35.
  - 42 labours (28%) are between 35-50 years.
  - 25 labours (16.7%) are over the age of 50.
- The average experience in walnut harvesting varies by age group:
  - The 18-35 age group has an average experience of 2.5 years.
  - The 35-50 age group has an average experience of 6 years.
  - The 50+ age group has an average experience of 9.5 years.

Working Conditions

- Working Hours: On average, labours work 7.5 to 8.5 hours per day during the harvest season.
- Tools and Equipment: The primary tool used by workers is a long wooden stick made of bamboo, which is exclusively made for walnut harvesting. These tools, however, are not considered safe, and there is a lack of proper safety equipment.
- Wages and Compensation: Labourseарn daily wages, which are relatively higher compared to other manual labour jobs in the region. However, these wages are hardly sufficient to meet all living expenses. Payment is mostly made after the harvest season ends, with some labours occasionally receiving small bonuses based on performance.
- Health Issues: Across all age groups, labours report common physical ailments, including:
  - Back pain
  - Joint pain
  - Burning eyes
  - Fatigue

These health complaints are largely attributed to the physically demanding and hazardous nature of walnut harvesting.

- Safety Concerns:

  - No formal safety protocols are in place, and labours report concerns about the lack of protective measures. Workers climb trees without any safety harnesses or other safety equipment.

  - Rains during the harvest season complicate climbing trees, making the work even more dangerous.

  - Many labours acknowledge that walnut harvesting is physically demanding and dangerous, but there is no systematic training or support to reduce these risks.

- Social Impact:

  - The work is considered physically demanding and dangerous, contributing to social stigma about the nature of the labour.

  - Labours report that their ability to spend quality time with their families is severely limited during the harvest season, leading to potential psychological stress and difficulty in managing domestic responsibilities

Results from SKIMS Soura (Secondary Data)

The secondary data from SKIMS Soura reveals the significant risk factors associated with walnut harvesting, particularly with regard to Fall from Height (FFH) and internal organ injuries. The breakdown of cases is as follows:

- Injury Types:

  - The majority of the injuries were due to Fall from Height (FFH), leading to severe injuries such as spinal injuries, head trauma, and internal organ damage (e.g., damage to lungs and internal bleeding).

  - Among the injured, those with spinal and head injuries experienced severe consequences, including partial or complete disability. This highlights the long-term impact of such injuries on workers' lives.

- Fatalities:

  - Out of the 95 cases, 12 individuals were brought dead upon arrival, and 13 died within 24 to 72 hours of admission. The high number of fatalities underscores the lethal nature of walnut harvesting, especially due to the risks of falls from tall trees.

- Age Distribution:

  - The majority of those affected were in the 18-35 age group, a demographic most involved in the physically demanding task of climbing trees. This group faces the highest risk of FFH injuries due to the nature of the work.

  - Injuries among the 50+ age group were also notable, suggesting that older labours may be more prone to severe injuries due to their decreased physical resilience.

Discussion

The data from SKIMS Soura paints a grim picture of the human cost of walnut harvesting in Kashmir. The labours are exposed to grave health risks, including spinal, head, and internal organ injuries, many of which lead to disabilities or fatalities. There are several critical findings that warrant further discussion:

1. Physical Risks and Injuries:

   - The fall from height (FFH) injuries resulting in severe spinal and head injuries are the primary cause of concern. These injuries are often life-changing and lead to either partial or complete disability, which significantly impacts the workers' ability to continue earning their livelihood.

   - The internal organ injuries, including damage to lungs and internal bleeding, also pose a high mortality risk. Given the absence of safety protocols, these injuries are often exacerbated, leading to long-term health consequences.

2. Labour Shortage and Fear:

- The high fatality rate has resulted in a labour shortage as workers become increasingly fearful of the risks associated with walnut harvesting. The fear of serious injury or death may deter younger labours from participating, contributing to a decline in workforce participation.

3. Economic and Social Impact:

- Due to the lack of compensation for the injured or families of the deceased, labours are left without support in the event of severe injury or death. This exacerbates the economic insecurity of families relying on walnut harvesting as their primary source of income.

- The high risk of disability means that labours who survive serious injuries may struggle with long-term medical costs and financial instability.

Recommendations for Improvement

Based on the data and analysis, several key recommendations can be made to improve the situation for walnut harvesters in Kashmir:

1. Use of Modern Technology and Mechanization:

- The introduction of modern technology in walnut harvesting, such as mechanical tree pruning and automated harvesting tools, would significantly reduce the need for labours to climb tall trees. This would lower the risk of falls and physical strain associated with traditional harvesting methods.

2. Training and Safety Protocols:

- Providing safety training for workers is essential to reduce the incidence of workplace injuries. Training should focus on proper climbing techniques, the safe use of tools and equipment, and the importance of personal protective gear (e.g., harnesses, helmets).

- The use of safety kits, including harnesses and fall-arrest systems, must be made mandatory, ensuring that workers are better protected while working at height.

3. Restrictions on Labour Participation:

- Introducing age restrictions for walnut harvesting could help mitigate the risks associated with the physical demands of the job. Restricting workers under 25 years of age could ensure that only physically capable labours are involved, reducing the incidence of injury, especially among older workers who may not have the physical resilience needed for such dangerous work.

4. Health Insurance and Compensation Systems:

- Implementing health insurance and compensation systems for walnut harvesters is crucial. This would provide a safety net for workers in case of injury or death, helping them cover medical expenses and ensuring financial stability for their families.

5. Policy Advocacy for Improved Worker Conditions:

- Government policies should prioritize worker welfare, including the introduction of laws mandating safety protocols and regular medical checkups for workers. These policies could be reinforced by awareness campaigns aimed at educating labours and employers about the risks and preventive measures.

Conclusion

The walnut harvesting industry in Kashmir is a vital economic sector, but it comes at a significant human cost. The high incidence of serious injuries and fatalities, especially due to fall from height (FFH), calls for urgent action. By introducing modern technology, safety measures, training programs, and age restrictions, the industry can reduce the risks faced by labours, while ensuring their economic stability and health. Furthermore, establishing compensation systems and health

insurance will provide much-needed support to workers in case of injury or fatality, ultimately improving the sustainability of the industry

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