

# MAINSTREAMING GREEN SKILLS THROUGH LIFE SKILLS EDUCATION: A STUDY ON AWARENESS AND IMPLEMENTATION

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## ABSTRACT

Green skills are the technical skills, knowledge, values and attitudes needed in the workforce to develop and support sustainable social, economic and environmental outcomes in business, industry and the community.

**Aim:** The aim is to examine their knowledge, mastery, application, and development of green skills essential for sustainable development and growth.

**Purpose:** The purpose of the study is to understand the level of awareness and understanding of green skills among postgraduate students and suggest few recommendations to enhance green skills.

**Method:** The researcher has adopted Descriptive Research Design. Convenient sampling method was used select the samples. The sample size for the study was 108. The respondents were administered with the self-prepared questionnaire with four dimensions. The dimensions are Understanding, Mastery Application and Development of Green Skills.

**Findings:** Despite postgraduate students exhibiting a fundamental comprehension and even proficiency in green skills, a notable disparity exists in their implementation of these competences in both personal and professional contexts.

**Conclusion:** This underscores the need for life skills into education systems to move beyond knowledge transmission and focus on experiential, interdisciplinary approaches that bridge the gap between knowing and doing.

**Key Words:** Green Skills, Life Skills, Sustainable Development

## INTRODUCTION

Education and sustainability remain two of the most pressing issues at this juncture in human history. As several interconnected issues threaten the establishment of a sustainable, just, and peaceful future, education for sustainability becomes even more important. The 21st century educational industry faces the issue of preparing pupils who are truly competitive. According to a study by Zolkifli et al. in 2018, employers in the 21st century are looking for individuals with a range of essential skills, such as the ability to tackle complex problems, think critically and creatively, and effectively manage and interact with others. The list also highlights the importance of emotional intelligence, sound judgment, and strong decision-making skills, as well as being service-oriented, a skilled negotiator, and adaptable in the face of change. In this perspective, the country's goal of developing a generation with 21st-century capabilities is analogous to the green technology strategy. The students are preparing a variety of abilities for global society.

**DEFINITION OF GREEN SKILLS:** According to UNESCO-UNEVOC, green skills are the technical knowledge, values, and attitudes necessary to support a sustainable, resource-efficient society and help individuals and businesses reduce environmental impact in all sectors.

**SIGNIFICANCE OF GREEN SKILLS:** Green skills are technical and cross-cutting capacities facilitating environmentally friendly practice (ILO, 2011), whereas life skills like decision-making, critical thinking, and working in partnership enable people to apply knowledge to action (UNESCO). Incorporating green skills into life skills education fills the gap from awareness to action by enabling learners to contribute significantly to sustainable development. To better understand the green skills, the knowledge on Green Economy & Green Industry are very important. A green economy can be viewed as a paradigm for long-term growth since it supports social, economic, and environmental progress and sustainability. The concept of a green economy has been explored and defined in numerous ways by a range of organisations, each drawing on distinct research findings and tailored to specific groups. Notably, the United Nations Environment Programme has put forth a compelling vision, envisioning a green economy as one that seamlessly integrates social equity, minimal carbon footprint, and judicious use of energy resources, ultimately mitigating environmental risks while markedly enhancing overall social welfare. The emergence of the green economy, increased by a combination of public and private

sector investments, is poised to have a profoundly positive impact on both the environment and local communities. As this sustainable economic model continues to take shape, it is expected to not only generate new job opportunities and boost income levels but also yield a range of environmental benefits. These include a significant decrease in pollution, enhanced energy and resource efficiency, and a concerted effort to preserve biodiversity and safeguard fragile ecosystems, ultimately contributing to a more balanced and resilient natural world, as noted by researchers such as Heong et al. in their 2016 study.

Green jobs are created within green industries that focus on protecting the environment and conserving natural resources. These occupations involve producing goods or offering services that support environmental sustainability. In essence, green jobs aim to minimize resource consumption and promote eco-friendly production processes. Therefore, individuals need to develop green skills to qualify for and succeed in such environmentally responsible careers (D. G. De Silva et al.).

Hard and soft skills are no longer enough to land a job, especially in the green industry. Green skills which is otherwise known as sustainable life skills or environmental skills. These skills refer to the understanding, talents, and abilities needed by individuals to help create a more sustainable and environmentally responsive society and economy. These talents include both technical and life skills that allow people to comprehend, promote, and execute environmentally conscious procedures in a variety of businesses and occupations. Green skills are critical for solving environmental issues like climate change, resource conservation, pollution reduction, and sustainable resource management. They play an important role in promoting a more environmentally conscious and sustainable future. Green skills development in the framework of lifelong learning, which incorporates numerous SDGs, is inextricably linked to environmental protection, climate change mitigation, equitable economic growth, and decent work for all. UNESCO's 2030 education plan includes an emphasis on greening skills in technical and vocational education and training (TVET).

## **TYPES OF SKILLS**

Green skills encompass a diverse set of competencies that can be classified into two categories: technical skills and Life skills. Individuals must contribute to environmental conservation and accountability.

### **Technical Skills (Green Skills):**

Technical skills, sometimes known as "green skills," are industry-specific competencies that enable people to engage directly with technology, procedures, and practices that lessen environmental impacts. These abilities are especially helpful in fields like energy, construction, waste management, and agriculture that have a direct impact on the environment. The following are some examples of technical green skills:

- **Renewable Energy Technologies:** Expertise in renewable energy installation, maintenance, and operation, including solar, wind, and hydropower systems.
- **Energy Efficiency:** Optimize energy utilization in buildings, industries, and transportation to decrease waste and greenhouse gas emissions.
- **Sustainable Agriculture:** Understanding ecologically conscious farming techniques, such as organic farming and crop rotation, to reduce environmental effect.
- **Waste Management:** Learn recycling, composting, and trash reduction practices to minimize landfill waste and promote resource conservation.
- **Green development and Design:** Demonstrated expertise in designing sustainable constructions with high energy efficiency, eco-friendly materials, and green technology.

### **Life skills**

According to UNESCO's definition of life skills in 2017, they refer to "a set of psychosocial and interpersonal skills to inform decisions, to establish effective communication, and to adopt coping and management strategies." When skills such as empathy, ethics, communication, and problem-solving are realized as facilitators for the implementation of green skills in real-life scenarios, the relationship with sustainability is made clear.

- **Communication:** The capacity to explain complex environmental concepts and initiatives to a diverse variety of audiences, including stakeholders, coworkers, and the general public.
- **Teamwork and Collaboration:** Successfully addressed environmental concerns and implemented sustainability programs with diverse teams and stakeholders.
- **Problem Solving:** Demonstrates expertise in identifying environmental challenges, analyzing data, and developing new solutions to promote sustainability.
- **Adaptability:** Ability to adapt to changing environmental regulations, new green technology, and best practices.
- **Leadership:** Encourage sustainable practices and advocate for environmental stewardship in organizations and communities.

Technical (Green skills) and life skills are both essential for creating a sustainable and ecologically conscious future. Individuals who possess a combination of these skills can solve environmental issues, reduce their environmental footprint, and make a difference to a more sustainable and environmentally aware society.

### **GREEN LIFE SKILLS: BUILDING YOUTH CAPACITY FOR SUSTAINABLE DEVELOPMENT:**

Half of the world's population is aged 30 or younger, and this figure is expected to rise to 57% by 2030, making today's youth the largest generation in history. This demographic presents both a significant challenge and a critical opportunity. Prioritizing green skill development is essential for equipping young people to lead and actively participate in a just transition toward a sustainable future—one that promotes environmental responsibility and social equity. According to the International Labour Organization (ILO), a shift to sustainable energy systems and a circular economy has the potential to create over 100 million new jobs. However, this transition will also lead to the decline of certain traditional roles, requiring young people to be adaptable and well-prepared. Alongside green skills, life skills such as critical thinking, decision-making, emotional resilience, communication, and collaboration are equally important. These competencies enable youth to cope with the dynamic nature of green economies, engage in sustainable innovation, and contribute meaningfully to their communities. As emphasized by UNESCO (2017), integrating life skills into educational frameworks fosters responsible citizenship and empowers learners to convert knowledge into action—an essential step toward achieving the Sustainable Development Goals.

Furthermore, governments across the globe are introducing increasingly stringent environmental regulations in response to the escalating climate crisis and resource depletion. To comply with these evolving standards and avoid potential penalties, it is imperative for both organizations and individuals to adopt environmentally conscious practices. Understanding and aligning with these regulations is not only a legal necessity but also a strategic approach for ensuring long-term sustainability and competitiveness. Environmental literacy and responsible behaviour are, therefore, essential components of modern professional and personal life, reinforcing the broader goal of sustainable development. Governments across the world are ratifying sturdier environmental rules. All the citizens and the Organizations must have green skills to comply with these rules and avoid penalties. Understanding and adhering to these principles is critical for the sustained achievement of both businesses and individuals.

### **GOVERNMENT OF INDIA'S GREEN SKILLS MISSION: SHAPING CLIMATE-READY YOUTH:**

- The Government of India plans to expand the Green Skill Development Programme (GSDP) Nationwide.
- After a successful pilot project in 2017, the ministry expanded the Green Skill Development programme.
- The financial allocation for Environmental Information system (ENVIS) grew by 33% in 2018-19, with an emphasis on sponsoring training courses under the Green Skill Development Programme.
- The Green Skill Development Programme (GSDP) of the Ministry of Environment, Forest and Climate Change (MoEF&CC) aims to equip India's young with skills in the environment and forest sector, leading to gainful employment or self-employment opportunities.
- The initiative aims to produce green skilled individuals with technical expertise and a commitment to sustainable development. It will contribute to the achievement of the Nationally Determined Contributions (NDCs), Sustainable Development Goals (SDGs), National Biodiversity Targets (NBTs), and Waste Management Rules (2016). (Ministry of Environment, Forest and Climate Change [MoEF&CC], n.d.)

## **REVIEW OF LITERATURE**

The LinkedIn 2023 Green Skills study also shows a change in green skills and occupations, noting that green talent in the workforce increased by 12.3% between 2022 and 2023. Around the world, one in every eight workers has one or more green talents as they continue to green-skill and transition into green and greening employment. Pirzada, Naz, and Jamil (2023) explores the perceptions of vocational educators regarding the integration of green skills into vocational education and training (VET) in Pakistan. Pakistani educators acknowledge the need of green skills for sustainability; however, they encounter difficulties because of a lack of funding and training. They are in favour of incorporating green ideas into all-disciplinary vocational curriculum. Recycling and conserving energy and water are two specific areas of concentration. Teachers think green education inspires students to be environmentally conscious despite challenges. According to the report, multi-stakeholder cooperation is necessary for the effective implementation of green skills in VET.

Dr. D. Thirumala Rao's (2023) study examines the development of green job employment reforms in India. It draws attention to how labour markets are changing due to environmental sustainability, which is driving up demand for eco-friendly skills. The study highlights green energy regulations and government programs like Skill India as catalysts for green jobs. Additionally, sectoral potential in sustainable agriculture, waste management, and renewable energy are covered. In order to close the green skill gap, the study's conclusion emphasizes the necessity of awareness-raising, vocational training, and policy alignment.

Recent studies in higher education (e.g., Budwig, 2020; Singh & Mishra, 2021) further confirm that interdisciplinary approaches—combining environmental education with skill-based learning—are more effective in changing students' attitudes and behaviours than traditional subject-based models. These approaches promote holistic learning, wherein students develop both the technical know-how and the personal responsibility needed for sustainable living and leadership. Implementing green skills in higher education institutions may help students reduce greenhouse gas emissions, boost awareness of green practices, and foster a good attitude towards environmental care. (Ibrahim et al., 2020). On the other side, Kamis et al. (2017) incorporate technical skills into

green skills, in line with (Setiawan, 2017), who believes that green skills comprise both hard and soft abilities. With the fourth industrial revolution allowing Malaysia to develop in accordance with the green economy, future human resource development must be equipped with general green competencies. Based on the 11th Malaysia Plan, it contains an agenda for generating and developing talented individuals that can inspire future national economic growth, as well as promoting a culture of green technology among secondary students; this is a significant stage for secondary school education through a creation of a more effective syllabus (Arasinah et al., 2016).

Ramlee (2015) emphasizes that education and training are critical to the success of transitioning the economy to the establishment of a green economy and a clean environment that promotes overall economic growth. Thus, components of sustainability or green skills should be integrated in school, university, and skill training curriculum to develop environmentally conscious people resources.

According to Brown (2013), there is a need to integrate a regular green skills component in elementary school to build green technologies and raise knowledge of the need of environmental conservation. We should approach our environmental actions with a high level of knowledge and comprehension. It also has a significant impact on how people interact with their surroundings.

Tilbury and Wortman (2011) highlight the fact that Education for Sustainable Development (ESD) requires moving past the delivery of content to approach learning from an experiential, values-centred foundation with cognitive, emotional, and action-related dimensions. Mochizuki and Fadeeva (2010) further posit that sustainable development calls for education systems to address the gap between knowledge and practice through mainstreaming sustainability principles into all learning areas and skill areas.

We ought to handle our environmental actions with a high level of knowledge and comprehension. It also plays a significant part in influencing people's behaviour toward their surroundings. Zaharim et al. (2009) defined personal qualities as an individual's positive attitudes and traits that are utilized to get, keep, and succeed in work. McKeown (2002) believes that education is critical to long-term growth. One of the declaration's four out of eight agendas is to include greening skills into the TVET curriculum to achieve sustainable development, which includes poverty reduction and economic inclusion. We should approach our environmental actions with a high level of knowledge and comprehension. It also has a significant impact on how people interact with their surroundings.

## RESEARCH METHODOLOGY

**Aim:** The aim is to examine their knowledge, mastery, application, and development of green skills essential for sustainable development and growth.

**Objectives:**

1. To examine the demographic characteristics of the respondents.
2. To understand the level of green knowledge among postgraduate students.
3. To elicit the proficiency of postgraduate students in green skills.
4. To analyse the application and development of green skills among postgraduate students

**Methodology:** The researcher has adopted Descriptive Research Design to examine the knowledge, mastery, application, and development of green skills among postgraduate students. The Non-probability sampling technique, using Convenient sampling method to select the samples. A minimum of 15 participants were selected from each of the six departments across colleges in Chennai, resulting in a total sample size of 108 students. Data were collected using a self-constructed questionnaire developed by the researcher, which was designed to measure four dimensions of green skills: (i) understanding of green knowledge, (ii) mastery of green skills, (iii) application of green skills, and (iv) green skills development among postgraduate students. The data was analysed through SPSS (Statistical Package for Social Sciences).

### Ethical Considerations

Ethical standards were strictly observed throughout the study. Prior to data collection, participants were briefed about the objectives and purpose of the research. Their voluntary informed consent was obtained, ensuring that participation was free of coercion. Participants were also assured of confidentiality and anonymity, with responses used solely for academic purposes. These measures ensured compliance with ethical research practices.

## ANALYSIS AND INTERPRETATION

### Figure No. 1 Distribution of Respondents

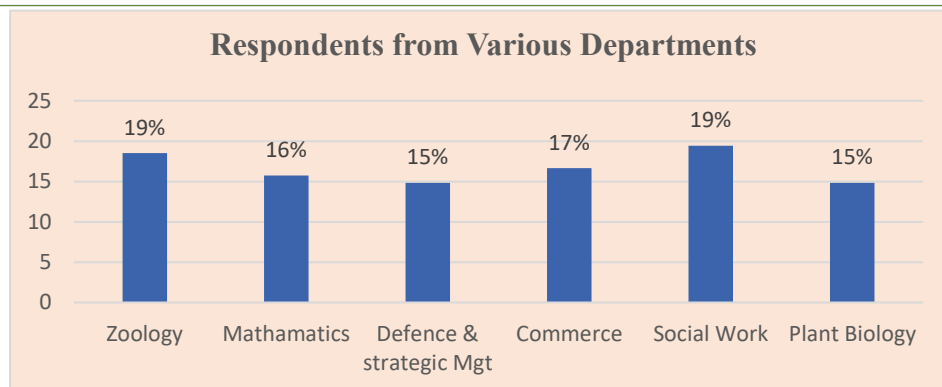


Figure -1, states that 15 percentage of the respondents are from all the departments. The awareness level of Green Skills among the post graduate students were analysed.

**Figure No. 2** Distribution of respondent by Gender

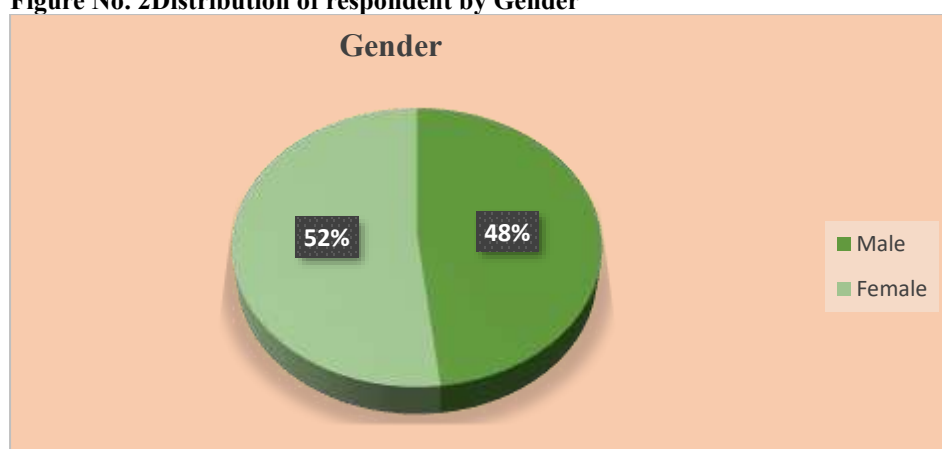


Figure - 2, depicts that nearly half of the respondents (52%) are female and 44 percent of the respondents are male. Female students were interested in answering to the questionnaire.

**Figure No. 3** Awareness on Green Skills

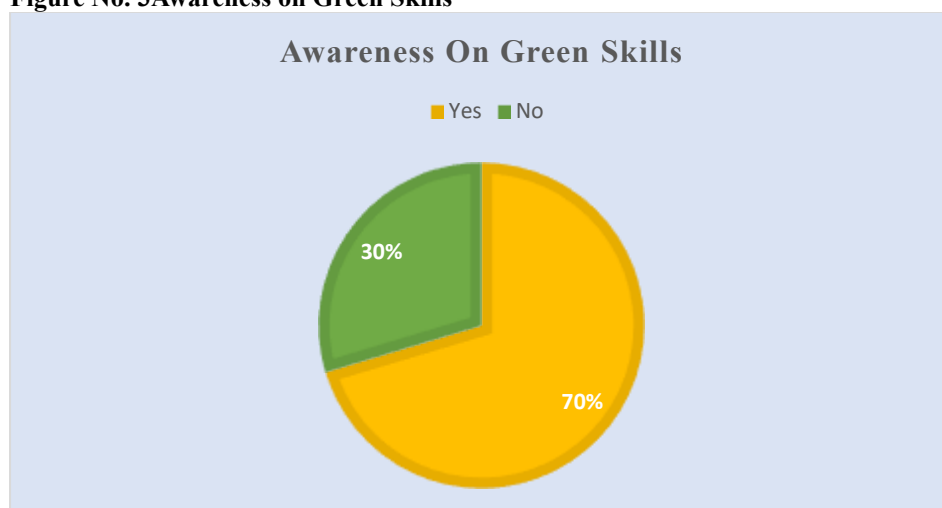


Figure - 3, shows that 70 percent of the respondents are aware of the green skills and 30 percent of the respondents were not aware of the green skills.

**Table No. 1** Gender wise distribution of awareness on Green Skills

| Gender | Awareness on Green Skills |    |       |
|--------|---------------------------|----|-------|
|        | Yes                       | No | Total |
| Male   | 41                        | 15 | 56    |
| Female | 35                        | 17 | 52    |

|       |    |    |     |
|-------|----|----|-----|
| Total | 76 | 32 | 108 |
|-------|----|----|-----|

Table – 1, reveals that awareness is slightly higher among males (73%) compared to females (67%). According to UNESCO's 2017 report, "Greening Technical and Vocational Education and Training," technical courses are typically where male students are exposed to more green skills. In domains where there are typically more male students, such as engineering or environmental sciences, awareness was higher.

**Table No. 2 Understanding of Green Knowledge**

| Understanding of Green Knowledge                                                                                  | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|-------------------------------------------------------------------------------------------------------------------|----------------|-------|---------|----------|-------------------|
| I understand what environment protection is                                                                       | 40             | 59    | 7       | 1        | 1                 |
| I possess professional knowledge of topics such as energy, waste, resource efficiency and sustainable development | 31             | 56    | 17      | 3        | 1                 |
| I possess knowledge of topics such as energy conservation and ecosystem protection                                | 33             | 57    | 15      | 2        | 1                 |
| I possess knowledge of environmental management responsibility                                                    | 32             | 59    | 11      | 4        | 2                 |

Table - 2, shows that 59 out of 108 respondents agreed that they understand about environment protection and 40 of them strongly agreed and very few have disagreed to the statement. High agreement is seen for knowledge on sustainable development, energy conservation, and environmental responsibilities.

**Table No. 3 Mastery of Green Knowledge**

| Mastery of Green Knowledge                                                                                     | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|----------------------------------------------------------------------------------------------------------------|----------------|-------|---------|----------|-------------------|
| I possess knowledge of environmental protection skills                                                         | 24             | 55    | 20      | 7        | 2                 |
| I possess management of work skills related to energy, waste, resource efficiently and sustainable development | 25             | 54    | 23      | 5        | 3                 |
| I possess the skills related to energy conservation and ecosystem protection                                   | 27             | 51    | 24      | 3        | 2                 |
| I possess skills related to environmental management responsibility                                            | 27             | 51    | 25      | 3        | 2                 |

Table – 3, shows about the Environmental protection skills like skills in energy/waste/resource management and sustainable practices. Most students agree or strongly agree to possess Environmental protection skills. Nearly half, 55 respondents agreed and 24 of them strongly agreed to the statement. And very few of them have disagreed the statement. Total agreement responses range from 72 to 78 across different skill areas (67%, 72%).

**Table No. 4 Application of Green Social Work**

| Application of Green Social Work                                                                                                        | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|-----------------------------------------------------------------------------------------------------------------------------------------|----------------|-------|---------|----------|-------------------|
| I can use environmental skills effectively in my studies and life                                                                       | 24             | 52    | 19      | 8        | 5                 |
| I can apply the knowledge and skills related to energy, waste, resource efficiency and sustainable development in management or at work | 23             | 51    | 18      | 12       | 4                 |
| I can apply the skills related to energy conservation and ecosystem protection in my studies and life                                   | 25             | 53    | 20      | 5        | 5                 |
| I can apply the skills related to environmental management responsibility in my studies and life                                        | 22             | 51    | 16      | 11       | 8                 |

Table - 4, indicates that students often express confidence in their ability to apply environmental and green skills in their studies, daily life, and future work. The survey findings suggest a more complex reality. Although a majority reported some level of competence, 9% to 17% disagreed with statements related to the practical application of green skill, revealing gaps in confidence and real-world use. This indicates that while understanding

and mastery of green concepts may be present at a theoretical level, translating them into action remains a challenge for many learners. This pattern reflects broader concerns raised by Tilbury and Wortman (2011), who argue that Education for Sustainable Development (ESD) often lacks experiential learning, leading to academic understanding without adequate real-life application. Similarly, Mochizuki and Fadeeva (2010) note that although sustainability principles are increasingly embedded in curricula, they are rarely connected to everyday decision-making, limiting their practical relevance. These findings reinforce the need to bridge the gap between knowing and doing—by making education not only informative but also empowering, equipping students to apply green skills confidently in both personal and professional contexts.

**Table No. 5 Green Skills Development**

| Green Skills Development                                                                                                                          | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-------|---------|----------|-------------------|
| My professional knowledge continues to improve                                                                                                    | 20             | 38    | 18      | 24       | 8                 |
| My professional skills continue to improve                                                                                                        | 23             | 34    | 20      | 22       | 9                 |
| The resources of the college are effectively helping me grow professionally                                                                       | 21             | 30    | 26      | 23       | 8                 |
| The diverse and sufficient platforms, as well as the opportunities provided by the college, are sharpening my abilities in professional practices | 24             | 32    | 18      | 26       | 8                 |

Table - 5, shows about the students' perception of their development. Only around 50–60 percent agree or strongly agree that their knowledge and skills are improving. Significant percentage (20–24%) disagree, especially regarding institutional support, highlighting areas for improvement.

**Table No. 6 Sources of Learning About Green Skills**

| Sources of Learning | Frequency | Percentage |
|---------------------|-----------|------------|
| Schools             | 28        | 26         |
| Under Graduation    | 18        | 17         |
| Post-Graduation     | 20        | 19         |
| Not Learnt          | 42        | 39         |

Table – 6, reveals that 39 percent have not learned Green Skills through formal education which is a critical gap in curriculum exposure. And only 26 percent of the students have learnt green skills in schools. This needs an attention for the incorporation of green skills in the curriculum for the better understanding at the earlier stage of the students.

## MAJOR FINDING

- 52 percent of respondents were female and 44 percent male.
- 70 percent of respondents were aware of green skills, while 30 percent lacked awareness.
- Awareness was slightly higher among male students (73%) compared to female students (67%), likely due to greater exposure to technical and environmental courses.
- Most students demonstrated strong understanding of environmental protection and sustainable development concepts, with high levels of agreement across related statements.
- Most students reported possessing green skills related to energy efficiency, waste management, and ecosystem protection; total agreement levels ranged from 67% to 72%.
- Although students expressed confidence in applying green skills in daily life, 9–17% disagreed with practical application statements, suggesting a gap between theoretical understanding and real-world implementation.
- Around half of the respondents agreed their professional knowledge and skills continue to improve, but 20–24% expressed dissatisfaction with institutional resources and support for green skill development.
- 39 percent of students reported that they had not learned green skills through formal education, highlighting a significant gap in curriculum integration.

## RECOMMENDATIONS:

Green talents should be fostered because they are critical to achieve sustainable development. By teaching green skills to children, we can provide them with self-employment skills, as well as the dignity of labour and confidence to face life.

### Promotion of Green Skill Development in Industrial Sectors

These focus areas can generate sustainable employment and support India's SDG commitments.

- Expand training in solar and wind technologies to boost clean energy adoption.
- Equip youth with skills in Electric Vehicle (EV) manufacturing, maintenance, and charging infrastructure.
- Promote energy-efficient cooling and green building practices.
- Develop expertise in producing eco-friendly fuels from agricultural and organic waste.
- Foster skills in recycling, upcycling, and innovative waste-to-energy solutions.
- Encourage practical skills in afforestation, ecosystem restoration, and sustainable farming.

### Integration of Green Skills within Educational Institutions

- Integrate green skills and sustainability concepts across all subjects and curriculum levels to ensure comprehensive exposure for students, beyond isolated environmental courses.
- Offer practical workshops, projects, and hands-on activities focused on environmental problem-solving and sustainable practices to reinforce theoretical knowledge.
- Collaborate with local industries, NGOs, and government bodies to provide internships, field visits, and real-world experiences linked to green skills.
- Train teachers and staff in current green technologies, sustainability methodologies, and pedagogical approaches for effectively teaching green skills.
- Promote campus-wide green initiatives such as recycling programs, energy conservation campaigns, and sustainable infrastructure developments to model responsible behaviour.

### Advancement of Green Skills through Social Entrepreneurship

- Equip social entrepreneurs with training in sustainable resource management, eco-friendly innovation, and the use of renewable energy to minimize environmental impact.
- Foster knowledge of local and international environmental policies and regulations to ensure ventures operate in compliance and leverage opportunities for responsible growth.
- Integrate life cycle assessment and circular economy concepts into business planning and product development for long-term ecological sustainability.

## CONCLUSION

The survey confirms that green skills are a vital life ability in today's environment, in addition to being a professional necessity. It is essential to incorporate green skills into the curriculum since early exposure fosters in children the ideals of sustainability, accountability, and environmental stewardship. Young learners are prepared to make environmentally conscious decisions in both their personal and professional lives when these abilities are integrated with fundamental life skills like critical thinking, problem-solving, teamwork, and self-awareness. As a result, educational institutions are essential in producing ecologically conscious individuals who can make significant contributions to sustainable growth and a more sustainable future. Industries and social entrepreneurs can actively integrate green skills into their operations and initiatives, thereby accelerating the nation's progress toward sustainable development. By adopting environmentally responsible practices and promoting sustainability across sectors, they will contribute to economic growth, innovation, and a greener future.

## REFERENCES

- Ahmad, A. L., Mohamad Suhaily Yusri, S., & Shahrudin, S. (2013). Environmental education and the development of ethical environmental attitudes among Malaysian students. *International Journal of Educational Methodology*, 8(3), 585–593. <https://doi.org/10.12973/ijem.8.3.585>
- Arasinah, K., Ramlee, M., Waliza, A. W., & Bushra Limuna, I. (2016). Green skills as an added-value element in producing competent students. *International Journal of Engineering Research and Application*, 6(11), 12–21. Retrieved from [https://www.researchgate.net/publication/309804265\\_Green\\_Skills\\_as\\_an\\_Added-Value\\_Element\\_in\\_Producing\\_Competent\\_Students](https://www.researchgate.net/publication/309804265_Green_Skills_as_an_Added-Value_Element_in_Producing_Competent_Students)
- Brown, M. (2013). The development of green skills through the local TAFE Institute as a potential pathway to regional development. *International Journal of Training Research*, 11(1), 27–43. Retrieved from <https://eric.ed.gov/?id=EJ1089728>
- Budwig, N., & Alexander, A. J. (2020). A transdisciplinary approach to student learning and development in university settings. *Frontiers in Psychology*, 11, 576250. <https://doi.org/10.3389/fpsyg.2020.576250>
- De Silva, D. G., Hubbard, T. P., McComb, R. P., & Schiller, A. P. (2011). Entry, growth, and survival in the green industry. MPRA Paper. Retrieved from <http://mpra.ub.uni-muenchen.de/34412/>

- Heong, Y. M., Sern, L. C., Kiong, T. T., & Binti Mohamad, M. M. (2016). The role of higher order thinking skills in green skill development. *MATEC Web of Conferences*, 70, 05001. EDP Sciences. <https://doi.org/10.1051/mateconf/20167005001>
- Ibrahim, Z., Lai, C. S., Zaime, A. F., Lee, M. F., & Othman, N. M. (2020). Green skills in knowledge and attitude dimensions from the industrial perspective. *IOP Conference Series: Materials Science and Engineering*, 917, 012025. <https://doi.org/10.1088/1757-899X/917/1/012025>
- International Labour Organization (ILO). (2019). Skills for a greener future: A global view based on 32 country studies. International Labour Office. Retrieved from [https://www.ilo.org/skills/pubs/WCMS\\_732214/lang-en/index.htm](https://www.ilo.org/skills/pubs/WCMS_732214/lang-en/index.htm)
- Kamis, A., Rus, R. C., Rahim, M. B., Affandi, H. M., Yunus, F. A. N., & Mohd A Yusoff, Y. M. (2017). Exploring green skills: A study on the implementation of green skills among secondary school students. *International Journal of Academic Research in Business and Social Sciences*, 7(12), 327–339. <https://doi.org/10.6007/IJARBS/v7-i12/3615>
- LinkedIn Economic Graph Research Institute. (2023). Global green skills report 2023. LinkedIn. Retrieved from <https://economicgraph.linkedin.com/content/dam/me/economicgraph/en-us/global-green-skills-report/green-skills-report-2023.pdf>
- McKeown, R. (2002). Progress has been made in education for sustainable development. *Applied Environmental Education & Communication*, 1(1), 21–23. <https://doi.org/10.1080/15330150213983>
- Ministry of Environment, Forest and Climate Change (MoEF&CC). (n.d.). Green Skill Development Programme. Retrieved August 27, 2025, from <https://www.moef.gov.in/index.php/green-skill-development-program>
- Mochizuki, Y., & Fadeeva, Z. (2010). Competences for sustainable development and sustainability: Significance and challenges for ESD. *International Journal of Sustainability in Higher Education*, 11(4), 391–403. <https://doi.org/10.1108/14676371011077603>
- Mustapha, R. B. (2016). Green and sustainable development for TVET in Asia. *Innovation of Vocational Technology Education*, 11(2). <https://doi.org/10.17509/invotec.v11i2.2147>
- Oecd, & Training, E. C. F. T. D. O. V. (2014). OECD Green Growth Studies Greener skills and jobs. OECD Publishing.
- Pirzada, G., Naz, M., & Jamil, M. (2023). Incorporating green skills in vocational education & training in Pakistan: The educators' perspectives. *Journal of Social Sciences Review*, 3(1), 42–52. <https://doi.org/10.54183/jssr.v3i1.121>
- Ramlee, R. B. (2015). Green and sustainable development for TVET in Asia. *Innovation of Vocational Technology Education*, 11(2). <https://doi.org/10.17509/invotec.v11i2.2147>
- Rao, D. T. (2023). A study on emerging employment reforms in India with respect to green jobs. *Journal of Green Research*. <https://doi.org/10.5281/zenodo.10276824>
- Setiawan, A. (2017). Identification of green skills acquisition in Indonesian TVET curricula. *AIP Conference Proceedings*, 1887(1), 020074. <https://doi.org/10.1063/1.5003557>
- Stuhmcke, S. M. (2012). Children as change agents for sustainability: An action research case study in a kindergarten (Doctoral thesis, Queensland University of Technology). QUT ePrints. Retrieved from [https://eprints.qut.edu.au/61005/1/Sharon\\_Stuhmcke\\_Thesis.pdf](https://eprints.qut.edu.au/61005/1/Sharon_Stuhmcke_Thesis.pdf)
- Tilbury, D. (2011). Education for sustainable development: An expert review of processes and learning. UNESCO. Retrieved from <https://unesdoc.unesco.org/ark:/48223/pf0000191449>
- UNESCO. (2017). Education for sustainable development goals: Learning objectives. United Nations Educational, Scientific and Cultural Organisation. Retrieved from <https://unesdoc.unesco.org/ark:/48223/pf0000247444>
- United Nations. (2015). Transforming our world: The 2030 agenda for sustainable development. Retrieved from <https://sdgs.un.org/2030agenda>
- United Nations Development Programme (UNDP). (2020). Human development report 2020: The next frontier—Human development and the Anthropocene. Retrieved from <https://hdr.undp.org/content/human-development-report-2020>
- Vikaspedia. (n.d.). Green skill development programme. Retrieved August 27, 2025, from <https://vikaspedia.in/social-welfare/skill-development/schemes-for-skill-development/green-skill-developmentprogramme>
- Zaharim, A., Yusoff, Y. M., Zaidi, M., & Mohamed, A. (2009). Engineering employability skills required by employers in Asia. In *Proceedings of the 6th WSEAS International Conference on Engineering Education* (pp. 195–201). Rodos Island: WSEAS. Retrieved from <https://www.scirp.org/reference/referencespapers?referenceid=2812224>
- Zolkifli, A. H., Kamin, Y., Azlan, B. A. L., Yahya, B., & Awang, Z. (2018). Generic green skills development: initiatives of green manufacturing industries in Johor, Malaysia. *Advanced Science Letters*, 24(4), 2931–2935. <https://doi.org/10.1166/asl.2018.11097>