

Green Jobs in a Sustainable Labor Market: Remote Work, Skills and Training

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Abstract. In the face of rapidly growing environmental threats, the need to transition to a green economy based on the use of environmentally friendly technologies and resources comes to the fore. One of the most important aspects of this transition is the creation of green jobs that contribute to reducing negative environmental impacts and sustainable development. The article examines the concept of green jobs as they define their role in mitigating the climate crisis and contributing to economic growth. The required skills for these jobs are analyzed, including both technical and soft skills that enable successful completion of environmentally responsible tasks. The study explores the differences in skill requirements for green and non-green jobs, and the importance of training managers and workers to effectively operate remote work in the context of a green economy. Based on data from sociological surveys conducted in the Republic of Uzbekistan, a relationship is found between the levels of manager training and employee support when working remotely, which plays an important role in organizing green jobs. The findings highlight the significance of building appropriate skills for a successful transition to a green economy and sustainable development.

Key words: Green jobs; Green skills; Soft skills; Remote work.

1 Introduction

Occupations that benefit the environment or positions that offer goods or services that reduce the use of natural resources are becoming the most sought-after green jobs today. Because human influence on nature is leading to irreversible global changes [1]. Vacancies for green jobs are growing almost twice as fast as the number of workers with the skills to fill them. And green jobs require unique skills compared to non-green jobs. Currently, only one in eight people have the skills to tackle the climate crisis. Between 2022 and 2023, the share of talent with skills to help address the climate crisis grew by 12.3%. At the same time, the share of job postings requiring at least one green skill grew nearly twice as fast over the same period to 22.4% [2]. How can green skills pave the way for a cleaner, greener and more economically

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prosperous world? By examining their various aspects in depth, we can see their important role in solving environmental problems, promoting resource management and enforcing strict regulations.

Green jobs are professions that reduce damage to the environment and save resources. It can be said that through the organization of remote employment, it is possible to reduce traffic and prevent the risk of toxic gases from transport to the environment. But green jobs, or remote employment, also require unique and modern skills of their own. We can call it green skills.

Green skills refer to the knowledge, skills and competencies that people need to contribute to a more sustainable and environmentally friendly society and economy. These skills include a range of technical and soft skills that enable individuals to understand, promote and implement environmentally responsible practices across a range of industries and professions. Green skills include a wide range of competencies that fall into two categories: technical skills and soft skills. Both are required for individuals to contribute to environmental sustainability and responsibility [3].

Given the specific requirements of the transition to green jobs, there may be significant changes in economic structures. These differential changes in economic activity affect the labor market [4, 5]. On the one hand, some occupations and skills currently available in the labor market will become obsolete, on the other hand, new occupations and skills may appear and demand for several existing occupations and skills will increase.

The fair transition towards a green economy will mean the creation of 24 million jobs worldwide by 2030, according to the report "World Employment and Social Outlook: Greening with jobs" from the International Labor Organization. These new green jobs are not only key to protecting the environment, but they also improved quality of life worldwide. Because, regarding green job characteristics, studies tend to find that green jobs require technical skills, are higher-skilled, demand more educational attainment, are male-dominated, and are relatively high-quality (e.g., higher-paid, full-time, permanent contract) [1].

The main objectives of green jobs and green skills acquisition are addressing the climate crisis, more inclusive economic growth, creating decent jobs for all (including remote employment) and personal career development through soft skills enhancement.

The main tasks of this research work:

- Researching the theoretical and conceptual foundations of green job creation and green skills acquisition;
- To reveal the socio-economic importance of studying the modern requirements for the labor force in the labor market;
- Analyze the differences in skills required in green jobs from non-green jobs;
- Green jobs include a survey-based analysis of the role of enterprise management in the organization of remote employment.

2 Literature review

A number of researchers have found that the growth of the renewable energy industry has a positive effect on employment [6-8]. In particular, Bottazi [9] studied that environmental policies affect labor markets and that workers should be supported to adapt to these changes without questioning the production model of consumption and development.

Vona et al. [10] in their research on green jobs use the production approach ("in enterprises that produce products or provide services that benefit the environment or save natural resources jobs") and the process approach (jobs in which the duties of workers include the organization of enterprise production).

Bohnenberger [11] has proposed methods for evaluating the environmental impact of employment in four dimensions, and by combining the four dimensions, it develops a Sustainable Employment Taxonomy to classify employment into green, mixed and brown jobs.

Bohnenberger divides the various considerations that ensure the sustainability of employment on two scales: the organizational level of analysis (macro-micro) and the immediacy of the impact on the environment (direct-indirect).

According to this research, the organizational level ranges from aspects that are valid for a whole industry (macro) to aspects that relate to a single workplace (micro). At the macro-level, sectors and businesses can be categorized, e.g., petroleum refining is rendered fully unsustainable by the requirement of greenhouse gas neutrality. The micro-level evaluates the specific tasks and activities of individuals, e.g., energy-saving consultants might be considered as a green job, independent of the sector they consult. The immediacy of the environmental effects of a job distinguishes whether the brown or green effect results from the workplace (direct), or whether evaluation requires considering the environmental consequences resulting from the interplay between workplaces and the overall socio-economic structures (indirect). In a research paper, Janser [12] presents four empirical studies examining wage differentials in the renewable resources sector.

3 Research methodology

Statistical data grouping, comparison, correlation-regression analysis methods were used in this research work.

To carry out these analyses, the World Bank reports and survey data from the population of the Republic of Uzbekistan are based. The survey was conducted online by the professors-teachers and researchers of the Departments of Labor Economics of Tashkent State University in all regions and cities of the Republic of Uzbekistan. The survey questions consist of two parts, in the first part, the demographic data of the participants of the survey, and in the second part, the status of the organization of remote employment in our country, including green jobs, the opinion of the population regarding the organization of green jobs, consists of questions clarifying the public's current transportation to work.

A total of 3,886 people participated in this survey, and an econometric analysis was conducted based on the cross-sectional data collected from them. In this case, as a non-independent variable, mental support for employees working remotely, providing them with the appropriate equipment and work tools necessary for work, establishing clear rules that determine the time of contact with employees, remote employees training for effective work, provision of flexible working day schedule, and training of leaders in remote team management was selected as an independent variable.

4 Analysis and Results

Skills have become increasingly important in determining an individual's ability to secure a job and retain employment and move flexibly in the labor market. In the labor market, green jobs place higher skill requirements on the workforce than non-green jobs. Globally today, the share of middle and high-skilled occupations in green jobs is higher than in non-green jobs, at 92% and 74%, respectively (Fig. 1).

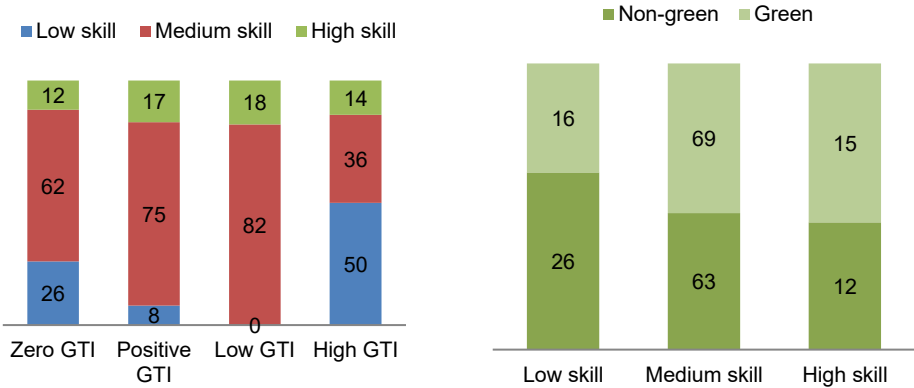


Fig. 1. Skill levels of green jobs, and of jobs in green industries.
Note: GTI is gran turismo injection: a high-performance car with a fuel-injection engine.
Source: [13].

Fig. 1 shows workers in green jobs and green industries have higher levels of education than those in non-green jobs. 30% of those working in non-green jobs have an elementary school degree or less, while 25% of those working in green jobs are low-skilled workers. Green jobs employ 17% of highly skilled workers with at least a university or advanced degree, compared to 11% of non-green jobs. However, high levels of green intensity in green jobs do not require higher education: 15% of workers in high-green-intensity jobs have at least a university degree, compared to 18% of workers is highly qualified in low-green-intensity jobs. As with the distribution of education found among green jobs, workers in green industries are more educated than those in non-green industries. 26% of workers in green industries have vocational training or university education and above, while 19% of workers in non-green industries do. On the other hand, workers in potentially green jobs tend to have lower educational attainment than workers in jobs with no green potential, consistent with the higher concentration of agriculture among potentially green occupations [14].

A well-managed ecological transition can become a strong driver for job creation and social justice. The potential for new, decent jobs is huge in the shift to renewable energy, green buildings, environmental services, clean transport, organic farming and so on. On the other hand, job losses are expected, in particular in the most polluting sectors, so professional transitions must be anticipated. In addition, all economic activities and occupations are faced with changing practices and the need to adapt skills. A shortage of skills can represent a strong barrier to ecological progress, delaying technological and economic transformation. Public intervention is therefore needed to help labour markets and education and training systems adapt to the new demands of a green economy [15]. Qualification requirements for green jobs in countries also depend on clean climate policies implemented at the national level [16-18]. Therefore, countries with a clean climate and many green areas in the world are leaders in creating green jobs (Fig. 2). Jobs that contribute to the preservation or restoration of the environment and our planet are considered "green jobs" and are known to require higher soft skills (green skills) than the workforce. Green skills can be understood as "knowledge, skills, values and attitudes necessary to live, develop and maintain a society that reduces the impact of human activities on the environment". These include: decision-making, teamwork, leadership, risk management, design, communication, commercial, and creativity and problem-solving.

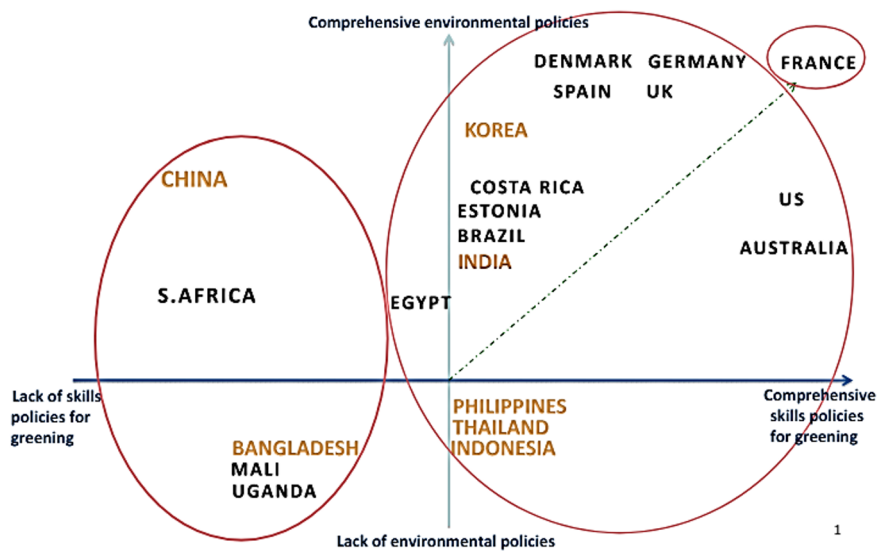


Fig. 2. Environmental and skills policies.

Along with the consideration of the impact of the state's climate policy on green jobs, we found it necessary to study the attitude of management and workers to the greening of jobs in enterprises (Tables 1-5). Taking into account that it is possible to reduce traffic damage to the environment through the organization of remote work in organizations, we studied the status of remote work organization among the population of Uzbekistan in the organizations where they work. A total of 3,886 respondents from all regions of the Republic of Uzbekistan took part in this survey. According to the results, the organization of remote work in organizations depends on the understanding of the effectiveness of remote work, and management should be trained in managing remote working teams.

Table 1. The relationship between the level of training of managers on managing remote teams and the level of psychological support of remote employees.

Source	SS	df	MS	Number of obs	=	3,886
Model	4068.79116	1	4068.79116	F(1, 3884)	=	4591.93
Residual	3441.51378	3,884	.886074609	Prob > F	=	0.0000
				R-squared	=	0.5418
				Adj R-squared	=	0.5416
Total	7510.30494	3,885	1.93315442	Root MSE	=	.94132

company2	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
company1	.7300809	.0107739	67.76	0.000	.7089578	.7512039
_cons	.7772412	.0328511	23.66	0.000	.7128341	.8416482

According to Table 1, if the level of training of managers on remote team management increases, the level of psychological support of remote employees also increases, that is, if the level of training of managers increases by 1 unit, employees' psychological support increases by 0.73 units. Also, the correlation coefficient of these two factors was 0.736.

Table 2. The relationship between the level of training of remote team management leaders and the provision of appropriate equipment and work tools necessary for remote work.

Source	SS	df	MS	Number of obs	=	3,886
				F(1, 3884)	=	2383.19
Model	3165.73055	1	3165.73055	Prob > F	=	0.0000
Residual	5159.3464	3,884	1.32835901	R-squared	=	0.3803
				Adj R-squared	=	0.3801
Total	8325.07694	3,885	2.14287695	Root MSE	=	1.1525

company3	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
company1	.6439842	.0131916	48.82	0.000	.6181212	.6698473
_cons	1.030456	.0402228	25.62	0.000	.9515966	1.109316

According to Table 2, if the level of training of remote team management leaders increases by 1 unit, the provision of appropriate equipment and work tools necessary for remote work increases by 0.64 units. The correlation between these two factors was 0.62.

Table 3. The relationship between level of training of managers on managing remote teams and the establishment of clear rules determining the time of contact with employees.

Source	SS	df	MS	Number of obs	=	3,886
				F(1, 3884)	=	2802.60
Model	3202.40571	1	3202.40571	Prob > F	=	0.0000
Residual	4438.07833	3,884	1.14265663	R-squared	=	0.4191
				Adj R-squared	=	0.4190
Total	7640.48405	3,885	1.96666256	Root MSE	=	1.069

company4	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
company1	.6477038	.0122348	52.94	0.000	.6237166	.671691
_cons	1.163462	.0373055	31.19	0.000	1.090322	1.236602

According to Table 3, if the level of training of managers on managing remote teams increases by 1 unit, the establishment of clear rules determining the time of contact with employees increases by 0.65 units. The correlation between these two factors was 0.65.

Table 4. The relationship between the level of training of managers on remote team management and the training of employees on effective remote work.

Source	SS	df	MS	Number of obs	=	3,886
				F(1, 3884)	=	4058.28
Model	3897.66297	1	3897.66297	Prob > F	=	0.0000
Residual	3730.27965	3,884	.960422154	R-squared	=	0.5110
				Adj R-squared	=	0.5108
Total	7627.94261	3,885	1.96343439	Root MSE	=	.98001

company5	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
company1	.7145628	.0112168	63.70	0.000	.6925714	.7365542
_cons	.8990365	.0342016	26.29	0.000	.8319817	.9660912

According to Table 4, if the level of training of managers on remote team management increases by 1 unit, the training of employees on effective remote work increases by 0.71 units.

Table 5. The relationship between the level of training of managers on managing remote working teams and the provision of free work schedules.

Source	SS	df	MS	Number of obs	=	3,886
Model	3178.91493	1	3178.91493	F(1, 3884)	=	2508.20
Residual	4922.61595	3,884	1.26740884	Prob > F	=	0.0000
				R-squared	=	0.3924
				Adj R-squared	=	0.3922
Total	8101.53088	3,885	2.08533613	Root MSE	=	1.1258

company6	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
company1	.6453238	.0128854	50.08	0.000	.6200611	.6705866
_cons	1.116896	.0392892	28.43	0.000	1.039866	1.193925

According to the data of Table 5, if the level of training of managers on managing remote working teams increases by 1 unit, the provision of free work schedules increases by 0.65 units. The correlation between these two factors was 0.63.

5 Conclusion

In conclusion, one of the most urgent issues today is protecting the environment and reducing the harmful effects of the economy on the climate, and it can be helped by creating green jobs. However, as seen from the results of the research, the establishment of green jobs depends on many factors, such as the geographical location of the country, the country's green policy, the skills of the workers in the labor market, and the management's understanding of the importance of green jobs. That is 25% of those working in green jobs are low-skilled workers, while in non-green jobs, this figure is 5% more. Conversely, high-skilled workers are 6% less likely to be employed in non-green jobs than in green jobs. Therefore, non-green jobs are mostly workers with secondary education, while green jobs require higher skills than the workforce.

Qualification requirements for green jobs in countries also depend on clean climate policies implemented at the national level. Therefore, France, Germany, Denmark and similar countries with a clean climate and many green areas in the world are leaders in creating green jobs.

The relationship between the level of preparation of managers for remote group management and the level of psychological support for remote employees, the provision of appropriate equipment and work tools necessary for remote work, and the specific time that determines the contact time with employees there is a proper correlation between such factors as setting rules, training employees to work effectively at telecommuting, providing free work schedules, and greening jobs can be achieved by increasing the knowledge of management in the organization of remote work.

It is worth noting that green jobs not only reduce the damage to the environment, but such jobs require higher skills from workers, encourage people to get better education, and offer higher incomes for this.

References

1. A. Apostel, M. Barslund, Measuring and characterising green jobs: A literature review. *Energy Research & Social Science* **111**, 103477 (2024) <https://doi.org/10.1016/j.erss.2024.103477>
2. A. Villij, Green job vacancies are on the rise – but workers with green skills are in short supply. Jobs and the future of work (World Economic Forum, February 29, 2024)
3. The importance of green skills. The importance of Green Skills: Nurturing a Sustainable Future. EV Search (Oct. 19, 2023) <https://www.linkedin.com/pulse/importance-green-skills-nurturing-sustainable-future-evsearch-tmcrf>
4. G. Cecere, M. Mazzanti, Green jobs and eco-innovations in European SMEs. *Resource and Energy Economics* **49** (2017) 86-98 <https://doi.org/10.1016/j.reseneeco.2017.03.003>
5. K. Connolly, G. Allan, S. McIntyre, The evolution of green jobs in Scotland: A hybrid approach. *Energy Policy* **88** (2016) 355-360 <https://doi.org/10.1016/j.enpol.2015.10.044>
6. A. Malik, M. Lenzen, R.N. Ely, E. Ditzenbaxer, Simulating the impact of new industries on the economy: The case of biorefining in Australia. *Ecol. Econ.* **107** (2014) 84-93 <https://doi.org/10.1016/j.ecolecon.2014.07.022>
7. M. Markaki, A. Belegri-Roboli, P. Michaelides, S. Mirasgedis, D.P. Lalas, The impact of clean energy investments on the Greek economy: An input–output analysis (2010–2020). *Energy Policy* **57** (2013) 263-275 <https://doi.org/10.1016/j.enpol.2013.01.047>
8. C. Tourkolias, S. Mirasgedis, Quantification and monetization of employment benefits associated with renewable energy technologies in Greece. *Renew. Sustain. Energy Rev.* **15**, 6 (2011) 2876-2886 <https://doi.org/10.1016/j.rser.2011.02.027>
9. P. Bottazzi, Work and social-ecological transitions: a critical review of five contrasting approaches. *Sustainability* **11**, 3852 (2019) <https://doi.org/10.3390/su11143852>
10. F. Vona, G. Marin, D. Consoli, D. Popp, Green Skills No. 21116, NBER Working Paper Series (National Bureau of Economic Research, 2015)
11. K. Bohnenberger. Is it a green or brown job? A Taxonomy of Sustainable Employment. *Ecol. Econ.* **200**, 107469 (2022) <https://doi.org/10.1016/j.ecolecon.2022.107469>
12. M. Janser, The Greening of Jobs: Empirical Studies on the Relationship between Environmental Sustainability and the Labor Market (University of Bamberg, 2018)
13. World Bank. www.worldbank.com
14. D. Doan, T. Luu, N.T. Nguyen, A. Safir, Green Jobs, Upskilling and Reskilling, Vietnam's Workforce for a Greener Economy (World Bank)
15. International Labour Organization. Advancing Green Human Capital, a framework for policy analysis and guidance.
16. A. Bowen, K. Kuralbayeva, Looking for green jobs: the impact of green growth on employment. Grantham Research Institute Working Policy Report (London: London School of Economics and Political Science, 1-28, 2015)
17. M.I. Aceleanu, Green jobs in a green economy: support for a sustainable development. *Progress in Industrial Ecology, an International Journal* **9** (2015) 341-355
18. H. Yi, Clean energy policies and green jobs: An evaluation of green jobs in US metropolitan areas. *Energy Policy* **56** (2013) 644-652