Green Skills – Enablers of Transition to a Green Economy

Arzu D. HÜSEYNOVA[1], Intizar RUSTAMOVA[2], Simuzar MAMMADOVA[3], Intizar MAMMADOVA[4]

Abstract

This article analyzes the importance of developing "green" skills and their role in economic development within the context of Azerbaijan. The primary issue lies in the lack of consensus regarding the definition of "green" skills, which reduces the effectiveness of coordinated efforts in this area. The development of "green" skills is not only related to the implementation of technologies but also to broader economic and ecological processes. The article proposes systematic forecasting of "green" skills, updating educational programs, and applying international standards. Based on international experience, the implementation of ecological technologies not only creates new jobs but also modernizes existing ones and increases labor productivity. Ultimately, the transition to a "green" economy is a critical strategic step for enhancing Azerbaijan's economic and ecological potential.

Keywords: *Green Skills, Green Economy, Sustainable Development, Environmental Management, Skill Development.*

Introduction

Environmental changes pose substantial challenges for contemporary society, particularly in ensuring sustainable development and high living standards for future generations. In light of increasing environmental pollution, the depletion of natural resources, and escalating demand, it is imperative to adopt measures that foster the expansion of a "green" economy to achieve long-term sustainability. The greening of the economy, however, is fraught with various complexities. Nevertheless, the transition to a green economy holds significant promise not only for mitigating the impacts of the global economic crisis but also for facilitating the creation of new employment opportunities, thus addressing the persistent issue of unemployment. Additionally, this transition provides a pathway for generating jobs that will contribute to economic recovery and offer long-term solutions to unemployment challenges on a global scale.

As such, green skills emerge as critical enablers in this transformative process. These skills, which encompass a range of technical, managerial, and policy-related competencies, are essential for driving innovation and ensuring the successful implementation of green economic strategies. The development and integration of green skills across various sectors are fundamental to advancing sustainable practices, fostering job creation, and ensuring the resilience of economies in the face of environmental challenges.

In our country, the integration of economic development with ecological balance, prioritizing environmental protection, addressing ecological issues as a top priority, and improving the welfare of the current generation without limiting the opportunities for future generations have been placed at the forefront. To achieve this, it is essential to enhance the efficiency of the economy, protect the environment, safeguard natural resources, and ensure science-based development. In this regard, numerous laws have been enacted over the past period. The key aspect is that environmental protection and the comprehensive resolution of ecological security issues have become priorities of state policy.

---

[1] First Deputy Chair of the Board of the Public Legal Entity Management of the Economic Scientific Research Institute, Ministry of Economy of the Republic of Azerbaijan, Email: arzu.huseynova@esri.gov.az, ORCID: 0000-0002-0981-9923

[2] Researcher and PhD Candidate at the Economic Scientific Research Institute, Email: intizar.rustamova@esri.gov.az, ORCID: 0009-0000-2559-0092.

[3] Department of Business Management, Azerbaijan State Economy University (ASEU), 6 Istiglaliyyat Street, AZ 1001 Baku, AZERBAIJAN., Email: Simuzar_Mammadova@unec.edu.az, ORCID: 0000-0002-2996-5207.

[4] Department of Business Management, Azerbaijan State Economy University (ASEU), 6 Istiglaliyyat Street, AZ 1001 Baku, AZERBAIJAN., Email: Intizar_Mammadova@unec.edu.az, ORCID: 0000-0001-5322-7362.

Two of the five directions outlined in the "Azerbaijan 2030: National Priorities for Socio-Economic Development" document focus on the formation of a sustainable and competitive economy, as well as the creation of a clean environment and a "green growth" space. The document places significant emphasis on the application of environmentally clean technologies, the promotion of waste recycling, and the restoration of polluted areas. Concrete tasks have been set for the expansion of "green" technologies that are ecologically favorable. This strategic approach aims to foster a sustainable, environmentally friendly economy, highlighting the importance of integrating green technologies and practices in national development.

For this reason, the "Social and Economic Development Strategy of the Republic of Azerbaijan for 2022-2026" identifies environmental protection as one of the key areas of focus. One of the main goals of the concept is to achieve ecologically sustainable socio-economic development, preserve biodiversity, neutralize the negative impacts of the fuel-energy complex on the environment, eliminate and protect the marine environment and its water basin from pollution, restore green areas, and ensure the efficient protection of existing resources. These objectives form the foundation of sustainable development goals in environmental management.

As the "green" economy evolves, the demand for jobs and skills also changes. There is an increasing need for the development of "green" skills that contribute to ensuring sustainable production and environmental protection, while also helping to address ecological challenges. These skills are essential for fostering a transition to a green economy and supporting the broader goal of sustainable economic growth.

Literature Review

The topic of green skills is widely discussed in the reports of various international organizations. The United Nations Environment Programme (UNEP, 2021) and the International Labour Organization (ILO, 2018) emphasize the importance of a skilled workforce in the context of the green transition. LinkedIn reports, however, indicate that the growth rate of "green" job roles is lagging behind the increasing number of "green" job postings. Documents from CEDEFOP (2012) and the OECD (2014) provide classifications of green skills and highlight their sectoral impacts. Throughout this paper, references to studies and reports on this subject are cited to provide a comprehensive understanding of the development and significance of green skills in the context of sustainable economic transformation.

Methodology

The primary objective of the research is to classify "green" skills and analyze their role in economic development within the context of Azerbaijan. The study employs qualitative analysis and descriptive methodology. Reports from international organizations, statistical data, and various research findings are compared to analyze approaches to the development of green skills. The research utilizes figures from the World Inequality Report, while the theoretical framework is based on the synthesis of ideas from various published articles on the subject. The paper addresses (1) the definition and classification of green skills, (2) the characteristics of green jobs, and (3) the issues related to bridging the skills gap.

The Nature and Classification of Green Skills

What skills are required in a "green" economy?

As the world progresses toward a more sustainable future, individuals are increasingly acquiring "green" skills. The United Nations Environment Programme (2021) emphasizes the critical need for a skilled workforce to facilitate the transition to a green economy. The International Labour Organization (ILO) report highlights that job creation is becoming increasingly dependent on a healthy environment and sustainable services. A "green" economy has the potential to significantly improve the living conditions of millions of people, as well as future generations.

The acceleration of the transition to a green economy requires workers to possess new, specialized skills, and demands urgent measures to ensure social security for workers. Education and training systems must be tailored to meet the needs of the green economy, financial strategies must be adopted, and standards for both new and existing qualifications need to be established and implemented. According to the key findings of the ILO report, most economic sectors stand to benefit from the creation of clean jobs. Of the 163 sectors analyzed, only 14 are projected to experience job losses exceeding 10,000 globally. Specifically, two sectors—oil extraction and oil refining—are expected to lose over 1 million jobs. However, the renewable energy sector is expected to create 2.5 million jobs, compensating for the approximately 400,000 jobs lost in the coal-based electricity generation sector. Furthermore, the transition to a "circular economy," which replaces the traditional economic model of "extraction, production, consumption, and disposal" with activities such as repair, rental, and recycling, could generate 6 million jobs.

Although the green transition is progressing faster than ever before, the pace is still not sufficient, as indicated in the report.

According to the ILO (2018), the development of the "green" economy worldwide could result in the creation of 24 million new jobs by 2030. This projection is supported by LinkedIn reports, which show an annual 8% increase in green job postings over the last five years, while the global share of "green" talent has increased by only 6% annually (Tsynovkina, Ludmila, 2022). Green skills encompass a broad range of competencies and span all sectors of activity. As highlighted, the accelerated transition to "green" technologies demands specific skills within the workforce. As green technologies rapidly evolve, preparing and upskilling both current and future workers to meet the requirements of the green transition is a strategic imperative.

Today, as we transition to "green" technologies, more than half of the workforce could face unemployment in the future unless they upgrade their knowledge and skills. Workers must adapt to technological advancements and ensure they meet the future demands of the job market. The development of "green" skills is therefore critical for securing employment in the green economy. Green skills are intrinsically linked to green technologies and will contribute to sustainable development in environmental, economic, and social dimensions.

Green Skills and Employment

Green skills are essential for reducing environmental impacts, ensuring decent working conditions, achieving a cleaner, climate-resilient, and ecologically sustainable economy, and supporting a fair economic transition. These skills are required for jobs that conserve ecosystems and biodiversity, reduce energy consumption, and minimize waste and pollution.

The business world plays a crucial role in the transition to a low-carbon economy, but this transition is dependent on opportunities and the availability of green skills. Green skills contribute to preserving or restoring environmental quality for a sustainable future. As individuals actively acquire new skills, employers are reassessing their business models and creating new markets.

Jobs are a vital part of this green transition chain. In the coming decades, millions of new jobs will be created worldwide based on new climate policies and commitments. These are not merely jobs; they are built upon green skills that are essential for achieving the green transition.

Key Trends in Green Jobs

In addition to green skills, green jobs serve as key drivers for real change. What defines a "green" job? There is no single answer to this question. Various organizations and authors have attempted to provide definitions at different points in time.

Definitions of green jobs have been generalized and are presented in Figure 1. These definitions focus on activities aimed at environmental protection and restoration, highlighting similarities in terms of employment created in both the public and private sectors.

Bangladesh (2008)

• Green jobs refer to direct employment that reduces environmental impact to a sustainable level. These jobs include roles that help decrease energy and raw material consumption, decarbonize economies, protect and restore ecosystems and biodiversity, and minimize waste production and pollution.

UN, ILO, IOE, ITUC (2008)

• Green jobs are defined as roles in agriculture, manufacturing, research and development (R&D), administration, and activities that significantly contribute to the preservation or restoration of the environment. Specifically, these jobs include those that help protect ecosystems and biodiversity, reduce energy, material, and water consumption through high-... all forms of waste

European Statistical Committee (2009)

• Employment in the environmental goods and services sector includes jobs in eco-friendly enterprises, public agencies engaged in developing environmental technologies, goods, and services, as well as support activities related to various production units.

O*NET National Center for Development in the United States (2009)

• Occupation greening refers to the extent to which green economy activities and technologies increase demand for existing occupations, create job and worker requirements within those occupations, or establish unique job and worker demands specific to green roles.

Netherlands (2011)

•Green jobs measure employment in companies and organizations that produce goods and services aimed at assessing, preventing, limiting, minimizing, or rectifying environmental damage to nature, degradation, and resource degradation.

World Bank (2012)

• In a broad sense, green jobs can be seen as those related to ecological goals and policies.

European Commission (EC) (2013)

•Green jobs encompass all occupations that are dependent on, created by, modified, or redefined during the transition to a greener economy, including aspects such as skill sets, work practices, created profiles, and so on.

U.S. Bureau of Labor Statistics (BLS) (2013)

• The BLS uses an output and process approach to define green jobs: (a) "business activities that produce goods or provide services that benefit the environment or conserve natural resources," and (b) "jobs where the responsibilities of workers involve making the production processes of an enterprise more environmentally efficient or using fewer natural resources."

Vinter L. və Mur M.S. (2013)

•"Green" jobs may be specific to a particular occupation with field-specific characteristics, reflecting the main process or outcome of the product being ...

ILO (2013, 2019, 2016)

Green jobs are ... significantly reduce the negative impact of economic activities on the environment and ultimately leads to the creation of viable enterprises and sustainable economies.

Green jobs contribute to environmental protection or restoration, whether in traditional sectors such as manufacturing and construction, or in new, emerging green sectors like renewable energy and energy efficiency.

Green jobs help support the increase in energy and raw material efficiency, the limitation of greenhouse gas emissions, the minimization of waste and pollution, the protection and restoration of ecosystems, and the adaptation to the impacts of climate change.

LinkedIn Economic Graph (2022)

Green jobs are ... require extensive knowledge of "green"skills.

Green jobs are those that help restore the environment. In addition to improving the planet, green jobs also contribute to economic growth.

Figure 1. Definition of "Green" Jobs

The provided definitions are not comprehensive, and there are challenges in accurately identifying "green" jobs. These challenges include the following (Auktor, 2020):

- The broad scope of activities related to ecological sustainability, such as pollution reduction and resource exploitation (e.g., preventing pollution and reducing the exploitation of resources through reducing energy and material use).

- The classification and statistics of "green" jobs are unclear, as it is not well-defined whether existing jobs in the traditional economy are simply classified as "green" or if new jobs are added to the classification. This is because they contribute to the transition to a low-carbon economy and represent new jobs created either in traditional or green sectors.

- There is limited agreement on which types of activities should be considered "green," leading not only to conflicting statistics but also to debates on the subject.

- The consideration of jobs in the supply chain is another challenge. For example, jobs related to the operation of renewable energy plants are considered "green," but workers involved in the supply chain (such as those providing engines, cables, equipment parts, etc.) are categorized as non-green jobs.

Many sources adopt the definition provided by the ILO, which not only focuses on employment in ecological products and processes but also includes non-ecological jobs created as a result of greening in non-ecological sectors. Moreover, the ILO definition emphasizes that these jobs must be "decent" because green jobs are not necessarily high-quality jobs. Figure 2 illustrates the types of jobs included in the ILO classification.

"Green jobs"

Source: (ILO 2003).
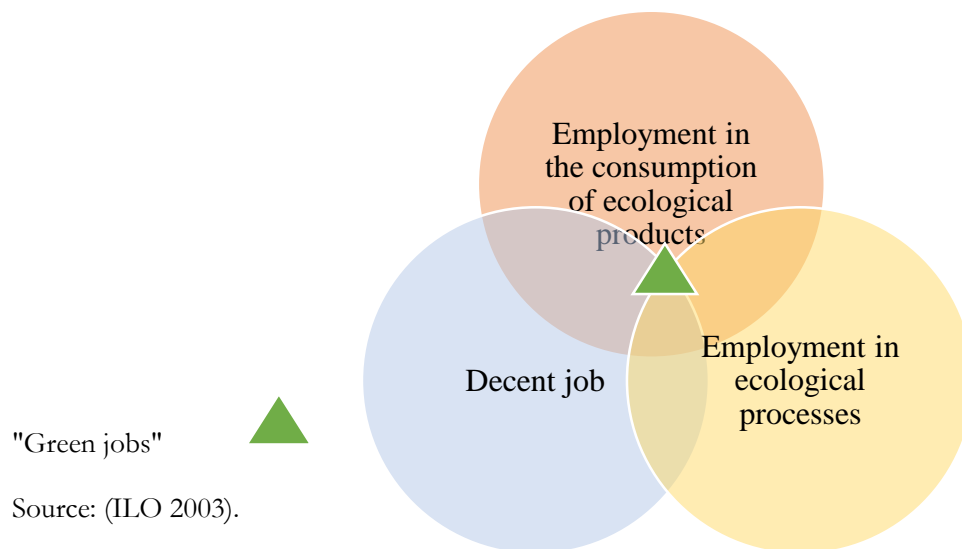
Figure 2: ILO Definition of "Green" Jobs

In the literature, "green" jobs are classified based on various characteristics, such as the nature of the job, production characteristics, and so on. According to the nature of the job, jobs are categorized as "green," "greening," and "non-green" (LinkedIn Economic Graph, 2022):

- **"Green" Jobs** – Jobs that cannot be performed without "green" skills.

- **"Greening" Jobs** – Jobs that can be performed without "green" skills but are dependent on "green" factors.

- **Non-Green Jobs** – Jobs that do not require "green" skills.
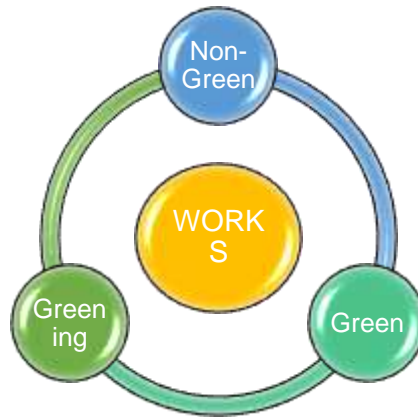

Figure 3: Job Classification

Source: (LinkedIn Economic Graph, 2022)

"Green" jobs are classified based on the nature of the work as follows (Figure 4):
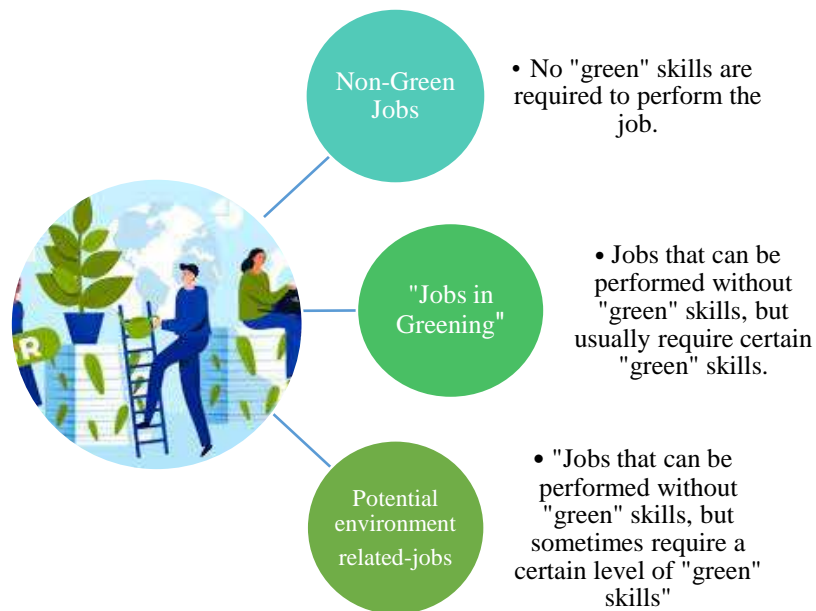

Figure 4: Classification of "Green" Jobs Based on Job Characteristics

Source: (LinkedIn Economic Graph, 2022)

1807

Thus, "green" jobs are those that cannot be performed without a broad knowledge of "green" skills. The shortage of "green" jobs and skills slows down the pace of the economy's greening. Reports from various international organizations highlight that the fastest-growing green jobs are in ecosystem management, environmental policy, and pollution prevention. For example, LinkedIn's report lists non-traditional green jobs that require more green skills, such as fleet managers, data processing specialists, and healthcare professionals (LinkedIn Economic Graph, 2022). In addition to these jobs, skills are required in areas like effective and comprehensive green transition, clean energy, sustainable finance, construction, technology, and urban planning.

This indicates that "green" skills will be in demand across all sectors of the "green" economy. Therefore, infrastructure for employee upskilling should be established now (LinkedIn Economic Graph, 2022).

Most of the "green" skills are traditionally used in jobs that were not considered green.

Relevance of "Green" Skills

The development of the global world and environmental pollution not only affect economic processes but also change the lifestyle of society. The transition to a new generation economy, i.e., a low-carbon economy that efficiently uses resources, will require systematic changes that involve not only new products and services but also alterations in production processes and business models. All of this presents new demands for individuals. The new generation economy, including the Fourth Industrial Revolution, intellectual manufacturing processes (known as Industry 4.0), artificial intelligence, and the development of green technologies, changes the demand for skills. "Green" skills align with the competencies needed for the development of the new generation economy (such as digital skills and other sectoral skills). The greening of the economy inevitably changes the skills and tasks required for many existing professions. As society faces various ecological challenges, the relevance of green skills in today's world becomes increasingly apparent (Figure 5).

Climate Change	• The threat of climate change demands more sustainable and efficient use of resources, as well as a transition to a low-carbon economy.
The depletion of natural resources	• The growing population and economic growth lead to the depletion of natural resources. The ability to manage resources efficiently becomes a crucial aspect of sustainable development.
Environmental Pollution	• The problems of air, water, and soil pollution require measures to be taken to improve environmental quality.
Consumer Awarness	• There is an increasing interest among consumers in environmentally sustainable products and services, leading to a growing demand for professionals with green skills.
Normative Regulation	• Many countries are implementing laws and standards aimed at reducing the negative impact on the environment. This stimulates the demand for professionals with expertise in ecological practices.
Green Innovation	• The development of green technologies and innovations requires the presence of skilled professionals capable of implementing and managing environmentally sustainable new solutions.
Global Challenges	• The loss of biodiversity, forest fires, and the impact of human activities on ecosystems highlight the urgency of adopting environmentally sustainable approaches.

Figure 5: Some of the Key Factors Highlighting the Relevance of Green Skills

Thus, the development of skills, knowledge, and competencies becomes a crucial component of the transition to a "green" economy. "Green" skills enable the private sector and individual consumers to apply resource-efficient, sustainable processes and technologies (Cedefop/OECD, 2015)

Green skills are the pillar of the green transition and the key to the human capital that sustains it.

What does the term "skills" encompass?

A skill is the ability to perform a specific activity, acquired through practice, competence, and habit. It is the capacity to carry out certain tasks, which develop through repetition and automation.

In addition to the term "skill," the term "competence" is used to express an individual's abilities.

Competence is a comprehensive characterization of an individual's readiness to apply their knowledge, skills, and personal qualities in professional activities.

In other words: Skills are "the knowledge, competence, and experience required to perform a specific job or task" (ILO, 2019).

The concept of "green" skills

Despite its importance, defining the concept of "green" skills remains a challenging task. There is no unified definition of "green" skills.

There is ambiguity regarding whether the term only refers to skills directly related to green processes or functions (e.g., environmental restoration), or if it includes broader skills applicable to "green" objectives (e.g., the development of "green" software).

Over the years, various organizations have provided definitions for the concept of "green" skills. These definitions are reflected in Table 1.

Table 1. Definitions of the Concept of "Green" Skills

Institutions	Years	Description
CEDEFOP	2012	Defines "green" skills as "the knowledge, skills, values, and attitudes needed to live, develop, and support a sustainable and resource-efficient society."
NCVER	2013	Australia defines "green" skills as "the technical skills, knowledge, values, and attitudes required in the workforce to develop and support sustainable social, economic, and environmental outcomes in business, industry, and society."
OECD and CEDEFOP	2014	Defines "green" skills as "the skills needed across all sectors and levels of the workforce to help adapt products, services, and processes to the changes caused by climate change and environmental regulations."
CEDEFOP	2014	Europe defines "green" skills as "the abilities necessary to live, develop, and support society with the aim of reducing the negative impact of human activities on the environment."
European Commission (Skill Panorama)	2015-2022	Europe defines "green" skills as "the knowledge, skills, values, and attitudes necessary to live, develop, and support a society that reduces the environmental impact of human activities."
UNIDO	2022	Defines "green" skills as "the knowledge, skills, values, and attitudes needed to live, develop, and support a sustainable and resource-efficient society."

IEMA	2022	The UK defines "green" skills as "the technical skills, knowledge, behaviors, and abilities required to address the ecological challenges we face. Specific jobs and roles may not be directly identified in terms of achieving sustainability or ecological outcomes, but they may still contribute to these outcomes."
European Commission	2022	"Green" skills are defined as "the knowledge, skills, values, and attitudes necessary to live, develop, and support a society that reduces the environmental impact of human activities."
Economist Impact	2024	Defines "green" skills as "the knowledge, skills, values, and attributes needed to develop and support a sustainable, low-carbon, and resource-efficient society."
EcoStandard.journal	2023	Defines "green" skills as "the knowledge, values, and attitudes needed to live, develop, and support a sustainable, resource-efficient society, aimed at making the world around us more environmentally clean, energy-efficient, and safe."
Generalized	2024	Green skills are essential for the transition to an environmentally sustainable economy that considers ecological, social, and governance criteria. Green skills include both technical and soft skills that help apply green technologies and processes and make environmentally responsible decisions in work and life.

Source: Collected by the author from various sources.

Thus, "green" skills are the abilities required to adapt services, processes, and products to climate change and the associated environmental regulations. "Green" skills include the knowledge, skills, attitudes, and values necessary to develop and support a sustainable, resource-efficient society, as well as those essential for life.

To meet the supply and demand necessary to achieve climate goals, it is crucial to intensify the development of green skills in every sector and country. The areas where these skills are required primarily include, for example, wastewater treatment, climate-resilient cities, green building, solid waste management, renewable energy, and more. "Green" skills are in demand across all fields, and these skills are necessary to create more environmentally sustainable jobs.

Classification of "Green" Skills

One of the main approaches is the development of "green" skills, i.e., competencies that contribute to a sustainable and environmentally responsible lifestyle.

The variety and ambiguity of the definitions of "green" skills also creates challenges in their classification. There are different approaches to the classification of "green" skills. Classifications vary depending on the purpose of the approach.
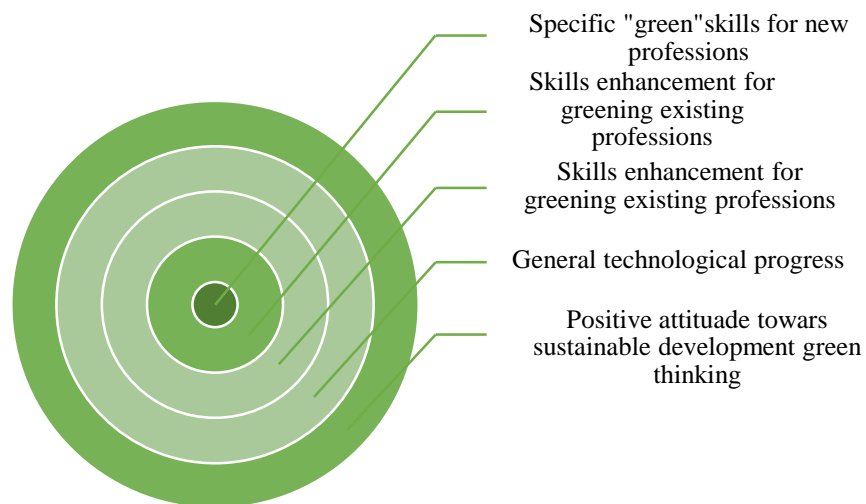
When approaching from the perspective of employment and professional orientation, Soldatova V. (2023) divides "green" skills into two groups (Figure 6).
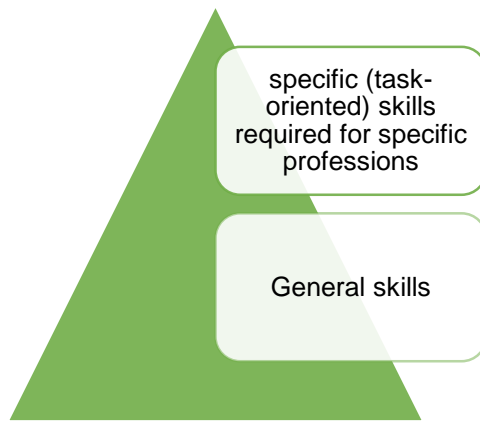
Figure 6: Classification of "Green" Skills According to Soldatova V.

Both types of competencies are used in specific contexts and require knowledge, skills, and attitudes (or beliefs, tendencies, and values).

Another classification of "green" skills is presented in Figure 7.

Specific "green"skills for new professions

Skills enhancement for greening existing professions

Skills enhancement for greening existing professions

General technological progress

Positive attituade towars sustainable development green thinking

Figure 7. Topology of "Green" Skills (Author, 2020)

The widespread application of "green" approaches changes the characteristics of labor. As a result, the skills required for certain labor activities or professions are also changing (Florance, 2021). According to this approach, the "green" transition is presented in Figure 8.
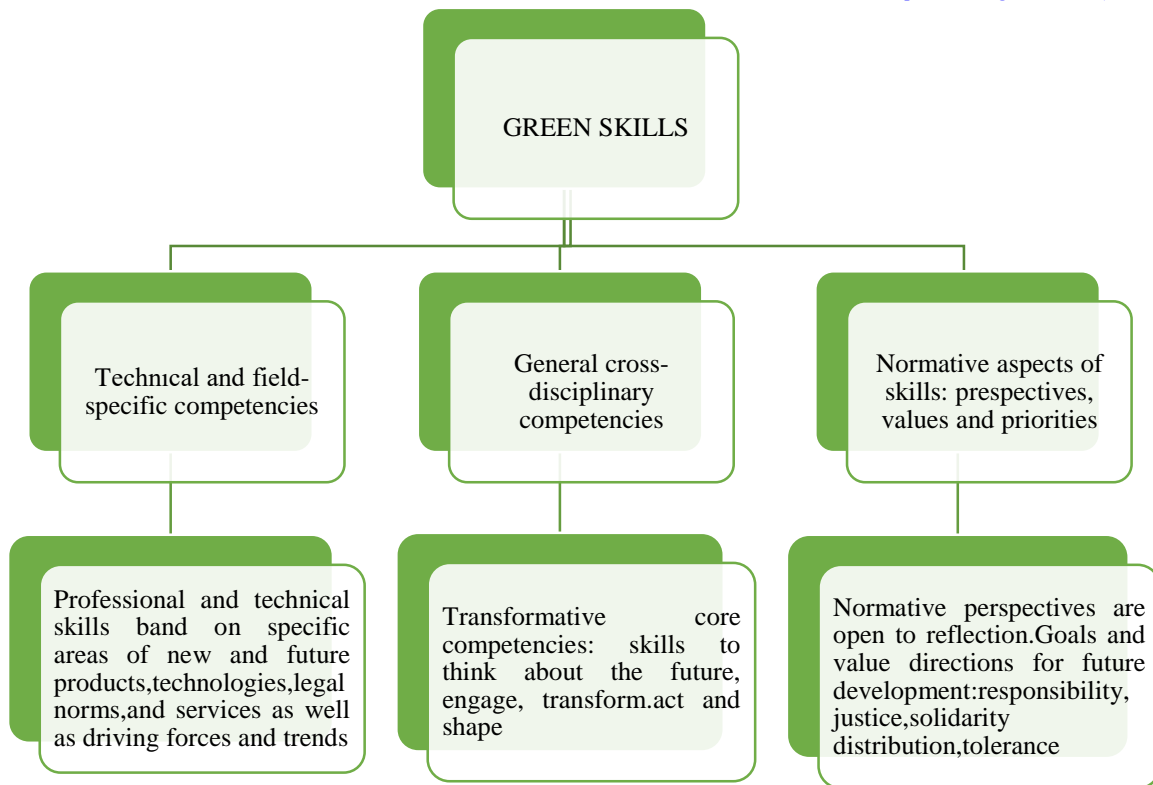
Figure 8: "Green" Skills in the Green Transition

According to another classification, "green" skills are divided into three broad categories (Economist Impact, 2024) (Figure 9):

- Soft skills: Non-professional, non-technical skills necessary for success in green jobs. For example, creativity or ecological awareness.

- Cross-sectoral skills: Skills required to perform similar eco-safe processes and functions across different sectors of the economy. For example, sustainability reporting or environmental impact assessment.

- Sectoral skills: Skills related to the use of green technologies or methods that improve ecological outcomes of activities. For example, the installation of solar panels or environmental improvement.
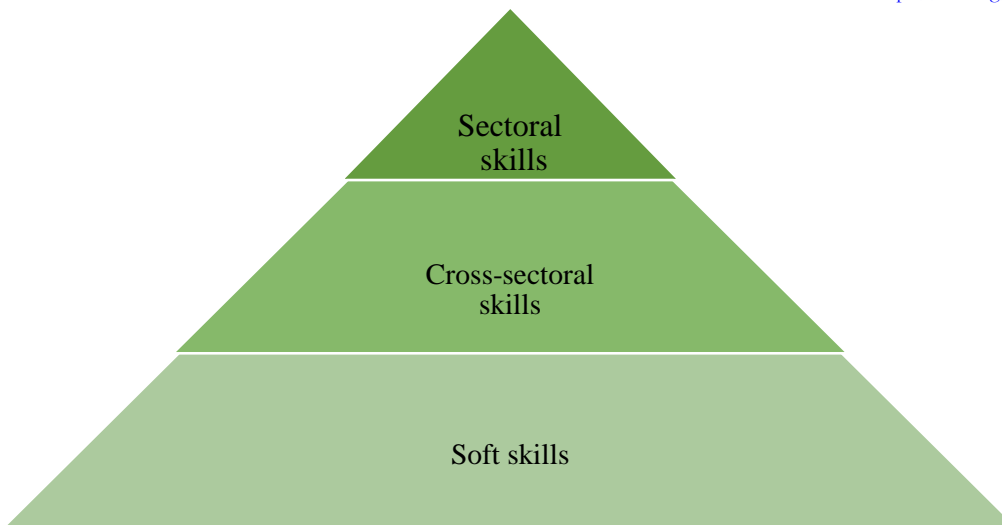
Figure 9. Classification of "Green" Skills (Economist Impact, 2024)

According to another classification, "Green" skills are divided into three categories:
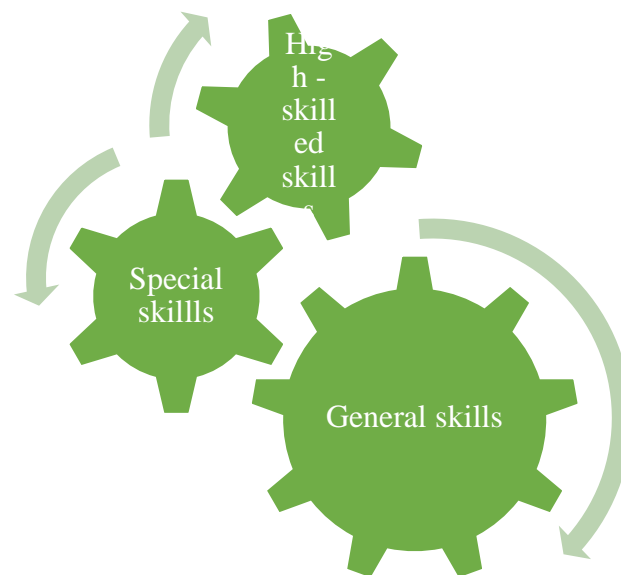
Figure 10. Classification of "Green" Skills

- General Skills – These skills help raise awareness about the importance of "green" skills. For example, understanding how the proper distribution of resources helps minimize losses.

- Specific Skills – These skills assist in the preservation of ecosystems and in finding ways to minimize the consumption of materials, energy, and water. People working in professions such as automotive emissions inspectors, energy auditors, solar photovoltaic equipment installers, and similar roles possess specific ecological skills.

- High-Skilled Skills – These are not directly related to environmental issues, but involve developing waste management technologies, increasing the use of renewable resources instead of non-renewable ones, and other related activities. Individuals with highly specialized ecological skills include nanotechnologists, environmental engineers, and other similar specialists.
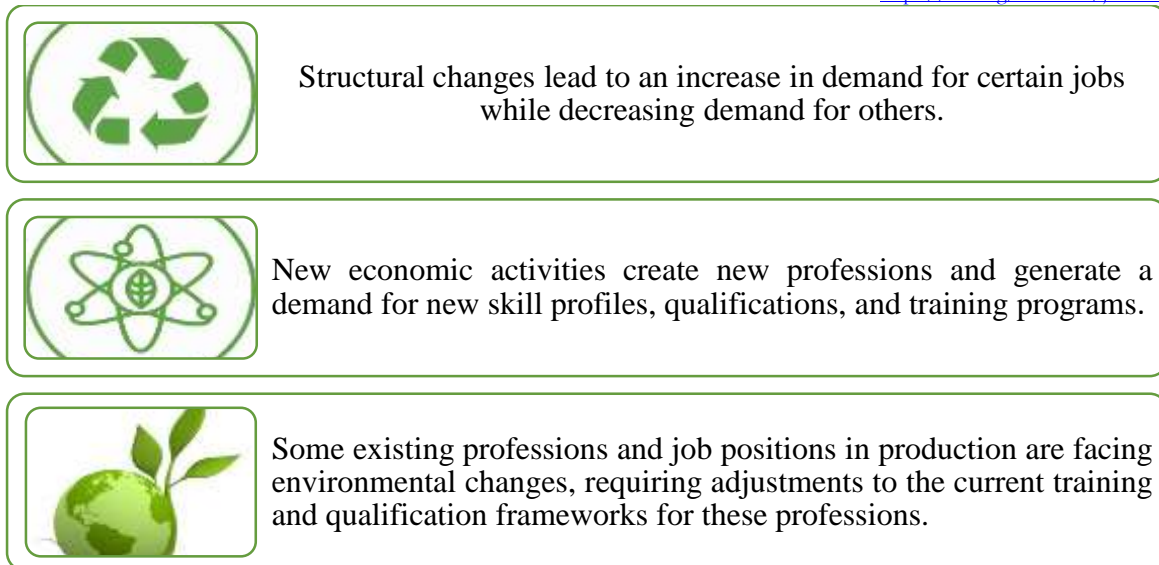
General "Green" Skills

- General "green" skills encompass a broad range of knowledge, abilities, attitudes, and values, which are essential for contributing to sustainable social, economic, and ecological development in any job.

- Thus, acquiring green skills has become a necessity to effectively address the challenges humanity faces and to build a more sustainable and ecologically clean future.

- Green skills are crucial for transitioning to an environmentally sustainable economy that considers ecological, social, and governance criteria for development. These skills include both technical and soft skills that help in applying green technologies and processes and making ecologically responsible decisions in both work and life. Green skills are relevant for people of all ages.

Energy conservation.	• The ability to use energy efficiently and apply energy-saving technologies.
Sustainability of consumption.	• The ability to make informed decisions about consumption, taking into account environmental outcomes.
Waste management.	• Knowledge of proper waste management, including recycling and reducing the use of single-use materials.
Green building and design.	• Understanding green building principles and using environmentally sustainable materials.
The ability to work with renewable energy sources.	• Knowledge and skills to work with solar, wind, and other renewable energy sources.
Biodiversity	• Understanding the importance of biodiversity conservation and caring for ecosystems.
Sustainable agriculture	• Knowledge of sustainable agricultural practices, including organic farming and permaculture.
Transportation and Mobility	• Awareness of sustainable transportation options, including electric and hybrid vehicles, as well as bicycles and public transportation.
Climate Awareness:	• Understanding climate change and the impact of human activities on the environment.
Environmental Education	• The ability to teach and promote an environmentally sustainable lifestyle.

Figure 11. General Green Skills

Acquiring these skills can contribute to the environment and help create a more sustainable future. The transition to a "green" economy affects skills through three main methods:

|	
	Structural changes lead to an increase in demand for certain jobs while decreasing demand for others.
	New economic activities create new professions and generate a demand for new skill profiles, qualifications, and training programs.
	Some existing professions and job positions in production are facing environmental changes, requiring adjustments to the current training and qualification frameworks for these professions.

Figure 12. Methods By Which the Transition to A "Green" Economy Influences Skills

Source: (Cedefop, 2012) (OECD/Cedefop, 2014)

The development of general "green" skills is crucial for the greening of all sectors. "Green" skills enable individuals to develop a "green" mindset and apply general production practices that reduce environmental impacts.

M. Pavlova classified general "green" skills as follows (Pavlova M., 2018):
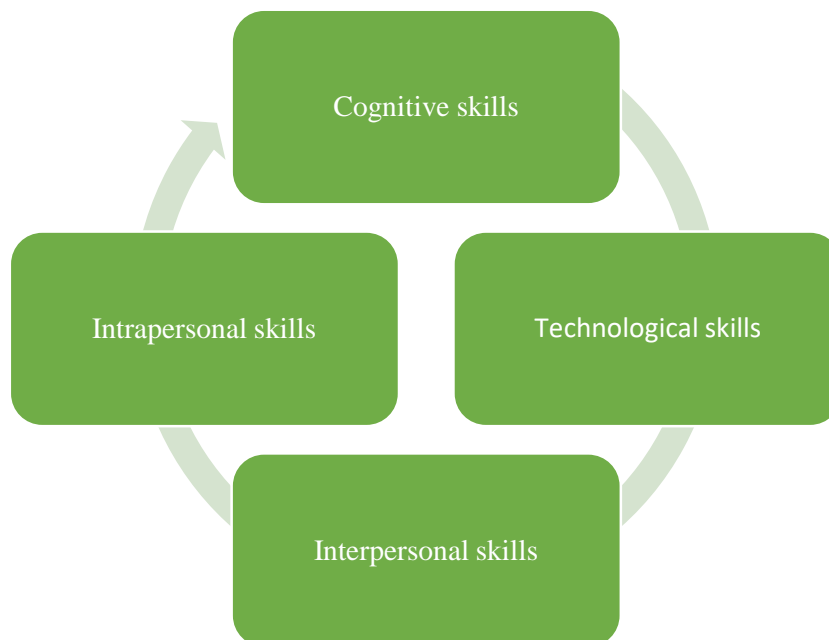
Figure 13. Categories of General Green Skills

- Cognitive skills (competencies) (e.g., ecological awareness and sustainable development, willingness to learn about systems and risk analysis, recognizing the need for and demand for change, assessing, interpreting, and understanding the actions required for this change, identifying opportunities to respond to green challenges, and innovative skills for creating new strategies);

- Technological skills (e.g., working with digital tools, working with green technologies, learning and applying necessary low-carbon technologies, new technologies, and processes);

- Interpersonal skills (e.g., coordination, management, and business skills to promote unified and interdisciplinary approaches encompassing economic, social, and ecological goals, communication and negotiation skills for discussing conflicting interests in complex contexts, marketing skills to promote greener products and services);

- Intrapersonal skills (e.g., adaptability and transferable skills that assist workers in learning and applying new technologies and processes required to green workplaces, entrepreneurial skills to leverage opportunities provided by low-carbon technologies).

The classification system through which these general "green" skills are identified aligns with the core competencies or "soft" skills that employers are already familiar with and which are critically important for the modern workforce. However, most importantly, they are contextualized in terms of ecological awareness and understanding sustainable development.

Per Capitan (2010) proposed the following list of general "green" skills related to environmentally safe processes common across various sectors:

- Quantitative assessment and monitoring (waste, energy, water);

- Management systems (waste, energy, water);

- Procurement and selection;

- Material usage and impact quantification;

- Exposure and use minimization;

- Impact assessment for risk management.

These skills are required in all professions across every sector of economic activity, regardless of specialization, as they reinforce the core values and competencies necessary to improve the current and future state of our planet (Pavlova M, 2018).
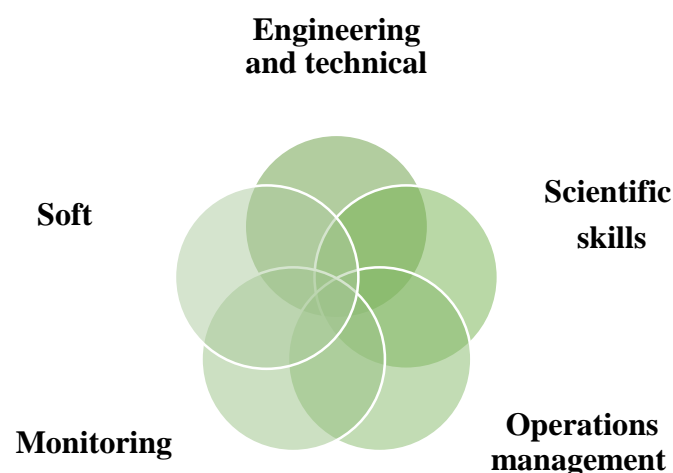
Figure 14. Classification of 'Green' Skills Based on the Green Index of General Skills (Vona, 2015)

People with 'green' skills must also possess other skills. Other skills are presented in Figure 14
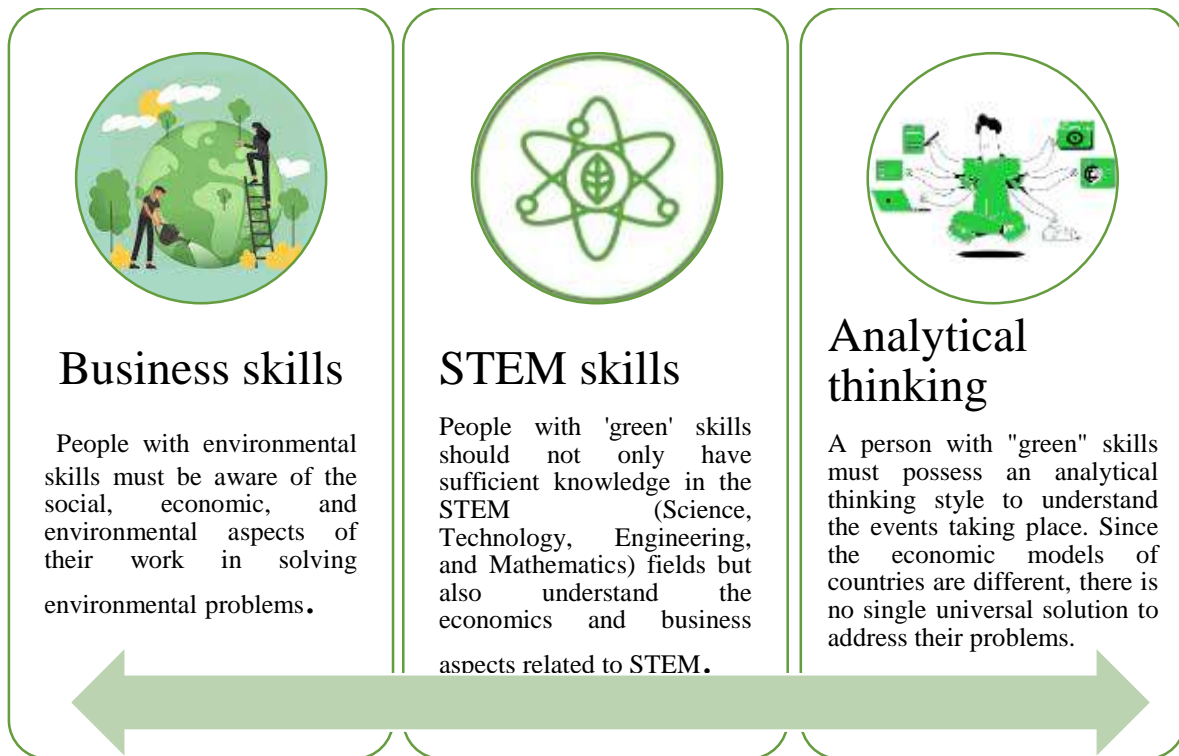
Business skills

People with environmental skills must be aware of the social, economic, and environmental aspects of their work in solving

environmental problems.

STEM skills

People with 'green' skills should not only have sufficient knowledge in the STEM (Science, Technology, Engineering, and Mathematics) fields but also understand the economics and business

aspects related to STEM.

Analytical thinking

A person with "green" skills must possess an analytical thinking style to understand the events taking place. Since the economic models of countries are different, there is no single universal solution to address their problems.

•.

Figure 15. Other Skills

Thus, while "green" jobs and "green" skills are sometimes used interchangeably, it is essential to distinguish between them. Primarily, green skills present a more segmented view of labor market dynamics related to the greening of the economy. This enables policymakers to design measures for training (capacity building) those responsible for policy formulation. For instance, determining how similar the skill levels of green and non-green jobs are can help identify the extent of new skills required for the transition to a green economy.

"Green" Skills and Professions

According to an alternative classification, the "green" index of general skills highlights four key areas that are crucial for "green" professions (Vona, 2015):

Engineering and Technical Skills: These professional skills pertain to the design and evaluation of technologies typically held by engineers and technical workers. This expertise is applied in green buildings, renewable energy projects, and energy-efficient scientific research.

Scientific Skills: These skills derive from the broad knowledge required for innovation. They are particularly in demand at every stage of the value chain and in the utilities sector. For example, ecologists, materials scientists, and hydrologists require such skills.

Operations Management Skills: These skills are related to the know-how needed to implement changes in the organizational structure to support green activities. They involve life-cycle management, efficient production, and integrating green perspectives through collaboration with external stakeholders, including customers. These skills are essential for roles such as sales engineers, climate change analysts, sustainability experts, sustainability directors, and transportation planners.
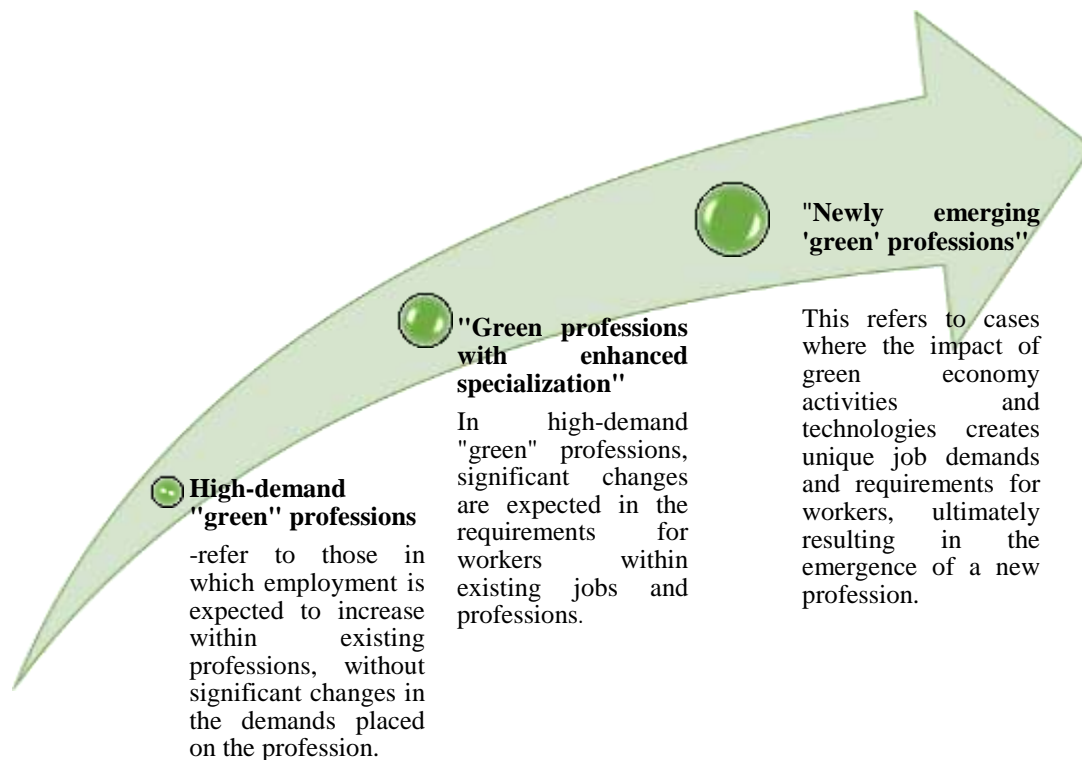
Monitoring Skills: These skills relate to the technical and legal aspects of entrepreneurial activities that are distinctly different from engineering or scientific fields. They involve the skills necessary to assess compliance with technical standards and legal regulations. These skills are required by environmental compliance inspectors, nuclear monitoring technicians, emergency management directors, and legal assistants.

Additionally, some "soft" skills are incorporated. These "soft" skills are considered part of the "future" skillset and are also required for Industry 4.0. Such skills include design thinking, creativity, adaptability, resilience, and more.

Green Professions

Green professions are intended for both high- and low-skilled jobs, with "green" skills requiring significant training and formal education.

According to the O*NET database, "green" professions are classified into three categories (Auktor, 2020):

"Newly emerging 'green' professions"

This refers to cases where the impact of green economy activities and technologies creates unique job demands and requirements for workers, ultimately resulting in the emergence of a new profession.

"Green professions with enhanced specialization"

In high-demand "green" professions, significant changes are expected in the requirements for workers within existing jobs and professions.

High-demand "green" professions

-refer to those in which employment is expected to increase within existing professions, without significant changes in the demands placed on the profession.

Figure 16. Classification of "Green" Professions

Source: (Auktor, 2020)

New professions address more complex, higher-level issues and are exposed to the impact of new technologies. Therefore, the need for the development of skills for newly emerging "green" jobs (i.e., training and education) will significantly increase.

As seen, there is no unified definition of "green" skills, and their classification varies. This also means that "green" jobs, whether new or existing but "expanded" (with some new elements), depend on the economic

structure of a particular country, and especially on the level of development of the economy undergoing a green transformation. In some cases, the fundamental skills required for most "green" jobs may make the retraining phase easier. Instead, additional training, skill enhancement, or supplements to existing core skills specific to green concepts and practices may require restructuring in the fields of training and vocational skills (OECD, 2017).

Current and Expected Impact of Climate Change and Green Economy Policies on Employment

Effects	Examples	Expected Scale
Creation of new jobs (in existing and new specialties)	Solar panel specialists, organic farmers, waste management supervisors, eco-tourism resort workers, natural resource conservation and restoration workers, environmental consultants, etc.	Medium
Closure of some jobs	Mining workers, workers in packaging plants using water and material-saving technologies, workers in factories producing outdated or banned packaging materials.	Small
Renewal of jobs (professions will change)	Jobs in transportation systems transitioning to rail, electric, and general vehicles, waste management in incineration and recycling landfills, jobs in construction using new materials, and recycling waste.	Medium
Most jobs will change (occupation profiles will change)	Workers, operators, and managers in green sectors, especially in construction, agriculture, or transportation: learning to manage new technologies and operating methods; workers in all sectors with energy and resource savings (cleaner production in manufacturing, packaging-free retail services, glass companies transitioning to new materials and products), workers in financial institutions adopting sustainability strategies.	Large

Source: (Ree, 2019)

Thus, the impact of the transition to a "green" economy is not the same for everyone. The demand for skills and tasks in jobs during the "green" transition is not uniform, depending on the economic development levels of the countries. Moreover, the scale of impacts also depends on the structure of the economy, the energy intensity of production, and labor intensity. The number of workers acquiring "green" skills is increasing daily, and they are seeking "green" jobs. This, in turn, has a positive effect on the "green" transition.

Closing Skill Gaps in "Green" Skills

International standards can help fill skill gaps. These standards can bridge the gap between the demand for skilled workers and the supply of individuals possessing these skills.

An example of this is ISO 14001 (Environmental Management Systems). ISO 14001 has emerged as one of the top 10 most in-demand skills among LinkedIn users in recent years (LinkedIn Economic Graph, 2022).

ISO 14001 is an international standard that sets out the requirements for an organization's environmental management system. This standard was developed by the International Organization for Standardization (ISO) Technical Committee 207. ISO 14001 assists organizations in improving their environmental performance through efficient resource utilization and waste reduction, while also providing competitive advantages and earning the trust and confidence of stakeholders. It facilitates the creation and monitoring of an effective environmental management system for the organization, based on the criteria of its Environmental Management System. ISO 14001 is typically adopted by organizations that aim to enhance resource efficiency and productivity while reducing costs.

ISO 14001 enables the organization to achieve the intended outcomes of its environmental management system, which provides value to the environment, the organization itself, and its stakeholders.

In accordance with the organization's environmental policy, the intended outcomes of the environmental management system include:

- Enhancing environmental performance;

- Fulfilling compliance obligations;

- Achieving environmental objectives.

The implementation of ISO 14001 increases the organization's credibility with stakeholders by reducing energy and water consumption, systematically meeting legal requirements, and enhancing overall environmental performance.
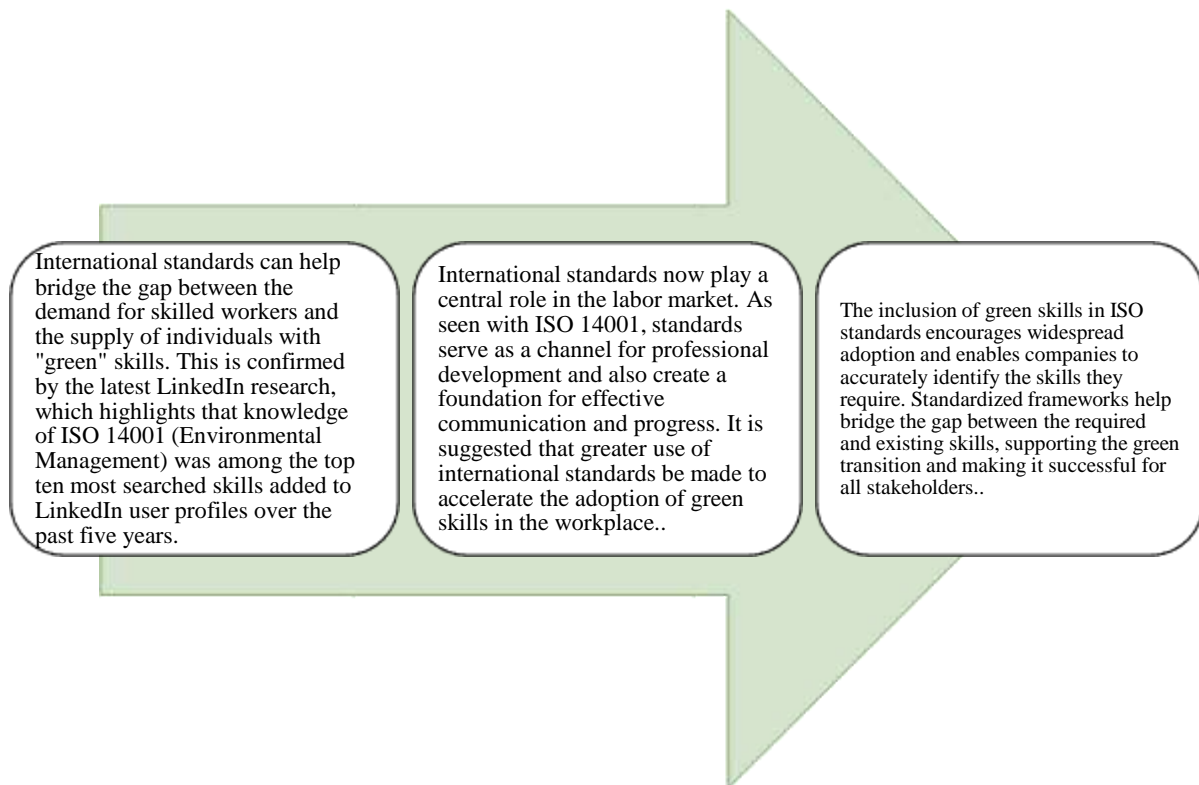
The ISO 14001 standard is critical for organizations seeking to improve their environmental performance by optimizing resource use and minimizing waste, while also establishing a regulatory foundation for environmental protection.

The adoption of ISO 14001 also offers other benefits and advantages, such as:

- Energy savings;

- Reduced environmental risks for the organization;

- Regular monitoring of adverse environmental impacts;

- Savings in energy and resources, leading to reduced costs;

- The opportunity to align organizational activities with legislative and regulatory requirements;

- Reduced waste-related costs;

- Increased revenues due to more efficient resource utilization;

- Enhanced trust and confidence from customers and clients.

- Increased access to foreign markets.

Since a clean environment and sustainable development are fundamental to the direction of a country's growth, the adoption of the ISO 14001 standard by organizations will enhance human capital development and the transition to a new generation economy. This will accelerate innovations and the application of modern technological solutions, speed up green energy processes, and create the necessary conditions for a healthy ecological environment.

It is well known that international standards form the foundation for skill development and growth. To accelerate the integration of "green" skills into the workforce, international standards should be utilized more extensively. Incorporating green skills into ISO standards will promote their widespread adoption, help workers choose their career paths in the labor market, and enable the identification of the necessary skills and their areas of application.

International standards can help bridge the gap between the demand for skilled workers and the supply of individuals with "green" skills. This is confirmed by the latest LinkedIn research, which highlights that knowledge of ISO 14001 (Environmental Management) was among the top ten most searched skills added to LinkedIn user profiles over the past five years.

International standards now play a central role in the labor market. As seen with ISO 14001, standards serve as a channel for professional development and also create a foundation for effective communication and progress. It is suggested that greater use of international standards be made to accelerate the adoption of green skills in the workplace..

The inclusion of green skills in ISO standards encourages widespread adoption and enables companies to accurately identify the skills they require. Standardized frameworks help bridge the gap between the required and existing skills, supporting the green transition and making it successful for all stakeholders..

Figure 16. Bridging Skills Gaps

General standards can help bridge the gap between the required and existing skills and make the green transition successful for all (Figure 17).

Conclusion

The primary issue is the lack of consensus on which jobs and skills should be considered "green." This problem creates inertia in coordinating efforts for relevant skills development programs. Therefore, knowing what constitutes green skills allows stakeholders to assess the availability of these skills and determine the need for further interventions in this area.

The development of "green" skills is not only dependent on a set of actions aimed at the application of "green" technologies and the formation of knowledge related to the transition to a "green" economy but also relies on processes implemented across all sectors and countries. In particular, several guiding principles are essential for skill development:

- Policy alignment between "green" skill programs and other policy objectives through a systematic consultation process with stakeholders.

- Close coordination of goals and activities between sectors and stakeholders (at the national, regional, and global levels).

- A strong empirical base on existing "green" jobs and "green" skills.

- Systematic forecasting mechanisms for predicting future needs in "green" skills in skill development initiatives.

- Monitoring and evaluation of outcomes.

To facilitate the transition from "old" jobs to new "green" jobs, it is crucial to analyze changes in labor demands as quickly as possible and forecast future skill needs. Based on these forecasts, it is essential to identify new "green" skills and the needs of the national labor market, implement new upskilling and reskilling measures, and adapt educational programs in vocational and higher education to meet contemporary demands.

International experience shows that the application of ecological technologies not only creates new jobs but also ensures the modernization of existing jobs and increases labor productivity.

Thus, the transition to a "Green" economy presents significant economic and ecological opportunities for Azerbaijan. In this regard, the development of "green" skills holds strategic importance. The acceleration of the "green" transition is possible through the renewal of educational programs, public-private partnerships, and the promotion of technological innovations.

Recommendations

- Development of a Green Skills Strategy: Preparation of a long-term strategy for the development of "green" skills within the framework of collaboration between the public and private sectors.

- Updating Educational Programs: Special emphasis on teaching ecological technologies and "green" knowledge in higher and vocational education.

- Creation of Systematic Mechanisms for Skill Forecasting: Establishing mechanisms for the systematic forecasting of future skill needs related to the green economy.

- Application of Standards: Ensuring workforce preparedness through the widespread application of international standards, particularly ISO 14001.

- Technological Innovations: Promoting innovations in renewable energy and resource recycling.

References

Auktor, G. (2020). Green industrial skills for a sustainable future. Vienna: United Nations Industrial Development Organization. Retrieved from https://www.unido.org/sites/default/files/files/2021-02/LKDForum-2020_Green-Skills-for-a-Sustainable-Future.pdf

Bureau of Labor Statistics (BLS). (2013, January 25). Measuring green jobs. U.S. Bureau of Labor Statistics. Retrieved from https://www.bls.gov/green/home.htm#overview

Cedefop. (2012). Green skills and environmental awareness in vocational education and training. Luxembourg: European Commission. Retrieved from https://www.cedefop.europa.eu/files/5524_en.pdf

Cedefop/OECD. (2015). Green skills and innovation for inclusive growth. Luxembourg: Publications Office of the European Union. https://doi.org/10.2801/49143

Charles, A. (2022). What are green skills? UNIDO. Retrieved from https://www.unido.org/stories/what-are-green-skills

Economist Impact. (2024). Green skills: Driving the transition to a more sustainable future. Retrieved from https://impact.economist.com/sustainability/green-skills-outlook/downloads/Iberdrola_GreenSkillsOutlook_report.pdf

ESCO. (2022). Green skills and knowledge concepts: Labelling the ESCO classification. ESCO Publications. Retrieved from https://esco.ec.europa.eu/nb/about-esco/publications/publication/green-skills-and-knowledge-concepts-labelling-esco

European Commission, Directorate-General for Employment, Social Affairs and Inclusion, Barton, M., Hawley, J., & Scott, D. (2013). Promoting green jobs throughout the crisis: A handbook of best practices in Europe. EEO Review. European Commission, Directorate-General for Employment. https://data.europa.eu/doi/10.2767/43395

Eurostat. (2009). The environmental goods and services sector: A data collection handbook. Methodologies and Working Papers. European Commission. Retrieved from https://ec.europa.eu/eurostat/web/main/search/-/search/estatsearchportlet_WAR_estatsearchportlet_IN

Florance, L. (2021). Green skills for green transformation and sustainable future. G. Lulu.com. Retrieved from https://www.academia.edu/53348088/GREEN_SKILLS_FOR_GREEN_TRANSFORMATION_AND_SUSTAINABLE_FUTURE

Hüseynova, A. D. (2017). İnnovasiya fəaliyyəti haqqında bir sıra stimullaşdırıcı mexanizmlər. Bakı: Çap ART.

Hüseynova, A. D. (2017). İnsan kapitalının inkişafı: nəzəri aspektləri və qiymətləndirmə metodologiyası. Bakı: Çap ART.

IEMA. (2022). Defining green skills. Retrieved from https://www.iema.net/corporate-programmes/blog/2022/04/28/ema-defining-green-skills

ILO. (2013). Proposals for the statistical definition and measurement of green jobs, preliminary paper. Geneva: ILO.

ILO. (2013). Sustainable development, decent work and green jobs. International Labour Conference, 102nd Session, Report V. Geneva: ILO. Retrieved from https://www.ilo.org/ilc/ILCSessions/102/reports/reports-submitted/WCMS_207370/lang--en/index.htm

ILO. (2016). Technical paper: A just transition to climate-resilient economies and societies: Issues and perspectives for the world of work. Geneva: ILO.

ILO. (2018). World employment and social outlook 2018: Greening with jobs. International Labour Office. Geneva. Retrieved from https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_628654.pdf

ILO. (2019). Skills for a greener future: A global view based on 32 country studies. Geneva: ILO. Retrieved from https://www.ilo.org/wcmsp5/groups/public/---ed_emp/documents/publication/wcms_732214.pdf

LinkedIn Economic Graph. (2022). Global green skills report 2022. Retrieved from https://linkedin.github.io/global-green-report-2022/

LinkedIn Economic Graph. (2023). Global green skills report 2023. Retrieved from https://economicgraph.linkedin.com/research/global-green-skills-report?deliveryName=DM202199

OECD. (2017). Employment implications of green growth: Linking jobs, growth, and green policies. OECD Report for the G7 Environment Ministers. Paris: OECD.

OECD/Cedefop. (2014). Greener skills and jobs. OECD Green Growth Studies. Paris: OECD Publishing. https://doi.org/10.1787/9789264208704-en

Ree, K. v. (2019). Promoting green jobs: Decent work in the transition to low-carbon, green economies. International Development Policy, 11, 248-271. https://doi.org/10.4000/poldev.3107

Stoevska, V., & Hunter, D. (2012). Proposals for the statistical definition and measurement of green jobs. Geneva: ILO. Retrieved from https://unstats.un.org/unsd/envaccounting/londongroup/meeting18/LG18_28.pdf

UNEP, ILO, IOE, ITUC. (2008). Green jobs: Towards decent work in a sustainable, low-carbon world. Retrieved from https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/documents/publication/wcms_158727.pdf

United Nations Environment Programme. (2021). Global guidance for education on green jobs: Connecting higher education and green opportunities for planetary health. Retrieved from https://wedocs.unep.org/20.500.11822/35070

Vona, F., & M. G. (2018). Environmental regulation and green skills: An empirical exploration. Journal of the Association of Environmental and Resource Economists, 5(4), 13-753. https://doi.org/10.1086/698859

Vona, F. G. (2015). Green skills. NBER Working Paper No. 21116. Cambridge, US: National Bureau of Economic Research. Retrieved from https://ssrn.com/abstract=2599382