



International
Labour
Organization

REPORT BRIEF



Assessment of 21st Century Skills Across Emerging Sectors

Agro-processing Industry

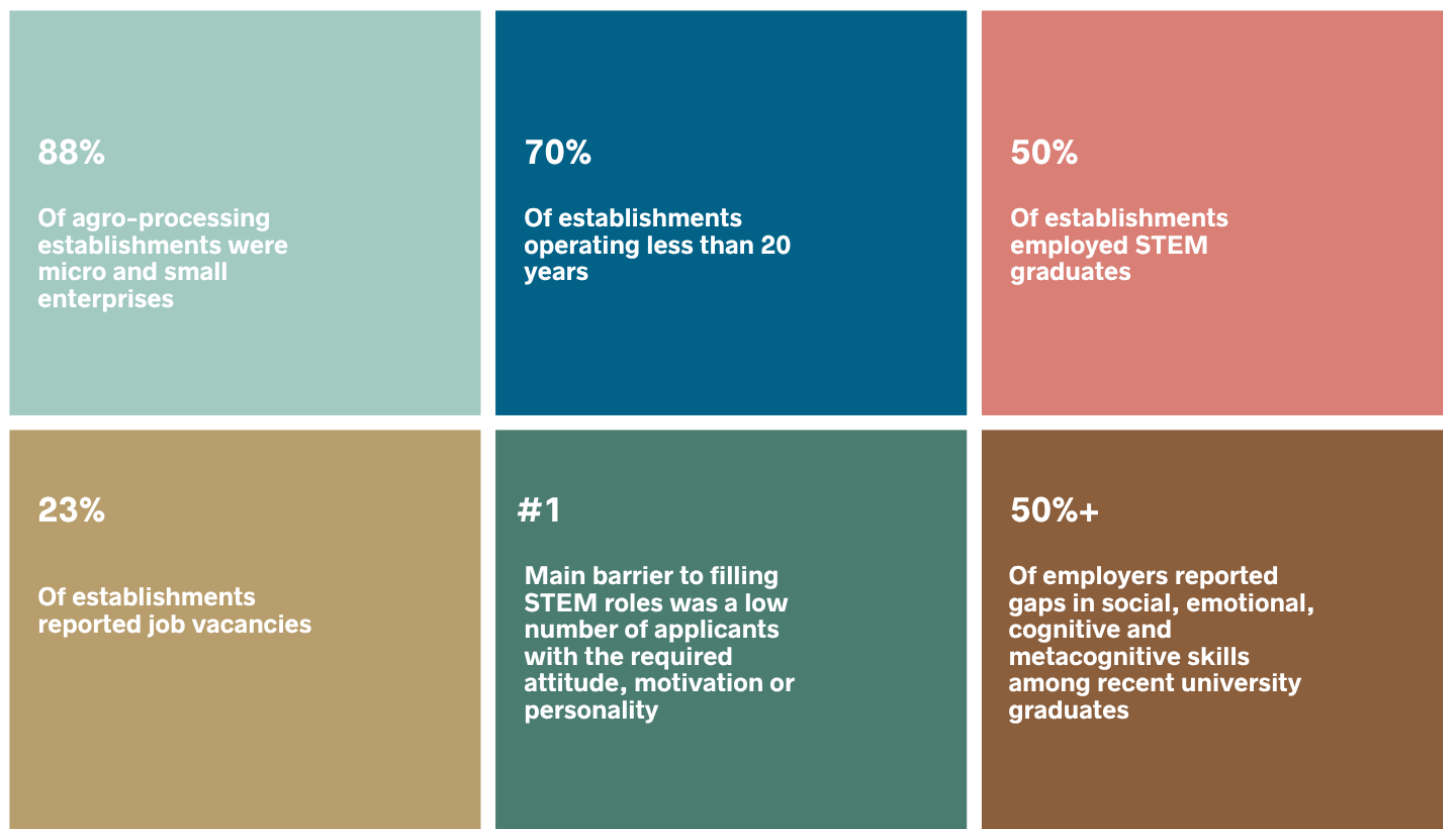
Volume 4

Key points

- Rapid global advances in automation, digitalisation, biotechnology and data-driven production are accelerating changes in skills requirements, outpacing the capacity of education and training systems to equip the workforce with the skills required by the agro-processing sector.
- Closer collaboration among government, industry, education and training institutions, and social partners is required to ensure that skills development systems are effectively aligned with emerging labour market needs.
- STEM-related employment opportunities are emerging in Trinidad and Tobago's agro-processing sector, while productivity and competitiveness continue to be constrained by persistent skills mismatches and structural barriers.
- Strategic investments in STEM education, TVET strengthening, workforce upskilling and technology adoption can help ensure that the agro-processing sector develops a future-ready workforce capable of supporting productivity, innovation and sustainable growth.



HEADLINE STATISTICS



INTRODUCTION

Trinidad and Tobago is well positioned to meet growing local, regional and international demand for high valued added agricultural products from its unique natural resources, such as cocoa, hill rice, hot peppers, and other indigenous agricultural species. The country's agro-processing sector holds significant economic potential, contributing to manufacturing output while supporting employment and rural development, particularly through micro and small enterprises. This sector also plays a strategic role in Trinidad and Tobago's economic diversification and food security. Strengthening workforce skills in this sector is essential to improving productivity, fostering innovation, and enabling value-added production.

The Assessment of 21st Century Skills Across Emerging Sectors: Agro-Processing Industry, conducted by NIHERST in collaboration with the ILO

(2023–2025), gathered data from agro-processing establishments in Trinidad and Tobago using an establishment skills survey aligned with standards of the International Labour Office Geneva, the European Training Foundation, and the European Centre for the Development of Vocational Training. The survey frame was developed using business listings from the Central Statistics Office, the National Agricultural Marketing and Development Corporation, and the National Training Agency, with the sample selected through systematic random sampling. Data collection was conducted through structured, face-to-face interviews with employers and senior managers, examining firm characteristics, workforce composition, job vacancies, recruitment challenges, core skills needs, skills mismatches, and current and projected demand for Science, Technology, Engineering and Mathematics (STEM) occupations.

The findings capture consistent patterns across active firms and provide directional, sector-specific insights typical of establishment skills surveys, offering a credible evidence base for policy in a data-scarce, emerging sector. Evidence-based policies and strategies can ensure that both the current and future workforce are well equipped to meet the challenges of fast evolving labour markets. By addressing identified labour and skills needs, Trinidad and Tobago can increase the productivity, innovativeness, and competitiveness of its agro-processing industry, driving growth and development in this critical sector and strengthening its position in the global market.



FIRM CHARACTERISTICS AND WORKFORCE COMPOSITION

The agro-processing sector in Trinidad and Tobago is characterised by a relatively young and predominantly small-scale business landscape. Most of the establishments that responded to the survey (88%) are micro and small enterprises that have been operating for less than 20 years and employ fewer than 25 workers. The main economic activity of these establishments is food processing (38%), followed by fruit and vegetable processing (23%), meat processing (19%), and other food processing activities, with a smaller number of establishments engaged in beverage production and oil extraction and refining.

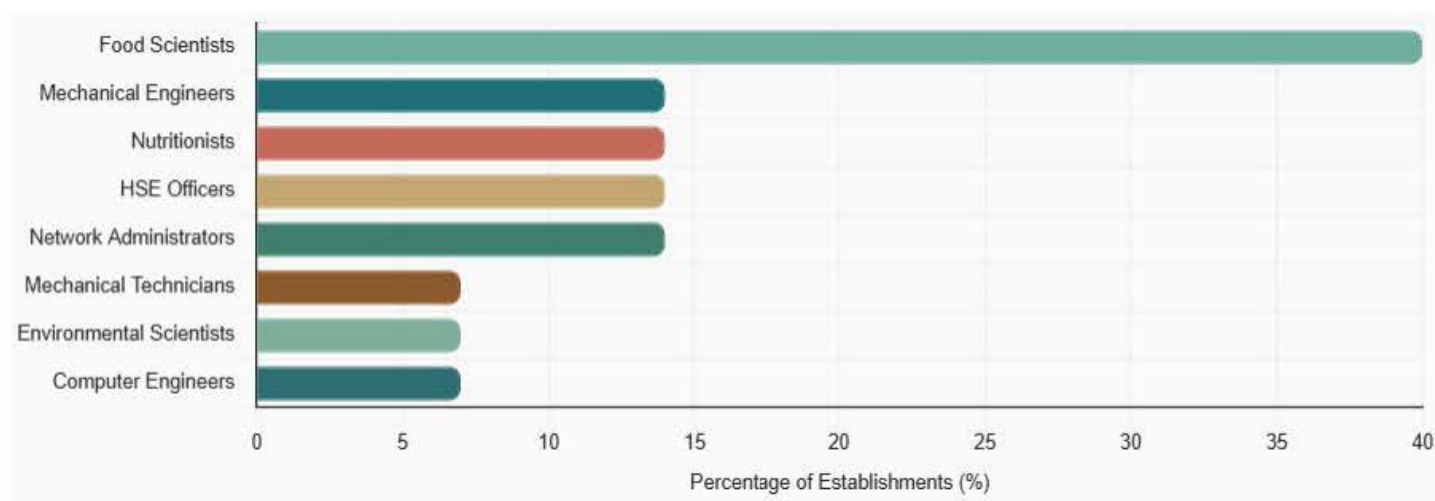
The workforce composition reflects the small size and owner-managed nature of most establishments. Employment is concentrated in managerial, service and sales, and elementary occupations, with managers often performing multiple functions within the enterprise. Male employment was higher than female employment overall. Gender distribution also varies across occupational groups. Women are more represented in management, clerical, and service-related roles, while men are more prevalent in technical, production and skilled agricultural occupations.

JOB VACANCIES AND RECRUITMENT CHALLENGES

VACANCY PROFILE

Job vacancies in the agro-processing sector are more commonly observed in non-STEM occupations, which employers generally reported as easier to fill. In contrast, STEM-related vacancies, particularly at the professional level, are significantly more difficult to recruit for, indicating emerging constraints in the availability and suitability of STEM talent for the sector. Among these, food scientist (40%) positions were identified as the most difficult to fill. Employers also reported difficulties in recruiting for other STEM-related occupations, including mechanical engineers and specialised roles such as nutritionists, health, safety and environment (HSE) officers, as well as professionals in network management and information and communication technologies (ICT).

MOST DIFFICULT STEM OCCUPATIONS TO FILL



MAIN RECRUITMENT BARRIERS

Recruitment challenges reflect a limited supply of suitably qualified candidates, combined with structural constraints that make it difficult for enterprises to attract and retain specialised STEM talent. The predominance of micro and small enterprises within the sector may limit the availability of competitive employment conditions and opportunities for career advancement. In addition, weaknesses in work readiness, lack of exposure to industry-relevant practical experience, and a limited number of persons willing to undertake agro-processing jobs further narrow the pool of available STEM professionals.

CORE SKILLS NEEDS AND MISMATCHES

KEY SKILLS

A set of core skills were identified as critical for achieving business objectives in the agro-processing sector. These include communication; collaboration and teamwork; problem-solving and decision-making; self-reflection and learning to learn; and green skills, particularly those related to energy and water efficiency and waste management.

LARGEST SKILLS GAP (IMPORTANCE X PROFICIENCY)

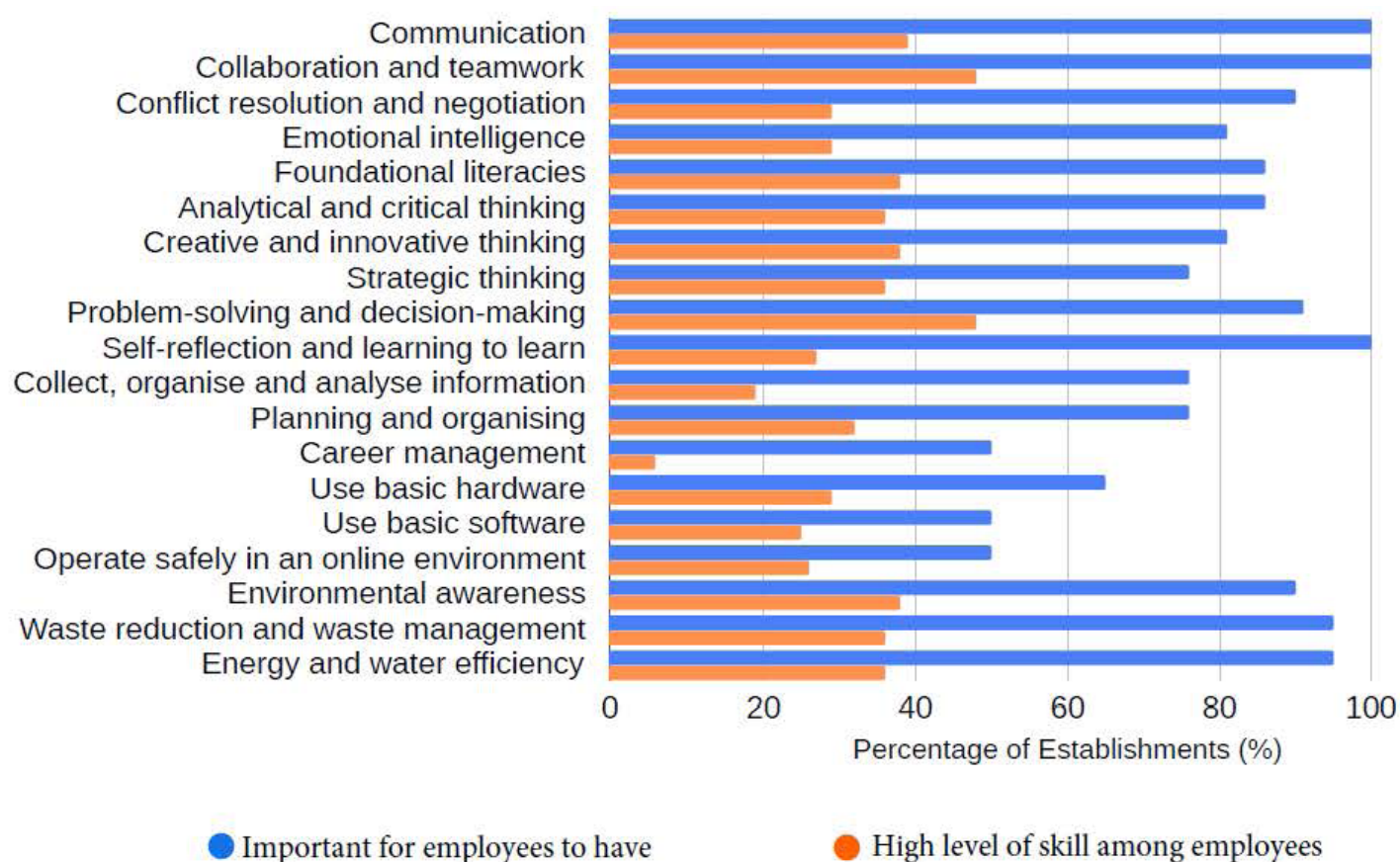
Survey respondents were asked to identify the extent to which a set of core skills were present among recent graduates (2021–2023) applying for positions within their enterprises. Basic digital skills and green skills were reported as generally readily available in the recent graduate labour pool. However, foundational socio-emotional skills, particularly communication, conflict resolution and negotiation, as well as self-reflection and learning-to-learn were consistently reported as very difficult to find among recent graduates.



Survey respondents were also asked to provide their assessments of the core skill levels of their workforces. The majority indicated that the levels of communication, conflict resolution, negotiation, and learning-to-learn skills were low. Given the high importance of this specific set of skills to business objectives, the gaps between their importance and

actual perceived proficiency are significant. These gaps highlight the growing importance of strengthening soft and adaptive skills within agro-processing training programmes.

ESTIMATED SKILLS GAPS (IMPORTANCE OF SKILLS TO MEET BUSINESS GOALS X PROFICIENCY LEVEL AMONG EMPLOYEES)



TECHNOLOGICAL ADVANCEMENTS IN THE SECTOR

At the global level, technological change is transforming the agro-processing industry through the adoption of automation and robotics, digital technologies such as artificial intelligence (AI) and the Internet of Things (IoT), biotechnology, digital agriculture platforms and blockchain solutions. These technologies are improving productivity, quality control, traceability and sustainability across processing and supply chains, while increasing demand for STEM-intensive roles, including food scientists, automation engineers, ICT specialists, data analysts, and environmental scientists. Ultimately, building a stronger STEM workforce is essential for improving productivity, competitiveness, and sustainability in the sector.

In Trinidad and Tobago, the adoption of these technologies remains at an early stage and is uneven across the sector, reflecting the predominance of micro and small enterprises with limited capital and technical capacity. While some firms have begun to integrate basic automation, digital monitoring and food safety technologies, wider uptake is constrained by skills shortages, investment costs, and gaps in digital infrastructure. Strategic support through training, partnerships, and enabling policies will be critical to fully harness the benefits of these emerging technologies.

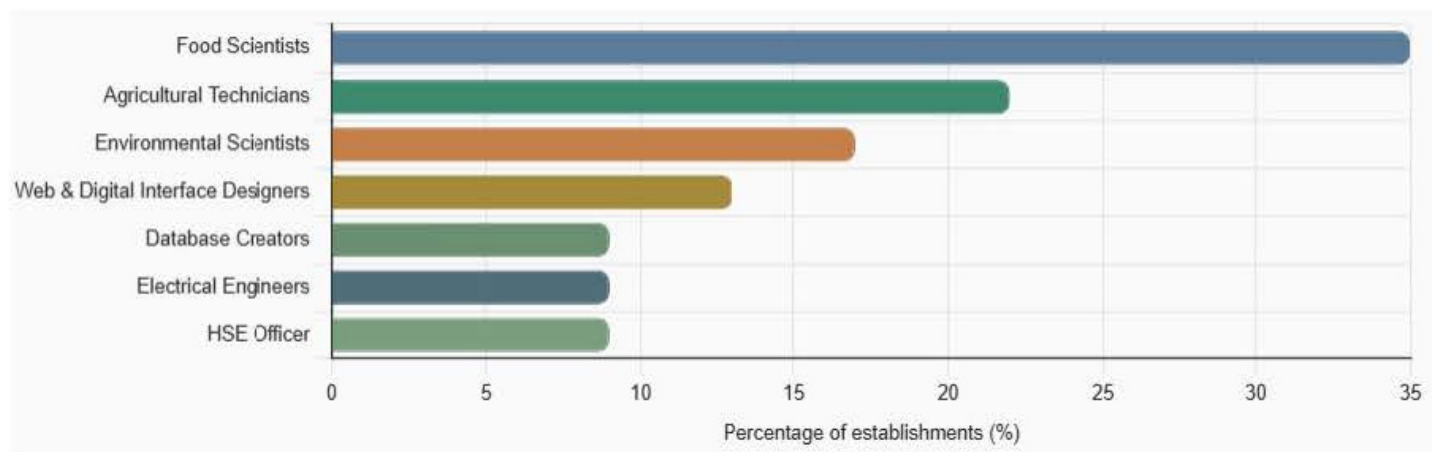
expand, modernise, and integrate more advanced production and digital systems. Future priorities highlight increased demand for STEM roles such as Food Scientists, Agricultural Technicians and Environmental Scientists. At the same time, this structural composition may constrain the sector's capacity to adopt new technologies and achieve scale, underscoring the need for targeted policy interventions to support enterprise growth, technological upgrading, and workforce skills development.



DEMAND FOR STEM LABOUR

The current demand for STEM labour in the agro-processing sector is generally low, reflecting the predominance of micro and small enterprises and the early stage of technological adoption across the industry. Many firms operate with lean staffing structures and limited specialisation, relying on multifunctional roles rather than dedicated STEM professionals. As a result, the immediate need for highly specialised STEM occupations remains modest; however, this reflects the sector's current stage of development and is expected to evolve as firms

MOST IMPORTANT STEM OCCUPATIONS FOR ESTABLISHMENTS IN THE NEXT 5 YEARS



TVET FINDINGS

The survey employed the STEM in TVET Curriculum Guide, developed under the ILO Women in STEM for Workforce Readiness and Development Programme, to gather information from respondents on the work-readiness of their current workforce and of recent Technical and Vocational Education and Training (TVET) graduates (2021–2023) applying for positions within their enterprises.

Although the response rate to the TVET component of the survey was relatively low, the findings indicate that employers face varying levels of difficulty in sourcing STEM-related skills among TVET graduates. Employers reported challenges in identifying candidates with strong problem-solving, critical thinking, decision-making, and systems-thinking skills. Conversely, skills such as collaboration, empathy and service orientation were generally perceived as more readily available among recent graduates from TVET.

These findings highlight the need to strengthen the integration of STEM skills within TVET programmes, particularly in areas related to analytical thinking, digital literacy, and problem solving. Moreover, greater collaboration between training institutions

and industry, through internships, mentorship programmes and workplace-based training, could help ensure that TVET graduates acquire the practical and transversal skills required to support technological upgrading in the agro-processing sector.

RECOMMENDATIONS

Employers in the agro-processing sector proposed a range of measures for government agencies, industry stakeholders and education and training institutions to strengthen STEM education and support the development of a more robust STEM workforce. In addition to these stakeholder-driven suggestions, the study also presents broader recommendations derived from the survey findings.

Coordinated and forward-looking measures are needed to address existing skills gaps, strengthen the STEM workforce pipeline and facilitate technological upgrading within the agro-processing sector. The priority recommendations in this section are proposed for consideration by policymakers, education and training institutions, industry stakeholders, and social partners.

STRENGTHEN EDUCATION INDUSTRY ALIGNMENT TO RESPOND TO EVOLVING NEEDS OF THE SECTOR

Education and training systems need to be more closely aligned with the evolving needs of the agro-processing sector. This includes systematically and continuously integrating inputs from industry into tertiary and TVET curricula, updating course content to reflect emerging technologies and priority STEM occupations, and expanding work-based learning opportunities such as apprenticeships and internships. Strengthened employer engagement in curriculum design and assessment processes will help ensure that graduates acquire relevant technical and core skills.

INVEST IN UPSKILLING AND RESKILLING WORKERS

Given the significant skills gaps identified among existing workers, targeted upskilling and reskilling initiatives are essential. Continuous professional development programmes should focus on digital literacy, analytical and problem-solving skills, communication, and other core competencies required in technology-enabled production environments. Public incentives and co-financing mechanisms can support micro and small enterprises in investing in employee training, recognising that smaller firms often face financial and capacity constraints in delivering structured training programmes.

BUILD STEM CAREER PIPELINES TO INCREASE THE SUPPLY OF JOB-READY TALENT FOR THE SECTOR

To meet projected growth in demand for Food Scientists, Agricultural Technicians and Environmental Scientists, targeted measures are needed to strengthen the STEM talent pipeline. These may include scholarships, grants and incentives directed

towards priority agro-processing STEM fields, as well as strengthened career guidance and outreach initiatives to reposition agro-processing as a modern, innovative, and technology-driven sector. Early exposure to STEM education and clearer career pathways can help increase student interest and participation in relevant disciplines.

ENABLE TECHNOLOGY ADOPTION AMONG SMALL AND MICRO ENTERPRISES

Skills development should be complemented by measures that facilitate technology adoption at enterprise level, especially for small and micro enterprises. Fiscal incentives, competitive grants, innovation vouchers and shared technology or innovation facilities can lower the barriers to investment in automation, digital monitoring, and other advanced systems. Stronger collaboration between universities, research institutions and industry can support applied research, knowledge transfer, and the development of context-specific technological solutions for the local agro-processing industry.



IMPROVE JOB QUALITY AND SECTOR ATTRACTIVENESS FOR STEM TALENT

Addressing structural constraints within the sector is also critical for attracting and retaining specialised STEM talent. Measures to regularise employment practices, strengthen compliance with labour standards and improve job security can enhance the attractiveness of agro-processing careers. Improved working conditions, clearer career progression pathways, and greater formalisation of employment relationships will contribute to a more stable and competitive labour market environment within the sector.

PROMOTE THE PARTICIPATION OF WOMEN IN STEM ROLES TO EXPAND AND DIVERSIFY THE TALENT POOL

Targeted measures could be implemented to strengthen the participation of women in STEM-related occupations within the agro-processing sector, where gender differences are evident across certain occupational groups. This could include scholarships and training programmes for women in food science, agricultural technology and engineering fields, mentorship initiatives linking female students with industry professionals, and awareness campaigns that promote STEM careers in agro-processing as viable and rewarding pathways for women. Strengthening gender-inclusive training and recruitment practices would help expand the sector's talent pool while supporting more equitable participation in emerging STEM occupations.

ENCOURAGE ADDITIONAL LABOUR MARKET AND WORK- FORCE INTELLIGENCE STUDIES ON STEM SKILLS AND JOBS

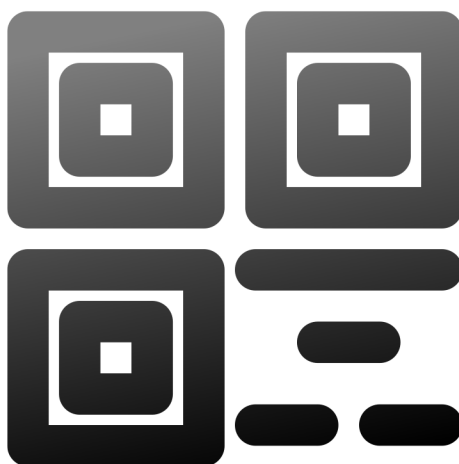
Undertaking more labour market and workforce intelligence studies focused on STEM skills and STEM-related occupations is essential for strength-

ening evidence-based policymaking within the agro-processing sector. Regular labour force assessments, employer surveys, and sector-specific skills studies can continue to identify emerging occupations, evolving competency requirements, skills shortages, and workforce trends associated with technological change and industry modernisation. Such data will support policymakers, education and training institutions, and industry stakeholders in developing targeted policies, programmes, and investments to address identified gaps, strengthen workforce planning, and improve alignment between education and training systems and current and future industry needs. Strengthening national labour market intelligence systems will also support more responsive curriculum development, career guidance, and human capital planning for the agro-processing sector and related STEM industries.



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