Influence of Labour Market Information on Agricultural Programmes Curriculum Development in National Polytechnics: Case of the Kisii National Polytechnic, Kenya

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Abstract

Agricultural curricula worldwide must advance to meet dynamic labour market demands. Labour Market Information (LMI) surveys provide critical insights into employment trends, skill levels, and training needs, enabling demand-driven curriculum development. This study examined the influence of LMI on agricultural programmes at Kisii National Polytechnic, Kenya, with surveys conducted across 15 regions including Bomet, Kericho, Bungoma, Trans Nzoia, Busia, Siaya, Kisii, Nyamira, Transmara, Nairobi, Homabay, Migori, Nakuru, Naivasha, and Kisumu. Using a cross-sectional baseline survey and qualitative design, data were collected from 159 organizations and 435 respondents via KoboCollect questionnaires. Findings revealed that 21% of respondents believed graduates lacked sufficient practical skills. Key areas requiring improvement included agricultural technology (15.7%), ICT integration (14.0%), value addition (13.3%), and soft skills (10.7%). Respondents emphasized capacity building in agro-processing (11.1%), agricultural value addition (9.8%), animal health and production (9.6%), ICT integration (7.5%), dairy production, crop production, and artificial insemination (6.1%). The study concluded that competencies missing in the sector include agro-processing, smart agriculture, poultry farming, dairy technology, animal disease diagnosis, greenhouse management, agronomy, irrigation, and drainage. Integrating these skills into curricula will bridge gaps, enhance employability, and align training with labour market needs.

Keywords: Labour Market, Agricultural Sector, Market Trends, Training Needs

Introduction

Since its inception in the 19th century, technical and vocational education and training, or TVET, has seen substantial change in Kenya. TVET is now acknowledged as a key factor in youth employment, economic and financial empowerment, lifelong learning, skill development, and the achievement of national development and economic goals. In a 2014 study, the World Bank and Kenya Vision 2030 (Akala, 2021) stressed that the country's significant unemployment problem is caused by disparities in education and skills. A large number of young people lack the education and skills necessary to satisfy the expectations of the job market.

Since the implementation of free primary education in 2003 (Biavaschi *et al.,* 2012) and subsequent subsidized secondary education, there has been an increase in the number of students who complete primary and secondary education in Kenya. However, only a small percentage of students proceed to tertiary education. For example, in 2022, just 19.7% of the Kenya Certificate for Secondary Education (KCSE) cohort qualified for university admission (Andersen *et al.,* 2024). Students who do not meet the university admission requirements often pursue alternative paths, such as enrolling in technical and vocational training institutions (TVETs) to develop skills.

Kenya and other sub-Saharan African countries encounter challenges in aligning skills development with the evolving demands of the labour market. Even after completing their training, many graduates find it difficult to secure employment. Additionally, a sociocultural perception posits that vocational training is inferior and is primarily intended for the underprivileged, sometimes equating it with servitude. This perpetuates socioeconomic disparities of access to training in TVET institutions (Jwan, 2023).

The delivery of TVET programs varies by region. For instance, Germany's dual vocational education system integrates workplace and school training, with responsibilities split between employers and state-sponsored training. This approach prioritizes practical, hands-on learning and is shaped by employer needs (Jwan, 2023).

Vocational training is globally recognised as a catalyst for young creativity, self-employment and income prospects in line with the national youth policy targets of Kenya (Najoli, 2019). Employers increasingly demand vocational skills and broad-based capabilities to enable efficiency, confidence and teamwork in the workplace. Kenya’s focus on Competency Based Education and Training (CBET) further demonstrates how LMI findings can inform agricultural curricula to address skills gaps and respond to growing labour market needs (Mugambi *et al.,* 2022).

Study Objective

The objective of the study was to identify skill gaps in the labour market, the market trends in skill requirements and the relevance of agriculture programmes.

Materials and Methods

Research Design

Kothari (2004) claims that research design is the blueprint for the complete data gathering, measurement, and analysis process. From generating the hypothesis and its operational implications to data analysis and

making conclusions, the research design provided the framework for everything the researcher did. A cross-sectional baseline survey and qualitative design was used. This hybrid design was used because of the need to generate quantifiable information as well as in depth understanding of issues of assessment.

Population and Sample

Sample and Sampling Procedure

Purposive/convenience sampling technique was used to identify industry players. Random sampling was used to identify TVET graduates within different organizations. Purposive/convenience sampling was used to organisations and industry players based on the degree of their concentration in each region; thus the sample sizes are not equal in each region. This was a methodological and deliberate choice and not an oversight since it ensured the adequate representation of regions with a higher density of agricultural establishments and therefore greater relevance to the study's objective, while regions with fewer agricultural establishments contributed proportionately fewer respondents. The sampling frame is presented in Table 1.

Table 1: Sample Population

Region	CBO	NGO	Public Sector	Private Sector	Total
Bomet - Kericho	7	9	57	27	100
Bungoma- Tran Nzoia	12	6	48	31	97
Busia- Siaya	4	3	35	18	60
Homabay- Migori	6	7	17	12	42
Kisii-Nyamira – Trans Mara	5	6	27	14	52
Kisumu	1	1	7	4	13
Nairobi	2	4	25	17	48
Nakuru-Naivasha	2	3	10	8	23
Total	39	39	226	130	435

A total of 159 organisations and 435 respondents took part in the survey. In addition, 8 key informants were interviewed. A pilot was carried out in organisations and involved 12 participants. This assisted in checking validity and reliability of the research instruments.

Sampling Design

Cross-Sectional Design

This was applied through a survey to collect data on characteristics of the respondents, skills gaps and current trends in the labour market and suggestions on curriculum needs for the agricultural sub sector.

Qualitative Design

A Key Informant Interview (KII) was conducted with stakeholders to establish the reasons behind survey responses. This helped to strengthen the quantitative data and support identification of priority areas for curriculum development.

Data Collection Instruments and Procedure

Data Collection Methods

Data was collected using a questionnaire designed in KoboCollect software and KII.

Questionnaire

Questionnaires were administered to key industry players and participants in the agricultural value chains to solicit their views on skills gaps, current trends in the labour market and suggestions on curriculum needs.

Key Informant Interviews

Key Informant Interviews were administered to 8 industry players to get in-depth information on skills gaps, partnerships & collaborations, current trends in the labour market and suggestions on curriculum needs.

Timeframe

Data collection activities took place between 2nd April to 16th April, 2024. These activities included planning meetings, travels, training of enumerators, piloting and validation of data tools and actual data collection.

Data Management and Analysis

The study generated both quantitative and qualitative data. Questionnaire data was captured in xls format and then imported to SPSS for cleaning and labelling. A clean data set was analysed in line with key variables. Data has been presented using descriptive statistics (frequencies, percentages, means and visual presentation). Free content analysis was used to analyse qualitative data and notes from KII data were typeset in ms word and coded then synthesised and thematised into key study variables. This have been reported to support the survey findings.

Quality Control

Data collection has known limits and is therefore reliant on interviews rather than on direct observation. However, it is thought that the problems and opportunities that surfaced are actual and beneficial to TVET. The survey was field tested before it was widely used, enumerators were trained in interviewing techniques, and a validation training with the enumerators was planned to cross-reference findings as part of quality control measures.

Results and Discussion

Location of the Respondent

The study was carried out in 8 regions as follows: Bomet-Kericho, Bungoma-Trans Nzoia, Busia-Siaya, Kisii-Nyamira-Transmara, Migori-Homabay, Kisumu, Nakuru-Naivasha and Nairobi. Distribution of the respondents is as shown in Figure 1.

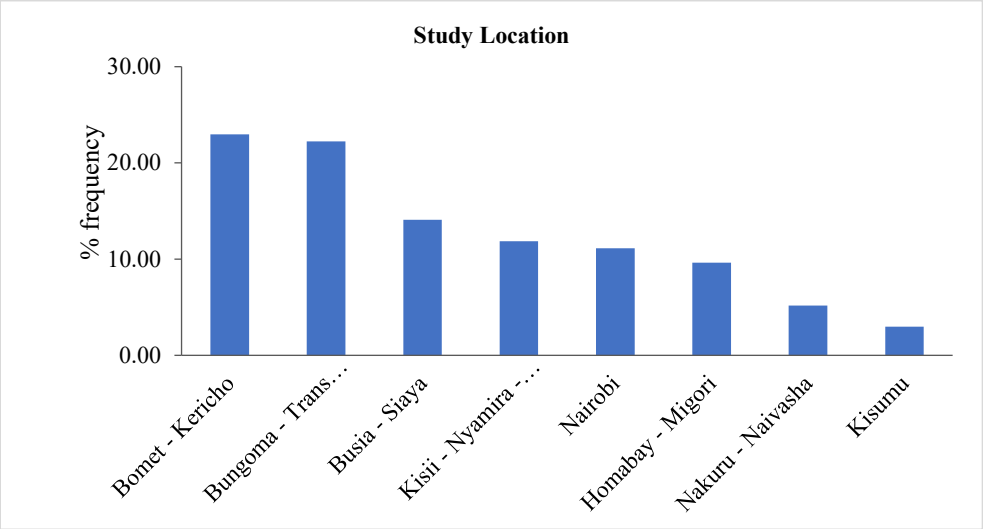

Figure 1: Distribution of the respondents

From Figure 1, majority of the respondents were from Bomet-Kericho region (22.96%, N=100), followed by Bungoma-Trans Nzoia (22.22%, N=97), Busia-Siaya (14.07%, N=61), Kisii-Nyamira-Transmara (11.85%, N=51) and Nairobi County (11.11%, N=48). This was attributed to the fact that most agro-industries and organizations are located in this region as it lies within the Kenyan food basket zone. Agro-ecological zones play immense role in agricultural practices as it determines the extent of extension services and farm input supply that in turn attract industries. In regions like Homabay, Migori and Kisumu, the main agricultural activity is aquaculture with reduced focus on other agricultural enterprises.

Gender of Respondents

Majority of the respondents (62%, N = 270) were male while (38%, N=165) were female as shown in Figure 2.

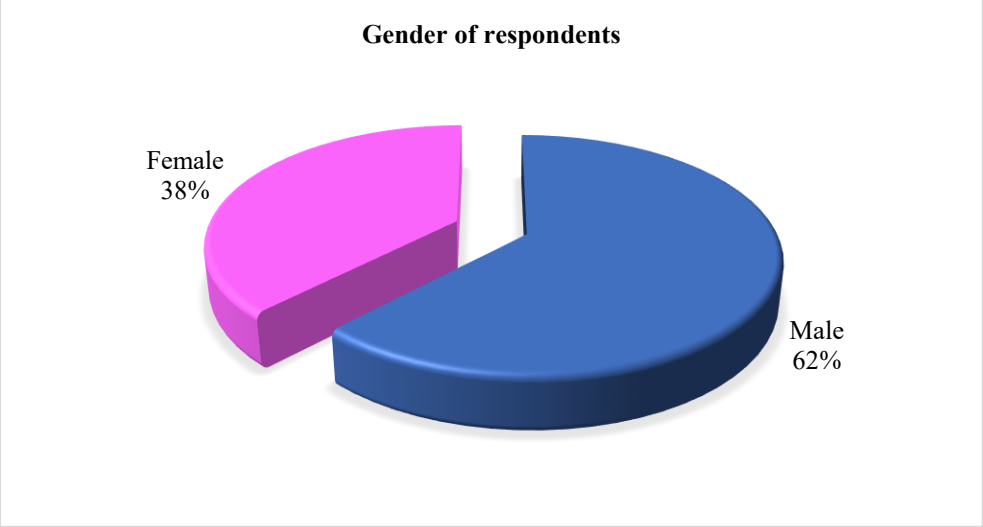

Figure 2: Gender of the respondent

Category of the Respondents

Majority of the respondents (87%) were industry players as shown in Figure 3.

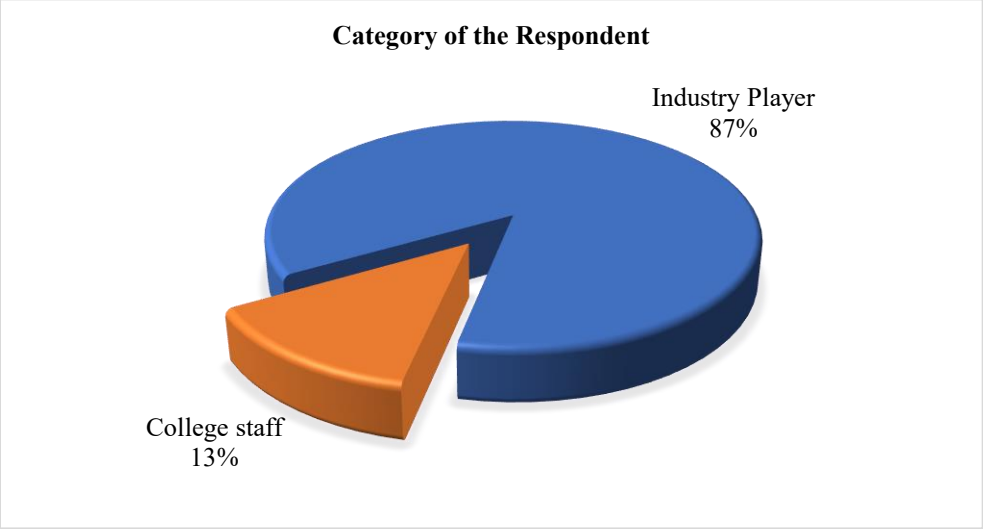

Figure 3: Category of respondents

The industry players consisted of CBOs, research institutions, farmers, training institutions, agro-processing firms and agricultural consultants. The data on type of organization is presented hereunder.

Type of Organization

For this labour market needs majority of the respondents (52%) were from public organizations followed by those from private sector (23%), CBOs and NGO (9%) while self-employed were the least at 7% as shown in Fig 4.

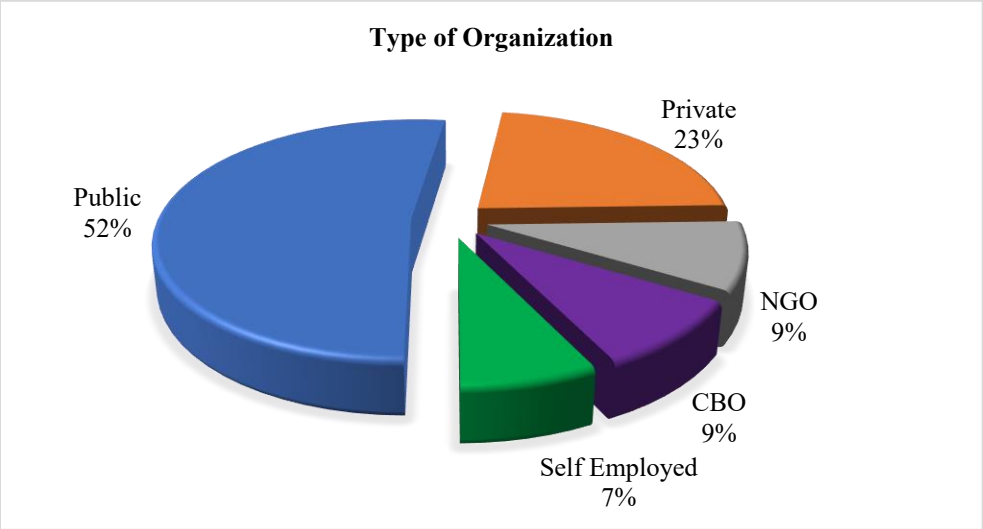

Figure 4: Type of organization

Area of Specialization

The respondents were also asked to state their areas of specialization. This was to ascertain that the responses given on labour market gaps are in correlation with professional experience and hence the validity of the data. The results are as presented in Figure 5.

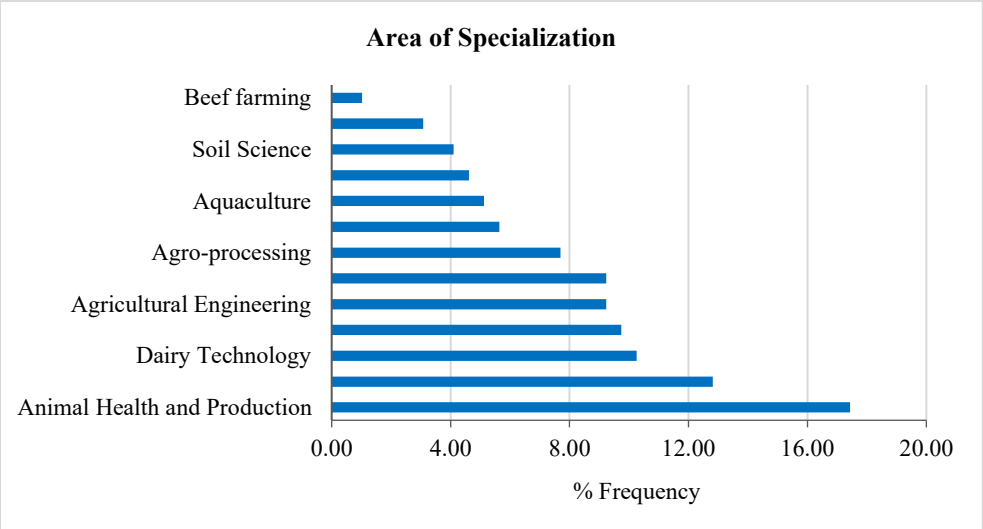

Figure 5: Respondents' area of specialization

The major fields of respondents` specialization were in animal health and production (17.44%) followed by agricultural extension and education (12.82%), dairy technology (10.26%), agronomy (9.74%), agricultural engineering and horticulture (9.23%). Some areas of specialization such as beef farming (1.03%), environmental science (3.08%), soil science (4.10%) and food science and technology (4.62%) attracted lower number of industry players probably due to lack of enough sensitization on their impact in agricultural sector.

Staff Characteristics

The study established the employee characteristics in the industries visited in terms of number of males, females, youth and vulnerable population. This data will guide in intervention efforts during the program implementation.

Table 2: Industry Staff Characteristics

Parameter	Mean	SD
Total Number of employees	30	51
Number of male employees	20	38
Number of female employees	9	15
Employees below 35 years	14	26
Employees who are vulnerable	1	2
Youth, women and vulnerable involved in management	3	7

The results showed that for every 30 employees only one belongs to the vulnerable groups hence they are not adequately absorbed in the job market. Similarly, youth, women and vulnerable groups are not adequately involved in organization management (ratio 10:1).

Employee Performance

In order to establish the skill gaps, we sought to find out the level of satisfaction with employees' performance in agricultural value chain sector. The respondents were also asked to specifically rate TVET graduates who are currently working in their sector of economy (on a scale of 1 – 5 where 1 poor, 2- fair, 3- average, 4 -good and 5- very good) on work related attributes as presented in Table 3.

Table 3: TVET Graduates` Performance

Attribute	Poor (%)	Fair(%)	Average (%)	Good (%)	Very Good (%)
Ability to perform assigned task	1.48	8.15	23.7	48.89	17.78
Accepting extra work	2.22	13.33	22.22	48.89	13.33
Creativity/innovativeness	2.96	8.15	36.3	43.7	8.89
Punctuality	2.22	9.63	20	48.89	19.26
Attitude towards work	2.96	10.37	20	50.37	16.3
Application of ICT skills and knowledge	2.96	14.07	28.15	38.52	16.3
Willingness to consult seniors	4.44	5.19	25.19	44.44	20.74
Reliable/dependable	2.22	9.63	17.78	53.33	17.04

From Table 3, TVET graduates overall performance in industry was ranked as good while the expectation should be very good. A good score means that the graduate has an acceptable level of proficiency in their technical skills, theoretical knowledge and practical applications in their fields. The expectation was high level proficiency in skills, theoretical knowledge and practical applications. This means that there are gaps that need to be fulfilled in order to meet industry expectation.

Graduate Skills Gaps in Agricultural Value Chains

One of the core objectives of this survey was to establish the skills gap in agricultural value chain. Data was collected using questionnaires and KIIs. The respondents in agricultural sector were asked to list competencies/skills TVET graduates are lacking in their sector of economy. The skills which were lacking are as shown in Figure 6.

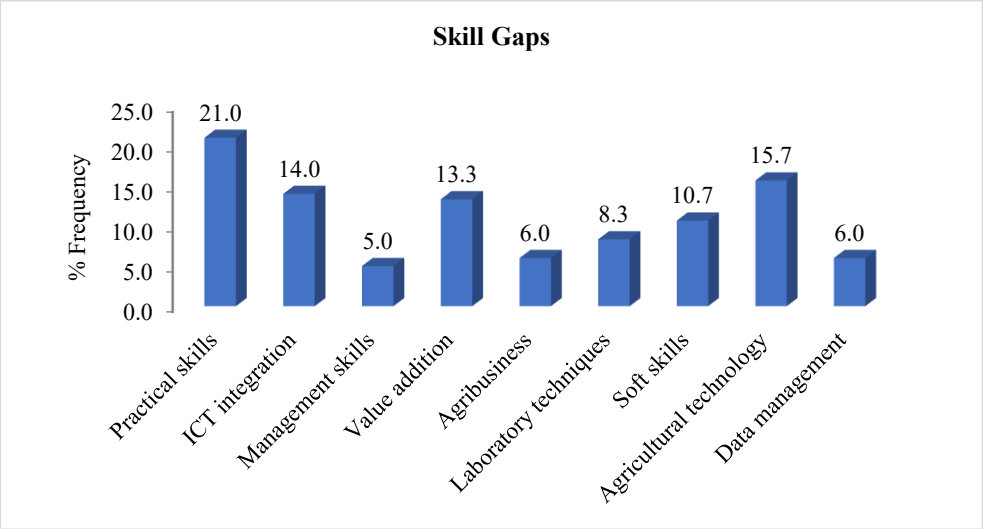

Figure 6: Skills gaps in the agricultural value chain

Majority of the respondents were of the opinion that most TVET graduates lacks practical skills (21.0%), agricultural technology (15.7%), ICT integration (14.0%), value addition (13.3%) and soft skills (10.7%). To support this data respondents said:

"*We need practical skills relevance(sic) to industry practical communication skills and new technology e.g. for example in automated greenhouses sustainable agriculture and risk management". Source: KII data*
"We need practical skills in feed formulations to reduce production costs since animal feeds account for over 70% of production costs". Source: KII data
"Most local vets do not understand disease diagnosis". Source: KII data
"Value addition technique like drying of vegetables and tomato processing will reduce wastage during pick (sic) period". KII data

This implies that focus should be on practical training, proficiency in the use of agricultural technology, knowledge and skills of sustainable agricultural methods. Competency in using ICT in agriculture among others. Therefore, these skill areas should be integrated in the curriculum to bridge the gap. In terms of short term stop gap measures, the study sought to determine if there were any training needs and the specific areas for continuous professional development and it established as follows:

Figure 7: Current industrial employees training needs

Majority of the respondents (97%) felt that there were current training needs within their organization. The specific needs are highlighted in Figure 8.

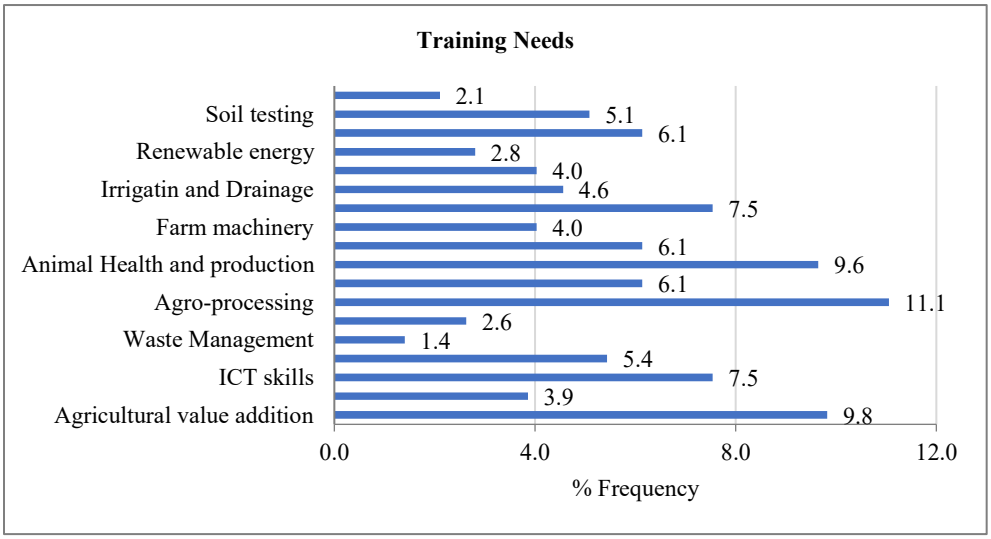

Figure 8: Training needs

Majority of the respondents felt that there was need for capacity building in agro-processing (11.1%), agricultural value addition (9,8%), animal health and production (9.6%), agricultural technology and ICT integration (7.5%), dairy production, crop production and artificial insemination (6.1%). These are further pointers to areas that need attention in skills development. To support this data, on the question of areas for possible capacity building in agricultural value chain, the respondents said:

"*Technology is dynamic and so our employees need refresher courses on climate smart technologies". Source: KII data*
"I will appreciate if I will be sponsored to undertake a short course in milk processing". Source: KII data

"Success of business depends on customer satisfaction therefore soft skills should be integrated in the curriculum". Source: KII data
"Most vets (sic) lacks knowledge in artificial insemination". Source: KII data
"Food safety is an emerging issue for export products therefore our laboratory technician needs upskilling to guarantee safety of export products". Source: KII data

Market Trends in Agricultural Value Chain

Knowing market trends in agricultural sub-sector is crucial in strategic planning of production cycles and decision making as well as risks management. This study sought to establish the trends in agricultural value chains to guide curriculum preparedness and help trainees gain competitive advantage. Industry players with lived experience would provide great insights in this regard. Table 4 show highly valued skills by the respondents in agriculture sector.

Table 4: Market trends in agricultural value chain

Skill Area/Competency	Frequency	Valid Percent
1. Agro processing	62	7.2
2. Smart agriculture	52	6.0
3. Poultry farming	47	5.4
4. Dairy technology	47	5.4
5. Agricultural value addition	45	5.2
6. Animal disease diagnosis and treatment	40	4.6
7. Greenhouse management	37	4.3
8. Agronomy	33	3.8
9. Irrigation and drainage	30	3.5
10. Soft skills	30	3.5
11. ICT skills	29	3.3
12. Vegetable production	28	3.2
13. Farm management	27	3.1
14. Artificial insemination	26	3.0
15. Laboratory techniques	26	3.0
16. Food technology	25	2.9
17. Agricultural extension	25	2.9
18. Feed formulation	25	2.9
19. Organic farming	24	2.8
20. Farm machinery operation	24	2.8
21. Soil and water management	23	2.7
22. Post-harvest handling	23	2.7
23. Cage fish farming	23	2.7
24. Beef farming	21	2.4
25. Environmental resource management	20	2.3
26. Meat inspection	19	2.2
27. GIS	17	2.0

28. Occupational health and safety practices	15	1.7
29. Milk- processing	12	1.4
30. Marketing skills	11	1.3
Total	866	100.0

From the Table 4, majority of the respondents listed agro-processing, smart agriculture, poultry farming, dairy technology, agricultural value addition, animal disease diagnosis and treatment, greenhouse management, agronomy, irrigation and drainage as the top ten most valued skills in agricultural sector. This listing will be a beneficial guide in areas for curriculum development. To support data from table 4, respondents said:

"*We are transitioning to a generation where tasks that require use of a lot of energy are left for machine therefore skills in automation of machinery, greenhouses and dairy processing are necessary". Source: KII data*
"The current employment space prefer skills over theory therefore practical training should be given more emphasis in agricultural sector". Source: KII data
"Agro processing is what most industries are moving towards". Source: KII data

Conclusions and Recommendations

Conclusions

The objective of this study was to identify skill gaps in the labour market, market trends in skill requirements, and the relevance of agricultural programmes at Kisii National Polytechnic. The conclusions below are organized around this objective and translate the survey findings into direction for curriculum development at the Polytechnic.

Employee Satisfaction

The industry rated the performance of TVET graduates as good, but there is still space for improvement to reach the very good standard. A high ranking denotes that graduates have a fair degree of theoretical understanding, practical application, and technical proficiency. The industry does, however, want greater competence in these fields. This discrepancy emphasizes the need for additional improvements to training and educational initiatives in order to close the performance gap with industry standards. By bolstering these areas, we can make sure that TVET graduates have the tools they need to flourish in their positions and make more valuable contributions to the workforce.

Skills Gap

The LMI report's identification of the skills gap reveals a notable disparity between the workforce's skill set and the abilities that employers require. Additionally, there is a noticeable skills gap between the needs of businesses and the current workforce, according to LMI study. This gap is particularly noticeable in the fields of animal illness detection and treatment, dairy technology, smart agriculture, agro-processing, and agricultural technology. Consequently, there should be a focus on the necessity of capacity building in important agricultural domains, indicating distinct prospects for focused skill enhancement to fortify the labour force, stimulate creativity, and maintain the agricultural industry's expansion. Important areas for

collaboration were also highlighted as being essential to enhancing training, including joint research initiatives, internships and learning opportunities, and consulting services. These areas provide a road map for educational institutions and industry stakeholders to form strategic collaborations that will improve learning opportunities, encourage innovation, and better align training with industry standards, all of which will benefit students and the community at large.

Market Trends in Agricultural Value Chains

The key areas of focus for the agricultural sector as highlighted by the respondents' as of priority now include Agro-processing, smart agriculture, poultry farming, dairy technology, agricultural technology, agricultural value addition, diagnosis and treatment of animal diseases, greenhouse management, agronomy, irrigation and drainage. These essential competencies need to be a useful framework for developing curricula, guaranteeing that academic programs meet industry demands and furnish aspiring professionals with pertinent, marketable talents. This connection will boost efficiency, stimulate innovation, and promote agriculture's sustainable growth. For Kisii National Polytechnic specifically, these market trends provide a direct, evidence-based reference point for reviewing and updating its agricultural programmes so that they remain responsive to regional labour market demand.

Training Needs

The survey's findings, taken together, highlight the urgent need for capacity building in critical sectors such dairy and crop production, artificial insemination, animal health and production, agricultural technology, and agro processing among others. These are further pointers to areas that need attention in skills development. These results show that there are good chances for focused skill-building programs to improve the agriculture industry. By addressing these issues, we can improve the labour force, stimulate innovation, and promote the general expansion and sustainability of the agricultural industry.

Recommendations

From the analysis of findings and conclusions, the following recommendations are suggested: Curriculum development should focus on bridging the skills gap with a focus on practical aspects in critical areas such dairy and crop production, artificial insemination, animal health and production, agricultural technology, and agro-processing among others, provide training on modern agricultural technologies and practices, implement agricultural programmes that offer opportunities for skills development, establish focused partnerships in critical sectors such dairy and crop production, artificial insemination, animal health and production, agricultural technology, and agro-processing among others, collaborate with industry players to develop curriculums, particularly for Kisii National Polytechnic's agricultural programmes, tailored to the needs of agricultural sector and implement targeted training programmes to address specific skills gap in agricultural sector.

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