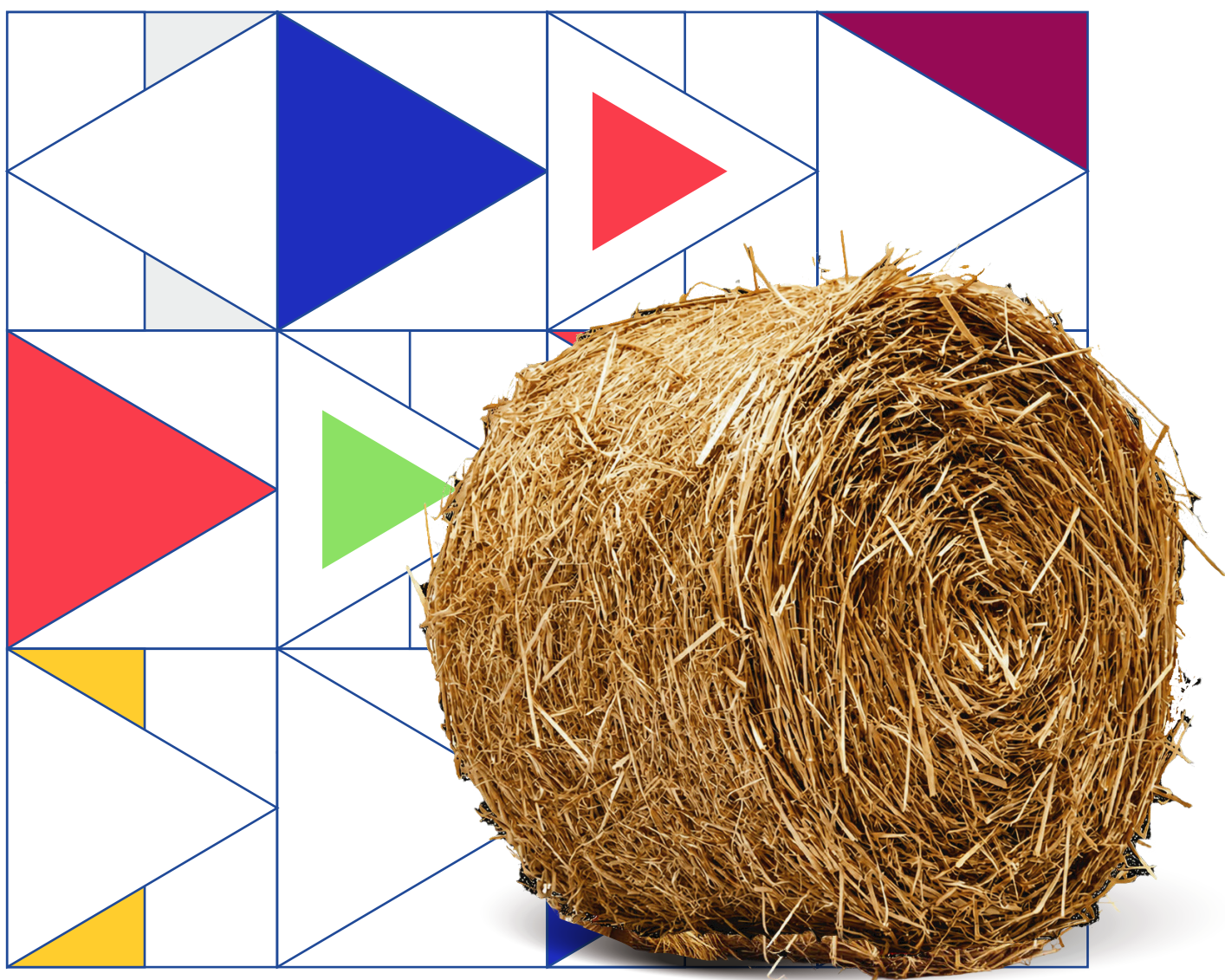


► **Skills Gap Assessment in Fodder Sector
that Promote Inclusive Decent
Employment and Productive Livelihood
in Nakuru, Narok and Kajiado Counties**

Final Report



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The ILO appreciates the collective commitment of all partners and stakeholders towards building a skilled, inclusive, climate-smart and competitive fodder sector that creates decent employment and productive livelihood opportunities, particularly for women and youth in Nakuru, Narok and Kajiado counties.

Executive Summary

This Skills Gap Assessment of the fodder sector in Nakuru, Narok and Kajiado counties was undertaken under the framework of the PPDP program to diagnose systemic mismatches between workforce capabilities and employer needs. Using a mixed-methods design that integrated enterprise surveys (n=147), KIIs, FGDs, TVET site visits, and field observations, the study applied a four-part typology of skills gaps consisting shortages, surpluses, obsolescence, and aspirational/relevance mismatches to deliver a comprehensive analysis of the sector's skilling architecture. Employer evidence was tied to specific value-chain nodes (production, harvest & preservation, processing, mechanization services, aggregation & logistics, and commercialization/QA), and triangulated with what was observed at clamps, barns, and workshops and what institutions teach, when they teach it, and how they assess it.

The findings reveal pervasive skills shortages across critical nodes of the value chain. In upstream production, 77% of enterprises reported deficits of skills among current staff in agronomy, irrigation, and soil fertility management. Mechanization emerged as the most limiting constraint, with 42% citing acute shortages of competent operators and technicians, and 48% reporting disruptions

from machine downtime and poor calibration. Post-harvest operations face similar pressures where 56% of employers reported skills gaps in silage making, bale density, and moisture testing, leading to high wastage and inconsistent quality. Aggregation and distribution are undermined by weak marketing, contracting, and logistics skills among current staff, while 49% of enterprises reported inadequate competencies in quality assurance, testing, and certification. Cross-cutting shortages were evident in financial literacy (46%), digital competencies (47%), and emerging green technologies (30%). These gaps translate into measurable operational inefficiencies such as missed dry-matter windows, sub-optimal compaction, variable bale density, poor order fulfilment, and low cooperative price realization.

Despite these shortages, the sector simultaneously faces some minimal skill surpluses, primarily in misaligned and generic competencies. Employers reported an oversupply of graduates with broad agronomy or animal production training but without practical fodder-specific experience. In mechanization, while qualified operators are scarce, casual laborers and general mechanics are abundant but lack the specialization required for forage harvesters, balers, and choppers. Similarly, generic ICT skills are oversupplied relative to the demand

for digital platforms and traceability applications. These surpluses highlight the structural inefficiencies of the supply side where training institutions produce generalists, while employers seek certified specialists.

Obsolescence is another defining challenge. Traditional practices such as rain-fed forage systems, visual inspection of fodder quality, and paper-based bookkeeping are increasingly inadequate in a competitive, quality-driven, and digitalizing sector. Curricula that continue to prioritize generic animal production or engineering, while neglecting preventive maintenance, QA standards, digital commerce, and agri-fintech, are no longer fit for purpose. Field observations confirmed widespread non-conformance to silage SOPs, with missed chop-length targets, weak compaction, and sealing failures, resulting in compromised feed quality.

At the same time, the sector is characterized by pronounced aspirational and relevance mismatches, where employer visions outpace current training provision. For instance, 84% of enterprises in Nakuru identified climate-smart agronomy as critical for competitiveness, yet few local institutions teach regenerative practices or hydroponics. More than 50% highlighted advanced mechanization and automation as emerging needs, while TVETs still lack modules on telematics or precision calibration. Aspirations for digital marketing, e-commerce, dashboards, and data analytics are similarly unmet.

The supply side is constrained by weak collaboration and outdated training infrastructure. Over half (56%) of enterprises reported no engagement with training institutions, while those that did noted the arrangements were informal and limited to basic student placements. 86% of employers cited inadequate practical facilities, while 62% pointed to insufficient agribusiness orientation, and 30% flagged limited integration of ICT. Industrial attachments are poorly timed against fodder production cycles, leaving students without exposure to peak harvest or ensiling windows. Employers expressed strong appetite for PPDP collaboration with 72% willing to host attachments, 52% to serve on advisory boards, and 82% to provide in-kind support such

as equipment, trainers, or demonstration sites.

The gender dimension compounds these challenges. FGDs revealed that women often self-select out of machine-intensive roles due to safety concerns and cultural expectations, concentrating instead in lower-value seed harvesting or trade roles. Employers confirmed barriers to recruiting local youth and women, with more than 90% citing low technical skills, 82% lack of experience, and 37% absence of certification. This exclusion not only narrows the workforce pipeline but also undermines inclusive employment goals central to PPDP's mandate.

In conclusion, the fodder sector in Nakuru, Narok and Kajiado is constrained by critical shortages in operational competencies, misaligned surpluses of generalist training, outdated practices that no longer meet industry standards, and aspirational mismatches in climate-smart, digital, and green technologies. Addressing these gaps will require comprehensive curriculum reform, season-aligned work-integrated learning, and deliberate gender-responsive pathways. Without season-aligned training, recognition of prior learning, and on-county service ecosystems, value will continue to be lost at harvest and preservation, prices will be under-realized, and women and youth will remain under-represented in the roles that drive competitiveness. A structured PPDP framework offers the strongest opportunity to align training with market realities by embedding employer participation, co-design of curricula, certification of prior learning, and co-investment in facilities and demonstration sites. By doing so, counties will professionalize its fodder workforce, raise productivity, reduce feed deficits, and create inclusive, decent jobs for youth and women, while positioning the sector for future competitiveness in a climate-smart and digital economy.

Recommendations

In the short term, the counties should deliver field-based, fodder-specific micro-credentials that prove competence in moisture and dry-matter testing, chop-length control, clamp design with proper compaction and sealing, bale-density measurement, safe basic maintenance, and phone-based orders and dispatch. Student

attachments should be re-timed to the production calendar with rotations through dealerships, local fabricators, and cooperatives so learning occurs in real work settings. Experienced operators and crew leads should be certified quickly through on-farm challenge assessments with targeted coaching, and counties should publish service rosters and pre-position mobile mechanics and common parts, prioritizing Narok's service gap. Standard buyer specifications, simple contracts, delivery notes, and mobile orders should be introduced so sales move from verbal agreements to documented standards, while safe, mentored entry paths for women and youth such as paired crews, proper protective equipment, and safe transport bring new talent into higher-value roles.

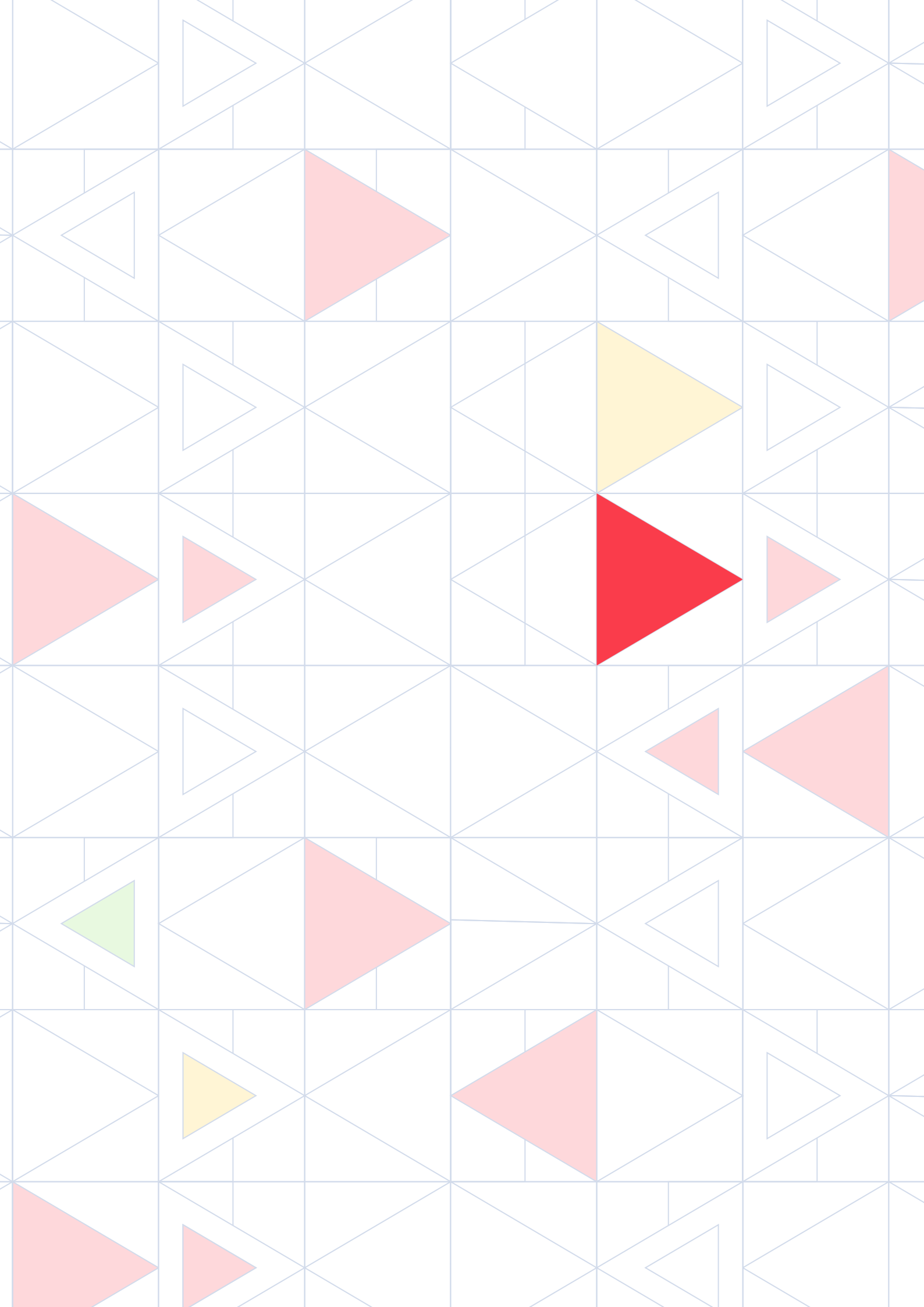
In the medium term, these starter actions should be converted into recognized fodder pathways at county training centers, with stackable modules in climate-smart agronomy, preservation and quality assurance aligned to national standards, machine operation and calibration with preventive care, digital commerce and basic analytics, and practical business and finance for small enterprises. Each county should establish a light quality-testing room and deploy mobile quality teams to test lots and document specification at the point of sale. A stream of mechanic apprentices should be trained into diagnostics-capable technicians, small parts depots should be stocked ahead of the season, and pre-harvest calibration days should become routine. A simple marketplace layer should link specification, orders, dispatch, and proof-of-delivery via basic mobile tools, while county skills councils review results each season and keep curricula, placements, and certification tightly aligned with employer demand.

In the long term, national skills and product standards should be institutionalized so operator licensing at progressive levels and supplier certification linked to traceability are recognized by buyers and lenders. Telematics and predictive maintenance should be integrated into training and service contracts to stabilize quality and reduce downtime, and end-to-end digital

traceability should allow each lot to carry its test results and delivery record, accelerating payment and rewarding quality with premiums. Gender-responsive ladders and continuous recognition of skills should remain in place so women and youth not only enter specialist roles but progress within them as the market deepens.

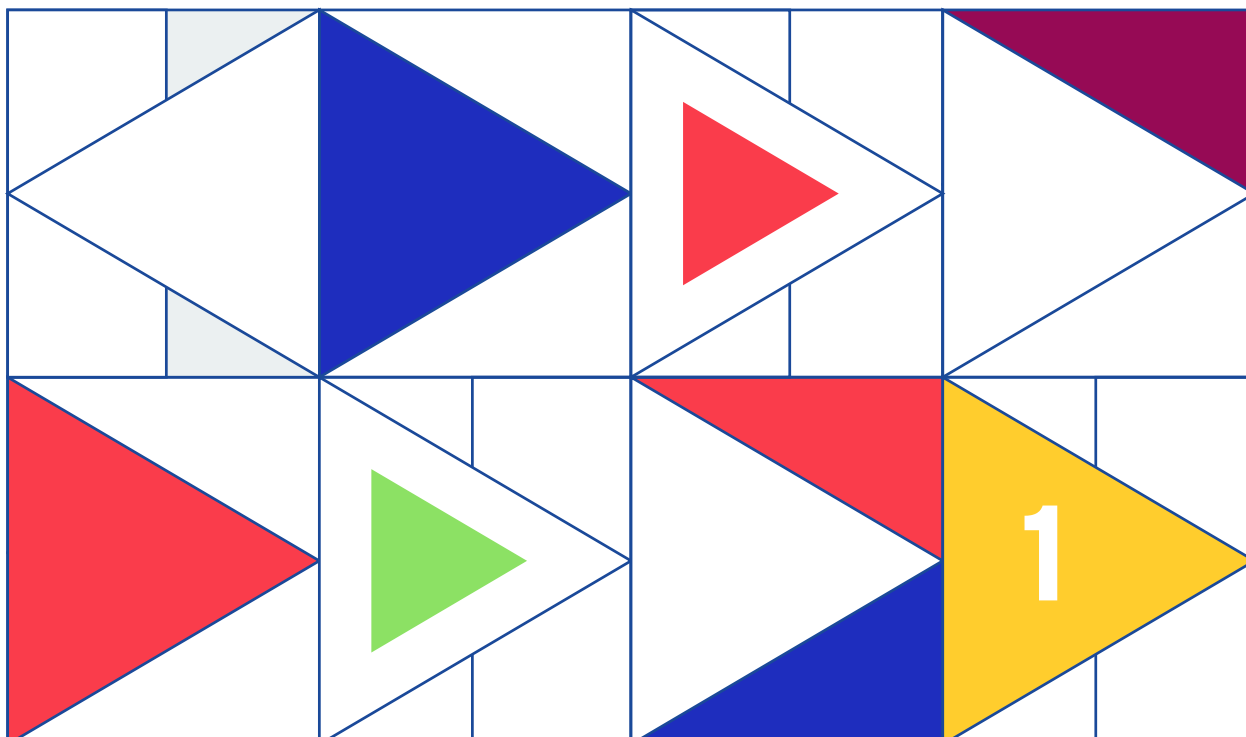
Taken together, these steps move the three counties from generalist training and ad-hoc service toward a specification-led, climate-smart, digitally transacted fodder market staffed by a professional local workforce. Within two years, more youth especially young women can hold recognized certificates and work in QA brigades, calibrated operations, and first-line maintenance; by five years, counties can operate verified QA at sale, reliable repair and parts networks, and simple digital dispatch; and by ten years, the region can sustain a transparent, investable market where prices reflect proven quality and time-definite delivery.

A multi-stakeholder validation workshop, convened with county departments, TVET and university representatives, employer and labor institutions (NITA, FKE, COTU), private sector actors, financial institutions, and youth and women groups, confirmed the accuracy and relevance of the assessment's findings across the fodder value chain. Stakeholders further emphasized that green and climate-smart capabilities are now integral to sector competitiveness, leading to the mapping of the Green Jobs Ecosystem and corresponding Green Skills Stack required for future workforce readiness. The workshop validated the need to align curricula, certification frameworks, enterprise financing, and work-based learning systems to create coherent, market-responsive skilling pathways. A separate workshop proceedings report provides the full set of deliberations, institutional commitments, and the agreed implementation roadmap.



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Credit: Joyce Macharia, ILO

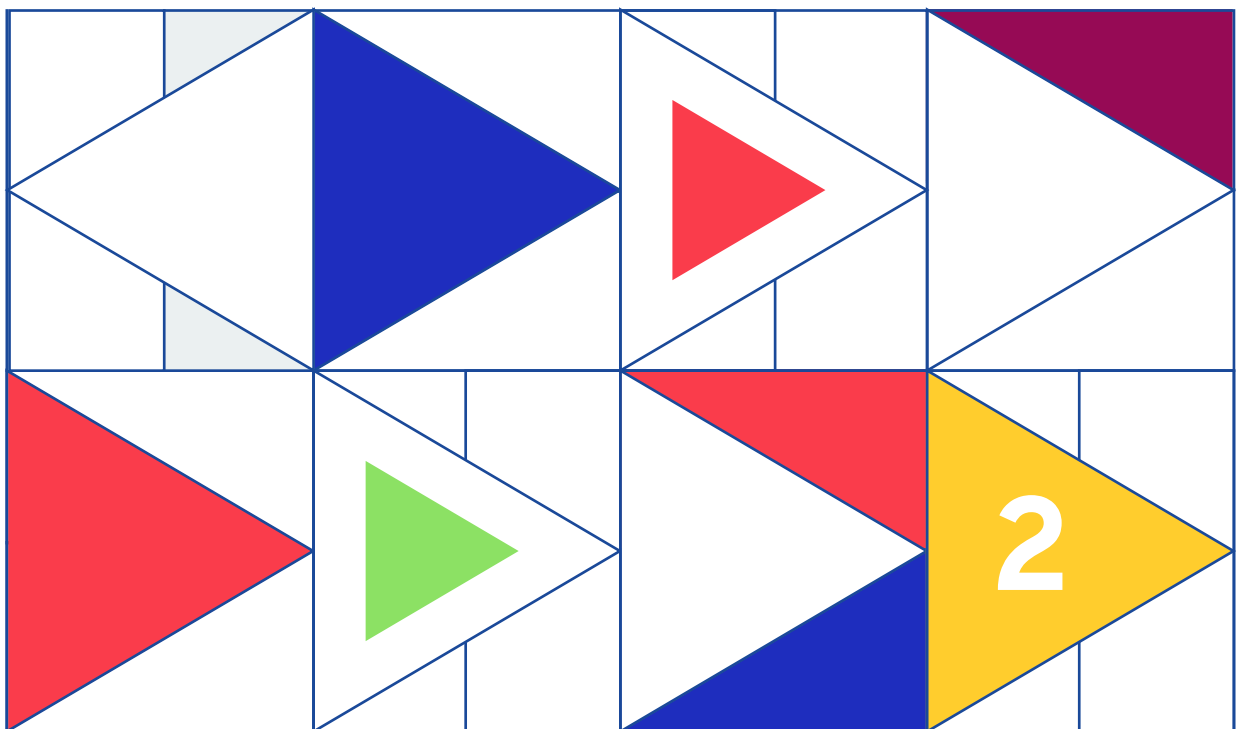
1. Introduction

The fodder sector is a cornerstone of livestock productivity in Nakuru, Narok and Kajiado counties, directly influencing the stability of dairy and beef value chains that underpin rural incomes, food security, and agribusiness competitiveness. As demand for quality hay and silage grows, especially in response to climatic shocks and rising commercial dairy production, the ability of the sector to meet this demand depends fundamentally on the availability of skilled human capital. A robust skills ecosystem in the fodder sector has implications not only for production efficiency and quality assurance but also for youth and women's employment, innovation adoption, and the integration of green and digital technologies that will shape future competitiveness.

Recognizing the strategic importance of this sector, the International Labor Organization (ILO) commissioned this study to provide a comprehensive skills landscape for the fodder value chain in Nakuru, Narok and Kajiado counties. The study seeks to diagnose the availability, gaps, and misalignments of skills across production, mechanization, processing, aggregation, and distribution nodes, with an explicit focus on gender, youth employment, and seasonality. It further examines the responsiveness of training institutions to market needs, identifies emerging skill areas critical for competitiveness, and outlines pathways for Public-Private Development Partnerships (PPDPs) to close systemic gaps. The assessment therefore offers evidence base to inform policy, curriculum reform, and investments in workforce development for a professionalized, inclusive, and future-ready fodder sector.

1.2 objectives of the assignment

- i. To assess the existing skills landscape in the tourism and fodder sectors, including current capacities for green jobs.
- ii. To identify skills required for future growth, value addition, and sector transformation.
- iii. To evaluate the capacity and alignment of existing training and education programs with labor market needs.
- iv. To explore the feasibility of establishing sector-specific skills councils.
- v. To recommend concrete, gender-inclusive and youth-responsive interventions to address the identified gaps.



Credit: Geoffrey Rono, ILO

2. Methodological Approach

2.1 Study design and scope

The assessment employed a mixed-methods, multi-source design to diagnose skills mismatches along the three counties fodder value chains from production, harvesting and post-harvest, processing (silage and hay), mechanization services, aggregation, to marketing functions. The design integrates **enterprise-level evidence** with **institutional perspectives** (training providers, original equipment manufacturers (OEMs) and county departments) and **direct workplace observation**, enabling a granular view of both the training ecosystem which is the *supply-side* and employers defining the *demand* sides.

2.2 Sampling frame and respondents

The study applied a stratified purposive design combining a **stratified enterprise survey** covering producers, processors, mechanization service providers, aggregators, and traders to represent operational nodes where capability gaps manifest. This was complimented with in-depth discussions with Key Informant Interviews targeting decision-makers from OEMs dealers (tractor/forage brands), mechanization service workshop leads, Department of Livestock and training officials, cooperative managers, and TVET and college programme heads. To surface gendered and seasonality dynamics, the study ran separate FGDs with youth and women engaged or aspiring to engage in production, value addition, and mechanization services. Institutional engagements (TVET site visits) assessed curricula content, facilities, trainer capacity, and employer expectations, with emphasis on misaligned industrial-attachment calendars relative to fodder seasonality.

Direct field observations at hay barns and fodder farms documented **silage SOPs** (moisture/DM

assessment, chop-length control, compaction, sealing, curing, storage), equipment setup, safety practices, and QA routines under real operating conditions. A **document review** synthesized sector reports, **KEBS/industry standards**, and market-systems analyses to benchmark local practice and triangulate findings across data streams.

2.3 Data collection protocols

Data collection followed standardized, auditable procedures comprising a **structured enterprise questionnaire**, stakeholder-specific **KII guides** (OEMs/mechanization, county/TVETs, cooperatives, processors), **FGD guides** for youth and women, **observation checklists** covering silage/hay SOPs and mechanization set-up, and a **document-review matrix**. Field teams were trained on **seasonality-anchored probes** (e.g., aligning industrial attachments with farm operation, crop management, harvesting, baling and ensiling windows), **gender-sensitive facilitation**, and health & safety protocols. KIIs with **OEM/dealer principals** emphasized operator competency frameworks, preventive-maintenance regimes, diagnostic workflows, parts after-sales ecosystems, and co-training feasibility, while **TVET site visits** combined structured workshop walk-throughs with programme-head interviews to validate field signals such as attachment timing, curriculum scope/sequence and assessment modalities.

Non-participant observations documented in-situ SOP conformance and deviations (chop-length control, compaction, sealing, curing, storage, equipment set-up), captured via consented photos **Data management & QA** comprised daily field debriefs, completeness/logic checks, **double-entry reconciliation** for quantitative data, **thematic coding** for qualitative transcripts, inter-coder reliability spot-checks, and **evidence memos** to preserve audit trails and analytic transparency.

2.4 analytical framework

The study applied a rigorously structured framework that mapped all evidence to a **skills-**

mismatch typology consisting **shortages, surpluses, obsolescence, and aspirational/relevance mismatches** to distinguish “insufficient critical skills” from “skills no longer valued”. Secondly the study constructed a **mismatch severity index (1-5)** from quantitative indicators (operational disruptions by function, recruitment obstacles), disaggregated by value-chain node to localize most limiting constraints. Finally, the assessment operationalized a **triangulation matrix** linking each quantitative signal. For instance, corroborating “Processing disruptions” with **KIIs, FGDs, TVET visit notes, and observed SOP deviations** thereby yielding **convergent evidence statements** for decision-grade inference. Two **transversal lenses** such as **seasonality** (does learning occur during actual operational windows?) and **gender or inclusion** (barriers and pathways for women/youth in machine and QA roles) were applied end-to-end to ensure diagnostics translate into **practicable, equitable** recommendations.

2.5 The triangulation rationale

Applying several methods was **necessary**, not optional, given the fodder sector’s seasonality and operational complexity. The study strengthened internal validity and reduced bias by cross-checking self-reported enterprise pain points with non-participant observations in hay barns and on-farm silage sites and with KIIs at OEMs and TVETs, which allowed verification of SOP adherence, equipment set-up, and the translation of curriculum into practice. To secure construct validity, the study treated “skills” as technical, organizational, and commercial capabilities and used OEM interviews to surface operator competency models, diagnostic workflows, and after-sales ecosystems that the survey could have not captured, while TVET site visits clarified assessment modalities and facility constraints that explain “low experience” signals.

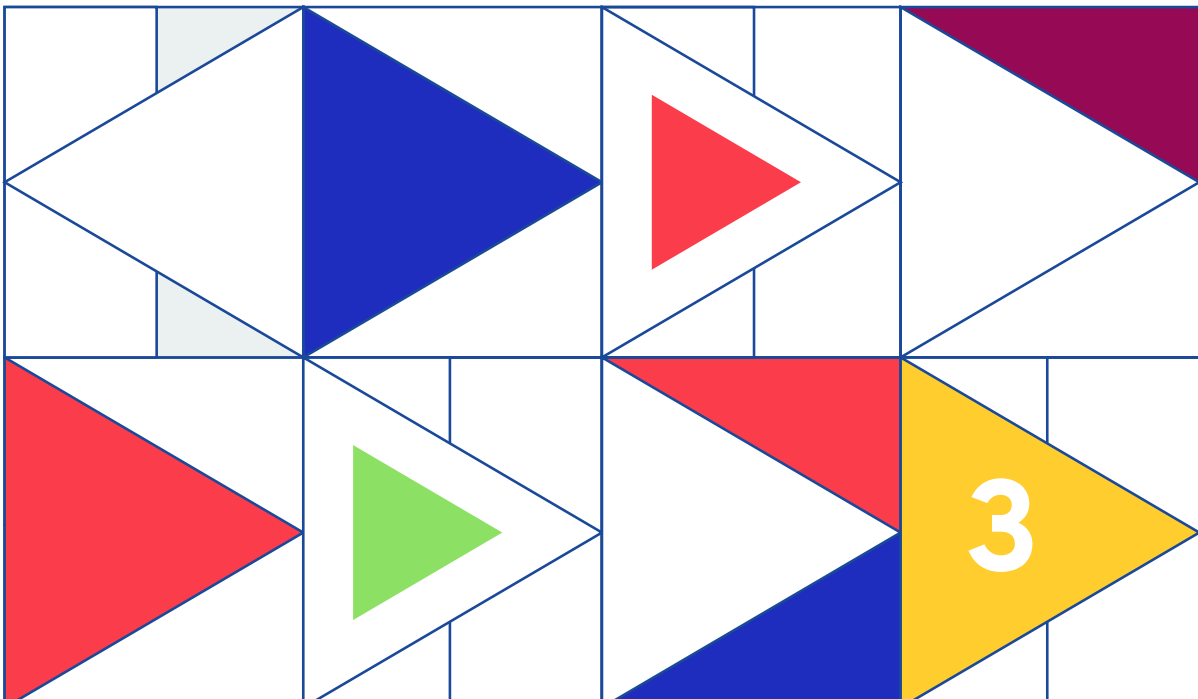
For explanatory depth, FGDs supplied the mechanisms behind the numbers, including misaligned attachment calendars, gendered aversion to machine roles, and weak credential signals in hiring, which turned descriptive statistics into actionable bottlenecks. For external validity and transferability, we benchmarked local practice and dealer capability against documented

standards and market-systems evidence, increasing confidence that recommendations such as OEM-TVET co-certification and season-aligned work-integrated learning (WIL) can scale through PPDP pathways. Finally, for risk diagnostics, we combined these evidence streams to reduce mono-method error, surface contradictions early, and run sensitivity analyses that distinguish calendar-driven from capacity-driven disruptions, thereby informing adaptive cohort design, phased implementation, and a robust MEL plan.

2.6 Ethics and limitations

All primary data collection adhered to “do no harm” principles and applicable data-protection requirements, with informed consent, plain-language participant information, the right to withdraw without penalty, and strict confidentiality through anonymization, role-based access, and encrypted storage of de-identified datasets and key files separately. Field teams were trained on safeguarding and SEA/SH protocols, gender-sensitive facilitation, and site safety, and they operated under a documented risk assessment that governed access to hay barns and on-farm silage operations, and non-interference with production workflows. Photographs were captured only with explicit permission, and any potentially identifying imagery was masked or excluded at analysis.

Quality assurance covered tool piloting, daily debriefs, completeness and logic checks, double-entry reconciliation for quantitative data, and codebook-driven thematic coding with inter-coder reliability spot checks and auditable evidence memos. The study’s key limitations include the cross-sectional timing of fieldwork against a seasonal production calendar, potential non-response and social-desirability bias in employer reporting, restricted facility access at some institutions, and the possibility of observer effects during site visits. These risks were mitigated through visits across different production systems including irrigated fodder systems, triangulation across enterprises, KIIs, FGDs, TVET engagements, and direct observation, sensitivity analyses that distinguished calendar- from capacity-driven disruptions, and explicit bounding of assumptions when inferring beyond the sampling frame.



Credit: Joyce Macharia, ILO

3. Findings of the Assessment

The assessment of the fodder sector, conducted through key informant interviews (KIIs), focus group discussions (FGDs), and employer surveys, revealed a complex but consistent pattern of skill needs across the value chain. Employers, sector experts, and producers all underscored that while there is growing demand for fodder driven by dairy and livestock enterprises, the skills base remains thin, fragmented, and often misaligned with industry realities.

3.1. Nakuru Fodder Sector Architecture

3.1.1 The Agro-ecology and Production Systems.

Nakuru's fodder economy operates across two agro-ecological zones and two dominant production systems. In the semi-arid Rongai corridor, large commercial hay farms run highly mechanized operations, with service contracting for peak operations especially harvesting and baling. The zone also hosts irrigated perennial fodders, notably super napier grass, (at Juncao Grass Farm) with on-farm value addition (silage compaction/sealing, pelletizing, and bulk storage) that enables year-round supply.

In Nakuru West and Njoro dairy belt, fodder is embedded in mixed dairy systems with large hay farms, extensive smallholding on-farm Napier, and maize for whole-crop silage; production blends estate-scale units with smallholder cut-and-carry and custom-hire mechanization during peak windows. In this structure, 70% of employers ranked fodder agronomy as a critical skill for reliable biomass and quality, 50% prioritized silage/bale making and storage, and 40% emphasized harvesting/post-harvest and mechanization O&M which is a profile consistent with dairy-led, preservation-intensive operations feeding year-round demand. Operationally, 68% of employers reported inadequate skill-related disruptions in farm/field production, 56% in processing/value-addition, and 42% in mechanization services; 48% also flagged marketing/sales frictions providing evidence that both production and commercialization nodes are under strain. Looking ahead, employers see competitiveness shifting toward eco-digital and capital-readiness where 84% of employers flagged climate-smart practices, 70% digital commerce/e-platforms, 76%

enterprise finance/investment readiness, and 56% advanced mechanization/automation.

Daily and cooperative pull.

The Nakuru West/Njoro zone is anchored by dairy cooperatives and on-farm preservation for zero-grazing and processor supply and the cooperative intake points which function as aggregation nodes for hay and silage. Product flows move from on-farm clamps to aggregation depots and dairy cooperative intakes, with transport scheduling tuned to drought-season peaks yet price discovery remains brokered, which employers link to skills gaps in QA, contracting, and digital sales.

3.1.2 Service and Equipment Ecosystem.

Nakuru town functions as a regional mechanization hub with a dense OEM dealer and *jua kali* fabricators that supply parts, repairs, servicing equipment and offer after-sales diagnostics for Nakuru, and neighboring counties. This hub-and-spoke model underpins cross-county custom-hire services, parts availability, and after-sales diagnostics, and creates demand for operator certification, service-technician pipelines, and local repair garages specialized in fodder machinery. The study found that employers in the sector strongly feel that the current training interface under-exposes trainees to OEM protocols and informal fabricator shops, limiting readiness for preventive maintenance, calibration, and diagnostics which are precisely the skills that determine machine uptime in harvest/ensiling windows.

3.1.3 Aggregation, Logistics, and Trade

Product flows move from **on-farm temporary clamps** to **aggregation depots** and **dairy**

cooperative intake points, with **inventory control**, and **transport scheduling** aligned to dairy demand cycles which peaks with annual drought regimes in the country. **Price discovery** is largely mediated by brokers, direct B2B contracts, and cooperative channels; digital order capture and **e-market listing** capacity remain emergent but strategically important for youth and women job opportunity areas.

3.1.4 Training, research spine and anchor enterprises.

Nakuru benefits from a dense education and research footprint ranging from TVET institutions such as the Rift Valley National Polytechnic (formally RVIST in Nakuru), Baraka Agricultural College (Molo) to Egerton University (Njoro) which provide the human-capital base in agriculture, engineering, and dairy; KALRO Naivasha offers dairy R&D and training in dairy technologies; and large commercial operations such as Delamere Farm set practice benchmarks and attract industrial attachments. Yet collaboration is still uneven. The study found that 44% of employers report some engagement with local TVETs/colleges, while 52% report no collaboration, and attachments are often short and not season-aligned, leaving graduates under-exposed to real production windows (land prep, harvest, baling, ensiling, off-season maintenance). The assessment further reveal that employers strongly desire partnerships under a PPDP model where 70% would offer internships/attachments, 46% curriculum co-design, 58% advisory roles, and 88% in-kind support (equipment, trainers, sites).

3.3 Kajiado County Fodder Ecosystem

3.2.1 Agro-ecological sub-regions and demand pull

Narok West especially areas around Transmara forms the county's core pastoral-agro-pastoral fodder zone, with broad rangelands supplying beef finishing and a rising share of dairy in pockets with more reliable rainfall. To the north-east, the Mulot-Narok Town corridor has a denser dairy footprint with smallholder zero-grazing, cooperative bulking, and peri-urban demand, creating a two-speed market: field-intensive

preservation (to stabilize quality over distance and time) serving beef, and regularized silage/hay deliveries serving dairy. This bifurcation is visible in the employer data where 94% of Narok fodder production enterprises rate harvesting/post-harvest as a critical skill for their businesses, 88% emphasize fodder agronomy, 66% prioritize silage/baling & storage, and 38% highlight mechanization operation and maintenance.

3.2.2 Production systems, large hay growers, and youth heifer-fattening

Narok's fodder value chain includes large commercial hay growers and a broad base of smaller producer groups, but the binding skills gaps are concentrated at the harvest and preservation ("clamp") stages. In the employer survey, 88% of enterprises reported that their staff lack harvesting/post-harvest competencies, and 56% reported processing/value-addition bottlenecks. Among producers specifically, 98% flagged production/harvesting strain and 96% cited processing challenges. In practice, this means crews struggle to (i) measure and hit target moisture/dry-matter (DM) levels at harvest, (ii) maintain consistent chop length for animal performance and transportability, (iii) achieve adequate compaction and airtight sealing in clamps or bales, and (iv) prevent aerobic spoilage and nutrient losses all of which are magnified by long haulages into Mulot/Narok dairy buyers and distant feedlots. The net effect is quality volatility, higher waste, and reduced feed value, which directly erodes margins for both large hay enterprises and youth groups engaged in heifer fattening, whose profitability depends on repeatable fodder specification and on-time deliveries.

3.2.3 Logistics and market organization

Because fodder often travels long distances from production areas such as Transmara to Mulot dairy nodes and outside the county the market is thinly intermediated with most producers selling through brokers or opportunistic buyers at seasonal prices. This structure increases volatility and weakens incentives for on-farm upgrades such as proper clamps, tarping, moisture/DM testing, and density management. In response,

the field survey shows strong adoption intent by producers where 96% of commercial hay producers plan to introduce climate-smart production and preservation technologies. However, staff capabilities lag in the commercial backbone needed to make these upgrades pay. Employers report that their current staff lack skills in data management (71%) and digital commerce (46%), yet these are the very competencies required to support contracts, dispatch planning, e-orders, and traceable deliveries for dairy and feedlot clients.

3.2.4 Mechanization and service depth

KIIs and FGDs consistently indicate that mechanization services are structurally under-supplied in Narok. Farms frequently rely on mechanization service providers from neighboring counties, which introduces queuing and travel delays during short harvest windows. Stakeholders reported no specialized OEM presence in-county, limited trained mechanics, and no dedicated spare-parts outlets, so breakdowns are not resolved on time and equipment often returns to work mis-set. This aligns with survey evidence that custom-hire capacity is thin for precision

chop, kernel processing, baler calibration, clamp construction, and preventive maintenance. The competency profile confirms the bottleneck at the frontier: staff are under-prepared in advanced mechanization (77% of employers) and post-harvest/preservation (98%), making operator certification and in-county service-technician pipelines with on-site diagnostics and rapid parts access which are the most critical levers to reduce downtime and quality loss.

3.2.5 Training and partnerships

Narok benefits from an emerging training partnership spine with the Narok Pastoral Training Center (Narok Town) focuses on farmer-level capacity in rangeland/fodder management; Narok TVET supplies foundational technical skills; and Maasai Mara University (MMU) has established a TVET Directorate with a pro-partnership posture for co-designing fodder curricula, short-cycle specializations, and season-aligned attachments. Field evidence, however, indicates the current interface is thin where employers report low adequacy and limited collaboration with TVETs (no-collaboration reported by 82% of employers).

3.3 Kajiado County Fodder Ecosystem

Kajiado's fodder economy operates at the intersection of pastoral mobility and peri-urban market pull. On the Athi-Kapiti-Kajiado rangelands, herds track forage and water across community lands and conservancy blocks, while around Kitengela, Isinya, Kiserian, and Ongata Rongai a fast-growing peri-urban dairy ring and Nairobi feedlots generate steady, specification-driven demand. During prolonged dry spells, a distinctive adaptation has emerged where households fence off portions of their plots and lease short-term grazing/paddocks to pastoral neighbors.

Production remains highly dispersed and service-dependent where 51% of employers report production constraints (dryland establishment, species/variety choice), 47% report mechanization service gaps (operators, repairs, downtime), and 45% flag logistics/transport frictions along the Magadi Road and Namanga corridors. Downstream capacity is thinner, with 26%

citing processing/value-addition deficits and 23% aggregation/storage shortfalls which is an expected profile where custom services and mobile depots anchor the chain rather than fixed plants. Forward-looking demand concentrates in frontier, market-facing competencies where 53% of firms prioritize advanced mechanization/automation (calibration to buyer specs), 62% prioritize climate-smart dryland practices (water-use efficiency, drought-tolerant forages), 45% require digital marketing/e-commerce for Nairobi buyers and paddock-leasing transactions, and 36% seek QA/certification to differentiate product in a price-thin urban market. Notably, 77% of employers are already attempting to adopt new technologies/standards, yet staff are under-prepared in QA (46%), digital platforms (44%), data management (44%), enterprise finance (42%), mechanization O&M (34%), and post-harvest (32%)—the precise stack needed to turn dispersed production and short-term paddock leases into repeatable, specification-compliant deliveries.

3.2 Skills Gap Analysis

The fodder sector across Nakuru, Narok, and Kajiado exhibits a shared skills deficit profile yet with county-specific concentrations shaped by agro-ecology, market structure, and production systems. Using employer surveys, KIIs, and FGDs, the assessment classifies gaps under four typologies:

- i. **Shortages** - skills in high demand but scarce in the labor pool,
- ii. **Surpluses** - over-produced generalists relative to market need),
- iii. **Obsolescence** - competencies rendered outdated by eco-digital and quality-assurance standards,
- iv. **Aspirational/relevance mismatches** - what trainees want versus what firms require.

3.3 Skill Shortages

3.3.1 Skill shortages in Nakuru

Skills shortages dominate the fodder value chain and were consistently cited by employers as the most limiting constraint. In upstream fodder production, 70% of respondents pointed that in the last 12 months, they have faced challenges in their farms staffs have deficits in agronomic knowledge, particularly in forage establishment, irrigation, and soil fertility management. Similarly, in mechanization and services, 48% of enterprises reported major operational disruptions due to the lack of competent machine and equipment operators and mechanics capable of calibration, safe handling, and preventive maintenance of balers, choppers, and harvesters.

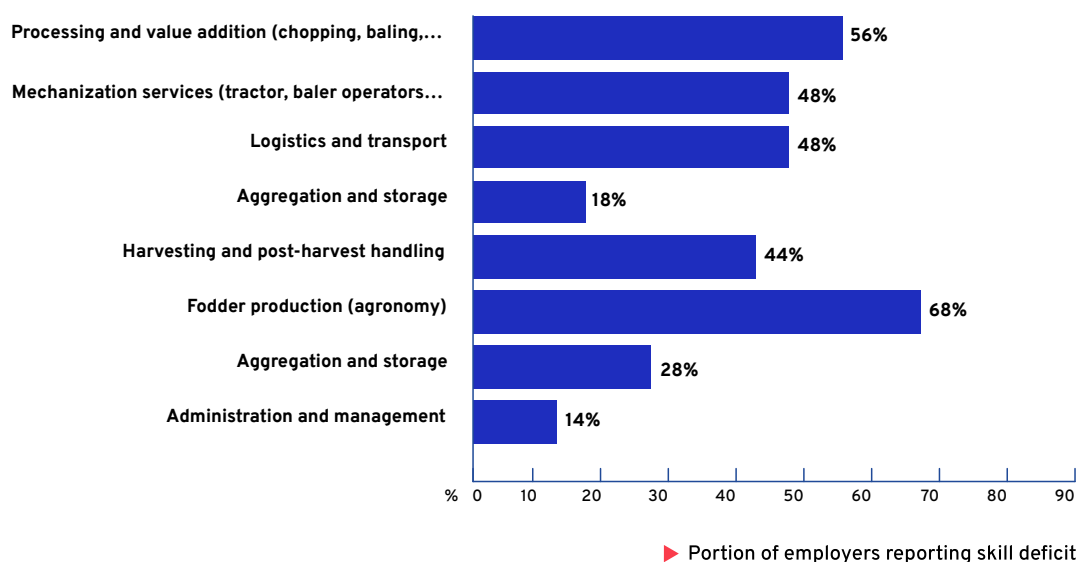


Figure 1: Skill-gap among current staff in the fodder sector

Post-harvest processing and storage also suffer from acute shortages where 56% of employers highlighted skills gaps in silage making, bale density, and moisture testing, with losses often attributed to weak technical handling. In

aggregation and distribution, shortages were evident in marketing, contracting, and logistics, with 48% of enterprises citing challenges in sales capacity. The quality assurance function reflects one of the most severe shortages where

46% of employers reported their staff lacked competencies in certification, nutritive value testing leaving processed fodder (silage) largely traded without quality assurance. Cross-cutting shortages were also documented in enterprise and finance, where 42% of businesses lacked financial literacy and investment readiness, and in digital and data, where 44% reported gaps in digital record-keeping, e-commerce, and analytics. Finally, green technologies remain under-served, with 34% of employers pointing to absent skills in climate-smart practices and renewable energy integration. These shortages collectively limit productivity, reduce quality, and constrain the sector's competitiveness.

"We do not get agriculture or engineering students on attachment coming to our farms. They prefer large industries like Delamare Farm, Soilo and the likes. Maybe our members would have benefited from their services" (KII with Hay Cooperative rep - Nakuru).

These shares represent the proportion of employers for whom inadequate staff skills, knowledge, or competency translated into measurable operational challenges such as missed dry-matter windows, sub-optimal compaction and sealing, variable bale density, and inconsistent customer fulfilment. The pattern indicates breadth of need rather than isolated pockets, with multiple functions simultaneously under-skilled within single enterprises and with knock-on effects on quality assurance, throughput, and working capital cycles.

Together, these demand-side findings point to a structural shortfall of **certified operational specialists that is**, operators, service technicians, and silage QA crews rather than a simple lack of general labor, and they signal an urgent need to

professionalize frontline roles through season-aligned, standards-based training and clear certification requirements in hiring. Recruitment pipelines are thin with 40% of firms struggling to hire qualified local women and youth in the past 12 months citing that low technical skills (90%), lack of experience (85%), absence of certifications (40%), and work-readiness issues (45%).

3.3.2 Skill shortages in Narok county

Within the fodder value chain, the assessment results show that skill shortages in Narok are concentrated at the harvest and preservation node, with upstream agronomy, mechanization O&M, and QA and digital-commercial functions compounding performance losses. Employers interviewed overwhelmingly classify harvesting & post-harvest and agronomy as critical functional capabilities (harvesting/post-harvest 94%; agronomy 88%; silage/bale & storage 66%; mechanization O&M 38%), underscoring a production system where seasonal windows and quality preservation determine value.

Employers were asked about which operational areas they have faced challenges due to lack of adequate skills, knowledge, or competency among your staff in the last one year. 88% of interviewed face most acute pain point is harvesting & post-harvest, followed by processing/value addition (56%). Additional challenges included fodder production (field operations) (42%), mechanization services (26%), aggregation/storage (14%), administration (14%), marketing/sales (6%), and logistics/transport (2%). Among producers specifically, 98% report strain at production/harvesting and 96% at processing.

Recruitment of local women & youth.

Commercial producers report a persistent hiring bottleneck at the specialist end of the value chain where 48% of employers struggled in the past year to recruit qualified local women and youth. Among the employers reporting difficulty, every employer cited insufficient technical skills as the primary barrier. Secondary constraints included limited experience (17%), work-readiness/attitude concerns (17%), and lack of formal certifications (13%). Taken together, the pattern signals a

shortage of operational specialists such as harvest crew leads, preservation/QA technicians, and calibrated machine operators rather than a lack of general labor. For commercial producers working to tight harvest windows and specification-driven contracts, this gap translates directly into missed DM targets, higher losses, and unreliable fulfillment, reinforcing their dependence on out-of-county talent and ad-hoc brokers.

Emerging technologies vs. workforce readiness.

When asked which emerging technologies and practices will be essential for competitiveness over the next five years, sector employers in Narok identified a clear frontier stack; post-harvest and preservation technologies (98%), climate-smart production systems (96%), advanced mechanization and equipment calibration (77%), data management and analytics (71%), quality assurance/certification protocols (69%), and digital marketing/e-commerce channels (46%). However,

the same respondents reported that their current staff lack proficiency in precisely these areas.

Mechanization service depth in Narok

Qualitative evidence from KIIs and FGDs indicates a systemic service deficit in Narok's fodder mechanization ecosystem. Specialist mechanics and OEM-aligned providers are largely absent in-county, forcing farms to source services from neighboring counties and creating repair queues and delays during narrow harvest windows. With no local OEM presence, limited trained mechanics, and no dedicated spare-parts outlets, breakdowns are not resolved in time and equipment frequently returns to operation mis-calibrated. This service gap occurs precisely at the harvest-preservation node which is the most critical point in the value chain and directly translates into missed moisture/DM targets, density variability, elevated losses, and contract slippage. This was well put by a commercial farmer;

"The biggest problem we have is with the harvesters who tamper with baling machines to reduce bale sizes so as to produce many underweight bales so exploit farmers by charging more. You see, we do not know and our staffs are not technicians to tell. We only realize this when buyers start complaining about the sized of our bales" (KII, Narok).

Table 1: Summary skill shortages by value-chain node in Narok county

Value-chain node	Proportion of employers reporting skills in the value chain node as critical	Proportion of employers who faced challenges with staff capacity in last 12 months	Frontier skills employers are trying to adopt but staff are not ready
Upstream agronomy	Agronomy critical 88%.	Field production disruptions 42%.	Climate-smart practices 96%; data management 71%.
Harvesting & post-harvest	94%; silage/bale & storage 66%.	Disruptions 88% (highest); producers: 98% at production/harvest.	Post-harvest & preservation 98%.
Processing / value addition	Silage/bale & storage 66%.	96%	QA/certification 69%
Mechanization services (O&M, calibration)	Mechanization O&M 38% listed as critical.	26%; KIIs/FGDs: few service providers, no OEM presence, no spare parts, delays.	Advanced mechanization 77%
Aggregation & storage	–	Disruptions 14%.	QA/certification 69% under-prepared (storage standards, documentation). Field Narok Data Analysis Fodde...
Logistics & transport	–	2% (but long haulages amplify losses without preservation QA).	Digital commerce 46% and data analytics 71%
Marketing & sales / contracting	Aggregators rate marketing as critical (67%) despite low producer emphasis.	Disruptions 6% (producer-heavy sample; thin intermediation).	Digital commerce 46% (e-orders, visibility).
Quality assurance (DM/CP/NDF/ADF; KEBS)	QA listed by 14% as critical (baseline), but 69% under-prepared to adopt QA/certification.	Processing failures 56% often linked to QA lapses (moisture, density, sealing).	QA/certification 69% under-prepared (lab use, documentation).

The breadth and intensity of Narok's shortages indicate a structural deficit in certified operational specialists (harvest crews, preservation/QA teams, and mechanization operators/technicians), not merely a lack of general labor. The producer-dominant sample explains why marketing/logistics show lower incident rates, while harvest, processing, and QA dominate both criticality and disruption metrics. With 48% of firms struggling to recruit qualified local women/youth and low technical skill cited in 100% of such cases, Narok requires season-aligned, standards-based training (operator certification, clamp QA, calibration) and the build-out of in-county service depth (mechanics, parts, diagnostics) to convert high adoption intent (96% climate-smart)

into repeatable, spec-compliant output within upcoming seasons.

3.3.2 Skill shortages in Kajiado County

When employers were asked to identify the critical functional capabilities for their businesses, 94% pointed to harvesting and post-harvest operations as decisive, 88% to upstream fodder agronomy, 66% to silage/bale preservation, and 38% to mechanization operation and calibration. However, when the same respondents were asked which operational areas had faced challenges in the past 12 months because current staff lacked adequate skills, 88% reported machine breakdowns at harvest/post-harvest, and 56% at processing/value addition. Additional incidents were cited in

field production (42%), mechanization services (26%), aggregation/storage (14%), administration (14%), marketing/sales (6%), and logistics/transport (2%). Among producer enterprises specifically, the exposure is systemic with 98% reported skill deficit in production/harvesting and 96% reported processing challenges.

Workforce pipeline for women and Youth

When employers were asked about recruiting qualified local women and youth into specialist roles over the last year, 48% reported difficulty. Among those reporting difficulty, all cited insufficient technical skills as the primary barrier; second-order constraints were limited experience (17%), work-readiness/attitude (17%), and lack of certification (13%). This pattern indicates a deficit of operational specialists in harvest crew leads, preservation/QA technicians, calibrated machine operators rather than a shortage of general labor, with direct consequences for meeting specification-driven contracts.

Five-year technology horizon vs. staff readiness

When asked which emerging technologies and practices will be essential for competitiveness in the next five years, employers identified post-harvest & preservation technologies (98%), climate-smart production systems (96%), advanced mechanization & equipment calibration (77%), data management/analytics (71%), quality assurance/certification protocols (69%), and digital marketing/e-commerce channels (46%). The same respondents reported that their current staff are lack skills in precisely these domains

Depth of mechanization services

When KIIs and FGDs probed how farms secure mechanization services, respondents consistently reported a structural service deficit. That specialist fodder mechanics and OEM-aligned providers are largely absent in-county, forcing reliance on neighboring counties and creating repair queues and delays during short harvest windows. With no local OEM presence, few trained mechanics, and no dedicated spare-parts outlets, breakdowns are

not resolved in time and equipment frequently returns mis-calibrated amplifying losses at the very node employers rate as most critical (harvest-preservation).

3.3.2 Skill Surpluses

In this assessment, “surplus” refers to areas where training supply or available labor exceeds what firms in the fodder sector can productively absorb, typically because the skills are too generic, not fodder-specific, or misaligned with operational nodes (harvest/preservation, QA, mechanization calibration, and digital commercialization). Across the three counties, surpluses appear narrow but consequential, shaping recruitment choices, utilization of graduates, and on-the-job retraining costs.

In all the three counties the analysis revealed relatively few but important skill surpluses, concentrated in areas where training supply exceeds industry uptake. The study found that 90% of enterprises interviewed reported “satisfied/very satisfied” with basic practical skills among their staff, yet still rate the mismatch 4/5 indicating a surplus of generalists without specialization (e.g., silage QA, machine operation, finance/digital commerce). In agribusiness, general agriculture, there are graduates with theoretical agronomy knowledge that lacks practical applicability to fodder systems, leading to underutilization of their skills. In mechanization, while skilled operators are scarce, employers noted a surplus of general mechanics whose competencies are not aligned to modern forage machinery requirements. Similarly, in post-harvest operations, enterprises reported an oversupply of casual seasonal laborers whose availability is high but whose technical value is low, creating inefficiencies in handling, baling, and silage preservation. A comparable trend was observed in digital and data management, where many graduates possess generic ICT skills (e.g., MS Office) that are in surplus relative to demand, yet lack sector-specific competencies such as telematics, traceability, or e-commerce platforms. These surpluses underscore the problem of misaligned supply rather than actual abundance, where available human capital does not fit specialized industry needs.

In Narok's producer-dominant system, the evidence points to deficits, not surpluses, at value-critical nodes. Training adequacy is low (employers report no adequate ratings; collaboration with TVETs is weak) and frontier adoption intent (post-harvest tech, climate-smart, QA) far outpaces workforce readiness. Where "surplus" does surface, it is volume without specialization: abundant casual seasonal labor that lacks preservation QA, and graduates with general agriculture/ICT exposure but no fodder-specific practice hence not deployable to clamp build-out, density control, moisture/DM testing, or documentation.

Focus group discussions and in-depth discussions with trainers pointed out that training pathways for fodder sector are non-existent as stand-alone curricula. Local colleges and universities such as Narok Pastoral Training Center in Narok; Egerton University, Rift Valley National Polytechnic, KALRO Naivasha and Gilgil, and local TVETs in Nakuru and well as colleges in Kajiado county only embed fodder-related content within animal production, mechanical engineering, or agronomy tracks. Tuition fees and entry requirements into these programs are relatively high, creating an access barrier for many local youths who could otherwise enter the sector. As a result, the system produces graduates with broad theoretical grounding but minimal exposure to the specific operational realities of fodder production, processing, and mechanization.

The absence of a dedicated fodder curriculum means that machine and equipment operations in silage and hay production are not systematically taught. Instead, skills are acquired informally, with young men typically learning on the job as assistants to tractor drivers, baler operators, or silage machine crews. Competence development is experiential and highly dependent on peak-season exposure rather than structured instruction. This practice-based "shadow learning" leads to oversupply of semi-skilled casual labor machine operators with partial competence, while leaving unfilled vacancies for certified technicians (mechanics), and quality assurance specialists.

3.3.3 Skill Obsolescence

Field evidence from all the three counties show that skills obsolescence is already undermining competitiveness in the fodder sector. Employers and training institutions confirmed that curricula continue to emphasize generic animal production, agronomy, civil or mechanical engineering, leaving critical capabilities in data/ICT, standards and QA, agri-fintech, and preventive maintenance underdeveloped. Across silage and baling operations observed in Nakuru county, trainees and casual workers could assist with fieldwork but struggled with precision tasks such as moisture/DM calibration, chop-length control, and compaction density. Employers repeatedly flagged this gap, with 74% rating digital platforms as future-critical and 42% emphasizing QA and certification needs, yet actual practices revealed frequent missed targets that compromised feed quality. The obsolescence is visible in the reliance on informal learning and generic attachments, which equip youths with only partial competence for roles that now demand specialized, certified skills.

Commercial practices reinforced the same obsolescence trend. The enterprise survey showed 41-44% disruption in marketing and sales, while agri-fintech adoption stood at just 40%. FGDs and KIIs revealed that most cooperatives and processors still operate analogue workflows, lacking marketplace listings, search visibility, or digitized order-to-cash systems. Without CRM, inventory integration, or funnel analytics, seasonal surpluses could not be reliably matched to demand, and broker intermediation continued to suppress farm-gate prices. By contrast, integrated fodder farms like Juncao Grass Farm that had adopted irrigated year-round, data-aware processes reported smoother cash cycles and higher price realization.

In-depth discussions with commercial hay farms and trainers in TVETs confirmed that during industrial attachments students often miss peak operations such as land preparation, harvest, baling, ensiling, and off-season maintenance

thus losing exposure to the very windows where machine reliability and quality assurance skills are acquired. Unless curricula and workplace learning are re-tooled to embed **season-aligned silage QA modules, OEM-linked mechanization diagnostics, digital commerce integration, and agri-fintech rails**, the obsolescence loop will persist. Lecturers agreed that introducing these as stackable micro-credentials, coupled with Recognition of Prior Learning (RPL) for experienced operators, would shift training outcomes from broad literacy to **specialized, performance-ready competence** demanded by today's market.

3.3.4 Aspirational/Relevance Mismatches

The most dynamic set of gaps lies in aspirational or relevance mismatches, where employers foresee emerging needs but the training ecosystem lags behind. **Climate-smart agronomy** is a prime example where 82% of employers ranked it as critical for future competitiveness, yet few institutions integrate regenerative practices, hydroponics, or drought-tolerant forage technologies into curricula. In **mechanization**, enterprises aspire to advanced automation, telematics, and precision calibration, but these are absent from TVET offerings, leaving a mismatch between employer vision and training provision. **Post-harvest operations** similarly reflect aspiration gaps, with enterprises seeking skills in aflatoxin control, use of inoculants, and advanced storage standards that are not mainstreamed in current programs. In **aggregation and trading**, 56% identified digital marketing and e-commerce as future skill priorities, yet training institutions have not designed sector-specific modules in this domain. Aspirational mismatches are also acute in **enterprise and finance**, where businesses see opportunities in agri-fintech, digital credit scoring, and blended finance but lack trained personnel. **Digital and data management** further illustrates this gap, as employers envision dashboards, analytics, and precision agriculture applications that are not covered in ICT training

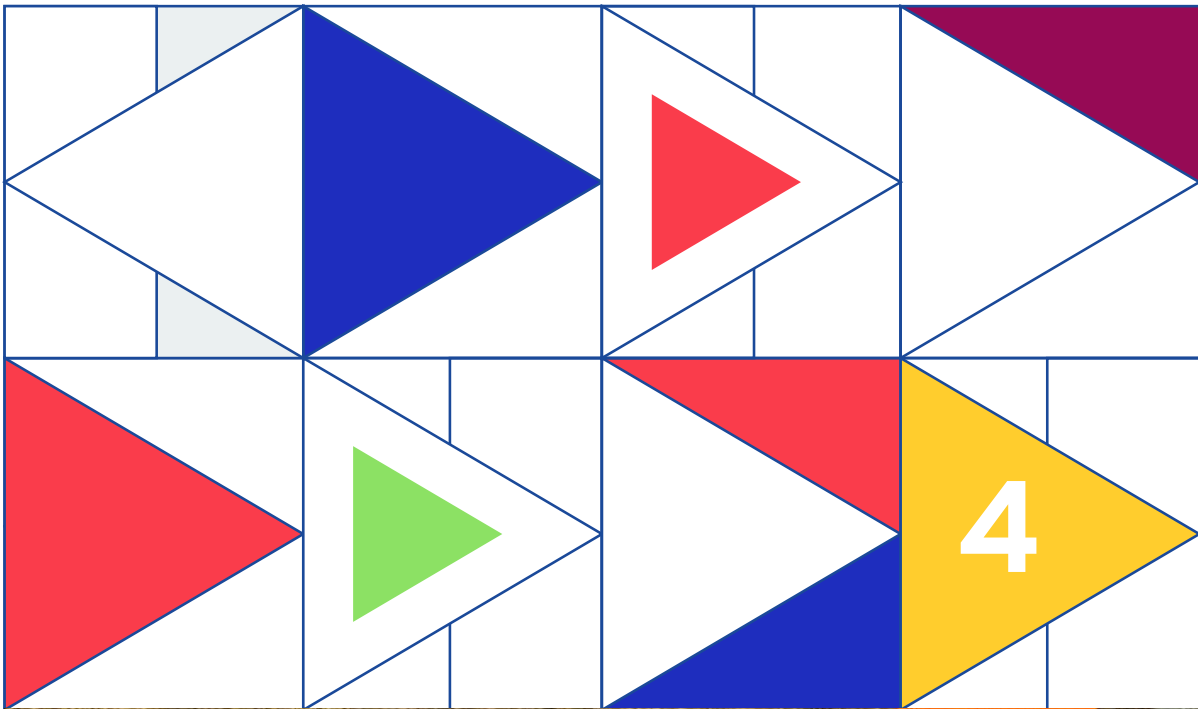
programs. Finally, **green technologies** stand out: while 32% of enterprises already acknowledge their absence and 81% see them as critical to future competitiveness, skills in solar irrigation, renewable energy O&M, circular storage, and Monitoring, Reporting, and Verification (MRV) for climate finance remain largely unaddressed in training pipelines. These aspirational mismatches highlight where the fodder sector is moving, but where skill supply remains structurally behind.

Evidence indicates a structural misfit between training pathways and workplace realities. Industrial attachments are not synchronized with the fodder calendar, which limits trainee exposure to peak operations such as machine set-up, chop-length targeting, compaction and sealing routines, and time-critical logistics. Discussions during FGDs showed that participation remains gender-skewed because women face safety concerns, restrictive norms, and an absence of gender-responsive entry routes, so they cluster in seed harvesting and trade roles while high-value mechanization positions remain male-dominated. Employers report persistent hiring barriers for local women and youth, citing low technical skills at 92%, lack of experience at 84%, and missing certifications at 41%, which together depress readiness for frontline production, post-harvest, and QA roles.

The skills landscape in the fodder sector in the three counties is marked by dominant **shortages** in core technical functions, modest but impactful **surpluses** of generic and misaligned skills, widespread **obsolescence** of traditional practices, and strong **aspirational mismatches** in green, digital, and climate-smart domains. Addressing these gaps requires not only scaling up training volumes but also recalibrating content, pedagogy, and partnerships under PPDP models to ensure that the future skills architecture aligns with industry trajectories and systemic transformation goals.

Table 2: Summary of skill gap analysis

Sector domain	Shortages	Surpluses	Obsolescence	Aspirational/ Relevance Mismatches
1. Upstream Production	Irrigation, soil fertility, climate-smart agronomy (70% cite critical need)	Theoretical agronomy graduates with limited practical skills	Rainfed systems, traditional forage varieties	Climate-smart agronomy, hydroponics, regenerative practices (84% cite future need)
2. Mechanization services	Operators, mechanics, calibration & maintenance (42% cite gaps)	Drivers & generic mechanics not trained in modern machinery	Manual baling, unsafe operator practices	Advanced mechanization, telematics, automation (56% cite need)
3. Post-Harvest Processing and storage	Bale density, moisture testing, silage pit management (56% cite gaps)	Casual seasonal labor lacking technical value	Traditional stacking & informal preservation methods	Aflatoxin control, inoculants, storage standards not in curricula
4. Aggregation, trading and distribution	Contracting, logistics, structured trading (48% cite sales gaps)	Informal intermediaries without structured business practices	Face-to-face spot trading & visual inspections	Digital marketing & e-commerce (44% cite need)
5. Quality Assurance	Technicians for DM/CP/NDF/ADF testing & HACCP (46% cite gaps)	None significant (QA roles rarely filled)	Visual inspection as sole QA approach	Nutritive value certification, KEBS-aligned QA not trained
6. Enterprise, finance and compliance	Financial literacy, investment readiness, compliance (42% cite gaps)	Generic business graduates without agribusiness specialization	Manual bookkeeping & informal finance practices	Agri-fintech, credit scoring, blended finance under-served
7. Digital data	Digital record-keeping, e-commerce, analytics (44% cite gaps)	Graduates with basic ICT skills (MS Office) but not sector-specific	Paper-based record-keeping & manual payments	Dashboards, analytics, precision agri-applications not taught
8. Green technologies	Renewable energy, climate-smart production skills (34% cite gaps)	None (area still emerging)	Water-intensive irrigation, plastic-heavy packaging	Solar irrigation, renewable O&M, MRV for climate finance (84% see critical)



Credit: Geoffrey Rono, ILO

4. Industry-Training Institution Collaboration

The assessment investigated the extent and nature of collaboration between fodder sector employers and training institutions in the three counties. Findings revealed that **employers (Nakuru 49%; Narok 18%; Kajiado 44%) reported some form of engagement with local TVETs and colleges**, overall 57% indicated no collaboration at all. However, discussions with key informants underscored that these collaborations are largely informal and unstructured, limited primarily to accepting students for industrial attachments on an *ad hoc* basis. In such arrangements, employers typically allocate in-house staff to provide day-to-day supervision and later fill out institutional forms to confirm that students were placed. Beyond certifying attendance, training institutions rarely involve employers in assessing student performance, with final grading left to lecturers who may only visit once at the tail end of the attachment period. Employers argued that this model is insufficient for building practical competencies, as it reduces their role to passive hosts rather than active co-educators.

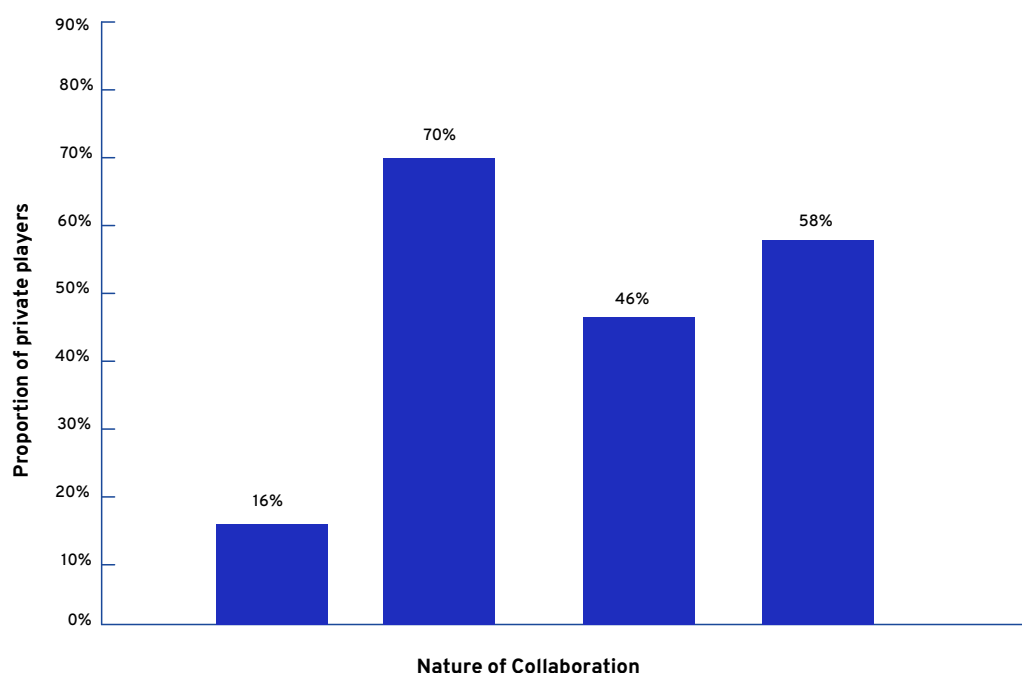


Figure 2: Nature of preferred industry collaboration

Field evidence also revealed **gaps in exposure to the actual mechanization and repair ecosystem**. TVET students rarely go for industrial attachments with *jua kali* (**informal**) fabricators, who dominate the repair and customization of fodder machinery, and there are no structural arrangements with **Original Equipment Manufacturers (OEMs) such as John Deere or Massey Ferguson**. This lack of structured linkage deprives students of hands-on experience with

the very machines and diagnostic protocols that drive fodder mechanization services. Employers noted that without such exposure, graduates may understand basic theory but remain unprepared for preventive maintenance, diagnostics, and operation of balers, choppers, and tractors, skills that directly determine machine uptime during peak harvest and ensiling periods.

When asked about their willingness to engage in structured Public-Private Development

Partnership (PPDP) models, employers expressed strong commitment to participate. Specifically, they highlighted areas where their involvement could add value, including:

- i. **Curriculum co-development:** integrating practical industry requirements, agribusiness, QA, and digital competencies into training programs.
- ii. **Reformed work-integrated learning (WIL):** rolling out attachments throughout the student lifecycle, aligning them with fodder seasonality (land preparation, harvest, baling, ensiling, and off-season maintenance).
- iii. **Industry-led practical instruction:** inviting senior operators, technicians, and fabricators to deliver guest lectures or short modules on machine setup, preventive maintenance, QA protocols, and workplace safety.
- iv. **Recognition of Prior Learning (RPL):** allowing experienced but uncertified machine operators and fodder technicians to access structured certification through partner TVETs, thereby formalizing existing competencies.

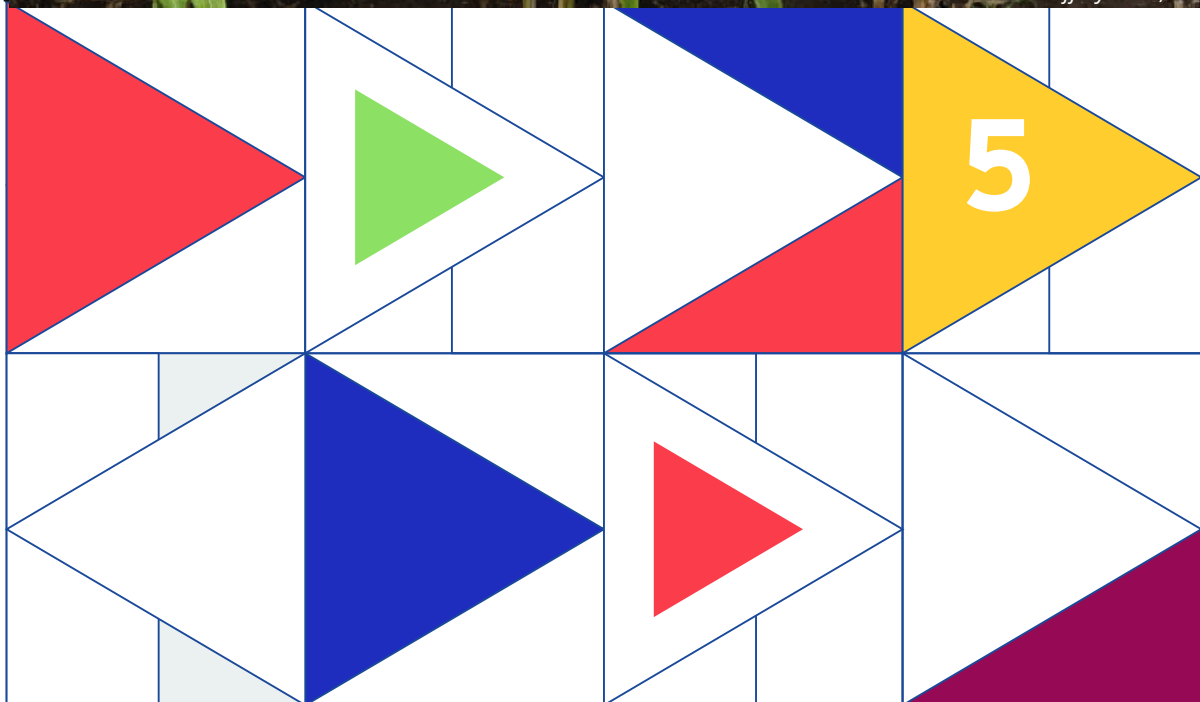
As the survey data illustrate, employers showed the strongest interest in offering **internships and attachments (Nakuru 70%; Narok 23%; Kajiado 23%)**, reflecting recognition of WIL as a central mechanism for skill transfer. Joint curriculum design and participation in advisory boards or sector skills councils also attracted notable support, signaling readiness to shape governance and training content. However, fewer employers expressed willingness to commit direct financial resources, with less than 10% open to co-funding training programs, while a much larger share (72%) preferred in-kind contributions such as equipment, trainers, or land for demonstration sites. These findings highlight both the opportunities and constraints of partnership: while there is strong enthusiasm for practical collaboration and resource-sharing, direct financial commitments may require stronger facilitation, cost-sharing arrangements, and incentives under a PPDP framework.

The study also confirmed that many employees in the sector do not hold formal fodder-specific qualifications but have become skilled through experience. Employers viewed RPL as an opportunity to recognize this latent expertise, raise professional standards, and formalize career pathways. Collectively, these insights demonstrate a strong appetite for deeper, institutionalized partnerships between training providers, OEMs, *jua kali* fabricators, and fodder enterprises. If harnessed under PPDP facilitation, such partnerships could bridge systemic skill gaps, align curricula with labor market demand, and professionalize the workforce needed to

modernize the fodder value chain.



Credit: Geoffrey Rono, ILO

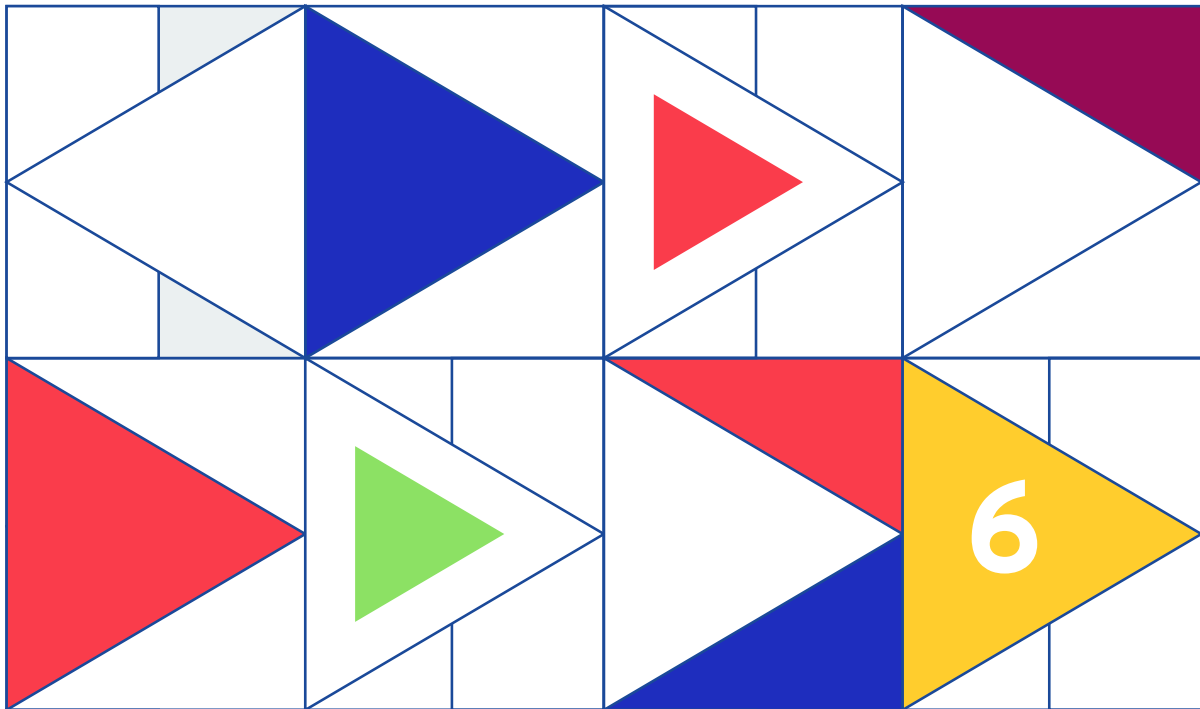


5. Green Technologies and the Missing Training Landscape

The assessment investigated the extent to which green technologies and sustainability-oriented practices are integrated into the fodder sector skills ecosystem. The study observe that **green technologies remain thinly covered in the training curricula, institutional programs, and workplace learning models**. While global and national agendas increasingly prioritize low-carbon, resource-efficient production systems, employers in the fodder value chain did not identify green skills as an immediate or emerging training priority. Instead, most framed their needs around mechanization, marketing, and quality assurance, with minimal recognition of the competitiveness and compliance advantages that sustainability credentials can confer.

Field visits confirmed that many enterprises continue to rely on diesel-powered machinery without integrating solar or biogas options, and silage/hay storage facilities lacked energy-efficient designs or loss-reduction features such as moisture control, aflatoxin mitigation, or standardized QA protocols. Employers noted rising costs linked to energy use and post-harvest losses but did not link these challenges to missing sustainability competencies. This disconnect underscores a **latent training opportunity** such that if embedded in curricula and industry partnerships, green technologies could reduce operational costs, improve feed quality, and open access to eco-conscious markets. When asked about emerging skills critical for competitiveness, a subset of employers cited renewable energy in processing/storage (34%) and climate-smart fodder practices (84%) as priority areas. However, these signals remain weakly institutionalized and are not yet reflected in structured learning programs or certification frameworks.

To address this gap, the PPDP should commission a **dedicated green technology skills assessment for the fodder sector**, mapping adoption barriers, training pathways, and certification needs. Priority modules should include renewable energy (solar/biogas) applications in mechanization, water-use efficiency in irrigated fodder systems, regenerative practices for soil and fodder crops, and waste minimization in silage/hay processing. Embedding these modules as competency-based micro-credentials, coupled with recognition of prior learning (RPL) for experienced practitioners, would equip local youth and women with future-proof skills.



Credit: Joyce Macharia, ILO

6. Conclusion

Across Nakuru, Narok, and Kajiado, the fodder economy is expanding under pressure from rising dairy and beef demand, increasingly erratic rainfall, and a gradual shift toward quality specific-driven, contractable feed markets. Yet the human-capital base that should enable this transition is uneven and structurally misaligned with value-critical work. Convergent evidence from employer surveys, KIIs, FGDs, TVET site-visits, and field observation indicates a common skills core missing across the three counties including agronomy, preservation quality assurance (QA), and mechanization uptime/calibration with county-specific expressions shaped by agro-ecology, market access, and service ecosystems.

The assessment confirms that the fodder value chain is constrained by structural skills deficits at the operational core especially on climate-smart agronomy, silage or hay quality assurance, and mechanization operation and maintenance (O&M). These deficits are compounded by misaligned industrial attachments that fail to coincide with critical production windows, gender-based exclusion from machine-intensive roles, and an underdeveloped local repair ecosystem. Enterprises face systemic disruptions across production, processing, and marketing, reflected in inconsistent bale density, high post-harvest losses, and low cooperative price realization. At the same time, the workforce pipeline is saturated with generalists in agronomy or animal production and dairy technologists but under-supplied with certified specialists, creating a paradox of surplus entry-level labor amidst shortages of critical technical competence.

Obsolescence is accelerating as curricula remain anchored in generic animal production and engineering pathways, with little attention to digital commerce, agri-fintech, standards, and preventive maintenance. Aspirational mismatches persist as trainees miss exposure to peak fodder operations, while women and youth face barriers to entry into higher-value mechanization and

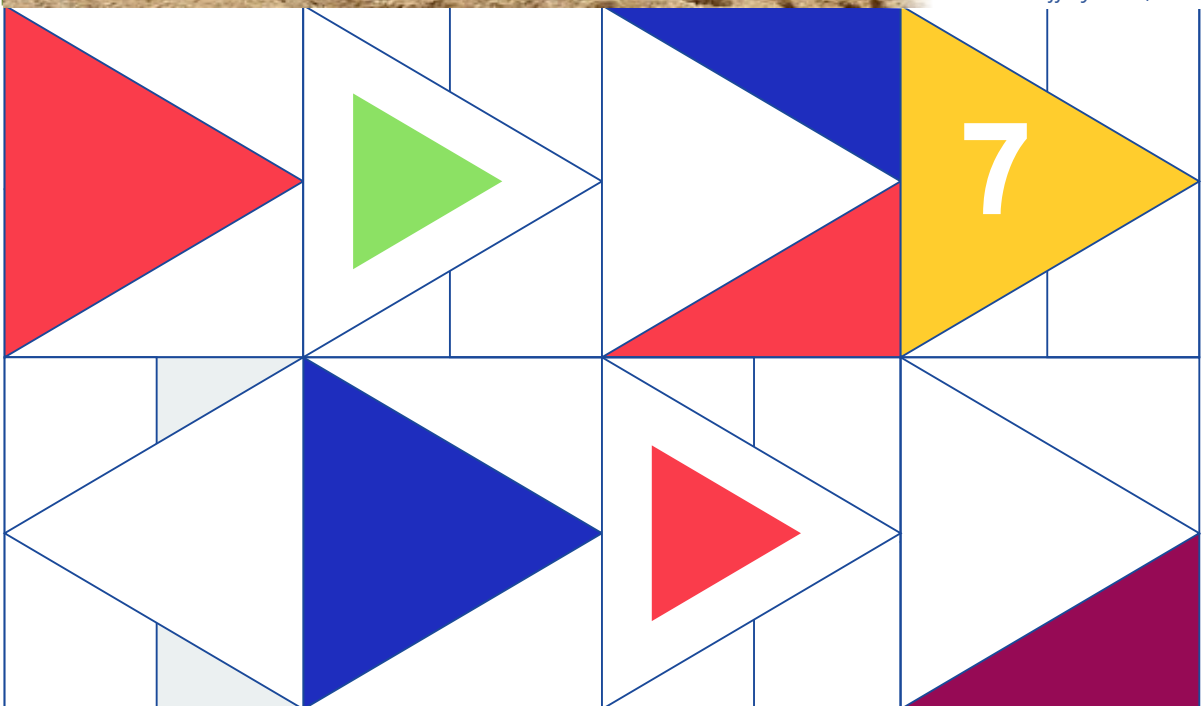
quality assurance functions. Employer-training institution collaboration remains weak, with most linkages informal and *ad hoc*, reducing employers to passive hosts rather than active co-educators.

Green technologies are almost entirely absent from the training and workplace ecosystem, reflecting a missed opportunity to embed sustainability, resource efficiency, and climate-smart practices. This omission risks excluding the fodder economy in these counties from eco-conscious markets and undermines alignment with Kenya's climate-smart agriculture and green growth agenda.

Collectively, these findings highlight an urgent need to institutionalize season-aligned, competency-based skilling pathways that are industry-led, modular, gender-responsive, and future-oriented. The appetite for Public-Private Development Partnership (PPDP) engagement is strong, with enterprises signaling readiness to provide equipment, trainers, and sites, provided that programs are co-designed, standards-driven, and commercially relevant.



Credit: Geoffrey Rono, ILO



7. Strategic Recommendations

These strategic recommendations convert the study's evidence into a phased skills agenda that targets the fodder value chain's highest-value nodes identified as climate-smart agronomy, precise harvest and preservation (moisture, chop length, density, sealing), reliable machine operation and maintenance, and simple digital commerce that delivers to specification and on time. The roadmap is sequenced across short term (0-2 years), medium term (2-5 years), and long term (5-10 years) to secure quick operational wins, build specialist depth, and institutionalize standards at scale. Short-term actions prioritize field-based micro-credentials, season-aligned attachments, rapid certification of experienced workers, gender-responsive entry paths, and basic service and sales systems. Medium-term actions formalize accredited pathways, establish county quality-testing capacity and repair/parts networks, and deploy light market tools for orders, dispatch, and proof-of-delivery. Long-term actions embed national skills and product standards, licensing for critical roles, end-to-end traceability, climate-aligned financing, and permanent county skills councils thereby creating an inclusive, specification-driven, and investment-ready fodder market for local youth and enterprises.

7.1 short- term interventions (0-2 Years)

7.1.1 Curriculum Reform and Competency-Based Training

There is a pressing need to establish fodder-specific curricula that address the core operational gaps in climate-smart agronomy, silage and hay quality assurance, mechanization operation and maintenance, and digital commerce. Training programs should be modular and competency-based, allowing learners to acquire stackable micro-credentials such as fodder moisture calibration, chop-length control, compaction

standard operating procedures, and preventive maintenance diagnostics. At the same time, a Recognition of Prior Learning (RPL) framework should be institutionalized to certify the skills of experienced operators and technicians who currently function without formal qualifications, thereby professionalizing the workforce and elevating standards across the value chain.

7.1.2 Create a starter set of practical, fodder-specific certificates and teach them in the field.

Technical and vocational training institutions should co-design with employers a small set of short, very practical courses that young people can complete in two to five days at farms, depots, and cooperative sites. The first set should cover: measuring and adjusting fodder moisture and dry matter; controlling chop length and, where needed, cracking kernels; building, compacting, and sealing silage clamps correctly; measuring bale density; and safe, basic care of choppers, balers, and tractors so they run reliably through the day. Each course should end with a hands-on test on real equipment, and successful learners should receive a simple certificate that employers recognize. Teaching must happen during live work so learners practice on the same machines and materials they will use in paid jobs.

7.1.3 Season-Aligned Work-Integrated Learning

Industrial attachments must be reformed to coincide with fodder production cycles such as rather than generic academic calendars. By synchronizing work placements with land preparation, harvesting, baling, ensiling, and off-season maintenance, students will gain exposure to real operational windows that define sector competitiveness. Work-integrated learning should also include structured rotations with Original Equipment Manufacturers (OEMs), *jua kali* fabricators, and cooperatives to ensure comprehensive exposure to both formal mechanization ecosystems and informal repair or customization practices that dominate the sector.

7.1.4 Recognize the skills that experienced workers already have and certify them quickly.

Many operators, crew leaders, and mechanics have learned on the job but have no paper proof of their skills. Counties should run three-day “challenge” assessments on farms and depots where experienced workers demonstrate what they can do on real tasks such as setting chop length, testing moisture, adjusting bale density, or diagnosing a common fault. Those who pass receive an “Operator Level 1” or “Mechanic Apprentice” certificate; those who fall short get targeted coaching and a second attempt within the same season. This immediately strengthens crews and sets a clear ladder for pay progression.

7.1.6 Gender-Responsive Pathways

Deliberate efforts must be made to dismantle the barriers that exclude women from high-value mechanization and quality assurance roles. This requires gender-responsive entry points, including targeted bursaries, mentorship schemes, and the design of safety protocols that make machine operations more accessible. Promoting inclusive skilling not only addresses equity concerns but also expands the talent pool available to enterprises. Embedding role models and champions within training institutions and industry partnerships will further encourage women and youth to pursue technical roles traditionally dominated by men.

Set targets for women and youth to take at least half of places in the new short courses and attachments. Organise “paired crews” where a senior operator works with a new female trainee, provide proper protective clothing in women’s sizes, guarantee safe transport to and from remote fields, and assign a female mentor in each depot or college. Publicize clear rules for safe machine operation and respectful conduct at worksites. This turns interest into real participation, not just enrolment.

7.2 Medium-term interventions (2-5 years): build depth, equipment uptime, and trusted quality

7.2.1 Turn the starter courses into a recognized fodder training pathway with clear steps

By year two, the counties should have one centre in each county that offers a proper fodder pathway with certificates and diplomas. The pathway should include climate-smart farming for both dryland and irrigated conditions; silage and hay quality assurance with proper sampling, laboratory testing, and record-keeping that matches national standards; machine operation, care, and accurate calibration; practical sales and data skills such as taking orders by phone, planning routes, pricing, and keeping simple digital records; and basic business and finance for small enterprises. Each module must be taught with employers, assessed on live work, and stack into larger awards so learners can progress over time.

7.2.2 Scale up attachments that follow the season and expand the recognition of prior learning.

Keep attachments tied to live work and expand them so learners complete multiple seasons, including off-season maintenance. Extend recognition to “Operator Level 2 and Level 3” and to “Mechanic Technician” through supervised practice and a final on-the-job test. This creates a visible ladder from helper to specialist.

7.2.3 Grow a reliable repair and parts network so machines do not sit idle.

Train a stream of local mechanic apprentices into technicians who can diagnose faults and do preventive care on choppers, balers, and tractors. Work with dealers and local fabricators to stock the most common parts in small county depots. Before each harvest, run “calibration days” where machines are set correctly and tested in the field. Publish response times for breakdowns and measure them.

7.2.4 Introduce a light market tool that links specification, orders, dispatch, and proof of delivery.

Build a very simple ordering and dispatch system that works through mobile messaging and basic phones but stores the essential information: what was ordered, what specification was agreed, where and when it was delivered, and who signed for it. Train young people as dispatch coordinators who help several small sellers meet time-definite deliveries to Nairobi and other towns.

7.2.5 Create county skills councils that keep training honest and useful.

Turn the short partnership agreements into small, permanent county groups that meet each season to check whether the training matches what employers need, whether students are getting jobs, and where to adjust. These councils should include employers, training leaders, county officials, and youth and women representatives.

7.3 long term interventions (5-10 Years)

7.3.1 Strengthening Industry-Training Institution Partnerships

A formal Public-Private Development Partnership (PPDP) framework should be established to institutionalize collaboration between employers and training providers. Joint curriculum development, co-delivery of modules, and structured certification will ensure that training remains aligned with market realities. Employers should be encouraged to contribute in-kind resources such as equipment, trainers, and land for demonstration sites, while Sector Skills Councils (SSCs) should be set up to oversee governance and guarantee sustained alignment between training outputs and industry needs. Such structures will transform employers from passive hosts to active co-educators in the fodder skilling ecosystem.

7.3.2 Digital and Commercial Capability Development

Enterprises must be supported to modernize their commercial practices through the adoption

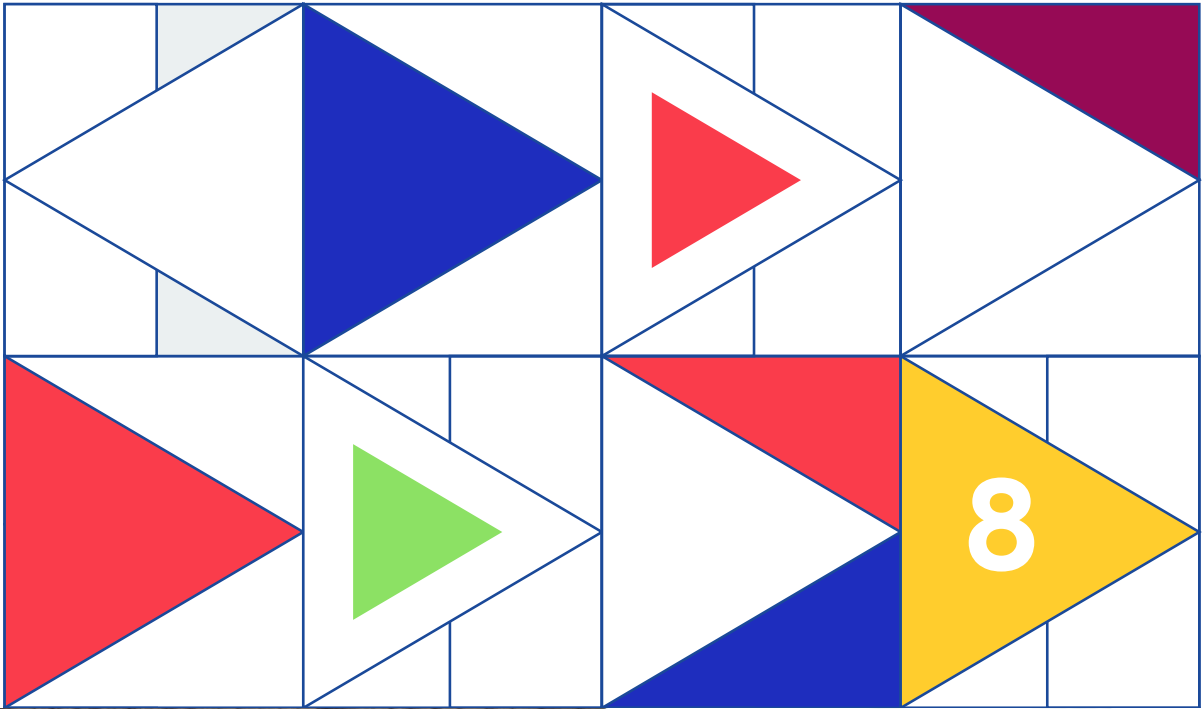
of integrated customer relationship management (CRM), inventory, and e-commerce systems that streamline order-to-cash processes. Short, applied training sprints should be rolled out to build competencies in digital sales funnel design, analytics, pricing, and customer account management. At the financial level, agri-fintech solutions such as equipment leasing, invoice factoring, and pay-on-delivery mechanisms should be mainstreamed to smoothen cash flow cycles. In parallel, investor readiness coaching should be offered to enterprise managers and cooperative leaders, equipping them with skills in cash cycle modeling, covenant compliance, and unit economics to enable sustainable growth.

7.3.3 Green Technologies Integration

Green technologies must be integrated into both training curricula and workplace practices to align the fodder sector with Kenya's climate-smart agriculture strategy and eco-conscious markets. This should include modules on renewable energy applications (solar and biogas) in mechanization, water-use efficiency in irrigated fodder systems, regenerative soil and crop management, and waste minimization in silage and hay processing. Certification pathways for green practices should be developed to raise professional standards and unlock access to sustainability-conscious buyers. Demonstration sites showcasing energy-efficient silage storage facilities and low-emission mechanization models will help accelerate adoption and provide real-world training platforms.

7.3.4 Adopt clear national skills and product standards and license

Work with national training and qualification bodies to fix the content and testing for fodder skills at different levels, and to align product specifications with national quality rules. Introduce simple licenses for machine operators at Levels 1 to 3 and a certificate for suppliers who can prove and trace their quality. Buyers and lenders should then require these licenses and certificates in their contracts.



8. Validation workshop reflections and multi-stakeholder alignment on findings

A multi-stakeholder validation workshop was convened with representation from county governments (Livestock, Youth, TVET, and Education departments), training and accreditation bodies (NITA, TVETA, KNQA), labor market and employer organizations (FKE, COTU), financial institutions (Equity Bank), higher learning and TVET institutions (Egerton University, Rift Valley Institute of Business Studies, Narok Pastoral Training Centre, Narok VTC), and private sector actors including waste recyclers and youth and women-led producer and logistics groups. The workshop also included tour operator associations given their role in the integrated pasture-wildlife-conservation landscape in Narok and Kajiado.

Their collective participation was significant in validating the findings, as each institution plays a different but complementary role in either skill supply, skill demand, quality assurance, labor governance, market access, financing, or workforce transition pathways. The convergence of evidence across these diverse actors confirmed that the skills gaps identified in the assessment are accurate, systemic, and widely experienced across the value chain.

One key refinement arising from stakeholder dialogue was the explicit recognition that green transition capabilities are no longer optional but foundational to sector competitiveness. Stakeholders underscored that climate-smart fodder production, regenerative rangeland management, low-emission mechanization practices, water-efficient irrigation, and safe

preservation/ensiling methods are emerging economic and ecological imperatives. The workshop therefore mapped the Green Jobs Ecosystem within the fodder sector and identified the corresponding Green Skills Stack required along the value chain.

A critical outcome of the stakeholder validation dialogue was the reaffirmation that green transition capabilities are now central and not peripheral to the competitiveness and long-term resilience of the fodder sector. Participants emphasized that competencies in climate-smart fodder production, regenerative rangeland management, low-emission and efficiency-optimized mechanization, water-conserving irrigation systems, and safe, specification-compliant preservation/ensiling techniques are no longer emerging considerations but core operational requirements. Accordingly, the workshop undertook a structured mapping of the Green Jobs Ecosystem across the fodder value chain and delineated the Green Skills Stack needed to support these roles. The full technical rationale, detailed deliberations, stakeholder perspectives, and agreed next-step actions arising from this exercise are documented comprehensively in a separate Workshop Proceedings and Action Framework Report. This companion report provides expanded analysis on institutional roles, partnership commitments, curriculum integration pathways, certification modalities, and county-level implementation sequencing to guide operationalization of the green skills agenda.

The validation workshop confirmed strong stakeholder alignment on the need to integrate these green skills into county training curricula, artisan-level micro-credentials, and season-aligned work-integrated learning models (WIL/WBL). The shift toward green, digital, and professionalized fodder service delivery was reaffirmed as central to competitiveness and inclusive job creation for youth and women.

The workshop stakeholders unanimously affirmed that the assessment accurately reflects the core capability constraints shaping competitiveness in the fodder sector. They validated the presence of acute operational skill shortages in climate-smart fodder agronomy, harvesting and post-harvest

preservation, silage making, bale density control, and advanced mechanization operation and maintenance, alongside persistent gaps in quality assurance and nutrient testing. At the same time, they recognized surpluses of general agriculture and engineering graduates whose training does not translate into practical, fodder-specific competencies. This reinforces the assessment's conclusion that the sector is not constrained by labor availability, but by specialized, work-ready technical capacity. Stakeholders also confirmed that current curricula suffer from obsolescence, as training programs do not adequately incorporate digital record-keeping, preventive maintenance, traceability systems, climate adaptation practices, or regenerative land management, thereby misaligning training output with the technical and commercial realities of the market.

Furthermore, stakeholders agreed that the sector faces a growing aspirational skills gap, where enterprises increasingly require capabilities in smart mechanization technologies, renewable-energy powered irrigation systems, digital commerce platforms, and standardized quality assurance frameworks yet these competencies are not embedded in existing training pathways. The participation of NITA and COTU ensured that the validation process foregrounded the need for industry-endorsed certification frameworks and decent work standards, while FKE emphasized structured employer co-investment and clearer demand signaling in curriculum reform. Collectively, the workshop confirmed not only the accuracy of the diagnostic findings, but also the urgency of re-engineering the skills ecosystem to link curriculum, certification, enterprise finance, and labor market governance into a coherent, market-responsive workforce development strategy.



