AWQAF NEW ZEALAND · RESEARCH SERIES
Institutional working paper · English edition · Version 1.2

Securing Qurbani Livestock and Building Waqf Capability

An objectives-led assessment of Agriculture 4.0 for a proposed sheep-dairy pilot

Husain Benyounis



Version 1.2 · DOI: 10.5281/zenodo.24394096

Working paper, not peer reviewed, not a financial offer

About this paper

Contents

1 Awqaf NZ's purpose and the research question

2 Six objectives that should govern the design

3 Evidence, method and limits

4 Existing Qurbani links and their relevance

5 Compare livestock pathways before selecting technology

6 A proportionate Agriculture 4.0 design

7 Financial resilience and the benefit-versus-burden test

8 Research questions and measurable outcomes

9 Proposed short- and long-term pathway

10 Social development, stewardship and responsibility

11 Proposed institutional enquiries

12 Conclusion: an objectives-led case for testing

A Appendix A Revision record

R References and evidence types

Author: Husain Benyounis, Awqaf New Zealand.

Series: Awqaf New Zealand Working Paper. Status: working paper, not peer reviewed; not a financial offer, an operating-farm report or a religious ruling.

Licence: Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0). The Awqaf New Zealand name and logo are excluded.

DOI: 10.5281/zenodo.24394096.

Awqaf New Zealand's research and institutional development have been advanced through volunteer work. This paper was prepared with assistance from ChatGPT to organise and synthesise sources and develop the proposed evaluation framework. Versions 1.1 and 1.2 consider author-supplied Gemini feedback, assessed against the research scope and primary sources. It contains no original Awqaf farm results. Institutional authorship and release, and decisions requiring technical, Shariah or legal authority, remain subject to the appropriate human review. This English edition is the original. The Arabic, French and German editions are full translations, prepared with the assistance of ChatGPT (OpenAI) under the author's direction. Where meanings differ, the English text governs.

How to cite: Benyounis, H. (2026). Securing Qurbani Livestock and Building Waqf Capability: An objectives-led assessment of Agriculture 4.0 for a proposed sheep-dairy pilot (Awqaf New Zealand Working Paper, Version 1.2). Awqaf New Zealand. https://doi.org/10.5281/zenodo.24394096

Abstract

Awqaf New Zealand identifies reliable access to suitable livestock as a central constraint in Qurbani provision. Its interest in sheep dairying is motivated by the possibility of combining dependable animal supply with productive income and lasting social benefit. This paper assesses Agriculture 4.0 against six institutional objectives: livestock security; dependable and affordable charitable provision; viable dairy income; working-capital resilience; women's agricultural vocational training and inclusive capability; and accountable, adaptable waqf development. A targeted scoping review identifies existing Qurbani applications of animal sensing, digital procurement and farm records, including an adjacent dairy-goat case. It does not verify an independently evaluated, economically validated integration of Qurbani supply, dairy sheep and Agriculture 4.0 under New Zealand conditions. The assessment therefore separates enterprise viability from the incremental value of technology. Three pathways are proposed for comparison: planned contracted supply, a hosted dairy flock supplying suitable animals directly, and dairy production combined with separately documented procurement. Early work can improve supply visibility without farm ownership. Awqaf NZ's existing Google for Nonprofits environment offers a proposed near-zero-cost digital foundation for a small records pilot, subject to entitlement, workload and full-cost checks. Dairy integration should proceed only where a credible operator, milk route, biological plan and full-cost budget support it. Proposed evaluation measures distinguish animals forecast, reserved, verified and fulfilled; reconcile milk contribution and charitable allocation; and assess processing readiness, staff burden, welfare and cash exposure. The contribution is an objectives-led research framework, not an operating model or a demonstrated return. Agriculture 4.0 is potentially useful when it strengthens decisions and institutional capability at an acceptable full cost.

Keywords: Qurbani; livestock security; sheep dairy; Agriculture 4.0; precision livestock farming; waqf; social development; food security; women's agricultural vocational training

> Feasibility stage: no farm, flock, capital deployment or public collection is assumed. All pilot arrangements, institutional enquiries and outcomes proposed in this paper require evaluation.

1 Awqaf NZ's purpose and the research question

Awqaf New Zealand approaches the Qurbani industry as a setting in which recurring charitable demand could support more dependable provision and lasting institutional capability. Its publicly stated purpose connects service to vulnerable communities with sustainable waqf development. The proposed farm should therefore be judged by the benefit it can reliably produce, the

resources it requires and the people it enables to perform useful work. Owning land, maintaining a flock or adopting technology is not, by itself, evidence of that benefit. [1]

In the institutional account supplied for this paper, earlier Qurbani experience exposed three connected difficulties: securing suitable livestock, managing bridging-finance and foreign-exchange exposure, and responding to orders received close to Eid. These experiences motivated investigation of a productive livestock enterprise, including sheep dairying. This is Awqaf NZ's account of its motivation; the magnitude of each constraint has not been independently audited for this study.

The proposed pilot remains at feasibility stage as at 20 November 2026: no farm, flock, capital deployment or public collection is assumed. Institutional relationships are exploratory. The paper assesses the upstream livestock and dairy question. It does not develop a waste-accounting methodology, propose a financing instrument or determine religious rulings.

This paper continues an Awqaf NZ series on the proposed pilot. The published feasibility study draft proposes a founding flock of 300 East Friesian ewes in Franklin / North Waikato [57]. Discussion Paper No. 1 proposes an experimental Hijri-aligned framework for breeding, lambing, dairy production and Qurbani supply, treating each year's expected Eid date as a planning input [58]. A working paper on vocational education and training sets out a women's training pathway across the Qurbani and sheep-dairy cycle [59]. The present paper does not restate or replace those documents. It asks a prior operational question: which livestock arrangement and which proportionate digital tools could make such a pilot dependable at an acceptable full cost. Its findings are offered as material for the review of those documents once pilot evidence exists.

> Central question: which livestock arrangement, supported by which proportionate digital tools, can best advance Awqaf NZ's Qurbani objectives at an acceptable full cost, while maintaining animal welfare and strengthening institutional capability?

Agriculture 4.0 is used here to mean connected records, measurements and decision support, including electronic identification (eID), weighing, milk records, pasture information and selected automation. It is a management approach rather than a single platform. Dairy-sheep technology reviews identify integration, support, skills and economic uncertainty as material adoption constraints. [2]

For this paper, three functional layers explain the proposed design: **field sensing and capture** produce animal and farm observations; **records and workflow coordination** connect those observations with reservations, responsibilities and evidence; **decision support and reporting** turn the records into forecasts, exceptions and reviewable decisions. This is the paper's explanatory

framework. Google tools could support the latter two layers and selected entry tasks. Physical measurements, animal care, supplier commitments and processing capacity still require competent people and appropriate arrangements.

2 Six objectives that should govern the design

The following objectives synthesise Awqaf NZ's stated purpose and the research brief. They provide proposed criteria for comparing arrangements, not a claim that any outcome has been achieved. Livestock security is the primary outcome; affordability, welfare, financial resilience and institutional capacity are conditions for a successful model.

Objective	Intended contribution	Evidence needed
1. Secure suitable livestock reliably	Meet a defined requirement within the applicable Qurbani window, with manageable uncertainty.	Verified availability and on-time fulfilment; forecast errors; substitutions and shortfalls; full cost.
2. Provide dependable, affordable charitable benefit	Translate suitable animals into safe, timely food provision through appropriate processing and distribution arrangements.	Defined destination, delivered quantities and household usability; explicit charges and subsidies; access and exceptions.
3. Test productive dairy income	Determine whether saleable milk contributes a sustainable net benefit alongside the livestock requirement.	Credible milk terms; full production costs; net contribution; retained replacements; alternative livestock sales.
4. Strengthen working-capital resilience	Anticipate seasonal payments and withstand delayed receipts, supply disruption and late demand.	Peak cash deficit, payment timing, liquidity needs and currency exposure under adverse scenarios.
5. Build practical and inclusive capability	Develop farming, digital, financial and supervisory skills, with an explicit proposed pathway for women's agricultural vocational training.	Assessed competence, practical access, workload, retention and paid or supervisory progression, where achieved.
6. Strengthen stewardship and adaptable replication	Protect entrusted resources, make decisions reviewable and share methods that other Awqaf institutions can assess.	Accountable roles, independent review, usable records, maintenance capacity and the full cost of local adaptation.

Service destination and household usability

The destination remains a feasibility decision. Compare domestic NZ distribution, export of NZ meat to a named destination, or procurement and processing overseas as distinct service scenarios. Overseas donors or foreign-exchange exposure do not by themselves imply meat export. Select the scenario and delivery endpoint before pricing an operating pilot. For NZ exports, MPI guidance requires checking the relevant market-access, risk-management, premises and certific-

ation requirements. Its export-halal standards do not apply to domestic halal; export approval also does not settle the programme's Qurbani-specific religious requirements. [41] [42]

Proposed service design should consult recipient organisations and, where appropriate, households about portion size, cut format, packaging, storage and cooking capacity, collection access and communication needs. Use voluntary, proportionate feedback to record acceptance, reported difficulties and service exceptions. Delivered weight does not establish household consumption, absence of spoilage or nutritional benefit. This adds a practical usability check without expanding the paper into waste accounting.

Food provision and food security require different evidence. FAO identifies availability, access, utilisation and stability as four dimensions of food security. The analytical implication is that a Qurbani distribution may contribute to food access during a defined period, while sustained food-security or nutritional improvement requires evidence beyond the number of animals supplied. This paper therefore treats food provision as an observable programme outcome and broader food-security benefit as a question for later evaluation. [3]

Awqaf NZ also publicly identifies training, research and regionally adapted replication as proposed directions. The present paper carries these forward as objectives, without assuming a host agreement, accredited training provision or an approved international farm network. [4]

3 Evidence, method and limits

This paper builds on the Agriculture 4.0 and Qurbani sheep-dairy review completed on 19 November 2026. Targeted searches combined Qurbani, qurban, kurban and Eid al-Adha with smart farming, precision livestock, IoT, sheep and goat dairy, breeding, inventory, procurement and farm records. English, Indonesian/Malay, Turkish and Arabic terms were used. Publisher, university, government and operator sources were examined, with separate searches for dairy biology and technology economics.

Version 1.1 reviews the author-supplied Gemini feedback and checks the proposed additions against current primary sources on NZ traceability, export requirements and vocational provision, alongside relevant livestock research. The feedback is an editorial input, not independent peer review or evidence of pilot outcomes. Appendix A records the main decisions; the six objectives and comparative research design are retained.

Version 1.2 adds a focused assessment of Awqaf NZ's reported Google environment against current official product guidance, together with a reconciliation of the companion evidence register. Public product entitlements are distinguished from the organisation's unverified tenant configuration. The proposed near-zero-cost digital workflow is a feasibility hypothesis; no Awqaf pilot cost or performance result is reported.

Evidence was distinguished as experiments, observational studies, models, reviews, official reports, extension accounts, prototypes and commercial descriptions. Related accounts of one pro-

ject were not treated as independent trials. Full text was examined where accessible; reference annotations identify material access limits. This was a targeted scoping review, not an exhaustive global census or a registered systematic review.

Four forms of statement remain distinct: institutional objectives and reported experience; externally published findings; analytical interpretations; and proposed arrangements or tests. Awqaf NZ's own publications establish declared intentions, not independent validation. No field data from an Awqaf farm, signed milk contract or priced technology specification were available for this assessment.

The review supports a conditional proposition: useful digital management may improve the information and decisions behind livestock security, but neither an operating app nor a promising farm simulation establishes the financial case for a new dairy enterprise. A published Qurbani cattle-farm risk assessment identifies problems across planning, sourcing, production and delivery, illustrating the broader operating system that must be addressed. [5]

4 Existing Qurbani links and their relevance

Direct links between Qurbani and digital livestock management already exist. The examples below establish relevant prior work, with differing maturity and evidential strength. No independently evaluated exact combination of dairy sheep, Qurbani supply and Agriculture 4.0 under NZ conditions was verified. This qualified result does not establish a world-first claim.

Project and evidence type	What is directly relevant	What remains unproven
ITB / Rumah Amal Salman, Indonesia, 2022-23 [6]	First-party accounts of IoT Qurban trials describe connected live-animal weighing and temperature records. A second trial reportedly covered 20 sheep. Later RFID/NFC health and growth-history functions were under development.	No published controlled accuracy, future livestock-availability, milk-production or net-return result. Temperature and weight do not independently diagnose disease.
Universitas Muhammadiyah Karanganyar, 2024 [7]	A journal systems-development paper explicitly links Dompet Kurban to AI-IoT, cattle image-based weighing, monitoring and digital payments.	Small, weakly specified tests and table inconsistencies prevent using its headline savings as a planning coefficient. It is not a sheep-dairy trial.
Jawara Farm / Universitas Pamulang, 2026 [8]	An extension paper combines goat-milk products and Qurbani services with a digital catalogue, stock updates, vaccination histories and staff training.	Qualitative capability and marketing outcomes, not causal milk, supply or profit gains. It concerns goats. The paper also reports time and feature-learning burdens.

Project and evidence type	What is directly relevant	What remains unproven
Universitas Riau / BUMDesa-mosque model, 2026 [9]	A published entrusted-goat business model links weighing, monitoring and customer visibility to aqiqah/Qurbani livestock care.	The paper states operational validation remains in progress. Hardware, cloud, training and maintenance costs are acknowledged but returns are not demonstrated.
TarImCebimde, Türkiye, official accounts [10]	Ear-tag lookup gives prospective Qurbani buyers registered animal characteristics and vaccination information, alongside veterinary checks.	Lookup is not proof of future reservation, dairy suitability, accurate source data or a measured reduction in shortages and costs.
Ternaknesia / Smartqurban and ITS, 2020 [11]	A university case study maps an existing digital Qurbani programme's processes, identifies 16 root problems and proposes standard operating procedures.	No measured post-implementation improvement or production effect. A digital platform still needs clear roles and operational controls.
Aliyah Rizq Farm, Malaysia/ Indonesia [12]	A Qurbani sheep-supply operator describes a proposed partner-farm inventory, tracking and IoT network.	The digital network is prospective. Rollout, present capacity and benefits were not independently verified; no dairy component is established.
Throf, Saudi Arabia, current vendor tool [13]	Its public sheep/goat planner offers breeding, fattening and dairy options and describes calculating purchase timing backwards from Eid.	An indicative commercial function, not a validated integrated farm. Defaults and its calendar choice do not determine NZ husbandry or religious requirements.

The Dompet Kurban paper deserves particular caution: its printed Table 3 shows 365 versus 570 for one cattle-weight comparison, while adjacent text claims differences of 2-5 kg. This was visually checked. The discrepancy may be an error requiring author clarification; its published figures are not adopted as expected savings or accuracy. [7]

An official Indonesian visit account also describes eL Farm producing goat milk and raising sheep for meat/Qurbani. This demonstrates an adjacent enterprise combination, not sheep milking or an Agriculture 4.0 intervention. The distinction matters when describing prior art. [14]

A separate qualitative study of Dompet Dhuafa's Tebar Hewan Kurban programme connects financing, partner farmers and market access. Its evidence included 250 partner farmers and other participants, but came from one institution's programme and did not isolate a technology effect. It supports investigating coordinated supply and financing alongside farm production, not assuming farm ownership is the only solution. [15]

5 Compare livestock pathways before selecting technology

Awqaf NZ's supply objective does not predetermine farm ownership. Owning a flock can reduce some dependence on external availability, while creating direct exposure to fertility, survival,

feed and milk-market outcomes. A hosted pilot and contracted supply provide useful comparators before an independently owned enterprise is considered.

Pathway	What to compare	Main uncertainty
A. Planned contracted supply	Existing farms supply agreed suitable animals; compare current coordination with structured digital records.	Supplier availability, allocation rights, price, default and eligibility. Awqaf need not own the breeding flock to test this pathway.
B. Hosted dairy flock with direct Qurbani supply	Use an existing operator's dairy and lamb records; compare feasible management with selected digital additions.	Saleable milk, replacements, suitable surplus animals, seasonal feed and full costs. Hosting requires agreement; it is not established.
C. Dairy plus separately documented procurement	Where offspring do not match the Qurbani specification/window, model normal sales and purchase of suitable animals. Any value-exchange alternative requires separate contractual review.	Exchange or purchase terms, price movements, timing and extra handling. Do not assume a fixed lamb-to-animal conversion ratio.

All pathways should be assessed against the same required animal specification, timing, welfare expectations and service endpoint. A processor-gate comparison must not be presented as a delivered-to-beneficiary cost. Subsequent processing and distribution still need capable, authorised arrangements. Common downstream costs may be separated, but must remain visible when judging the complete service.

5.1 Reconcile the dairy flock and the Qurbani requirement

Breeding and milking ewes, retained replacements, breeding sales and potential Qurbani animals must be reconciled in one flock balance. A retained replacement cannot also be available for Qurbani. Milk comes from lactating ewes, not from every lamb selected for later provision. Pregnancy and lactation may overlap, so a fixed one-third milking, one-third breeding and one-third growth allocation is a hypothesis rather than a biological identity. NZ industry guidance distinguishes replacement breeding from terminal-lamb production. [16] [17]

Milk and lamb management interact. An NZ commercial-farm experiment with 118 dairy-cross ewes examined mixed suckling and milking; it did not establish a full-season profit gain, and the authors caution against the approach when feed is inadequate. Weaning weights were compared at different ages, so they cannot be presented as an equal-age growth penalty. A separate Massey-led study used 622 test-day records from 169 ewes in one flock. Its modelled 130-day lactation window is not a national annual-yield benchmark. Host-specific production and rearing records are needed. [18] [19]

The flock model should price retention until the required Qurbani date using the designated authority's animal specification. Record age evidence, growth, condition, extra feed and labour, peak pasture demand and effects on breeding ewes and replacements. Compare these costs with

pathways A and C, reconciling expenditure and opportunity cost to avoid double counting. Dairy ancestry alone does not establish slower finishing: an NZ field study found faster growth in lambs suckled by East Friesian × Romney dams under high nutrition, although that system was not commercial dairy rearing or a Qurbani trial. Host records and processor results are therefore needed. Record carcass weight and grade where available; assess usable-cut yield or meat-to-bone ratio only with an agreed cutting and measurement method. Age eligibility remains for the designated religious authority. [48]

5.2 Plan for a moving demand date and seasonal biology

The Hijri year is about 11 days shorter than the civil year, so Eid moves through the solar seasons over roughly 33 years. [20] For programme planning, Eid 2027 is assumed to fall around mid-May, in the NZ autumn, subject to the applicable declaration. This is calendar alignment; no effect of lunar phases on fertility, growth or milk is claimed.

Different cohorts, suitable older stock, partner farms and separately purchased animals can be compared with changes to breeding schedules. Every ewe need not follow a shortened annual cycle. Seasonal pregnancy differences occurred in a Massey experiment even with reproductive treatments. A four-year Australian natural-joining experiment supports investigating multiple cohorts in particular breed/site combinations; its companion analysis calculated higher annual feed requirements. Neither establishes a locally validated Hijri-aligned system. [21] [22] [23]

Awqaf NZ's Discussion Paper No. 1 sets out such a system as a proposed experimental framework open to testing. The stock, breeding and forecasting records proposed in this paper would supply the observations needed to review that framework after a pilot. [58]

The 2020 NZ sheep-dairy survey recorded seasonal lambing on all 18 farms then identified, with some using multiple flocks. It does not validate equal cohorts or continuous milk profitability. A French whole-farm simulation usefully compares reproduction, milk, feed and work across four dairy-sheep systems, but assumed perfect automated oestrus detection and stable economic/environmental conditions. Awqaf NZ could adapt the modelling method while testing realistic errors and local parameters. [24] [25]

6 A proportionate Agriculture 4.0 design

The proposed design starts from decisions, not a hardware list. Its conditional logic is: reliable records and clear responsibilities improve forecasts and allocation; effective action on that information may improve suitable-animal supply; a viable enterprise and verified service then support charitable outcomes. Each link can fail and should be examined.

Decision	Initial record or tool	Contribution and limit
How much supply is required?	Past order timing, cancellations, specification and destination records; simple demand scenarios.	Earlier procurement and cash planning. Separate expressions of interest from commitments.

Decision	Initial record or tool	Contribution and limit
What stock is available?	Supplier register, existing animal/group identifiers, age evidence, location, dated checks and relevant ASD references.	Better visibility. A listing is not a reservation, veterinary check or guarantee.
Will animals be ready?	Repeated weights, body condition, health/ treatment records, growth and feed plans.	Earlier warning of gaps. Preserve uncertainty and obtain later physical verification.
Which animals are allocated?	Written allocation terms linked to identifiers or a defined quantity; dated revision history.	Reduce double allocation. Contracts and supplier performance still determine enforceability.
Can the reserved stock be processed and delivered?	Separate processor, slaughter-window, chilling and transport capacity records linked to the proposed allocation.	Exposes missing capacity. A livestock reservation alone does not establish readiness for the complete service.
Can dairy and Qurbani plans coexist?	Pregnancy, lambing, survival, replacement, milk and sales records; monthly feed/cash model.	Forecast genuine surplus and compare calendars. Do not count unborn or retained stock as guaranteed supply.
Can the system be operated and reviewed?	Named roles, exception log, approved access, offline capture where needed, exports and manual fallback.	Build continuity and learning. Data correction, support and review consume staff time.

Use explicit stock states: **identified, projected suitable, reserved, finally verified and fulfilled**. Reconcile individual and supplier-quantity reservations so the same animals are not counted twice. Describe reserved stock as secured only subject to its contractual, biological and acceptance conditions. Preserve the evidence and timestamp for every status change.

Keep livestock reservation separate from processing and delivery readiness. Before an operational commitment, link the allocation to evidence of processor acceptance, capacity within the slaughter window approved by the designated specialist authority, chilling and onward transport. Record conditions, responsible parties and contingencies. Slot availability and price require supplier confirmation. The paper does not prescribe a universal 72-hour religious window or assume an NZ-wide shortage.

If an authorised Qurbani service is later established, a proposed audit record could link a pseudonymous order ID to an allocated animal or batch, the processor record and verified execution time with its time zone. Reconcile batch quantities, substitutions and exceptions; preserve the source and reviewer of each record. Use a processor-agreed workflow that does not obstruct slaughter operations. Keep personal donor information separately controlled. A timestamp, tag or halal certificate alone does not decide religious validity or prove an individual allocation where only batch evidence exists.

Sheep traceability and practical interoperability

As at 20 November 2026, NAIT individually traces cattle and deer; it is not a mandatory individual sheep-identification system. Mixed-species NAIT properties have separate declarations of non-NAIT animal counts. Sheep require Animal Status Declarations for relevant transfers where the person in charge changes and when sent for slaughter. MyOSPRI supports sheep eASDs for farm-to-farm and farm-to-processor routes; paper forms remain relevant, including saleyards. [38] [39] [40]

The proposed ledger should preserve existing sheep identifiers and link applicable ASD/eASD and processor references. Agree permitted fields and exchange methods with the operator, then test reconciliation and exports. OSPRI's November 2026 NAIT replacement announcement concerns cattle and deer and does not establish an operational sheep interface. Automatic integration is not assumed. [43]

The first version can use a controlled spreadsheet or existing farm system with consistent identifiers and compatible eID/scales already available. Connected weighing, milk meters, automatic drafting or targeted reproductive monitoring should be added only where they change a useful decision. NZ farm-data guidance supports clarity over permissions and sharing, but does not guarantee interoperability. [26]

A near zero cost digital foundation for a small pilot

Awqaf NZ reports an existing Google for Nonprofits environment with 73 of 76 applications or services enabled. This is institutional information supplied for the study, not an independently verified service inventory. A small pilot would select only the tools needed for its records and decisions. Google's current Nonprofits comparison lists a no-cost edition, Shared Drives and 100 TB of pooled organisational storage. Product eligibility, settings and the intended users must be checked before reliance. [49]

Proposed task	Candidate tools	Condition to test
Stock commitments and evidence	Sheets, Shared Drives and Docs	Controlled identifiers, source evidence, named responsibility and reconciliation; document history alone does not establish an independently assured audit trail.
Entry at farms or yards	Online Forms or a configured AppSheet app	AppSheet Core covers eligible domain-verified Workspace users; external access needs its own licence check. Forms does not supply the proposed offline workflow. [50] [51]
Forecasts and exception review	Sheets; Data Studio if justified	Show record dates and last refresh. Dashboards are not automatically live alarms. Data Studio is the current name for the former Looker Studio. [53]

Proposed task	Candidate tools	Condition to test
Responsibilities and learning	Calendar, Docs, Sites or Classroom as needed	Calendar entries must refer to actual commitments. Training needs assessed competence and an appropriate provider where qualifications are intended. [54]

An AppSheet offline workflow needs preparation, later synchronisation and reconciliation. Test the actual readers, scales, phones and file formats; a mobile app does not establish compatibility with a livestock eID reader. Retain a manual fallback. Data Studio's documented default freshness for Sheets is 15 minutes, so urgent exceptions require an agreed response process. Optional Gemini assistance could support drafting or checking with human review; the qualifying Gemini app's enterprise protections do not establish identical terms for all enabled services or inclusion of every embedded AI feature. [51] [52] [53]

Use existing supplier records with permission where practical. Test standard-file export and recovery of the associated workflow rules, permissions and responsibilities. Exportable data alone does not make an application fully portable. Optional routing, outreach and international replication require their own product eligibility and activation checks. They are not dependencies of the initial stock-records study. [55]

At the chosen yards, test connectivity before selecting equipment. A proposed offline workflow could store scans or entries locally on a reader or tablet and synchronise later, retaining event time, operator identity and duplicate/conflict checks. Test a manual fallback and a usable CSV export. Local offline capture does not replace required official declarations. Include device durability, cleaning, scale checks/calibration, battery charging, any solar installation, support and data-recovery tests in the specification and budget.

The 2014 paired sheep-recording studies are instructive: simple handheld digital entry captured useful time and error benefits, while the economic model did not find that voluntary eID performance recording necessarily recovered its additional cost. Those prices do not establish an NZ break-even flock size. [27] [28]

The SRUC-Moredun study reported 36% less labour in its trial. Its separate scaling to a traditional commercial farm suggested **19%, approximately GBP1.60 per ewe**. Neither is an Awqaf NZ forecast, and released time is not automatically a wage saving. A CSU-led adoption study and the Sm@RT cost-benefit framework also underline workload, training, setup and recurring costs. [29] [30] [31]

Recent prototypes reinforce the need for local validation. A Greek dairy-sheep sensor study was a single-farm predictive proof of concept. A German autonomous-weighing prototype obtained accurate weights among participating sheep, but voluntary use reached only 32.5% after six days. Accuracy among recorded animals and coverage of the required flock are different questions. [32] [33]

7 Financial resilience and the benefit-versus-burden test

7.1 Two tests, with reconciled accounts

Enterprise test: can the chosen arrangement meet full costs, working-capital requirements and animal-output needs under realistic market and biological conditions? **Technology test:** within that arrangement, do particular digital additions improve outcomes sufficiently to justify their incremental costs? Passing one test does not establish the other.

Use two linked statements. First, show the whole-farm income, expenditure and annual economic result. Second, show the incremental consequences of allocating animals to Qurbani rather than ordinary sales or another procurement arrangement. Reconcile shared costs and internal transfers. Do not deduct milk income twice, count an animal as both sold and donated, or add a forgone sale value already reflected as lost revenue in the first statement.

Assess milk through accepted saleable volume, quality, price, collection, rearing, feed, labour, veterinary care, replacements, facilities, depreciation and payment timing. Report a transparent milk contribution and the full enterprise result. Gross milk revenue is not a Qurbani subsidy, and an accounting surplus is not necessarily cash available for charitable allocation.

Market access is a gate. The 2025 official Scale Up review records expansion slowing when demand was weaker than anticipated. Current Spring Sheep pages invite expressions of interest in specified regions and describe milk/livestock agreements typically arranged 8-12 months before supply. These are useful commercial context, not evidence of an Awqaf milk contract or guaranteed margin. [34] [35] [36]

Before any expenditure or collection, identify each funding source and its actual restrictions. Proposed accounts should distinguish endowed or other restricted capital, project grants, operating resources and payments for an authorised Qurbani service where those categories apply. Record permitted uses, spending authority, ownership, loss exposure, refund obligations and treatment of any surplus. The terms and appropriate religious and legal review must determine safeguarding and any required separation. This paper neither prohibits particular asset classes categorically nor assumes that Qurbani receipts must remain untouched until slaughter; authorised procurement and processing payments need explicit terms.

7.2 Test cash timing, affordability and full technology cost

The original concern about bridging finance and late orders should become a monthly cash-flow test: the largest cumulative deficit, how long it persists, payment obligations, delayed receipts and exposure to emergency purchases or currency changes. Dairy can add recurring receipts and also increase early expenditure and workload. Whether it reduces the funding gap must be calculated. This paper identifies the requirement without assuming a funding source or financing structure.

Show the service charge, explicit subsidy and full economic cost separately. A lower charge may reflect external subsidy or donated labour rather than a more efficient enterprise. Affordability for people commissioning Qurbani requires evidence about access to the service; affordable service charges and charitable food access are related but distinct outcomes.

> Proposed technology rule: retain an addition only when its verified incremental value or necessary control justifies its full cost. Include equipment, integration, connectivity, subscriptions, training, data correction, support, downtime, replacement and exit. Report cash savings, released time and non-cash benefits separately.

Meaning of near-zero cost: a small internal records pilot using included software could incur no additional software licence charge. If existing devices, connectivity and volunteer skills are sufficient, additional cash spending on the basic digital workflow could also be close to zero. This is a conditional proposition, not a priced result. Record setup, training, routine work and support time even when donated; confirm any external-user licences, paid features or equipment gaps. These costs remain unknown. The near-zero-cost description applies to the defined digital component, while the farm and Qurbani service retain their full-cost tests. [49] [50]

Project-specific costs remain unknown until a host, service destination and equipment gaps are defined. Obtain separate quotations for processing capacity and deposits, chilling/transport, destination-specific assurance, hardware and support, training/assessment, learner access support and continuity cover. No farm-conversion total, pilot fee, milk margin or per-animal saving is claimed. Record paid and volunteer time. Research funding may support evaluation, but recurring viability should also be shown without assuming continuing grants. Keep cash-flow and annual-cost calculations consistent; do not charge capital expenditure and depreciation for the same investment in one cost calculation.

A system becomes a burden when duplicate entry, ignored alerts, poor coverage, inaccessible records or maintenance demands outweigh its value. Remove or redesign such additions while retaining necessary welfare and compliance controls. An inexpensive system that nobody can maintain is not an inexpensive operating model.

8 Research questions and measurable outcomes

The following hypotheses and measures are proposed. They require agreed thresholds before outcomes are observed. The evidence reviewed does not supply a defensible universal pilot size, budget or success percentage for Awqaf NZ.

Hypothesis	Test	Evidence against it
H1. Digital coordination improves security within a pathway.	Compare dated forecasts, shortfalls, emergency substitutions and full operating burden against the existing process.	No meaningful improvement, or additional cost/work exceeds demonstrated value.
H2. Hosted dairy improves the combined result.	Compare B with A on dependable suitable supply, full net delivered cost, replacements, milk-market conditions and welfare.	Apparent savings rely on omitted costs, unsupported milk receipts, replacement depletion or unacceptable welfare.
H3. Separate procurement can accommodate a seasonal mismatch.	Compare C with the cost and cash exposure of altering B's breeding/holding programme to meet the same requirement.	Purchase costs, losses, timing or funding needs erase the proposed advantage.

Within H1, test whether the existing Google environment reduces the cost of obtaining dependable records. Compare coordination time, duplicate entry, completeness, unresolved exceptions and suitable livestock secured by agreed checkpoints with the existing process. Record the defined users, tools, cash expenditure and paid or volunteer hours. Set acceptable workload and outcome thresholds before observing results. A low licence bill alone does not establish benefit.

Modelled tests can screen options but remain scenarios until supported by actual production and transactions. Within feasible pathways, use comparable cohorts or periods, prospective forecasts and repeated seasons. Where practical, stagger the digital workflow while keeping purchasing timing and operator responsibilities comparable. Record changes in breed, feed, weather, milk terms and staffing. Animal care must never be withheld to create a control.

Outcome	Proposed measure	Interpretation safeguard
Livestock security	Accepted suitable animals provided on time divided by the committed requirement fixed at a dated planning checkpoint.	Retain the original denominator; show later demand changes, shortfalls, substitutions and emergency purchases separately.
Service readiness	Reserved allocations with evidenced processing, approved timing, chilling and transport capacity; unresolved gaps and contingencies.	Report stock and service status separately. Capacity evidence is neither proof of execution nor a religious ruling.
Cost and affordability	Full cost per accepted animal at a common endpoint; service charge and explicit subsidy shown separately.	Reconcile farm and allocation accounts. Do not compare processor-gate cost with beneficiary delivery.
Cash resilience	Peak cumulative cash deficit, its duration and sensitivity to delayed milk payments, purchases or currency changes.	Annual profit does not establish liquidity. Do not assume funding is already available.

Outcome	Proposed measure	Interpretation safeguard
Biology and welfare	Survival, condition, clinical events, handling burden and replacements; retention feed/cost; carcass results where available.	Better detection may raise recorded incidents. Do not meet the current target by weakening the next cycle.
Capability and workload	Assessed technical and record competence; paid/volunteer hours, equitable access, authorised supervisory responsibility and progression.	Attendance is not competence or empowerment. Use voluntary, proportionate inclusion reporting; distinguish job creation from labour savings.
Charitable provision	Verified quantities, timing and access; voluntary feedback on portions, storage/ cooking suitability and reported difficulties.	Delivery or lack of complaints does not establish use, no spoilage, or nutritional benefit.
Stewardship and continuity	Independent reviews; two authorised people each demonstrating reconciliation, export and fallback; maintenance and adaptation costs.	The two-person exercise is a proposed readiness test, not a statutory rule or a guarantee of resilience.

9 Proposed short- and long-term pathway

Phase	Work and intended value	Decision gate
Short term: before farm commitment	Agree animal specification and service destination; reconstruct demand; identify suppliers, host and milk route; model monthly flock, feed and cash; assess processing capacity and a women's training pathway.	Feasible route and records access; realistic markets and downside case; proposed operator, capacity and training requirements identified.
First records study	Observe an agreed provider's existing authorised activity. Test stock/readiness forecasts, processing links, household usability questions and two-person record continuity. Use a limited Google workflow only after checking user entitlements and permissions.	Usable records, reconciled allocations and capacity status; known workload; documented response to gaps and tested fallback. Record digital cash outlay and staff or volunteer time.
Conditional hosted production cycle	Follow breeding, rearing, milk, feed, labour, replacements and allocations through a complete cycle. Add justified tools and agreed supervised learning activities.	Viable enterprise pathway and evidence that each addition improves a defined decision or control at acceptable cost.
Long term: repeated cycles and adaptation	Repeat in contrasting seasons, test other Eid positions, publish adverse findings and develop transferable records, training and governance procedures.	Independent review of reliability, welfare, cash exposure, maintenance and local replication costs.

The first study is proposed as observation and forecasting using a consenting provider's existing stock and authorised activity. Any Awqaf purchases, service commitments or charitable deliveries require their own agreed operating arrangements; the research protocol does not establish those activities or imply a public collection.

A separate gate precedes any operational supply or delivery commitment: documented supplier and processor acceptance, an agreed religious window, adequate chilling and transport, the relevant destination permissions, and funding consistent with its terms. Scope booking conditions, deposits, cancellation, substitution and failure arrangements. For the initial observation study, assess the existing provider's arrangements; do not imply Awqaf has booked capacity. Training also needs a suitable workplace, provider, supervision, eligibility and an agreed budget.

For Eid 2027, an agreed existing-stock records and supply trial is more credible than assuming a new farm, breeding programme and milk market can all be established in time. A dairy-production pilot should follow its host's biological and commercial calendar. Pilot size and institutional roles remain to be agreed.

Long-term records could become a useful institutional asset. A Massey-led genetic study illustrates how milk, pedigree and reproductive records can support selection research; it did not demonstrate realised genetic gain or procurement savings. Preserve authorised data in a reusable form and test a manual/export fallback before depending on a platform. One Eid cycle cannot validate performance across the full seasonal rotation. [37] [26]

10 Social development, stewardship and responsibility

10.1 Women's agricultural vocational training through the Qurbani industry

A proposed women's vocational pathway could use authorised activities across the Qurbani and sheep-dairy cycle to build technical competence and progression into responsible work. It should cover husbandry and supervision as well as administration. Agree learning activities with a suitable provider and workplace; the pilot itself is not an accredited programme.

Awqaf NZ's working paper on vocational education and training develops this pathway across the wider awqaf industry. This section limits itself to the learning that a sheep-dairy and Qurbani records pilot could offer. [59]

Proposed learning area	Practical activity	Evidence of competence
Livestock care and dairy practice	Supervised handling, body-condition checks, weighing, young-stock care and, where relevant, milking hygiene.	Observed safe tasks and accurate records within the learner's authorised scope.
Agricultural data and traceability	Capture identifiers; reconcile stock, ASD/processor references and exceptions; operate offline capture and exports.	A checked reconciliation and successful export/fallback exercise.

Proposed learning area	Practical activity	Evidence of competence
Food-supply coordination and quality	Plan processor schedules and cold-chain handovers; check package/portion needs and exceptions.	A supervised capacity plan and documented response to a simulated service problem.
Enterprise costing and supervision	Prepare feed/cash schedules, cost allocations and reconciliations; review decisions with the responsible operator.	An assessed budget or reconciliation and demonstrated authorised decisions.

NZQA qualification 3869, the current Level 3 Certificate in Agriculture with dairy and meat/fibre strands, provides relevant outcomes for mapping. It does not cover every Qurbani-specific task. Primary ITO's Meat & Fibre programme lists 20 months and normally requires sector employment, so a short Eid pilot should not promise a complete qualification. Confirm the current contracting provider, assessed units or other learning route, eligibility, timing and fees. Primary ITO is in an institutional transition in 2026. An Australian host would require separate Australian qualification and provider mapping. [44] [45] [46]

Co-design practical access with prospective participants: transport, scheduling and caring commitments, safe facilities and equipment, literacy/digital support and agreed paid-work or stipend arrangements where available. Measure demonstrated competence, authorised responsibility, progression and retention. No training places, employment or remuneration are promised. AWDT's rural capability work offers relevant learning, but its May 2026 announcement of a phased wind-down over the following year means it cannot be assumed to deliver a 2027 pathway. Any availability or successor enquiry remains conditional. [47]

Digital learning should assess transferable skills in data entry and checking, spreadsheet modelling, reconciliation, access management and handover. Classroom can organise activities for eligible Nonprofits users, but use of the tool does not establish NZQA accreditation or sector-wide recognition. Teach the underlying skill alongside the application and include practical progression for women trainees. [54] [44]

10.2 Continuity and institutional stewardship

Before relying on the records system, the proposed continuity test is for at least two authorised coordinators each to complete stock reconciliation, a data export and the manual fallback independently in a supervised handover exercise. Record errors, completion time and dependencies; use individual access rather than shared passwords. Include women's technical progression in this planning. The test reduces reliance on one person but does not guarantee continuity or remove the need for cover and support.

The roles must remain clear. Trustees define the charitable purpose, acceptable exposure and decision gates; a competent operator is responsible for husbandry and day-to-day records; the coordinator reconciles demand and allocation; an independent evaluator reviews attribution and results. Veterinarians, religious specialists and legal advisers address the decisions within their authority. These are proposed responsibilities, not appointments.

Waqf capability means the ability to steward entrusted resources, review decisions, sustain useful work and direct lawfully available benefits to the intended purpose. It does not mean that the proposed farm assets are necessarily endowed property, or that a particular financing structure is settled. A farm should not promise principal preservation or a distributable return merely because of its charitable purpose.

Replication should transfer tested methods and learning while allowing local changes to breeds, markets, land, skills, law and governance. An Awqaf institution in another country is not thereby a farm partner, co-signatory or approved delivery organisation. Shared software does not eliminate the cost of training, integration and maintenance. The useful long-term asset may be an adaptable operating protocol as much as an owned farm.

A possible shared output is a reusable research toolkit: agreed data definitions, stock and service-status records, execution-evidence requirements, full-cost accounting templates and training materials. Institutions in other settings could contribute adaptations and findings in both directions. Release would require permission, suitable licensing and protection of personal and commercial information. It would remain a research toolkit unless an appropriate process establishes a recognised standard.

Permissions and responsible use of the digital records

Before a dependent pilot, agree the permitted uses of host-farm data, individual access, necessary personal information, retention, correction, overseas sharing and any AI processing. Keep identifiable donor and beneficiary details separately controlled from the stock ledger where practical. Google's no-cost Nonprofits edition does not list the data-region controls available in certain paid editions; do not prescribe an unavailable setting or treat platform settings as proof of privacy or farm-data-code compliance. [49] [26]

New Zealand privacy guidance distinguishes overseas disclosure from storage or processing by an agent acting solely on an organisation's behalf. Assess the actual provider and partner arrangements, including any independent use, under the applicable obligations. Proposed public reporting should use aggregated or appropriately de-identified information. Partner institutions need their own eligibility, local permissions, training and support; reusable templates may reduce development effort, while adaptation costs remain to be measured. [56] [55]

10.3 Questions that must be resolved for a dependent pilot

• Religious requirements: approved animal age and condition, permitted slaughter timing and location, agency (wakalah), order/animal or batch allocation, substitutions and acceptable execution evidence. Ask how authorised fees, procurement payments and non-performance are treated. Software supports the specialist review; it does not decide validity.

• Ownership and contracts: who owns and allocates animals, who can commit supply, what happens after default or rejection, and how any separately proposed purchase or exchange is authorised.

• Operating permissions: host responsibilities, welfare, the applicable ASD/eASD process, processing and dairy requirements, transport and cold-chain capacity, destination-specific export arrangements where relevant, insurance, employment, supervision and training obligations.

• Data rights: access to animal, processor and commercial records; permission for order-to-animal/batch linkage; personal-data minimisation, roles, retention, exports, research publication and overseas sharing. Use aggregate or de-identified findings where suitable.

• Finance and stewardship: actual funding restrictions, approved cost limits, available funding, cash exposure, spending authority, ownership, loss allocation, refunds and any surplus. Decide required accounting, safeguarding and separation arrangements through the relevant terms and specialist advice. No financing instrument or financial offer is established here.

11 Proposed institutional enquiries

The following enquiries are proposed only. Begin with the host operator and possible milk buyer, since university expertise cannot substitute for a feasible site or market. Seek a defined deliverable, timetable, data requirements and quotation for each contribution. Fees, participation and funding remain unknown.

Institutional and bespoke pilot fees remain to be quoted. Published course prices do not establish participant eligibility or the cost of a tailored pathway. AWDT may be approached only about available learning or legacy arrangements in light of its announced wind-down, not as an assured delivery partner. [45] [47]

Institution or group	Focused question or contribution	Evidence connection
Massey University and AgResearch	Design a host-specific dairy/lamb/replacement balance and assess lactation, rearing, welfare and seasonality.	NZ dairy and reproductive research. [19] [18] [21]
INRAE / SELMET and collaborating modellers	Explore whether an established whole-farm model can test moving Qurbani dates, realistic detection errors and NZ parameters.	Dairy-sheep multiagent simulation. [25]
SRUC / Sm@RT	Compare manual records, simple digital entry and integrated equipment using a full-cost and labour framework.	Farm comparison and technology appraisal. [29] [31]
Charles Sturt University	Assess adoption workload and a clearly scoped possible research or host role, subject to a separate agreement.	Sheep/goat eID adoption study, not a verified dairy-host commitment. [30]
ITB / Rumah Amal Salman	Request the IoT Qurban trial protocol, measurement validation, failure logs, staff burden and any subsequent procurement outcomes.	Direct live-Qurbani-animal prototype experience. [6]

Institution or group	Focused question or contribution	Evidence connection
Universitas Pamulang / Jawara Farm	Clarify the costs and practical workload of linking dairy-goat records, stock catalogues and Qurbani services.	Closest identified dairy-plus-Qurbani digital administration case. [8]
Primary ITO or another suitable current training provider	Map a proposed women's pathway to relevant outcomes; identify workplace, assessment, eligibility, learner support and fees for the intended year.	NZQA register and provider guidance; contracting arrangements for 2027 require confirmation. [44] [45] [46]
OSPRI and the proposed processor/exporter and halal assurance provider	Confirm sheep records and a tested exchange method; scope capacity, religious evidence and destination requirements through the responsible authorities. Request itemised quotations.	Official ASD and export guidance; no confirmed interface, slot, approval or partnership. [39] [40] [41] [42]

12 Conclusion: an objectives-led case for testing

Agriculture 4.0 is a suitable framework for investigating Awqaf NZ's proposed Qurbani sheep-dairy pilot when it begins with livestock security and proportionate decision support. Its immediate contribution can be earlier visibility of demand, stock and allocation. Its longer-term contribution may include better production planning, women's agricultural vocational training, practical capability and a reusable institutional evidence base. The proposed near-zero-cost Google foundation makes a bounded records test accessible in principle; its incremental value and workload still need observation.

The case for dairy integration remains conditional on a capable operator, suitable production system, credible milk market, adequate working capital and full-cost performance. The case for each technology addition is conditional on the decisions it improves and the burden it creates. Contracted supply may be the preferred long-term arrangement if it best meets these objectives. Farm ownership or hosting is an option to justify, not a prerequisite for institutional success.

> The proposed contribution is a testable pathway from recurring Qurbani demand to dependable livestock provision and lasting waqf capability. Success would be demonstrated by reliable service, defensible costs, sound welfare, useful skills and accountable stewardship. It would not be established by the number of devices purchased or by an untested revenue projection.

A defensible next step is a supplier-and-host feasibility exercise, followed by a bounded records trial and, only where the enterprise case supports it, a hosted production cycle. Publication

should report neutral and adverse results as well as favourable ones. The intended legacy is knowledge and capacity that Awqaf NZ and other institutions can use responsibly.

This is Version 1.2 of the objectives-led working paper. Versions 1.0 and 1.1 and earlier research and feasibility documents remain unchanged. This revision adds the proposed digital foundation, its cost boundary and evidence-register reconciliation. It is not an operating-farm report, an approved partnership, a fatwa, a legal opinion or a financial offer.

Appendix A Revision record

Version 1.2 Digital foundation and evidence register

The 20 November 2026 revision incorporates the agreed Google connection and the near-zero-cost wording requested by Awqaf NZ. Product documentation supports capability and entitlement statements; it does not validate pilot outcomes. The current working paper and broad research register retain their different purposes.

Before publication, references 57 to 59 (Awqaf NZ's related publications), cross-references to them, author and licence details were added, and source-access notes were moved from the reference list to the companion register. No finding was changed.

Topic	Treatment in Version 1.2
Agriculture 4.0 definition	Section 1 explains field information, workflow coordination and decision support. The three-layer framework is an analytical aid.
Near-zero-cost digital foundation	Sections 6 and 7 define a small, conditional digital pilot. Included licences and existing resources may minimise additional cash spending; all resource costs remain visible.
Google capability and permissions	Sections 6 and 10 distinguish public entitlements, tenant checks, external users, offline limits, reporting freshness, AI terms and data responsibilities.
Evaluation and capability	Sections 8 to 10 add workload and cash-outlay measurement and transferable digital skills within the existing training and continuity tests.
Companion register	Version 1.2 preserves original IDs and research detail, adds a guide and paper-reference links, and separates evidence class, current purpose and proposed institutional roles.

Version 1.1 Feasibility and vocational training review

Version 1.1, dated 20 November 2026, considers the author-supplied nine-page Gemini review. Its practical proposals were assessed against the paper's scope and primary sources. AI feedback is not treated as peer review. Version 1.0 remains unchanged.

Feedback topic	Decision	Change and reason
Destination and beneficiary needs	Accepted with limits	Sections 2 and 8 distinguish service scenarios and add voluntary household-usability feedback. No zero-spoilage or nutritional outcome is claimed.
Dairy genetics and holding costs	Qualified	Section 5.1 adds retention/feed costs and carcass measures. Universal slower-growth or lower meat-to-bone assumptions are not adopted; age rules remain for specialists.

Feedback topic	Decision	Change and reason
NAIT and interoperability	Corrected	Section 6 distinguishes cattle/deer NAIT from sheep ASD/eASD records and tests any interface. A replacement-system announcement is not deployed sheep functionality.
Offline use and maintenance	Accepted as proposed tests	Section 6 adds local capture, later synchronisation, reconciliation, export/fallback and equipment-support costs. Official declarations remain separate.
Processing slots and agency evidence	Qualified	Sections 6 and 9 link stock with separate processing/chilling/transport readiness and execution evidence. A fixed 72-hour rule and automatic proof of validity are not adopted.
Capital and payment restrictions	Rewritten for review	Sections 7 and 10 add funding-source restrictions, permitted uses and safeguarding questions. Blanket asset prohibitions or a presumed trust/release rule are not established.
Women's vocational pathway	Expanded and verified	Section 10 adds practical learning areas, access and competence measures. Section 11 adds provider enquiries. NZQA mapping, Primary ITO transition and AWDT wind-down are distinguished from agreements.
Two-person continuity	Accepted as a proposed criterion	Sections 8-10 require two independent practical demonstrations before reliance on the system. This is a research/design proposal, not a statutory rule.
International governance standard	Reframed	Section 10 proposes a reusable research toolkit and mutual learning. Recognition as a standard and open publication/licensing are not assumed.

The six objectives, three supply pathways, enterprise-versus-technology test, primary livestock-security measure and corrected SRUC scaling result are retained. All new partnerships, training arrangements, costs and pilot activities remain proposed or unknown as specified. QUI and financing-instrument analysis remain outside this paper.

References and evidence types

The 59 numbered references are selected sources, not 59 independent trials. References 1-48 retain their accepted numbering; digital and privacy guidance in references 49-56 was checked on 20 November 2026; references 57-59 are Awqaf NZ's related publications. Notes on how each source was accessed and verified are kept in the companion evidence register. Original publication dates of live guidance are unknown unless stated. Institutional statements, related project accounts, models and commercial descriptions are distinguished from evaluated outcomes.

[1] About Awqaf New Zealand: Our Model, Mission & Initiatives

Awqaf New Zealand. 2026; accessed 19 November 2026.
Evidence: Institutional self-description of objectives and history.
Links: https://awqafnz.org/en/about.html

[2] Precision Livestock Farming for Dairy Sheep: A Literature Review of IoT and Decision-Support Systems for Enhanced Management and Welfare

Maria Consuelo Mura; Othmane Trimasse; Vincenzo Carcangiu; Sebastiano Luridiana. 2026.
Evidence: Peer-reviewed narrative/exploratory review, not new farm outcome data.
Links: https://doi.org/10.3390/agriengineering8020058 · https://www.mdpi.com/2624-7402/8/2/58

[3] An Introduction to the Basic Concepts of Food Security

Food and Agriculture Organization of the United Nations. 2008.
Evidence: Official conceptual and practical guidance.
Links: https://www.fao.org/4/al936e/al936e00.pdf

[4] Advancing Waqf for a Sustainable Future: institutional homepage and proposed research themes

Awqaf New Zealand. 2026; accessed 19 November 2026.
Evidence: Institutional description of proposed programmes and research.
Links: https://awqafnz.org/en/index.html

[5] Risk Mitigation in the Sacrificial Cattle Supply Chain in Indonesia: A Supply Chain Management (SCRM) Approach

Resista Vikaliana and Anggita Awanis. 2024.
Evidence: Peer-reviewed single-farm supply-chain risk assessment.
Links: https://doi.org/10.23917/jiti.v23i02.6392 · https://journals2.ums.ac.id/jiti/article/view/6392

[6] Alumni Beasiswa Aktivis Rumah Amal Kembangkan IoT untuk Layanan Kurban [Rumah Amal alumni develop IoT for Qurbani services: IoT Qurban]

Rumah Amal Salman; Institut Teknologi Bandung; Politeknik Manufaktur Bandung. 2022; related development account 2023.
Evidence: First-party trial and university development accounts; not a peer-reviewed outcome study.
Links: https://rumahamal.org/news/alumni_beasiswa_aktivis_rumah_amal_kembangkan_iot_untuk_layanan_kurban · https://alumni.itb.ac.id/waspada-pmk-alumni-teknik-fisika-itb-uji-coba-iot-untuk-cek-kondisi-hewan-kurban/ · https://pengabdian.dpmk.itb.ac.id/information/teknologi_iot_bantu_peternak_deteksi_ternak

[7] Optimalisasi Sistem Dompet Kurban Terintegrasi Peternakan Modern Berbasis AI-IoT dengan Teknologi YOLO [Optimising an integrated Qurbani wallet and modern livestock system using AI-IoT and YOLO]

Erwin Apriliyanto; Dimas Fajar Nugroho; Wakhid Kurniawan; Romi Iriandi Putra; Muhammadi Yusuf Ariyadi. 2024.
Evidence: Published journal systems-development article with limited and internally inconsistent performance reporting.
Links: https://doi.org/10.37859/jf.v14i3.8177 · https://ejurnal.umri.ac.id/index.php/JIK/article/view/8177 · https://ejurnal.umri.ac.id/index.php/JIK/article/download/8177/3316/

[8] Smart Farming dan Digital Entrepreneurship Mendongkrak Peternakan Kompetitif di Jawara Farm [Smart farming and digital entrepreneurship at Jawara Farm]

Angga Pramadjaya; Nita Aribah Hanif; Asriadi Asriadi; Siti Iramaya; Elly Shinta Herlina. 2026.
Evidence: Published community-service/extension article; single-farm implementation narrative.
Links: https://doi.org/10.52447/berdikari.v9i1.9457 · https://journal.uta45jakarta.ac.id/index.php/berdikari/article/view/9457 · https://journal.uta45jakarta.ac.id/index.php/berdikari/article/download/9457/3746

[9] Model Bisnis Terintegrasi BUMDesa-Masjid dalam Pengelolaan Titip Ternak Kambing Berbasis IoT [An integrated village enterprise-mosque business model for IoT-enabled entrusted-goat management]

Jahrizal; Achmad Tavip Junaedi; M. Dalil; Gusrio Tendra; Nicholas Renaldo; Azrul Muslihin; et al.. 2026.
Evidence: Published research-and-development article; conceptual business model/prototype integration.
Links: https://journal.ypmki.com/index.php/joseri/article/view/91 · https://journal.ypmki.com/index.php/joseri/article/download/91/108

[10] Kurban SatIŞ Yerleri Denetleniyor [Qurbani livestock-sale sites are being inspected: TarImCebimde digital lookup]

Ministry of Agriculture and Forestry of Türkiye, Giresun Provincial Directorate. 2026.
Evidence: Official operational account; not a controlled evaluation.
Links: https://giresun.tarimorman.gov.tr/Haber/946/Kurban-Satis-Yerleri-Denetleniyor · https://www.tarimorman.gov.tr/Haber/5889/Satisa-Sunulan-Kurbanliklarin-Bilgileri-%E2%80%98tarimcebimde-Mobil-Uygulamasi-Uzerinden-Sorgulanabiliyor

[11] Analisis Proses Bisnis dan Perancangan Prosedur Operasional Standar Platform Digital Kurban Online Ternaknesia [Business-process analysis and standard operating procedure design for Ternaknesia's digital Qurbani platform]

Ailin Muvidah (thesis); Ailin Muvidah, Imam Baihaqi and Reny Nadlifatin (related journal article). 2020 thesis and journal issue. Jurnal Teknik ITS 9(2)
Evidence: University thesis and related journal business-process case study; not a production trial.
Links: https://doi.org/10.12962/j23373539.v9i2.54364 · https://repository.its.ac.id/78028/

[12] The Aliyah Rizq Farm Story

Aliyah Rizq Farm; Agropreneur Farms Sdn Bhd; CV Asia Global. Undated; historical operations from 2016-2019; checked 19 November 2026.
Evidence: First-party commercial farm and proposed-network account.
Links: https://www.aliyahrizqfarm.com.my/about-us/

[13] Sheep & Goat Farm Roadmap - a free step-by-step plan

Throf Communications & Information Technology Co., self-described Saudi livestock software provider. Undated; current public page checked 19 November 2026.
Evidence: Commercial software feature description and indicative planning tool; no evaluated farm outcome.
Links: https://throf.com/en/tools/farm-roadmap

[14] Peternakan Pembibitan dan Budidaya Kambing Perah dan Domba eL Farm Sleman Yogyakarta [Breeding dairy goats and meat sheep at eL Farm, Sleman]

Central Java Livestock and Animal Health Service; eL Farm. 2024.
Evidence: Official livestock-department farm-visit account.
Links: https://disnakkeswan.jatengprov.go.id/posts/peternakan-pembibitan-dan-budidaya-kambing-perah-dan-domba-el-farm-sleman-yogyakarta

[15] Financing innovation for sustainable supply chain management in social business: a case of Qurban rituals in Indonesia

Zainal Abidin; Wiwiek Rabiatul Adawiyah; Intan Shaferi; Akhmad Sodiq. 2024 issue; online 10 May 2023. Journal of Islamic Accounting and Business Research 15(2) 342-366
Evidence: Peer-reviewed qualitative case report; publisher abstract inspected.
Links: https://doi.org/10.1108/JIABR-09-2021-0250 · https://www.emerald.com/jiabr/article-abstract/15/2/342/1226381/Financing-innovation-for-sustainable-supply-chain?redirectedFrom=fulltext

[16] Principles of Dairy Sheep Farming in New Zealand

Spring Sheep Milk Co., Scale Up SFF Futures Programme. 2025.
Evidence: Primary industry operating guide and illustrative model, not a peer-reviewed trial.
Links: https://spring-sheep-corporate-uploads.sgp1.cdn.digitaloceanspaces.com/Sheep-Dairy-Farming-Principles-For-Publication.pdf

[17] Pregnancy does not affect commercial milk yield in dairy ewes managed to lamb at 9-month intervals

A.D. Morrissey; A.W.N. Cameron; A.J. Tilbrook. 2008. Small Ruminant Research 76(3) 211-214
Evidence: Peer-reviewed commercial-dairy experiment.
Links: https://doi.org/10.1016/j.smallrumres.2007.12.021 · https://www.sciencedirect.com/science/article/pii/S0921448807002921

[18] Effect of weaning system on lamb growth, mammary gland development and ewe milk production in dairy sheep managed in an outdoor pasture-based commercial farming system

Sue Anne McCoard; Shen-y Hea; Adrian Molenaar; Katherine Lowe; Marita Broadhurst; David Stevens. 2022 issue; online publication 16 May 2023. Journal of New Zealand Grasslands 197-208
Evidence: Peer-reviewed randomised commercial-farm experiment.
Links: https://doi.org/10.33584/jnzg.2022.84.3572 · https://www.nzgajournal.org.nz/index.php/JoNZG/article/download/3572/3236/6592

[19] Modelling Lactation Curves for Dairy Sheep in a New Zealand Flock

Ana Carolina Marshall; Nicolas Lopez-Villalobos; Simon M. Loveday; Ashling Ellis; Warren McNabb. 2023. Animals 13(3) 349
Evidence: Peer-reviewed observational lactation-curve study.
Links: https://doi.org/10.3390/ani13030349 · https://www.mdpi.com/2076-2615/13/3/349

[20] The Islamic Calendar; Introduction to Calendars

US Naval Observatory. Undated official reference, accessed 19 November 2026.
Evidence: Official astronomical reference.
Links: https://aa.usno.navy.mil/faq/islamic

[21] Induced seasonal reproductive performance in two breeds of sheep

G. deNicolo; S.T. Morris; P.R. Kenyon; P.C.H. Morel; T.J. Parkinson. 2008; online 2007. Animal Reproduction Science 103(3-4) 278-289
Evidence: Peer-reviewed factorial reproductive experiment.
Links: https://doi.org/10.1016/j.anireprosci.2007.01.009 · https://pubmed.ncbi.nlm.nih.gov/17296273/

[22] Annual lambing performance of crossbred ewes in out-of-season and accelerated lamb production systems

N. M. Fogarty; J. G. Mulholland. 2013. Animal Production Science 53(10) 1093-1100
Evidence: Peer-reviewed four-year, two-site field experiment.
Links: https://doi.org/10.1071/AN12269 · https://connectsci.au/an/article-abstract/53/10/1093/17497/Annual-lambing-performance-of-crossbred-ewes-in?redirectedFrom=fulltext

[23] Monthly metabolisable energy feed requirements of crossbred ewes in accelerated and traditional lamb production systems

N. M. Fogarty. 2015 issue; online 28 March 2014. Animal Production Science 55(5) 595-602
Evidence: Peer-reviewed feed-requirement modelling from field records.
Links: https://doi.org/10.1071/AN13456 · https://connectsci.au/an/article-abstract/55/5/595/17903/Monthly-metabolisable-energy-feed-requirements-of?redirectedFrom=fulltext

[24] New Zealand Sheep Dairy Survey

Ministry for Primary Industries Economic Intelligence Unit and Massey University. 2020.
Evidence: Official primary industry survey.
Links: https://www.mpi.govt.nz/dmsdocument/43183/direct/

[25] Inseminate without hormonal treatment in dairy sheep farms: exploring the consequences on the sustainability of several contrasted production systems

E. Laclef; E. González-García; N. Debus; P. Taillandier; C. De Boissieu; E. Morin; A. Lurette. 2024. animal 18(7) 101210
Evidence: Peer-reviewed whole-farm multiagent simulation.
Links: https://doi.org/10.1016/j.animal.2024.101210 · https://horizon.documentation.ird.fr/exl-doc/pleins_textes/2024-08/010091051.pdf

[26] New Zealand Farm Data Code of Practice

Farm Data Accreditation Ltd. 2014 initial code; current website describes version 1.1, checked 19 November 2026.
Evidence: Industry data-governance code and issuer guidance, not a scientific trial.
Links: https://www.farmdatacode.org.nz/code-of-practice/

[27] Implementing electronic identification for performance recording in sheep: I. Manual versus semiautomatic and automatic recording systems in dairy and meat farms

A. Ait-Saidi; G. Caja; A.A.K. Salama; S. Carné. 2014. Journal of Dairy Science 97(12) 7505-7514
Evidence: Peer-reviewed comparative recording experiments with measured time and error outcomes.
Links: https://doi.org/10.3168/jds.2014-8090 · https://www.journalofdairyscience.org/article/S0022030214006638/pdf

[28] Implementing electronic identification for performance recording in sheep: II. Cost-benefit analysis in meat and dairy farms

A. Ait-Saidi; G. Caja; A.A.K. Salama; M.J. Milán. 2014. Journal of Dairy Science 97(12) 7515-7524
Evidence: Peer-reviewed economic model using the same measured experiments as the companion recording study.
Links: https://doi.org/10.3168/jds.2014-8091 · https://www.sciencedirect.com/science/article/pii/S002203021400664X

[29] Impacts of using a precision livestock system targeted approach in mountain sheep flocks

Claire Morgan-Davies; Nicola Lambe; Harriet Wishart; Tony Waterhouse; Fiona Kenyon; Dave McBean; Davy McCracken. 2018 issue; online 5 December 2017. Livestock Science 208 67-76
Evidence: Peer-reviewed three-year controlled farm comparison, with a separate commercial scaling analysis.
Links: https://doi.org/10.1016/j.livsci.2017.12.002 · https://www.sciencedirect.com/science/article/pii/S1871141317303670

[30] Supporting traceability and biosecurity in the sheep and goat industries in NSW: understanding barriers to implementing electronic identification

M Hernandez-Jover; L Hayes; J Manyweathers; T Marriott; MB Allworth. 2024; survey and interviews conducted in 2021. Australian Veterinary Journal 102(11) 576-593
Evidence: Peer-reviewed mixed-method adoption study.
Links: https://doi.org/10.1111/avj.13370 · https://onlinelibrary.wiley.com/doi/full/10.1111/avj.13370

[31] Cost-benefit analysis of digital and precision livestock farming technologies for sheep and goat farms

SRUC; Sm@RT consortium. 2024.
Evidence: Peer-reviewed conference contribution describing benchmark-farm cost-benefit analyses.
Links: https://pure.sruc.ac.uk/en/publications/cost-benefit-analysis-of-digital-and-precision-livestock-farming-/

[32] Towards Decision Support in Precision Sheep Farming: A Data-Driven Approach Using Multimodal Sensor Data

Maria P. Nikolopoulou; Athanasios I. Gelasakis; Konstantinos Demestichas; Aphrodite I. Kalogianni; Iliana Papada; Paraskevas Athanasios Lamprou; et al.. 2026. Ruminants 6(1) 3
Evidence: Peer-reviewed single-farm observational sensor study and predictive proof of concept.
Links: https://doi.org/10.3390/ruminants6010003 · https://www.mdpi.com/2673-933X/6/1/3

[33] Individual and autonomous walk-over weighing crate with concentrate feeder - Development and validation of an improved mobile weighing system for sheep

Hendrik Jasper; Rainer Kock; Eberhard Hartung. 2026. Computers and Electronics in Agriculture 248 111760
Evidence: Peer-reviewed engineering prototype and field validation.
Links: https://doi.org/10.1016/j.compag.2026.111760 · https://www.sciencedirect.com/science/article/pii/S0168169926003558

[34] 'Scale Up' SFFF Mid-Term Programme Review Report

Primary Purpose Ltd. June 2025.
Evidence: Officially published programme review using primary interviews and programme records.
Links: https://www.mpi.govt.nz/dmsdocument/70576/direct

[35] Supplier Support

Spring Sheep Milk Co.. Current page, accessed 19 November 2026.
Evidence: Live company service description; not a signed offer.
Links: https://www.springsheepmilkco.com/supplier-support

[36] Become a Supplier

Spring Sheep Milk Co.. Current page, accessed 19 November 2026.
Evidence: Live company invitation; not acceptance.
Links: https://www.springsheepmilkco.com/new-supplier

[37] Estimation of genetic parameters for production, composition and processability of milk from dairy sheep in a New Zealand flock

Ana Carolina Marshall; Nicolas Lopez-Villalobos; Simon M. Loveday; Mike Weeks; Warren McNabb. 2024 online publication; later 2025 issue metadata. New Zealand Journal of Agricultural Research 68(5) 1107-1124
Evidence: Peer-reviewed single-flock observational genetic-parameter study.
Links: https://doi.org/10.1080/00288233.2024.2368505 · https://mro.massey.ac.nz/server/api/core/bitstreams/6d253659-1ef1-449a-a6bc-58861779bbcf/content

[38] Declaring other farm animals in NAIT

OSPRI. Undated; accessed 20 November 2026.
Evidence: Official programme guidance.
Links: https://www.ospri.co.nz/farmers-and-livestock-owners/tagging-and-registering-animals/declaring-other-farm-animals-in-nait

[39] Animal status declarations

Ministry for Primary Industries. Guidance updated 13 February 2026; accessed 20 November 2026.
Evidence: Official regulatory guidance.
Links: https://www.mpi.govt.nz/animals/slaughtering-requirements/animal-status-declarations · https://www.ospri.co.nz/farmers-and-livestock-owners/moving-animals/animal-status-declarations-asds/about-animal-status-declarations-asds

[40] How to create a farm-to-farm Animal Status Declaration (ASD) in MyOSPRI

OSPRI. Undated; accessed 20 November 2026.
Evidence: Official operational user guide.
Links: https://www.ospri.co.nz/farmers-and-livestock-owners/myospri-user-guides-for-farmers/how-to-create-a-farm-to-farm-animal-status-declaration-asd-in-myospri · https://www.ospri.co.nz/our-programmes/myospri/about-myospri

[41] Steps to exporting meat

Ministry for Primary Industries. Current guidance; accessed 20 November 2026.
Evidence: Official regulatory guidance.
Links: https://www.mpi.govt.nz/export/food/meat/steps-to-exporting-meat

[42] Halal assurance system for exports from New Zealand

Ministry for Primary Industries. Last reviewed 4 March 2024; accessed 20 November 2026.
Evidence: Official regulatory guidance.
Links: https://www.mpi.govt.nz/export/food/exporting-halal-animal-products/halal-assurance-system-for-exports-from-new-zealand · https://www.mpi.govt.nz/export/food/exporting-halal-animal-products

[43] OSPRI confirms new NAIT supplier

OSPRI. 10 November 2026.
Evidence: Official project announcement.
Links: https://www.ospri.co.nz/news/ospri-confirms-new-nait-supplier

[44] New Zealand Certificate in Agriculture (Level 3) with strands in Dairy Farming, and Meat and/or Fibre Farming

New Zealand Qualifications Authority. Current register entry; accessed 20 November 2026.
Evidence: Official qualification register and graduate profile.
Links: https://www.nzqa.govt.nz/nzqf/search/viewQualification.do?selectedItemKey=3869

[45] New Zealand Certificate in Agriculture - Meat & Fibre

Primary ITO. Current programme page; accessed 20 November 2026.
Evidence: Provider programme and fee description.
Links: https://www.primaryito.ac.nz/programme-listing-page/new-zealand-certificate-in-agriculture-meat-and-fibre · https://www.primaryito.ac.nz/learners/learn-more-about-training-with-us

[46] The Food and Fibre Industry Skills Board and Primary ITO

Primary ITO. 2026; page marked updated 7 January 2026, with later consultation material.
Evidence: Official provider transition statement.
Links: https://www.primaryito.ac.nz/about-us/te-pukenga · https://www.primaryito.ac.nz/news/primary-ito-takes-next-step-towards-industry-owned-future

[47] AWDT reflects on impact as it enters final phase

Agri-Women's Development Trust. 12 May 2026.
Evidence: First-party institutional announcement.
Links: https://www.awdt.org.nz/news/awdt-reflects-on-impact-as-it-enters-final-phase/ · https://www.awdt.org.nz/programmes/understanding-your-farming-business/

[48] Maximising lamb growth rates

P.D. Muir; N.B. Smith; G.J. Wallace; C.J. Fugle; M.D. Bown. 2000. Proceedings of the New Zealand Grassland Association 62.
Evidence: Peer-reviewed field study of suckled lamb production under high nutrition.
Links: https://doi.org/10.33584/jnzg.2000.62.2400 · https://www.nzgajournal.org.nz/index.php/ProNZGA/article/view/2400

[49] Compare Google Workspace features for nonprofits

Google. n.d.; updated 10 November 2026.
Evidence: Official provider feature and subscription documentation.
Links: https://knowledge.workspace.google.com/admin/billing/compare-google-workspace-features-for-nonprofits · https://support.google.com/nonprofits/answer/2858465?hl=en

[50] How to choose a subscription

Google AppSheet. n.d.; accessed 20 November 2026.
Evidence: Official provider licensing documentation.
Links: https://support.google.com/appsheet/answer/10105400?hl=en · https://support.google.com/appsheet/answer/16563370?hl=en

[51] Offline and Sync: The Essentials

Google AppSheet. n.d.; accessed 20 November 2026.
Evidence: Official provider technical documentation.
Links: https://support.google.com/appsheet/answer/10107724?hl=en · https://support.google.com/chromebook/answer/2809731?hl=en

[52] Use Gemini Apps with a work or school Google Account

Google. n.d.; accessed 20 November 2026.
Evidence: Official provider service and data-handling documentation.
Links: https://support.google.com/gemini/answer/14620100?hl=en

[53] Welcome to Data Studio

Google Cloud. n.d.; updated 11 November 2026.
Evidence: Official provider product documentation.
Links: https://docs.cloud.google.com/data-studio/welcome · https://docs.cloud.google.com/data-studio/manage-data-freshness

[54] Classroom FAQ

Google. n.d.; accessed 20 November 2026.
Evidence: Official provider eligibility and support guidance.
Links: https://support.google.com/edu/classroom/answer/6025224?hl=en

[55] About Google for Nonprofits

Google. n.d.; accessed 20 November 2026.
Evidence: Official provider programme overview.
Links: https://support.google.com/nonprofits/answer/1614581?hl=en · https://developers.google.com/maps/billing-and-pricing/public-programs?hl=en · https://developers.google.com/maps/documentation/route-optimization/usage-and-billing

[56] Sending information overseas; Principle 12 Decision Tree

Office of the Privacy Commissioner, New Zealand. n.d.; accessed 20 November 2026.
Evidence: Official regulator guidance.
Links: https://www.privacy.org.nz/responsibilities/disclosing-personal-information-outside-new-zealand/ · https://www.privacy.org.nz/responsibilities/disclosing-personal-information-outside-new-zealand/decision-tree-page/

[57] Feasibility Study: Qurbani Sheep-Dairy Pilot, Franklin / North Waikato, New Zealand (Draft v4 for review)

Awqaf New Zealand. October 2026; accessed 20 November 2026.
Evidence: Institutional feasibility study published for criticism; proposed design and assumptions, not operating results.
Links: https://doi.org/10.5281/zenodo.23279953

[58] Hijri-Aligned Qurbani Sheep-Dairy Farming: The Economy of the Qurbani Ritual and an Open Invitation to Research, Test and Improve a Proposed Livestock Production System

Husain Benyounis. 2026. Awqaf New Zealand Discussion Paper No. 1, Version 1.0, 30 September 2026.
Evidence: Institutional discussion paper proposing an experimental framework; not a validated production protocol.
Links: https://doi.org/10.5281/zenodo.23044285

[59] Vocational Education and Training as an Engine of Awqaf Industry Development: empowering women across Qurbani, sheep dairy farming, resource utilisation, heritage skills, digital capability and social finance

Husain Benyounis. 2026. Awqaf New Zealand Working Paper, Version 1.1, 16 November 2026.
Evidence: Institutional working paper, not peer reviewed; proposes a training pathway, not an accredited programme.
Links: https://doi.org/10.5281/zenodo.24253676