

SARURA OS — Problem Statement

For:	Afri-Farmers Market Ltd (Kigali, Rwanda)		
Scope:	Whole system, greenfield		
Stack:	USSD native + PWA Portal + WhatsApp Business + Web Admin		
Date:	2026-09-09	Status:	v1.1

A case study of one middleman. Afri-Farmers already holds the three assets the timing fix needs. The same build applies to any distributor holding them. See section 8.

Note: “cooperative” is used in full throughout this document.

1. Problem in one paragraph

Rwanda loses 30–40% of fresh vegetables before they reach a buyer. Two things cause it, and they compound.

Timing: the buyer is booked **after** harvest, so produce sits 24–72h at a collection point waiting for a truck.

Storage: there is nowhere adequate to hold it while a buyer is found. National drying capacity covers 9% of rice and 18% of maize need, and cold capacity for fresh produce is thinner still.

Afri-Farmers already owns the storage half. It runs refrigerated trucks and collection centres for 13,000 farmers. What it lacks is the timing half, because the current flow is built for doorstep delivery, not for Kigali HORECA (hotels, restaurants, caterers) that need 20kg daily, same-grade, before 11am.

The gap this build fills is the timing half, by digitising the logistical process: order before harvest, batch, move in hours. Storage stays where it belongs, with the operator's fleet and cold rooms, and with the NAEB drying centres and the EU-backed Kigali Wholesale Market now coming online.

2. Evidence

- **40% of total food lost/wasted per year (~3M tons, ~12% of GDP).** World Bank Food Smart Diagnostic + RAB 2022.
- **By crop (RAB 2023 study):** tomatoes 33.5%, Irish potatoes 25.2%, cassava 24.8%, maize 13.8%, beans 11.3%, rice 12.4%.
- **Horticulture-specific:** fruits/vegetables/potatoes 20–30% (CCOAIB Dec 2025, 44 NGOs); 40% of tomatoes wasted for lack of cooling (MINAGRI, Aug 2025); 93% of farmers report storage/transport losses.
- **150,000 tons/year lost** to poor post-harvest handling (MINAGRI/NAEB).
- **Government target:** cut from 13.8% (2023) to 5% by 2029. Drying capacity today: rice 9%, maize 18% of need (Parliament Mar 2026). 52 mobile dryers nationally.

Sources: RAB, MINAGRI, NAEB, World Bank Food Smart Diagnostic, CCOAIB Dec 2025, KT Press Jun 2025, Farmers Review Africa Dec 2024, AgroCentric Aug 2025.

3. What exists today

- **NAEB/KOICA — 5 drying centres (groundbreaking 10 Dec 2024, operational 2026):** National centre Kigali 40T/day + 4 local centres in Bugesera, Nyagatare, Rulindo, Rubavu (9.6T chilli or 34.5T onion/day). Goal: onion 15.4% → 7.7%, chilli 17.2% → 8.7%. Only for dried/cured export crops. No fresh-tomato HORECA lane. This is the storage half, arriving.
- **Kigali Wholesale Market (EU Global Gateway, Team Europe):** Phase 1 pavilions + cleaning/grading/cold storage under construction. Also the storage half.
- **Afri-Farmers Market:** ~13,000 contracted farmers, refrigerated trucks, 5 retail outlets, e-commerce for households and some businesses. Cooperative income 4.5M → 8M RWF/season, loss -40% where trucks run. Stated "USSD coming soon" — not live. No HORECA batch engine, no standing-order route, no Nyabugogo cross-dock fast lane. This is the operator.
- **Murika:** potato-only, grading machines, 8.5% fee, 420T / 232M RWF traded. Not HORECA vegetables.
- **e-HingiriSoko / eHaho / TangaBid-Huriro:** price boards + listings, 57 markets tracked. Information only, no last-mile.

4. Who is affected

Farmer / cooperative (e.g. Duhuzimbaraga, Rwamagana): Harvests 100kg with no committed buyer → bulks at centre → waits 2–3 days → rots or sells to a broker at -30% for same-day cash. Needs cash today, but the cooperative pays members 15 days after the buyer pays.

HORECA buyer (Kigali restaurant/hotel): Needs 15–25kg daily, grade A/B, stable price. Gets irregular supply, mixed quality, price jumps 706 RWF/kg farm → 1,100 RWF/kg retail (Jun 2026). Calls several brokers on WhatsApp.

Afri-Farmers operations team: Owns farmers, centres, and the cold trunk but runs manual calls to fill trucks. No software layer that groups HORECA orders into one pick list for a cooperative.

5. Regulatory constraint

- **Law governing Cooperatives (Official Gazette 28 Bis, 08/07/2024), Art. 166:** a member may sell alone **or** the cooperative sells collectively **per its by-laws**. Once a member, the by-laws can require sale through the cooperative. Breach → suspension/expulsion (Art. 89/90), fines 500k–1M RWF.
- **Art. 166(2)(3):** if the cooperative sells collectively, the buyer pays the cooperative within 30 days, and the cooperative pays the member within 15 days. The system must enforce this settlement window and keep the audit trail.
- **Practical rule:** no buying from members individually. One collective-sale contract with the cooperative (General Assembly approval), price and term written, EBM invoice issued. Farmer input via USSD writes to cooperative stock, not a private deal.
- Formal HORECA sale requires an RRA EBM e-invoice. The system must generate it.

6. Why the timing half is addressable in software, and the storage half is not

The loss has two halves and they need different answers.

Timing is a sequencing problem, and sequencing is software. Today the flow runs harvest → centre → wait 48h → fridge needed. With pre-orders it becomes: HORECA orders by 4pm Day -1 → the cooperative harvests only the

committed quantity Day 0 6am → shared transport (Bugesera→Kigali) → Nyabugogo table-sort 1h → moto tour by 11am. Dwell falls from days to hours. No new asset is required, only a different order of events.

Storage is a capital problem, and capital is not software. Cold rooms, refrigerated trucks and drying capacity are built, bought and maintained by operators and by government. NAEB's five drying centres and the EU-backed Kigali Wholesale Market are that half, arriving now. A build like this one cannot and should not try to replace them.

The two halves compound. Shorter dwell means less produce needs holding at all, so whatever cold capacity exists goes further. Sequencing first, capacity second, and the second is worth more because the first reduced the demand for it.

Route limit: Rubavu (150km) does not work for small baskets. Bugesera/Rulindo (30–60km) does. The system must limit long-haul orders until volume justifies a full load.

7. What the system must do for Afri-Farmers

- **Farmer:** USSD *384* (Africa's Talking), Kinyarwanda. List stock → writes to Afri-Farmers database. No smartphone needed.
- **HORECA:** PWA Portal — catalog, cart, history, EBM invoices, offline cache — **plus** WhatsApp Business — alert with order-by-message fallback and portal deep-link. Both write to the same orders table.
- **Admin (Afri-Farmers team):** Web admin — batch view, pick-list, Nyabugogo sort board, truck manifest, MoMo/EBM records, loss tracker. Mobile view for field agents.
- **Out of scope:** new trucks, new cold rooms (the operator's existing fleet and cold capacity are assumed), farmer smartphone app, multi-district rollout, live RRA certificate (mock), long-haul Rubavu lane.

8. What this case study is, and what transfers

This is a case study of **one middleman:** Afri-Farmers Market Ltd, Kigali. It buys from cooperatives, moves produce into the city, and sells to households, businesses and now HORECA. It already holds the three assets that make the timing half solvable, and none of them is software:

1. **A distribution fleet** sparse enough to reach collection points, dense enough to run a city route.
2. **Cold storage and refrigerated transport**, so the storage half is covered for the volume it handles.
3. **A contracted farmer network**, here 13,000 smallholders, reachable in bulk rather than one call at a time.

The build digitises the logistical process that stitches those three together: what to harvest, how much, for whom, in what order, and who gets paid when.

What transfers. The software is not specific to Afri-Farmers. Any operator holding the same three assets can run the same build, and the variable is their assets rather than the code. A distributor with a larger fleet and deeper cold capacity would run the same pick-list and settlement logic at a bigger radius, and would capture more of the storage half on top. A cooperative with no fleet would get less from it, because the timing fix needs wheels to land.

The case study matters because it is the smallest complete instance: one operator, one lane, three crops, four surfaces. What is learned here scales by adding assets, not by rewriting the system.