

PROJECT KNOWLEDGE BRIEF 1

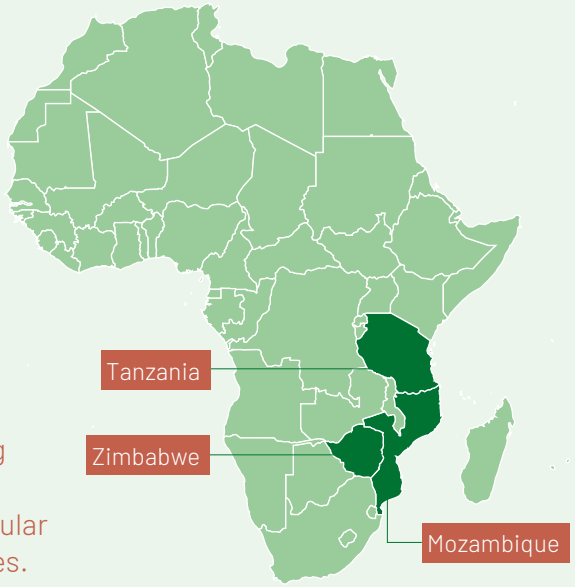
CIRCULAR FOOD SYSTEMS IN AFRICA

Lessons From Twelve Rural Enterprises Across Zimbabwe, Tanzania and Mozambique

POLICY RELEVANCE AT A GLANCE

The Circular Food Systems in Africa (CFS) project demonstrated that smallholder circular enterprises can:

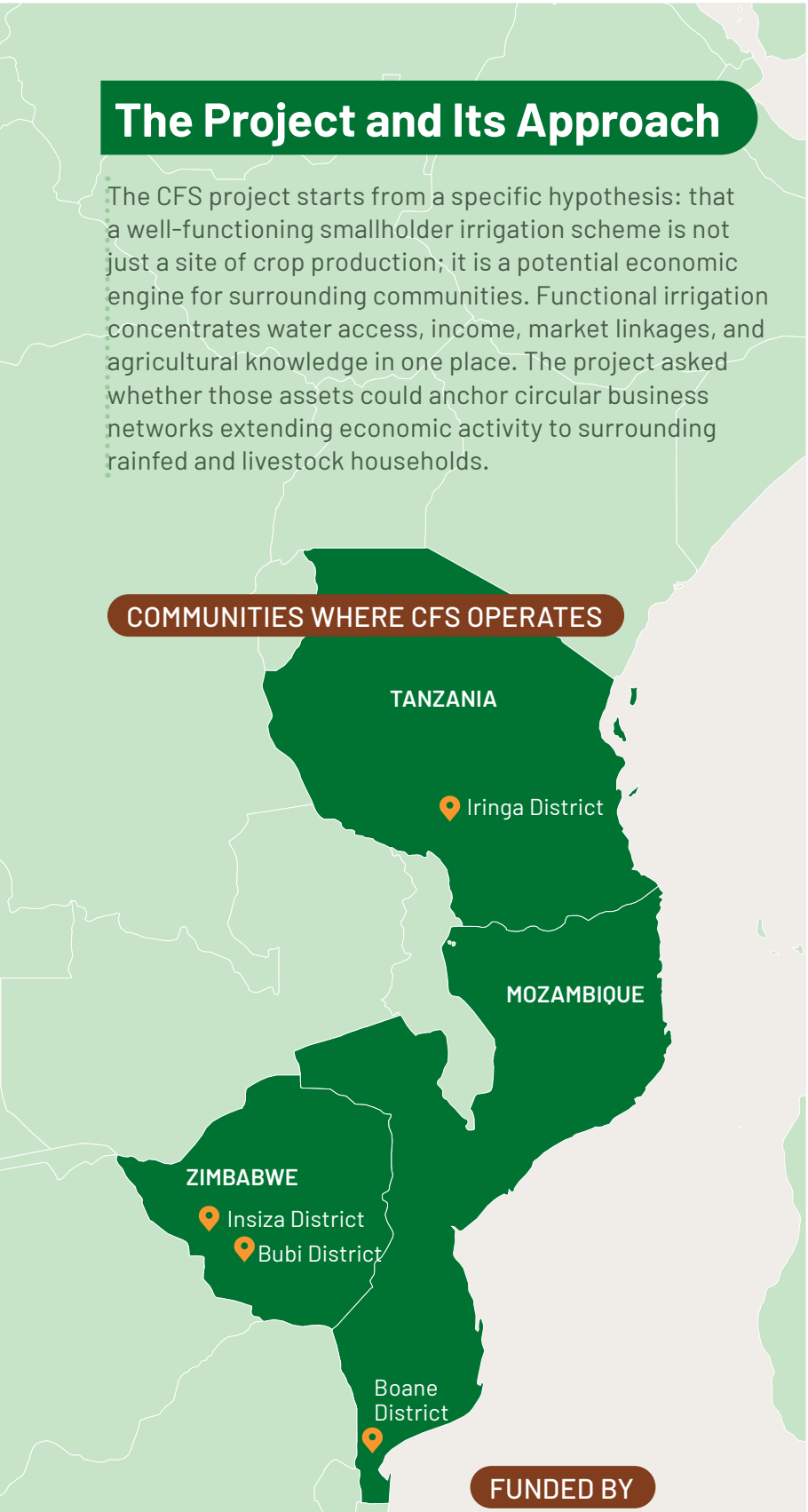
1. **Reduce dependency on external feed, fertiliser, and energy inputs**
2. **Generate income, employment, and local market opportunities in rural communities**
3. **Create commercially viable businesses without requiring formal credit or major infrastructure investment**



Across the **three countries** the project showed that combining enterprise support, community-based finance, appropriate technology, and participatory co-design can enable viable circular food system development in smallholder irrigation communities.

The Project and Its Approach

The CFS project starts from a specific hypothesis: that a well-functioning smallholder irrigation scheme is not just a site of crop production; it is a potential economic engine for surrounding communities. Functional irrigation concentrates water access, income, market linkages, and agricultural knowledge in one place. The project asked whether those assets could anchor circular business networks extending economic activity to surrounding rainfed and livestock households.



FUNDED BY

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IMPLEMENTING CONSORTIUM

FANRPAN | Australian National University | INIR | Ardhi University | Universidade Eduardo Mondlane | ICRISAT Transforming Dryland Agriculture

It builds directly on the Transforming Irrigation in Southern Africa (TISA) initiative, a ten-year predecessor project that made smallholder irrigation schemes productive and financially viable. CFS takes the next step: integrating the production of irrigated and rainfed cropping and livestock keeping with small-business development to create circular food systems.

The core mechanism is the Agricultural Innovation Platform (AIP): a facilitated, multi-stakeholder process that brings agricultural producers, small enterprises, extension services, financial institutions, market actors, and local governance structures together to co-design viable circular business opportunities.

AIPs are structured processes that move entrepreneurs from opportunity identification through business planning, input sourcing, and market development to investment readiness.

They are not primarily training events; their value lies in participatory co-design, ensuring subsequent interventions are relevant, locally legitimate, and built around the actual constraints and opportunities communities face. Where new enterprises had to be built from scratch (as in Tanzania), the AIP process took approximately fifteen months before the first business was ready for seed funding: a reflection of what substantive community-based enterprise development requires.

Implemented by a consortium comprising Australian National University (Lead), the Food, Agriculture and Natural Resources Policy Analysis Network (FANRPAN), International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Mozambique National Institute of Irrigation (INIR), Ardhi University, and Universidade Eduardo Mondlane.

Circularity in this context has a practical rather than ideological meaning. It describes business design that captures and reuses the waste streams of one enterprise as productive inputs for another:

Milling by-products become livestock feed; manure fertilises crops; fishpond water irrigates vegetables; Black Soldier Fly larvae replace commercial protein; solar energy replaces diesel.

The economic logic is direct.

Substituting on-farm by-products for purchased inputs reduces costs, improves margins, and insulates businesses from external price shocks. The environmental case follows: decoupling income growth from synthetic input dependency reduces soil degradation and fossil fuel consumption at farm level.

About This Series

This is Brief 1 of four CFS knowledge products.



1 Lessons from twelve rural enterprises across Zimbabwe, Tanzania and Mozambique

This brief documents twelve enterprises supported through the CFS project. It presents the project approach and implementation context, then profiles each case study.



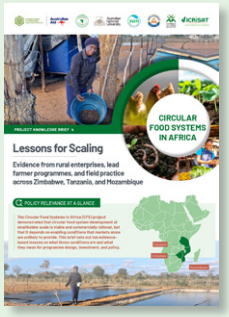
2 Lead farmer profiles

This brief profiles four lead farmers who participated in the CFS project across Zimbabwe's Insiza and Bubi Districts during the 2023/24 and 2024/25 cropping seasons.



3 Inclusion outcomes

This brief summarises how the CFS project approached the inclusion of underserved groups and the resulting outcomes across Zimbabwe, Tanzania, and Mozambique. The focus was predominantly on women and youth, including those with intersecting inequalities: single or widowed women, young women, and women from different cultural backgrounds (including Maasai women in Tanzania).



4 Lessons for scaling

This brief distils ten lessons from the CFS project's evidence base across Zimbabwe, Tanzania, and Mozambique. It is written for programme designers, policy actors, funders, and implementing partners with a direct interest in what makes circular food system enterprises viable, replicable, and scalable.



ZIMBABWE

Insiza District (Silalatshani) and Bubi District (Hauke, Pollards)

Six case studies

Zimbabwe's implementation built on a substantial base. Several enterprises had emerged independently during TISA's final stages, enabling the CFS team to deepen circularity within existing operations rather than starting from scratch. Sixteen businesses were supported in total across milling, threshing, horticulture, poultry, dairy, and mechanisation. Six were selected as case studies representing the breadth of enterprise types and circular approaches across the two districts. Capital origins were diverse: self-funded from cattle and asset sales, NGO grant-matched, and cooperative member contributions.

Jathalwasi Milling Business

Silalatshani, Insiza District

ZW-1

Jathalwasi was established in April 2024 by four farmers (two men and two women) as a direct response to the 2023/24 drought and the livestock feed crisis it triggered. Capitalised through a 70:30 donor-matching grant from the Zimbabwe Resilience Building Fund and a mobile hammer mill trailer donated by the CFS project, it provides food milling (maize meal) and feed milling services, travelling to farm sites to process crop residues, mopane leaves, and twigs that would otherwise be burned or left to deteriorate.

The core circular innovation is waste-to-feed conversion at the point of production. By milling materials that most households discard, the business produced 7 tonnes of livestock feed in its first year, supporting approximately 2,800 cattle through the drought. Bran from the milling process is used to produce nutrient-lick blocks, adding a second revenue stream from material that previously had no commercial value. Chopped residues are incorporated into compost, completing the nutrient loop. The mobile delivery model removes the need for resource-poor households to transport heavy residues to a fixed mill, a burden that falls most heavily on female-headed households who are least likely to have access to transport.

Annual income reached approximately USD 4,000 in year one. The business creates four part-time jobs and plans to extend coverage to two to four wards. Its significance goes beyond current scale: entrepreneur and NGO capital combined with a donated mobile hammer mill trailer produced a viable enterprise within a single season. The model is replicable wherever feed shortfalls and crop residues coincide

KEY FIGURES

- ~7 tonnes feed/year
- Income ~USD 4,000/year
- 4 part-time jobs
- Plans to expand to 2-4 wards

LESSON

Low-capital mobile processing services can unlock commercial value from agricultural residues that communities currently discard. Small-grant and equipment-donation instruments are a viable entry point.

Freshmark Business

Silalatshani, Insiza District

ZW-2

Freshmark is a family enterprise founded in 2020 by Mrs. Dube, a widow, and her three children. Its origins were practical: recurring droughts had made reliable vegetable supply erratic, and Mrs. Dube identified that gap as a commercial opportunity. Start-up capital came from cattle sales (60%), family remittances (20%), and irrigation scheme earnings (20%). She transformed a 0.8-hectare homestead into an integrated horticulture, poultry, and aquaculture system powered by a solar pump drawing from the Umzingwane River.

The business operates a tight circular loop. Poultry manure fertilises vegetable plots; nutrient-rich fishpond water replaces the equivalent of several cartloads of synthetic fertiliser per season. CFS training enabled the business to source 80% of animal feed on-farm from crop residues. The solar pump eliminated roughly 40 litres of petrol per month, saving USD 1,000 per year. A harvest-to-order model, in which produce is pre-sold before harvest, minimises post-harvest losses and reduces market risk.

Annual income is approximately USD 10,000. The business employs two people full-time and between two and five part-time workers. Mrs. Dube has become a significant community training resource: ten neighbouring farmers (five women and five men) have started their own businesses directly inspired by her model. A cash-only sales policy, introduced to counter the credit discrimination that disadvantages women in local markets, has become a replicable model for other female entrepreneurs in the area.

KEY FIGURES

- USD 1,000/year fuel savings
- 80% synthetic fertiliser substitution
- Income ~USD 10,000/year
- 10 farmers trained

LESSON

On-farm integration of horticulture, poultry, and aquaculture produces compounding efficiency gains. Solar investment pays back quickly in remote settings where fuel costs and availability constrain operations. Market policy innovation (cash-only sales) can address gender-specific commercial barriers.



Sebenza Sweat for Sweet — Pollards, Bubi District

ZW-3

Founded in 2023 by Nomuhle Sibanda, who sold cattle, sheep, and goats to fund construction of fishponds and a drip irrigation system, Sebenza operates an integrated system of horticulture, small livestock, aquaculture, and feed supplement production. The business serves the fresh food demand of local small-scale miners, a market that requires product reliability and consistent supply.

Sebenza's most distinctive circular innovation is Black Soldier Fly (BSF) farming, which produces a locally grown, high-protein feed source for fish and poultry. Urea-treated crop residues generate estimated savings of over USD 500 per season in fertiliser costs. Nutrient-rich fishpond water irrigates horticultural crops; solar drip irrigation reduces fossil fuel dependency. The business also aggregates produce from neighbouring smallholder farmers to fill demand it cannot supply alone, extending circular flows outward into the community.

Annual combined income is approximately USD 15,000. The business sources around 90% of feed inputs locally. Sebenza is one of only two case study businesses across all three countries to have accessed a formal commercial bank loan; this outcome reflects years of consistent financial record-keeping and the investment-readiness mentoring provided through the CFS project. It demonstrates that formal credit is accessible to rural circular enterprises, but only when entrepreneurs have built a verifiable financial history. Two youth employees are permanently employed; between five and ten casual workers are taken on at peak production.

BSF protein production and on-farm feed mixing are among the highest-impact circular interventions at smallholder scale. Financial record-keeping combined with structured mentoring can make rural enterprises bankable over time.

- >USD 500/season fertiliser savings
- Income ~USD 15,000/year
- 90% feed inputs sourced locally
- Bank loan accessed

Trust & Reuben Threshing Business — Hauke, Bubi District

ZW-4

Established in 2023 by two men and two women who pooled profits from their existing milling businesses, Trust & Reuben provides mobile mechanised threshing and dehulling services for maize, sorghum, millet, and cowpeas across four wards in Bubi District. The founding partners recognised that mechanised threshing was a shared community need and that consolidating their capital could meet it.

The circular dimension lies in by-product recovery: husks and chaff from threshing are collected and redistributed as livestock and poultry feed, retaining organic material within the local food system. The recent acquisition of a van eliminates previously outsourced transport costs of USD 20–50 per trip and extends service reach to previously inaccessible communities. Mobile threshing also substantially reduces post-harvest drudgery, physical processing work that falls disproportionately on women and female-headed households.

Combined annual income is approximately USD 4,000, with peak daily earnings reaching USD 150. The business is 50% female-owned and employs one permanent youth worker. Planned next steps include tractor acquisition and entry into livestock feed production from threshing by-products.

Cooperative capital pooling enables service infrastructure that no individual smallholder could afford alone. Mobile threshing generates both income and community welfare benefits, particularly for women.

- ~USD 4,000/year combined income
- Up to USD 150/day peak earnings
- 50% female-owned
- 1 permanent youth employee



Nhlizluc Poultry, Milling & Feed Making Business

Zhampale, Insiza District

ZW-5

Nhlizluc was established in 2022 by a woman entrepreneur who invested her retirement savings in a solar-powered hatchery, a hammer mill, and breeding stock. The business sells day-old chicks, live birds, eggs, and milling services.

The business achieves near-full feed self-sufficiency: 90% of poultry feed is produced on-farm using locally grown cereals (maize, sorghum, millet, sunflower) supplemented by Black Soldier Fly larvae introduced through the CFS project. The solar hatchery achieves hatch rates of 80–100%. Poultry manure is fermented with water; the liquid extract is applied as organic fertiliser on horticultural plots. Milling produces zero waste, with maize husks going into compost and nutrient-lick blocks. On-farm demonstration plots showcase drought-resistant varieties, intercropping combinations, and urea-treated stover for surrounding farmers.

Annual income is approximately USD 5,000 across poultry and milling. The business employs two full-time youth workers and five part-time workers. The owner has become an active community mentor, particularly for women, and plans to establish a vegetable garden using poultry manure to further close on-farm nutrient loops.

KEY FIGURES

- 90% local feed inputs
- USD 5,000/year income
- 80-100% hatch rate
- 7 employees

LESSON

Near-complete feed self-sufficiency through on-farm by-product use and BSF production is achievable at smallholder scale. Solar hatchery technology makes commercial poultry production viable in off-grid communities.

Hauke Dairy & Mechanisation Services

Hauke Irrigation Scheme, Bubi District

ZW-6

Hauke Dairy was formed in 2022 by 78 irrigation scheme members to solve a tangible community problem: the area had been sourcing milk from Bulawayo, 185 kilometres away. Beginning with two cows and one bull under a 30:70 member-NGO matching grant, the cooperative has grown to a herd of 10 dairy cows, with tractor tillage services generating additional revenue reinvested in herd expansion.

The circular approach is grounded in local feed integration: over 70% of feed is sourced from crop residues on scheme plots, substantially reducing commercial feed costs. Cow manure is applied as organic fertiliser on irrigation plots. Urea-treated stover, adopted through CFS training, reduces feed costs and addresses shortfalls during drought periods. Fresh milk is increasingly processed into sour milk (Lacto), extending shelf life and adding a premium product line.

All milk production sells out at the farm gate, with demand consistently exceeding supply. The cooperative employs one full-time youth worker. The governance foundation for water allocation at Hauke scheme was established during TISA, and the dairy's success illustrates the project's founding hypothesis: that investment in irrigation governance creates conditions for enterprise diversification in surrounding communities.

KEY FIGURES

- 185 km transport eliminated
- 70%+ local feed inputs
- 78 cooperative members
- Demand exceeds supply

LESSON

Cooperative dairy models anchored in irrigation scheme membership can eliminate long-distance supply chains and create local employment. Urea-treated stover is a low-cost feed supplement that reduces drought vulnerability without external purchase.



TANZANIA

- Iringa District (Kiwere & Magozi)
- Three case studies
- New enterprise development

Tanzania's approach differed structurally from Zimbabwe and Mozambique. Rather than deepening circularity in existing businesses by adding new components, the project focused on building entirely new group enterprises through a participatory AIP process. This required a longer development timeline. The first enterprise to receive seed funding took approximately fifteen months from project inception to launch, but generated substantive evidence on community mobilisation, group enterprise development, and formal financing pathways.

Tanzanian banks typically do not extend credit to entirely new businesses. They will support existing businesses seeking to expand, but require a documented history of bank deposits and withdrawals before extending credit. Consequently, the project had to function as a seed funder of last resort for enterprises with no other viable entry point to capital.

Lucy's Dairy Business — Kiwere Village, Iringa District

TZ-7

Lucy Majele is a Maasai woman entrepreneur who operates 25 kilometres from Kiwere Village with a herd of five Zebu cows. She is the first Maasai woman in her community to engage in irrigated cropping. Lucy received no capital grant from the CFS project; her business was built incrementally through business planning support, practical mentoring, and community networking.

Lucy collects milk from six neighbouring families and produces both fresh milk and yoghurt for sale to shops, vendors, and direct customers in Kiwere. Circularity is embedded in everyday practice: milk is transported in calabash containers or reused plastic bottles; cattle manure serves as both soil fertiliser and building material. Responding to evidence from CFS demonstration plots, she is establishing a one-acre Super Napier grass plot on an adjacent irrigation scheme to improve herd feed quality and consistency. Yoghurt production from surplus milk reduces spoilage and commands a 67% price premium over fresh milk.

Lucy supplies three shops, three food vendors, and eight women resellers in Kiwere. The reseller network creates structured market entry points for eight women who otherwise lacked either product access or capital. Her profits have funded a washroom, a goat, and school fees: tangible household gains from a business started with zero external capital.

KEY FIGURES

- 10-30L milk/day (wet season)
- 6 milk-supplying families
- 8 women resellers enabled
- No external capital required

LESSON

Mentoring and business planning support can build viable rural enterprises without capital grants. Women's reseller networks that distribute products on commission are a low-barrier market entry model that can be facilitated at minimal programme cost.

Elimika Seedling Nursery Business

Mgera Village, Kiwere Ward, Iringa District

TZ-8

Elimika (meaning 'be educated' in Swahili) was established in April 2025 by a group of eleven young farmers (five women and six men) who identified a gap in local seedling supply. Farmers in the area were sourcing low-quality seedlings from Iringa town at high cost and with unreliable timing. After completing fifteen months of AIP-guided business planning and training, the group accessed seed funding of approximately 5 million Tanzanian shillings (Tsh) from the CFS project and 2 million Tsh in donated seeds and other inputs from Bayer Crop Science.

Circular innovations are practical and low-cost: unsold seedlings are planted by group members on their own plots rather than discarded; seedling trays are returned by customers and reused across production cycles; seeds, pesticides, and fertiliser are purchased on credit from local agro-dealers, reducing transport costs and supporting local commerce. The group is transitioning from imported Israeli peat to a locally produced Tanzanian soil mix. An adjoining demonstration plot serves as a practical knowledge hub for scheme farmers on seedling varieties, spacing, and manure use. The nursery offers two service models: farmers can purchase seedlings produced from commercial seed stock, or contract Elimika to raise seedlings from the farmers' own seeds, with delivery on a specified date.

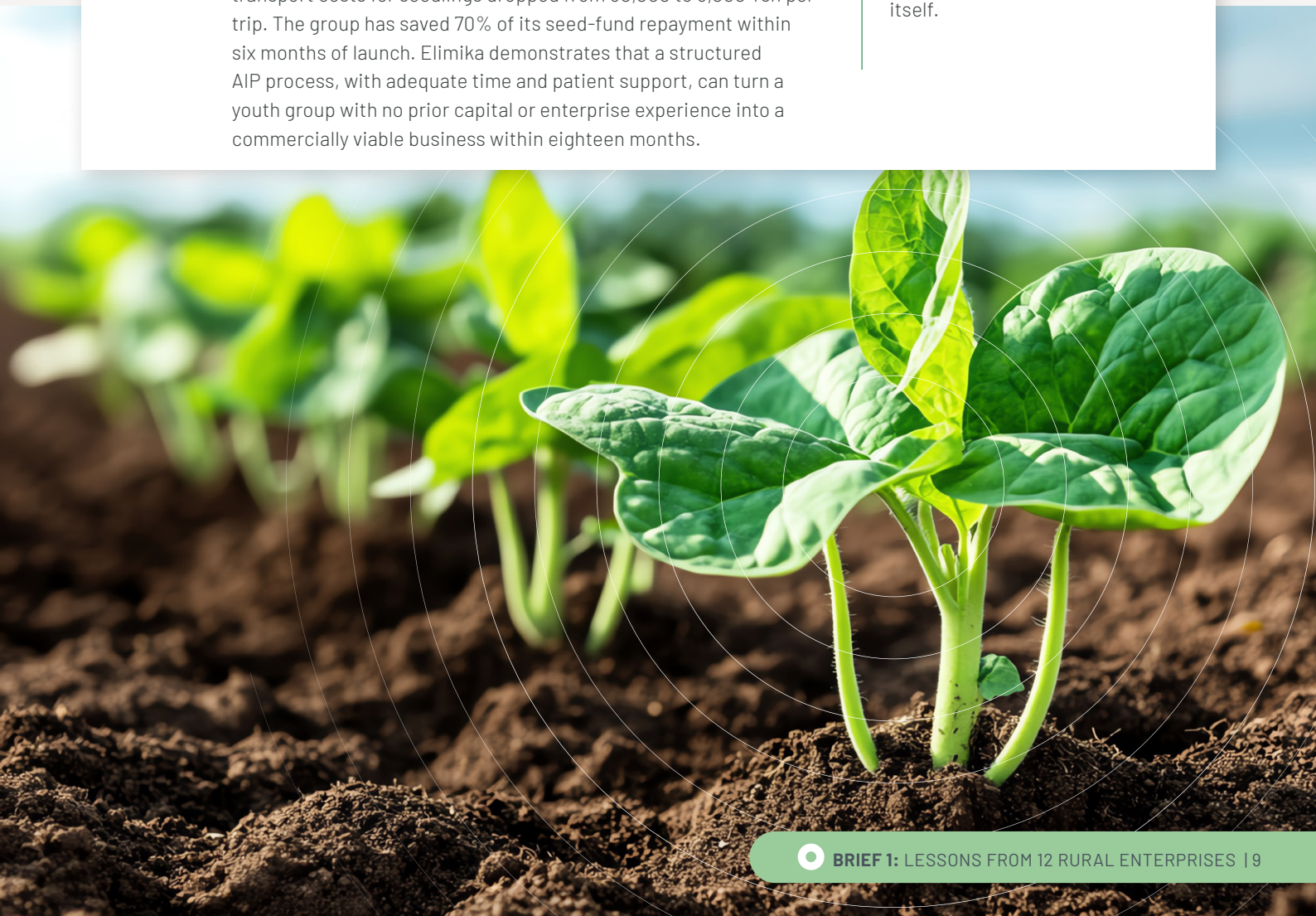
In its first three months, Elimika sold 98,200 seedlings valued at 9.82 million Tsh, equivalent to a planted area of 4.9 hectares. Farmers' transport costs for seedlings dropped from 30,000 to 5,000 Tsh per trip. The group has saved 70% of its seed-fund repayment within six months of launch. Elimika demonstrates that a structured AIP process, with adequate time and patient support, can turn a youth group with no prior capital or enterprise experience into a commercially viable business within eighteen months.

KEY FIGURES

- 98,200 seedlings in 3 months
- 9.82M Tsh revenue
- Transport savings: 30,000 to 5,000 Tsh
- 11 youth employed

LESSON

New youth enterprises can be commercially viable if the AIP co-design process is given adequate time. The fifteen-month AIP timeline reflects real community-based enterprise development requirements and should not be compressed. Accessible local seedling supply provides community-wide welfare benefits that extend beyond the enterprise itself.



Kapungu Poultry Business

Ilolo Mpya Ward, Iringa District

TZ-9

Innocent Kapungu, aged 39, started with 20 chicks received through an NGO livelihood initiative in 2016. Through sustained reinvestment and participation in both TISA and CFS business training, he has built a commercial egg production operation of 400 brown and Sasso layers. After establishing a documented financial track record, he secured a 6 million Tsh loan from NMB Bank: one of only two case study businesses across all three countries to access formal commercial credit.

Over 70% of feed is mixed on-site using sunflower cake, rice, and maize residues: agricultural by-products with limited standalone market value that become the primary input for a high-output system. Poultry sheds are built from local timber and rice straw, cutting construction costs from an estimated 6 million Tsh to 1.34 million Tsh. Poultry manure is applied to Innocent's one-acre maize plot, reducing synthetic fertiliser requirements by 50%, and shared freely with neighbouring vegetable farmers. A structured resale network of two women and four young people purchases eggs wholesale and sells at margin, creating entry points into local food markets.

The business produces approximately 290 eggs per day, all of which sell. The NMB Bank loan has been repaid. Kapungu's business has become a reference point for women's groups in the community seeking to establish similar poultry ventures: a multiplier effect that extends the project's reach well beyond its direct participants.

KEY FIGURES

- ~290 eggs/day
- NMB Bank loan secured and repaid
- 50% fertiliser reduction
- 6 local resellers supported

LESSON

On-farm feed mixing from agricultural by-products is a scalable circular intervention with direct return on investment. A documented financial track record, built over years of consistent record-keeping, is what makes formal bank lending accessible: the project's role in supporting record-keeping is directly consequential for long-term enterprise finance.





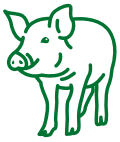
MOZAMBIQUE

Boane District, Maputo Province

Three case studies

Finance facilitated via Gapi

Mozambique's implementation began later than Zimbabwe and Tanzania, but progress has been rapid. The project has supported business plan development for 39 enterprises across crop production, poultry, fisheries, and piggery. Most significantly, Gapi, a formal agricultural finance institution, joined the AIP in August 2025, enabling direct collaboration between producers and lenders within the co-design structure. No other country in the portfolio achieved this. Two of the three original Mozambique case studies are published here with participant names. The third case study is published using an alternative name at the participant's request.



Mr. Julio's Integrated Horticulture & Piggery

Boane District

MZ-10

Mr. Julio's enterprise began in 2007 when a pig bought for a wedding became the start of a commercial breeding operation. It now runs two sows, two boars, and a one-hectare irrigated cabbage plot, with waste from each production system serving as input for the other. The business is entirely self-financed and has operated for nearly two decades without external grant support.

The crop-livestock integration is direct: cabbage trimmings from the irrigated plot are fed to pigs, eliminating both a feed cost and a waste disposal cost. Approximately 17 fifty-kilogram bags of pig manure per cropping cycle are returned to the cabbage field, supporting yields of 30–35 tonnes per harvest without full synthetic fertiliser dependency. A planned biogas system will convert manure into energy for sty lighting and refrigeration, closing the energy loop and reducing winter piglet mortality. A community genetics arrangement (sharing the boar with neighbouring farmers at no charge) improves local livestock genetics without creating a financial barrier for resource-poor households.

The business employs six workers, including women and youth, and sells 40+ pigs per year at 300 Mozambican meticais (MZN) per kilogram live weight. CFS business planning has repositioned the enterprise for entry into formal markets: a significant transition for a long-established informal operation.

KEY FIGURES

- 40+ pigs/year
- 30–35 tonnes cabbage/harvest
- 6 employees
- Free boar-sharing to community

LESSON

Long-established informal enterprises can be repositioned for formal market access through structured business planning. Crop-livestock integration eliminates both feed costs and waste costs simultaneously, offering compounding savings from a single intervention.

Dona Rosa's Integrated Crop, Livestock & Milling Business | Boane District

MZ-11

Published as 'Dona Rosa' at the participant's request

Dona Rosa, a retired educator, invested the proceeds from selling a property in another province in 2016 into a maize mill, peanut mill, pigsty, and poultry units in Boane. She manages a value chain spanning production (maize, poultry, pigs, goats), processing (maize meal, peanut butter), and direct retail, making this the most fully integrated enterprise in the case study portfolio.

All milling residues (maize bran, peanut shells, and cake) are channelled as feed for poultry, ducks, and pigs, eliminating processing waste entirely. Approximately 70% of inputs, including grain for milling, are sourced from surrounding farms. Poultry utilise grain by-products; pigs recycle vegetable residues; goats convert maize stubble into meat, milk, and organic manure. Beans intercropped with maize fix soil nitrogen and diversify household nutrition.

The business processes 5 tonnes of maize per month and sells approximately 200 broilers per cycle across at least four annual cycles. Four workers are employed. The milling services extend to at least four surrounding communities, making this enterprise as much a community infrastructure asset as a private business.

KEY FIGURES

- 5 tonnes of maize/month
- 4+ integrated production systems
- 70% local inputs
- 4 communities served by milling

LESSON

Full vertical integration across production, processing, and retail is achievable at smallholder scale where capital is accumulated incrementally over time. Milling services that extend to surrounding communities convert a private enterprise into a community infrastructure asset, with direct implications for how such businesses are valued and supported by local government and development programmes.

Daniel Mathe's Integrated Horticulture & Apiculture | 25 de Setembro Scheme, Boane

MZ-12

Daniel Mathe began beekeeping at age 13, learning traditional techniques from community elders. He now manages five modern and traditional hives alongside irrigated horticultural plots. Agrochemical drift from neighbouring fields and honey badger attacks have reduced his operation from 56 hives to five, but he remains committed to beekeeping as both a commercial enterprise and an ecological service.

The circularity in Daniel's operation is ecological as much as economic. His bees forage across irrigated crops, trees, and riparian vegetation, providing pollination that improves horticultural yields at no additional input cost. Harvested beeswax is reused to line hives and attract new colonies, enabling expansion without any external material purchase. Propolis harvested alongside honey functions as a natural antibiotic for livestock: a secondary revenue stream and a circular health input. Traditional beekeeping knowledge is actively preserved, practised, and transferred to trainees, reducing chemical intervention and maintaining organic honey quality.

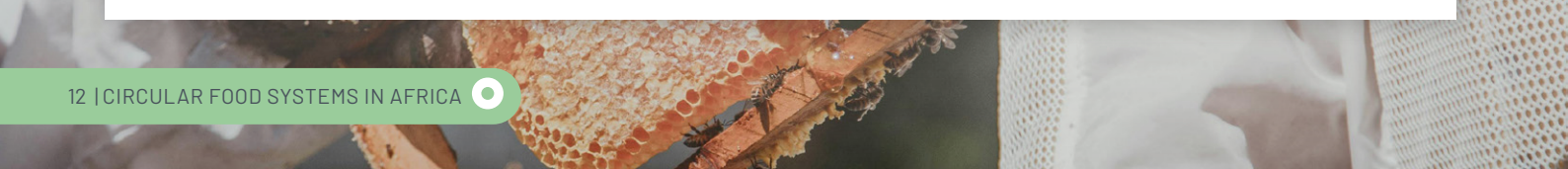
Each hive yields 20–25 kg of honey per harvest at MZN 300 per kilogram, generating MZN 6,000–7,500 per hive. Honey income has funded Daniel's secondary livestock enterprise in another province. He trains up to 20 young beekeepers per cohort and plans to establish a formal youth beekeeping association in Boane. Italian Development Agency equipment support and CFS business planning are jointly positioning the enterprise for branded premium market entry.

KEY FIGURES

- 5 hives
- 20-25 kg honey/hive/harvest
- MZN 6,000-7,500/hive revenue
- 20+ beekeepers trained

LESSON

Apiculture provides ecological services (pollination) alongside commercial returns and requires no farmland, making it a viable circular enterprise for youth and land-poor households. Traditional knowledge systems, where they are maintained and formally recognised, reduce input costs and maintain product quality.



What the Portfolio Shows

The evidence from these twelve case studies, considered alongside the broader portfolio of businesses the project supported, points to five patterns with direct relevance for programme design, policy, and investment.

1

Feed and fertiliser substitution delivers the fastest and most tangible impact.

Across the portfolio, the most significant circular innovation was the substitution of purchased feed or synthetic fertiliser with on-farm by-products: milling residue, manure, crop waste, or insect-derived protein. The economic returns are immediate; reduced input costs translate directly into improved margins. The environmental co-benefits compound over time. Fertiliser substitution savings ranged from estimated USD 500 per season (Sebenza, Zimbabwe) to significant reductions in commercial feed costs across the dairy and poultry enterprises. Programmes seeking rapid visible results should prioritise by-product-based feed and fertiliser substitution as the entry point intervention.



2

Self-finance dominates; formal credit requires a supported pathway.

Only two of the twelve case study businesses accessed formal commercial loans: Sebenza in Zimbabwe and Kapungu in Tanzania. The remainder relied on asset liquidation, family remittances, cooperative pooling, NGO grants, and personal savings. This is not primarily a reflection of inadequate discipline or ambition. Many rural enterprises cannot build the documented bank transaction history that formal lenders require without first accessing some form of structured support. The project's seed-funding mechanism in Tanzania and the Gapi AIP partnership in Mozambique are meaningful steps toward bridging this gap. Both deserve replication. Risk aversion among entrepreneurs is also real and should not be dismissed: the combination of informal borrowing norms and perceived lender complexity creates a behavioural barrier alongside the structural one.

3

Solar and mobile technology are enabling conditions, not optional additions.

Where businesses adopted solar pumping, solar hatcheries, or mobile milling and threshing equipment, the returns extended beyond direct cost savings. Solar eliminated fuel expenditure and removed operational dependence on volatile input supply. Mobile equipment expanded market reach and reduced drudgery for households that could not transport produce to fixed facilities. In each case, the technology was what made the business model viable, not an add-on to it. Programmes that treat solar and mobile equipment as discretionary technologies misread the evidence.



4

Women lead and co-own across the portfolio, and their enterprises are among the most integrated.

Women are sole or co-owners in the majority of case study enterprises across all three countries. Several of the most technically sophisticated circular operations, including those combining horticulture, aquaculture, poultry, and BSF production, are women-led. This reflects both deliberate project targeting and the practical reality of who was already most invested in these farming systems. Women-led businesses were also among the most active in community knowledge transfer. These outcomes should not be read as evidence that women are inherently better circular farmers; they reflect the project's design choices on participation and the enabling conditions that resulted.

5

Country context is not background; it is a determinant of what is possible.

Zimbabwe's TISA foundation accelerated implementation and allowed the project to deepen rather than build. Tanzania's formal banking constraints required the project to function as a lender, adding time and complexity. Mozambique's Gapi AIP partnership represents the most significant institutional innovation in the portfolio. These are not operational differences alone; they are structural lessons about which preconditions matter most for circular enterprise development. Programmes that arrive in communities without a functioning irrigation governance base, an established enterprise culture, or existing community trust will face longer development timelines and need different instruments than programmes building on a TISA-equivalent foundation.



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