CASE STUDY

Producing More with a Leaner Value Chain

Aquaculture Productivity, Value and Income Gains between Annual Outcome Survey (AOS) 1 and AOS 2

Key message

Between Annual Outcome Survey (AOS) 1 and AOS 2, treatment counties recorded a 219% increase in aquaculture production and a 249% increase in production value, while control counties declined in both production and value. The results show stronger aquaculture enterprise performance in treatment counties, but also reveal a leaner value chain that requires close monitoring to protect smallholder access to seed, feed, services and markets.

+1.06 million kg Treatment production gain	**+KES 412.0 million** Treatment value gain	**+9.4 percentage points (pp)** Treatment profitability change	**-14,105 kg** Control production change

1. Context and data scope

This case study compares aquaculture production and business performance between AOS 1 and AOS 2 across treatment (Homa Bay, Migori, Kakamega, Kirinyaga, Nyeri, Meru, Kiambu, Machakos, Kajiado, Tharaka Nithi, Siaya, Kisumu, Embu, Busia and Kisii) and control (Bungoma, Makueni and Nakuru) counties. The analysis focuses on production output, production value, average sales, costs, net income, profitability and selected value-chain actors supporting aquaculture production.

The central finding is the sharp increase in production and value in treatment counties, combined with a decline in both indicators among control counties. The outcome is therefore best interpreted as a strong but uneven transformation: treatment counties as a group moved toward stronger aquaculture enterprise performance, while some counties still require targeted follow-up.

2. Production growth: the clearest outcome signal

Between AOS 1 and AOS 2, total aquaculture production in treatment counties rose from 485,633.8 kg to 1,549,477.5 kg. This represents an increase of 1,063,843.7 kg, or approximately 219%. Over the same period, control counties declined from 61,227.0 kg to 47,122.0 kg, a reduction of 14,105.0 kg.

The treatment-control contrast strengthens the outcome story. While treatment counties gained more than one million kilograms of production, control counties declined, creating a net treatment-control production advantage of approximately 1.08 million kg between AOS 1 and AOS 2.

The result remains strong even after normalizing by number of counties. Average production per treatment county increased from about 32,376 kg to 103,299 kg, while average production per control county declined from about 20,409 kg to 15,707 kg. This confirms that the treatment-group improvement was not only due to having more counties in the treatment group.

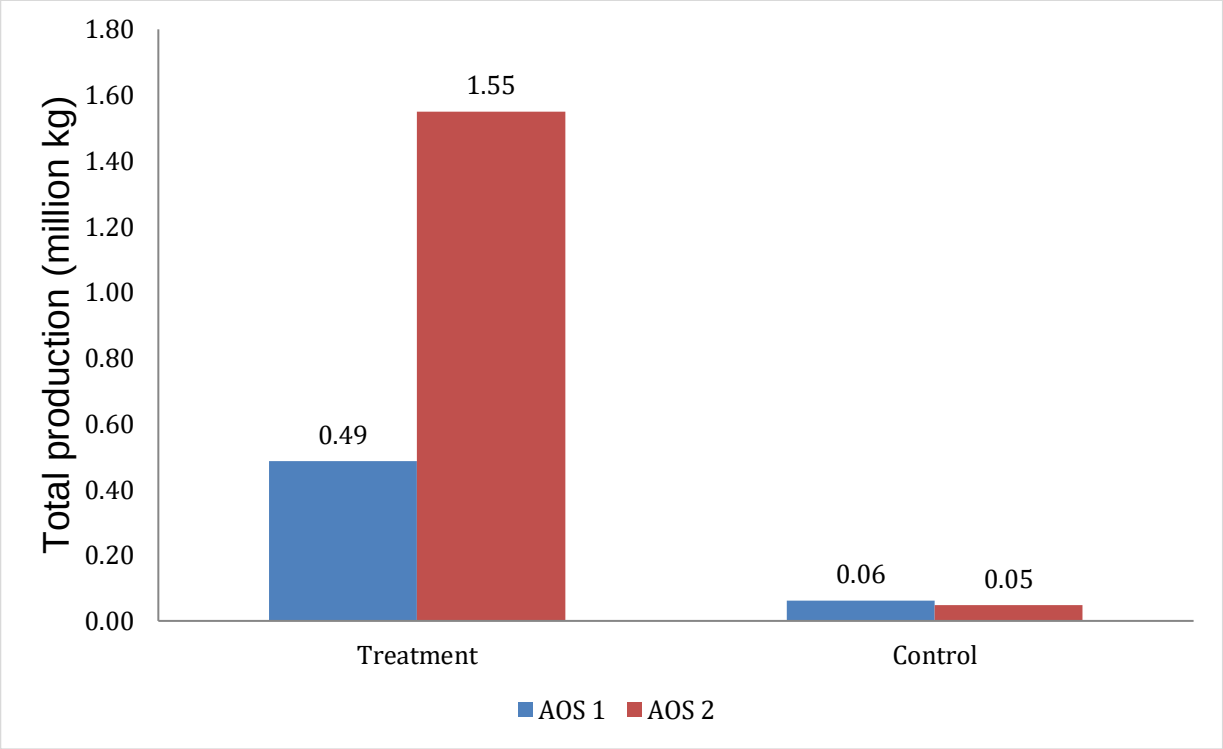

Figure 1. Total aquaculture production in treatment and control counties during AOS 1 and AOS 2. Treatment counties increased from 485,633.8 kg to 1,549,477.5 kg, while control counties declined from 61,227.0 kg to 47,122.0 kg.

3. Production value and enterprise performance

The production gains in treatment counties translated into substantially higher production value. Treatment-county value increased from KES 165.3 million in AOS 1 to KES 577.3 million in AOS 2, a gain of KES 411.97 million. In contrast, control-county value declined from KES 19.3 million to KES 13.2 million, a reduction of KES 6.07 million.

Relative to the control trend, treatment counties recorded a net value advantage of approximately KES 418.04 million. Average production value per treatment county increased from about KES 11.0 million to KES 38.5 million, while average production value per control county declined from about KES 6.4 million to KES 4.4 million.

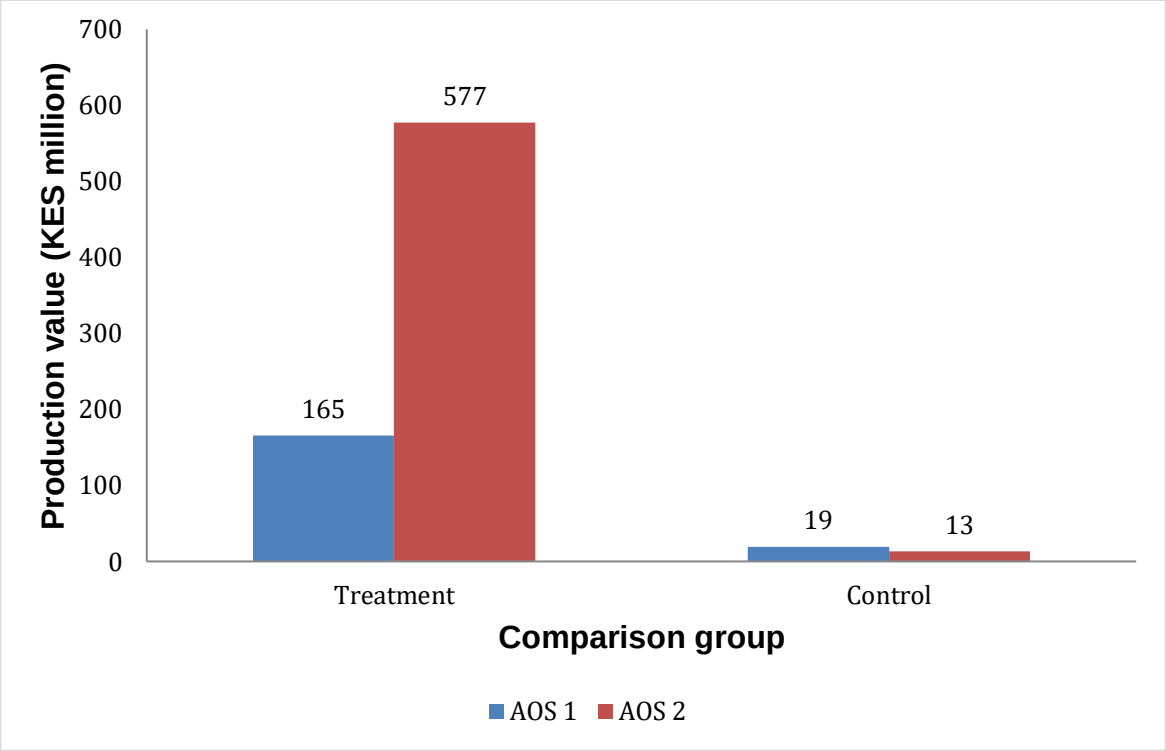

Figure 2. Total production value in treatment and control counties during AOS 1 and AOS 2. Treatment counties increased from KES 165.3 million to KES 577.3 million, while control counties declined from KES 19.3 million to KES 13.2 million.

Table 1. Business-performance indicators between AOS 1 and AOS 2.

Indicator	Treatment AOS 1	Treatment AOS 2	Treatment change	Control AOS 1	Control AOS 2	Control change
Average total fish sales	KES 93,042	KES 118,757	+KES 25,715	KES 41,074	KES 95,231	+KES 54,157
Average total costs	KES 61,092	KES 49,535	-KES 11,557	KES 31,317	KES 5,384	-KES 25,933
Average net income	KES 31,950	KES 51,948	+KES 19,998	KES 9,757	KES 90,782	+KES 81,025*
Profitability	34.3%	43.7%	+9.4 pp	23.8%	95.3%	+71.6 pp*

Profitability: Treatment profitability improved from 34.3% to 43.7%, suggesting stronger enterprise returns. The very high AOS 2 profitability reported in control counties should be interpreted cautiously because it appears to be driven largely by a sharp reduction in reported costs and may reflect differences in reporting, enterprise scale, cost accounting or sample composition.

4. County-level performance: strong gains, uneven distribution

The overall treatment result masks important county-level variation. The production gain was concentrated in a few high-performing counties. Kiambu, Kakamega, Nyeri and Kirinyaga together accounted for nearly 70% of the total treatment-county production gain, showing that the overall improvement was driven by a subset of strong performers rather than uniform growth across all counties.

County enterprise spotlight: Kiambu

Kiambu recorded the strongest production gain among treatment counties. Production increased from 16,681 kg in AOS 1 to 296,896 kg in AOS 2, while production value rose from KES 7.16 million to KES 118.74 million. This suggests that Kiambu moved from relatively modest production to a more commercially significant aquaculture county during the AOS 2 period.

High-performing counties and counties requiring diagnosis

Kakamega increased from 77,874 kg to 274,539 kg, Nyeri from 19,993 kg to 160,158 kg, and Kirinyaga from 28,409 kg to 151,536 kg. However, Homa Bay declined from 63,958 kg to 42,374 kg, Siaya from 49,835 kg to 23,309 kg, and Kajiado from 13,955 kg to 6,583 kg. These counties should be examined separately to identify whether declines were driven by seed quality, feed access, disease, water constraints, market access, farmer management, climate shocks or reporting gaps.

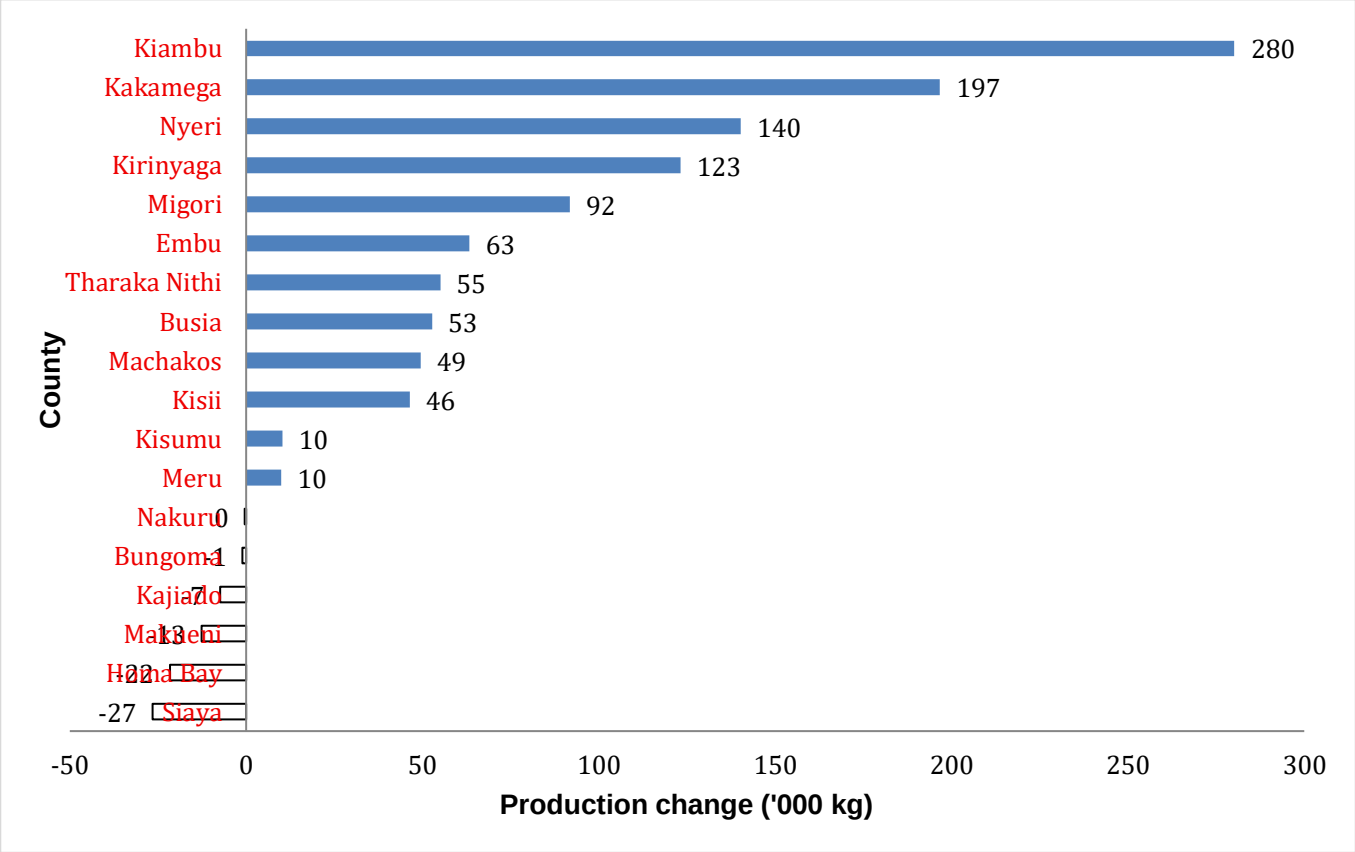

Figure 3. Ranked county-level production change between AOS 1 and AOS 2. The chart shows that production gains were concentrated in several treatment counties, while some treatment and control counties recorded declines.

5. A leaner value chain: the hidden systems lesson

The production story becomes more useful when read together with value-chain actor data. Treatment counties produced substantially more fish and generated substantially more value even though the number of recorded input suppliers, traders and hatcheries declined. This suggests a value chain that may have become more productive, more commercially concentrated or more dependent on fewer actors.

In treatment counties, production per recorded input supplier increased from approximately 11,037 kg to 44,271 kg. Production per recorded hatchery increased from approximately 11,294 kg to 43,041 kg, and production per recorded trader increased from approximately 5,337 kg to 19,614 kg. These are indicative ratios only, but they show that fewer value-chain actors were supporting a much larger production base in AOS 2.

Table 2. Change in selected value-chain actors between AOS 1 and AOS 2.

Actor category	Treatment AOS 1	Treatment AOS 2	Treatment change	Control change	Total change	System implication
Input suppliers	44	35	-9	-1	-10	Declined in both groups; may indicate consolidation or reduced actor participation.
Traders	91	79	-12	-1	-13	Declined despite higher treatment production, suggesting a leaner trading network.
Hatcheries	43	36	-7	+1	-6	Declined in treatment counties but increased slightly in control counties.
Processors	6	7	+1	0	+1	Small base; treatment processors increased slightly.

A leaner value chain is not automatically negative. It may reflect stronger or more efficient actors. However, if fewer suppliers, hatcheries and traders are serving larger production volumes, the programme should monitor whether smallholders face reduced service coverage, higher transaction costs, weaker bargaining power or limited access to quality inputs and markets.

6. What the results mean

The AOS 1 to AOS 2 comparison provides strong outcome evidence that treatment counties moved toward more productive and commercially stronger aquaculture systems. The clearest evidence is the simultaneous increase in total production, production value, average net income and profitability in treatment counties, combined with a contrasting decline in total production and value among control counties.

At the same time, the results should be understood as a transformation process rather than a simple uniform success story. Gains were concentrated in several counties, some treatment counties declined, and important value-chain actor categories became smaller. The next phase should therefore focus not only on sustaining production growth, but also on understanding why some counties performed better, why others declined and whether value-chain restructuring is affecting smallholder participation.

7. Lessons and next steps

- Prioritize diagnostic support in Homa Bay, Siaya and Kajiado to identify whether declines were driven by seed quality, feed access, disease, water constraints, market access, farmer management, climate shocks or reporting gaps.
- Document the production models, input access pathways, market linkages and management practices behind the strong gains in Kiambu, Kakamega, Nyeri and Kirinyaga, then use these lessons to support weaker-performing counties.
- Track whether the decline in input suppliers, traders and hatcheries is reducing service coverage, increasing transaction costs or weakening bargaining power for smallholder producers.
- Verify cost-accounting and profitability data, especially for control counties, before using profitability as a headline outcome indicator.

- Use normalized indicators in future reporting, including production per county, value per county, production per active farmer, and production per value-chain actor, so that growth is assessed alongside inclusion and service access.

Conclusion

The AOS 2 results show that treatment counties did not simply produce more fish; they generated substantially more value from aquaculture. The next step is to ensure that this growth remains inclusive by strengthening input access, advisory support and market linkages for smallholder producers in all counties, especially those where production declined.

8. Data interpretation note

The results should be interpreted as outcome evidence rather than definitive causal proof. Differences in respondent composition, reporting accuracy, enterprise scale and cost accounting may influence some indicators, especially profitability. However, the consistency of the production and value trends in treatment counties, together with the contrasting decline in control counties, provides strong evidence of improved aquaculture enterprise performance between AOS 1 and AOS 2.