



More Fish on the Table

Linking Aquaculture Growth, Gender Inclusion and Household Nutrition

Case Study 2: Gender, Nutrition and Household Fish Consumption Outcomes between Annual Outcome Survey (AOS) 1 and AOS 2

Key message

Aquaculture growth was associated with higher household fish consumption and improved per-person fish availability, especially in treatment counties, but women and youth participation remained uneven; future programming should deliberately link production gains with nutrition, women's participation, youth opportunities and household decision-making.

Background and case-study context

Fish is an important source of animal protein and micronutrients for rural households, but production growth does not automatically translate into improved household nutrition or more inclusive participation in aquaculture value chains. This case study examines whether changes between AOS 1 and AOS 2 were reflected in household fish consumption, per-person fish availability, and participation by women, youth and persons with disabilities.

The analysis compares treatment counties (Homa Bay, Migori, Kakamega, Kirinyaga, Nyeri, Meru, Kiambu, Machakos, Kajiado, Tharaka Nithi, Siaya, Kisumu, Embu, Busia and Kisii) with control counties (Bungoma, Makueni and Nakuru). using AOS 1 as the earlier outcome survey round and AOS 2 as the follow-up outcome survey round. The focus is on outcome trends rather than isolated totals. This is important because the nutrition story is strongest when household consumption and per-person consumption are compared over time, while the gender story requires careful interpretation because women remained underrepresented even where consumption outcomes improved.

Household fish consumption increased more strongly in treatment counties

Between AOS 1 and AOS 2, average household fish consumption increased in treatment counties from **26.99 kg to 35.23 kg**, a gain of **8.24 kg per household**. In control counties, average household fish consumption increased from **18.23 kg to 21.59 kg**, a gain of **3.35 kg per household**. This means the absolute increase in household fish consumption was more than twice as large in treatment counties as in control counties.

The share of harvested fish consumed also increased in both groups, but the treatment increase was larger. In treatment counties, the share of harvest consumed rose from 8.24% to 9.94%, compared with 13.94% to 14.75% in control counties. The higher percentage consumed in control counties should be interpreted carefully because control counties had a much smaller average harvest base. The stronger nutrition outcome in the treatment group is therefore better reflected by the larger absolute gain in household consumption and the stronger increase in per-person fish availability.

Table 1. Summary of household fish consumption and nutrition-linked 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 fish harvested (kg)	327.51	354.27	+26.77	130.83	146.34	+15.51
Average household fish consumption (kg)	26.99	35.23	+8.24	18.23	21.59	+3.35
Share of harvest consumed (%)	8.24%	9.94%	+1.70 pp	13.94%	14.75%	+0.81 pp
Average household size	5.92	5.83	-0.09	5.75	5.99	+0.24
Average consumption per person (kg)	4.56	6.04	+1.48	3.17	3.61	+0.43

Note: pp = percentage points

Table 1 provides the full summary of household consumption indicators, while Figures 1 and 2 highlight the two main nutrition messages: changes in household fish consumption and per-person fish availability.

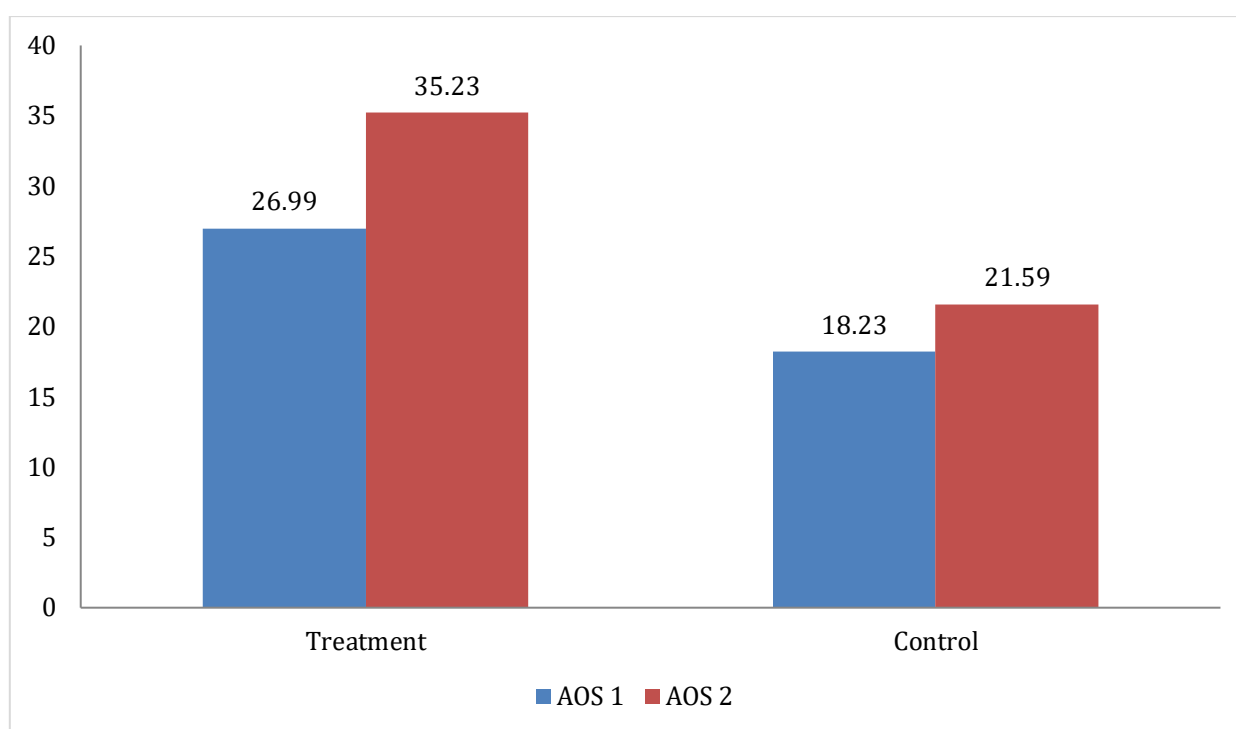


Figure 1. Average household fish consumption increased more strongly in treatment counties than in control counties between AOS 1 and AOS 2.

Per-person fish availability improved most in treatment counties

The per-person consumption result strengthens the nutrition story because it adjusts household consumption by household size. In treatment counties, average household size declined slightly from 5.92 to 5.83, while average consumption per person increased from **4.56 kg to 6.04 kg**. This represents a gain of **1.48 kg per person**. In control counties, average household size increased from 5.75 to 5.99, while per-person consumption increased from **3.17 kg to 3.61 kg**, a smaller gain of **0.43 kg per person**.

This finding suggests that treatment households were not only harvesting and consuming more fish at household level, but also improving the amount of fish available per person. This is the strongest nutrition-linked evidence in the dataset and should be emphasized as a central case-study result.

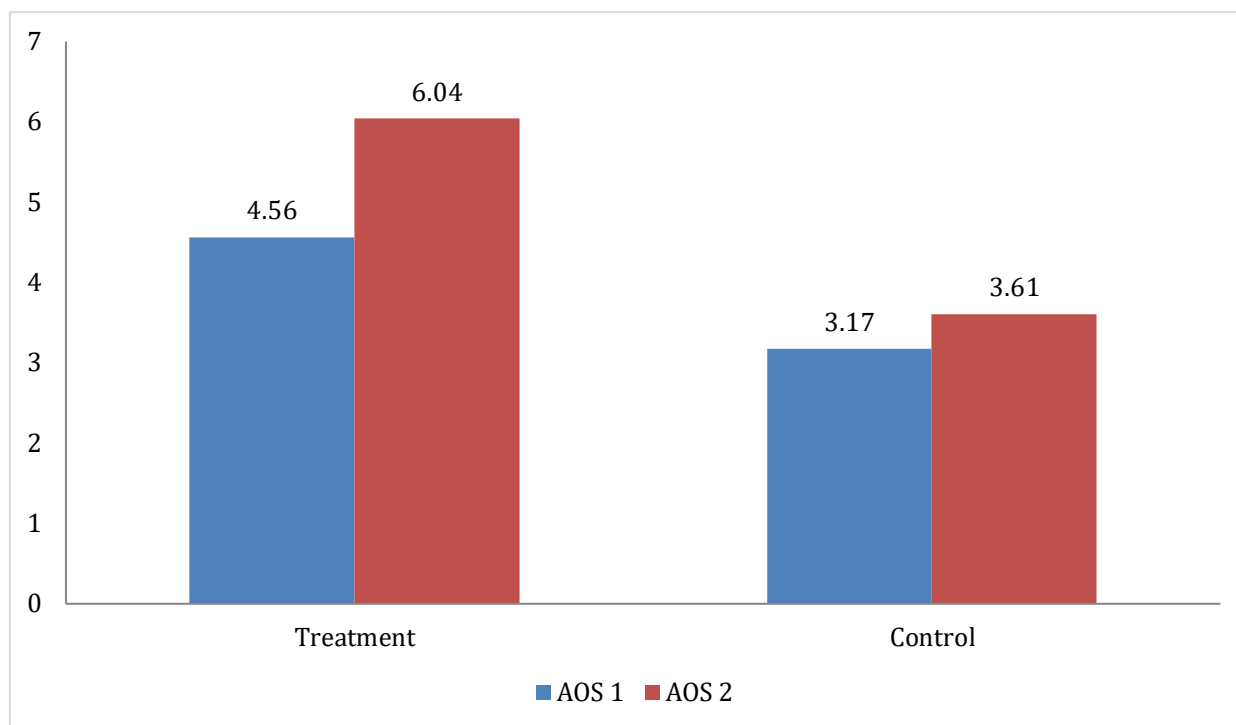


Figure 2. Average fish consumption per person increased from 4.56 kg to 6.04 kg in treatment counties, compared with 3.17 kg to 3.61 kg in control counties.

County examples show strong gains, but not all treatment counties improved

The treatment-county average masks important county-level variation. Some counties recorded very strong increases in household fish consumption, while others declined. This unevenness is important because it shows that aquaculture growth and household nutrition outcomes are shaped by local conditions, including production performance, market access, household preferences, fish availability, and the balance between selling and consuming fish.

Table 2. Selected county examples showing uneven household fish consumption outcomes

County	Pattern	Household consumption change	Per-person consumption change	Interpretation
Busia	Strong gain	+33.18 kg	+5.33 kg/person	Largest positive household consumption example among selected treatment counties.
Embu	Strong gain	+31.27 kg	+5.89 kg/person	Strongest selected per-person consumption gain.
Siaya	Gain	+14.05 kg	+2.60 kg/person	Consumption improved despite production decline in Case Study 1, suggesting household retention may have increased.
Nyeri	Gain	+9.64 kg	+2.56 kg/person	Consumption and per-person availability both improved.
Kiambu	Decline	-8.70 kg	-2.62 kg/person	High consumption remained, but it declined from AOS 1 levels.
Machakos	Decline	-13.61 kg	-2.43 kg/person	Household and per-person consumption both declined.
Kajiado	Slight decline	-1.70 kg	-0.06 kg/person	Consumption remained broadly stable but slightly lower.
Kisii	Slight decline	-1.77 kg	-0.12 kg/person	Small decline in both household and per-person consumption.



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The strongest positive examples were Busia and Embu, where both household and per-person fish consumption increased substantially. However, Kiambu, Machakos, Kajiado and Kisii show that nutrition outcomes did not improve uniformly across all treatment counties. These counties require follow-up to understand whether household consumption declined because of market incentives to sell, lower harvest retention, household preferences, production constraints, or reporting differences.

Women remained active but underrepresented in the aquaculture value chain

Although household fish consumption improved, the gender results do not show a broad transformation in women's participation. Women represented about **one-third of respondents** overall, while men represented about two-thirds. In treatment counties, women accounted for **33% of respondents** in both AOS 1 and AOS 2. In control counties, women accounted for **32%** in both survey rounds. This indicates stable but still male-dominated participation.

The value-chain role data provide an even more cautious message. In treatment counties, women involved in fish production declined from 300 to 288, while women in fish marketing declined from 36 to 21. Women's participation in fish processing remained stable at 5, and women's participation in sale of fish inputs and fish feeds increased from 0 to 3. This suggests that women remained present in the aquaculture value chain, but the data do not support a claim that gender inclusion improved significantly across all roles.

Table 3. Women and youth participation in selected value-chain roles in treatment counties

Role in aquaculture value chain	Women AOS 1	Women AOS 2	Change	Youth AOS 1	Youth AOS 2	Change
Fish production	300	288	-12	92	78	-14
Processing fish	5	5	0	2	2	0
Marketing of fish produce	36	21	-15	8	4	-4
Sale of fish inputs and fish feeds	0	3	+3	0	0	0
Transport of fish produce	1	1	0	0	1	+1

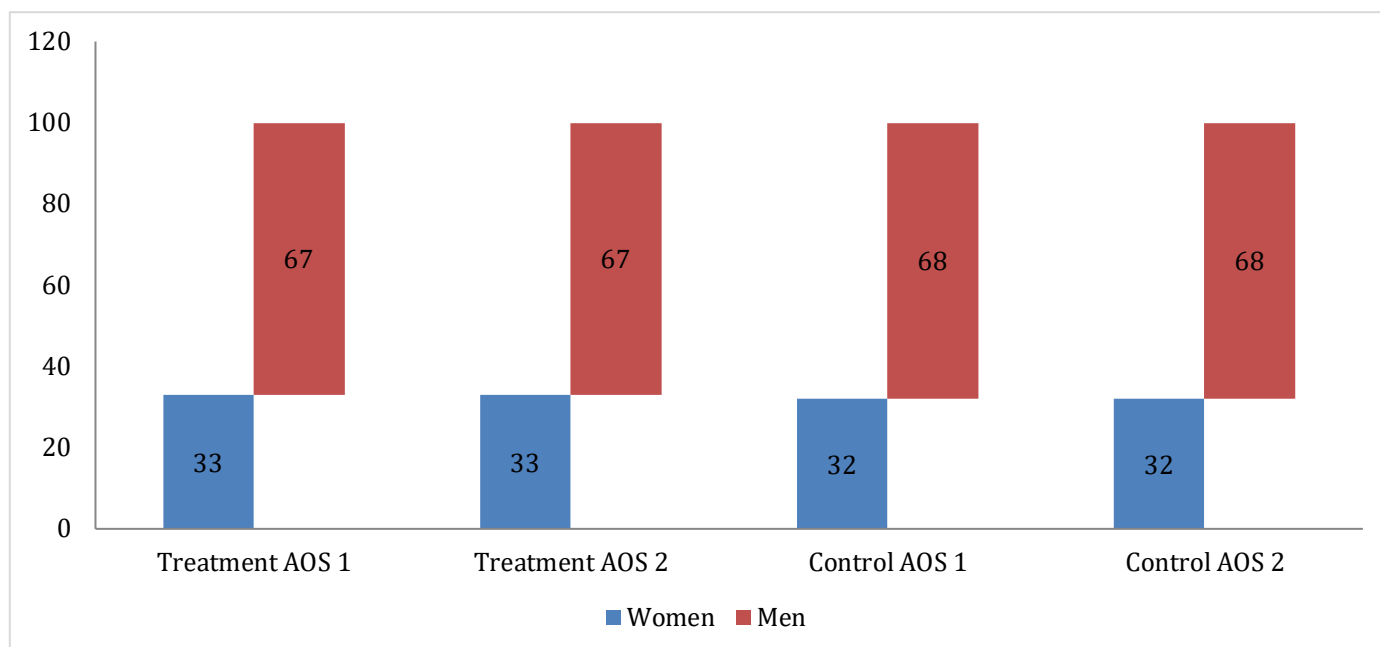


Figure 3. Women represented about one-third of respondents across treatment and control counties in both AOS 1 and AOS 2, indicating stable but still male-dominated participation.

Youth and disability inclusion require deliberate strengthening

Youth participation also requires cautious interpretation. In treatment counties, youth in fish production declined from 92 to 78, youth in marketing declined from 8 to 4, and youth in processing remained at 2. Youth participation appeared only marginally in transport, increasing from 0 to 1. These results suggest that youth remained involved in the aquaculture labour force, particularly through casual and temporary work, but youth participation in core value-chain roles did not expand substantially.

Disability inclusion should be retained as an important programming consideration. AOS 2 demographic data show persons with disabilities at around 5% in both treatment and control groups. This is a useful inclusion marker, but it should not be treated as a major outcome result unless supported by additional evidence on how persons with disabilities benefited from aquaculture training, employment, enterprise ownership or household nutrition gains.

What the findings mean

The findings show that aquaculture growth can contribute to household nutrition when households retain part of their harvest for consumption. In treatment counties, households increased both the amount of fish consumed and the amount available per person. This is important because it shows that aquaculture outcomes were not limited to production and income; they also had a household food-access dimension.

However, the inclusion findings show that improved production and consumption outcomes do not automatically translate into stronger participation by women and youth. Women remained underrepresented, and their participation declined in some important value-chain roles. The next phase should therefore deliberately connect



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aquaculture commercialization with household nutrition messaging, women's control over fish use and income, women-led processing and marketing, youth enterprise pathways, and inclusive service delivery.

Lessons learned

- **Aquaculture can support household nutrition when fish remains accessible and households retain part of production for home consumption.** The increase in household and per-person consumption in treatment counties suggests that aquaculture can improve both income and household access to fish.
- **Nutrition outcomes vary by county.** Busia and Embu recorded strong gains, while Kiambu, Machakos, Kajiado and Kisii declined, showing the need for county-specific follow-up.
- **Gender inclusion requires more than participation counts.** Women remained active but underrepresented, and their participation declined in production and marketing roles. This indicates that nutrition gains were not automatically matched by stronger women's participation or decision-making power in the aquaculture value chain.
- **Youth participation needs stronger enterprise pathways.** Youth were present, but participation in core production and marketing roles declined in treatment counties.

Recommendations

- Promote household fish consumption alongside commercialization by encouraging households to reserve part of production for home consumption, especially in counties where consumption declined.
- Integrate nutrition education into aquaculture support so that households understand the dietary value of consuming fish regularly, not only selling it.
- Strengthen women's participation in processing, marketing, input supply and enterprise management, where women can capture more value from aquaculture growth.
- Track who controls fish sales income and who decides how much fish is sold or consumed, because household decision-making is central to nutrition outcomes.
- Develop targeted youth enterprise pathways beyond casual labour, including training in hatchery work, input supply, aggregation, transport, digital marketing and value addition.
- Include persons with disabilities in training, enterprise development and monitoring systems so that inclusion is measured beyond basic representation.

Short data box

Indicator	Headline result
Treatment household fish consumption	26.99 kg in AOS 1 to 35.23 kg in AOS 2; gain of 8.24 kg per household.
Control household fish consumption	18.23 kg in AOS 1 to 21.59 kg in AOS 2; gain of 3.35 kg per household.
Treatment per-person fish consumption	4.56 kg in AOS 1 to 6.04 kg in AOS 2; gain of 1.48 kg per person.
Control per-person fish consumption	3.17 kg in AOS 1 to 3.61 kg in AOS 2; gain of 0.43 kg per person.
Gender representation	Women represented about one-third of respondents; men remained the majority.
Inclusion caution	Women and youth participation remained uneven; the data do not support a claim of significant gender transformation.