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"Strengthening Circular Economy and Valorisation of side-streams in RAS Aquaculture"

AQUALOOP International Conference

Stakeholder support, knowledge transfer and consumer perception – evidence from Polish aquaculture

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Structural mismatch between stakeholders

Circular economy is promoted by:

- policy makers
- researchers

...implemented by:

- producers
- processors
- other market actors

...accepted by:

- consumers

Primary constraint:
Economic feasibility...

Not environmental ambition.

Stakeholder	Primary objective	Circular economy priority
Producers	profitability, stability	only if economically viable
Administration	compliance, environmental targets	high
Scientists	innovation, optimisation	very high
Consumers	price, convenience, taste, health	indirect, declarative

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African catfish RAS production: ideal biological candidate

African catfish production characteristics:

- fast growth cycle (6–9 months)
- excellent feed conversion ratio (0.95–1.3)
- full compatibility with RAS
- year-round production

Biologically ideal for circular economy.

Economically constrained (both core products and side-streams products)

Critical constraint 1: sidestream scale

Sidestream valorisation depends on volume.

E.g. 10-50 tonnes of sidestreams per year (typical for African catfish in Poland):

- too small for dedicated collagen or gelatin extraction
- too small for industrial upcycling
- difficult to sell efficiently
- logistically inefficient

Circular economy requires aggregation.

Scale is a hard constraint.

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Critical constraint 2: who should valorise sidestreams?

Possible actors:

- Fish farmer
- Fish processor
- External specialised processor

Each has structural limitations.

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Why farmers cannot upcycle sidestreams

Fish farmers lack:

- processing infrastructure
- technological capability
- specialised expertise
- investment capital
- regulatory approvals

Their core competence is fish production.

Not advanced processing.

Upcycling at farm level is unrealistic in most cases.

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Why processors are also limited

Fish processors understand:

- traditional fish processing
- fish markets

But sidestream upcycling requires knowledge of e.g.:

- collagen markets
- gelatin markets
- functional ingredients markets
- feed ingredient markets

These are completely different industries.

Processing sidestreams is (usually) not a simple extension of fish processing.

It is a separate sector.

Critical missing actor: sidestream integrators

Circular economy requires specialised integrators.

Their role:

- collect sidestreams from multiple producers
- aggregate volume
- perform industrial upcycling
- access specialised markets

Logistics is the hidden bottleneck.

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Evidence from Polish African catfish development project

Major market barriers identified:

- fragmented supply
- product and logistics offer not aligned with the expectations of retail and HoReCa
- for side-streams: lack of market knowledge and small, fragmented volumes.

Consumer perception is the main but not only barrier.

Key consumer drivers

Positive:

- boneless fish
- convenience
- taste

Negative:

- unfamiliar species
- lack of culinary knowledge
- lack of brand recognition
- unfamiliar origin = safety worries

Evidence from Polish African catfish development project

Key finding: market development precedes circular economy

Circular economy sequence is:

Market demand for main product → processing
→ sidestream generation→ sidestream valorisation

Not the reverse.

Sidestream valorisation cannot create primary market demand.

Evidence from Polish African catfish development project

Lesson for the future: optimal circular economy project structure?

- Market research
- Technology assessment
- Processing optimisation
- Product development
- Consumer validation
- Market introduction
- Promotion and distribution

Circular economy cannot be implemented without market integration.

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Final conslucions

Success in circular economy depends on many factors:

- applicable technologies
- knowledge transfer
- processors/intergrators
- markets
- consumers…

Circular economy in aquaculture should not be perceived
only as a technical challenge.

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Out of the presentation

We need a circular economy.

The opportunity exists.

The market may exist.

But circular economy will only happen
if stakeholders are motivated
and willing **to change**.

Not only farmers, processors,
but also researchers, NGOs, and policymakers…

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