Economic Viability of Biofloc Technology (BFT) vs. Traditional Systems for Small-scale Tilapia Farmers in Bogor, Indonesia

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Background

- **Indonesia's aquaculture potential**: the second-largest aquaculture producer globally.
- 80% of aquaculture is **small-scale and traditional,** often inefficient.
- **Biofloc Technology (BFT)** is a sustainable approach utilising microbial communities to treat water, recycle nutrients, and provide supplementary protein to cultured species.
- Is BFT economically viable for small-scale tilapia farming despite its benefits? (By comparing Net Present Value).

Different types of production systems used for tilapia farming in Bogor, Indonesia.

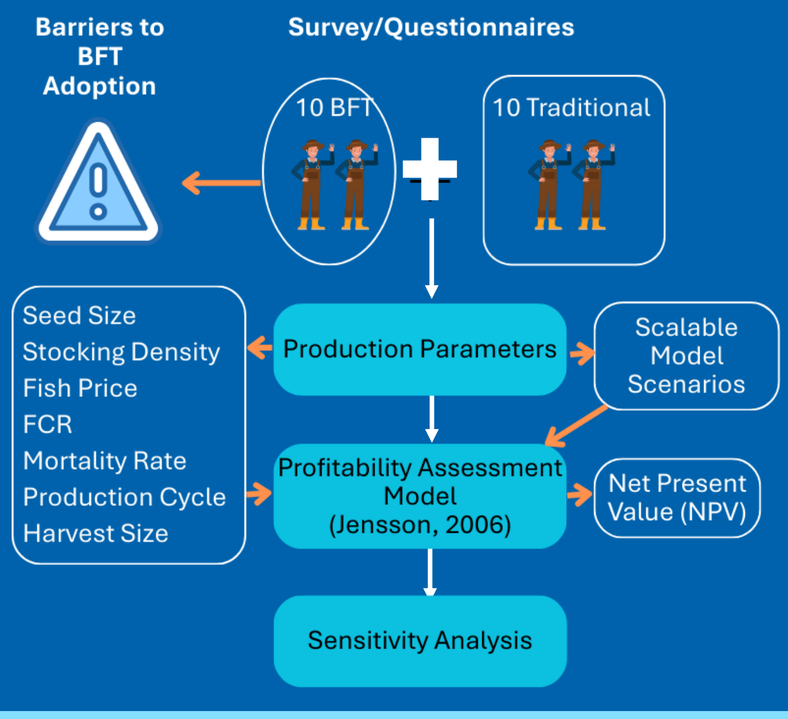
a. BFT as a sustainable approach.

b. Traditional system using concrete ponds.

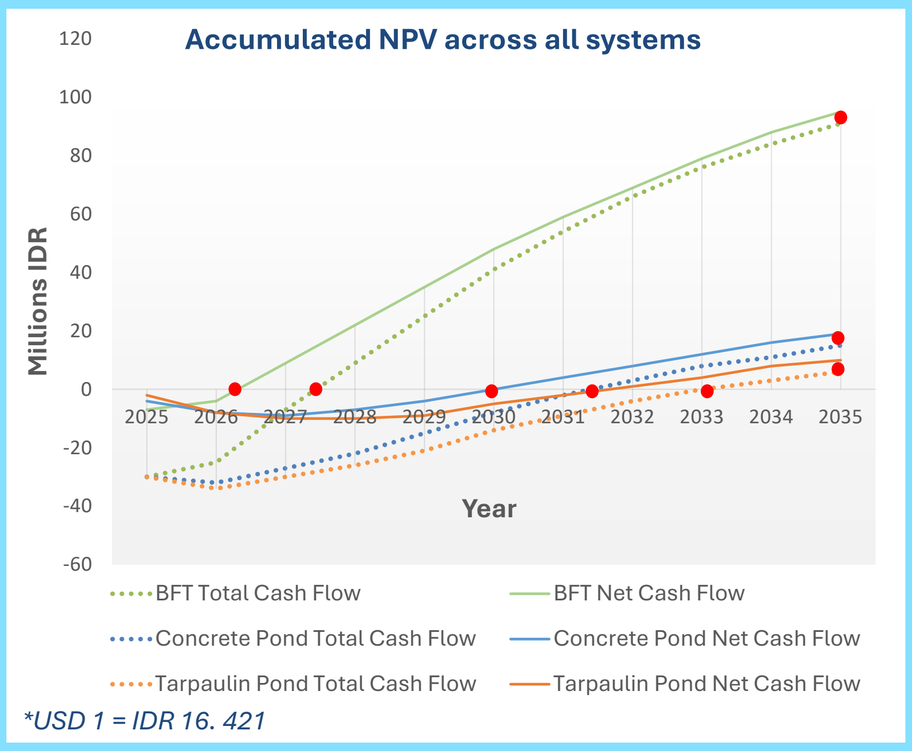
Objectives

- Assessing the profitability of BFT and traditional systems.
- Developing a scalable adoption model of BFT for small-scale tilapia farming.
- Identifying barriers to BFT adoption.

Methodology

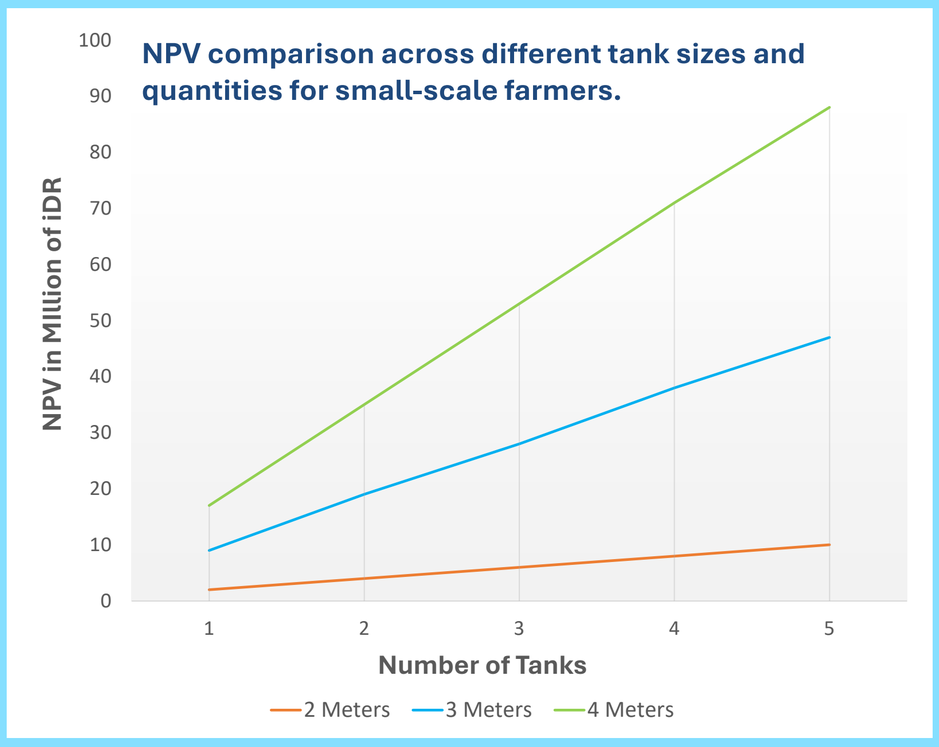


Results

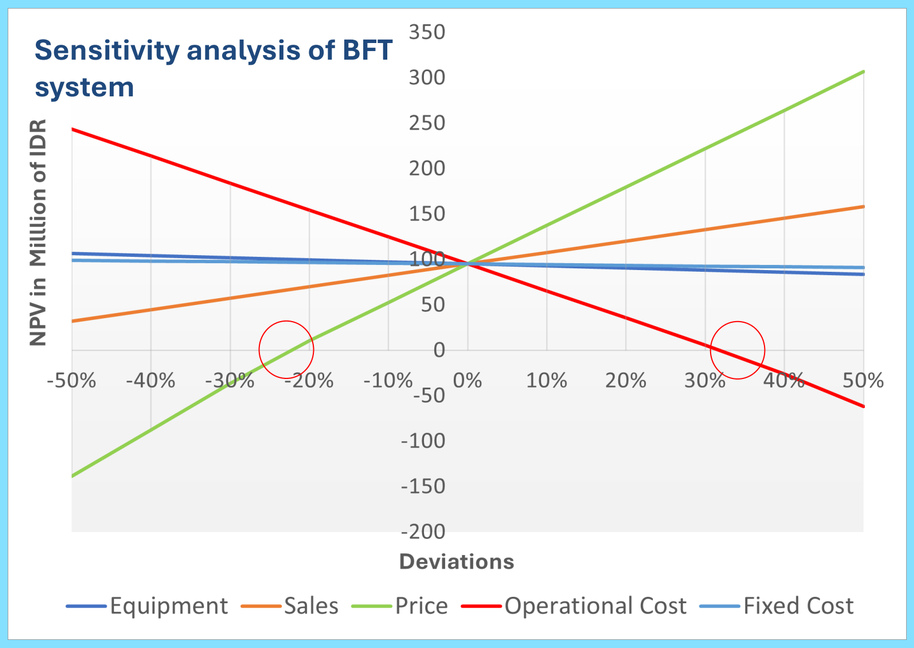


*USD 1 = IDR 16. 421

- BFT generates an NPV nearly 5x higher than concrete and around 8x higher than tarpaulin.
- BFT offers 4x shorter payback periods than other systems.
- BFT shows higher NPV, despite the same IDR 30M investment.

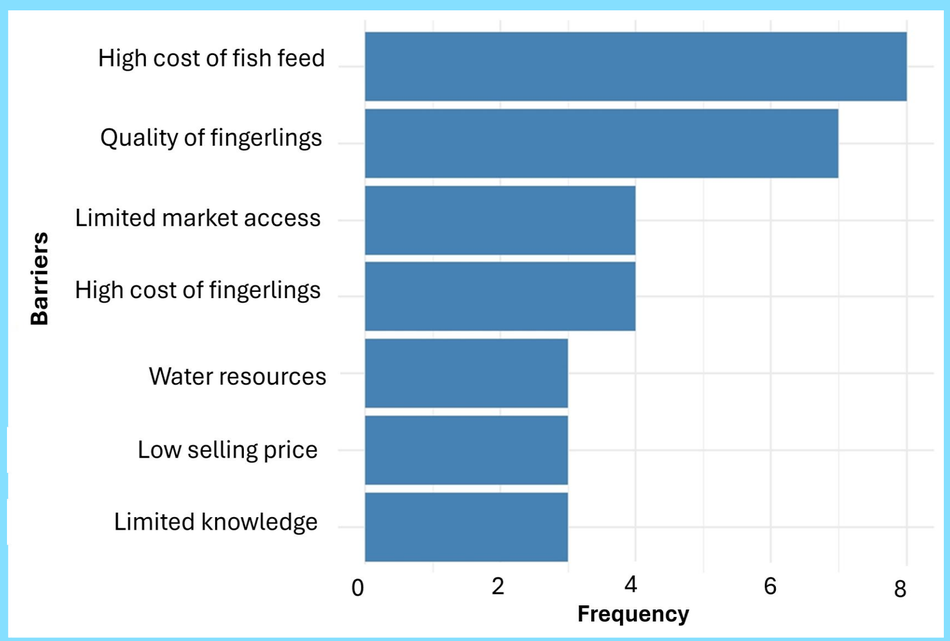


- Larger tanks (4m) are more cost-efficient and profitable → 51% lower unit cost, 2x–9x higher NPV than smaller tanks.
- Smaller tanks face higher risks (e.g., pH fluctuations during rain).



- A 50% price increase generates over 3x higher profit than the baseline.
- A 30% increase in operational costs causes the NPV to become negative.

Farmers' responses to BFT adoption barriers



- Fish feed is the most significant portion of operational expenses.
- Fingerling quality affects growth rates, feed conversion rate, and overall yields.
- Limited market access forces farmers to sell to middlemen who pay less, reducing profit margins.

Conclusion

- BFT outperforms economically due to more production cycles (3 harvests annually), higher production volume, and better efficiency (higher stocking density and lower FCR).
- However, its success relies heavily on precise management, skilled operators, and better market access.
- Conventional systems are easier to manage but less productive.
- Larger modular BFT tank (4-meter) provides more returns for small-scale farmers.
- High feed costs, poor fingerling quality, and limited market access are key barriers to BFT profitability.

Key Message

"BFT offers a more economically viable option for tilapia farming than traditional systems. However, its adoption by small-scale aquaculture farmers needs integrated support rather than technology transfer alone".

Limitations and Recommendations

- Small sample size for 10 traditional farmers limits the depth of comparative analysis.
- Improve training programs and better market access to help farmers achieve the economic potential of BFT.
- Research effective knowledge transfer methods for diverse small-scale farmers.

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