Performance and robustness of tilapia-shrimp polyculture in Java (KB35-101-001)

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Background

Polyculture systems is claimed to be a game-changer for improving environmental sustainability and the pond farmers' production (Hossain et al., 2022; Knowler et al., 2020). However, polyculture systems are complex, where production performance is not only influenced by the pond inputs but also by species interactions (Thomas et al., 2021). Studies in polyculture are scarce, existing models mainly focus on single species. Thus, attempt to optimize polyculture system is challenging.

Objective

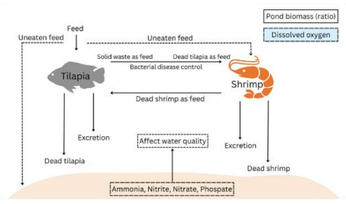
Develop a bioeconomic multispecies aquaculture model to predict and optimize the results of polyculture ponds, incorporating species interactions.

Methods (1st sub-objective)

DECIDE MULTISPECIES SYSTEMS CASE AND SPECIES

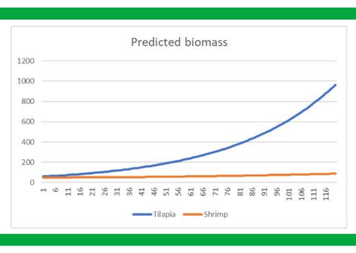
Smallholder brackish water tilapia-shrimp pond polyculture in Java

BUILD CONCEPTUAL SYSTEM OF TILAPIA-SHRIMP POND POLYCULTURE



DEVELOP BIOECONOMIC MULTISPECIES MODEL

Parameterization based on inputs and outputs of the polyculture ponds

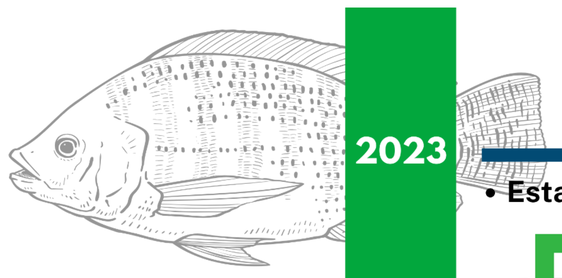


SENSITIVITY ANALYSIS

TILAPIA-SHRIMP POLYCULTURE SYSTEMS SIMULATION

FINALIZATION AND PUBLICATION

Outcomes (2023-2004)



2023

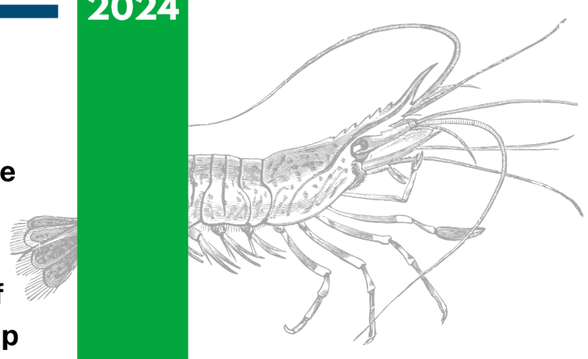
- Establish network

WMR

- Polyculture data and parameters
- Develop bioeconomic multispecies model 1.0

2024

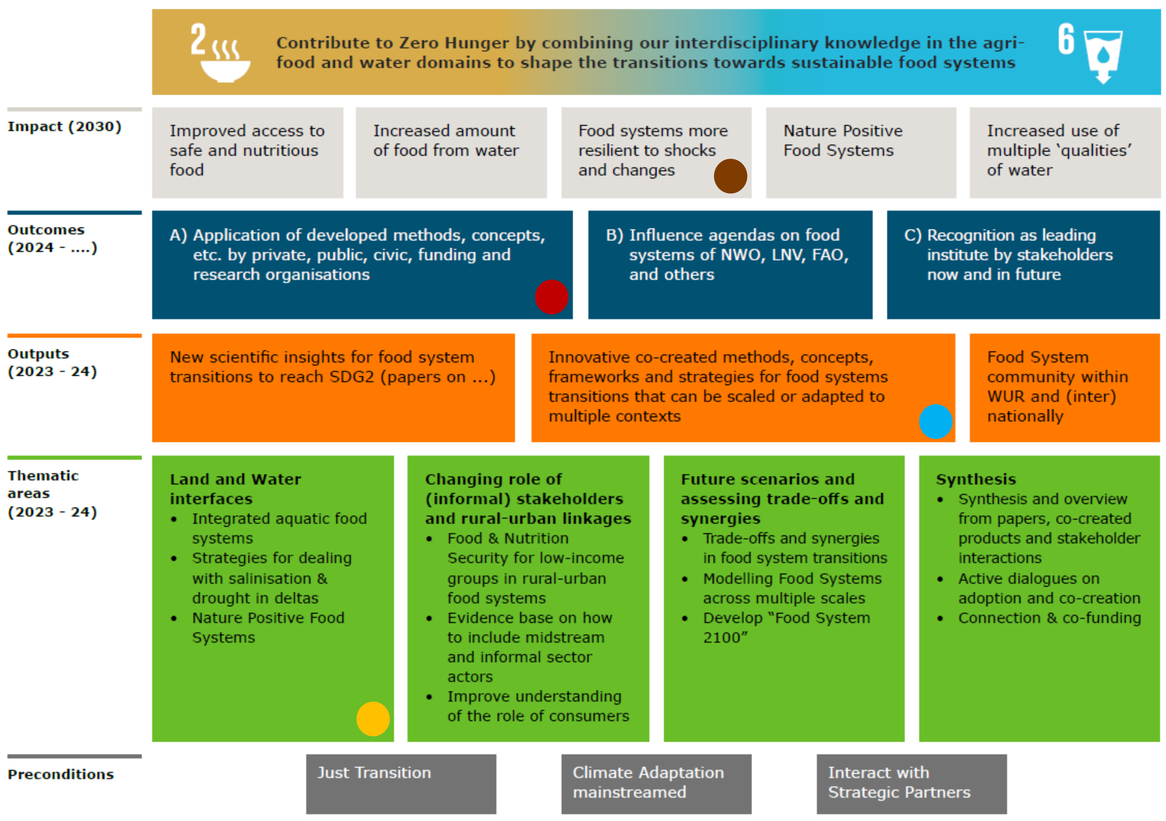
- Publish bioeconomic multispecies model
- Test the model with available farmer data from Indonesia
- Assess economic stability of polyculture for tilapia-shrimp farmers



Link to Theory of Change KB35

- Contribute to production stability for polyculture aquatic systems.
- The bioeconomic multispecies model is expected to be a reliable prediction tool when challenge with innovation and changes.
- Using knowledge of polyculture aquatic systems in the field to develop our model. Initiating collaboration with farmers and business' to improve the model and promote its use.

Theory of Change Food and Water Security



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Business Economics Group

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Wageningen Economic Research

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Thomas, M., Pasquet, A., Aubin, J., Nahon, S., & Lecocq, T. (2021). *When more is more: taking advantage of species diversity to move towards sustainable aquaculture*. https://doi.org/10.1111/brv.12677i