Investigating the sustainability of using wild-caught fish as feed in aquaculture through a systems approach

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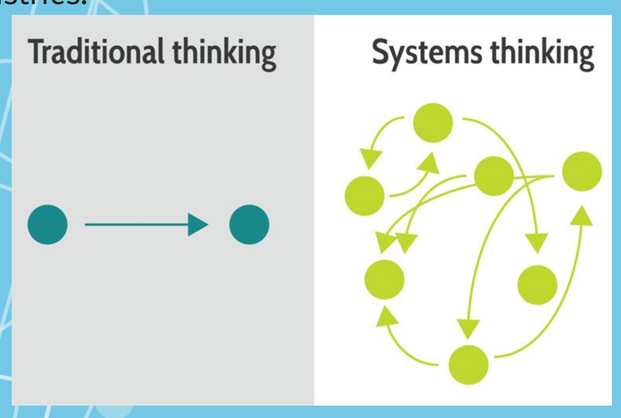
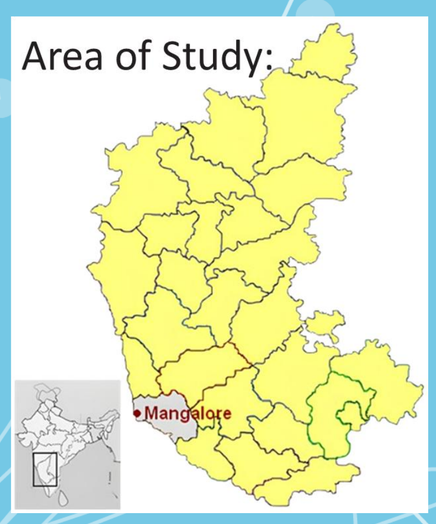
Introduction

A greater percentage of all seafood products are derived from fish farming. Fish meal, a major ingredient used in fish feed for aquaculture, is a value-added product of capture fisheries. The rise in fish farming and fall or stagnancy in wild stocks has raised concerns about the nutritional security of coastal communities and the future of fish meal industries.



A systems approach gives a holistic view of the ecologic, social and economic factors that influence the link between capture fisheries and aquaculture.



Mangaluru is a coastal city in the state of Karnataka, in the Southern part of India. It has all three fishing sectors and is a hub for fish meal and fish oil industries.

Aims and Objectives

AIM: To qualitatively define the ecological, social, and economic system that links capture fisheries with aquaculture; quantifying the factors that influence the sustainability of sourcing raw materials from wild-caught fish for aquaculture feed in India.

OBJECTIVES:

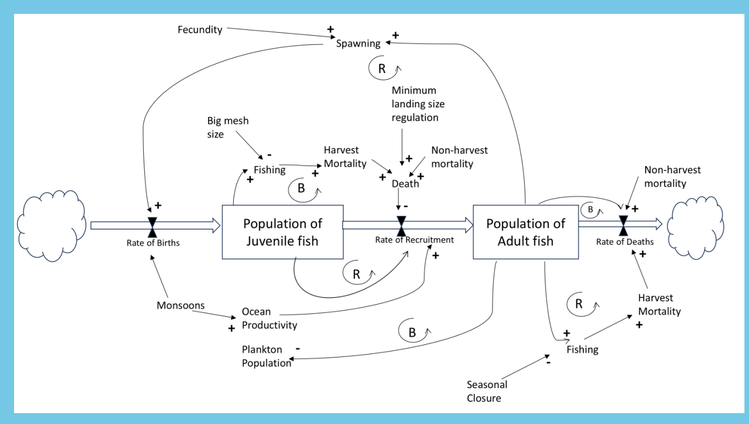
1. What are the trends in raw material sourcing for the Fish Meal Fish Oil Industries (FMFOI) over time – Study in Mangaluru.
2. What is the relation between the trends and the leverage points/drivers on the raw material sourcing for FMFOI over time? – study in Mangaluru.
3. What is the influence of currently employed fishing regulations on sourcing of wild-caught fish for FMFOI in Mangaluru?
4. Exploring the changes in the behaviour of this ecological social and economic system with a system dynamics model.

Method

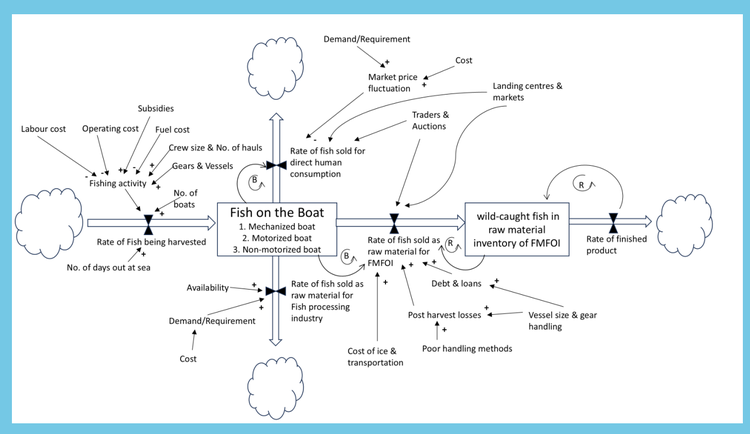
- Qualitative research method – Ethnography to understand the market dynamics.
- Semi-structured interviews of stakeholders
- Data collection and analysis – Fish landings, fish population, marine products export and other relevant data.
- Using Soft Systems methodology to define the qualitative model of the system.
- Developing the system dynamics model and analyzing the changes in the behavior of this dynamic, inter-connected fisheries system.

Results and Discussion

These are the preliminary results of the study. The ecological system dynamics model addresses the factors that influence the fish population in the marine environment.



The social and economic system dynamics model addresses factors that influence the fisheries system after the fish is harvested.



These are attempts at depicting the complex, dynamic, interconnected fisheries systems. At present, the field-work and data collection is ongoing at the study site. Post analysis, the system dynamics model will be developed to predict the changes in the behaviour of the system. This work will help in identifying the trade offs, synergies and future policies.

Summary

- **What ecological, social and economic factors influence the sustainability of sourcing raw materials from wild-caught fish for aquaculture feed? Study in India.**
- **Exploring the changes in the behaviour of this ecological, social and economic system with a system dynamics (SD) model.**

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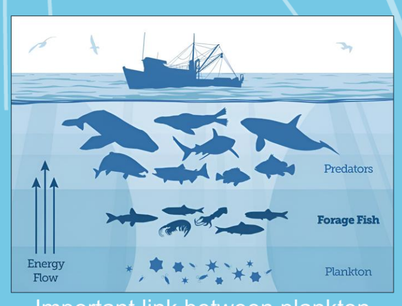

Important link between plankton and predators – forage fish.

Aquaculture – farming of fish.

Capture fishery – sea fishing.

'Fish unfit for human consumption – raw material for fish meal industries.

Fish meal – dry powder rich in animal protein.

Fish feed – artificial pellet feed for farmed fish.

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