

# I4F Project – Intelligent Fish Farming for Future



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## Objective

The I4F project aims to develop an innovative software platform for the aquaculture sector. In short, the software will determine fish weight from images to avoid manipulation and predict weight distribution depending on temperature, salinity, dissolved oxygen and feeding. It will also minimize unnecessary handling and facilitate the planning of fish grading procedures. The I4F project will represent a paradigm shift in aquaculture by improving productivity, fish quality and sustainability, and reducing the environmental footprint.

## The Problem

Growth dispersion in aquaculture is a problem that directly affects economic yield at harvest. To minimize weight dispersion, fish farmers periodically grade and redistribute fish among production tanks/ponds. However, this process is labor intensive and costly, and increases the risk of disease and mortality. Feeding is the largest cost in aquaculture, and feed waste has significant environmental and economic impacts. Fish farmers also lack tools to facilitate production management, which increases the risk of economic returns.

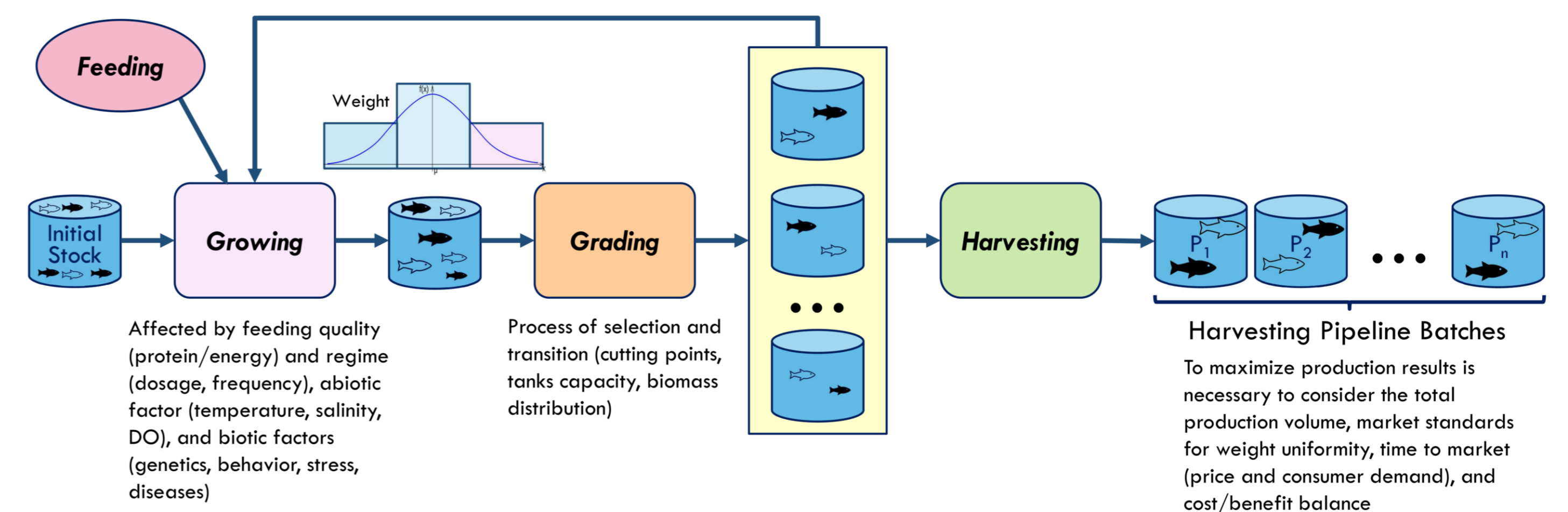


Fig.1 – Aquaculture Production Cycle.

## Research Problems

- 1) Continuous monitoring of growth in the tank without manipulating fish, to minimize stress and sampling costs.
- 2) High weight dispersion and feed wastage.
- 3) Grading process optimization of resources utilization and reducing weight dispersion.

## Research Solutions

**State-of-the-art methods to address the complex problems**

Computer vision and Deep learning instance segmentation algorithms to estimate fish weight from images.

**Outcome:** continuous monitoring of fish growth without handling.

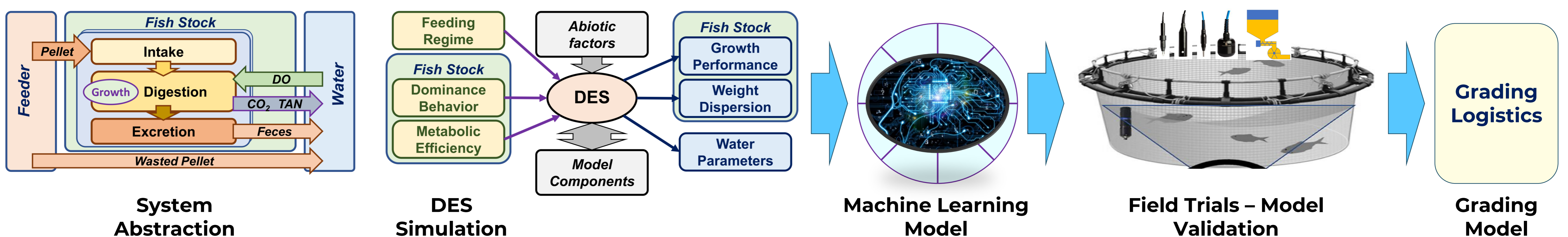
A control system based on a hybrid approach: Discrete Event System simulations (model based) + machine learning models (data-driven approach)

**Outcome:** minimize growth dispersion and feed waste.

Resources optimization of grading processes using clustering algorithms integrated with data provided by solutions 1) and 2).

**Outcome:** Optimization of resource utilization in the production cycle.

## Project Summary



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