The whole Philippines can be a Tubbataha Reef UNESCO World Heritage Site…

"Assessing Sources and Pathways of Nutrient Pollution in the Coral Triangle"
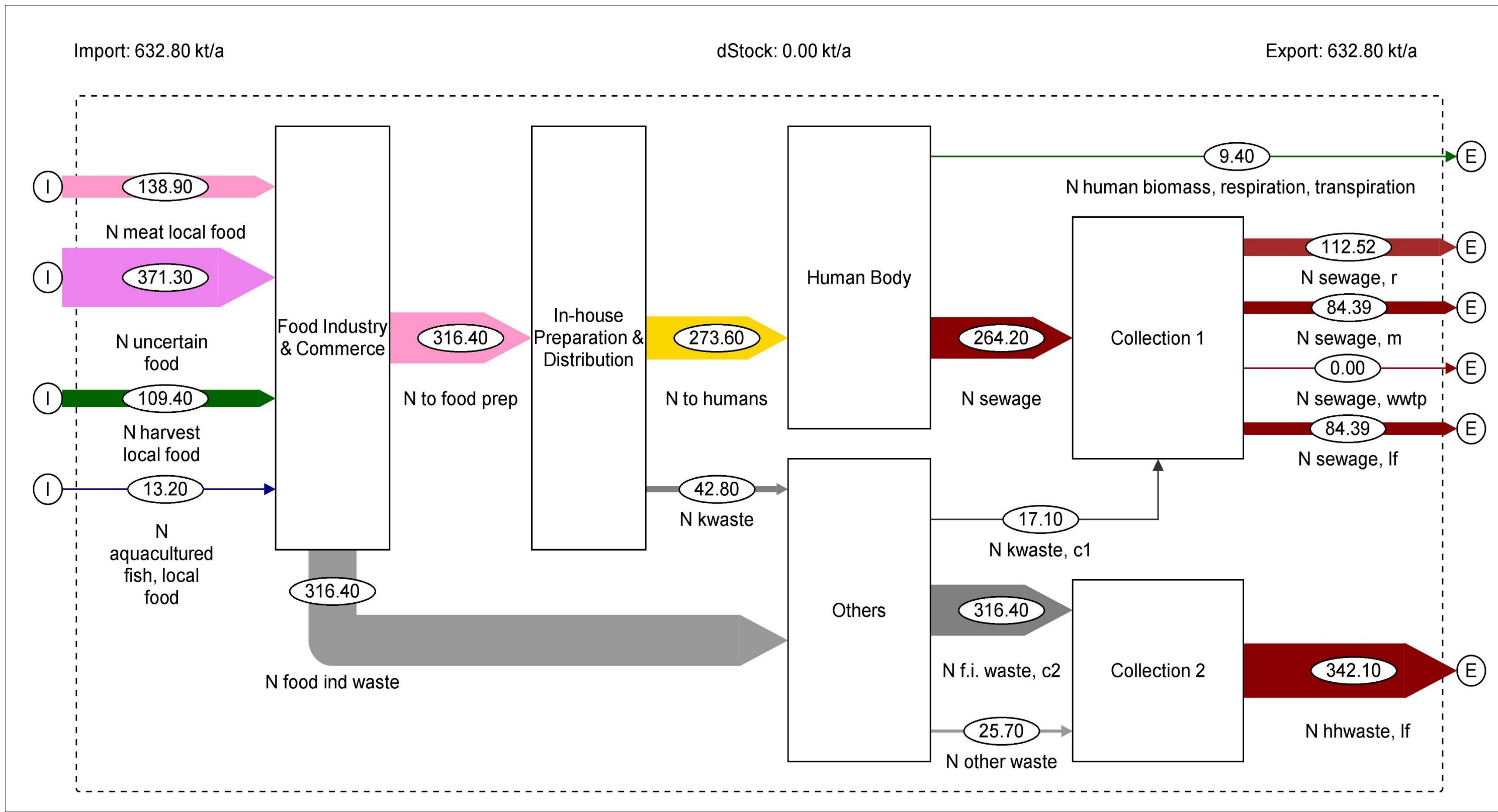### Author: Ann Marie Manhart

Abstract:

-N and P are precursors to eutrophication and harmful algal blooms. Increase in these nutrients also increase the growth of crown of thorns which eat up coral reefs.

-The study explores a model depicting N (Nitrogen) and P (Phosphorus) contributions of Philippines, Malaysia, and Indonesia in the Coral Triangle.

-Methodology is **Substance Flow Analysis (SFA)**, a mass balance approach.

-Area of study is based on the activity "to nourish", aquaculture and agriculture.

-The base year is 2005, while the total contributions of the 3 countries are estimated to be at **700 kt of N/annum** and **190 kt of P/annum**.

-Main sources of N and P are excess nutrients from **commercial fertilizers in agriculture** accruing as stocks in soils and run-off to rivers, **untreated human and animal wastes**, and **effluents from aquaculture**.
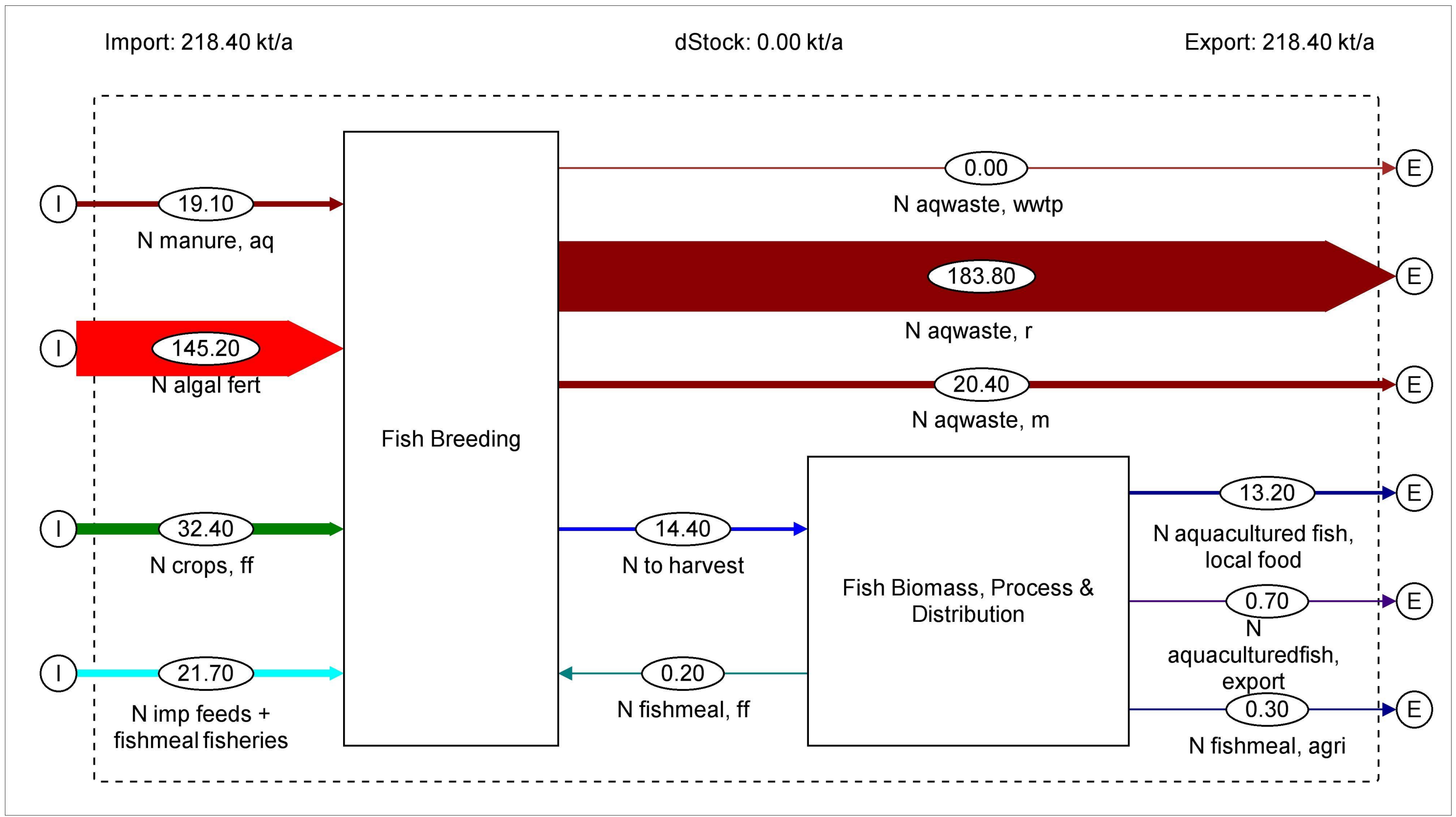
-Healthy coral reefs and pristine waters are pre-requisites to marine ecosystems which are able to rejuvenate themselves properly.

-Without controlling N and P, water quality, marine life, and people relying on the sea for food; tourism; and other livelihood needs will greatly be affected.

-Estimated contributions of the **Philippines: 226 kt N/a, 130 kt P/a**.
-Estimated contributions of **Malaysia (Sabah): 39 kt N/a, 14 kt P/a**.
-Estimated contributions of **Indonesia (East Indonesia): 166 kt N/a, 46 kt P/a**.

-**"To Nourish" Subsystem**: Two of the most significant N flows in the Philippines come from food industry waste and human sewage.

-**Aquaculture Subsystem**: In the Philippines' aquaculture sector, one of the biggest sources of N come from algal fertilizers which induce the growth of algae. Biggest N outflows are untreated aquaculture waste water.

-**Agriculture Subsystem**: The biggest flows of N in the Philippines' agriculture sector come from animal excretions and commercial fertilizers. Recycling animal waste to fertilizers is an efficient way of reducing nutrient pollution.

-Interventions are needed to reduce pollution: **secured landfills** properly treating leachate, **waste water treatment plants**, and the **prudent use of fertilizers** are viable solutions.

-Main result of this study is a consistent methodological approach for establishing the necessary knowledge base in regional nutrient analysis.

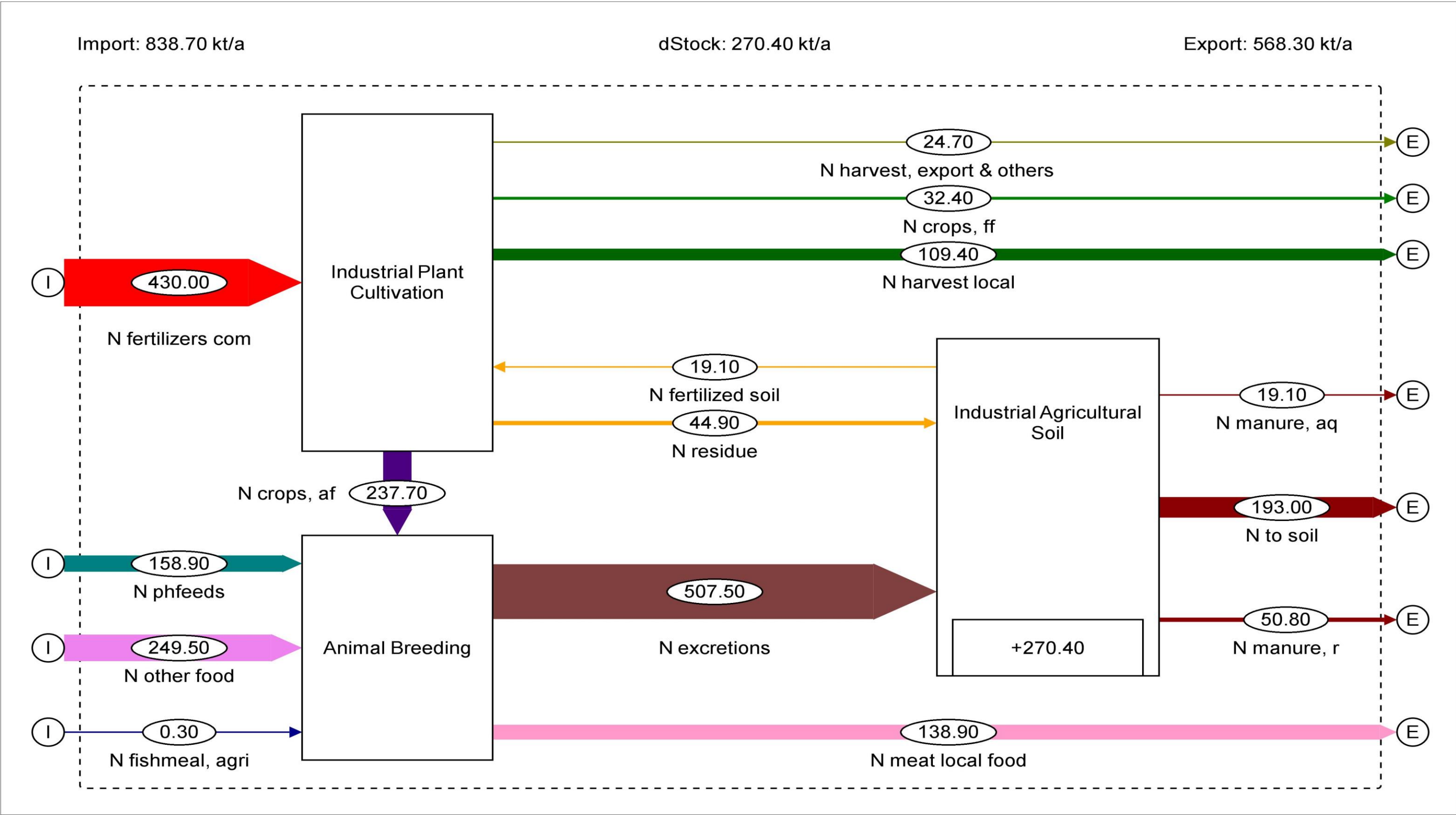-Additional work is needed to collect better, improved data.
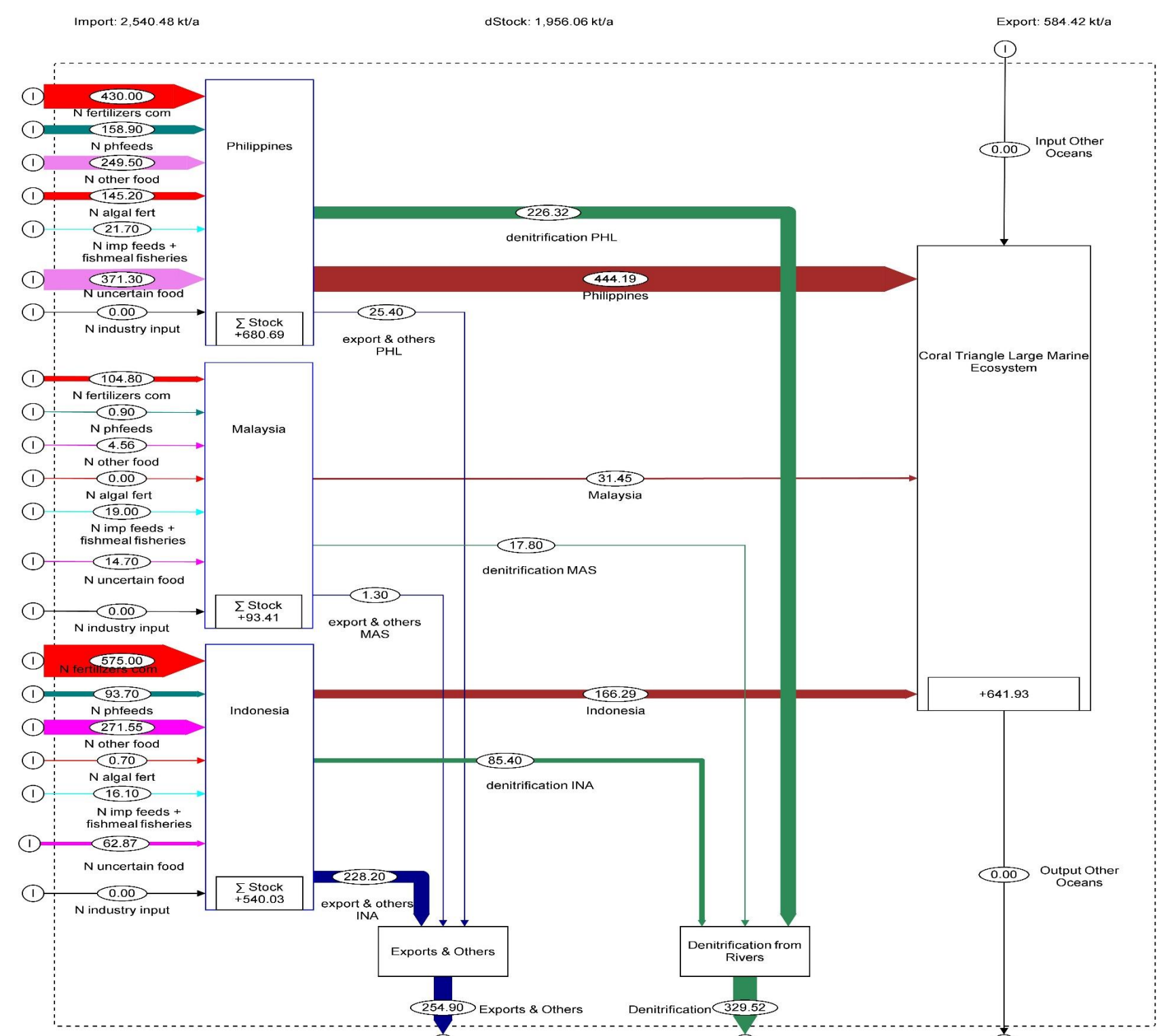
"To Nourish" Subsystem-Philippines, N

Aquaculture Subsystem-Philippines, N

Agriculture Subsystem-Philippines, N

Coral Triangle Large Marine Ecosystem (CTLME) System, N

-It is important to note that N flows into the country stocks are significantly higher than the flows to the CTLME.

-This is an environmental problem because even though reaction time is slow, these stocks will be future emissions into the CTLME.

-Although nutrient inflows in the future would have been reduced or even eliminated, the situation that these nutrients are already in stock creates a huge dilemma.

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