# A TILAPIA HATCHERY WITH RECIRCULATING WATER SYSTEM

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# Tilapia Hatchery Systems

## Ponds

## Hapa in ponds

Photos courtesy of Ruel Eguia

# Hapas in lakes/rivers/ impoundments

Photos courtesy of Ruel Eguia

# Tanks


Photo courtesy of Ruel Eguia

# BENEFITS OF RECIRCULATION

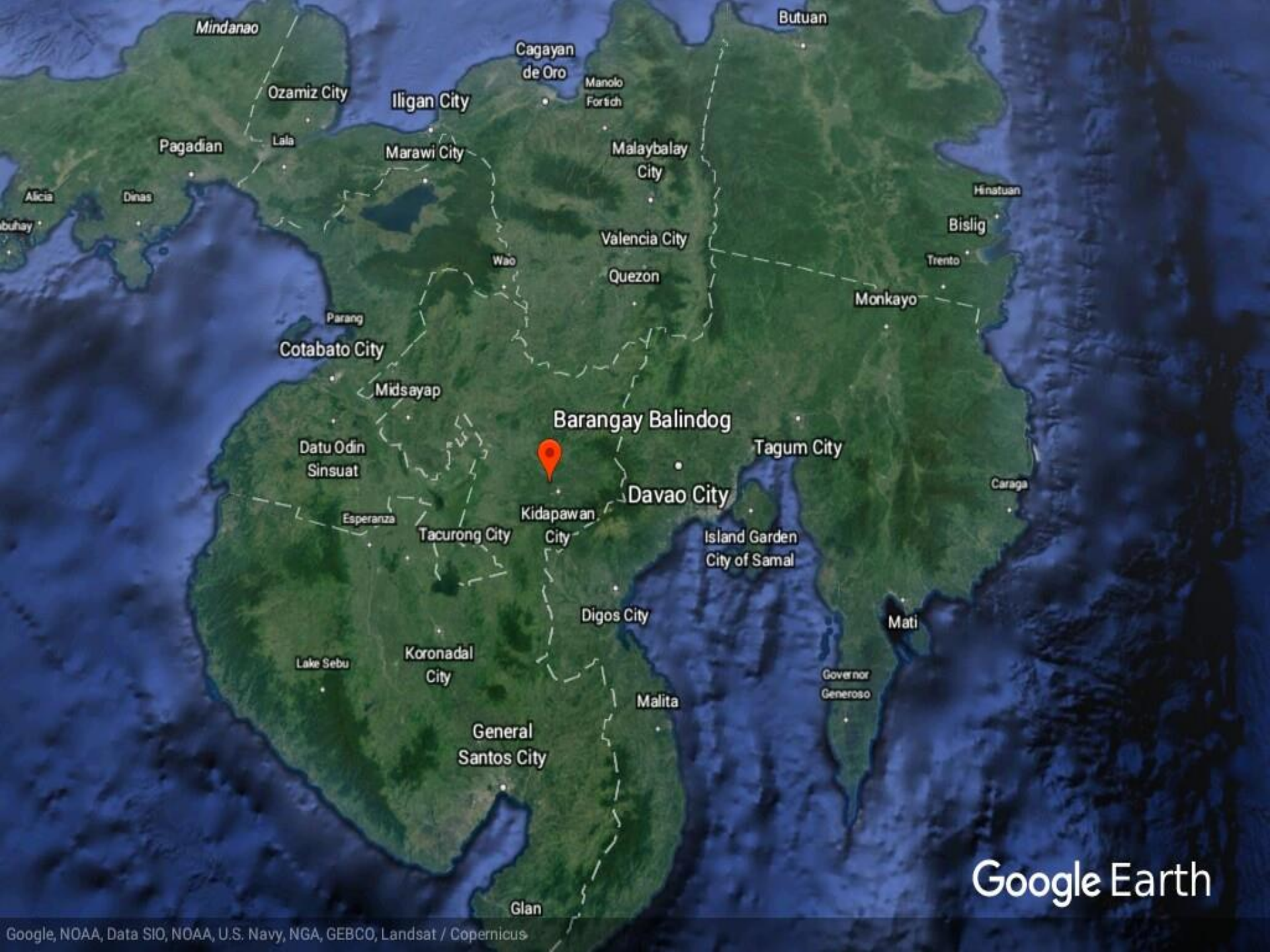
- Increased biosecurity

- Stable water conditions

- Reduced effluent discharge

# Project Site


HUNAN
GUANGDONG
Philippine Sea
Luzon
Paracel Islands
South China Sea
Philippines
Panay
Negros
Spratly Islands
Mindanao
Palawan
Sulu Sea
SABAH
Google Earth
SK telecom, Google, IBCAO, Data SIO, NOAA, U.S. Navy, NGA, GEBCO, Landsat / Copernicus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Island Garden City of Samal
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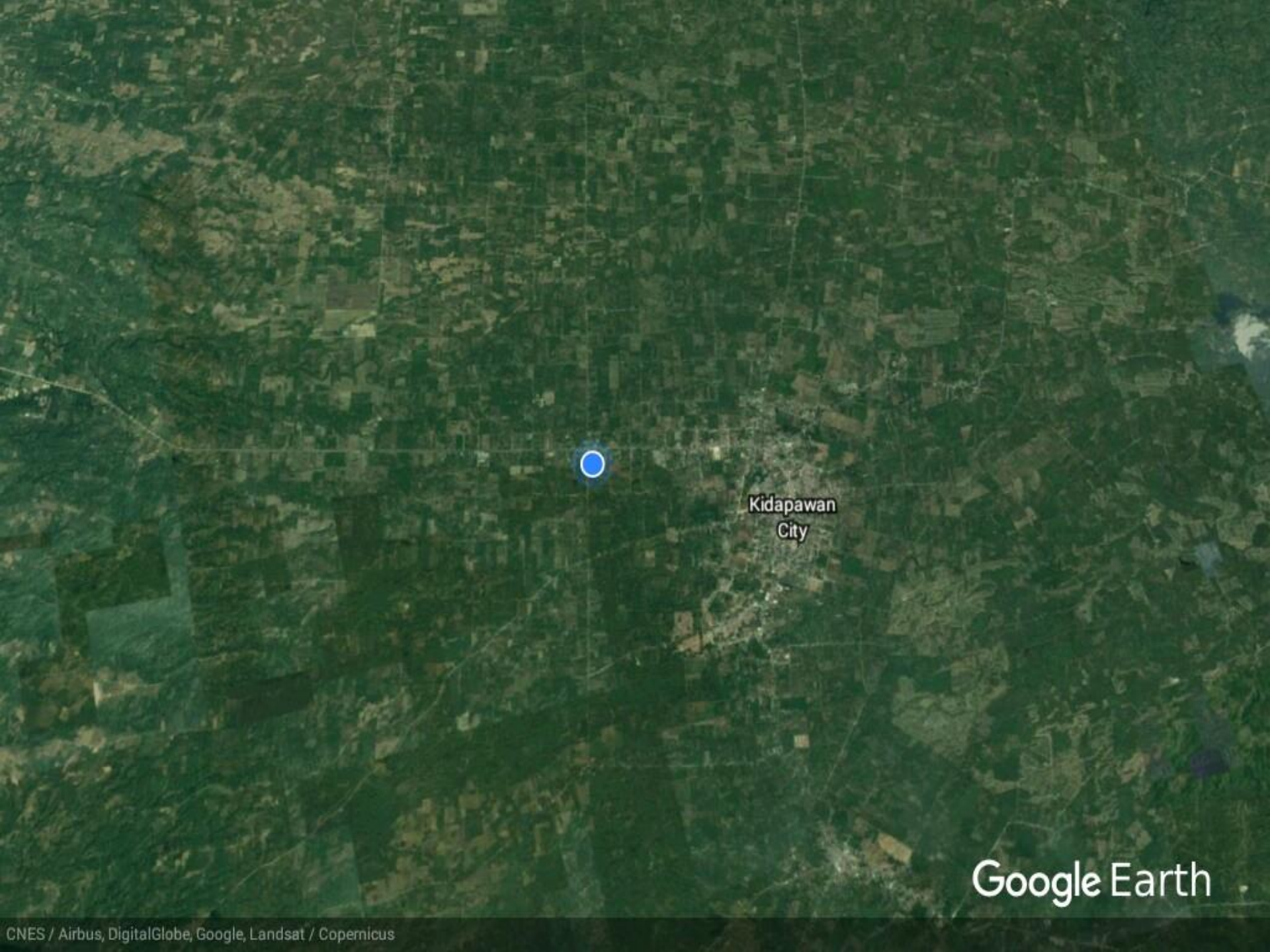
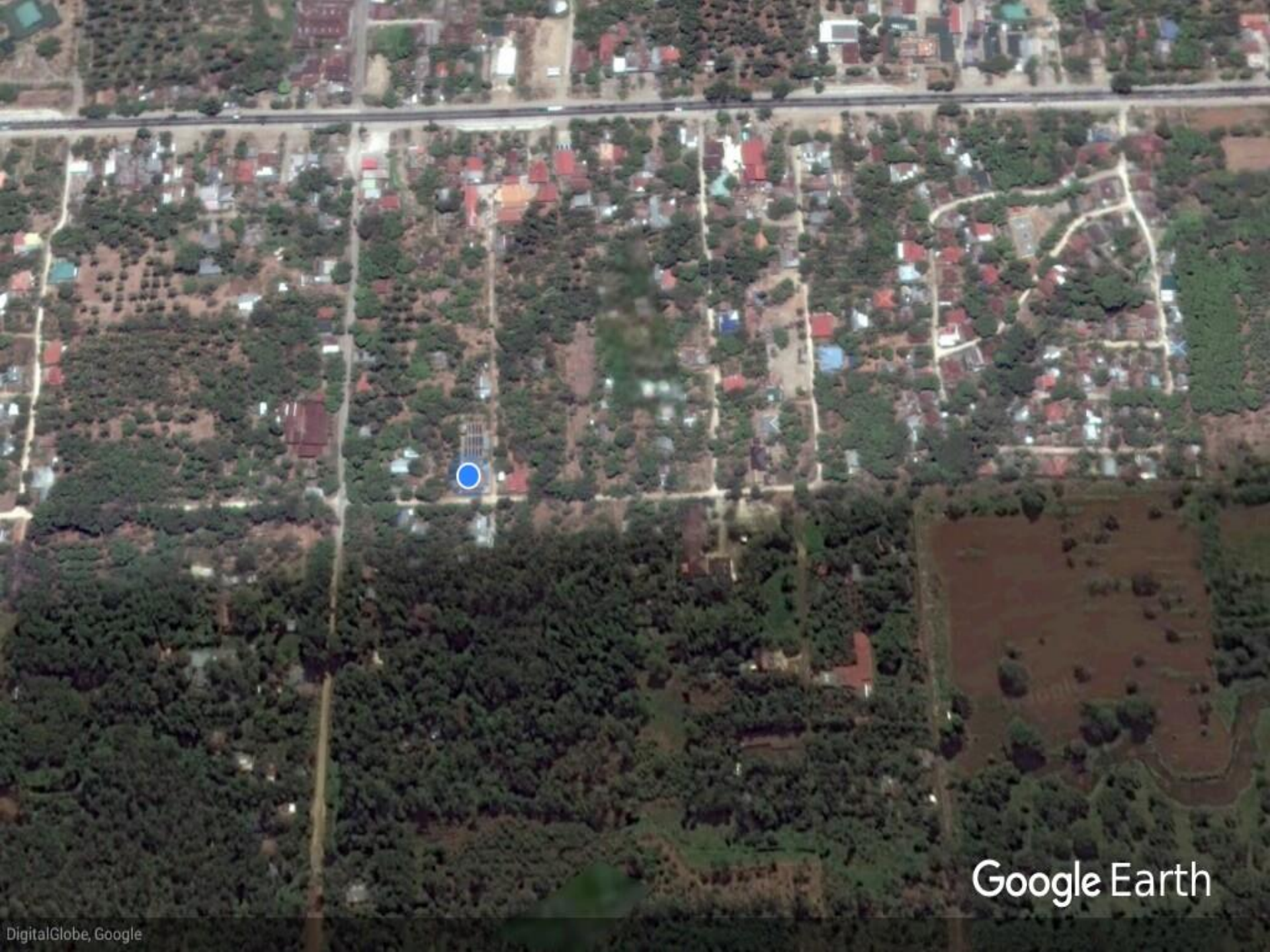

Kidapawan
City
Google Earth
CNES / Airbus, DigitalGlobe, Google, Landsat / Copernicus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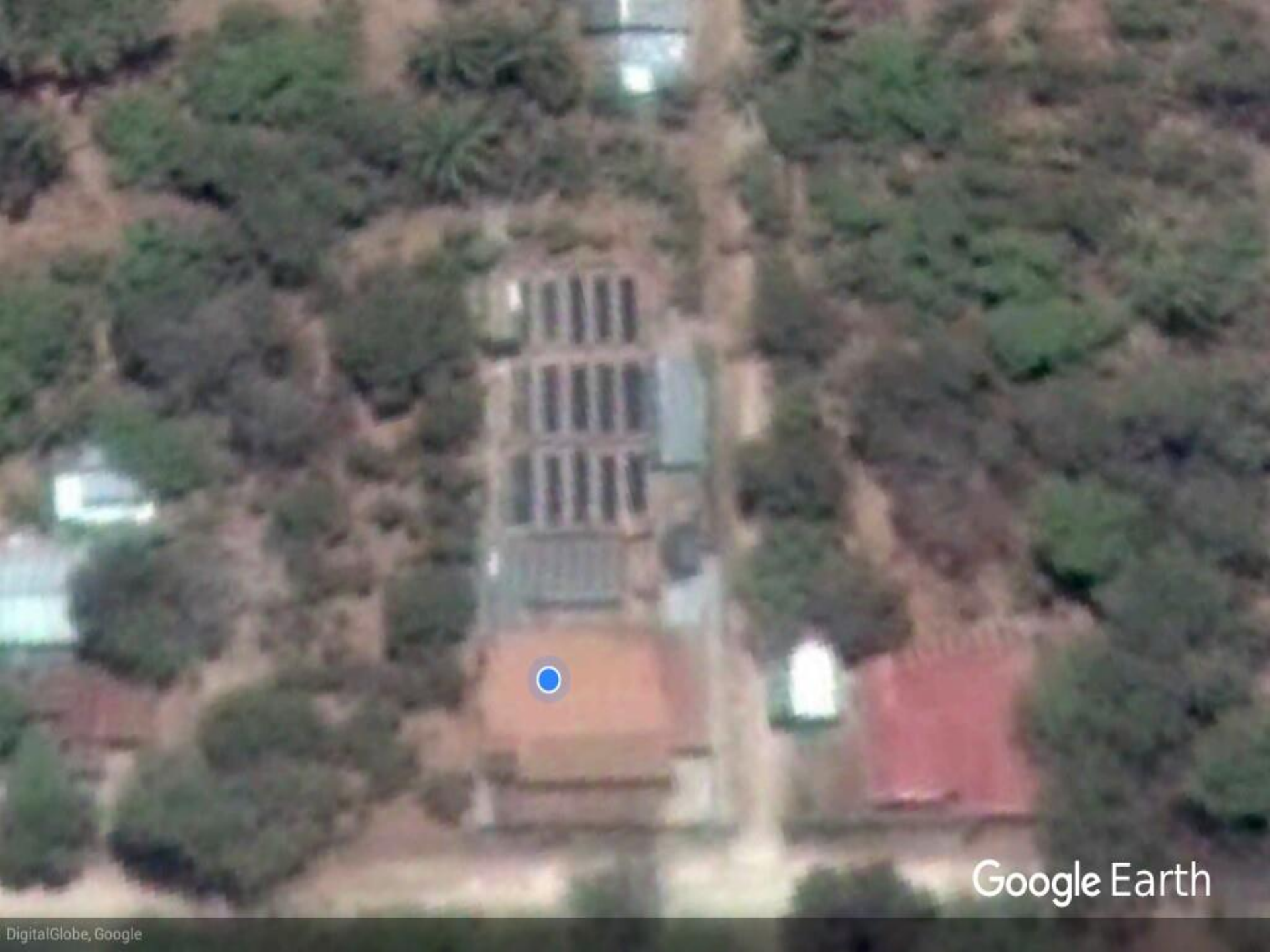
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# Design Features

| | |
|---|---|
| **BIO FILTER** | SEDIMENTATION TANK |
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| | |
|---|---|
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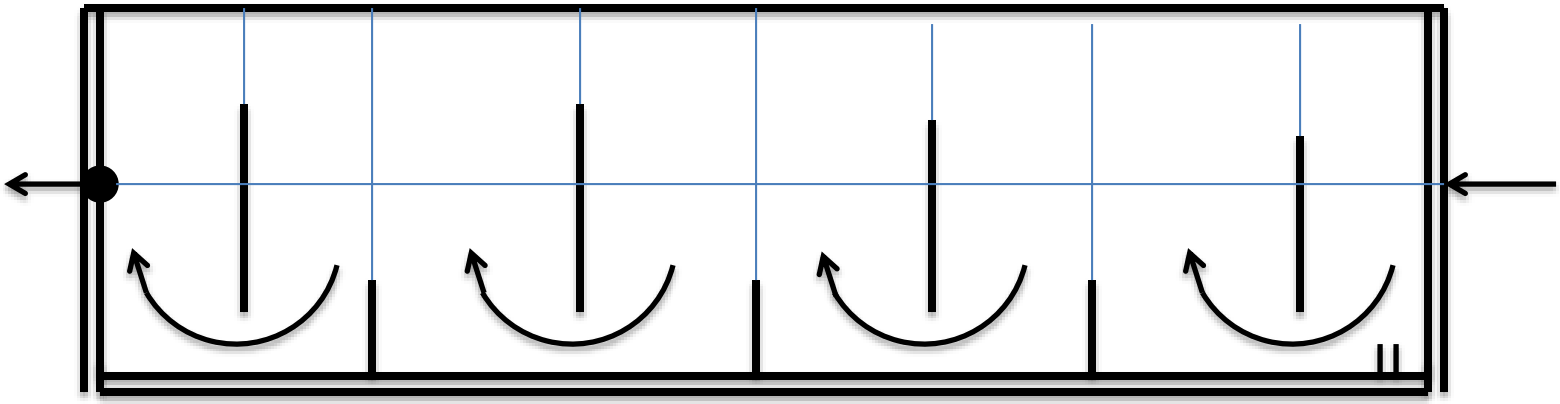
|---|---|
| **BIO FILTER** | SEDIMENTATION TANK |
| **BIO FILTER** | SEDIMENTATION TANK |

| | | |
|---|---|---|
| 4 | 8 | 12 |
| 3 | 7 | 11 |
| 2 | 6 | 10 |
| 1 | 5 | 9 |
| Spawning | Fry rearing | Fry rearing |

One module of 4 tanks and sedimentation/biofilter tank

Tank dimensions
2m W x 6m L x  0.75 H

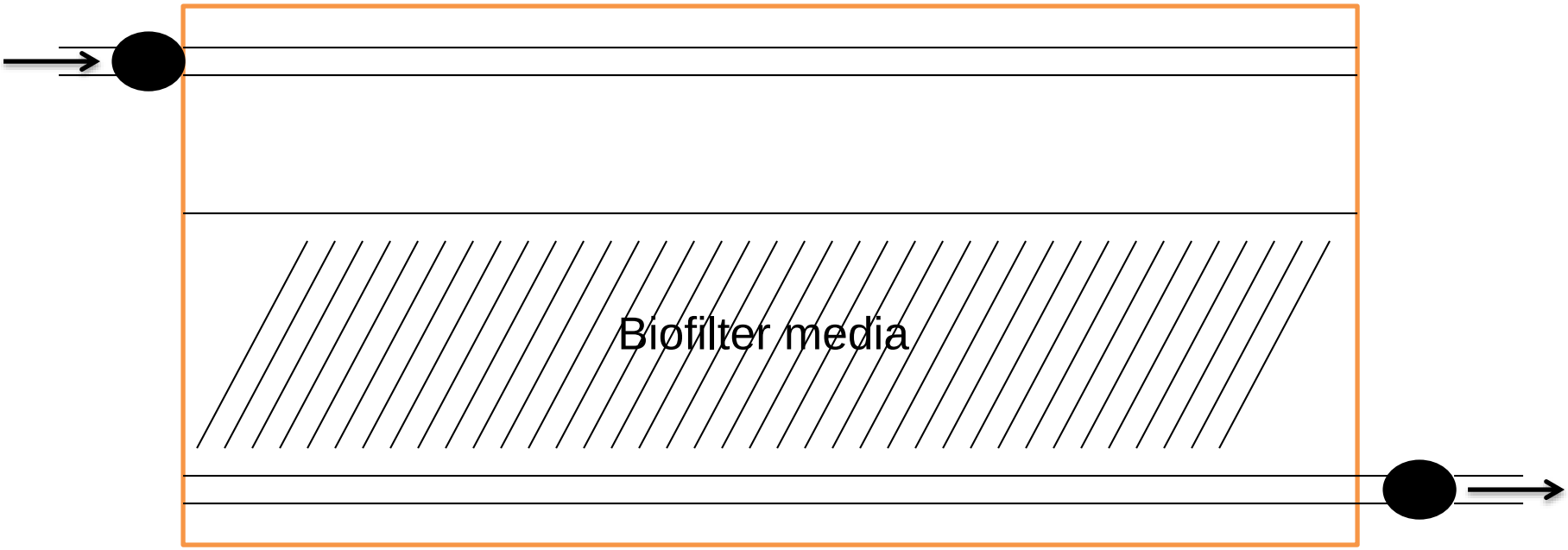
# Sedimentation Tank



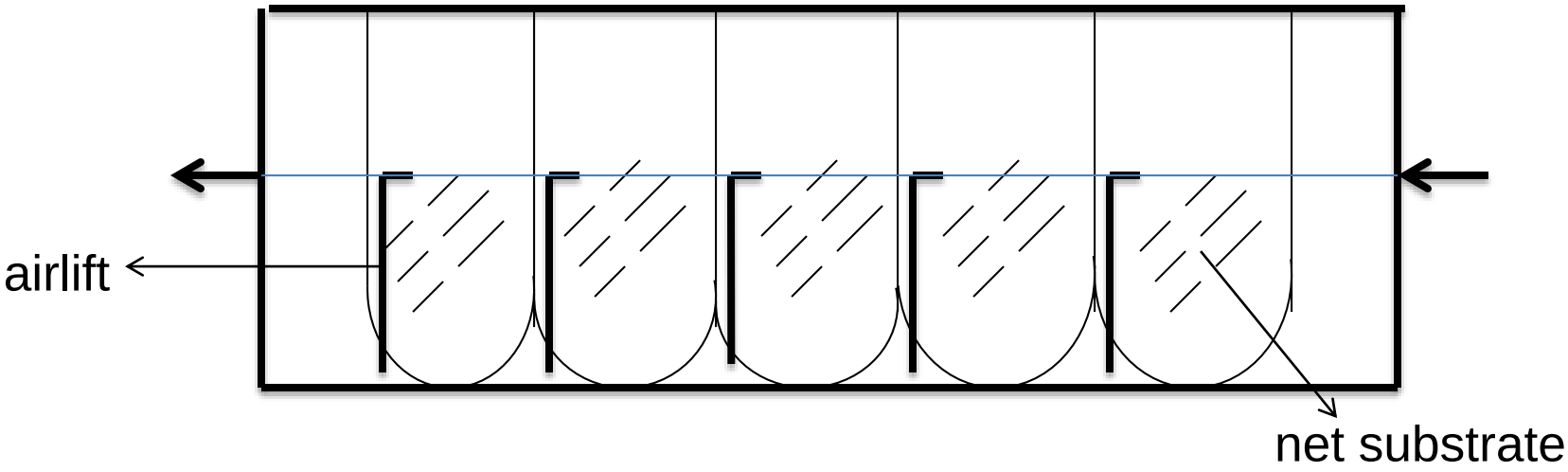
Schematic diagram of sedimentation tank

# Bio Filter

# Commercial biofilter substrates



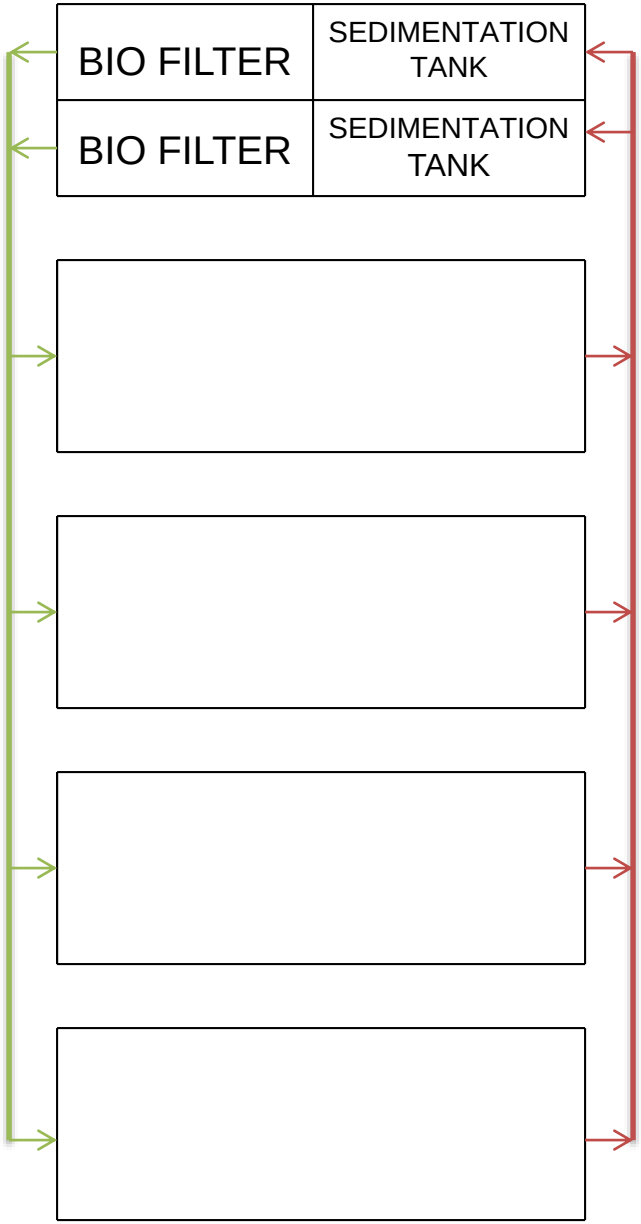

Traditional Biofilter



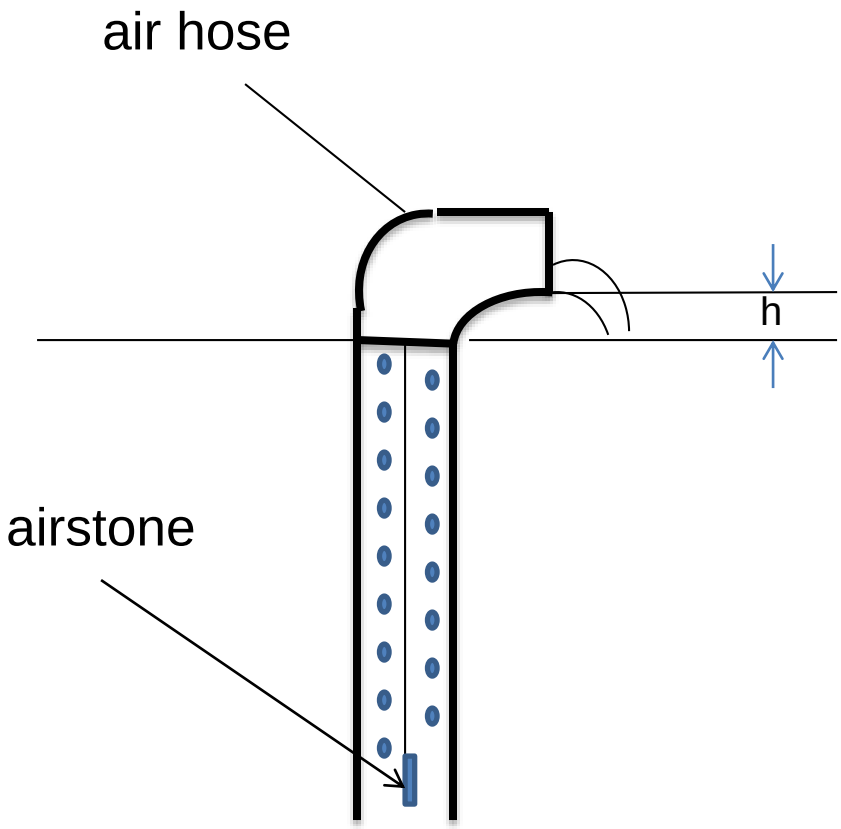

Schematic diagram of biofilter

View of net substrate in biofilter

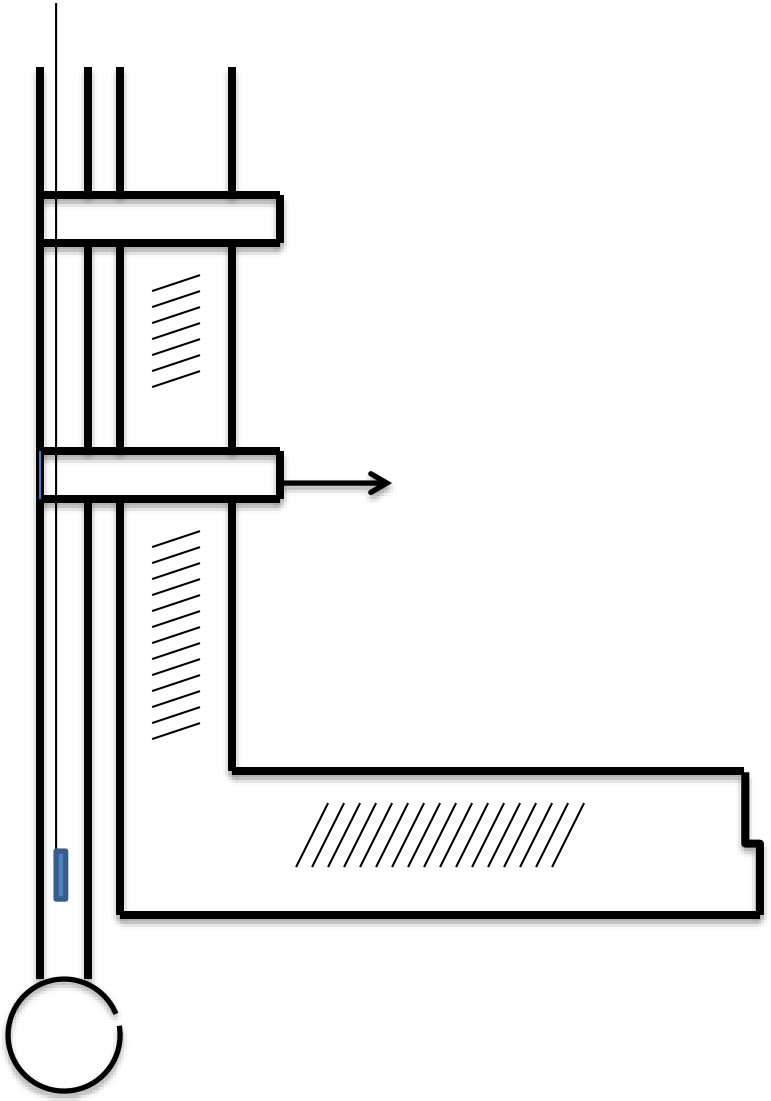
# Water Circulation



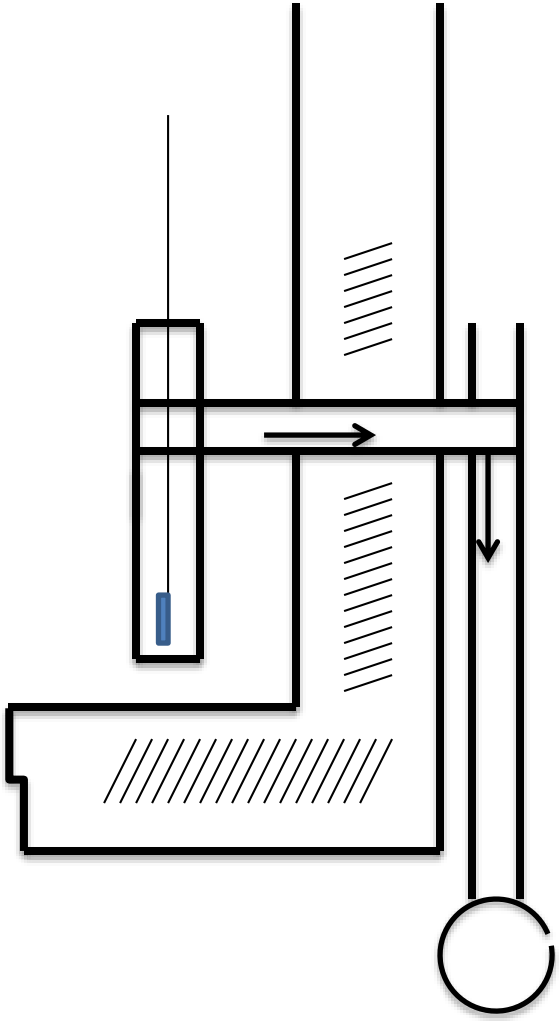

**WATER FLOW DIAGRAM**




# Airlift pump



Airlift pump at inlet of tank



Airlift pump at outlet of tank

Screen and standpipe at outlet

View of tank inlets

View of tank outlets

# Life Support System

Air blowers

Water pumps

Water distribution pump

Generator

# OPERATIONS

## A. Broodstock Management

-Source: SEAFDEC AQD Binangonan Freshwater Station

-Strain : SEAFDEC selected strain (SST)

M and F stocked in separate tanks

Spawners

# OPERATIONS

B. Pairing/spawning/fry collection

-M/F ratio – 1M:3F ,.....20M;60F / tank

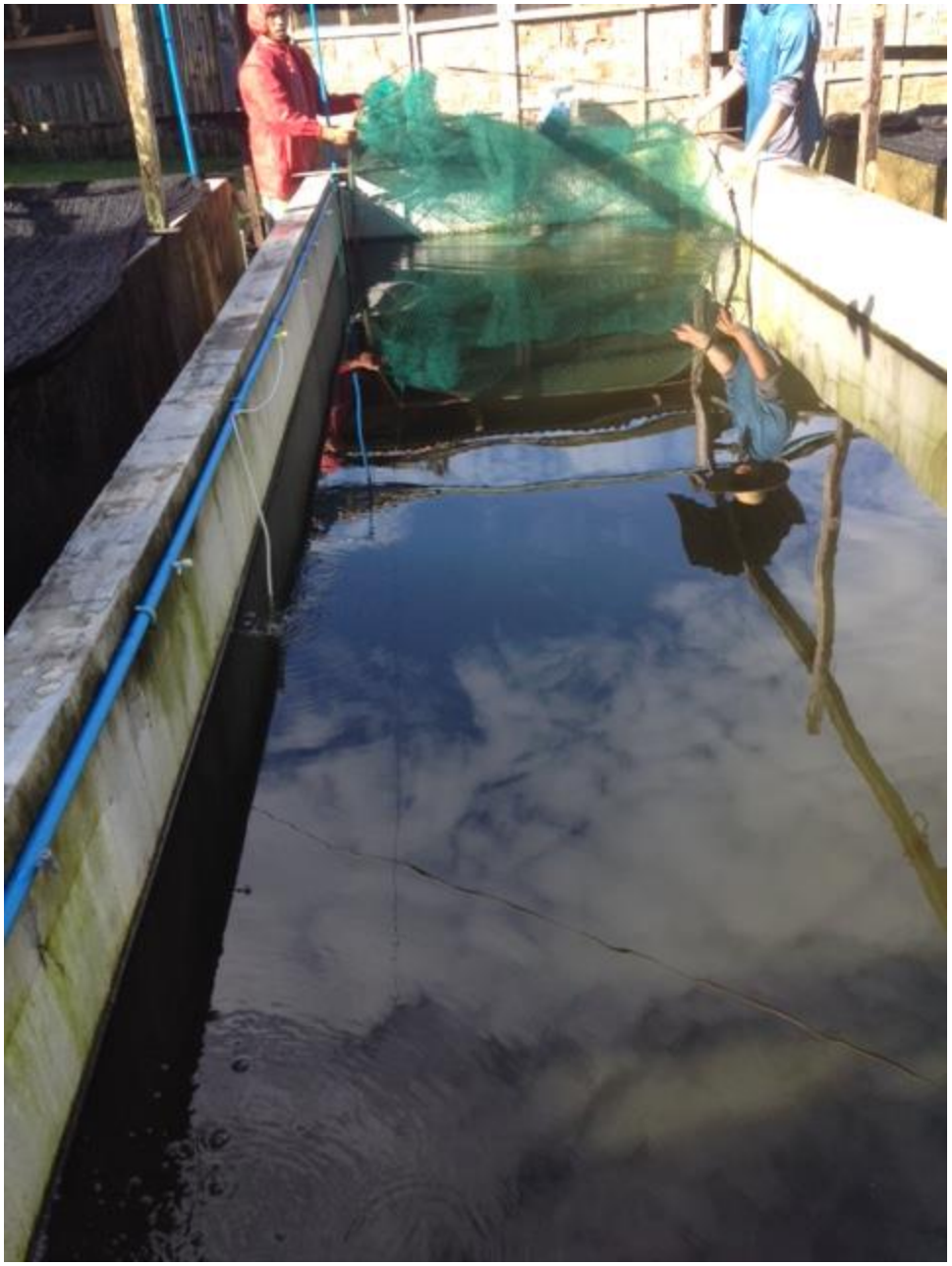
-Fry appears (10±2) days after pairing

Fry collection with scoop net

Fry collection

21 days after pairing

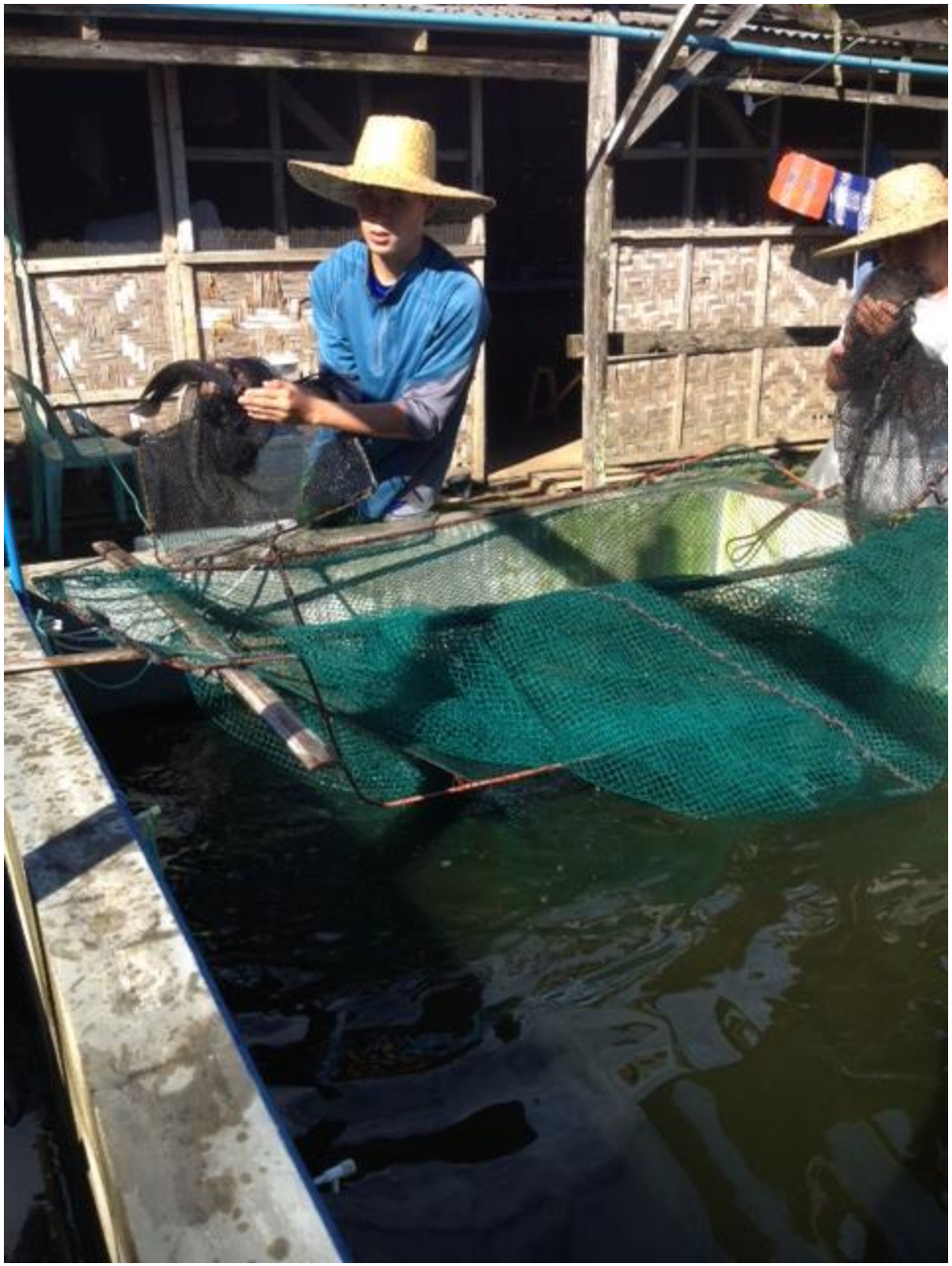
Post-spawning collection of spawners



Examining mouth of females

Separating male from female spawners

Transferred to separate tanks



# C. Fry rearing/nursery

- Fry collected transferred to rearing tank module

-Feeding with hormone treated feed for period of 21 days

Fry rearing tanks

# D. WATER MANAGEMENT

-Probiotics added to tanks

-Sedimentation tanks cleaned regularly

- Settled sludge used as fertilizer

- New water added after every cleaning

# Harvest

Fry / fingerling harvest

Scooping fry from harvesting net

Draining fry not collected by net

Sorting of fry / fingerlings

Estimating number of fingerlings

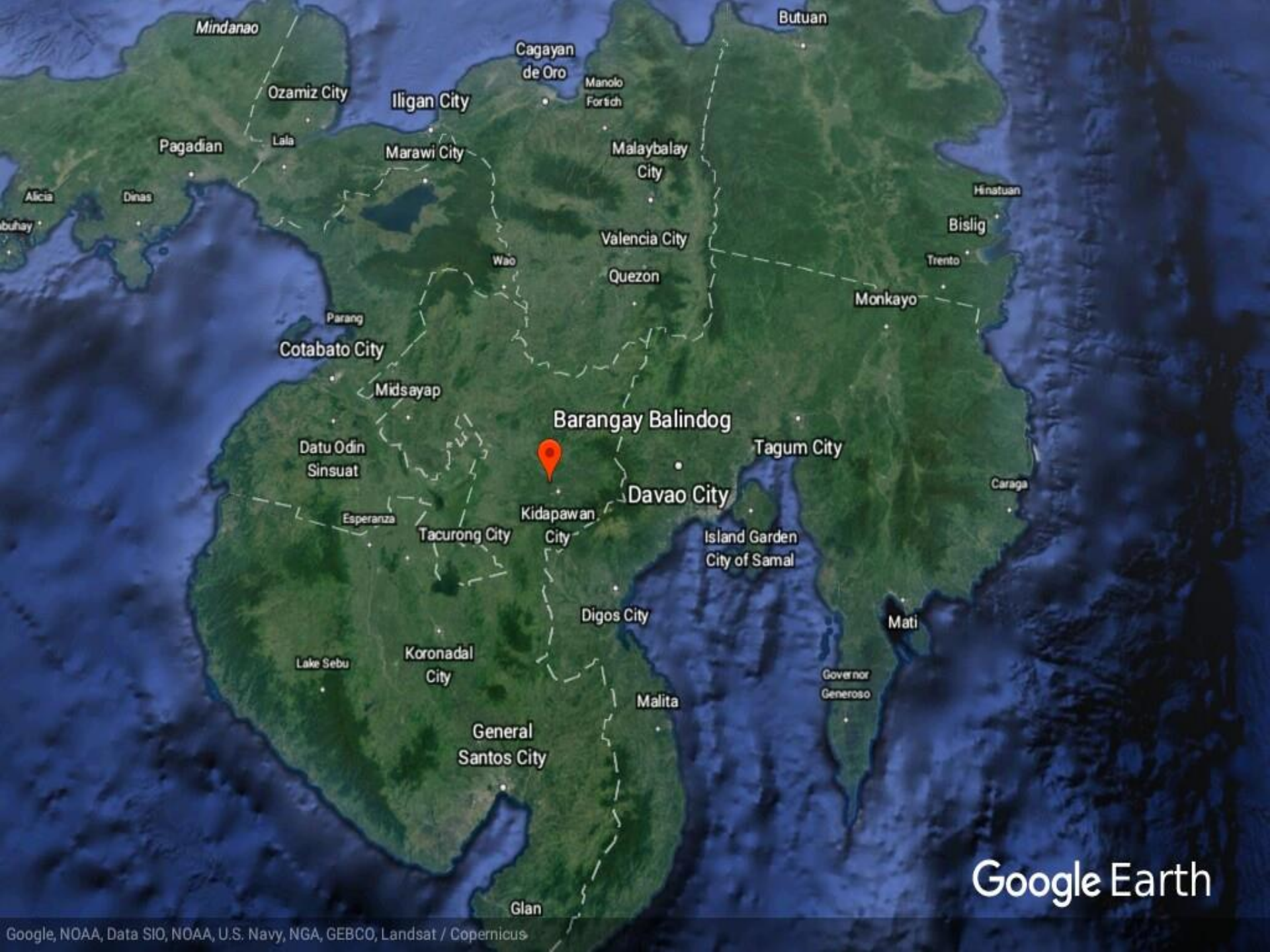
Packing

Packing with oxygen

Tying plastic bag tightly

Bags ready for transport

# MARKET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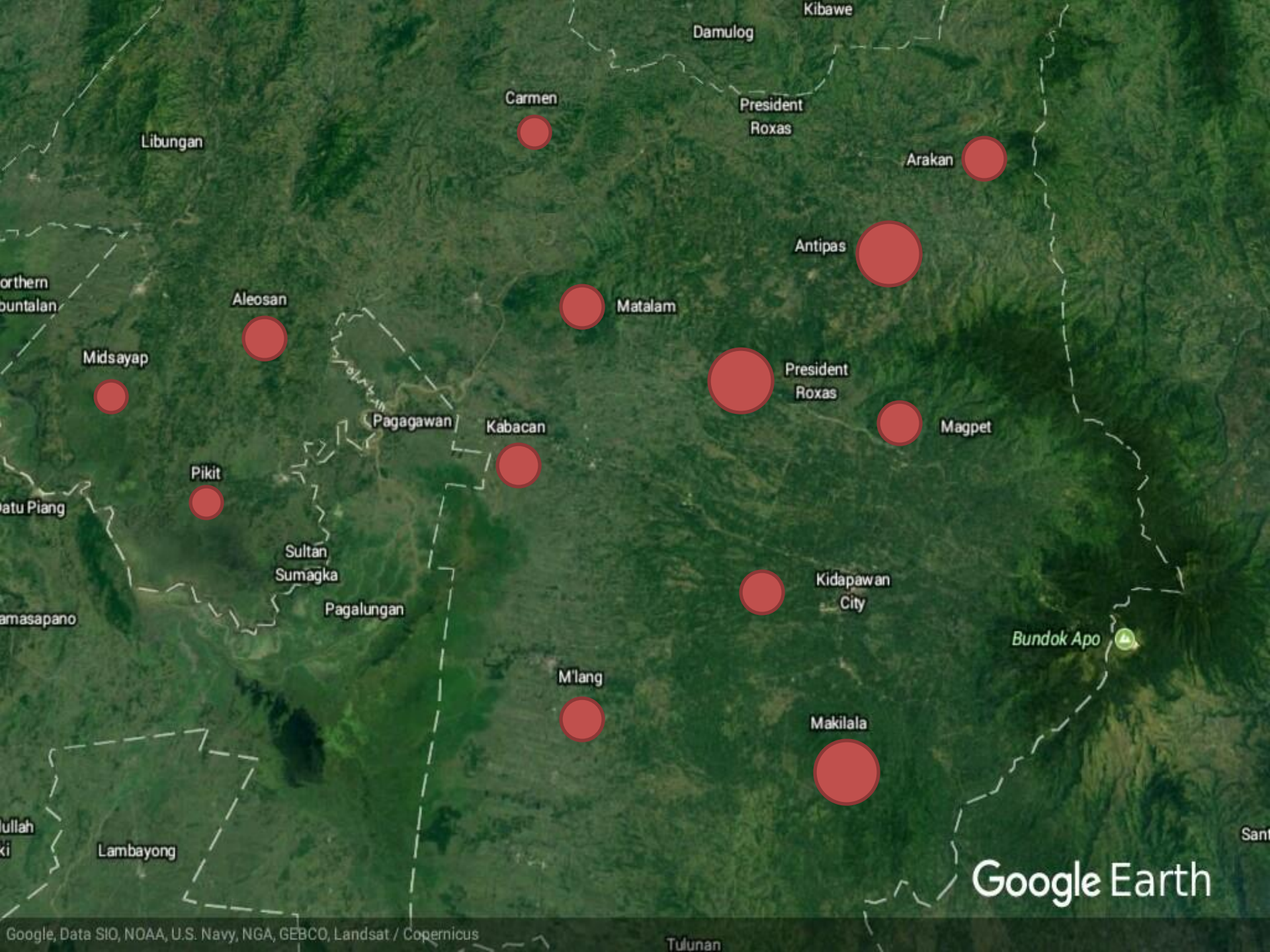
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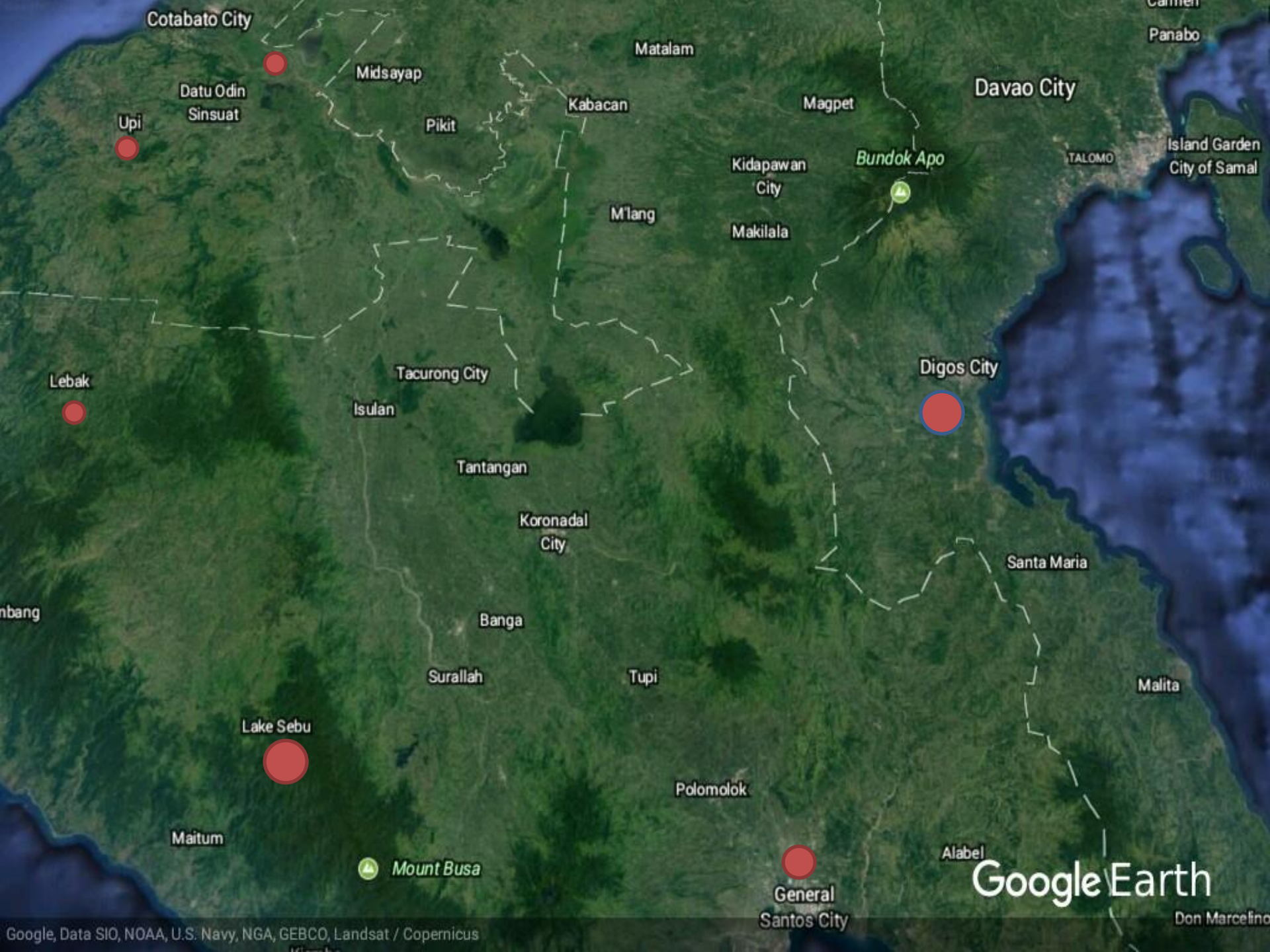
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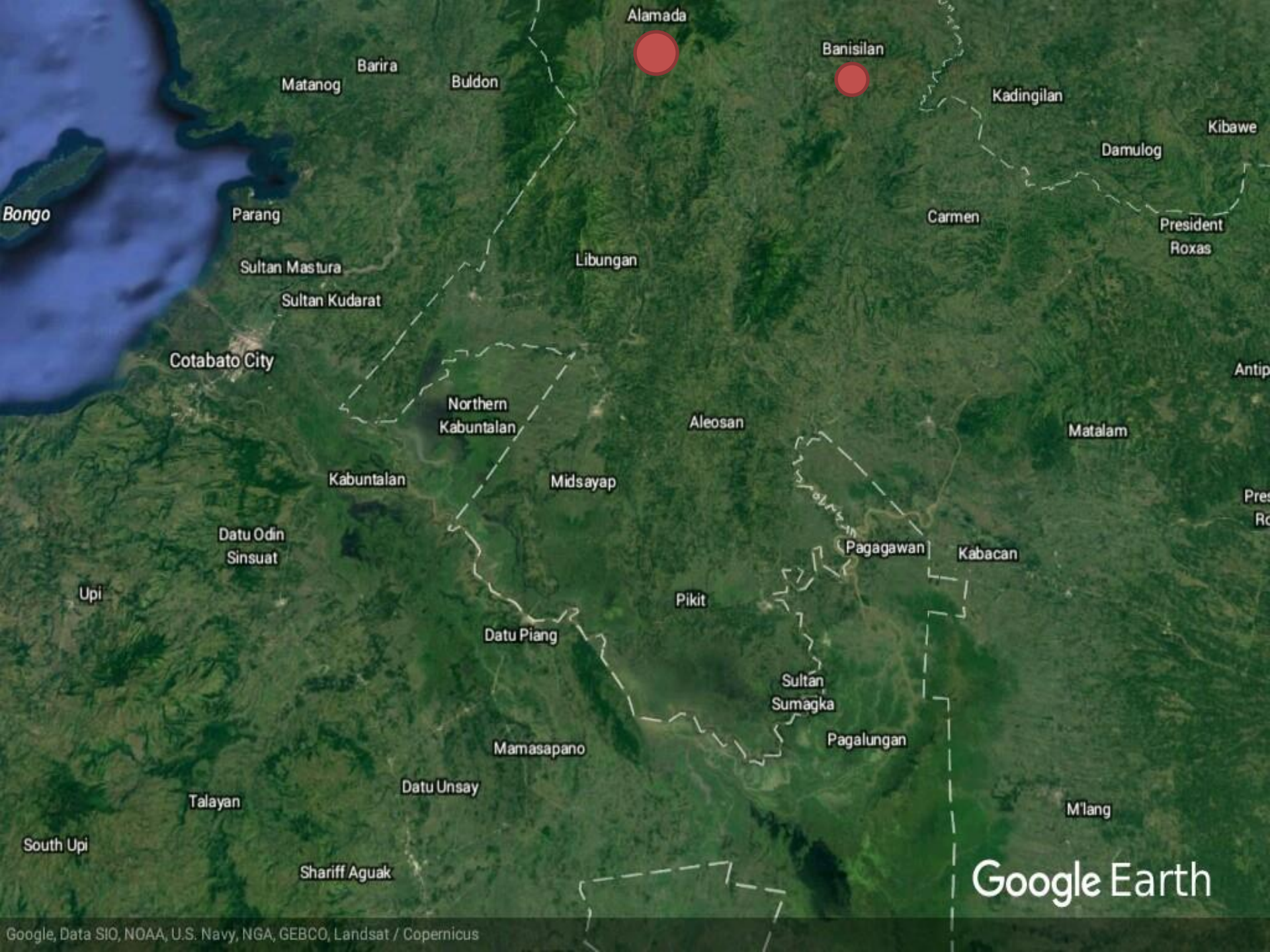
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# SUSTAINABLE  INTENSIVE AQUACULTURE

# SUSTAINABLE INTENSIVE AQUACULTURE

Response to:

- Increasing global demand for aquatic food

- Marine capture fisheries already at maximum yield

# GOALS OF SUSTAINABLE AQUACULTURE INTENSIFICATION

More aquaculture products without increasing usage of land and water

Environment preservation

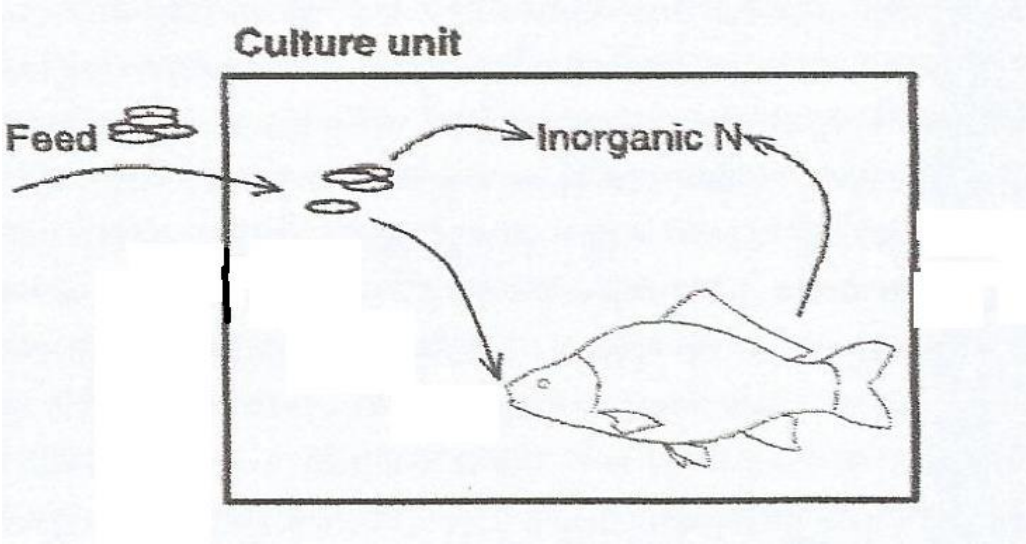
Economic and social sustainability

# APPROACHES TO SUSTAINABLE AQUACULTURE INTENSIFICATION

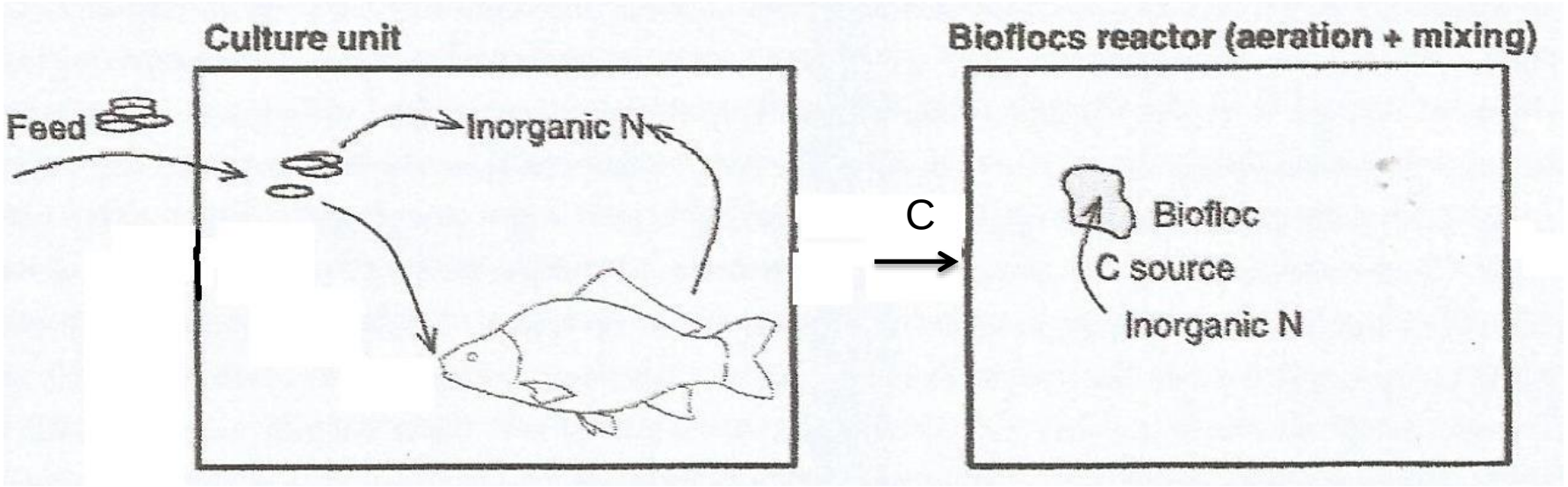
- Bacterial biomass production

- Ecological intensification of aquaculture

# BACTERIAL BIOMASS PRODUCTION



# BACTERIAL BIOMASS PRODUCTION



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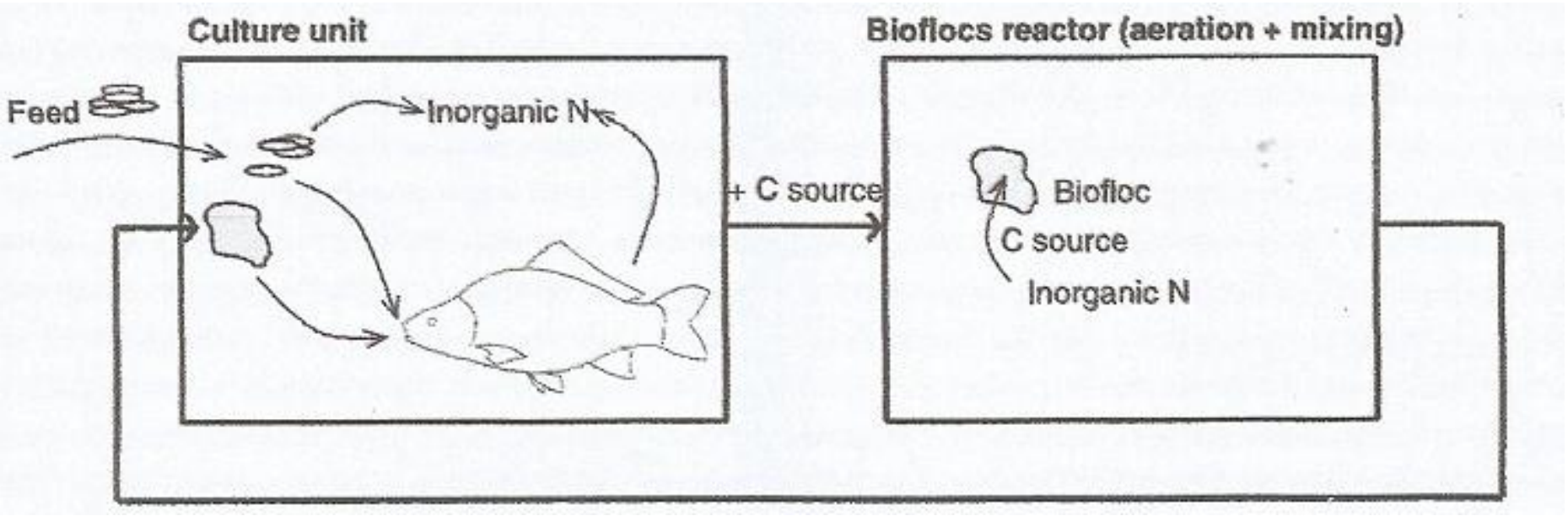


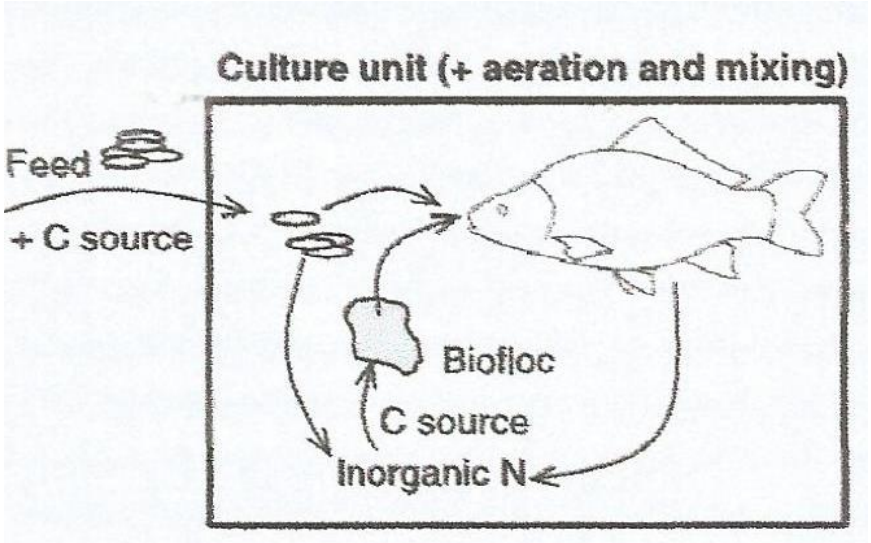


Crab, et al, (2010)

# ECOLOGICAL INTENSIFICATION OF AQUACULTURE

Multi-species with different feeding niches for more complex use of resources

# FUTURE CHALLENGES

- Replacement of fish products as ingredients in feed

- Identification of microorganisms as effective inoculum for biomass production

Thank You