



**AIGIF 2023**  
ASEAN-India Grassroots Innovation Forum  
Langkawi, Malaysia

**SEMINAR C THEME:**

**"GRASSROOTS AND SOCIAL INNOVATION FOR  
SUSTAINABLE DEVELOPMENT"**

**OYSTER FARMING:**  
*Way Forward Towards  
Sustainable Food Security*

**PROF. DATO' DR. AILEEN TAN SHAU HWAI**

# Our Ocean is Changing



Ocean's  
past



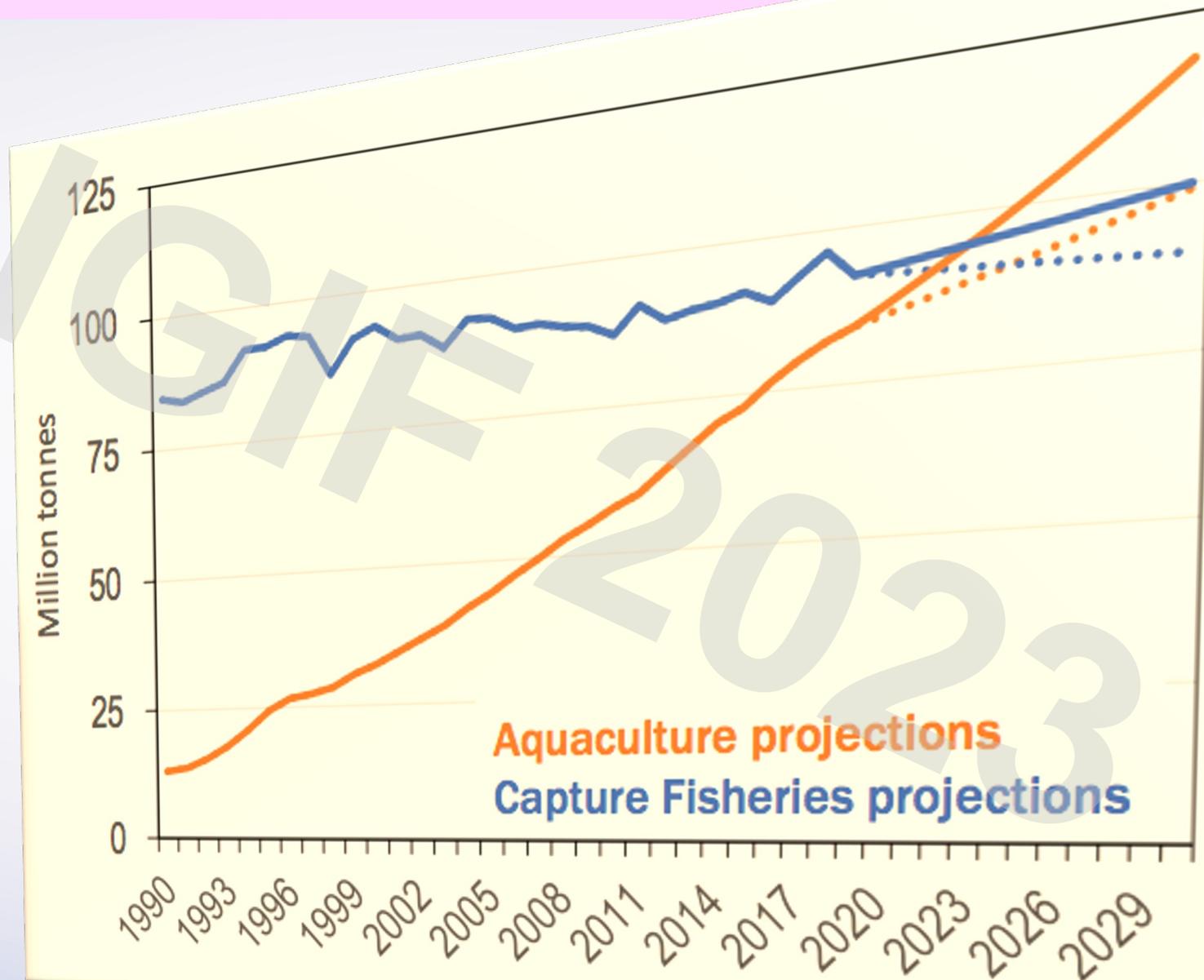
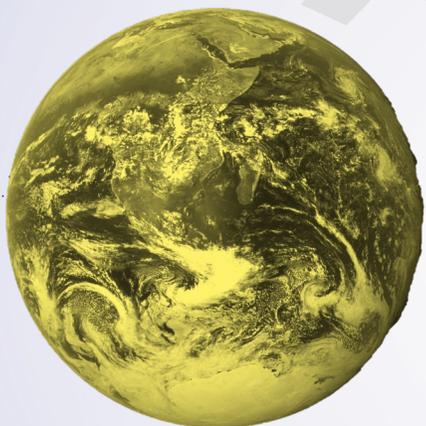
Ocean's  
present



Ocean's  
future



# TOMORROW'S POSSIBILITIES





# THE BLUE ECONOMY.



uses smart shipping to lessen the impacts on the environment



is inclusive and improves the lives of all



harnesses renewable energy



is based on sustainable fisheries



creates jobs, reduces poverty and ends hunger



takes action against illegal fishing



conserves marine life and oceans



protects coastal communities from the impacts of climate change



tackles marine litter and oceans pollution



# ***THE POWER OF BLUE FOOD***

MORE IS EXPECTED FROM AQUATIC SYSTEMS TO REDUCE HUNGER AND POVERTY

The nutritional value  
of fish products

The potential for  
aquaculture

The environmental  
impacts of land vs  
aquatic systems

**BUT THIS HAS TO BE DONE SUSTAINABLY**

# When it comes to sustainability, “blue foods” may be the answer



“Combined with its ability to provide vital nutrition to the developing world and others that a plant-based diet cannot, blue food is uniquely positioned at the table.”

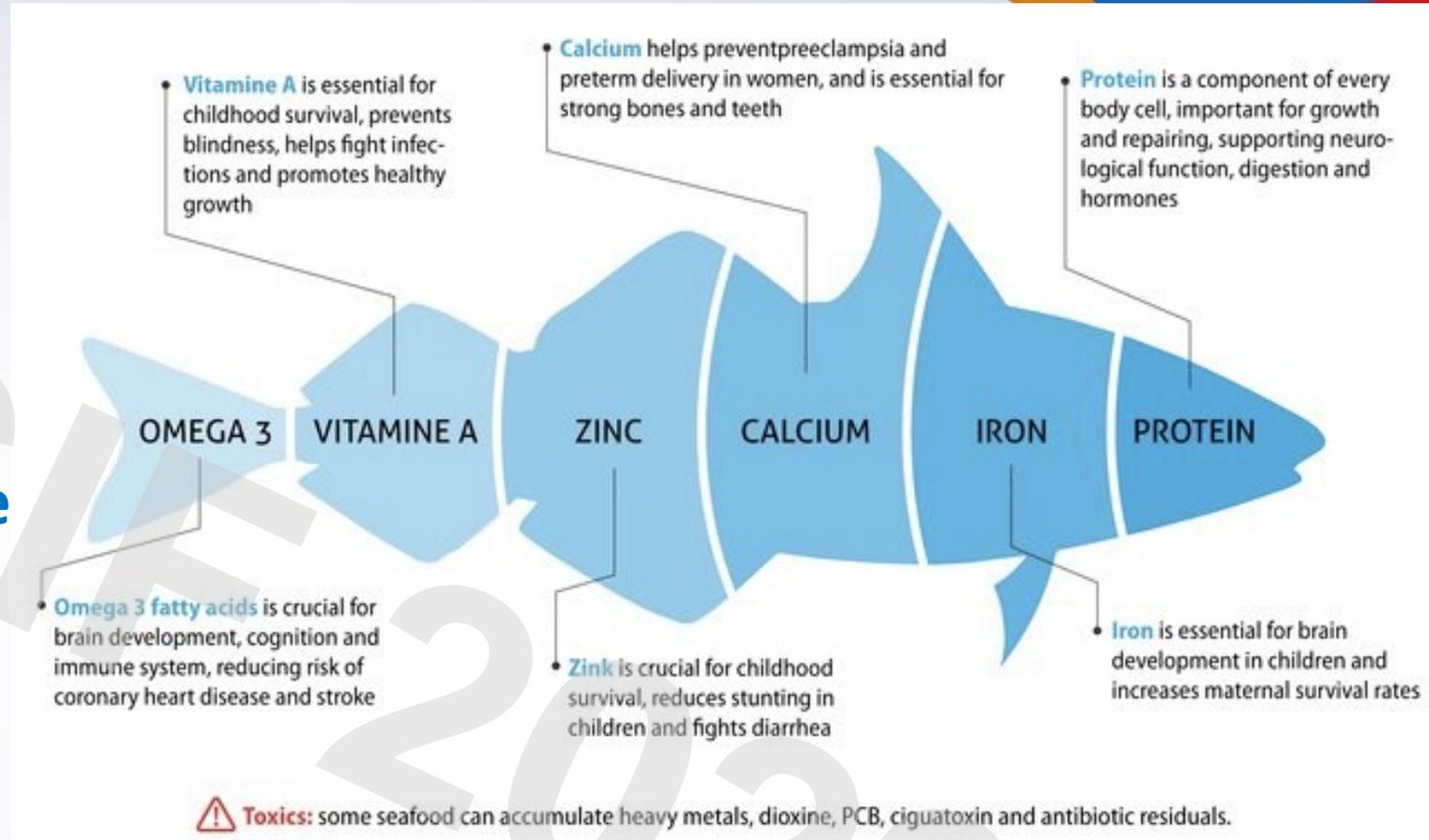


Shifting diets for sustainability and climate

**Blue Food: Placing Blue Food at the Center of a Sustainable and Healthy Future**

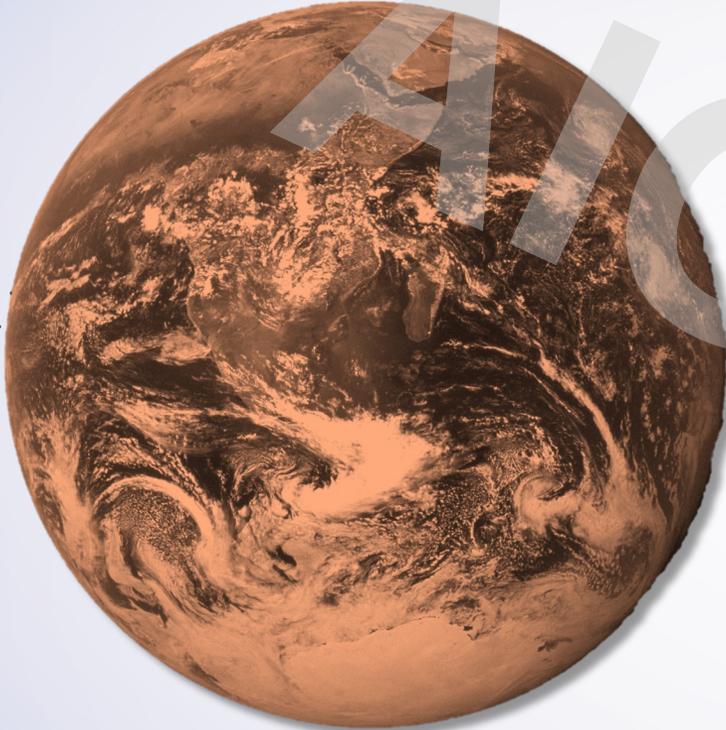


## Bringing Blue Food to the Table



*Fish provides important **health benefits** and remains **an essential source of protein and micronutrients**. Prevalence of **high quality and easily accessible omega-3 fatty acids (DHA and EPA)** has been identified as one of the main health advantages with seafood consumption. For some species caution should be taken due to accumulation of certain toxic compounds*

## BLUE FOOD



## OUR FUTURE

- **Smaller environmental footprint** compared to terrestrial animal sourced foods
- Blue food to provide for **healthy diets** within environmental boundaries
- Issues to be addressed : **overfishing, growing contamination of coastal areas, and the alarming rates of climate change and ocean acidification**

To release some of these pressures, many are looking to **sustainable aquaculture** to play an increasingly prominent role in local and global food systems.

# ***WAY FORWARD***

## ***Towards Sustainable Food Security***

### **Non-feed Aquaculture**



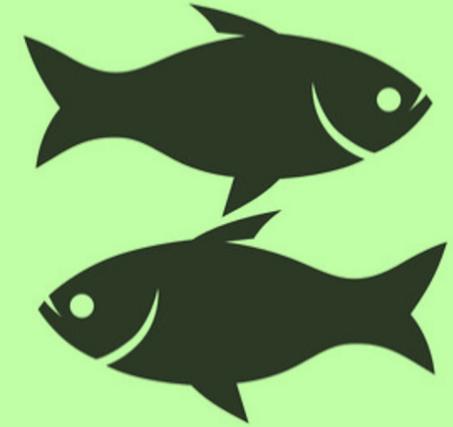
# OCEAN BLUE RESOURCES



all edible marine and freshwater organisms, including fish, shellfish and algae, whether wild caught or from aquaculture



key source of protein and essential micronutrients



linked to a reduced risk of non-communicable diseases such as type-2 diabetes.

**Yet non-feed aquaculture is greatly under-utilized and under-researched as part of holistic food-based nutrition interventions**

# Why we need *DIVERSIFICATION* to *NON-FEED AQUACULTURE*

- 01 To address food security.
- 02 Environmental protection
- 03 Sustainable future
- 04 More profitable in the long term

01

As demand for food and living space increases alternative modes of food production will be needed

03

A more health conscious society

02

It is the only way ahead

04

Green products are more acceptable now

# TRANSLATIONAL RESEARCH



**POVERTY** is not just about money BUT about **HOPE & SKILL**

## *Innovative Solutions to Local Issues*

The research that we perform must have **VALUES**:

- The right values will give us a sense of purpose and provide meaning to the research performed
- It will guide us to ask the question how can we make a difference today for tomorrow

# ***Poverty Eradication and Food Security Through Sustainable Aquaculture***



*Reduction in captive fisheries and resources; and the use of traditional fishing gears. More than 90% of fishermen received monthly income of <USD150 per month per household*



# *Why “Oyster Farming”...you might ask*



# OYSTER AQUACULTURE ADVANTAGES

## HIGH MARKET DEMAND

There is a high market demand for Malaysian oysters due to its freshness and delicious taste. A hit with the culinary and restaurant industries

## FARMING TECHNOLOGY THAT IS SIMPLE TO PRACTICE

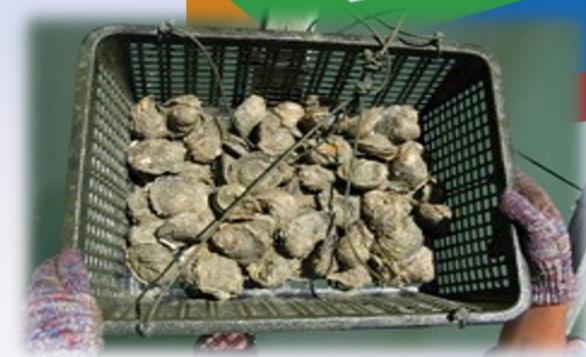
Farming technology that has been simplified and modularized. These are easily practiced on growing sites

## LOW LABOUR COST

A significantly lower labour cost compared to fish and prawn aquaculture. No feeding is required.

## PROVEN TECHNOLOGICAL SUPPORT

For farmers a consistent supply of healthy spat (oyster seeds) is important for sustainable supply of oysters. This and the support of the scientific team at USM ensures a safe and confident involvement into the industry.



THE MALAYSIAN OYSTER MARKET

IMPORTED 86%



LOCAL 14%



# malaysian **Oysters**

01

**Fresh**

02

**Delicious**

03

**Healthy Food (low in cholesterol  
and high in minerals)**

04

**Internationally acceptable and  
palatable**

05

**Known for its “aphrodisiac” value**



# LOCAL IS FAR BETTER

**LOCAL OYSTERS** are super fresh (as opposed to flacid and watery imports. They are cheaper. More presentable ...and taste much better

CLEAN

NO ANTIBIOTICS

ENVIRONMENTALLY SOUND

BOOSTS LOCAL ECONOMY





# FROM HATCHERY TO MARKET AT CEMACS

## • 12 MONTHS

- Grow out conditions. Water quality monitoring. Quality control. Health risk management. Marketing and feedback.



## • 2 MONTHS

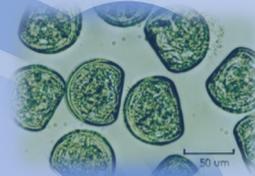
- Rapid growth. Feed changes. Acclimatization for field transplant. Site specific seeds. Site profiling. Transportation and transfer.



12 MONTHS CYCLE

## • 1 DAY OLD

- Pre-fertilisation readiness, optimized environment and receiving station. Followed by spawning at CEMACS lab



## • 2 WEEKS

- Larval health monitoring. Food plankton culture. Feeding and monitoring. Back-up environmental systems.



# CEMACS & THE COMMUNITY

AWARD WINNING INNOVATIONS AT UNIVERSITI SAINS MALAYSIA

## • WE CARE

CEMACS is sensitive to the needs of the local community and many of her activities respond to the needs of the communities around and how their lot can be improved.

## • WE INNOVATE

In response to the community needs new social and technological innovations are created. One approach that has proven successful is the modularization of business models to help the poor fishermen in creating alternative livelihoods



## • WE SHARE

Scientific findings are valuable in formulating management decisions. CEMACS findings especially in environmental monitoring and profiling help many industries navigate their future with calculated risks and improve their business

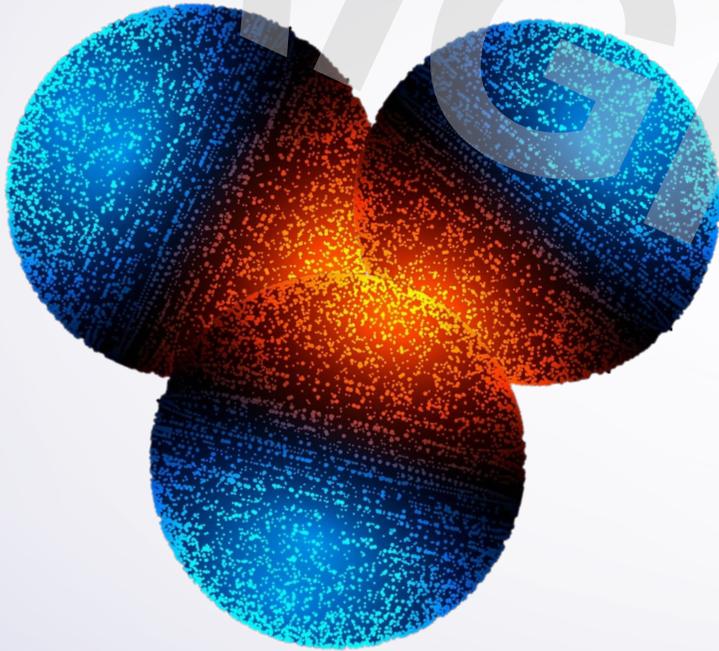
## • WE EDUCATE

Special courses are held in CEMACS to improve the understanding of critical issues. These may be in aquaculture or the translation of national and global issues such as climate change and ocean acidification into the layman' languages

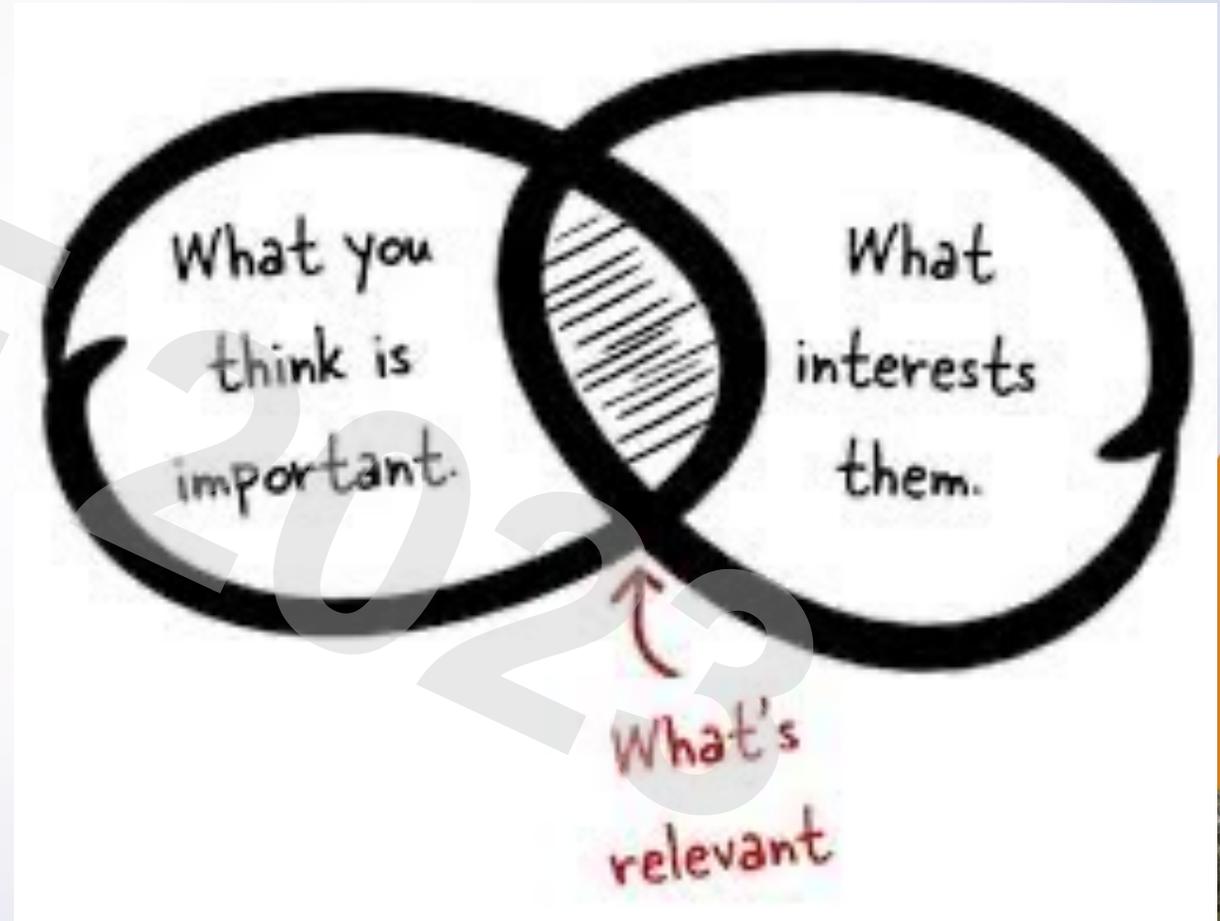
# A LOOK AT COMMON INTEREST AND INNOVATIONS

GRASSROOTS and their interests

CEMACS research and expertise



INNOVATIONS (filling the gaps)



# COMMUNITY ENGAGEMENT VS COMMUNITY SERVICE

Community engagement needs to be the central part of the academic curriculum and key to create impact via R&I

*Give a man a fish and you feed him for a day. Teach him how to fish and you feed him for a lifetime...*

**Lao Tze**

- Farmers do not have the technology but are willing to learn
- Many are committed as indicated through our long experience
- We have to simplify the technology
- Monitoring of progress is essential
- Associated problems need to be handled
- Up scaling and technology transfers are the way ahead



**TRANSLATING RESEARCH FINDINGS TO  
COMMUNITIES**

AIGIF 2023

# *Understanding the importance of the environment*



**2012**



**2013 - 2014**



**NOW.....**  
***the change in lifestyle***

ALONG  
2023



**LANGKAWI  
MALAYSIA**

# AQUACULTURE TO KNOWLEDGE-ECO-TOURISM



# PAK SU AND FAMILY

GOLD MEDAL-NATIONAL ENTREPRENEURSHIP AWARD



**“A COMMUNITY INVOLVEMENT PROJECT”**

## **BETTER LIVELIHOOD**

Stable income from oyster culture leading to better livelihood. Involvement of family members in the business especially the woman folks

## **COMMUNITY COOPERATION**

Cooperation in the communities involved has led to community level poverty eradication and even specialization in the supply chain

## **ECONOMICS OF SCALE**

Increasing family units participation ensure support and scaling up of production

# USM OYSTER FARMING AND THE COMMUNITY

## • LOCAL CREATIVITY

Use of local knowledge

## • SDGs AWARENESS

Sensitization and education of sustainable green aquaculture

## • INCOME

Sales of Oysters

Mean income increased from SD100 will increase to USD500 –USD1,000 per month per culturist

## • EXPANDING OPPORTUNITIES

Tourism Package

Charging USD2 per pax for visit to oyster platform

- Charging USD5 per pax for visit to platform inclusive of light meals
- USD2 per oysters

- COMMUNAL PROGRAMMES  
Development of other programmes for communities

## • WOMENFOLKS Independent income

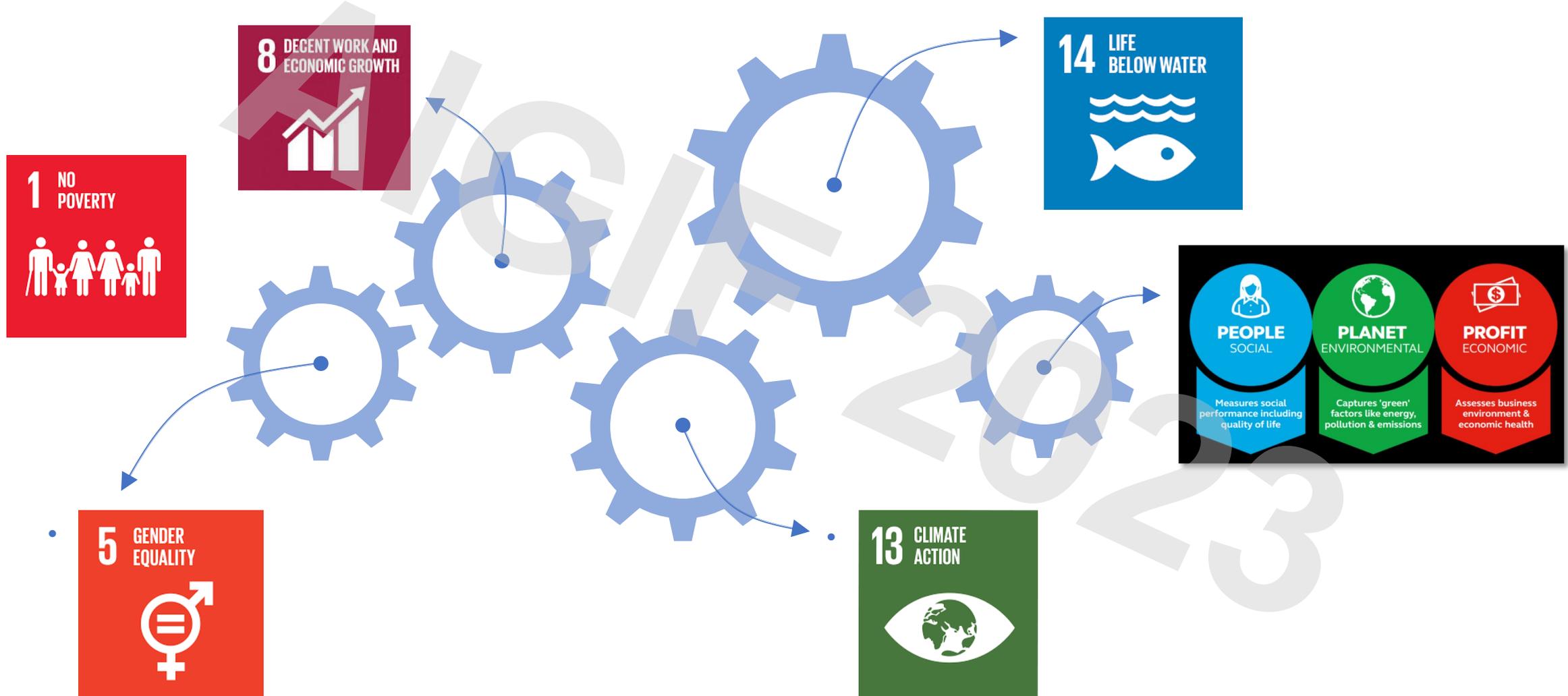
Opportunities for womenfolks. Generating > USD100 per month for cooking

## • OPPORTUNITIES FOR SCHOOL KIDS

Cleaning trays, obtaining daily allowances about USD3 per day



# THE OYSTER PROGRAMME - FULLFILLING MALAYSIA'S INTERNATIONAL OBLIGATIONS



# AIGIF 2023

“ **THE JOURNEY OF EDUCATING & MAKING A CHANGE IN LIFE** is a long one and filled with many challenges.... **IT REQUIRES COMMITMENT & COOPERATION FROM ALL** ”

