

SUSTAINABLE SHRIMP FARMING

- *L. vannamei*



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ESTIMATED GLOBAL SHRIMP PRODUCTION IN YEAR 2018

1. India	700 000 MT
2. China	650 000 MT
3. Indonesia	600 000 MT
4. Ecuador	400 000 MT
5. Thailand	300 000 MT
6. Vietnam	250 000 MT
7. Mexico	110 000 MT
8. Bangladesh	100 000 MT
9. Brazil	87 000 MT
10. Philippines	75 000 MT
TOTAL	3.5 MMT



SHRIMP MARKET MODULE



EXPORT
90%

DOMESTIC
10%

MAJOR CULTURE ISSUES IN YEAR 2018

- Less seed (PL) survival.
- Slow growth- High FCR.
- Abrupt bloom / water color / primary productivity.
- Gill choke/ Brown gill/ Black gill.
- Running mortality.
- Body deformity (cramping, bamboo shrimp)
- White gut/ White faeces.
- EHP.



WSSV

Still major damager

RESPONSIBLE FACTOR

Pond production v/s Pond carrying capacity.



Production area v/s Water source carrying capacity.

Farming Protocol

- Doing The Right way.

- 1 Pond soil conditioning
- 2 Water preparation
- 3 Seed selection
- 4 Multiphase culture system
- 5 Optimum water quality parameters
- 6 Effective feeding management
- 7 Effective organic load management
- 8 Strong biosecurity
- 9 Proper health monitoring of shrimp
- 10 Competent management during special case

POND SOIL CONDITIONING



After harvest flush bottom with 30-50 cm water



Close inlet and out let gate



Allow to sundry up to deep crack



Low organic load : Ploughing
Medium and high organic load: Scrapping



Monitoring soil pH and **Organic load** min 6 places

- Proper drying of old culture ponds





- Proper ploughing for effective oxidation of pond bottom soil.

mpaction after proper ploughing



- Pond is ready after ploughing and compaction.





WATER PREPARATION- Step1

Water intake from source



Settlement for 1-2 days



**Transfer the supernatant water into reservoir-1
and treat with Coagulant**

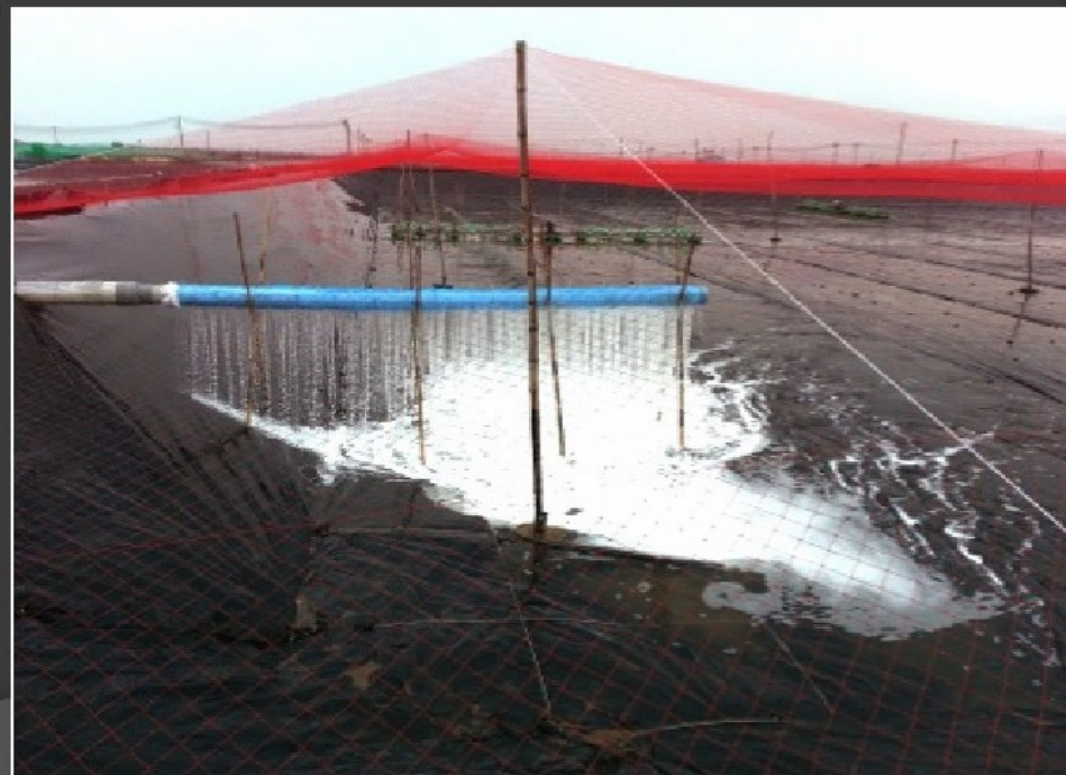


**Transfer supernatant water into culture pond/reservoir-2
and do chlorination**

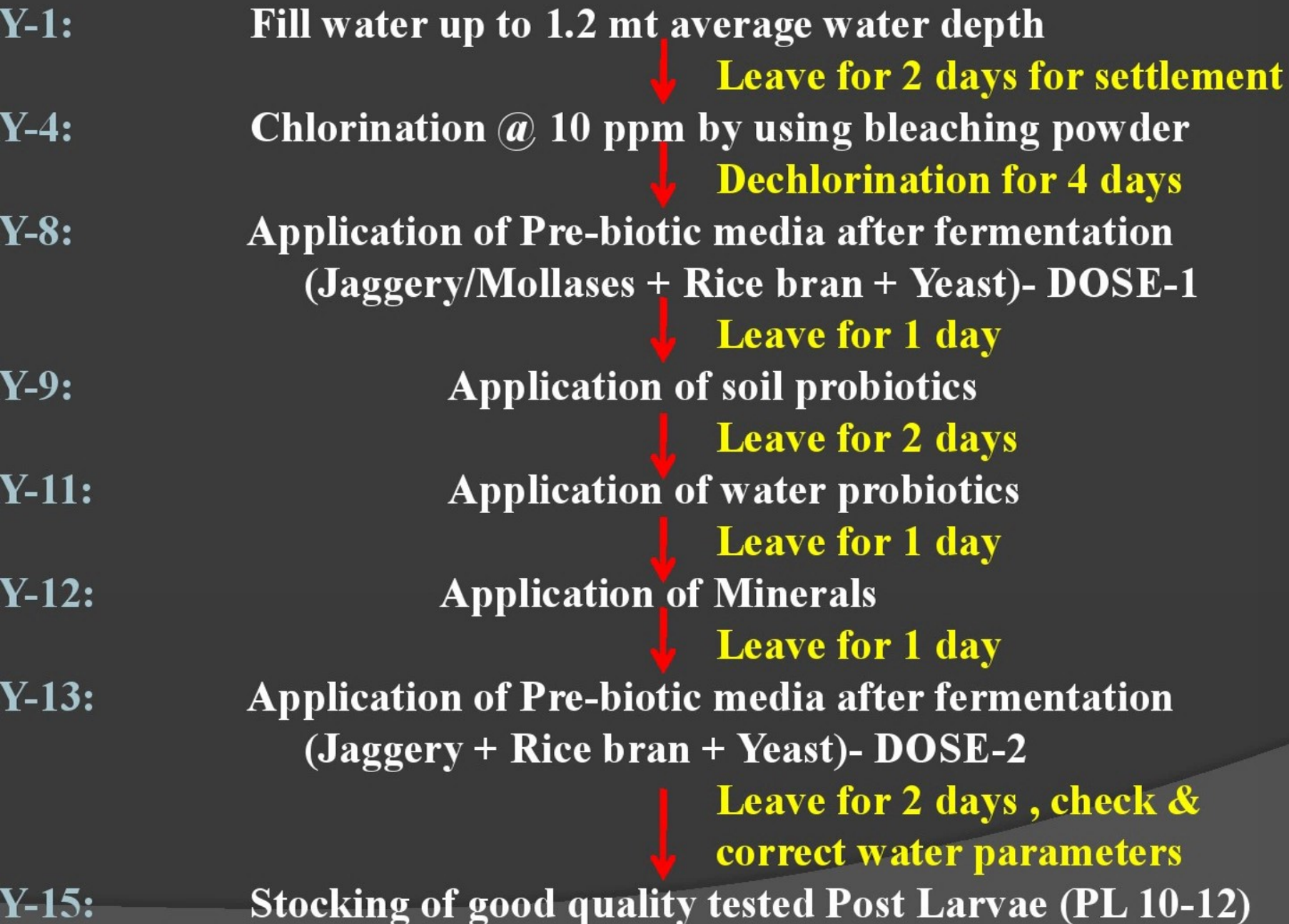
- Four steps (20, 40, 60, 80) mesh filtration to fill the ponds







POND WATER PREPARATION- Step 2



PREBIOTIC PREPARATION



INHOUSE PROBIOTIC USED



NOTE: MAP has developed in house probiotics in joint venture with HTS BIO

OPTIMUM WATER QUALITY PARAMETERS

General parameters:

Dissolved Oxygen	> 5 ppm
pH	7.5-8.5
Transparency	35-45 cm.
Alkalinity	>100 ppm
Salinity	15-30 ‰
Temperature	28-31 °C
Water depth	Avg. 1.8 mt.

Mineral profile:

- Ca : Mg ratio 1:3
- Cl : Na : Mg ratio 16:9:1
- Mg : Ca : K ratio 3:1:1
- Na : K ratio 40:1
- Chloride > 500 ppm

Vibrio count:

- Yellow colony < 300 cfu/ml
- Green colony < 30 cfu/ml

Natural pond productivity



Seed selection- Back to Basic

- **Hatchery track record**- Check at least 3 years performance.
- **Source of broodstock**- Supply and reliability.
- **Seed testing**- Very important to test all quality personally at hatchery level only. Don't be assure of SPF status.
- **PL selection**- Insists on PL 12-15 size only.

Good quality post larvae
L. vannamei



Farm acclimatization of post larvae in farm



sufficient required aeration in each culture pond
- @ 1 H.P./300 – 500 Kg of Biomass





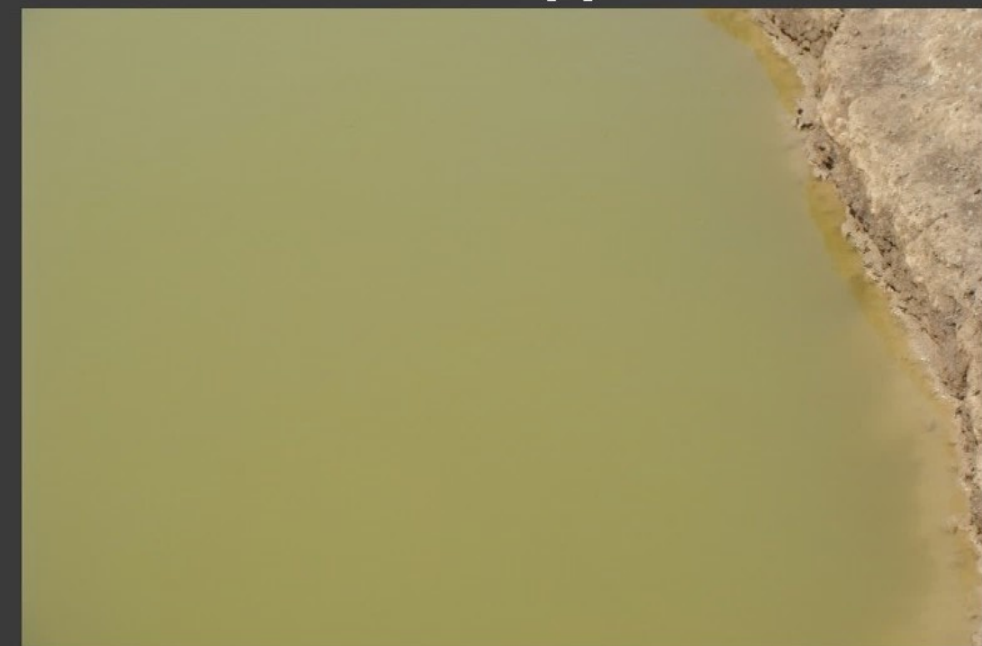
EFFECT OF PROBIOTIC APPLICATION IN SHRIMP CULTURE POND



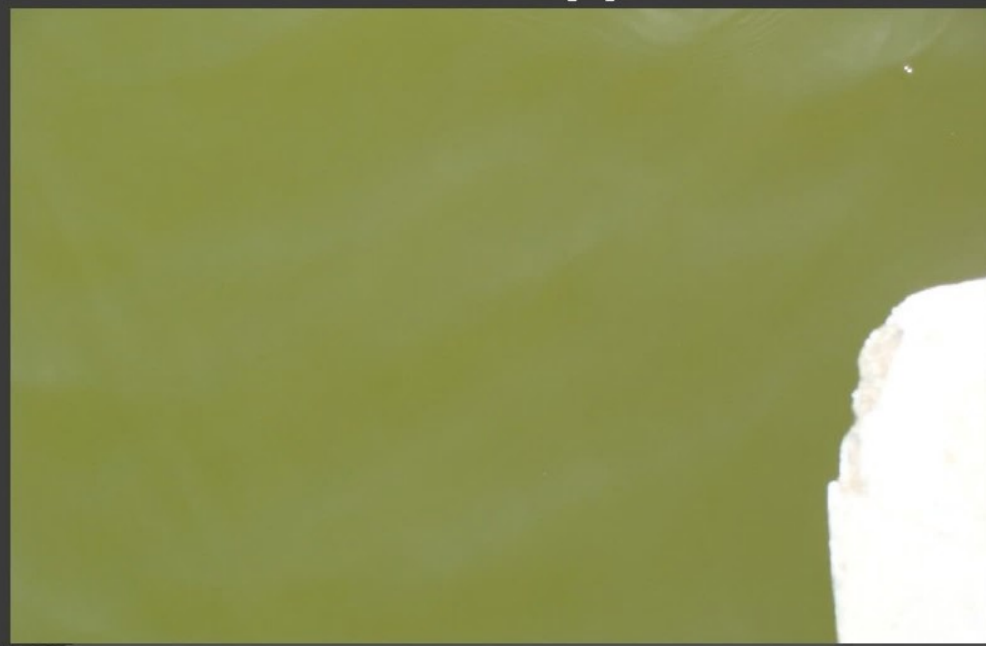
One month after application



Two months after application



Three months after application



Pre-harvest pond water colour

4 Mantra for water quality

- Lower pH
- High Oxygen
- Removal of Organic Matter
- Stable bloom

Farming Protocol

- Feeding The Right way.

FEEDING MANAGEMENT - KEY FACTOR TO SUCCESS

- Feeding management is the paramount factor in success of shrimp farming- 55-65% of COP.
- Wrong feeding is the mother of all problems in shrimp ponds.
- Don't feed vannamei the indicus way.
- In high stocking ponds (>30 pcs/mt²) percentage of feeding v/s quantity of feeding with frequency of feeding plays a vital role.
- Underfeeding is still manageable compare to overfeeding problems and issues.

FEEDING MANAGEMENT - KEY FACTOR TO SUCCESS

Example: Feeding for 100 000 PL

Initial stocking	: 100 000 PL
Survival	: 80% during end of culture
No of shrimps	: 80 000
Total feed during peak	: 35 Kg (ABW: 15-20 gms).
Max. nos of feed pellet consumed by single shrimp	: 4-5
Total pellets required per feed	: 320 000
Pellet per Kg of feed (grower/finisher)	: 70 000 (@ 70 pellets/gm)
Feed per meal	: Max. 5-6 Kg
Feeding frequency per day	: should be 6 nos.

Dyke feeding: Good?





Dyke feeding: Better?



Boat feeding: Excellent?



Auto feeder- Proving best for *L. vannamei*



Solar auto feeder





FEEDING MANAGEMENT – SUMMER

- Feeding management in summer becoming very crucial in case of *L. vannamei*. Feed intake drastically increases with high water temperature.
- The gut retention time also decreases with increase in water temperature leading to abrupt feeding behavior.
- It's very important not to overfeed the shrimp in summer by just observing check trays, percentage of feed in accordance to biomass is very decisive.
- During peak summer avoid feeding from afternoon to evening.
- Organic load is directly proportional to feed waste that triggers bacterial load especially *Vibrio spp.* during summer.

Feeding the right way- Auto feeder

Vannamei is a column feeder and actively catch the pellet before it sinks

Continuous feeding the shrimps more than 18 hrs a day helps to reduce stress variations and fasten the growth rate with better feed conversion

Less feed wastage means better pond conditions and less problems

Auto feeder ensures better biosecurity as workers will not enter the pond frequently

Manual feeding mistakes and calculation depends on labour, where as auto feeders are program to feed the shrimp without shortcut- Better efficiency



• Check tray feeding very important.



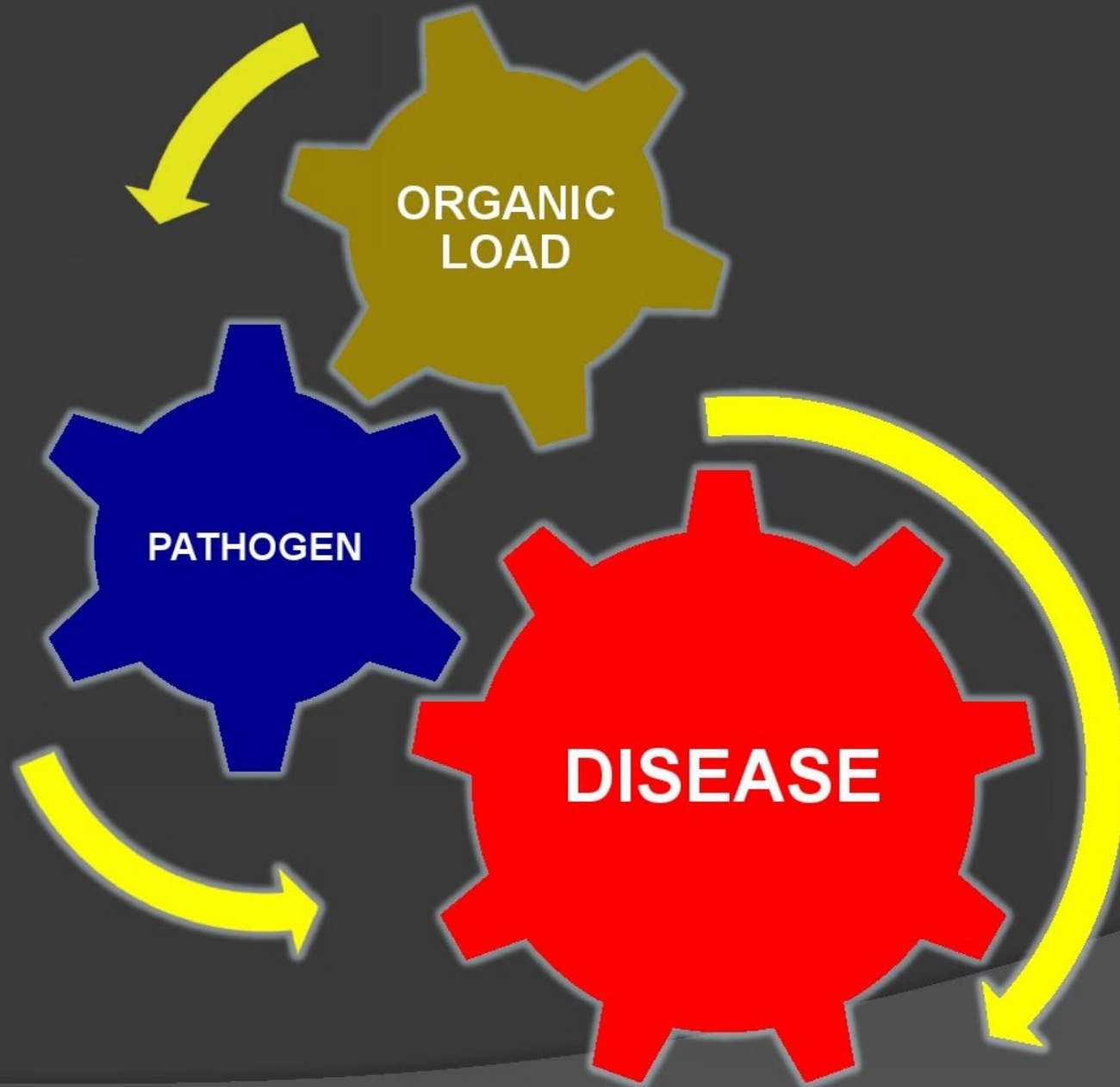
WHAT MATTERS “ORGANIC MATTER”

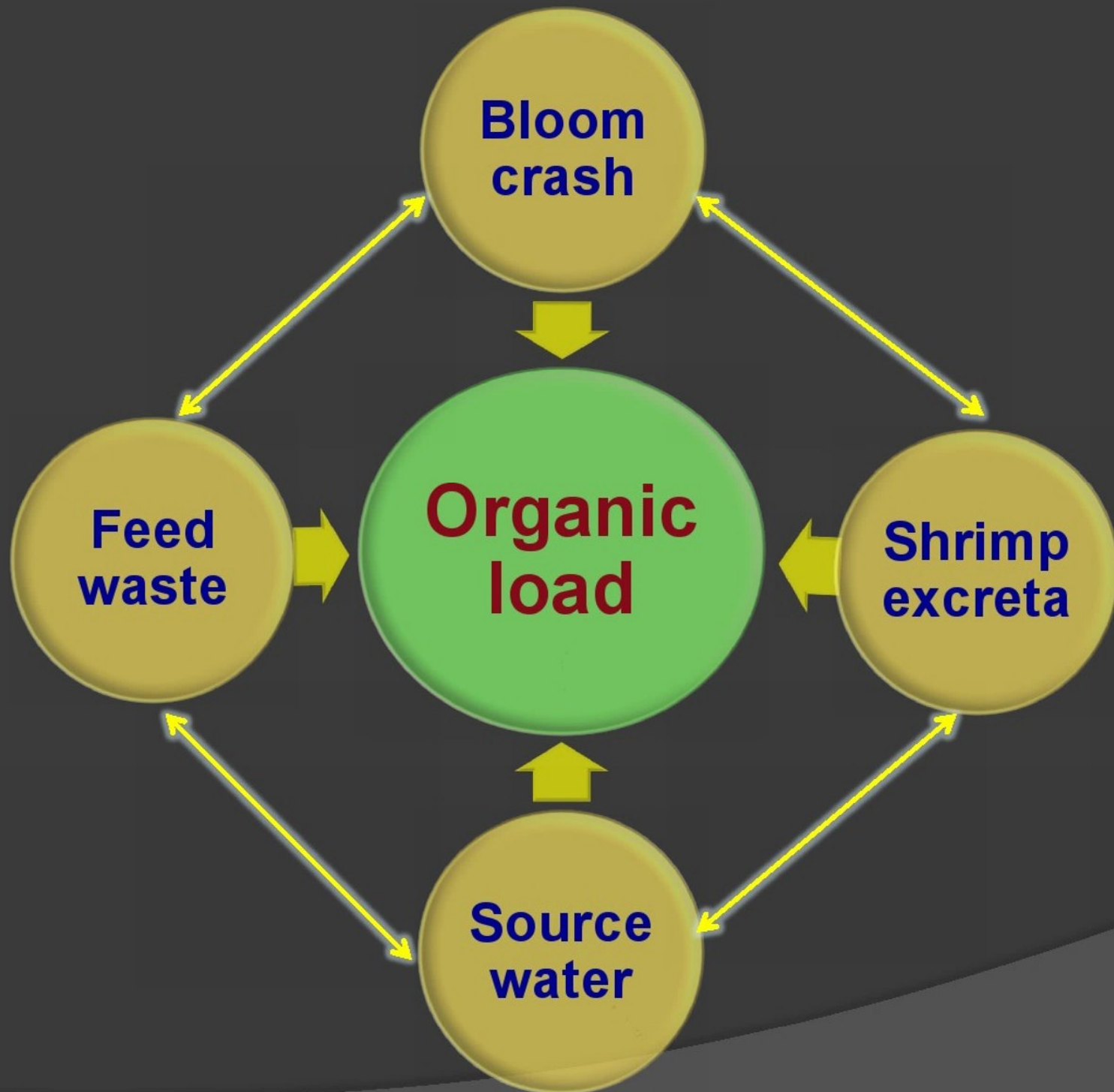
- Organic load is the major problem in shrimp ponds. Carrying capacity of the pond is directly related to organic load.
- Feed input is the major source of organic load followed by algal bloom.
- In modern day shrimp farming managing organic load is paramount factor through proper feed and water quality management.
- Uncontrolled or inefficient feeding regime may lead to heavy accumulation of organic matter inviting diseases especially *Vibrio*. Even heavy algal bloom and bloom crash further act as catalyst.





DISEASE EPISODE





- Monk type sluice gate.





• Shrimp toilet.



Shrimp Toilet



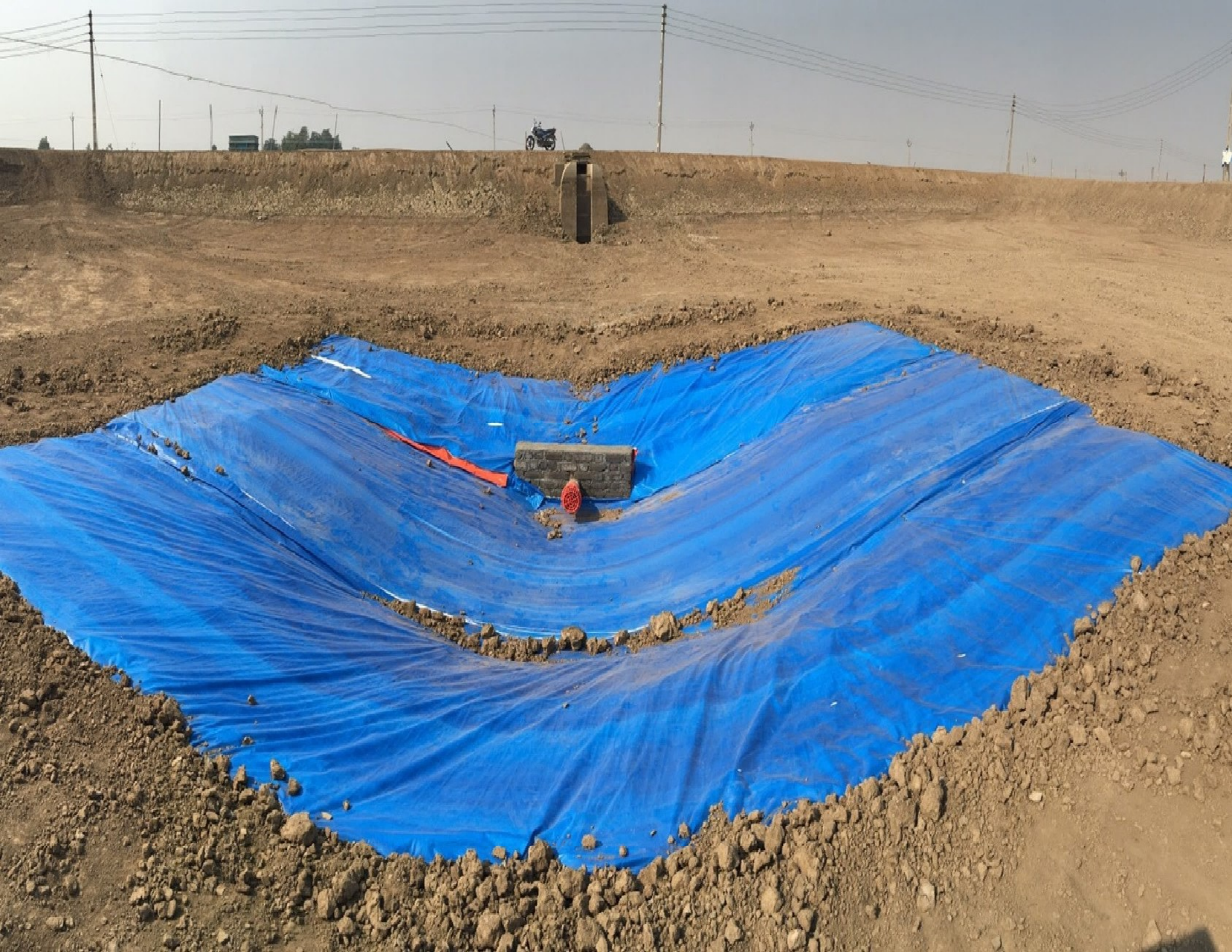
Shrimp Toilet







• Innovation of central drainage system.



SLUDGE REMOVAL THEORY

- Is it working??

- **Pond specific** - May be working for pond with different techniques and methods of sludge removal.
- **Creek** – Is it safe for long term sustainability as sludge is the biggest contributor for organic load.
 - For shrimp farming water intake and water exchange is a continuous process.
 - Whether is it safe to remove the sludge into the same water source.

Recommendation:

There should be separate area for sludge bed and its treatment. Proper care should be taken during disposing or recycling.



Healthy pond bottom

Biosecurity BREACH

- **Biometry**- Avoid sampling at least up to 60 DOC to minimize the cross contamination from pond to pond.
 - **Water quality testing**- Take water sample in bottles separately and do the parameters studies out side the ponds.
 - **Partial harvesting**- Should be avoided through dragging or cast netting during disease out break in surrounding area.
 - **Feeding**- Use auto feeder to lower the risk of contamination through manual feeding. Completely avoid boat/raft feeding.
 - **Sludge removal**- Avoid manual sludge removal completely, use mechanical pumps/ shrimp toilet system.
- Aerator installation**- Completely avoid installation/ shifting of aerators from pond to pond.

TYRE WASH



BIRD NETTING





CRAB AND DOG FENCING





FOOT DIP AND HAND WASH







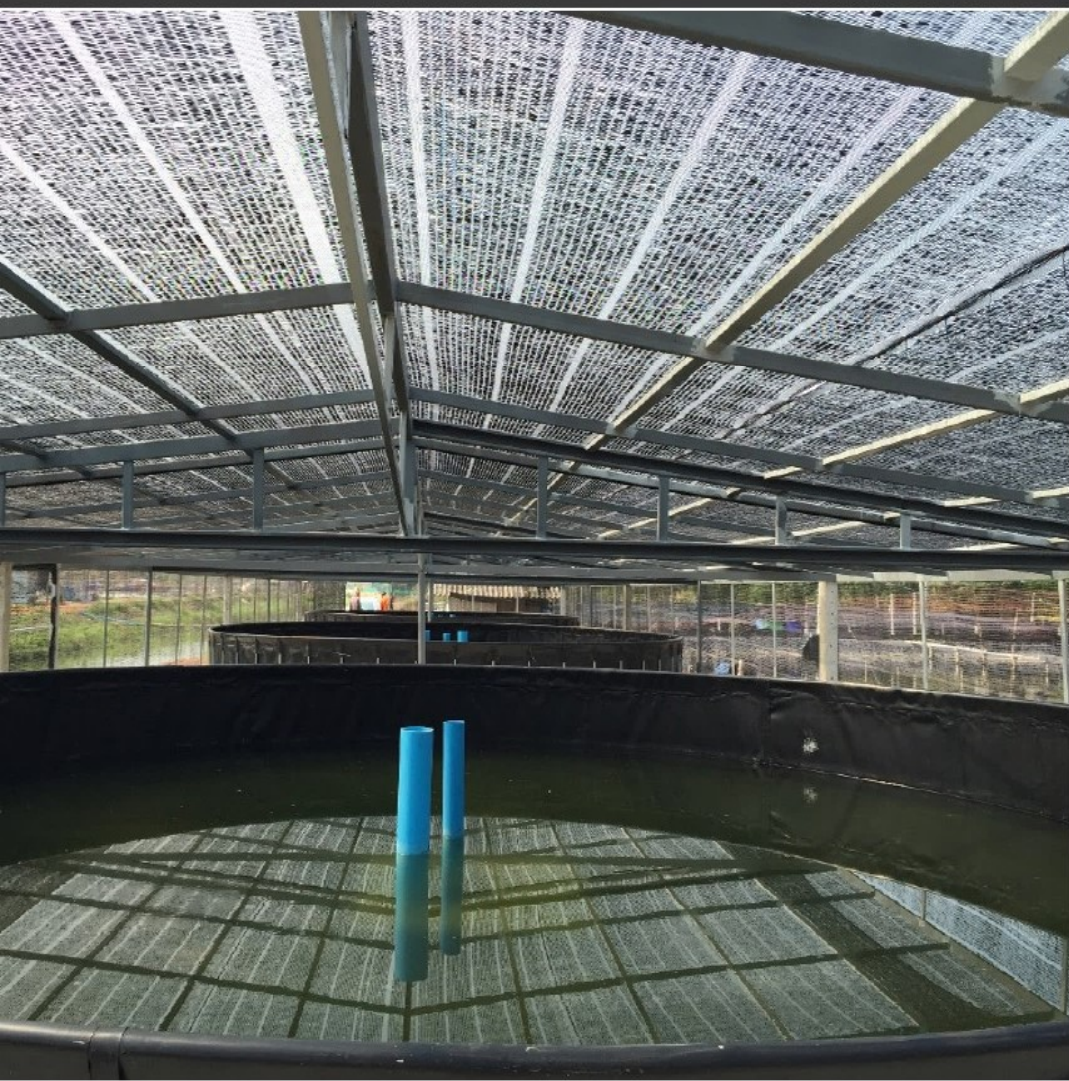
Two-phase culture system

- 30 days nursery phase- assured crop
- 5-10% of farm area- saves 100% farm
- High advantage- jump growth pattern
- Less grow-out phase : cost effective management
- Easy to manage two crops per year

















PROPER HEALTH MONITORING OF SHRIMP

- Judicious water quality parameters in regular interval
- Body conditions of shrimp
- Hepatopancreas
- Gut conditions
- Faecal strands
- Swimming activity

COMPETENT MANAGEMENT DURING SPECIAL CASE

- Season wise/ Climate change
- Heavy rain
- Cloudy weather
- Plankton crash
- Heavy water exchange
- Moulting time
- During disease out break

Development of aqua clinic

SHRIMP CLINIC

☎ 80002 00108
80004 06108



In service of shrimp farmers

Shrimp clinic services

- Analysis of important physico-chemical macro and micro water and soil parameters of shrimp pond
- Analysis of important mineral profiles of shrimp pond water
- Analysis of toxic gases of water and soil in shrimp pond
- Analysis of helpful and harmful plankton of shrimp pond water
- Analysis of other biodiversity of pond water
- Analysis of pathogens in shrimp pond
- Complete health diagnosis of culture shrimp

"On site services for water quality management in shrimp pond."

Fresh harvested shrimp of American white leg shrimp, *L. vannamei* from Gujarat shrimp pond



Fresh harvested white leg shrimp of 19/20 counts/Kg from Gujarat shrimp pond



Fresh harvested white leg shrimp of 19/20 counts/Kg from Gujarat shrimp pond





IRAN SHRIMP FARMING

- The Way Forward

SEED PRODUCTION SYSTEM:

- **Broodstock- Presently still farm reared**
- **Hatchery- Well standardized operation, seasonal**
- **Nursery- Yet to develop**
- **Testing facility- Yet to develop**

IRAN SHRIMP FARMING

- The Way Forward

PRESENT FARMING SYSTEM:

- Stocking density – Moderate
- Size of pond – Ideal for modified extensive to semi-intensive
- Salinity – Few area low, majority high
- Feeding management – Doing *F. indicus* pattern
- Aeration- ??
- Biosecurity- Complex, has to improve protocol
- Probiotics-??

IRAN SHRIMP FARMING

- The Way Forward

PRESENT RESCUE MEASURES :

- Use SPF/HH good quality broodstock**
- Maintain water depth as much as possible**
- Follow judicious pond preparation and water culture before stocking**
- Use of good quality probiotics to improve pond environment**
- Use good quality feed, feed additives and Improve feeding management must**
- Minimize organic load by biological and/or mechanical**
- Improve biosecurity**
- Transparent and traceability**

IRAN SHRIMP FARMING

- The Way Forward

SUGGESTIONS AND RECOMMENDATIONS:

- Pond renovation – Proper central drainage system or shrimp toilet should be developed in each pond to remove organic load**
- Nursery system – It must be developed to stock juvenile in grow-out**
- Feeding management – Demand feeding with minimum 5 meals per day to minimize feed wastage or labor Auto-feeder is highly recommended**
- Biosecurity – Basic farm biosecurity is highly recommended like multi-step water filtration for pond, Bird netting, crab and animal fencing**
- Probiotics/ Minerals – Shrimp health and pond management products should be part of culture protocol**

Save shrimp farming !!

