

Shrimp farming system

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Closed Zero exchange farm for intensive production of marine shrimp, using Bioflocs



Introduction



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Shrimp farm system is the most promising new method for environment friendly closed shrimp farm production system in the

world, in this system you can farm shrimp in high densities with fast growth and with year round production!

It is the ultra-intensive culture of shrimps with complete re-use of water through a biological treatment of aerobic and heterotrophic, also called biofloc-technology.



Pacific whiteleg shrimp (*Litopenaeus vannamei*)

Family: Penaeidae

Genus: *Litopenaeus*

Species: *L. vannamei*

Description

- Pacific Whiteleg shrimp (*Litopenaeus vannamei*, formerly *Penaeus vannamei*), is a variety of [prawn](#) of the eastern [Pacific Ocean](#).
- Length and weight: till \pm 23 cm and 45g (-60g cultured)
- Color: transparent white, blue mold
- Natural Feed: zoo- and phytoplankton, algae, seaweeds, death organic material, detritus, macrophyten and small invertebrate animals.
- Habitat: muddy bottoms from coastline, mangroves till approximately 70 meters depth in the ocean.
- Distribution: *L. vannamei* are native to the eastern [Pacific Ocean](#), from the [Mexican](#) state of [Sonora](#) as far south as northern [Peru](#) It is restricted to areas where the water temperature remains above 20 °C (68 °F) throughout the year.



System description

The system allows production of shrimp without ex-change of water.

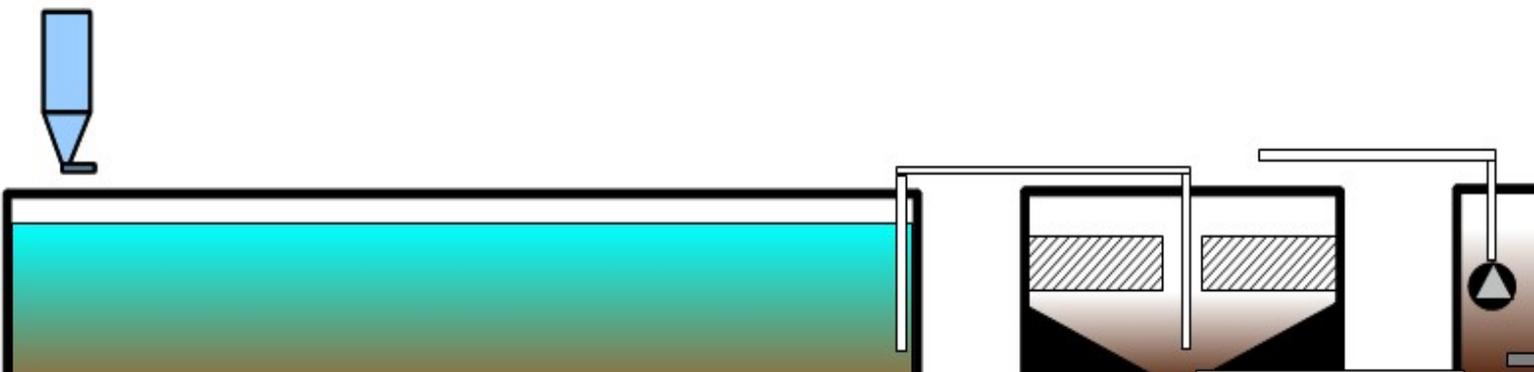
Its phase production maximizes the utilization of water volume by using a 2 or 3 phase split growing system and partial harvesting.

It allows harvesting of daily fresh shrimp through partial harvesting without stressing the remaining shrimp in the tank.

The interaction with the bio reactors reduces the excess sludge production and nitrate buildup. Excess bioflocs can be removed without special equipment.

Intensive aeration allows high biomass densities and keeps the flocs in suspension.

Utilization of substrates increases the surface of shrimp tanks and provides extra hiding and resting places for molting shrimp as well as an increased area for nitrification and production of micro-organisms



Thanks to zero exchange of water with no effluents the environmental impact is reduced and shrimp can be farmed anywhere. The application of such a system meets the growing aquaculture concept of a responsible, sustainable and environmentally shrimp farming method in proximity of the market. The system also reduces the risk of introduction and spread of diseases. When covered with a building or greenhouse this system provides the only good option for a bio-secure shrimp farm.

The module is equipped with an advanced bio reactor, which increases the flexibility of water quality management.

Addition of chemicals for pH adjustment is not necessary and nitrate levels are controlled. Excess bioflocs can be removed without special equipment.

The advanced utilization and control of bioflocs not only reduces the environmental impact, but also enables nutrient recycling into new protein biomass, as additional nutrition for the shrimp, resulting in faster growth and reduced FCR.

Thanks to the re-use of water, our system can be build anywhere in the world, in the tropics, in temperate climates, in the desert, close to towns, in buildings, former pig and chicken sheds and in greenhouses.

Our system is easy to handle and manage and has low operational costs.



Bioflocs

Bio-flocs are a mix of detritus with associated bacteria, algae, protozoa, rotifers, copepods, nematodes and other micro-organisms. They are the basis of the food chain in water. The nutritional value of organisms associated with bioflocs have been proven, even for larval stages of shrimp.

At intensive aeration the faeces of shrimp are assimilated by bacteria

These bacteria form colonies

Also rest products (fibers etc) and micro-organisms are part of these bioflocs

These bacteria take pollutants out of the water (ammonia) and convert them into protein. Plankton (ciliates, copepods, rotifers, nematodes) consumes these bacteria.

Shrimp consume these bioflocs (mainly the plankton) actively or passively

We thus obtain recycling of feed (similar to nature)



Bioreactor

The system is equipped with an advanced **bio reactor**, which increases the flexibility of water quality management.

The utilization of this bio reactor is the main difference between the production method and other shrimp production systems using bioflocs. This bio reactor enables a longer utilization of culture water without addition of chemicals for pH adjustment. Nitrate levels can be controlled.

The production of excess bioflocs is minimized and can be easily removed without special equipment.

The advanced utilization and control of bioflocs through a special bio reactor not only reduces the environmental impact, but also optimizes the nutrient recycling into new protein biomass, as additional nutrition for the shrimp, resulting in faster growth and reduced FCR.

Each bio reactor is customized to the farm production strategy.
farms are always equipped with this bio reactor



Advantages CreveTope system

- ⤴ Higher shrimp per m³ volume water
- ⤴ Location and climate independent
- ⤴ Whole year climate independent production
- ⤴ Lower feed conversion ratio
- ⤴ Higher bio-security
- ⤴ Higher survival rate
- ⤴ Zero water exchange
- ⤴ Possibility of partial harvests, sales of fresh or live shrimp for local market
- ⤴ More crops per year
- ⤴ Whole year locally produced fresh or live shrimp
- ⤴ System is suitable for *L. vannamei* and *P. monodon*

General parameters

Cultured shrimp species	<i>Litopenaeus vannamei</i> (whiteleg shrimp)
Production efficiency	8-12 kg/m ³ year
Water temperature	27-30° Celsius
Salinity	5-35 ppt
Shrimp age at stocking	± PL 12-20
Grow out period	120-180 days (PL12 till 20-35g)
Survival	± 50-65 % (depending on PL quality)
Average FCR (Feed conversion ratio)	± 1,6
Annual production days	± 365 days

12 ton module description

Capacity	12 000 kg fresh shrimp/year
Space requirement	± 1200 m ² (can be adapted)
Volume Nursery tank	± 10 m ³
Total Volume grow-out tanks	± 640 m ³
Avg electricity demand	± 12 kWh (without heating)
Expected daily average feed gift	± 40 kg/day
Investment cost estimate (without building):	525 000 Euro

25 ton module description

Capacity	25 000 kg fresh shrimp/year
Space requirement	± 1600 m ² (can be adapted)
Volume Nursery tank	± 20 m ³
Total Volume grow-out tanks	± 1400 m ³
Avg electricity demand	± 25 kWh (without heating)
Expected daily average feed gift	± 100 kg/day
Investment cost estimate (without building):	700 000 Euro

50 ton module description

Capacity	50 000 kg fresh shrimp/year
Space requirement	± 3200 m ² (can be adapted)
Volume Nursery tank	± 2 * 20 m ³
Total Volume grow-out tanks	± 3000 m ³
Avg electricity demand	± 36 kWh (without heating)
Expected daily average feed gift	± 200 kg/day
Investment cost estimate (without building):	1 000 000 Euro

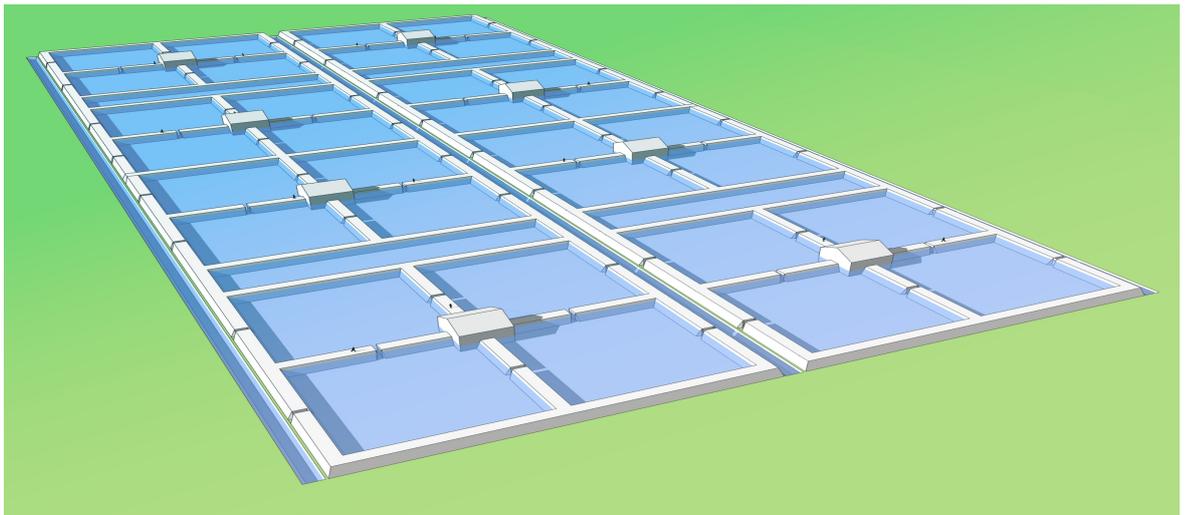
These figures are only an estimate. They are not an offer, but to give you an estimate of investment, surface needed, etc.

We can design projects for bigger capacities based on the same production principles

Pond module

The same technology can also be applied in open air bigger ponds.

4 ponds are connected to a central bio reactor. Each module consists of 8 ponds, 2 reservoirs and 2 reactors. Production is done in 2 phases, from 0-120 days and from 120-180 days. All water is recuperated and used for the next cycle. This system is the best method to farm shrimp in a bio-secure way.

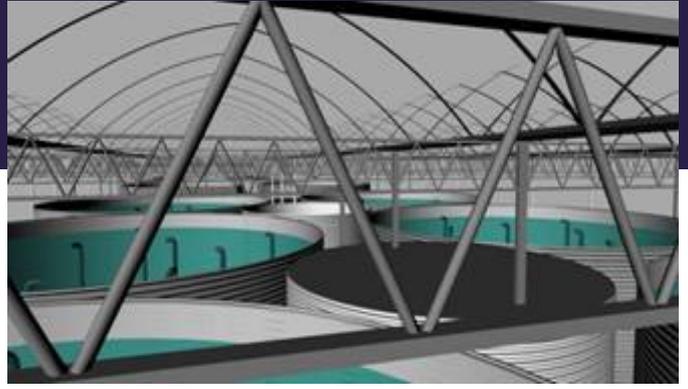


The system can be used for *L. vannamei* and *P. monodon*. In lower temperature regions, ponds can be covered to achieve a greenhouse effect.

A production of 50-100 MT per ha and per year can be achieved. All pond systems are designed tailor-made.



Our services



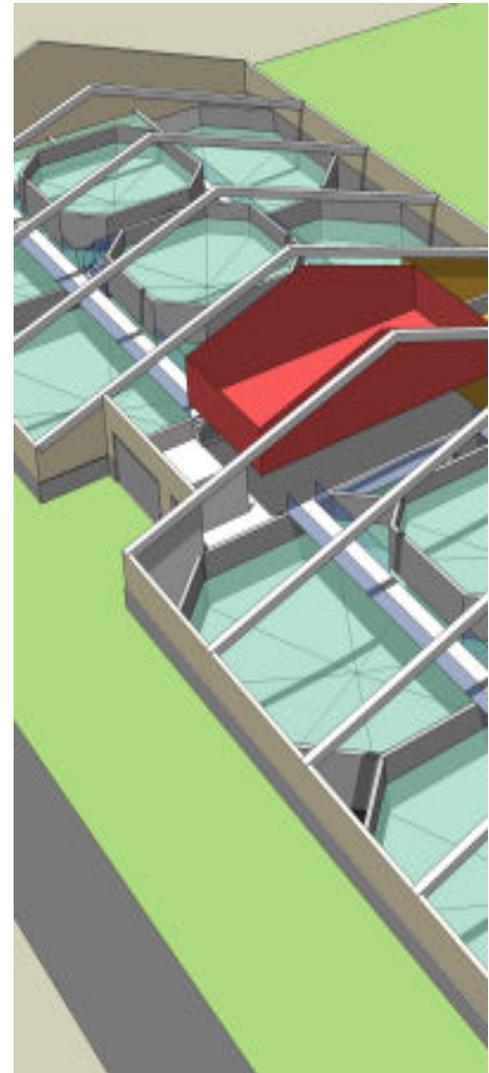
We can provide a custom-made design of your shrimp project. We don't supply a turn-key project, but can supply materials and equipment, supervision of installation, start-up of the farm (start-up of biofloc production and first intake of post-larvae), continuous advice during production, training of your staff at our farm.

This design will take into account the specific conditions of your project, such as: environmental conditions (temperature, water source, heat source), target market size of the shrimp, target capacity.

Existing shrimp farms can be adapted as well to enable production without exchange of water and take advantage of the nutritional benefits of bioflocs.

We offer consulting to any shrimp farm wishing to optimize feed and water management. This will result in lower water utilization, higher natural production in the ponds, lower FCR and faster growth. The economic and technical feasibility of a project can be calculated. This can include technical drawings of the farm, details regarding construction, investment cost, production cost calculation, list of equipment.

We can supply high quality and adapted shrimp feeds, or cooperate with a local feed supplier to produce such feeds.



List of services and budget. Steps for cooperation.

Step 1: Short Prefeasibility study. Estimation of investment cost and production cost, production plan, location advice: 5000 Euro. This includes a technical visit to the farm in Belgium.

Step 2: Complete design of the project, list of equipment and possible suppliers, technical visit to farm in Belgium to explain in detail how the system works: 18000 Euro

Step 3: Follow up on construction of shrimp project, detailed advice on construction, visit to site, training of technical staff on the farm: 17000 Euro

Step 4: Start-up of the farm on site, consulting and advice during first year of production, 1 week further training of 1 staff member on the farm including 1 more follow-up visit on your site: 17000 Euro

Training:

Sometimes we organize seminars with visit to the farm

Personalized training is also possible for 3000 Euro for a week on site

Conclusion: Sustainable Production !

Quality

- ⤴ Shrimp with a sweet flavor, thanks to a special designed preharvest system (shrimp have empty gut)
- ⤴ Fast harvested in an ice and water bath to ensure flavor and firm texture
- ⤴ Shrimp is processed and chilled moments after harvest and never frozen
- ⤴ All natural – no hormones, antibiotics or preservatives.



Sustainability

- ⤴ Inland, closed loop shrimp farm system minimizes land and water use, leaving coastlines and mangroves untouched
- ⤴ This system operation employs a Zero Water Exchange technology meaning culture water is recycled from cycle to cycle
- ⤴ Recycling of nutrient faeces by bioflocs

Innovation

- ⤴ Feeds contain a small percentage of fish meal: a feed without marine proteins is also available
- ⤴ Algae and seaweeds are used in the feed
- ⤴ You produce sustainable environment friendly shrimp with the highest quality next to your door.

