

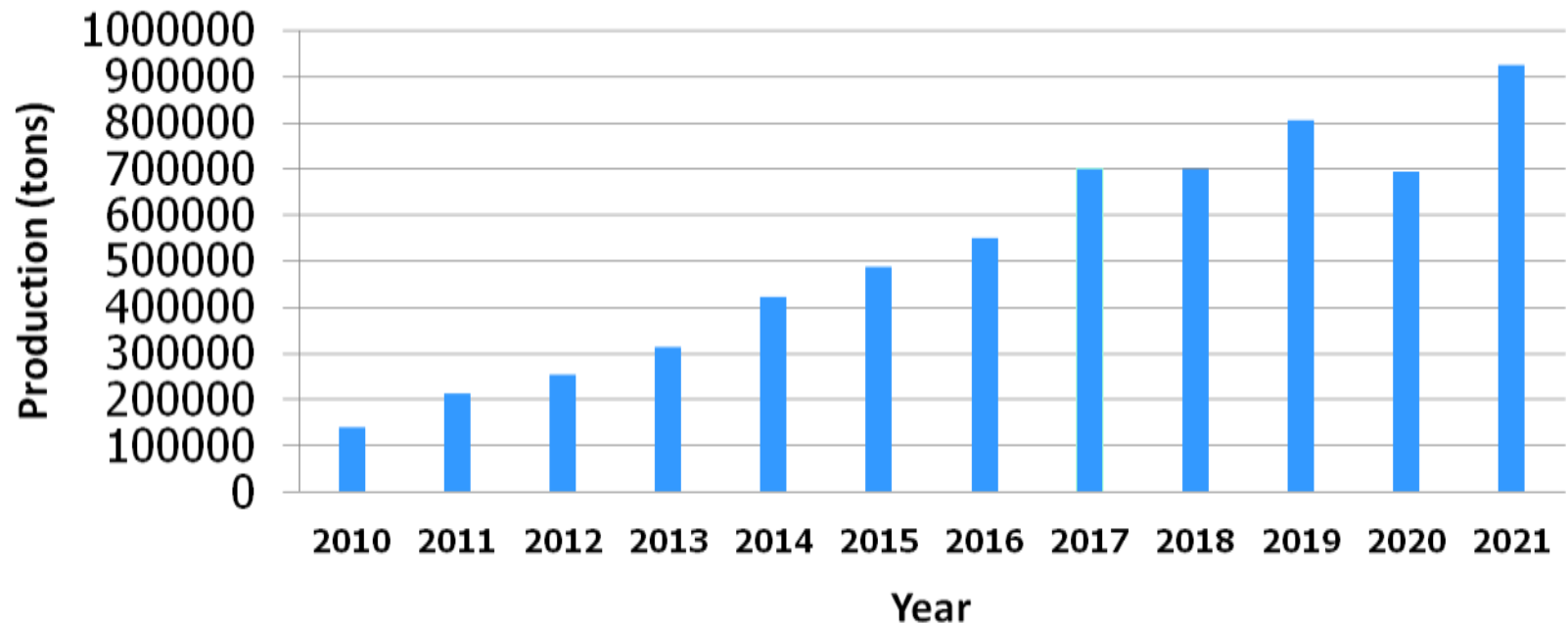
Sustainable Development of the Shrimp Farming Sector In India



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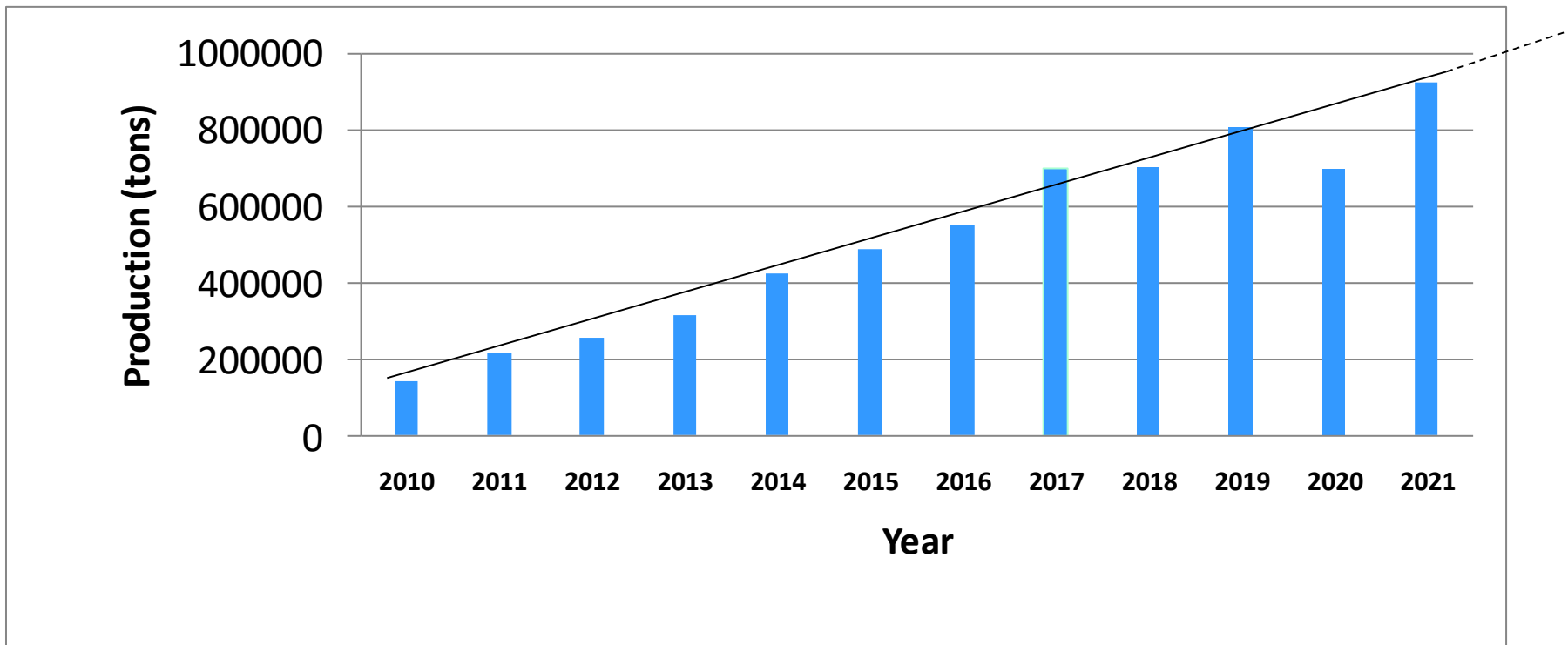


Indian Shrimp Production



Can we sustain this growth ?

CAGR-22.25%





Sector in 2021

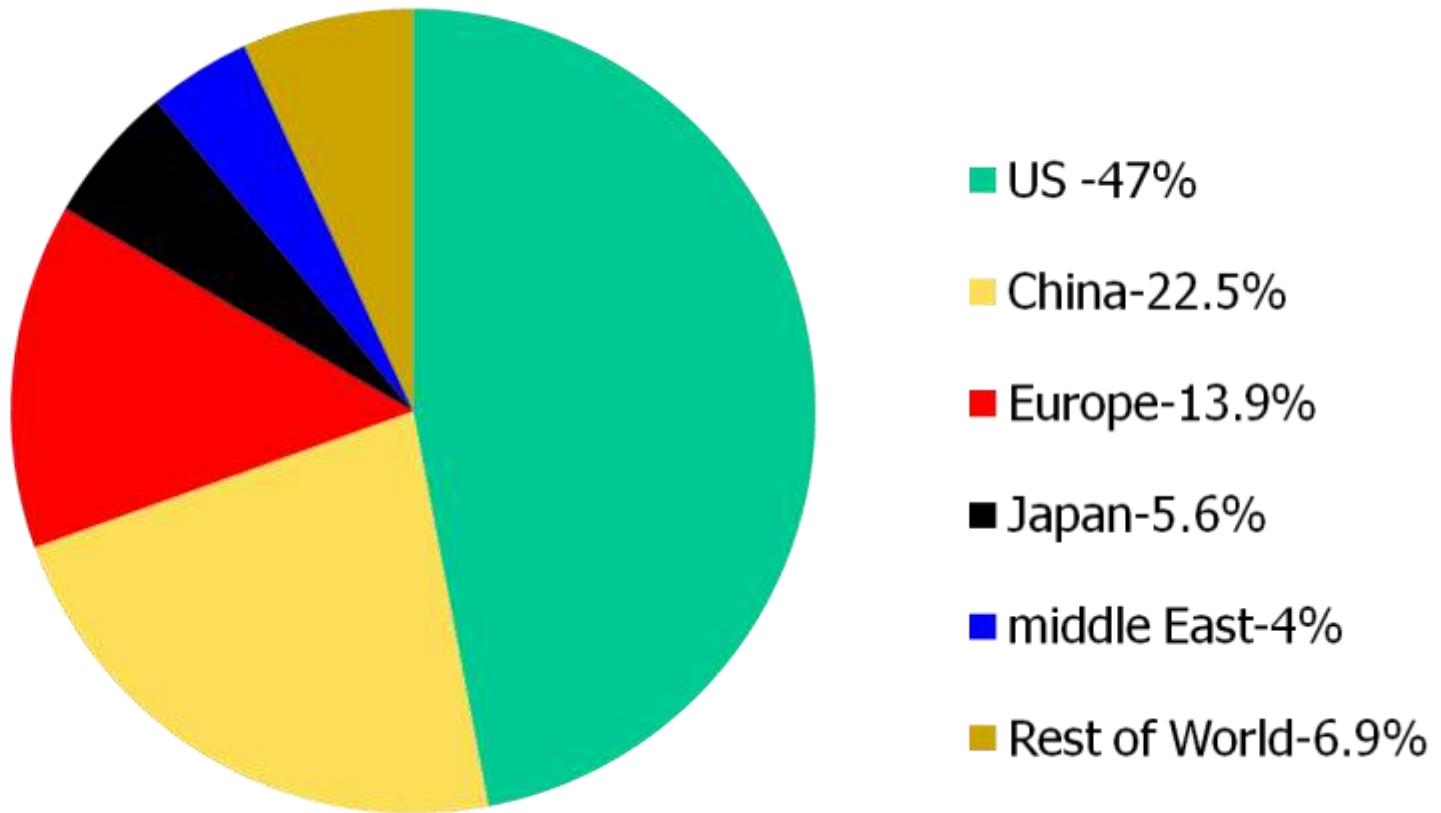
- Despite the record breaking production, the entire sector played a zero sum game.
- Exports are not all that profitable due to increase in ocean freights and global shrimp prices not being commensurate with farm gate prices during the course of the year.
- Farmers are not happy either with diseases wreaking havoc and increasing input costs.
- Feed mill operations are getting increasingly tougher, with raw material prices going up.
- Hatcheries are also finding it difficult to make it work with the cost of production going up.



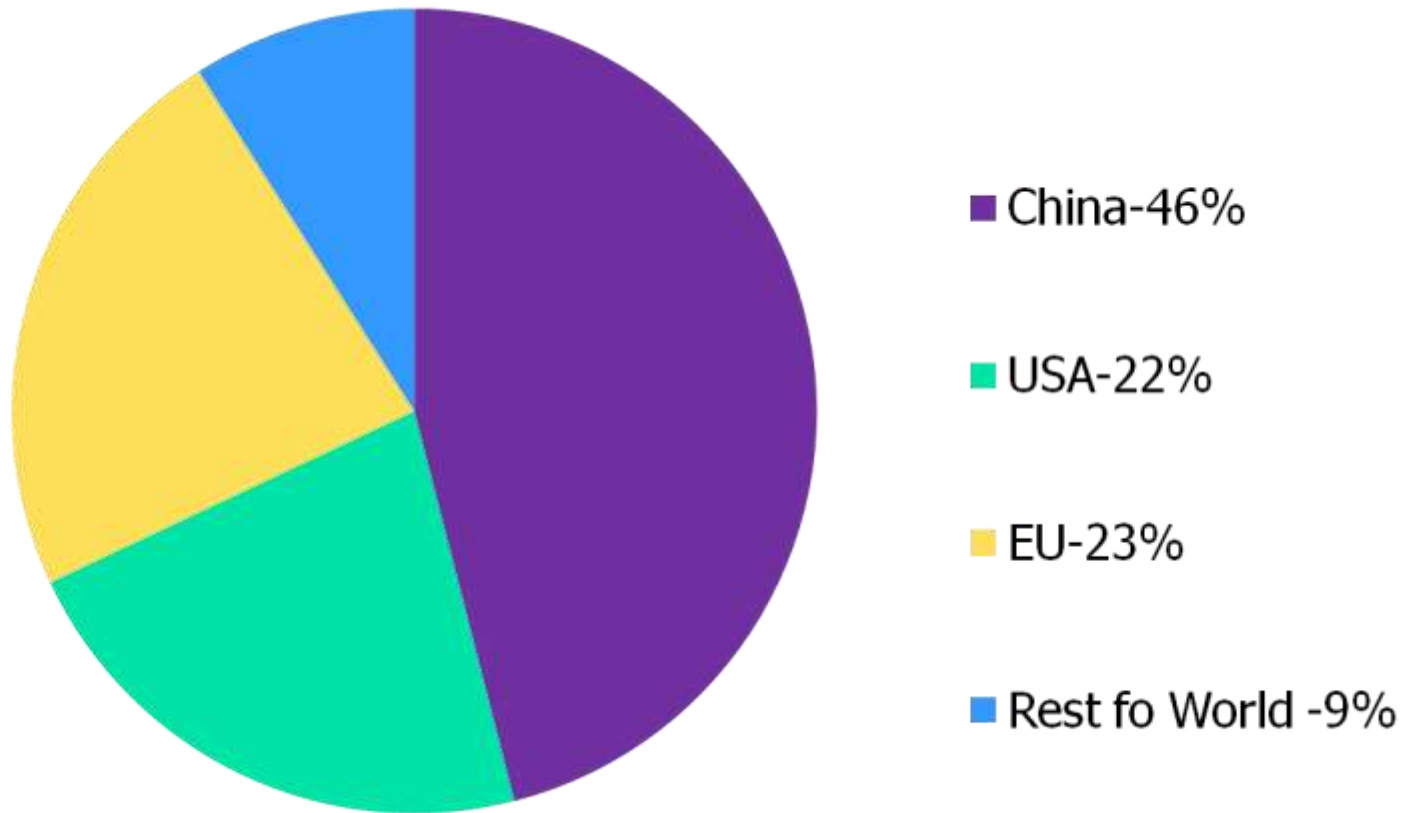
Trends in the market

- Ecuador making headway in to US Market with PDs & PDTOs.
- Chinese market getting stringent with covid screening of the shrimps as well as packaging material.
- Both the markets are increasing in size.
- Lot of Markets are looking for disease free commodity shrimps.
- The food service demand in all the markets is coming back with vengeance.

Indian exports in 2021



Ecuador exports in 2021





India Vs Ecuador

Market	India (MT)	Ecuador (MT)
USA	3,46,943	2,03,160
China	1,65,668	4,30,236
Europe	1,01,970	2,09,892
Rest of World	84,529	1,19,578



What we need to do sustain in the market...

- Need to increase our penetration in Chinese market by changing our harvesting and purchasing methods and take advantage of our proximity to china.
- Need to compete with Ecuador in European market as well.
- The industry need to work on the market by coming up with a right narrative as we don't have large exporters in comparison with Ecuador.
- Need to work on our domestic market.
 - take advantage of population & demographic dividend.
 - have to establish a robust cold chain infrastructure.
 - have an independent promotion board to augment fish & shrimp consumption.



The Challenge of Diseases

- The good old foe WSSV continues to trouble the industry.
- Emergence of EHP and White feces is one obvious reason for drop in the profitability.
- Running mortalities are reported right through out the country.
- Survivals are coming down with increasing days of culture
 - farmers are not able to harvest bigger sizes
- Diseases are the major difference between India & Ecuador
- Less Incidence of diseases in Ecuador is making their farming more viable.



WSSV

- During the second half this year it is very rampant.
- Most of the culture belts in A.P have been affected.
- Area specific crop holiday is helping the farmers to combat the problem.
- Collective spirit and understanding could further check the contagion.
- Nurseries could benefit the farmers for better preparation of the ponds and in a way protect crops from WSSV



EHP, White feces & Running mortality syndromes.

- White feces also looks to be very threatening of late.
- Running mortality syndrome looked more pronounced during last summer
- As of now, both are idiopathic.
- EHP has become endemic through out the country.
 - contributed to stunted growth of shrimps and there by huge losses to the farmers.
- White feces is possibly not associated with EHP alone
 - playing havoc with the crops when it is present along with EHP.



Measures to control EHP in farming

- Seed being tested at the hatchery and juveniles before shifting from nurseries.
- Soil getting tested for EHP spores.
- The earthen ponds affected with EHP are disinfected by the application of CaO (quick Lime) at 6tons/ha.
- The liner ponds are disinfected with application of 2.5% NaOH solution and washing it off after 3 hours of contact time. Then the ponds are dried for one week before getting rinsed with 200ppm acidified chlorine solution.
- During the course of the crop, partial harvest along with good water exchange and usage of functional feed is helping.
- It is rather advisable to screen all the ponds around 10 grams for EHP. If the Ct value is low , early harvesting is better option.



Changes needed to suppress bacterial load in farming

- The thrust should be given for suppressing the bacterial loads.
- Clean seed, clean water and clean pond bottom are helping the farmers in reducing the bacterial loads – right hatchery protocols, different water treatment methods, central sludge removal pit and sludge disposal pit.
- Nurseries are coming in handy.
- System diversification – three stage or even four stage culture system could further help ; Vietnamese industry is hugely successful with this model.
- Stocking tilapia in reservoirs and inside a cage with in the pond.
- Reduction of densities and shortening the crop.
- Micro biome studies – meta genomics.



Lower Densities

- It is enabling the farmers to play the game well within the carrying capacities of the farms & creeks.
- Farmers could control the organic matter and there by the bacterial loads.
- Giving the farmer a chance to take the crop to larger sizes.
- Looked to be less risky even on the creeks with too many farmers.



Change of protocols in hatcheries

- Thorough rinsing of eggs & Nauplii.
- Change in disinfection procedures of maturation.
- 2.5% NaOH solution is applied and washed off after 3 hours of contact time. Then the tanks are dried for one week before getting rinsed with 200ppm chlorine solution.
- Hatcheries are doing away with usage of live feeds.
 - Live feeds are either pasteurized or frozen.
 - Imported live SPF polychaetes are being tried as well.
- Larval rearing – modular operation and swift stocking.
- Antibiotics have to be completely done away with.



Disease surveillance & epidemiological studies.

- We need to have exclusive disease surveillance program for shrimp sector as it is quite different from fish in terms of immunity and value.
- Regular epidemiological studies on emerging pathogens is needed as well.
- SAP along with university of Arizona has conducted such study on EHP & White feces.



Study done by SAP along with University of Arizona

Study: White Feces Syndrome in shrimp can be caused by more than one pathogen

28 February 2022

By Luis Fernando Aranguren Caro, Ph.D. , Hung N. Mai, Ph.D. , Roberto Cruz-Florez, Ph.D. , Frances Laureen Agcalao Marcos , Rod Russel R. Alenton, Ph.D. and Arun K. Dhar, Ph.D.

Aquaculture Pathology Laboratory finds conclusive evidence that EHP is not the only pathogen associated with the presence of White Feces Syndrome in *Litopenaeus vannamei*

The shrimp gut microbiota is fundamental to the host's nutrition, growth, pathogen resistance and maintenance of the internal steady state or homeostasis. Feeding characteristics of shrimp, such as actively grazing and cannibalism, make the host vulnerable to pathogen invasion. Colonization by alternative microorganisms destabilize the intestinal microbiota, which leads to infections and co-infections in a taxonomically diverse gastrointestinal (GI) tract.

Although there is limited information on specific immune mechanisms provided by the shrimp gut microbiota, there is evidence of its interplay with the digestive activities that directly affect shrimp



Broodstock Trends

- Shrimp breeding is coming of age.
- We have whole range of broodstock from WSSV tolerant to super growth lines.
- One problem the breeding companies are facing is that the animals are attaining size very fast and they are forced to give under aged animals.
- On the other side, if hatcheries try to buy bigger animals transport and quarantine mortalities are way too high and they are also not able to use them for more than three months.
- Moving forward, breeding companies have to come up with some innovative solutions.
- To harness the potential of the genetics , breeding firms have to closely associate with feed mills.



Broodstock Range

Growth/Super growth	Balance	Tolerant Lines
SIS (Superior)	Kona Balance	SIS Hardy
SIS (Growth)	SyAqua	SIS Robust
Kona (Speed)	Bench Mark yield	Kona strength
SPD		API Dragon
		Bench Mark Protect
		Bench Mark Low salinity tolerant



Monodon

- There is renewed interest among farmers to do tiger farming.
- This species is able to overcome the emerging diseases better than vannamei, apparently due to its feeding habits.
- All the farmers willing to stock tiger are not able to do as the availability of seed is not good.
- The supply of broodstock from RGCA's breeding program at Andaman has to be expedited.
- Lifting the ban on the broodstock import from EMS affected countries has to be considered.
- BMC of Moana/Vaishanvi shall start their operations at the earliest.



Species Diversification

- India is blessed with multiple cultivable shrimp species like P.Monodon, P.Indicus and P.Merguiensis
- Some of these species are refractory to some of the diseases and some could overcome the diseases through their behavioral traits like P.Monodon is able to overcome E.H.P through its feeding behavior.
- We are also blessed with an island like Andaman which is far flung and devoid of any culture.
- If government earmarks an area for breeding programs in Andaman and calls for expression of interest, many of the firms with breeding expertise could come in and set up their shop; it would be in line with our honorable prime minister's 'Make in India' program.
- We can also work on resistant/tolerant lines of our indigenous species which in turn could help our tide fed farmers apart from our mainstream farmers



Conclusion

- All in all, there should be substantial changes at every level of the value chain and all the stakeholders including the government shall work in **unison** to keep the sector **sustainable**.