

# Development of **Shrimp Aqua Culture**

# Agro and Food Processing

**Government of Gujarat** 





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# **Project Concept**



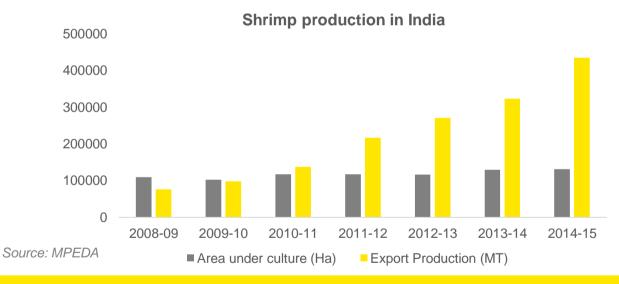


#### The concept

The project aims at establishing Shrimp Aqua Culture given the high potential of production, raw material availability and demand in food market.

### Shrimp aquaculture overview in India

- India is endowed with a long coastline and offers a huge scope for exploitation of marine wealth. Coastal aquaculture has been identified by the Government of India as high potential area for increasing the fish and shell fish production and also to achieve economic and social benefits.
- ▶ India with over 8,100 Km of coastline, vast stretches of estuaries/ backwaters, lagoons provide enormous opportunities for brackish water shrimp farming. Commercial shrimp farming is almost two decades old in India.
- ▶ It is commonly said that after Green and White Revolution in India, it is time for Blue Revolution to exploit the huge potential in fisheries sector. Shrimps are called the "Pinkish Gold" of the sea because of its universal appeal, unique taste, high unit value and increasing demand in the world market.
- ▶ India's aquaculture production basically can be classified into freshwater and brackish water production. There are 429 Fish Farmers Development Agencies (FFDA) and 39 Brackish water Fish Farmers Development Agencies (BFDAs) for promoting freshwater and coastal aquaculture.



### Brackish water shrimp aquaculture in India

- ▶ In India, brackish water aquaculture sector is largely based on farming of Penaeus monodon.
- ▶ Other shrimp species, i.e., Penaeus indicus, P. merguiensis and P. semisulcatus, are considered as potential ones and cultivation of Penaeus vannamei has been gaining momentum in the recent years.
- ▶ In India, a major shift in India's policy on shrimp took place with the introduction of an exotic species of shrimp, viz., Penaeus vannamei.

# **Project Concept**





### Technology/Process

Proposed integrated shrimp farming project will have four components, feed mill, hatchery, Shrimp farm and processing unit.

### Feed Mill

- Shrimp nutrition or feed is not of the required quality in India.
- It constitutes 40-60% of the operational cost in semi intensive and intensive culture operations, and largely determines the viability of the shrimp farming industry there arise a requirement of feed mill manufacturing.
- Technology for feed mill is indigenously available.

### Hatchery

- The high quality seed for proposed shrimp farm is available from two sources. One is the Natural Seed Resource and other is Hatchery production of prawn seeds.
- This would also facilitate the rearing facility within the Hatchery for brood stock rearing, maturation, spawning, larvae rearing, post larvae rearing/nursery phase, artenia hatching, isolation and maintenance of axenic unialgae culture, mass culture of algae, sea water reservoir, water treatment facility and laboratory.

#### Farm

- The species of Shrimp / Prawn that can be grown is the black tiger prawn (Penaeus Monodon), and is the one favoured world over.
- The post larvae to be grown out in the farm will be available from the hatchery within the complex. The harvested prawn will also be processed in the complex.

# Processing Unit

- The processing unit will suffice the requirements of value addition, where initially the shrimps will be processed as plate frozenheadless raw shrimps and later on Individually Quick Frozen (IQF) and block frozen.
- There is scope for manufacturing several other products from Shrimp so the unit can avail value added processing advantage.

# **Market Potential**





### **Brackishwater Aquaculture Area in India**

Sr.	State	Estimated brackish water area (ha.)	Area under cultivation (ha.)
1	West Bengal	4,05,000	34,660
2	Gujarat	3,76,000	3387
3	Andhra Pradesh	1,50,000	50,000
4	Maharashtra	80,000	716
5	Kerala	65,000	14,657
6	Tamil Nadu	56,000	2,879
7	Orissa	31,600	11,000
8	Goa	18,500	650
9	Karnataka	8,000	3,500
10	Pondicherry	800	37
	Total	11,90,000	1,18,983

Source: Indian Council of Agricultural Research

- The estimated brackish water area suitable for undertaking shrimp cultivation in India is around 11.91 lakhs ha. spread over 10 states and union territories, including West Bengal, Orissa, Andhra Pradesh, Tamil Nadu, Pondicherry, Kerala, Karnataka, Goa, Maharashtra and Gujarat. Of this only around 1.2 lakhs ha. are under shrimp farming now and hence lot of scope exists for entrepreneurs to venture into this field of activity.
- West Bengal and Gujarat have the majority of the potential area for brackishwater aquaculture owing to the high tidal amplitude. Andhra Pradesh developed almost 57% of area available for shrimp culture whereas Maharashtra and Gujarat utilized only 1.2 to 0.6% of the available area.
- ► Considering the vast brackishwater resources available in India to the extent of 1.2 million hectares and the sector currently utilizes only 14%, and therefore, huge opportunities exist here to reduce the pressure on wild stocks. The sector can emerge as the major contributor to the highest geographical aquaculture expansion in the immediate decades, to 2050.

# **Market Potential**





### India is the second largest producer of farmed shrimps after China

#### Global aquaculture scenario:

- ▶ Globally, aquaculture is the fastest growing food producing sector with an annual growth rate of 6.5%. Industry estimates indicate that the global farmed shrimp production in 2015 was about 2 million tonnes.
- ▶ Indian aquaculture sector too by having demonstrated a 6.5 fold increase in the past two decades, and contributing 4.43 million tonnes to the total fish production of 9.06 million tonnes, upholds our pledge towards increasing fish supply and ensuring food security.

#### India's brackishwater potential:

- ▶ Brackishwater sector in India stands on the pillar of shrimp farming, with a small group of industrial mode of farming, where the farming area is more than 5 ha, and supported by large number of small stakeholder owning farms lesser than 2 ha who comprise around 90% of brackishwater farming community.
- ▶ Brackishwater aquaculture sector in India is one of the most vibrant food producing sectors in India that contributes 1.6% of total export earnings with about 300,000 employees.

#### Potential to generate employment:

▶ Indian brackishwater aquaculture sector has tremendous potential, and prominent role to play with 857 million rural populations with access to brackishwater resource. Shrimp farming provides direct employment to about 0.3 million people and ancillary units provide employment for 0.6 to 0.7 million people in our country

#### India's farmed shrimp trade potential:

- ➤ The overall growth rate of farmed shrimp production in India for 2015 is estimated to be 10-15%. During FY15, Indian farmers produced 433,448 tonnes of famed shrimps, of which 82% was vannamei shrimp, making it the second largest producer of farmed shrimp after China.
- ▶ In export trade, India was the lead supply source of farmed shrimps exporting 383,000 tonnes in 2015. The leading export markets of farmed shrimps for India were the USA, Viet Nam, the EU, Japan and China. Indian exports also increased to Kuwait, Qatar and Egypt in the Middle East and to neighbouring Sri Lanka and Maldives.

# **Growth Drivers**





### Key drivers of shrimps and brackish water fisheries in India

Aquaculture is more efficient and cost effective

- Compared to agriculture/animal husbandry production, aquaculture production is more cost effective and has more efficient feed to end product conversion, both in natural as well as controlled farming.
- ➤ This has increased market share of marine products in general and fish products like shrimps in particular.

Changing
consumption
patterns and
Strong domestic
demand and
export potential

- ➤ Change in food consumption pattern with the trend escalating towards preference for cosmopolitan food and increased used of fast food products world over.
- ► Consumption expenditure is likely to reach USD3.6 trillion by 2020, up from an estimated USD1.0 trillion in 2010.
- ➤ Growing middle class, urbanization impacting food habits and rising preference towards processed food.
- ► India's export of processed food and related items rose at a CAGR of 23.3% during FY11-15.

Supply-side advantage

- ► India has favourable climate for agriculture and support wide variety of crops.
- ► Large livestock aiding Dairy and Meat Processing sector.
- ▶ Long coastline and large inland water bodies helping the growth of marine sector.

Establishment of logistics hubs across DMIC corridor

- ➤ Logistics parks and transshipment zones are being developed along the DFC between Delhi and Mumbai facilitating trade.
- In the first phase six logistics parks are being planned by Indian Railways for enhancing rail based traffic along the DFC.

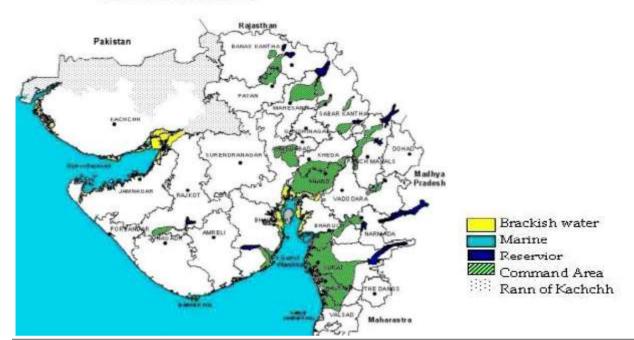
# **Gujarat - Competitive Advantage**





Gujarat has a long coastline and a great potential for brackish water aquaculture

#### **Fisheries Resources**



Brackish water Fisheries					
Coastal Saline Area (Khar lands) 3.76 Lakh ha					
Suitable Area	0.89 Lakh ha				

- ► Gujarat has 1,600 km long coastline and a vast stretches of brackish water area (approximately 3.76 lakh hectare), throughout the coastline which is ideal for shrimp culture.
- ► Four districts Valsad, Navsari, Surat and Bharuch are the major contributors for shrimp production with 95% of state shrimp farmer's population and a potential area of 69,583.91ha
- ▶ Shrimp farming activities has developed fast in the last decade. Numbers of shrimp farms have been constructed in the coastal districts of the state. Major activities have been carried out in South Gujarat coast than on Saurashtra coast.
- ► The fishermen of coastal districts along with other entrepreneurs have also taken up this shrimp farming business, which have also generated employment along the coastline.

# Gujarat - Competitive Advantage





# Strong push by the Government of Gujarat (GoG) in the agri and food processing sector and related infrastructure and services

- ➤ The State has identified Agro and Food Processing industries as one of the thrust industries in Industrial policy 2016-21. Under this policy, the GoG plans to develop agricultural clusters and the whole value chain from the farm to foreign countries.
- ➤ Gujarat is poised for second agriculture revolution with the availability of Narmada Canal Irrigation facilities in 18 lakh hectare areas. This will boost horticulture production in the State as it is giving much higher returns to growers as compared to conventional agriculture crops providing attractive volumes to the terminal market.

#### Gujarat is...

2nd

largest producer of papaya and Sapota in India

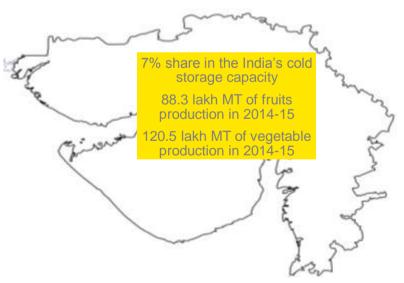
3rd

6<sup>th</sup>

largest producer of banana in India

largest producer of mango in India

# Cold chain industry in Gujarat



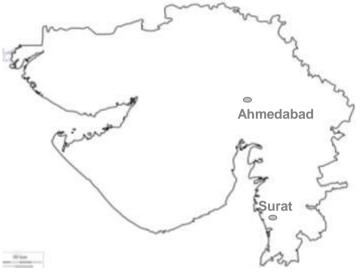
Cold storage industry in Gujarat				
No. of cold storages (as on 31 July 2015)	625			
Storage capacity	23.2 lakh MT			
Total manpower	18,343			
Average age of cold storages	12 years			
Product types in cold storages				
Horticulture/agriculture	65%			
Processed food	10%			
Animal husbandry	25%			
Source: Gujarat Agro policy 2016				

- ➤ Terminal Market are a service provider to horticulture growers and buyers of horticulture products in the districts, forming a critical element in the agriculture marketing system.
- ► The terminal market is linked to number of collection centers, set up at key production centers allowing easy access to farmers for marketing of their produce.





### Agro and cold chain projects in Gujarat



#### 10 cold chain

projects have been approved at Surat, Kutch and other locations

# Marine-based food parks

to be established by 2019 in Ahmedabad and Surat

### **Agriculture export zones**

to be established by Agricultural and Processed Food Export Development Authority (APEDA)

210

APMCs operating in Gujarat, under the National Agriculture Market (NAM) initiative.

### GoG plans to...

...establish linkage from farm gate to the consumer, end to end, to reduce losses through efficient storage, transportation and minimal processing.

INR110 million has been earmarked for financial assistance to the Agro industries in 2016-17.



Prioritize public investment in establishment of post harvest storage and marketing infrastructure at Agriculture Product and Market Committees (APMCs)



Establish multi-purpose and multi control atmosphere chambers, packing facility, cleaning in progress fog treatment, individual quick freezing and blast freezing facilities.





### Infrastructure availability



#### Rail

- Surat is connected with other districts of the state such as Rajkot, Vadodara and Ahmedabad by rail.
- ► Hazira port in Surat is ~16 kms away from the Surat railway station.

#### **Proposed**

- The Mumbai-Ahmedabad bullet train project will have Surat as one of the stations.
- ► In 2016, the Gujarat government assigned Delhi Metro Rail Corporation as a consultant for the proposed metro connectivity in Surat.
- Rail connectivity was proposed for Hazira and Nargol ports in the 2016 rail budget.



#### Road

- The city is connected to Delhi Mumbai Industrial Corridor (DMIC) which links Ahmedabad, Vadodara and Surat.
- Proximity to NH-8 and NH-6 further enhances connectivity in the city.
- Surat also has very good connectivity with other cities of the state such as Vadodara (154 km) and Ahmedabad (265 km).

#### **Proposed**

 Proposed four-lane highways which are expected to improve connectivity in Surat include – Dakor-Savli, Vadodara-Dabhoi & Surat-Olpad-Bardoli.



#### Air

Surat domestic airport is well connected to various parts of the country. The city is located ~275 kms from the international airport at Ahmedabad.

#### **Proposed**

- In January 2015, Airports Authority of India gave an in-principle approval for cargo terminal at Surat airport worth INR70 million. The terminal is expected to be operational in 2017.
- In February 2016, Surat Airport Action Committee filed an online petition for an international airport at Surat.



#### Port

- The nearest port is Hazira which is 25 km from Surat.
- Additionally, Hazira port is well connected to Mundra port and Jawaharlal Nehru Port Trust (JNPT) – India's largest container port
- Thus, it provides a convenient textiles-related trade gateway to International (Europe, Africa, America and the Middle East) and domestic markets.

#### **Utilities**



#### Water

vvater for industrial purposes can be obtained from four sources viz. Gujarat Water Supply and Sewerage Board (GWSSB), an irrigation canal, dams, and surface reservoirs.



#### **Power**

The main source for the power supply is Torrent Power Limited in Surat





## List of Plant and Machinery with Suppliers

SN	Particulars	Quantity	Suppliers
1	Flow-freezer 10 MT / day	1	Frick India Limited, New Delhi
2	Spiral freezer 10 MT / day	1	Frick India Limited, New Delhi
3	Pre-cooler, Glazo freeze	1	Frick India Limited, New Delhi
4	Packing M/C	1 line	Tool tech, Hyderabad
5	Ice chip making	1	Frick India Limited, New Delhi
6	Paddle wheels	1	Process Masters, Pimpri, Pune
7	Shrimp washing and grading back feeder	1	Process Masters, Pimpri, Pune
8	Oil fired boiler	1	Thermax Ltd, Pune
9	Complete Feed mill	1	Troika Process Pvt. Ltd, Mumbai
10	Cooking plant	1	Economode Food Equipment (India) Private Ltd Mumbai
11	Cold storage 500 MT storage capacity	Lot	Frick India Limited, New Delhi Mech-Air Industries, Vadodara
12	Trolleys, trays & Plastic crates		Sintex Industries, Kalol, Gujarat

- Raw Materials required: The crucial requirement for a shrimp farm except for spanners, feed for fry and shrimps are pond, water intake structure, store room for feed and equipments, an area for cleaning of the harvest, a workshop and pump house, office, watch, mini laboratory and a ward room.
- ▶ **Utilities:** The unit would necessitate utilities like water and electric power. 100 KL water per day and 800 KVA power would be a basic requirement for the proposed unit.
- ► **Timeline:** The proposed project will have cumulative period of 14-16 months of which 6 to 8 months would entail obtaining the obligatory clearances from various authorities.





### **Key Players**

- Adinath Bio Labs
- Softech Infinium Solutions
- BMR Group
- KCT Group
- Shree Datt Aquaculture Farmes Private Limited
- The Waterbase Limited
- Avanti Feeds
- Uniroyal Marine Exports
- Smilax Industries
- Hanswati Export Private Limited
- Shabina Foods
- Sailganga Eu Expor
- Mayank Aquaculture Pvt Ltd

### **Potential Collaboration Opportunities**

The potential collaboration could be between the investor, local shrimp producers and research institutes like

- Central Institute of Brackishwater Aquaculture (CIBA)
- National Bank for Agriculture and Rural Development (NABARD)
- Central Marine Fisheries Research Institute (CMFRI)







### Manpower requirement

Responsibility	Number
Managerial level people	2
Maintenance Supervisors	3
Accountant	1
Office Assistant	2
Skilled workers	20
Unskilled workers	70
Watchmen	2
Total	100

### **Key considerations**

- Aquaculture over years has led to substantial benefits and proven its potential
- It has also brought vast un-utilized and under-utilized land and water resources under culture.
- it is largely environmentally friendly and provides for recycling and utilization of several types of organic wastes.
- Recently, culture practices have undergone considerable intensification to obtaining high productivity levels.
- In the brackish water sector there were issues of
  - waste generation,
  - conversion of agricultural land,
  - salinization,
  - degradation of soil and the environment due to extensive use of drugs and chemicals,
  - destruction of mangroves and so on.

# **Project Financials**





# Estimated financial outlay for setting up a shrimp farm

SN	Financial parameters	In INR lakhs
A.	Capital cost	
a)	Earth work for construction of ponds, drainages and feeder canals etc. (20000 m 3) Rs.25/m3	5.0
b)	Lining of feeder canal	0.7
c)	Water inlet structure for ponds (2 Nos.)	0.5
d)	Water outlet structure for ponds (10 Nos.)	1
c)	Main outlet sluices (2 Nos.)	0.3
d)	Pump House, generator shed cum workshop etc	1
g)	Office, laboratory and stores	2
h)	Watchman shed	0.2
i)	Drinking water storage and supply network	0.75
j)	Pumps (3 Nos. Mixed flow pump of 25 HP each)	2.55
k)	Aerators (10 Nos. 1 HP)	2
1)	Electrical installations	2
m)	Generators (7 nos. X 30 KVA)	4
n)	Lab and farm equipment	1
0)	Miscellaneous expenditure	1
,	Total capital cost	24
B.	Operational cost for the first crop	
a)	Seed @ Rs.300/1000 Nos. for 2 lakh	3
b)	Feed @ Rs.40/kg for 15,000 kg	6
c)	Chemicals and manures for pond preparation (@ Rs.15,000/ha)	0.75
d)	Fuel and electricity	1.5
e)	Repairs and maintenance	0.5
f)	Harvesting	0.25
g)	Labour for pond preparation	0.2
h)	Staff salary for 4 months  1 Farm manager 10,000 x 4	0.92
	1 Mechanic 5,000 x 4	
	2 Farm hands 4,000 x 4	
	2 Watchman 4,000 x 4	
i)	Office and misc. expenses	0.5
	Total operational cost	13.62
	Total outlay for 5 Ha	INR37.62 lakh
	Total outlay per Ha.	INR7.52 lakh

# **Project Financials**





# Financial Analysis for Shrimp Culture in 5 ha. Farm (figures in INR lakhs)

S. No	Particulars	I year	II to VIII years
1	Fixed Cost	24	
2	Recurring Cost	13.6	27.2
3	Total Cost	37.6	27.2
4	Benefit	25	50
5	Net Income	-12.6	22.6
6	Discount Factor at 15%	0.87	3.17
7	Net Present worth of cost	-32.71	86.22
8	Net Present worth of benefits	21.75	158.5
9	BCR = 1.515		
10	Discount factor at 50%	0.67	1.25
11	NPW at 50%	-8.44	28.25
12	Internal Rate of Return is more than 50%		

# **Key Financial Indicators**

- ► Total Outlay = INR 37.6 lakhs
- ► Margin (25%) = INR 9.4 lakhs
- Bank Loan = INR 28.2 lakhs

Year	Bank Loan Outstanding at the beginning of the year	Net Income	Interest	Principal	Total	Bank Loan Outstanding at year end	Net Surplus
1	28.2	25	4.23		4.23	28.2	20.77
2	28.2	22.6	4.23	7.07	11.3	21.13	11.3
3	21.13	22.6	3.17	8.13	11.3	13	11.3
4	13	22.6	1.95	9.35	11.3	3.65	11.3
5	3.65	22.6	0.55	3.65	4.2		18.4

# **Approvals / Incentives**





### Clearances required for setting a shrimp farm

- > The proposed unit will have to register itself with Secretariat of Industrial Approvals (SIA),
  Ministry of Industries and Government of India, by filing Industrial Entrepreneur's Memorandum
  (IEM), as it will have plant and machinery investment of more than INR 10 million.
- > The unit will also cater to global needs and therefore it will necessitate registering with Food and Drugs Administration (FDA) of respective countries, apart from registration with Indian and state food administration.
- The most critical aspect of this product will be its shelf life for export consumers and hence there will be need for import of processing and packing equipments meeting international standards and Codex standards followed by them.
- The unit being an EOU will be required to obtain registration from RBI, DGFT, MOFPI and MPEDA as registered manufacturer exporter to avail export incentives.
- While the need to import machinery for the food processing sector specifically for shrimp processing and imports of new capital goods are allowed without any license or clearance, all imports of machinery from abroad is subject to custom duty @ 16% + education cess + Counter veiling duty(CVD) = Applicable excise to domestic equipment manufacturers.

### Acts & Policies for the regulation of Fisheries Sector

- Central Sector Scheme on Blue Revolution: Integrated Development and Management of Fisheries - 2016
- Gujarat Fisheries Act 2003
- Village Pond Fisheries policy 2003
- Reservoir Leasing Policy 2004
- Marine Fisheries policy 2004 (Gol)
- Coastal Aquaculture Authority Act 2005 (Gol)
- Brackish water land lease policy 2007

# **Approvals / Incentives**





#### Blue Revolution 2020, Government of India

Blue Revolution 2020 has identified development of freshwater/brackishwater aquaculture as a key area for formulation and implementation of such projects with the objective of integrated development and management of fisheries in India. Financial assistance for construction of new ponds/tanks as per actual cost, subject to a ceiling of Rs. 7 lakh per ha (50% centeral + 50% state), would be provided for freshwater/brackishwater aquaculture.

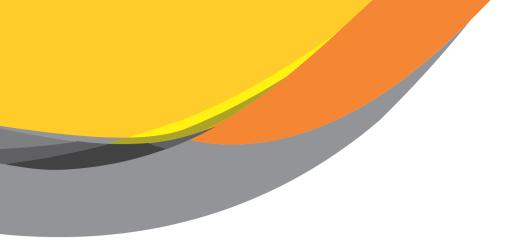
### Incentives from Government of Gujarat

- Establishment of fresh water prawn seed hatchery.
- > Fish culture through FFDA's
- > Fish seed Production and rearing by employing local youths
- Reservoir Fisheries Development
- Leasing out the fishing rights of reservoirs
- Fish marketing subsidy
- Distribution of kerosene to fishing vessels on educed rates
- Group insurance scheme and housing schemes for all active fishermen
- Strengthening of Fisheries Co -operatives
- > Fisheries Resource Assessment.

#### Incentives from Agri business policy 2016, GoG.

GoG has prepared a Agri business policy 2016 for strengthening agriculture-related infrastructure and promoting food processing industry. Discussed below are the various subsidies and incentives established for promoting the industry.

Subsidy				
Projects	Admissible Subsidy	Maximum Limit (INR crore)		
New project in agro food processing	25%	0.5		
Cold chain, food e-radiation, packaging houses and food parks	25%	5		
Primary processing or collection centre of farm produces at village level	25%	2.5		
Capital investment subsidy for reefer vehicles	25%	0.5		
National Horticulture Board provides capital subsidy for construction, expansion and modernization of cold storages	40%	INR6,000/MT (normal cold storages)     INR7,000/MT and INR8,000/MT (specialized cold storages)     INR32,000/MT for CA storages		



#### **Commissioner of Fisheries**

https://cof.gujarat.gov.in/contact-us.htm

Department of Animal Husbandry, Dairving & Fisheries

http://dahd.nic.in/

**Gujarat Agro Industries Corporation Ltd.** 

https://gaic.gujarat.gov.in/index-guj.htm

Office of the Commissioner of Fisheries, Gujarat

https://cof.gujarat.gov.in/contact-us.htm

**Industrial Extension Bureau** 

www.indextb.com

**Gujarat Industrial Development Corporation** 

www.gidc.gov.in

Office of Industries Commissioner

www.ic.gujarat.gov.in

This project profile is based on preliminary study to facilitate prospective entrepreneurs to assess a prima facie scope. It is, however, advisable to get a detailed feasibility study prepared before taking a final investment decision.

#### For further details:



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