

*Goan Fish Trails*

*Vol.-I-2014*

*An Overview of  
Department of Fisheries, Government of Goa*

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**Avertano Furtado**

*Minister for Labour & Employment, Fisheries  
Government of Goa*



*Message*

*I am happy to present before you, "Goan Fish Trails", an overview of Department of Fisheries, Government of Goa, which speaks about the development of Fisheries, its achievements and vision for the future.*

*Fish is a staple food of about 95 % of Goan population and with a coast line of about 104 kms., 250 kms of Inland water ways, fishing has turned out to be a important employment oriented industry. The Government of Goa on its part has taken all measures to promote fishing and finance the projects under the fisheries sector.*

*The Government has already started the process of augmenting the fisheries Jetties at Malim, Chapora, Cortalim and Cutbona and soon will initiate suitable action to make fish available through mobile fish stalls to common people, thus to arrest the soaring prices of fish commodity.*

*I am indeed happy that for the first time the Department has brought out the overview of Fisheries activity in Goa, through Goan Fish Trails which is laudable.*

*(Shri. Avertano Furtado)*

*Hon'ble Minister for Fisheries*



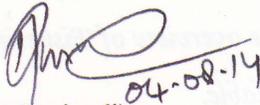
GOVERNMENT OF GOA  
SECRETARIAT, PORVORIM,  
GOA - 403 521

SHRI D.P.DWIVEDI, I.A.S.  
SECRETARY (FISHERIES)



It gives me immense pleasure to note that Department of Fisheries, under the dynamic leadership of Dr. Shamila Monteiro, Director of Fisheries has come out with compilation of Fisheries activity in Goa under the title "Goan Fish Trails". The Goan Fish Trails provides valuable information about the fisheries activities in Goa, role of Department in managing this valuable resources & exploiting the same in a sustainable manner. The overview will be useful for all those interested in knowing the fish activities in Goa. Its statistical portion will be very important not only for the Government Departments but also for the students scholars of Fisheries.

I wish all success to Dr. Shamila Monteiro and her team of Fisheries Department and hope that under her leadership more scientific sustainable growth of Fisheries sector will be ensured in Goa.

  
(D. P. Dwivedi)  
Secretary (Fisheries)



## **PREFACE**

*The Department of Fisheries was established in January, 1963 under the recommendation of a committee appointed by the Ministry of Food and Agriculture, Government of India, with a view to explore and develop Marine Fisheries in the State on scientific basis and to improve the socio-economic condition of the Fishermen. The Department was initially functioning with an Ice Factory which supplied ice at concessional rates to the fishing community and a Research laboratory conducting Biological Research.*

*The Department has grown from thereon. It functions with the full fledged Head office at Panaji and other sub offices. For the assistance of the Fishermen, extension staff are placed at the Block Development Office at the respective Village Panchayat.*

*The Department of Fisheries is committed to provide better infrastructure to the Fishing Industry, improve the socio-economic conditions of the Fishermen, increase the fish production in the state on scientific basis and explore different aspects of Fisheries.*

*The Goa Fish Trails is an effort to compile the past achievements of the year and the future vision of the Department.*

*This document will help the Fishermen, Fish Farmers and general public in creating awareness of the Department and all around development of the Sector.*

*I would like to appreciate the efforts taken by all the Officers in the preparation and timely printing of this issue.*

*I would also like to acknowledge the review and suggestions made by Shri. D.P. Dwivedi, IAS, Secretary Fisheries in making this issue relevant and useful one.*



*(Dr. (Smt.) Shamila Monteiro)*  
*Director of Fisheries*

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# **I. Introduction**

## **Preamble**

The state of Goa has a coast line of 104 km and continental shelf area of 10,000 km<sup>2</sup>. Six major rivers viz. Terekol, Chapora, Mandovi, Zuari, Sal and Talpona flow across the state. Marine and fresh water fishery contributes significantly to the state's economy.

Fishing has traditionally been one of the chief occupations and the source of livelihood of the people living in the coastal areas of Goa.

For a population of 1.34 million, fish provides a source of protein rich food. Fishery and related activities provide employment, trade and economic well-being to the people of Goa. Hence, it is important to carry out fishing activities in a sustainable manner..Although the marine fishery sector has made considerable growth over the years, it has also generated a number of socio-political issues. The Directorate of fisheries has been making a continuous effort for sustaining the available fisheries resources, for present and future and striving to improve the quality of life for the fishermen.

## **Scenario**

### **Marine Fish Production of Goa**

The Maximum Sustainable Yield calculated from the catch and effort data over the years for Goa is 85,407.61 tons.

The marine production in Goa has increased from 24,600 to 87984 tons during the period of 1965 to 2013, experiencing a fluctuating trend. Mackerels and Sardines contribute around 50% of the Marine catch. The dominant demersal species have been the prawns, squids & cuttle fish.

### **Traditional and Mechanized Fishing Sector**

The traditional sector contributes 26.0% of the total fish landings as against 74.0% by the Mechanized sector. It was observed that although the mechanized sector is the major

contributor of oil sardines, Indian mackerels and shrimps, the catches from the traditional sector are also significant. The mechanized sector contributes 80.83% of the total oil sardines landed. The mechanized sector employs gears like trawl net and purse-seine, besides a few long lines. Trawling is in full operation from August to September, November to December and March to May. Purse-seining is carried out throughout the fishing seasons, but the activity is intense in August and September when oil sardines and Indian mackerel are available in large shoals. Mechanized vessels also operate gillnets during October - December period.

One of the important traditional fishing gears used in Goa is the beach-seine, locally known as *Rampon*. It is an important gear during the monsoon months. Gillnet, locally called as *Mag* plays a major role during the rest of the months. Different mesh sized gillnets (mesh size > 24 mm) are used depending upon the type of the target fish. The average catch per fishing vessel depends on the type of gear operated.

## **FISH FARMING**

### **Brackish Water Farming**

Around 18,000 hectares area is covered under khazan lands. Of this 3,800 hectares land over the coastal stretch is identified as marshy land which could be utilized for aquaculture. The land is mainly owned by local village institutions called *comunidade* and private parties. Around 600 hectares of land is under pisciculture with sluice gate operation. 174.76 hectares of land is scientifically developed for shrimp farming.

Government has set up 7 hectare demonstration farm at Old Goa. The fish farmers /entrepreneurs are given technical knowledge on brackish water finfish farming, shrimp farming and mussel and oyster farming.

### **Mariculture**

Mussel and finfish culture is still in its infancy stage and is expected to be taken up in a big way as there is immense scope for the farming of shellfish and finfish in Goa.

## **Fresh water Fish Farming**

The State has around 3300 hectares of water spread area of fresh water bodies covering Salaulim reservoir in South Goa and Anjunem Dam reservoir in North Goa. Besides, smaller water bodies are available in several irrigation bandharas in Mayem lake and smaller perennial and seasonal water sheets. In this regard fresh water aquaculture offers a good potential to increase fresh water fish production as well as to generate self employment for the inland rural youth.

The department has stocked all the fresh water reservoirs in the State with fast growing Indian Major carps i.e Catla , Rohu and Mrigal.

Short-term trainings are being organized at regulat intervals to motivate the farmers to take up the freshwater fish culture. The Department through the Fresh water Fish seed Hatchery supplies quality fish fingerlings to the farmers. About 200 hectares is under extensive fresh water farming in the state.

Cage culture in reservoirs and abandoned mining pits also has a potential and is being explored.

## **II. Achievements 2013-14**

To bring transparency in the Department, it is felt necessary to showcase the achievements of the year 2013-14, so that people are aware of how the Department is functioning. For the year 2013-14 the Department has generated total revenue of Rs.2.38 crore.

### **Infrastructure**

Some of the projects initiated during the year 2013-14 are listed as under:

- (i) Development/Extension/Up gradation/Construction of four fish landing centres in the State of Goa i.e. Cutbona, Cortalim, Malim and Chapora.
- (ii) Fishing Ramps at Ambelim, Assolna, Issorcim, Velsao.
- (iii) Sulab Souchalaya at Cutbona.
- (iv) Construction of community hall at Karapur, Sakhalim.
- (v) Reconstruction of existing fishing jetty at Panaji.

### **Financial Assistance to Fishermen**

The Department has provided financial assistance to the fishermen on various fishing related aspects such as canoe, outboard motors, nets, fuel, ice boxes and safety equipments. The department also implements welfare schemes for the fishermen such as housing, saving cum relief scheme and insurance.

### **Fish Landing Centres**

The Government of Goa has proposed to upgrade four fish landing centres in the State i.e. Chapora&Malim in North Goa and Cortalim and Cutbona in the South Goa. Further, the project sanctioning Committee of Government of India has approved the proposal to carry out the work of Development/extension/Up gradation/Construction of four fish landing centers in the State of Goa i.e. Malim, Chapora, Cortalim and Cutbona. The estimated cost of the project is Rs.8418 lakhs with 75% central Financial Assistance amounting to Rs.6313 lakhs under the Centrally Sponsored Scheme on Development of Marine Fisheries, Infrastructure and Post Harvest Operation. The project work will be carried out through Goa

State Infrastructure Development Co-operation (GSIDC). The detailed estimate cost of the project work is as follows:

<b>Sr. No.</b>	<b>Name of fishing Harbour/Fish Landing Centre</b>	<b>Estimated Cost</b>
1	Malim Minor Fishery Harbour at MalimBardez Goa	Rs.13.27 crores
2	Chapora Fishery Harbour at Chapora, Bardez Goa	Rs.37.05 crores
3	Cortalim Fish landing Centre at Cortalim, Mormugao Goa	Rs. 5.06 crores
4	Cutbona Minor Fishery Harbour at Cutbona, Velim, Salcete Goa	Rs.28.73 crores

**Scheme Achievements for the year 2013-14 at a Glance**

<b>Sr. No.</b>	<b>Name of the Scheme</b>	<b>Physical Achievement (Nos.)</b>	<b>Amount Disbursed (Rupees in Lakh)</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
1.	Construction of Canoe	114	66.45
2.	Purchase of OBM	20	12
3.	Replacement of old Kerosene OBM to Petrol OBM	176	206.65
4.	Purchase of Nets	50	13.40
5.	Purchase of Kerosene to OBM	1176	576.25
6.	Construction of houses	2	0.50
7.	Saving cum Relief Scheme	6100	36.60
8.	Group Accident Insurance	12721	1.91
9.	General Insurance Scheme	5338	5.34
10.	Insulated Boxes	291	2.00
11.	Safety Equipments	338	6.14
12.	Life Jackets/Bouys	1	0.052
13.	Goa Value Added Tax (VAT) Subsidy	850	1463.73
14.	Relief for PHYAN victim	4	2
15.	Assistance to fishermen societies	7	3.5
16.	Power Block	5 under process	
17.	Assistance to farmers for purchase of feed	1 under process	
18.	Assistance to farmers for purchase of equipments	1 under process	

Besides the above mentioned schemes, the Department has also undertaken the following:-

### **1. TRAINING IN FISHERIES.**

For the year 2013-14, Fishermen training centre has conducted its 06 months training course. Thirteen students have successfully completed the course. The Fishermen Training Center along with the estuarine fish farm and fresh water fish seed hatchery has conducted 03 short term training courses. Around 75 persons were trained in aquaculture comprising of Fresh Water Fish Culture, Brackish Water Fish Culture along with Mussel Culture.



Training on Short Term Course at Training Centre, Old Goa



Fresh water Training



Training on Brackish Water Fish



Training on identification of Fresh Water Fish

### **2. KEEL LAYING OF TRAINING VESSEL:**

A Fisheries Training vessel has been sanctioned under the Rashtriya Krishi Vikas Yojana (RKVY) Scheme. The vessel is being constructed by M/s. Desa Engineering Works, Cortalim Goa. The vessel shall be used to impart training to the fishermen youth/crew in

various techniques of fishing, sea man ship and navigation. This will help the fishermen to operate different life saving equipments on vessels and to use gadgets such as fish finders, GPS, VHF, Safety Beacon etc. The vessel is expected to be delivered by December, 2014.



Keel Laying of Training Vessel

### **3. COASTAL SECURITY MEASURES:**

#### **a. ONLINE REGISTRATION OF FISHING VESSELS**

As a part of the coastal security measure, to ensure that the fishing vessels operated from Goa are authorized, the Department has successfully completed the online registration of all fishing Vessels under the Merchant Shipping Act (MS Act).

The Department has successfully completed the online Registration under Merchant Shipping Act (MS Act), as a coastal security measure and issued **2083** new Vessel Registration Certificate (VRC) to both traditional and mechanized vessels.



Issue of New Online VRC to both traditional and mechanized vessels

**b. ADOPTION OF UNIFORM COLOR CODE**

All Mechanized fishing vessels in Goa have adopted the uniform color code of White hull, black fenders and blue cabin. This can help the coastal security Agencies to identify the fishing vessels of Goa State.

**c. BIOMETRIC CARDS:**

The Department has issued **9140** Biometric cards to the Goan fishermen and 12500 temporary ID cards to the floating crew of the fishing vessels as a measure of coastal security

**d. MONSOON FISHING BAN**

As a conservation measure the Department has increased the fishing ban period from 45 days to 61 days and implemented it successfully for two months i.e. June and July, 2014.



Vessels at Malim Jetty during Fishing Ban

**e. PATROL VESSEL**

The Department is procuring a Patrol Vessel. The keel laying ceremony for Patrol vessel was held in the month of March, 2014. The Patrol Vessel is being constructed by Goa Shipyard Ltd., Vasco. The vessel will be a great help for enforcing the MFR Act and also for rescue operation. The vessel is expected to be delivered by December, 2014.



Keel Lying of Patrol Vessel

**f. NARLI PORNIMA CELEBRATED**

The Annual Samudrapooja was conducted followed with the Sathya Narayan Pooja with great devotion. A Mass was also offered by the Department at Immaculate Conception Church to seek the blessing for a good fishing season ahead.



NaraliPurnimaPooja 2013

**4. FRESH WATER FISHERIES**

The Fresh Water Fish Seed/Hatcheries at Kerim, Anjuna produced 10 million fry and 3 lakh of advanced fingerlings. Additional seed were procured from hatcheries outside the State to ensure supply of good quality seed. A total of 10 lakh fish fingerlings were supplied to Fresh Water Fish Framers.



Release of Fish Fingerlings at Fresh Water Fish Seed Hatchery at Anjuna Keri



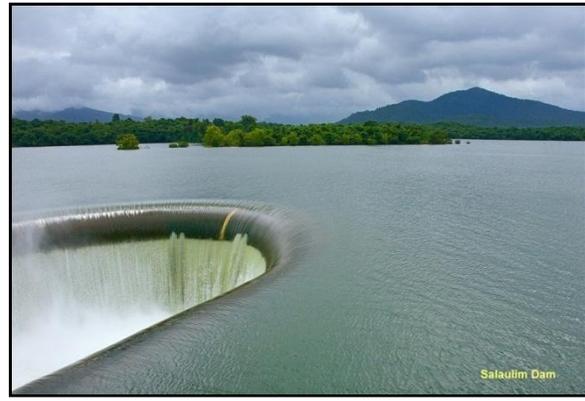
Sale of Fish Fingerlings at Fresh Water Fish Seed Hatchery at Anjuna Keri

**5. RESERVOIR FISHERIES**

Salaulim, Anjuna, Chapoli, Panchwadi and Amthane were stocked with Fast growing Fingerlings of Indian Major Carps and Common Carps. Salaulim and Panchwadi were stocked under the National Fisheries Development Board (NFDB) Scheme.



Anjana Dam



Salaulim Dam



Release of Fish Fingerlings of IMC at Panchawadi Reservoir, Ponda



Release of Fish Fingerlings of IMC at Salaulim Reservoir, Sanguem

## 6. **OPEN SEA CAGE CULTURE:**

The Department has introduced the Open Sea Cage culture under the National Mission for Protein Supplement, to culture high value fish like Sea Bass and Cobia. A total **of 50 cages** were fabricated and 19 have been commissioned at Canacona. The inauguration of Open Sea Cage Culture was held on 25/11/2013 at the hands of Hon'ble Minister for Fisheries Shri. Avertano Furtado. The Project was funded under the Rashtriya Krishi Vikas Yojana (RKVY) scheme.



Inauguration of Open Sea Cage Culture at Talpona, Canacona



Release of Fish Fingerlings of Cobia & Chonak in Open Sea Cage Culture at Talpona, Canacona



Catch of Cobia in Open Sea Cage Culture at Talpona, Canacona

## 7. EXPOSURE VISIT OF THE FISHERMEN

### (a) Surat, Gujarat from 23<sup>rd</sup> to 29<sup>th</sup> November, 2013

The Department conducted a seven days exposure visit to **Surat, Gujarat from 23<sup>rd</sup> to 29<sup>th</sup> November, 2013**. Twelve participants got an insight on various aspects of fisheries such as, pond construction, fresh water cage culture, water resource through canal system for bringing sea water into rivers, ornamental fish breeding, soil testing for culture of fish, white spot disease analyzing system etc. The participants also visited Navsari Agriculture University situated at Navsari, Gujarat in which the participants were briefed about the system of how cattle rearing by product can be diverted as nourishment feed to the fresh water fish.



Open cage culture, Surat



Chinese Circular hatchery, Surat



Nayak Matsyudyog Niyamak Kacheri, Surat



Open cage culture, Surat Reservoir

**(b) Tiruvanathapuram, Kerala from 23<sup>rd</sup> to 29<sup>th</sup> January, 2014**

A study tour of fourteen participants was conducted from 23<sup>rd</sup> to 29<sup>th</sup> January, 2014 at **Tiruvanathapuram, Kerala**. The participants were exposed to open sea cage farming and hatchery. The farmers explored Rajiv Gandhi Aquaculture Centre and Central Institute for Fisheries in Navigation and Aeronautical Training at Kochi.



Tour Participants, CIFNET, Kochi



Exposure to Bio-Filter in RGCA Hatchery



Open Sea Cage Culture, Kerala

**(c) 3<sup>rd</sup> to 12<sup>th</sup> February, 2014 at Kolkata, West Bengal**

A study tour of fishermen under Rashtriya Krishi Vikas Yojana (RKVY) was held from 3<sup>rd</sup> to 12<sup>th</sup> February, 2014 at **Kolkata, West Bengal** which consisted thirteen participants from fisher folk community. The group was taken to CIFRI, Barackpore, Howrah Fish Market and Ornamental Fish Farming unit and also visited the Fishing Harbour. The fisherfolk got exposure to details regarding geographical information, mapping system, demonstration and discussion on the importance of disease diagnostics in aquaculture.



Tour Participants, Kolkata



Ornamental Mega Seed Project Hatchery (Central Inland Fisheries Research Institute), Barackpore Kolkata



Commercial Feed Preparation (CIFRI), Kolkata

## 8. TECHNICAL MONITORING COMMITTEE MEETING (TMC) 2013.

The Directorate of Fisheries had the privilege of conducting the 11th Technical Monitoring Committee (TMC) meeting of the Central Sector Scheme on “Strengthening of Database and Geographical Information System for the Fisheries Sector” held on 30th August, 2013 on a National level, under the Chairmanship of Dr. U. C. Sud, Director, IASRI, New Delhi.



Inauguration of TMC Meeting



Presentation by Dr. Shamila Monteiro, Director of Fisheries



Team Members for Technical Monitoring Committee Meeting held on 30<sup>th</sup> August, 2013



Participants from all the States for Technical Monitoring Committee Meeting held on 30<sup>th</sup> August, 2013

## **9. WORK SHOP OF FISHERY SURVEY OF INDIA (FSI)**

A trainees Training programme on sustainability fishing was conducted by Fishery Survey of India (FSI) at its Goa Centre Headland, Sada, Vasco. The Officials of the Department participated in this programme.

## **10. AQUA GOA MEGA FISH FESTIVAL 2014**

The Department also conducted the First ever Fish Festival in Goa at Navelim from 31<sup>st</sup> January 2014 to 2<sup>nd</sup> February 2014. The festival was 3 days extravaganza, having participants from all over India showcasing the various Industries related to Fisheries Sector, along with Aquarium Gallery with exotic fish display, knowledge seminars/Exhibitions, commercial stalls exhibiting various products and services.

The festival was also celebrated by entertainment with Goan dances and cultural programs, showcasing national level participants with live performances, along with Goan delicacies through its food court.

### **a. Knowledge Seminar**

The presentation on various fisheries related topics were made on the three days of the Festival by eminent personalities from various Institutions like NIO, CMFRI, CIFRI, FSI and Private Entrepreneurs. The topics which were presented are as follows:

1. Marine Research Off Goa Coast.
2. Environment changes, pollution and its impact on Coastal Ecology.
3. Fisheries from prospective of fishermen.
4. Rules and Regulations and Licensing of Aqua Farm under CAA.
5. Prospects of Open Sea Cage Culture.

6. Recent Advancement in Fresh Water Aquaculture.
7. Value Addition of Fish.
8. HACCP Standards at Fish Landing Centres and Processing Plants.
9. Scope for Ornamental Fish Farming.



Seminar by Shri. Sydney Furtado, President of All Goa Fishing Boat Owner Association



Seminar by Dr. A.K. Bhargava, FSI, Vasco



Seminar by Dr. N. Ramaiah, NIO



Crowd to attend Seminar

## b. Felicitation of Fishermen

On the occasion of the Aqua Goa Mega Fish Festival 2014, the fishermen were felicitated by giving awards in different categories as listed below:

- i) For Excellence in Fish landing, award was presented to Cutbona Fisheries Co-operative Society Ltd., South Goa Mechanized Boat Owners Co-operative and Marketing Society Ltd. for highest fish catch for the past four years, followed by the Vasco Fishing Boat Owners Marketing Co-operative Society Ltd. and Zuari Fishermen Marketing Society Ltd.
- ii) For Excellence in Management of Fish Landing Centre, award was presented to Mandovi Fishermen Marketing Co-operative Society Ltd.

- iii) For Excellence in providing services to its members, award was presented to Goenche Ramponkarancho Ekvott (GRE), Cansaulim and Akhil Goa Kshatriya Pagui Samaj, Canacona.
- iv) For Excellence in Shrimp Farming, award was presented to Smt.Joanita Fernandes.
- v) For Excellence in fresh Water Farming, award was presented to Shri. Roque Dias.
- vi) For Excellence in Fish Drying, awards were presented to Shri. Suresh D'souza and Shri. Coensao D'souza.
- vii) For Excellence in Inland Fishing, awards was presented to Akhil Goa Harkari Sahakari Saunstha Ltd.



Felicitation of Fishermen

**c. PHOTO GALLERY OF AQUA GOA MEGA FISH FESTIVAL 2014**



Inauguration of Aqua Goa Mega Fish Festival by Hon'ble Governor of Goa



Display of Ornamental Fish at Aqua Goa Mega Fish Festival



People seen in a queue for entering the Aqua Gallery



Entertainment Programme at Aqua Goa Mega Fish Festival



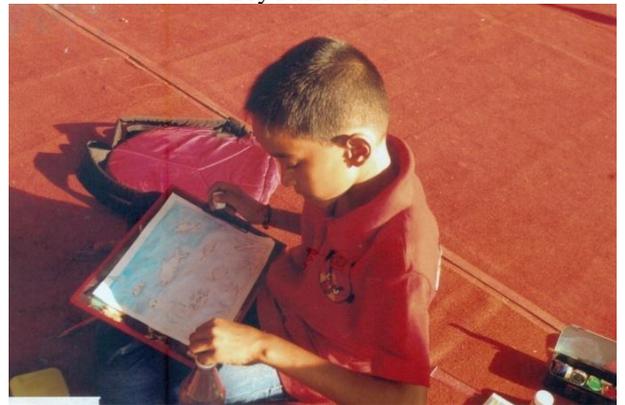
Hon'ble Governor of Goa's visit



Dry Fish Seller



Drawing competition for Children



Cooking Competition



Rangoli Competition



Entertainment Programme

### III. VISION

#### VISION OF THE FISHERIES DEPARTMENT

*It is the need of the hour to deliver optimum results within the stipulated time and sustainably harvest the available natural resources. To strike a balance, Department has already set up visionary objectives well in time, so that better planning will bring more prosperity to the state.*

*The Directorate of Fisheries strongly believes in same and works for a fruitful tomorrow.*

#### **I. On Going Projects:**

- a) **Open Sea cage Culture:** The Department in collaboration with CMFRI Karwar, has taken up Open Sea Cage Culture as a source of alternate livelihood for coastal fishermen under the National Mission for protein supplement and will be producing high value fish like Seabass, Cobia and Pompano at Canacona Taluka.

The fishermen were given training in culture and maintenance of the sea cages. The culture is in progress. With the growing tourism in Goa, the demand for quality fish is growing day by day.

The Department has successfully demonstrated Open Sea Cage Culture to the fishermen and in 2014-15, all the 50 cages will be operational targeting a production of about 100 tons. It is envisaged to extend the benefit of Open Sea Cage Culture to the fishermen of other coastal areas as well so that the fish production increases and quality fish is made available to the consumer.

b) **Fish and Fisheries of Goa**

In order to document the Fish resources of Goa, the Department has recently appointed two Research Assistants. A detailed document on different species of fish including invertebrates of the fresh water as well as Marine shall be made available in Goa. The document can be used as reference by policy makers, students and fishermen.

c) **Infrastructure:**

With the Coastal Marine capture fisheries being exploited to its fullest and the ever increasing demand for fish, it is important that every step be taken to ensure that there is no wastage and discard of the raw material due to spoilage. The Government is keen in progressing towards this and as a measure, project for Malim, Chapora, Cortalim and Cutbona Jetties have already been approved by the Ministry. This will help to decongest the jetties, provide better and hygiene Auction halls, slip way etc. at these centres.

II. **Visionary Projects:**

a) **Inland Riverine Cage Farming**

There is immense scope to promote Inland Riverine Cage Farming in the State. Brackish Water Cage Farming of fish like Pompano and Sea Bass and Mussel will be taken up for culture to increase the Inland Fish Production.

b) **Reservoir Cage Fish Farming**

The State has three major reservoirs and a number of smaller reservoirs and there is potential to tap these resources for cultivation of growing Pangasius.

c) **Fish Museum**

The Department has a plan to have a fish museum which will help to maintain records of fish diversity in the State. The Fish Museum will give an opportunity to the University students to conduct their studies as well as for the school children and general public who have active interest in Fisheries. This will create awareness as regards to the conservation of endangered Fisheries Resources.

d) **Solar Driers**

The Department proposes to install solar driers for drying of fish for human consumption in hygienic manner at selected areas. The fishermen shall be trained to use these solar driers so that they get higher rate for their produce.

e) **Ornamental Fish Farming:** Ornamental Fisheries has tremendous scope in Goa as well as for export. A Ornamental Fish Farm shall be set up, which will motivate the

Goan youth to take up this activity as a alternate source of livelihood or support their ongoing activities.

- f) **Aqua Marine Park:** The Department also proposes to set up a marine park at Benaolim Prawn Hatchery site, which can also boost eco-tourism in the state. The Aquamarine Amusement Park is envisaged to provide the public with knowledge and experience of the enchanting underwater world of the fish and other aquatic resources besides add-on Tourism Avenue to the tourist visiting the State. It is designed to view aquatic life under water something akin to viewing terrestrial animal in a zoo. The aqua marine parks among other things will feature vary large water holds with a viewing glass. The prime emphasis is not just on entertainment but also on conservation issues and public education. With the vision to attract substantial investment and develop a major aquamarine park for amusement and education in Goa, the Department of fisheries is envisaging to put the State in edutainment map of India.

## *IV. Statistics*

### *Statistical Marine Production Analysis of Goa at a Glance*

*The maximum sustainable yield for Goa is computed at around 85000 Tons a year.*

*The marine production in Goa has showed a sustainably steady growth from 24,600 tons in 1965 to 40,000 tons in 1988 and 87984 tons in the year 2013.*

*The production increased from 1988 onwards to an average of 1,00000 tons in 1993, mainly because of the active participation of the Government in mechanization of the fleet by providing financial assistance in the form of subsidies.*

*Further, it was observed that there was again a downward trend from 1993 to 1997. This was mainly on account of the virtual disappearance of the pelagic resources of sardines, which constituted bulk to the production. The shoals reappeared in 1997.*

*The production drastically came down to 67000 tons in 1998 and has been constant on an average of 65000 tons till 2002. The reduction is attributed to natural vagaries over exploitation and also to some extent to the exploitation of the offshore grounds by bigger vessels operating under the joint venture policies.*

*The production has again increased from 2003 onwards with an average of 85000 tons per year, achieving a highest marine production of 103087 tons in 2005 which could be attributed to the implementation of the Monsoon Fishing Ban.*

*The dominant species in the State production has been the pelagic resource of Mackerels and sardines which has been contributing to around 50% of the oceanic catch.*

*The mackerels have been more dominant till the year 1996 with production of average 40000 tons. However, it showed a decline from 1996 onwards to 15000, wherein the sardines have been dominating the production over the past decades with an average production of 29000 tons.*

*The dominant demersal species have been the prawns, squids & cuttle fish. These are also the commercially important species of the State, which contributes largely to the exports.*

*The production of the shrimps was reported to a low of 874 tons in 2001 and thereafter it increased over the past decade to the average of 7900 tons a year. The average marine fish production for the last decade is 89230 tons a year.*

## **GOA FISHERIES AT A GLANCE 2013**

1.	(a) Coastal length	104 kms.
	(b) Continental shelf (up to 100 fathoms depth)	10,000
2.	Inland waterways in Goa	250 kms.
3.	Inland water tanks (area)	100 hacts.
4.	No. of Fishing talukas	7
5.	No. of Fishing villages(North) *	23
6.	No. of Fishing villages (South) *	16
7.	Fisheries population upto 2010	30,225
8.	Active Fisherman population upto 2010	11944
9.	No. of Mechanized Trawlers up to 2013 in operation	843
10.	No. of Motorized crafts registered upto 2013	1420
11.	No. of Non-motorized crafts registered upto 2013	780
12.	No. of registered nets upto 2013	7309
13.	Fish landing centers (Major Jetties)	5
14.	Fish landing centers ramps	22
15.	(a) Fisheries Co-operative Societies (Boat Owners) upto 2013	07
	(b) Fisheries Co-operative Societies/ Association (Canoe Owners) upto 2013	24
16.	Annual Fish landing (in tons) during 2013	
	Marine	87984
	Inland	4678
	<b>Total</b>	<b>92662</b>
17.	Value of fish landing during 2013 (in lakh Rs.)	
	Marine	100218
	Inland	5736
	<b>Total</b>	<b>105954</b>
18.	Export of Marine Fish Products (in tons) 2013	33939
	Value (in lakh Rs.)	41181

(Source (\*): Marine Fisheries Census 2010 (Goa) Published by Ministry of Agriculture & CMFRI)

There are about **29 Inland Fish Landing centers** taken up for collection of fish catch data. Taluka wise list of Inland Fish Landing Centres is given below

<b>Bardez</b>	<b>Tiswadi</b>	<b>Ponda</b>	<b>Canacona</b>
1. Siolim	1. St.Estevam	1. Bandora	1. Talpona
2. Badem	2. Cumbharjua	2. Shiroda	2. Galgibag
3. Colvale	3. Diwar	3. Borim	3. Mashem
4. Camurlim	4. Choraio	4.Durbhat	4. Panefond
5. Chapora	5. Mandur	5. Madkai	
6. Aldona	6. Goa Velha		
7. Pomburpa	7. Neura		
8. Britona	8. Agaciam		
9. Nerul	9. Curca		
10.Verem			
11.Candolim			

### **District wise Marine Fish Landing Centres in Goa**

<b>Name of the District/Landing Center (37)</b>			
<b><u>North Goa (15)</u></b>		<b><u>South Goa (22)</u></b>	
<b><u>I Major (2)</u></b>		<b><u>I Major (3)</u></b>	
Malim Jetty, Bardez Chapora Jetty, Bardez		Khariwada Jetty, Vasco Cutbona Jetty, Salcete	Talpona Jetty, Canacona
<b><u>II Medium (4)</u></b>		<b><u>II Medium (9)</u></b>	
Siridao, Tiswadi Morjim, Pernem Siolim, Bardez Arambol, Pernem		Cansaulim Mormugao Baina Mormugao Velsao Mormugao Benaulim Salcete	Colva Salcete Cortalim Jetty-Salcete Agonda Canacona Palolem Canacona Betul Salcete
<b><u>III Minor (9)</u></b>		<b><u>III Minor (10)</u></b>	
Nauxi, Tiswadi Mandrem, Pernem Calangute, Bardez Candolim, Bardez Donapaula Tiswadi Caranzalem Tiswadi	Cacra Tiswadi Nerul Bardez Ashvem Pernem	Izossim-Mormugao Majorda-Mormugao Bogmalo-Mormugao Cavellosim-Mormugao Varca –Salcete	Saleri-Canacona Nuvem-Matvem-Canacona Galgibag-Canacona Pollem-Canacona Mashem Canacona

### *1.1 Major Species Wise Marine Production - 2001-2013 (in tones)*

Sp\Yr	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13
Mackerel	14204	8103	5779	6303	12006	12244	19980	16597	15169	23831	22128	17860	12994
Sardine	21470	30951	30874	34203	28246	30558	28574	34062	23496	23732	26391	34329	31629
Cat fish	2436	1585	1007	1043	1303	2586	1821	1480	2279	1402	1545	364	383
Shark	1211	1355	1571	1305	1716	988	1007	1019	1329	3159	375	234	281
Seerfish	2746	1230	2274	3478	9556	3522	4407	3777	2285	1229	1844	1616	2751
Shrimp	874	2299	6656	5586	10599	9065	8642	7458	9795	9970	8008	8968	8380
Pomfret	859	500	825	568	720	446	559	534	284	185	376	174	1342
Others	25586	21540	34770	31908	38941	36917	26195	23844	26050	23554	25518	23083	30224
<b>Total</b>	<b>69386</b>	<b>67563</b>	<b>83756</b>	<b>84394</b>	<b>103087</b>	<b>96326</b>	<b>91185</b>	<b>88771</b>	<b>80687</b>	<b>87062</b>	<b>86185</b>	<b>86628</b>	<b>87984</b>

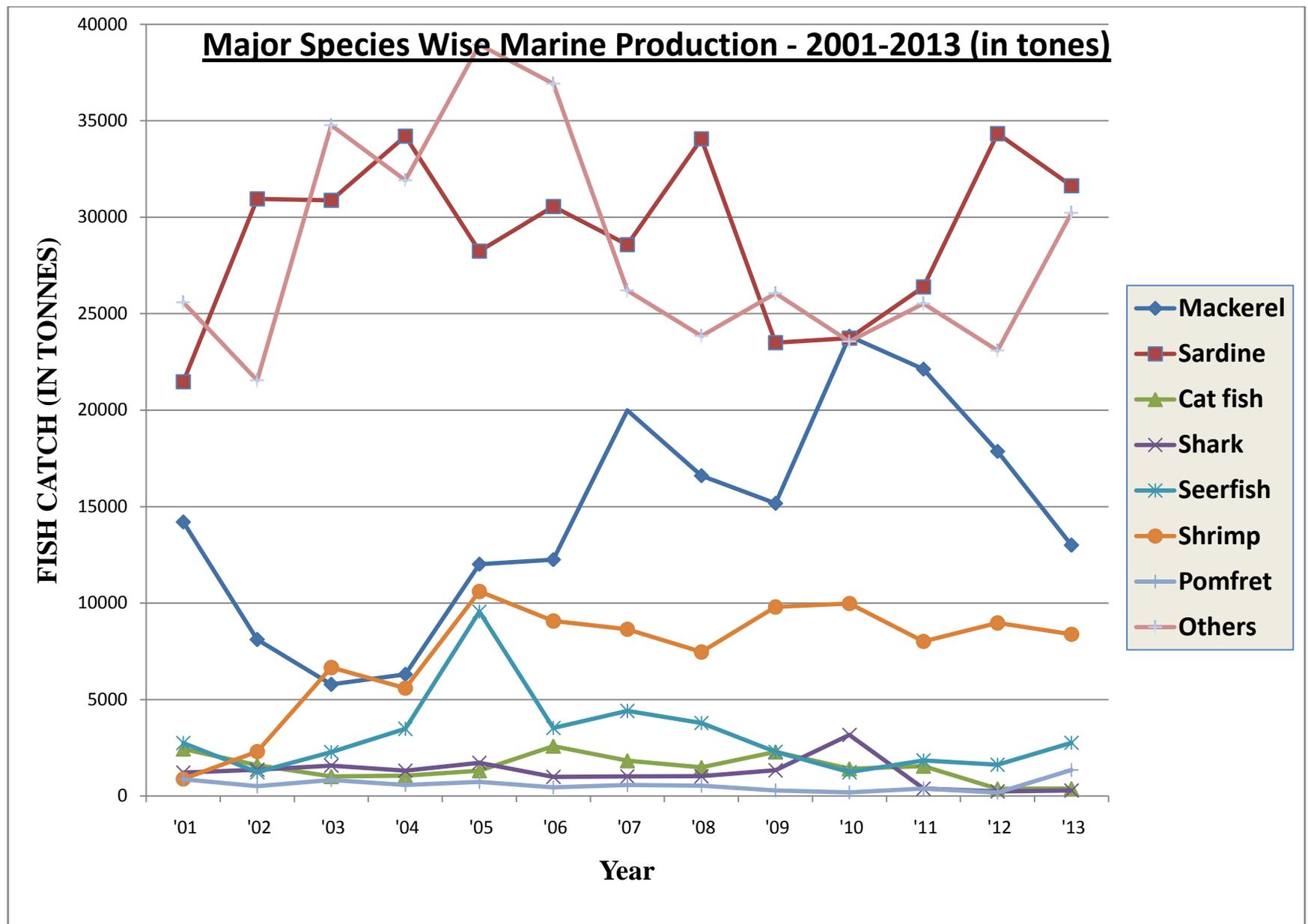
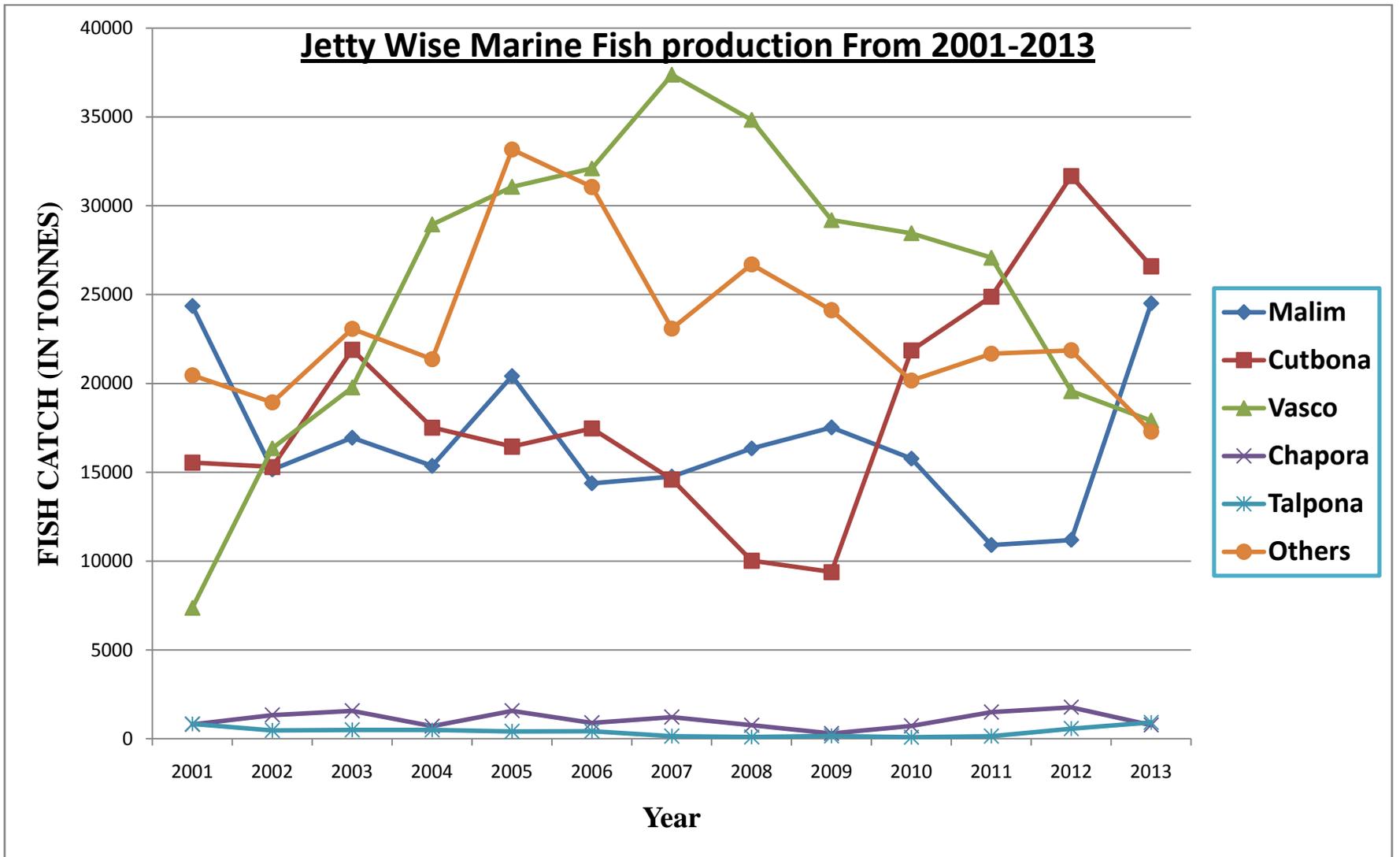


Fig. 1.1

## ***1.2 Jetty Wise Marine Fish production From 2001-2013***

**(in tones)**

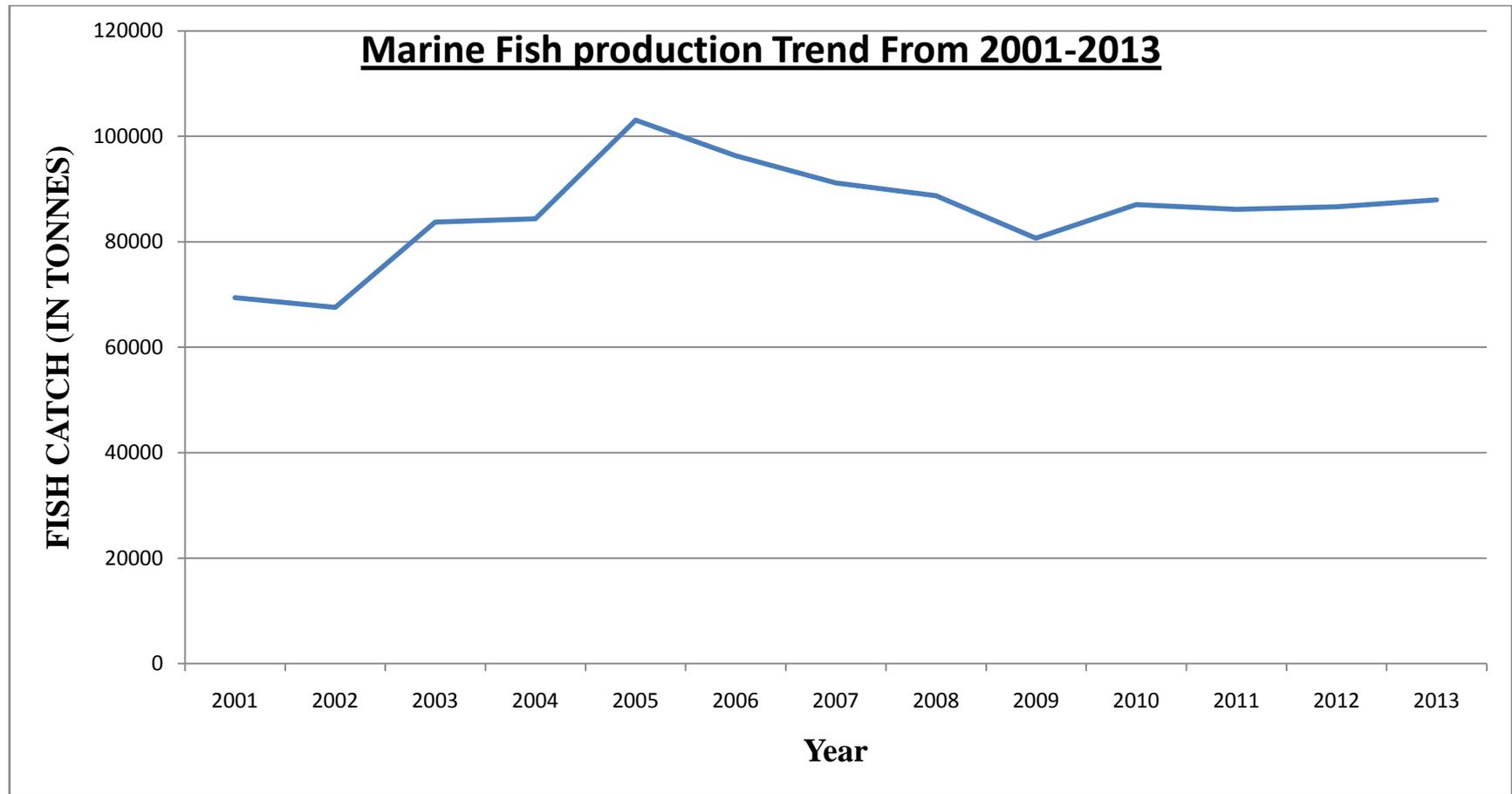
<b>Year</b>	<b>Malim</b>	<b>Cutbona</b>	<b>Vasco</b>	<b>Chapora</b>	<b>Talpona</b>	<b>Others</b>	<b>Total</b>
<b>2001</b>	24358	15543	7375	815	839	20456	69386
<b>2002</b>	15157	15299	16356	1343	476	18932	67563
<b>2003</b>	16945	21894	19775	1576	505	23061	83756
<b>2004</b>	15361	17510	28948	713	502	21360	84394
<b>2005</b>	20414	16445	31065	1585	418	33160	103087
<b>2006</b>	14378	17467	32102	904	425	31050	96326
<b>2007</b>	14756	14595	37373	1226	152	23083	91185
<b>2008</b>	16341	10027	34837	765	107	26694	88771
<b>2009</b>	17524	9386	29193	304	164	24116	80687
<b>2010</b>	15767	21857	28457	731	92	20158	87062
<b>2011</b>	10905	24879	27075	1507	150	21669	86185
<b>2012</b>	11194	31661	19567	1777	573	21856	86628
<b>2013</b>	24510	26589	17913	776	918	17278	87984



*Fig. 1.2*

### 1.3 Marine Fish production Trend From 2001-2013

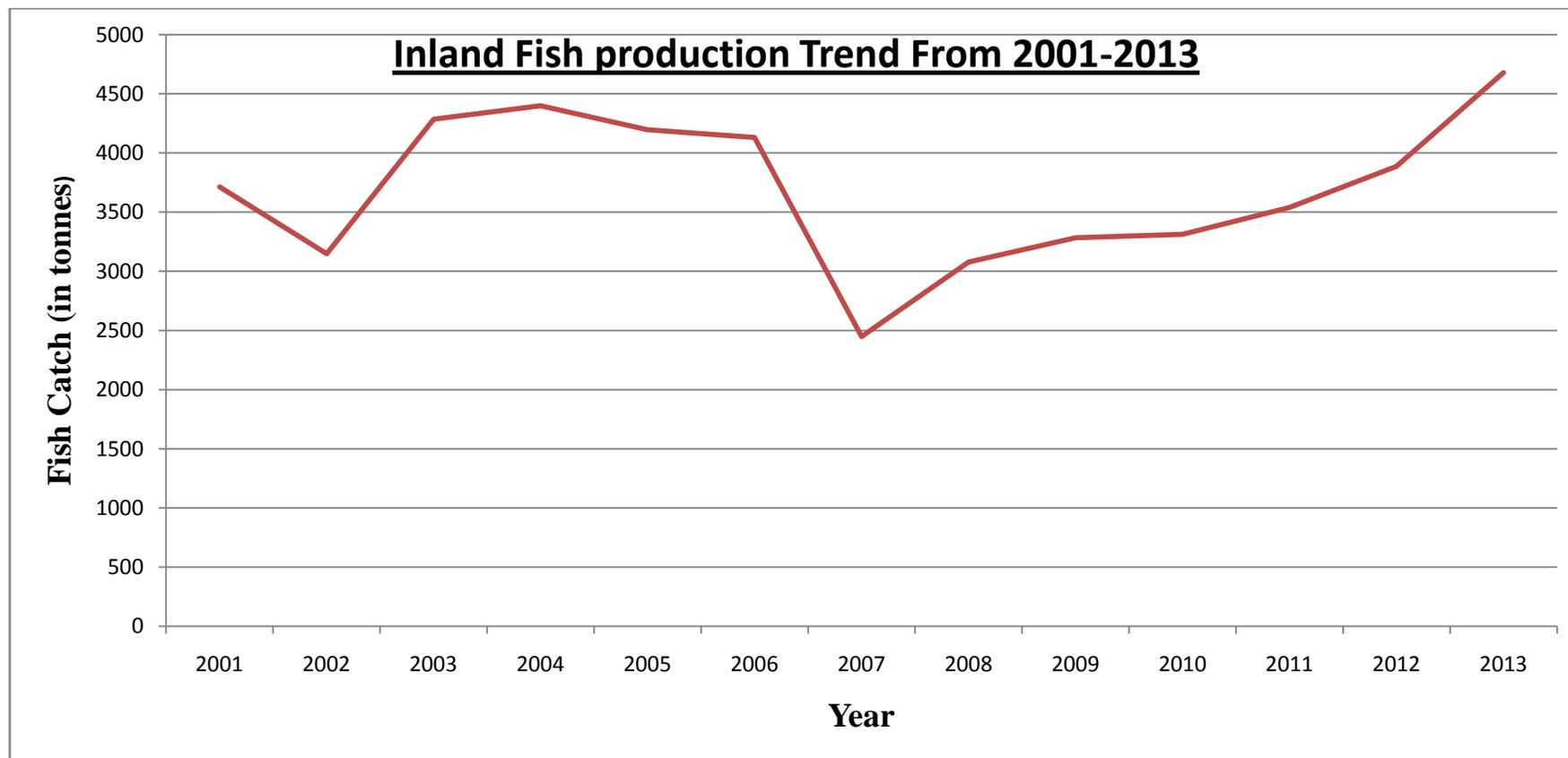
Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Fish Catch (in tons)	69386	67563	83756	84394	103087	96326	91185	88771	80687	87062	86185	86628	87984



*Fig. 1.3*

### 1.4 Inland Fish production Trend From 2001-2013

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Fish Catch (in tons)	3713	3148	4285	4397	4194	4131	2447	3077	3283	3311	3538	3887	4678



*Fig. 1.4*

***1.5 Marine Fish Production of Goa for the period from 2001 to 2013 (in tons)***

Sr. No.	Species	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Mackerals (Bangdo)	14204	8103	5779	6303	12006	12244	19980	16597	15169	23831	22128	17860	12994
2	Sardines (Tarlo)	21470	30951	30874	34203	28246	30558	28574	34062	23496	23732	26391	34329	31629
3	Cat Fish (Sangot)	2436	1585	1007	1043	1303	2586	1821	1480	2279	1402	1545	364	383
4	Shark fish (Mori)	1211	1355	1571	1305	1716	988	1007	1019	1329	3159	375	234	281
5	Seer Fish (Wiswan)	2746	1230	2274	3478	9556	3522	4407	3777	2285	1229	1844	1616	2751
6	Prawns (Sungtam)	874	2299	6656	5586	10599	9065	8642	7458	9795	9970	8008	8968	8380
7	Pomprets (Paplet)	859	500	825	568	720	446	559	534	284	185	376	174	1342
8	Cuttle Fish (Manki)	2027	832	2029	1737	73	1919	330	2201	--	1941	1012	1180	4422
9	Tuna (Bugde)	198	669	1241	609	2459	589	1916	2095	1044	2524	3801	2621	3520
10	Ribbon Fish (Balle)	291	2645	3178	3647	5791	5354	1368	2551	558	839	49	644	1107
11	Reef Cod (Gobro)	699	99	769	2371	--	--	--	276	--	1303	5	495	1409
12	Kowala kowal (Velli)	553	315	268	421	854	724	226	455	395	279	438	562	1046
13	Golden Anchovy (Kapsale)	68	129	63	9	17	30	3	57	0	2	--	50	29
14	Silver Belly (Kampi)	3818	3331	2740	2489	2046	3187	1664	1688	1976	1584	1012	1146	3328
15	Soles (Lepo)	1747	1682	2935	2016	2054	2339	1950	1795	1532	1606	3995	3683	2579
16	Silver Bar (Karli)	388	312	370	336	849	435	251	336	637	219	62	98	54
17	Crabs (Kurlio)	893	654	866	972	994	1092	819	1021	1349	763	1236	1160	830
18	Sciaenoids (Dodiario)	2451	1629	2806	2634	3211	2404	1938	2780	2207	1376	1448	1629	1425
19	Butter Fish (Soundale)	790	287	439	340	598	892	615	655	1353	1116	978	656	594
20	Others	11663	8956	17066	14327	19995	17952	15115	7934	14999	10002	11482	9159	9881
	<b>Total</b>	<b>69386</b>	<b>67563</b>	<b>83756</b>	<b>84394</b>	<b>103087</b>	<b>96326</b>	<b>91185</b>	<b>88771</b>	<b>80687</b>	<b>87062</b>	<b>86185</b>	<b>86628</b>	<b>87984</b>

## 1.6 Inland Fish Production of Goa for the period from 2001 to 2013 (in tons)

Sr. No	Name of the Fish	Year												
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Prawns													
a	Big	21	20	62	64	46	48	15	11	10	21	39	32	122
b	Medium	93	262	137	150	111	158	77	41	46	51	37	78	193
c	Small	474	958	977	987	716	979	811	571	618	333	285	361	405
2	Lady Fish	173	77	70	74	83	76	38	26	35	41	69	70	116
3	Mulletts	337	144	187	186	207	196	233	304	375	354	386	391	336
4	Gerres	201	59	67	65	80	70	79	81	96	102	128	100	110
5	Lutianus	35	28	23	35	45	37	5	7	7	16	37	44	55
6	Cat Fish	284	254	219	205	210	196	111	115	144	167	211	268	331
7	Anchovy	174	31	22	31	34	35	3	1	5	14	35	25	26
8	Pearl Spot	90	59	62	59	71	64	116	140	171	172	219	236	261
9	Betki	9	6	4	5	7	4	1	1	1	5	13	13	32
10	Milk Fish	--	--	--	--	1		30	26	33	39	65	52	61
11	Megalops	--	1	1	1	1		4	1	20	28	20	16	19
12	Scatophagus	28	31	26	31	31	33	36	37	45	54	75	42	81
13	Ambasis	109	111	94	83	92	88	9	27	48	32	65	69	131
14	Crabs	213	157	133	143	161	138	116	116	151	152	190	204	251
15	White/Black Water Clams	465	60	723	756	716	718	604	307	332	330	130	76	119
16	False Clams	147	293	194	179	163	155	70	360	158	555	592	442	759
17	Oysters	18	19	81	380	184	167	1	1	2	6	57	163	30
18	Mussel	120	46	613	364	464	358	88	113	-	1	11	9	24
19	Lepo	--	--	--	--	--	--	--	--	--	2	2	5	11
20	Indian Salmon	--	--	--	--	--	--	--	--	--		--	--	--
21	Balle Reddish	--	5	--	--	--	--	--	--	--	1	25	--	--
22	Sciaenoids	--	--	--	--	--	--	--	--	--		--	--	--
23	Others(Palu)	11	2	6	5	6	4	--	--	--	15	--	--	30
24	Others(Vagolem)	--	--	--	--	--	--	--	--	--	--	--	--	--
25	Others(Leather Jackets)	--	--	1	--	--	--	--	--	--	--	--	--	--
26	Others(Buyari)	--	1	--	--	--	--	--	--	--	--	--	--	--
27	Miscellaneous	711	524	583	594	765	607	--	791	986	820	847	1191	1175
	<b>Total</b>	<b>3713</b>	<b>3148</b>	<b>4285</b>	<b>4397</b>	<b>4194</b>	<b>4131</b>	<b>2447</b>	<b>3077</b>	<b>3283</b>	<b>3311</b>	<b>3538</b>	<b>3887</b>	<b>4678</b>

**1.7 EXPORT OF MARINE FISH & FISHERY PRODUCTS (Quantity in tons)**

Sr. No	Item	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
1	Fr. Shrimps	51	--	--	18	--	--	19	15	--	--	--	--	297
2	Fr. Cuttle Fish	216	691	882	766	642	628	224	839	1772	229	991	3802	2805
3	Fr. Squids	393	49	--	22	--	22	49	486	654	3095	1342	2288	4721
4	Fr. Fresh Fish		--	--	27	--	--	12259	10904	18644	27327	--	--	--
5	Fr. Tuna	394	--	--	594	--	--	--	--	--	--	--	27	55
6	Ribbon Fish	1272	8238	4692	3461	4243	5961	--	--	--	--	6415	6770	8142
7	Indian Mackerels	2989	2383	1990	1227	1443	2358	--	--	--	--	16817	9252	8410
8	Reef Cod	1961	2341	2098	370	430	287	--	--	--	--	941	444	1258
9	Fr. Seer Fish	200	31	166	286	727	132	--	--	--	--	294	147	-
10	Fr. Assorted Fish	235	1727	344	474	380	--	--	--	--	--	--	--	-
11	Other fishes		134	116	1610	3137	4729	5717	9289	5939	6561	11029	19945	8251
	<b>Total (Qty. in tones)</b>	<b>7711</b>	<b>15594</b>	<b>10288</b>	<b>8855</b>	<b>11002</b>	<b>14117</b>	<b>18268</b>	<b>21533</b>	<b>27009</b>	<b>37212</b>	<b>37829</b>	<b>42675</b>	<b>33939</b>
	<b>Value (in lakhs)</b>	<b>3007</b>	<b>5618</b>	<b>3273</b>	<b>3907</b>	<b>6178</b>	<b>7299</b>	<b>9336</b>	<b>19783</b>	<b>19563</b>	<b>28891</b>	<b>33125</b>	<b>37918</b>	<b>41181</b>

The data provided by Marine Product Export Development Authority has been made available in this format

**Total Mechanized and Non-Mechanized Canoes upto 2013**

Sr. No.	Taluka	Mechanized	Non-Mechanized	Total
1	Bardez	330	165	495
2	Tiswadi	268	121	389
3	Salcete	100	110	210
4	Vasco	406	171	577
5	Canacona	187	163	350
6	Pernem	125	41	166
7	Ponda	04	09	13
	<b>Total</b>	<b>1420</b>	<b>780</b>	<b>2200</b>

**Taluka wise fishing gears registered upto 2013**

Sr. No	Type of gear	Tiswadi	Bardez	Ponda	Pernem	Canacona	Mormugao	Salcete	Total
1	Sea gill net	733	708	23	272	590	1012	338	3676
2	Sea cast net	1	7		5	36			49
3	River gill net	76	51	48	17	10	8	35	245
4	River cast net	1	31	2	14	13	1		62
5	Rampon net	14	5		8	5	14	26	72
6	Drag net	25	45		5	62	15	21	173
7	Purse-seine net	81	57			1	92	193	424
8	Trawl net	410	386		21	18	358	364	1557
9	Barrier(Futauni)	69	57	72	6	36	48	46	334
10	Sluice gate	23		13		6	9	10	61
11	Stake net	78	49	85	8		6	194	420
12	Kadsari net			6					6
13	Other net	101				3	10		114
14	Ormol net	16					22		38
15	Singel net	8					70		78
	<b>Total</b>	<b>1636</b>	<b>1396</b>	<b>249</b>	<b>356</b>	<b>780</b>	<b>1665</b>	<b>1227</b>	<b>7309</b>

### No. of Vessels operated at major Landing centers

The approximate number of fishing trawlers in operation at major landing centers during 2013.

Sr. No.	Fishing Centres	No. of fishing vessels in operation
1	Chapora/Keri	43
2	Malim	277
3	Cutbona	285
4	Cortalim	04
5	Vasco	230
6	Talpona	04
<b>Total</b>		<b>843</b>



**Average catch for craft, Purse-seiner – 3 to 6 tones and trawling 500 to 700 kgs per boat. However, the quantity of catch depends upon fishing season.**

### Fresh water Fishery Resources

The State has around 3300 Ha. of water spread area of fresh water bodies covering Salaulim reservoir in South Goa and Anjunem Dam reservoir in North Goa. Besides, smaller water bodies are available in several irrigation bandharas in Mayem lake and smaller perennial and seasonal water sheets. In this regard fresh water aquaculture offers a good potential to increase fresh water fish production as well as to generate self employment to the inland rural youth.

Table below shows the area of Freshwater Fishery resources available in Goa.

#### Inland Fishery Resources in Goa

States/ U.Ts	Rivers & Canal	Reservoirs (Lakh Ha)	Tanks & Ponds (Lakh Ha.)	Floodplain Lakes & Derelict Water (Lakh Ha.)	Brackish Water (Lakh Ha.)	Total Water Bodies (Lakh Ha.)
Goa	Ha. 54.00	Ha. 0.034	Ha. 0.015	Ha. 0.0016	Ha. 0.0033	Ha. 0.06

#### Culture Fisheries

No. of Prawn Hatcheries	--	1
No. of licensed Prawn Farm	--	33
Area covered under Sci. farm	--	96.00 Ha
Area covered under traditional farming	--	600 Ha
No. of Fresh Water Fish seed Hatchery	--	1
No. of Fresh Water bodies	--	52
Total Fresh Water Area	--	3962.00 Ha
Approximate production from Culture Fisheries, 2013-14 (Brackish & Fresh water)	--	130 tons
Brackish Water Fish Demonstration Farm	--	1