



Chief Editor's Note

Shri. Avertano Furtado

Minister for Labour & Employment, Fisheries & NRI Affairs
Government of Goa

The availability of reliable database in the Fisheries Sector plays an important role in planning and framing policies for elevating the Socio-economic Development of the State apart from the development of Fisheries Sector in particular.

I am happy to note that the Department of Fisheries is coming out with the Publication 'Goan Fish Trail-Vol-II-2015' for the second year. The Government of Goa has made its sincere efforts to promote the Fisheries Sector which is reflected through this Publication.

It is my pleasure to exploit this opportunity and thank the Department of Fisheries, for showing its ability to take up the arduous task in implementing the policy measures and projects of Fisheries in reality and showing its capability for the future endeavors.

I am indeed sure that this Publication will be of immense utility to all associated with the development of Fisheries in the State.

Shri. Avertano Furtado
(Hon'ble Minister for Fisheries)

Editor : Dr. Shantala Monteiro
Statistical Assistant : Shri. Sanjay R. Korgaonkar
Supdt. of Fisheries : Smt. Chandrakant D. Vello
Supdt. of Fisheries : Smt. Pratiksha Haldankar
Supdt. of Fisheries : Smt. Pratiksha Haldankar
Technical Assistant : Smt. Pratiksha Haldankar

In a mark of tribute to our former People's President Dr. A.P.J. Abdul Kalam, this handbook has his memorable quotes listed on the bottom of each page.

Look at the sky. We are not alone. The whole universe is friendly to us and conspires only to give the best to those who dream and work.



Shri. Amjad Tak
Secretary Fisheries

To highlight the general work, new initiatives, various schemes and fisheries related activities of department of fisheries, the first publication of Goen fish trail was appreciated by everyone.

This Year's issue is even more elaborate and informative; Department of Fisheries has highlighted some of the major achievements of the year 2014, like the marine production for the last year 2014 touched new height with total production reached up to 1.28 lakh metric tons. Open sea cage culture successfully takes up this year as well. To provide fish at reasonable rate to Goens, department has purchase 5 new vehicle for mobile fish stalls to be stationed at various locations of Goa. A new petrol vessel has been inducted for better regulation and enforcement. Celebration of Aqua Goa Mega fish festival at Navelim and Mapusa was a high point for the calendar of department this year.

I would like to convey my regards to Hon'ble minister for fisheries Shri Avartino Furtado for his continuous support and encouragement. I would also like to convey my sincere thank to Director of fisheries Mrs Dr. Sharmila Montario for taking interest in innovations and new initiatives.

I am sure this publication like this will help general public to understand ths working of department and will generate interest of students and academics as well.

My best wishes for entire team of fisheries department for the hard work put in for this publication.

Amjad Tak
Secretary Fisheries

"Dream, Dream Dream, Dreams transform into thoughts And thoughts result in action."



**Directorate of Fisheries,
Government of Goa.**

Chief Editor's Note

In the inaugural issue of 'Goan fish Trail' last year, we had taken an initiative to make the Department of Fisheries more transparent in terms of its accountability and Good Governance.

This year we have gone one step forward, by bringing out this issue and showing our commitment towards Good Governance.

This issue shows the works accomplished and important events undertaken by the Department during 2014-15.

The booklet also highlights the Fisheries Statistics in the State for the past decade, which is an effort to preserve our fisheries data for the benefits of not only the Government Departments, but also for the students and scholars of Fisheries.

I acknowledge the guidance rendered by the Honourable Minister for Fisheries Shri Avertano Furtado in all the works undertaken by the Department. I also thank the Secretary Fisheries Shri Amjad Tak for the advice in all the activities of the Department.

I would like to appreciate the work and cooperation of all my staff in striving to achieve their individual targets and collectively the targets set for the department.

I sincerely hope that this handbook serves the purpose of the people interested in this sector in particular and the general public at large.

**Dr. Shamila Monteiro
Director of Fisheries**

Vol. II – 2015

Chief Editor : Dr. Shamila Monteiro
Editor : Shri. Samir R. Korgaonkar, Statistical Assistant
Editorial Team : Shri. Chandrakant D. Velip, Supdt. of Fisheries
Dr. Hrishikesh Pawar, Supdt. of Fisheries
Dr. Smita A. Mazumdar, Supdt. of Fisheries
Smt. Megha S. Kerkar, Supdt. of Fisheries
Smt. Prajakta Haldankar, Technical Assistant

As a mark of tribute to our former People's President Dr. A.P.J. Abdul Kalam, this handbook has his memorable quotes listed on the bottom of each page.

Contents

Page Nos.

I	Introduction
II	Achievements 2014-15
III	Vision
IV	People & Events around Fisheries
V	Statistics
VI	Articles

I. INTRODUCTION

The Goan Fish Trail was first published on 10th August, 2014 to showcase the efforts of the Directorate of Fisheries, Government of Goa towards the welfare of the fishing industry and fisher community.

This yearly publication was introduced to provide information about the fisheries sector in Goa, fish catch and trends in the fish production. It also serves as a reference booklet about welfare schemes operated for the industry, activities of the Department of Fisheries, its visionary objectives and efforts being made to achieve the same.

This second edition of Goan Fish Trail primarily focuses on the activities of the Department for the year 2014-15 and some informative articles related to fisheries.

Goa situated at the west coast of India, is known the world over for its beautiful beaches and its cuisine. The 104km coastline, although very small, has significantly helped the people living in the coastal areas in undertaking fishing activity as a source of livelihood. The six rivers Chapora, Mandovi, Zuari, Talpona Galgibagh and Sal intricately traverse across the State bringing in the rich nutrients from the upper stretches to the lower estuarine region making it a rich nursery and feeding ground for the aquatic life benefiting the inland fishermen.

The Fisheries Sector has boosted the State's Economy with the help of Fisheries Cooperative Movement in the State generating direct and indirect employment.

SCENARIO

Marine Fish Production

The marine production for the last year 2014 has been the highest recorded over the past few years. The total production achieved was 1,28,107 tons. This increase has primarily been due to introduction of bigger purse-seine fishing vessel of OAL ('Over All Length' of the boat) of around 70 ft. by some of the Mechanized fishermen. These bigger vessels have helped the fishermen venture into deeper seas and in multi day fishing especially for sardines. The increased demand for quality fish meal overseas has lead to number of fish meal plants on the Konkan Coast which has lead to increased demand for sardines and better price for the fishermen.

The dominant demersal species have been the prawns, squids & cuttle fish. The Marine production has increased from 103087 to 128107 tons during the period from 2005 to 2014.

The Maximum Sustainable Yield (MSY) calculated from the data on catch obtained and effort used over the years for Goa is 85,407.61 tons (Monteiro, 2006).



INLAND FISH PRODUCTION IN GOA

The Inland Fish Production plays a very significant role in providing some of the most sought after fish like the Lates sp (Chonak) and Red Snapper(Palu). The brackishwater fish, shellfish including crustreacean species have found favour with the fish loving population of Goa and the tourist..

The Inland Fish comprises of nearly 20% of Prawns. The other important Inland Fish species are the Lady Fish, Mulletts, Cat Fish, Pearl Spot etc.

The book gives an insight on the Inland Fish produced in the State over the last decade.



II. ACHIEVEMENTS 2014-15

Budget Provision

The annual budget for the year 2014-15 including plan and non plan budget of the Department was 5463.00 lakhs. The Department was able to utilize 75% of its budget for the year 2014-15.

Revenue Generated

The Department generated total revenue of Rs.2.6039 Crores for the Financial Year 2014-15 through various fees and rent of various structures.

Infrastructure:

Keeping with the commitment to create and provide better and adequate infrastructure to the fishermen to facilitate the fishing activity the department has initiated various works. There are various stages of approvals and tendering which include construction of ramps at Assolna, Issorcim, Velsao- Mormugao Taluka, Saleri Cola, Cakra-Tiswadi, Azossim-Mandur as well as the much awaited up gradation of the four fish landing centers of the state i.e Malim,Chapora, Cutbona and Cortalim.

1. FINANCIAL ASSISTANCE SCHEMES.

Fishing is an important sector of the State and it is the only source of the livelihood of sizable community of the fishermen who have been contributing significantly to the fish production of the State. They are among the most vulnerable communities towards the vagaries of nature. With the escalating fuel and other operational cost on one side coupled with the uncertainty of a good catch makes this sector dependent on financial assistance from the Government. In order to grant relief to the fishermen to overcome the financial losses, the Department implements various financial assistance schemes. The department implements various Welfare Schemes for the up-liftment of Fishermen. Following are the State as well as Central Schemes implemented by the department and the physical and financial achievements during financial year 2014-15.

Sr. No.	Name of the Scheme	Physical Achievements (Nos.)	Financial achievement (Rupees in Lakhs)
1.	Construction of wooden/ FRP canoe	73	43.23
2.	Replacement of old kerosene OBM to petrol OBM	408	469.93
3.	Purchase of Fuel (kerosene/petrol) to the fishermen for operation of Out board Motors	1164	416.22
4.	Purchase of Fisheries requisites	56	16.33
5.	General insurance Scheme for active fishermen	5735	5.73
6.	Purchase of power block	7	8.73
8.	Assistance to registered Fishermen Societies/Association	4	2.00
9.	Insulated Boxes	421	4.96
10.	Safety Equipments	338	159.38
11.	Life Jackets/Bouys	13	7.82
12.	Goa Value Added Tax (VAT) Subsidy	659	1499.00
13.	Interest Subsidy Scheme on Loans for Agriculture and Allied Activities	172	18.19
14.	Relief for PHYAN Victims	1	0.50
15.	Purchase of new OBM	47	28.20
16.	Group Accident insurance scheme for active fishermen	11747	1.19
17.	Saving –cum-Relief	5707	102.73
18.	Development of model Fishermen village Housing	5	1.25
19.	Safety Equipments like VHF, Search & Recue Beacon	338	159.38
20.	Assistance to Farmer for Purchase of Feed	8	4.07
21.	Assistance to Farmer for Purchase of Equipment	2	2.45
22.	Assistance for Construction / Renovation of Fish Farm	3	6.43

2. FISH FARMING

i. Open Sea Cage Culture- Phase-I (Part 2)

The Department had taken the initiative to demonstrate and produce quality fish in the open sea through culture in sea cages. The response received from the fishermen was very encouraging and it further paved way to continue this project with 44 fishermen in three groups. These three groups took up this activity at Pollem, Nuvem and Talpona in Canacona Taluka. This time a new species Pompano (American pomphret) was introduced which gave a good result achieving 90% survival besides Cobia (Modso) and Lates(Chonak). This project was undertaken under the Rashtriya Krishi Vikas Yojana (RKVY).

A total of 41 cages (9 at Pollem, 19 at Talpona & 13 at Nuvem) were installed at Canacona stocking Seabass, Pompano & Cobia seeds.



Open Sea cage Culture at Talpona, Canacona



Fisheries Staff checking the growth of fish



Pompano



Cobia

ii. Fresh Water Fish Seed Hatchery, Kerim

The freshwater fish seed hatchery produces quality fish seed of Indian Major carps and common carp.

For the financial year 2014-15 it produced 3.5 lakh advanced fingerlings of good quality. Besides additional 10 lakh fingerlings were procured from outside state and supplied to

the fish farmers at a reasonable rate. This ensures the quality of the fish fingerlings to the fish farmers.



Demostration on Identification of brooder

3. MOBILE FISH STALLS

With the demand from all quarters to supply fish at reasonable rate and to fulfill the commitment of the Hon Minister for Fisheries on the floor of the house, the Department has purchased 5 mobile fish stalls under National Fisheries Development Board (NFDB) scheme. All the five mobile fish stalls are in operation through the fisheries cooperative society/self help group .Fish is made available to the public at a price 5% above rate at the whole sale market.



Inauguration of Mobile Fish stall

4. REGULATION AND ENFORCEMENT

i. Patrol Vessel

It is a matter of great pride that the department has procured a patrol vessel **“AVE MARIA-14”**. The Vessel is equipped for both marine as well as inland waters, with a state of art technology provided by the Goa Shipyard Limited. The specification consists of 15 meters Glass Reinforced Plastic High Speed Patrol vessel which is having 2 x 330 horse power, volvo penta engines running with a maximum speed of 30knots per hour and can

accommodate 6-8 members. The aim of the patrol vessel is to curb the illegal activities carried out in waters.



Patrol Vessel

ii. Monsoon Fishing Ban in a State Of Goa

The Government of India has imposed an uniform ban on fishing by all fishing vessel in the Indian Exclusive Economic Zone beyond territorial waters on the West Coast including Lakshadweep Island from 1st June to 31st July 2015(61 days) and the East Coast of India including Andaman and Nicobar Island from 15th April to 14th June 2015 (61 days) for the purpose of conservation and effective management of fisheries recourses and for safety of fishermen.

The demand of the state to have an uniform monsoon fishing ban along the west coast has been accepted by the neighboring states of Maharashtra and Karnataka. The monsoon fishing Ban is now notified and implemented from 1st june to 31st july from this year.. In monsoon, during the ban period only non motorized and motorized canoes fitted with upto 10HP outboard using gill net only are exempted from the ban.

The main aim towards the fishing ban is to conserve the fish and protect the breeding species as most of the fish species breed during the monsoon and assist to increase the fish productivity in the State. The ban also ensures the safety of the fishermen due to the rough weather in monsoon, and allows the fishermen to undertake annual maintenance of their fishing vessels.



Vessels at Malim Jetty during Fishing Ban

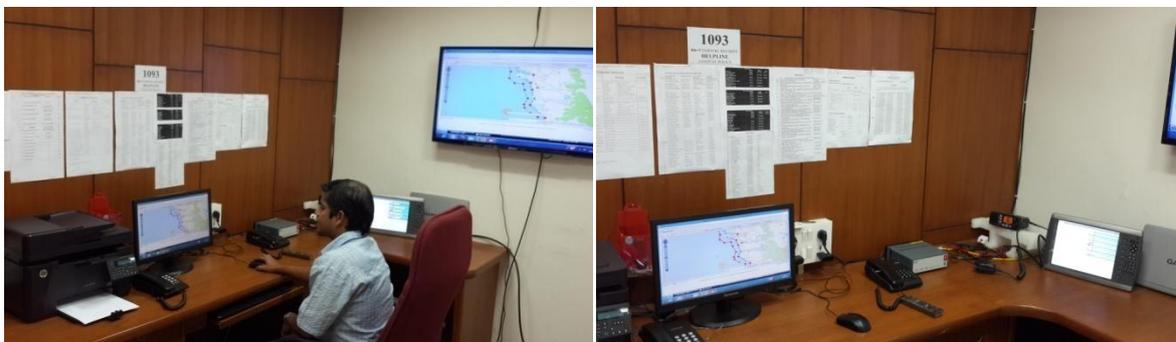
5. COASTAL SECURITY AND SAFETY OF FISHERMEN

i. Control Room

The Department is equipped with a full fledged modern state of art control room which is functioning round the clock.

The aim of the control room is to inform the uncertainties of the environment and to provide safety communications to the Fishermen by continuously monitoring the vessels which help in detecting any fishing activities in Goan territorial waters.

Contact no. of the control room is 0832-2425263 and fax no. 0832-2425263



Control Room

ii. Fishermen Identity Cards

As a enhanced Coastal Security Measure, the Government of India has made it mandatory to carry identity cards by the fishermen while venturing in the sea for fishing.

To further strengthen the measure, Government of Goa has taken a policy decision and decided to issue Biometric Cards to the Goan Fishermen which will be implemented by the end of this year.

iii. Biometric Cards/Card Readers

Under the biometric card scheme it is proposed to issue 19,676 nos. of biometric cards out of which 10,233 nos. of cards have been processed and 9140 nos. of card have been distributed to the fishermen.

iv. Temporary Fishermen Identity Card

Under this scheme 11,582 temporary cards have been issued to the Non-Goan crew members working on fishing vessel for the year 2014-15. The validity of this card is only for one fishing season i.e. from 1st August – 31st May (ten months).

The Department also participated in the Sagar Sajag, Sagar Kawach with the cooperation of Senior Coast Guard Officer, District 11, Vasco by guiding them regarding the importance of coastal security.

6. TRAINING IN FISHERIES:-

i. Six Month Training Programme



Students keen in learning

Department conducts six months certificate course for the fisher youth. The course is meant for training in Fishing Craft & Gear, Fundamentals of Navigation & Seamanship, and Maintenance & Operation of Marine Diesel Engine, Weaving and Mending of modern Nets, Seafood value addition & Marketing, Aquaculture, Aquarium Making & swimming.

A total no. of 20 students participated in six months training course for the year 2014-15.

ii. Short Term Training Programme

The Department organizes 2-3 days short term training programme at Fishermen Training Centre, Ela-Old Goa for fishermen. The course includes training on Shrimp farming,

Ornamental fish breeding, Fabrication of Aquarium tanks, Value added seafood product preparation etc..

A total no. of 112 beneficiaries participated in six months training course for the year 2014-15.

7. TRAINING VESSEL “OCEAN QUEEN”

In the prior edition of this book, we had shown the keel lying of the training vessel, which is attained in this year under the Rashtriya Krishi Vikas Yojana scheme (RKVY) Scheme. The training vessel “OCEAN QUEEN”, which is a trawler-cum-Purse-seiner is engaged in imparting training regarding modern sustainable fishing techniques, use of safety equipment when vessel is in distress condition etc.



Training Vessel “OCEAN QUEEN”,

8. DEMONSTRATION ON BRACKISH WATER FISH FARMING AT ELA DHAUJI

Four demonstration trainings were conducted in Brackish water fin fish and shell fish culture, including Tiger shrimp and Pearls spot in collaboration with the training center.

i. Training Fresh Water Fish Farming

Four demonstration trainings in Fresh Water fish farming were conducted in collaboration with the training center.



Fresh Water Fish Harvesting

9. RESERVOIR FISHERIES

The Department is regularly stocking Fresh Water Fishes in the reservoirs of Goa at Anjunem, Amthane, Chapoli, Selaulim and Panchwadi with 50,000 seeds of Indian Major Carp (IMC) under the National Fisheries Development Board (NFDB) Scheme.

The fishing rights in Anjunem, Amthane and Chapora auctioned for a period of 15days. However the fishing in each reservoir could be done only for a one to two days. Around 1 ton of fish was harvested from these reservoirs.



Release of Fish Fingerlings



10. AQUA GOA MEGA FISH FESTIVAL-II, 2015

The Department successfully conducted two Aqua Goa mega fish festival one at Navelim from 29th Jan to 1st Feb 2015 & other at Mapusa from 6th Feb to 9th Feb 2015 displaying over 100 varieties of Ornamental Fish. Short educational films were screened for school children. In addition drawing, rangoli and cooking competitions were also conducted for children. Stalls depicting various aspects of fisheries were mounted. In the evening various entertainment programs were conducted. It gave a common platform for participants from various State/Central Government institutes and private industries dealing in fisheries related activities to bring them together. The response received from fishermen, school children and general public was overwhelming.

III. VISION

VISION OF THE FISHERIES DEPARTMENT

The Department has set a vision for it last year and is working towards achieving the same. Some of these projects have been approved and work on them will be taken up as and when the budget is available.

VISIONARY PROJECTS:

i. Inland Riverine Cage Farming

There is vast scope to promote Inland Riverine Cage Farming in the State. Cage Farming of fish like Pompano and Sea Bass and mussel in brackish water will be taken up for culture to increase the Inland Fish Production.

ii. Reservoir Cage Fish Farming

Cultivation of *Pangasius* in the three major reservoirs and a number of smaller reservoirs will be taken up as potential resources.

iii. Fish Museum

The Department has a plan to build 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 for conservation of endangered Fishes.

iv. 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.

v. Ornamental Fish Farming:

Ornamental Fisheries has tremendous scope in Goa as well as for export. An ornamental Fish Farm shall be set up, which will motivate the Goan youth to take up this activity as an alternate source of livelihood or to support their ongoing activities.

vi. Aqua Marine Park: The Department also proposes to set up a marine park at Benaullim 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. PEOPLE AND EVENTS AROUND FISHERIES

1. Patrol Vessel



Inauguration of the Patrol Vessel on 28th August, 2014

2. Training Vessel



Inauguration of the Training Vessel on 20/02/2015

3. Control Room



Inauguration of Control Room at the Directorate of Fisheries, Panaji on 28th August, 2014

4. Aqua Goa Mega Fish Festival -Navelim



Aqua Goa Mega Fish Festival, Navelim held from 29th January to 01st February, 2015

5. Aqua Goa Mega Fish Festival -Mapusa



Aqua Goa Mega Fish Festival, Mapusa held from 6th to 9th February, 2015

6. MOBILE FISH STALLS



Inauguration of Mobile Fish stall on 25th February, 2015

7. RELEASE OF GOAN FISH TRAILS FOR A MILESTONE

For the first time the Department has brought out the overview of Fisheries activity in Goa, through its Yearly Publication “Goan Fish Trails”, which was released on 10/08/2014. The Publication was an effort to compile the achievements of the year and the future vision of the Department.



Release of Publication Goan Fish Trails – 2014 –Vol. I on 10th August, 2014

8. NARLI PURNIMA CELEBRATED

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



Narali Purnima Pooja 2014 celebrated on 10th August, 2014

9. SWACHA BHARAT

The Department is dedicated towards cleanliness and started its activities from the office itself. It actively participated in the launch of the Clean India Mission on 2nd October 2014, and then onwards abided by the mission of cleanliness on regular intervals.

10. PICNIC AS RECREATIONAL ACTIVITY

The first ever picnic of the Department of Fisheries was carried out at Betalbatim Beach on 15th November, 2014.

The recreational activity narrowed the hierarchical gap and brought all the staff on a common platform, enjoying the day, with fun, games, prizes, singing, dancing and knowing each other.



Picnic of the staff of the Department

11. MONTHLY MEETING OF THE FISHERIES STAFF

The Department reviews its activities every month through its monthly meetings held on 02nd of every month or in the next working day in case of a Public Holiday.

The Director being the Head of Department takes personal interest in this meeting. Here, the members discuss to find out suitable solutions to various work related problems. The members also feel free to express their suggestions and grievances which could be addressed directly to the Director.



Monthly Meeting of Fisheries Personnel

12. NEW APPOINTEES

The Department of Fisheries congratulates and welcomes all the newly appointed staff for the year 2014-15 to the Fisheries Family.

Sr. No.	Name of the Officer/Official	Designation
1.	Kum. Zigyasaben Patel	Asst. Supdt. of Fisheries
2.	Shri. Ravi Rodrigues	Fisheries Officer
3.	Kum. Dias Pearl Carmel	Fisheries Officer
4.	Shri. Deepak G. Kunkolikar	Marketing Inspector
5.	Ganpat Chari	Net Mending Instructor
6.	Shri. Dina Volvoikar	Store Keeper
7.	Smt. Nishi N. Naik	Fisheries Surveyor
8.	Shri. Anil T. Naik	Fisheries Surveyor
9.	Shri. Avinash Arondekar	Fisheries Surveyor
10.	Shri. Shamsundar Mishal	Fisheries Surveyor
11.	Shri. Sagar Ankush Naik	Fisheries Surveyor
12.	Miss. Rajeshri Gaonkar	Fisheries Surveyor
13.	Smt. Anita Madkaikar	Lower Division Clerk
14.	Shri. Sidhesh Naik	Lower Division Clerk
15.	Shri. Shivanand Surlakar	Wireless Operator
16.	Shri. Janardhan Naik	Wireless Operator
17.	Shri. Prajay P. Parulekar	Junior Deckhand
18.	Shri. Subhash Shetkar	Junior Deckhand
19.	Shri. Rajendra R. Degvekar	Peon

13. PROMOTIONS

The following staff got promotion during the year 2014-15:

Sr. No.	Name of the Officer/Official	Promoted To
1.	Shri. Ramdas Bandekar, Fisheries Surveyor	Fisheries Officer
2.	Shri. Govind Kelu Gaude, Lower Division Clerk	Upper Division Clerk
3.	Shri. Soccoro Sebastiao Pinto, Helper	Fieldman

The Department of Fisheries congratulates all the promotes and wishes all the best for their future endeavors.

14. RETIREMENTS

The following staff has retired on superannuation during the year 2014-15:

Sr. No.	Name of the Officer/Official	Designation
1.	Shri. Damodar Kudaskar (30/04/2014)	Store Keeper
2.	Smt. Benandita Fernandes (31/07/2014)	Office Supdt.
3.	Shri. Lakshuman Ambekar (30/09/2014)	Fisheries Surveyor
4.	Shri. Mangalmurthi Pokle (30/09/2014)	Marketing Officer
5.	Smt. Vandana V.N. Panvelkar (30/10/2014)	U.D.C
6.	Shri. Ramdas Bandekar (31/12/2014)	Fisheries Officer
7.	Shri. Purshottam Velgekar (31/12/2014)	Fisheries Surveyor
8.	Shri. Harichandra Gawas (31/12/2014)	Fieldman
9.	Shri. Ulhas Haldankar (31/12/2014)	Driver

The Department of Fisheries wishes them a healthy, happier and peaceful retired life with their family.

15. REMEMBRANCE IN MEMORY OF OUR BELOVED STAFF

*Memories are treasures that no one can steal but they can leave behind
an ache that no one can heal*



Shri. Rajendra Y. Naik,
Fisheries Officer
(Expired on 11/07/2014)



Shri. Shrikant Vaigankar
Driver
(Expired 17/07/2014)



PHOTO GALLERY OF AQUA GOA MEGA FISH FESTIVAL 2015









V. Statistics

The Directorate of Fisheries is having its own Statistical wing which collects raw data from the fish landing centres and carries out data processing. The Department has always strived its best to produce accurate data, which serves as a base for any planning process of the Organization.

In this following section the data on Fish Production, Export, Vessel Information etc. are depicted.

GOA FISHERIES AT A GLANCE 2014

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 2014 in operation	843
10.	No. of Motorized crafts registered upto 2014	1481
11.	No. of Non-motorized crafts registered upto 2014	900
12.	No. of registered nets upto 2014	7553
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 2014	
	Marine	128107
	Inland	3718
	Total	131825
17.	Value of fish landing during 2014 (in lakh Rs.)	
	Marine	110261
	Inland	5556
	Total	115817
18.	Export of Marine Fish Products (in tons) 2014	40365
	Value (in lakh Rs.)	51195

(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

Bardez	Tiswadi	Ponda	Canacona
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. Chorao	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

Name of the District/Landing Center (37)			
<u>North Goa (15)</u>		<u>South Goa (22)</u>	
<u>I Major (2)</u>		<u>I Major (3)</u>	
Malim Jetty, Bardez Chapora Jetty, Bardez		Khariwada Jetty, Vasco Cutbona Jetty, Salcete	Talpona Jetty, Canacona
<u>II Medium (4)</u>		<u>II Medium (9)</u>	
Siridao, Tiswadi Morjim, Pernem Siolim, Bardez Arambol, Pernem		CansaulimMormugao BainaMormugao VelsaoMormugao BenaullimSalcete	ColvaSalcete Cortalim Jetty-Salcete AgondaCanacona PalolemCanacona BetulSalcete
<u>III Minor (9)</u>		<u>III Minor (10)</u>	
Nauxi, TiswadiMandrem, PernemCalangute, Bardez Candolim, Bardez DonapaulaTiswadi CaranzalemTiswadi	CacraTiswadi NerulBardez AshvemPernem	Iizossim-Mormugao Majorda-Mormugao Bogmalo-Mormugao Cavellosim-Mormugao Varca –Salcete	Saleri-Canacona Nuvem-Matvem-Canacona Galgibag-Canacona Pollem-Canacona MashemCanacona

1.1 Major Species Wise Marine Production - 2005-2014(in tones)

Species\ Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Mackerel	12006	12244	19980	16597	15169	23831	22128	17860	12994	10308
Sardine	28246	30558	28574	34062	23496	23732	26391	34329	31629	80849
Cat fish	1303	2586	1821	1480	2279	1402	1545	364	383	598
Shark	1716	988	1007	1019	1329	3159	375	234	281	232
Seerfish	9556	3522	4407	3777	2285	1229	1844	1616	2751	1621
Shrimp	10599	9065	8642	7458	9795	9970	8008	8968	8380	9283
Pomfret	720	446	559	534	284	185	376	174	1342	643
Others	38941	36917	26195	23844	26050	23554	25518	23083	30224	24573
Total	103087	96326	91185	88771	80687	87062	86185	86628	87984	128107

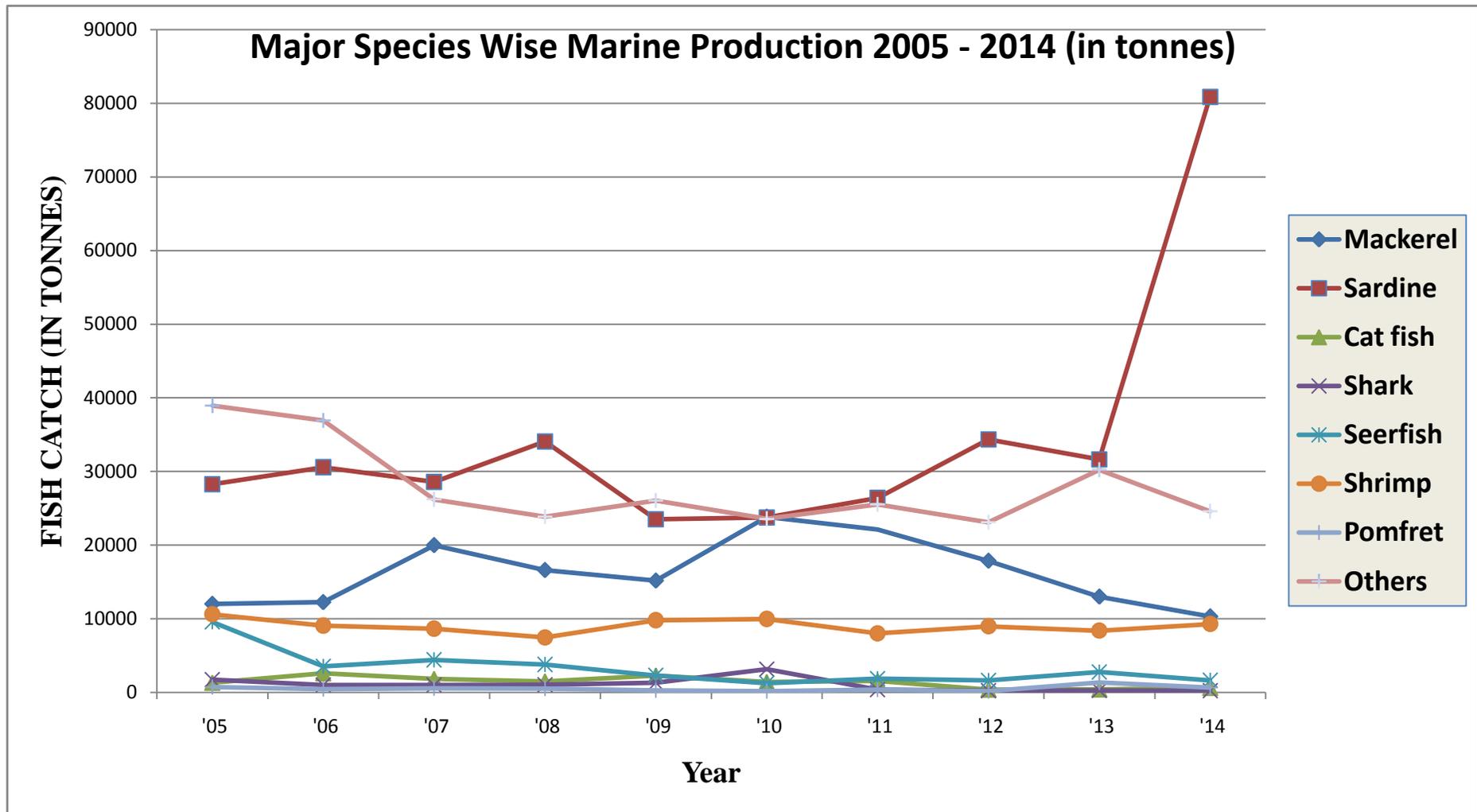


Fig. 1.1

1.2 Jetty Wise Marine Fish production From 2005-2014

(intones)

Year	Malim	Cutbona	Vasco	Chapora	Talpona	Others	Total
2005	20414	16445	31065	1585	418	33160	103087
2006	14378	17467	32102	904	425	31050	96326
2007	14756	14595	37373	1226	152	23083	91185
2008	16341	10027	34837	765	107	26694	88771
2009	17524	9386	29193	304	164	24116	80687
2010	15767	21857	28457	731	92	20158	87062
2011	10905	24879	27075	1507	150	21669	86185
2012	11194	31661	19567	1777	573	21856	86628
2013	24510	26589	17913	776	918	17278	87984
2014	22299	72351	14528	724	478	17727	128107

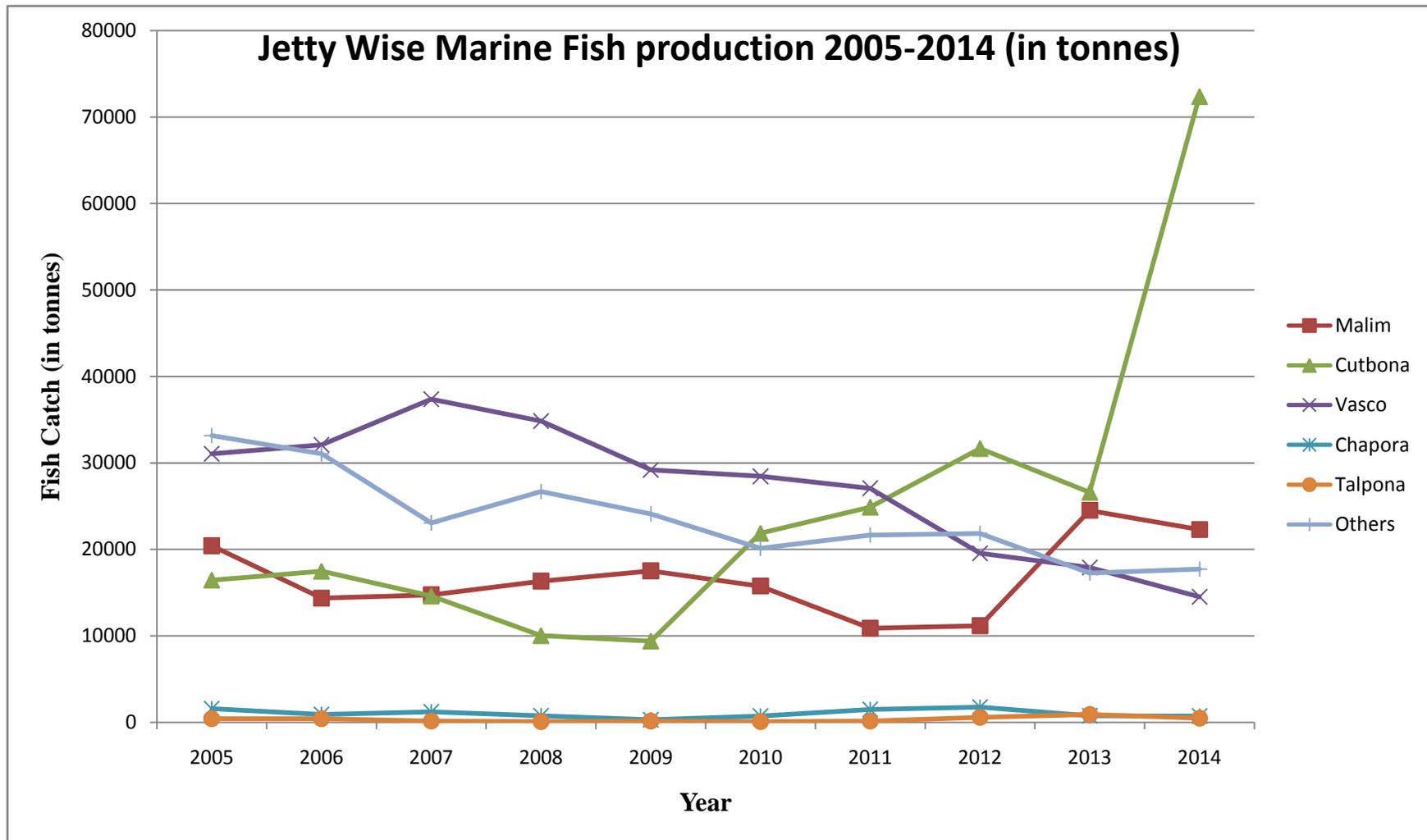


Fig. 1.2

1.3 Marine Fish production Trend From 2005-2014

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Fish Catch (in tons)	103087	96326	91185	88771	80687	87062	86185	86628	87984	128107

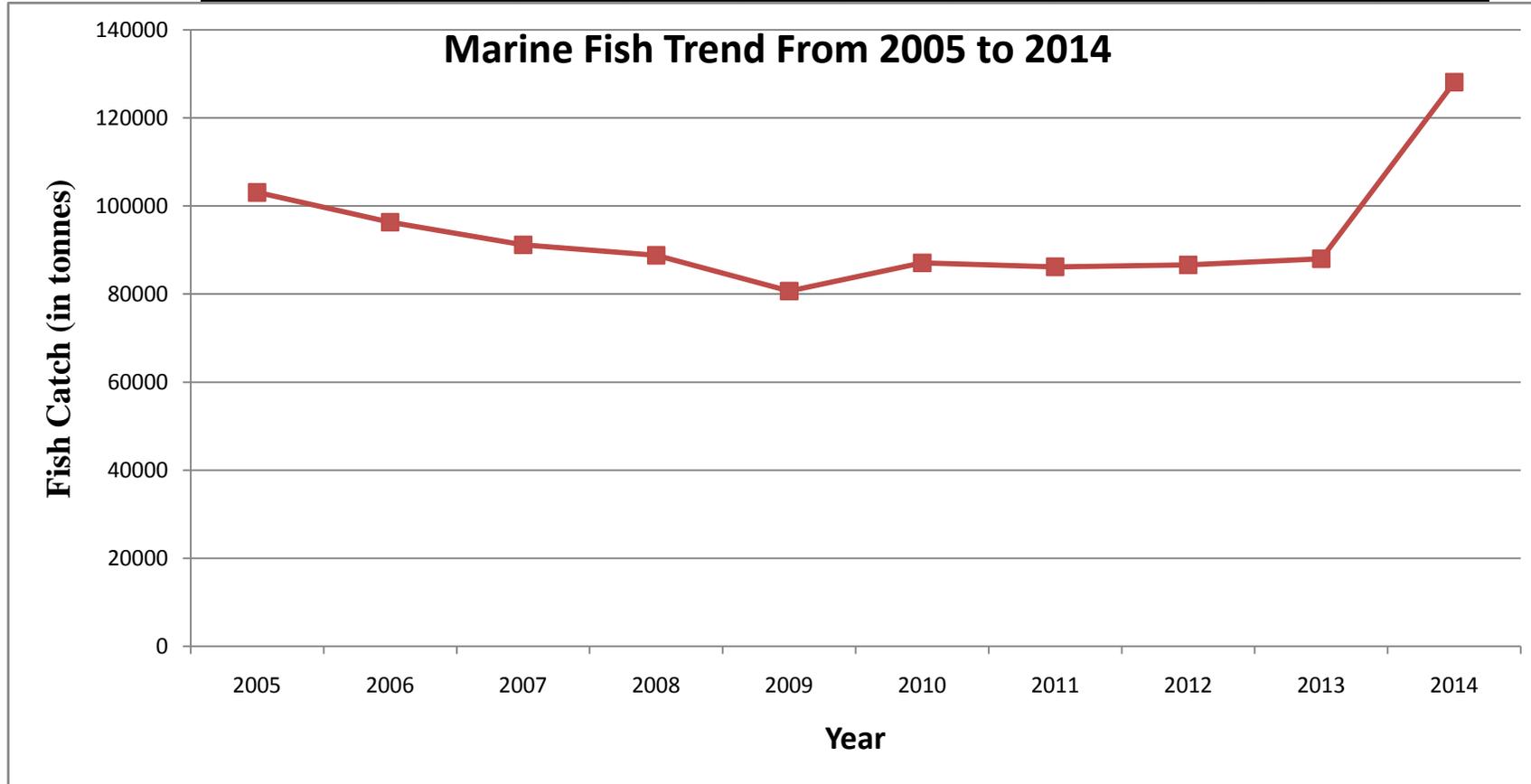
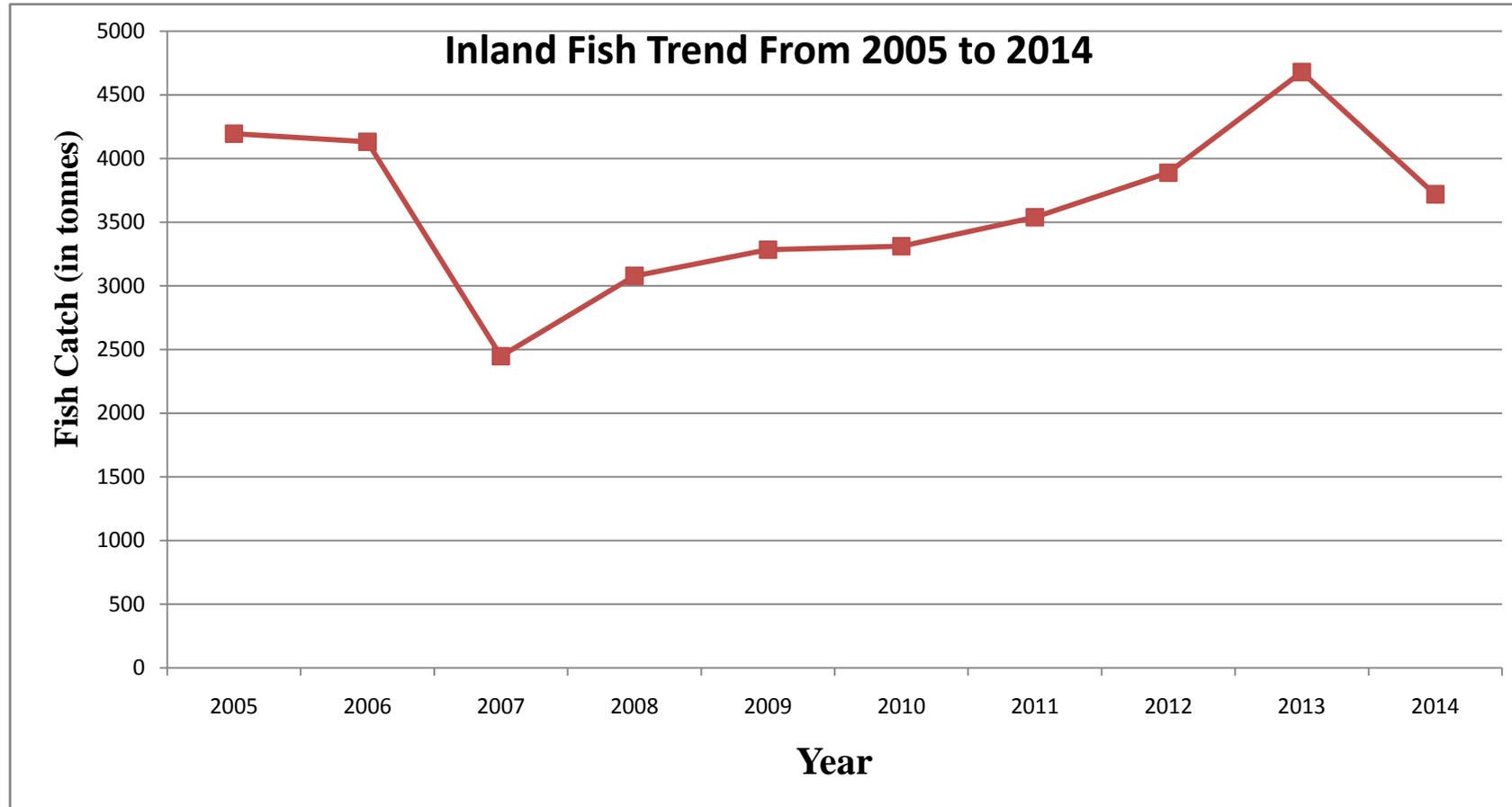


Fig. 1.3

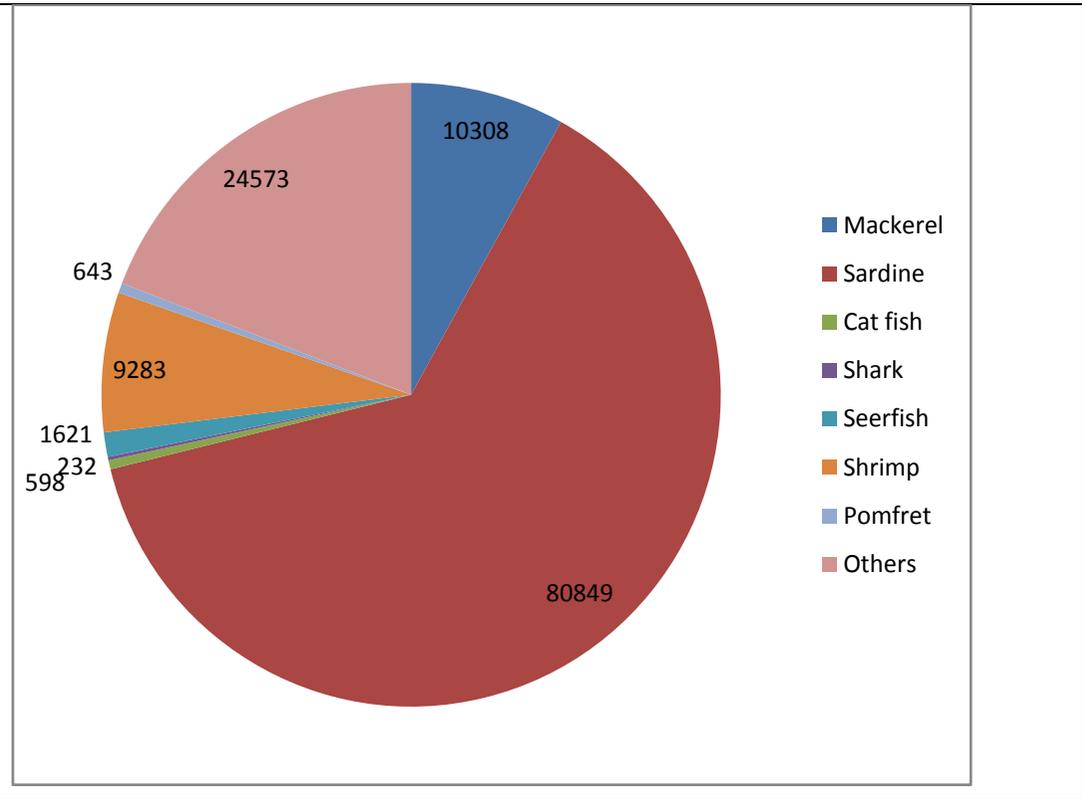
1.4 Inland Fish production Trend From 2005-2014

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Fish Catch (in tons)	4194	4131	2447	3077	3283	3311	3538	3887	4678	3718



1.5 Major Species Wise Fish production for the Year 2014 (in tonnes)

Sr. No.	Species\ Year	2014
1.	Mackerel	10308
2.	Sardine	80849
3.	Cat fish	598
4.	Shark	232
5.	Seerfish	1621
6.	Shrimp	9283
7.	Pomfret	643
8.	Others	24573
	Total	128107



1.6 Marine Fish Production of Goa for the period from 2005 to 2014 (in tons)

Sr. No.	Species	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
1	2	3	4	5	6	7	8	9	10	11	12
1	Mackerals (Bangdo)	12006	12244	19980	16597	15169	23831	22128	17860	12994	10308
2	Sardines (Tarlo)	28246	30558	28574	34062	23496	23732	26391	34329	31629	80849
3	Cat Fish (Sangot)	1303	2586	1821	1480	2279	1402	1545	364	383	598
4	Shark fish (Mori)	1716	988	1007	1019	1329	3159	375	234	281	307
5	Seer Fish (Wiswan)	9556	3522	4407	3777	2285	1229	1844	1616	2751	1621
6	Prawns (Sungtam)	10599	9065	8642	7458	9795	9970	8008	8968	8380	9283
7	Pomprets (Paplet)	720	446	559	534	284	185	376	174	1342	643
8	Cuttle Fish (Manki)	73	1919	330	2201	--	1941	1012	1180	4422	2150
9	Tuna (Bugde)	2459	589	1916	2095	1044	2524	3801	2621	3520	1368
10	Ribbon Fish (Balle)	5791	5354	1368	2551	558	839	49	644	1107	376
11	Reef Cod (Gobro)	--	--	--	276	--	1303	5	495	1409	1262
12	Kowalakowal (Velli)	854	724	226	455	395	279	438	562	1046	618
13	Golden Anchovy (Kapsale)	17	30	3	57	0	2	--	50	29	2
14	Silver Belly (Kampi)	2046	3187	1664	1688	1976	1584	1012	1146	3328	1991
15	Soles (Lepo)	2054	2339	1950	1795	1532	1606	3995	3683	2579	3982
16	Silver Bar (Karli)	849	435	251	336	637	219	62	98	54	121
17	Crabs (Kurlio)	994	1092	819	1021	1349	763	1236	1160	830	1256
18	Sciaenoids (Dodiario)	3211	2404	1938	2780	2207	1376	1448	1629	1425	1802
19	Butter Fish (Soundale)	598	892	615	655	1353	1116	978	656	594	676
20	Others	19995	17952	15115	7934	14999	10002	11482	9159	9881	8894
	Total	103087	96326	91185	88771	80687	87062	86185	86628	87984	128107

1.7 Inland Fish Production of Goa for the period from 2005 to 2014 (in tons)

Sr. No	Name of the Fish	Year									
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
1	2	3	4	5	6	7	8	9	10	11	12
1	Prawns										
a	Big	46	48	15	11	10	21	39	32	122	101
b	Medium	111	158	77	41	46	51	37	78	193	224
c	Small	716	979	811	571	618	333	285	361	405	373
2	Lady Fish	83	76	38	26	35	41	69	70	116	62
3	Mulletts	207	196	233	304	375	354	386	391	336	230
4	Gerres	80	70	79	81	96	102	128	100	110	63
5	Lutianus	45	37	5	7	7	16	37	44	55	55
6	Cat Fish	210	196	111	115	144	167	211	268	331	341
7	Anchovy	34	35	3	1	5	14	35	25	26	52
8	Pearl Spot	71	64	116	140	171	172	219	236	261	188
9	Betki	7	4	1	1	1	5	13	13	32	29
10	Milk Fish	1		30	26	33	39	65	52	61	18
11	Megalops	1		4	1	20	28	20	16	19	16
12	Scatophagus	31	33	36	37	45	54	75	42	81	54
13	Ambasis	92	88	9	27	48	32	65	69	131	128
14	Crabs	161	138	116	116	151	152	190	204	251	281
15	White/Black Water Clams	716	718	604	307	332	330	130	76	119	21
16	False Clams	163	155	70	360	158	555	592	442	759	442
17	Oysters	184	167	1	1	2	6	57	163	30	37
18	Mussel	464	358	88	113	-	1	11	9	24	33
19	Lepo	--	--	--	--	--	2	2	5	11	7
20	Indian Salmon	--	--	--	--	--		--	--	--	0
21	Balle Reddish	--	--	--	--	--	1	25	--	--	2
22	Sciaenoids	--	--	--	--	--		--	--	--	
23	Others(Palu)	6	4	--	--	--	15	--	--	30	16
24	Others(Vagolem)	--	--	--	--	--	--	--	--	--	
25	Others(Leather Jackets)	--	--	--	--	--	--	--	--	--	
26	Others(Buyari)	--	--	--	--	--	--	--	--	--	
27	Miscellaneous	765	607	--	791	986	820	847	1191	1175	945
	Total	4194	4131	2447	3077	3283	3311	3538	3887	4678	3718

Export of Marine Fish and Fishery Products

Q: Quantity in M.tones

V: Value in Rs. lakhs

Sr. No	Item		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
1	Fr. Shrimps	Q	--	--	19	15	--	--	--	--	297	2165
		V	--	--	35	25	--	--	--	--	1084	11312
2	Fr. Cuttle Fish	Q	642	628	224	839	1772	229	991	3802	2805	4817
		V	383	598	256	888	2034	200	2132	6958	4329	9146
3	Fr. Squids	Q	--	22	49	486	654	3095	1342	2288	4721	4583
		V	--	18	65	493	462	2995	1876	3995	7713	6685
4	Fr. Fresh Fish	Q	--	--	12259	10904	18644	27327	--	--	--	--
		V	--	--	4645	6043	11697	18626	--	--	--	--
5	Fr. Tuna	Q	--	--	--	--	--	--	--	27	55	274
		V	--	--	--	--	--	--	--	025	53	278
6	Ribbon Fish	Q	4243	5961	--	--	--	--	6415	6770	8142	5445
		V	1683	1618	--	--	--	--	6657	692	11143	6912
7	Indian Mackerels	Q	1443	2358	--	--	--	--	16817	9252	8410	11411
		V	778	1251	--	--	--	--	12901	9576	9667	11164
8	Reef Cod	Q	430	287	--	--	--	--	941	444	1258	184
		V	127	144	--	--	--	--	442	298	770	137
9	Fr. Seer Fish	Q	727	132	--	--	--	--	294	147	-	24
		V	604	304	--	--	--	--	491	297	-	59
10	Fr. Assorted Fish	Q	380	--	--	--	--	--	--	--	-	9834
		V	177	--	--	--	--	--	--	--	-	4295
11	Other fishes	Q	3138	4729	5717	9289	5939	6561	11029	19945	8251	228
		V	2426	3366	4335	12334	5370	7070	8626	9849	6422	187
12	Dried Fishes	Q	--	--	--	--	--	--	--	--	--	1400
		V	--	--	--	--	--	--	--	--	--	1020
	Total	Q	11002	14117	18268	21533	27009	37212	37829	42675	33939	40365
		V	6178	7299	9336	19783	19563	28891	33125	37918	41181	51195

TOTAL CANOES REGISTERED FOR THE YEAR 2014-15

CANOES REGISTERED IN BARDEZ	NOS
REIS-MAGOS	1
CARMULIM	2
SIOLIM	1
MALIM	2
CALANGUTE	6
NERUL	5
CHAPORA	1
ANJUNA	1
TOTAL=	19

CANOES REGISTERED IN CANACONA	NOS
PALOLEM	7
POIGUINIM	3
COLOMB	3
PATNEM	2
NUVEM	2
DINDIBAG	1
AGONDA	5
TOTAL=	23

CANOES REGISTERED IN TISWADI	NOS
BAMBOLIM	2
AGASSAIM	1
RIBANDAR	1
TALEIGAO	3
DONA PAULA	5
SIRIDAO	4
CHORAO	1
TOTAL=	17

CANOES REGISTERED IN VASCO	NOS
CORTALIM	2
DESTERRO	1
KANTEM BAINA	2
BOGMALO	5
VELSAO	1
TOTAL=	11

CANOES REGISTERED IN PERNEM	NOS
ARAMBOL	10
MORJIM	8
TEREKHOL	1
MANDREM	1
QUERIM	1
TOTAL=	21

CANOES REGISTERED IN SALCETE	NOS
COLVA	3
BENAU LIM	3
VELIM	1
TOTAL=	7

CANOES REGISTERED IN SATTARI	NOS
VOLVOI	1
TOTAL=	1



Total Motorized and Non-Motorized Canoes upto 2014

Sr. No.	Taluka	Mechanized	Non-Mechanized	Total
1	Bardez	337	191	528
2	Tiswadi	277	160	387
3	Salcete	100	113	213
4	Vasco	436	192	628
5	Canacona	194	179	373
6	Pernem	133	55	188
7	Ponda	04	10	14
	Total	1481	900	2331



Taluka wise fishing gears registered upto 2014

Sr. No	Type of gear	Tiswadi	Bardez	Ponda	Pernem	Canacona	Mormugao	Salcete	Total
1	Sea gill net	793	750	25	290	640	1042	368	3908
2	Sea cast net	1	7		5	36			49
3	River gill net	78	54	48	18	12	10	37	257
4	River cast net	1	31	2	16	15	2		67
5	Rampon net	14	5			8	5	26	58
6	Drag net	26	48			5	62	21	162
7	Purse-seine net	84	59			1	92	193	429
8	Trawl net	418	392		21	18	358	364	1571
9	Barrier(Futauni)	69	57	72	6	36	48	46	334
10	Sluice gate	23		13		6	9	10	61
11	Stake net	79	49	85	8		6	194	421
12	Kadsari net			6					6
13	Other net	101				3	10		114
14	Ormol net	16					22		38
15	Singel net	8					70		78
	Total	1711	1452	251	364	780	1736	1259	7553

No. of Vessels operated at major Landing centers

The approximate number of fishing trawlers in operation at major landing centers during 2014.



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

SOLAR SHRIMP FISHERY ALONG GOA COAST

- DR. SHAMILA MONTEIRO, DIRECTOR OF FISHERIES,
DIRECTORATE OF FISHERIES, GOVERNMENT OF GOA.



Shrimps form an important component of the marine fisheries of India. Since early 1960s, the Indian shrimps have found a place in the export market fetching substantial foreign exchange. The high demand for shrimps in the international market, has led to the indiscriminate exploitation of all the shrimp species. Although penaeid shrimps are found in all the seas of the world upto sub-polar latitudes, their distribution is mainly confined to the tropical and sub-tropical waters and the most productive grounds are in the tropics. The coastal shrimp of the world belong to about forty species, divided into six genera. In India the important genera are the *Penaeus*, *Metapenaeus* and *Perapenaeopsis*.

Species belonging to the genus *Metapenaeus* are distributed throughout the Indo-Pacific region. The commercially important species occurring in Indian Ocean are *M. monocerous*, *M. affinis*, *M. kuchensis* and *M. dobsoni*. These species have two phases in the life cycle, one the estuarine phase of post-larvae and juvenile and the marine phase of sub-adults and the adults. The spawning invariably takes place in the sea.



The most important species of penaeid shrimp caught along the Goa coast is *Metapenaeus dobsoni*. In Goa, it is popularly known as the **Solar shrimp**. This species is very important to the entire fishing industry, both traditional and mechanized sectors. It is the most sought after species during the south-west monsoon months. However, its fishery is facing challenging problems of sustainable exploitation and management.

M. dobsoni locally called Solar by itself supports the fishing industry during south-west monsoon months of July and August. During this period the shrimps are caught in large quantities primarily by mini purse-seines operated by motorized canoes and purse-seiners. The catch is dominated by mature impregnated larger size females.

The very fact that these shrimps are caught by surface fishing gears with least effort may be due to the severe environmental factors that are prevailing in the near-shore areas of the Goa coast during the south-west monsoon months, forcing the shrimps to move away from the deeper waters to the surface waters. The bottom waters of the Goa coast are deficient in oxygen during monsoon period. During the monsoon months the low-oxygen bottom layer ascends on to the shelf waters along the west coast of India. As a result of the upwelling, a band of shelf bed along the south-west coast is overlaid with poorly aerated water. The demersal fish and shrimp migrate either to deeper waters or to shallower areas of the shelf. This may be the reason for forming large shoals of Solar shrimps during this period in the inshore waters of Goa coast and are caught in large quantities very close to the shore.

It was also observed that the fishing grounds of Solar shrimp during the monsoon period of July and early August were only along south Goa coast. It was also observed in the present study that during both the periods of the study, the catches of the Solar shrimp slowly started to drop from September onwards and the larger size group started to disappear. The Solar shrimp then made their appearance again in a smaller proportions in the trawl catches from November upto January along with other shrimps like *M. monoceros*, *P. stylefera* and other species of *Metapenaeus* and *Penaeus*. The Solar shrimp caught during this period were, however, smaller in size. From February to May, the Solar shrimp catches again started to dwindle and were caught mostly by trawlers along with other miscellaneous shrimps and fish species at depths of less than 10 m. These are comprised largely of immature females. However, males from the April - May trawl samples, although small in size, were mature.

THE IMPORTANCE OF STATISTICS IN FISHERIES

PLANNING – An Overview

**BY SHRI. SAMIR R. KORGAONKAR, STATISTICAL ASSISTANT,
DIRECTORATE OF FISHERIES, GOVERNMENT OF GOA.**



In a democratic system of a Government, equipped with the modern administrative system, the bureaucracy plays a very vital and crucial role. Indian bureaucracy in a total Administrative set-up, fulfills the need of a well organized structure to apply its policies in a concrete situations.

Fish is rightly said as a protein rich food and as per the directive principles of the State Policy it is the duty of the state to raise the level of nutrition and the standard of living of its people and to improve public health, which serves as a primary duty.

For this planning to ensure sustainable development of marine fisheries with due concern for ecological integrity and bio diversity is a need of the hour. The Fisheries Management in India is categorized into management of Fisheries in the EEZ and in the territorial waters. The Government of India, holds its jurisdiction over the Fisheries in the EEZ, while the state Government have jurisdiction over Fisheries in the territorial waters.

As a matter coastal security, the Government of India has taken up e-registration of the fishing vessels through the state Fisheries Departments, which will serve as a common platform for database which will serve as a tool on the planning of Fisheries, which will intently prove its solidarity in control and surveillance mechanism. Further, the Central Government starting from this year onwards i.e. 2015 has also introduced a uniform ban period along its coastline viz from 1st June to 31st July. India being a Federal structure of Government privileges its own integrity for betterment of its policies for planning in a broader aspect and having its own comprehensive Marine Fishing Policies and guidelines. It is having its own national committees, constituted for effective implementation of the provisions headed from different coastal states.

The outcome of such integrity places India as the 2nd largest producer of fish in the world with a share of 5.68 % of the Global total and contributing a value of Rs. 30,213 Crore through exports during 2013-14, as per the FAO statistics. The country having a coastline of 8118 Kms. with an Exclusive Economic Zone of 2.02 million Sq. Km. shows a immense growth potential in the sector. In overall the Fisheries sector accounts for 0.83 percent of total GDP and 4.75 percent of the Agriculture Sector GDP at current prices for the year 2012-13.

Coming back to the state province of the Traditional waters, Goa has remarked its significance to generate substantial employment in the sector, towards production, processing, storage, transport and marketing of the Fish.

Having a coastal length of 104 Kms. and Inland water ways of 250 Kms. the potentiality of Goa has been significantly planned to bring prosperity to the people in the state. By looking at the Fisheries Statistics, printed on this book, the substantial growth of the average fish production being increased over the no, of years, remarks the domain of its bureaucracy in adhering its policies in maintaining pace with the growing needs and available resources. The State Government has geared up its activities towards sustainability, an example of which was demonstrated by the Fisheries Department in the open sea cage culture and is in the process of augmenting its resources in the inland cage culture, thus increasing the fish production on scientific basis.

The State Fisheries Department has shown its sincere efforts to balance the ecological integrity and bio-diversity in its territorial waters, thereby focusing more on the 'Development; of the sector, by means of recognizing the conservation and management of Fisheries Resources and to arrest the soaring of its exploitation.

The Role of Statistics in planning Fisheries Sector is dignified through the Fisheries Policies, Statistics on Fish Production, No. of Fishing Villages, Population of Fishing Community, Fishing Co-operative Sector, Marketing of Fish and Fish Products etc. which formulate together to move towards a common goal of upliftment of this sector.

To conclude, I would say that every person who joins in this statistical activity actually contributes towards the country in nation building, by giving a output towards formulations of policies by the Government to the people. Any work a Statistician does should never be underestimated, as it is rightly quoted by Lt. Robert A. Heinlein, an American science fiction writer as "There is no such thing as luck; there is only adequate or inadequate preparation to cope with a Statistical Universe".

**CONSERVATION AND MANAGEMENT OF PAPHIA
MALABARICA CHEMNITZ (TISREO): AN EDIBLE CLAM**

**DR. SMITA A. MAZUMDAR, SUPERINTENDENT OF FISHERIES,
DIRECTORATE OF FISHERIES, PANAJI GOA**



Introduction

Paphia malabarica forms an important fishery in Goa. The species is locally referred to as “tisreo” (Plate I). *Paphia malabarica* is a traditional staple food for the local population for its nutritional values especially high protein content. *Paphia* is available round the year with variable quantities depending on the seasonal variation in production. A large section of the fishermen depends on the sale of *P. malabarica*. Harvesting of *Paphia* is done by hand, feet, hand-operated scoop net or with the aid of a small hand-held digging stick (Plate II). The collectors work for three to four hours a day at ebb period. Small non-mechanized crafts are normally used for collection from deeper waters and for transport of clams from the collection site to the villages.



Plate I: External shell view of *P. malabarica*



Plate II: Various tools used for collection of *P. malabarica*

Various studies from the coastal Karnataka, Goa, Kerala and Maharashtra show that temperature, salinity, food etc. influence the productivity, average shell size and nutritional content of *P. malabarica*. Studies on allometry (shell dimensions), biochemical/ antioxidant properties and metal composition of soft tissues from Mandovi and Zuari estuaries (Goa) may help in improving the knowledge gap and assist the fisheries as well as the research and consumer community to develop sustainable management strategies relevant to clam, particularly *Paphia* fisheries. Owing to economic and food value, sustainable growth and harvesting of *Paphia malabarica* are extremely important.

Management of clam beds

Management of natural clam beds is an important practice for long term sustainability. Annual survey of clam beds gives information on the abundance of clam in each bed. It also

helps in providing continuous monitoring of beds to investigate the temporal changes of the population. Hence regular monitoring of *P. malabarica* beds has to be carried out. Drastic change in factors like temperature, salinity, food, diseases and pollution may adversely influence the health of clams and results in mass mortality. Hence, these factors should be regularly monitored. Mining/industrial and sewage effluents into the estuarine complexes of Mandovi and Zuari rivers of Goa may harm the production as well as quality of *P. malabarica*. Hence, water quality of any ecosystem should be protected and conserved. Regular monitoring of water quality for metal contamination should be carried out to avoid health hazards. Proper database on the resource availability of *P. malabarica* and their utilization pattern should be carried out.

Overfishing

Overexploitation is one of the major problems in fishery throughout the world. In many cases, the rate of harvesting exceeds the natural rate of renewal, resulting in biological overfishing. Such overexploitation may lead to depletion of clams. In an overexploited stock, the number of adults may be reduced to a level where reproduction is unable to replace the numbers lost (recruitment overfishing) or large numbers of individuals may be caught at too small size (growth overfishing) to maximize yield. Hence overexploitation of undersized/smaller *P. malabarica* should be avoided. Limited fishing activity during breeding season (September to January) of *P. malabarica* will allow the young organism to grow to a marketable size. It is suggested that a proportion of reproductively mature individuals 40-50 mm in length be left in the population to allow breeding to take place.

Culture

Owing to the natural abundance of the seeds of *P. malabarica* and its demand in the local market, culture of this species should be attempted on a large scale in estuaries which will increase the yield. A high yield has been reported following “on-bottom” and “transplantation” culture method respectively.

STEPS INITIATED BY THE DIRECTORATE OF FISHERIES

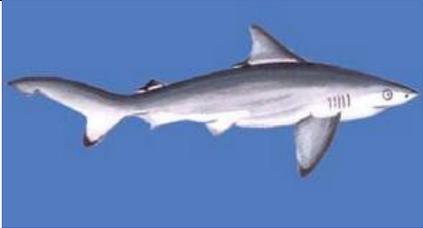
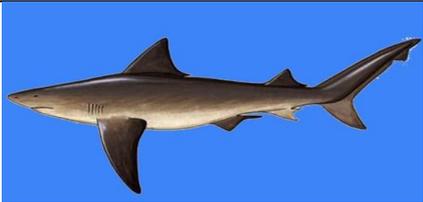
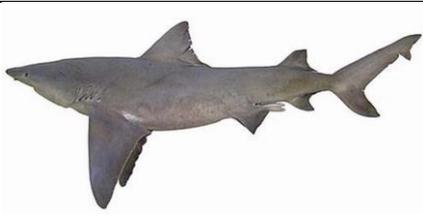
TO CONSERVE THE BAN SPECIES OF SHARK

BY SHRI. CHANDRAKANT VELIP ,SUPDT OF FISHERIES,

DIRECTORATE OF FISHERIES, PANAJI GOA



The Government of India, under Ministry of Forest and Environment has banned killing of certain species of shark under the Wild Life Protection Act 1972. The Species of shark were added to the Schedule under the Wild Life Protection Act 1972 vide Notification dated 5th December 2001.

Scientific Name	Common Name	Photo
Rhincodon types	Whale Shark	
Anoxypristis cuspidate	Pointed sawfish	
Carcharhinus hemiodon	Pondicherry Shark	
Glyphis gangeticus	(Ganges Shark)	
Glyphis glyphis	(Spear tooth Shark)	

Himantura fluviatilis	Ganges Stingray	
Pristis microdon	large tooth sawfish	
Pristis zjisron	long Comb Sawfish	
Rhynchobatus djiddensis	Giant Guitarfish/White Spotted Shovel Nosed Ray	
Urogymnus Asperrimus	Porcupine Ray /Thorny Ray	

(Source: Identification Manual cum Practical Field Guide to Fishes, Listed in Schedules of Wildlife Protection Act, 1972(March- 2006, Wildlife Regional Office, Western Region, Mumbai, Ministry of Environment & Forests, Government of India))

The Department of Fisheries has circulated copies of photographs of the banned species of Shark to all the Fisheries Co-operative Societies/ Association to distribute to their members so that the fishermen are aware and will not catch the banned species of Shark. The fishermen have also been instructed to release the shark species in sea if accidentally caught in the fishing nets.

Further the fields Officials of Department of Fisheries are also instructed to make fishermen aware about the banned species of shark and report to the Department about the catch of ban species of shark if any, on the fish landing center. In respect of Notification dated 6th January 2015 issued by The Ministry of Commerce and Industry, Department of Commerce,

Government of India for prohibition on export of shark fins of all species the Department has circulated the copy of notification to the entire fisherman cooperative Societies of State so that the fisherman are aware about the ban of export of shark fin. The Marine Product Export Development Agency has been requested to inform the fish processing units the prohibition on export of shark fins of all species of shark.

**Directorate of Fisheries****Government of Goa**

Dayanand Bandodkar Marg, Panaji Goa

Tel: (O) 2224838, Tel: (Dir) 2227780

Fax: (0832)2231049

Email: dir-fish.goa@nic.in**Employee Directory**

Sr. No.	Name	Designation	Contact No.
1	Dr. Shamila Monteiro	Director of Fisheries	9326125026
2	Shri. Chandrakant D. Velip	Supdt. of Fisheries	8007511717
3	Dr. Hrishikesh Pawar	Supdt. of Fisheries	9922353425
4	Dr. Smita Mazumdar	Supdt. of Fisheries	8806086860
5	Smt. Megha Kerkar	Supdt. of Fisheries	9420162084
6	Smt. Manisha Gaonkar	Assistant Accounts Officer	9158056391
7	Pramodini P Mardolkar	Office Supdt.	9158372625
8	Chandan A Shirodkar	Asst. Supdt. of Fisheries	9270067014
9	Zigyasaben Shankar Patel	Asst. Supdt. of Fisheries	8407973579
10	Preetam Baburay Naik	Asst. Supdt. of Fisheries	08322224838
11	Chandresh P. Haldankar	Asst. Supdt. of Fisheries	9764480663
12	Judith F Lobo	Head Clerk	9823213129
13	Hazel Almeida	Accountant	9921367879
14	Rosario Estevas Botelho	Stat. Asst.	9822984134
15	Francisco Victor Dos Milagres de souza	Stat. Asst.	9767807634
16	Samir R.Korgaonkar	Stat. Asst.	8888687764
17	Shailesh M Tari	Investigator	9922537646
18	Sanchita Nagvekar	Investigator	9049170956
19	Hanumant M Vaingankar	Fisheries Officer	9922353425
20	Pundalik K Naik	Fisheries Officer	9765791442
21	Vishnu S Harmarlikar	Fisheries Officer	9823945123
22	Agnelo D Melo	Fisheries Officer	7507639755
23	Prakash S Morje	Fisheries Officer	9923852588
24	Gurudas A Kerkar	Fisheries Officer	9423883241
25	Mahesh V Korgaonkar	Fisheries Officer	9923319025
26	Bhanudas T Madgaonkar	Fisheries Officer	9822031147
27	Dr. Sunita Rupesh Pauskar	Fisheries Officer	9850764554
28	Pradeep M. Gawas	Fisheries Officer	9403175091
29	Ravi Rodrigues	Fisheries Officer	9921948844
30	Dias Pearl Carmel	Fisheries Officer	08322224838
31	Roshini Ulhas Naik	Jr. Technician	9764243587
32	Shamrao R Raikar	Lab Assistant	9923159494
33	Prakash P Kawthankar	Mech. Instructor	9822981836
34	Dina Narayan Volvoikar	Store Keeper	9049600907
35	Deepak Kunkolikar	Marketing Inspector	8806624355
36	Kshama Navelkar	Junior Stenographer	9423075353
37	Roshan R Taluanekar	UDC	9049270608
38	Joao F C Mascarenhas	UDC	8322787090
39	Gauri R Golatkar	UDC	9049481636
40	Govind K Gawde	UDC	9764864284
41	Ines Rodrigues	UDC	9527491970
42	Uday Y. Kamat	UDC	9923748915
43	Pallavi V S Dangui	UDC	9850183385
44	Sameer S. Parab	LDC	8390829693
45	Lavu C. Gauns	LDC	7774953547
46	Ujwala V. Naik Sirodkar	LDC	9860032006
47	Umesh Dattatray Kulkarni	LDC	8411025887
48	Sidhesh Naik	LDC	9823454593
49	Anita Madkaikar	LDC	9637017392
50	Richard Raicar	LDC	9765468413
51	Prajakta A. Haldankar	LDC	9823987389
52	Steffi Melissa Pires	LDC	9822518207
53	Frida Severina Barretto	LDC	7721889747
54	Renisha Cardozo	LDC	8805232307
55	Prathamesh Shirodkar	LDC	9881211999
56	Sonia A. Naik	LDC	8975101221
57	Damodar Kalangutkar	LDC	7588454082
58	Gaston DA Silva	LDC	9011124435

59	Florence I Rebello	Wireless Operator	8411993438
60	Janardhan H. Naik	Wireless Operator	8007382769
61	Shivanand Surlakar	Wireless Operator	8408872613
62	Ramesh Gawas	Wireless Operator	9552080099
63	Anant Satardekar	Driver	9421087353
64	Govind Z Naik	Driver	9881744298
65	Subhash R Salgaonkar	Driver	9049018315
66	Satish B Gawas	Driver	9420744956
67	Lenin Aguiar	Driver	9823672438
68	Keshav R Dessai	Engine Driver	9822048383
69	Edward A Pereira	Fisheries Surveyor	9922623011
70	Alec Dsouza	Fisheries Surveyor	9604033152
71	Madhu H Gokarnkar	Fisheries Surveyor	9923962981
72	Divakar A Korgaonkar	Fisheries Surveyor	9423837493
73	Mahesh N Volvoikar	Fisheries Surveyor	9922598437
74	Vipul V Mapari	Fisheries Surveyor	8806407880
75	Uday Waman Khanolkar	Fisheries Surveyor	9422018550
76	Saby Moraes	Fisheries Surveyor	9763555380
77	Harish Rohidas Prabhu	Fisheries Surveyor	9545225033
78	Nishi Navin Naik	Fisheries Surveyor	9860435071
79	Anil T. Naik	Fisheries Surveyor	9823137561
80	Avinash Arjun Arondekar	Fisheries Surveyor	8806753314
81	Sagar Ankush Naik	Fisheries Surveyor	7798889240
82	Rajeshri Santosh Gaonkar	Fisheries Surveyor	9923850398
83	Subhash Laxman Gaonkar	Fisheries Surveyor	9579302298
84	Lavkush Krishna Malik	Fisheries Surveyor	9673549177
85	Mahadev Vithu Gaonkar	Fisheries Surveyor	9420158813
86	Kalpesh Kamlakar Gaonkar	Fisheries Surveyor	9764937170
87	Vedanand Shirodkar	Fisheries Surveyor	8308364110
88	Kishen Rama Borcar	Fisheries Surveyor	8411953837
89	Saily Subhash Korgaonkar	Fisheries Surveyor	9673257293
90	Vishal Nanu Pagi	Fisheries Surveyor	9764682588
91	Nikhil Narayan Betkikar	Fisheries Surveyor	7038474124
92	Ankush Govind Shirodkar	Fisheries Surveyor	7798124462
93	Bablo Narayan Kalangutkar	Fisheries Surveyor	9823352145
94	Damodharan L. Naik	Fisheries Surveyor	9923843930
95	Prathamesh P. Khandeparkar	Fisheries Surveyor	9673272527
96	Vinayak Jaywant Pednekar	Fisheries Surveyor	8806474529
97	Shenia Sabrina Coutinho	Fisheries Surveyor	9923033457
98	Rajesh Dhruva Nechkankar	Fisheries Surveyor	9765973713
99	Seema S. Shet Dessai	Fisheries Surveyor	9850104424
100	Janhavi Tukaram Redkar	Fisheries Surveyor	8805247089
101	Nitin Jotiba Anandache	Fisheries Surveyor	9673601030
102	Sujay Jiva Dessai	Fisheries Surveyor	9665216551
103	Krishna Nandkishore Naik Shirodkar	Fisheries Surveyor	7798676067
104	Shyamsundar Mishal	Fisheries Surveyor	7588674297
105	Deelip B. Gawandi	Fisheries Surveyor	9923635200
106	Domingo Fernandes	Fisheries Surveyor	9421246892
107	Devanand Lone	Fisheries Surveyor	9823679921
108	Amogh Mahavarkar	Fisheries Surveyor	9960365724
109	Jaganath S Gaonkar	Bosun	9890468748
110	Narayan Zilu Naik	Bosun	8275622373
111	Ganpat Shivram Chari	Net Mending Instructor	9765157218
112	Sidesh R Kerkar	MECH.GR.I (DIESEL)	9421248792
113	Dinesh S Naik	MECH.GR.II (Ref.)	9423061334
114	Bhalchandra P Parwar	Carpenter	9823261103
115	Surendra R Shirodkar	Asst. Electrician	9423060826
116	Prajay P Parulekar	Junior Deckhand	8421137017
117	SubhashS Shetkar	Junior Deckhand	9623325335
118	Vishnu S Govenkar	Junior Deckhand	9767017910
119	Gokuldas U Tari	Junior Deckhand	9822904320
120	Somnath P Harlarnkar	Junior Deckhand	9975492818
121	Sudhakar P Pagui	Junior Deckhand	9158507173
122	Vikas Faldessai	Junior Deckhand	9822882455
123	Anand V Gaude	Junior Deckhand	9673243231
124	Rohidas K Naik	Junior Deckhand	9765948302
125	Premanand V Kalangutkar	Junior Deckhand	9423883043
126	Pravinder V Lone	Junior Deckhand	9923478888

127	Kamlakant G Gaude	Junior Deckhand	9422845037
128	Anand C Naik	Junior Deckhand	9158345953
129	Gopal G Zuvatkar	Junior Deckhand	9923040949
130	Rohan D Morajkar	Junior Deckhand	9923880829
131	Nitin S. Sawant	Junior Deckhand	9923348696
132	Sameer S. Velip	Junior Deckhand	8390829693
133	Illo D Gawde	Junior Deckhand	7798555061
134	Anay Rajanikant Halarnkar	Jr. Deckhand	9860314936
135	Hari Fati Palyekar	Jr. Deckhand	7798104790
136	Gopal Devraj Naik	Jr. Deckhand	9881779052
137	Indur R Kankonkar	Fieldman	08322224838
138	Pravin N. Shirodkar	Fieldman	8888632301
139	Prasanna Y Pagi	Fieldman	9763741525
140	Shashikant P Pagi	Fieldman	9923749464
141	Flavio Fernandes	Fieldman	9822689563
142	Siddarth T. Mishal	Fieldman	08322224838
143	Vidhyanand S Phadte	Fieldman	08322224838
144	Rahul R. Tari	Fieldman	9049245236
145	Soccoro Pinto	Fieldman	9921879257
146	Bhupal U Phadte	Peon	9881732250
147	Shobha B Parab	Peon	9637749551
148	Suresh A Mahale	Peon	9527165272
149	Sudha P Gaude	Peon	9764775953
150	Gauri V. Chodankar	Peon	8390203141
151	Prabhakar Jairam Shetgaokar	Peon	9423154373
152	Rajan Rama Digvekar	Peon	7507846568
153	Filipe Colaco	Peon	8380958978
154	Pritam Shirodkar	Peon	9822824456
155	Rajendra Naik	Peon	9823783647
156	Gangaram Rathod	Peon	8550900815
157	Norman Pires	Peon	8308765217
158	Niella Fernandes	Peon	8888184392
159	Ibrahim Saha	Watchman	9822686515
160	Chandrakant Y Gaonkar	Watchman	9420746729
161	Atmaram S Naik	Watchman	9623371523
162	Narayan G Naik	Watchman	8407929658
163	Sambhaji G Sawant	Watchman	9420897288
164	Vaibhav V. Tamposkar	Watchman	9823188233
165	Ratnakar Jairam Kanolkar	Watchman	9923651057
166	Filomeno Henry Columbano Carvalho	Helper	9881882360
167	Pramila Shirodkar	Sweeper	08322224838
168	Joaquim S Sequiera	Messenger	9850456585
169	Mohan E Garudi	Messenger	9226792539
170	Ragunath D Gaonkar	Messenger	08322224838
171	Xavier Simoes	Messenger	9763133103

****This yearly publication of the Directorate of Fisheries is not for sale. Matter from this Publication may be used without prior permission, but source has to be acknowledged by the user. ****