

MARINE FISHERY ADVISORY SERVICES

22 May 2024

Naga Swetha, INCOIS Hyderabad

Fishing in the History

- ❑ Sea as one of the main sources of food for humans
- ❑ Fishing is one of man's oldest activities
- ❑ Fishermen always tried to find out where marine mammals are available and catchable
- ❑ Fishermen search for the fish shoals with a lot of efforts
- ❑ Fishing communities have developed over generations, a mental model for making their conclusions

Fish Finding -The Heritage

Bird Congregation

Colour

Bubbles breaking on Surface

Muddy and oily water and calm Sea

Reflection in the Night

***Kaladu* (a kind of smell)**

Fish

Availability

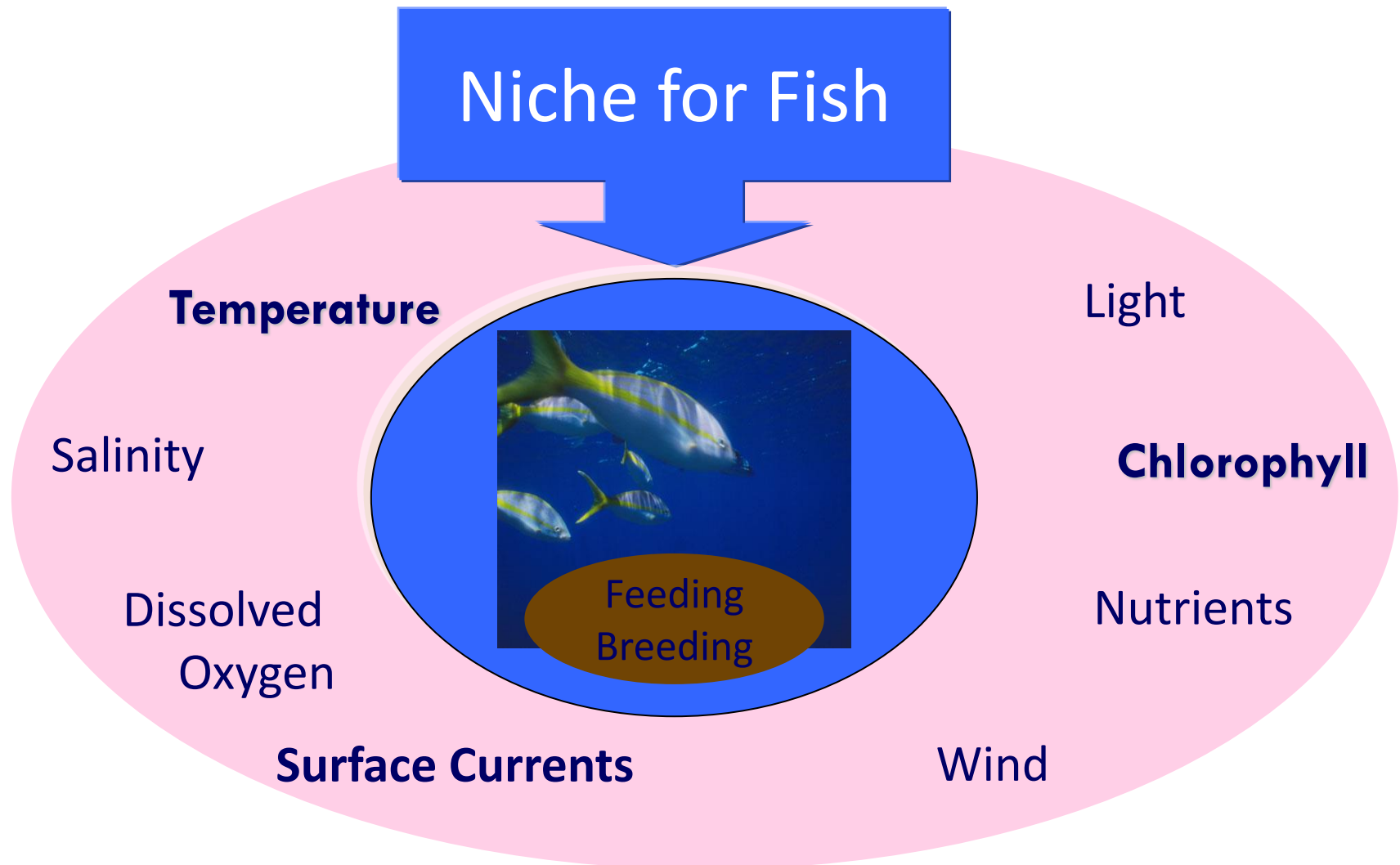
Type

Quantity

Challenges in Fishing & Sollution

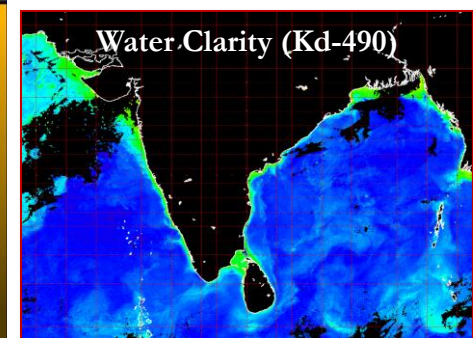
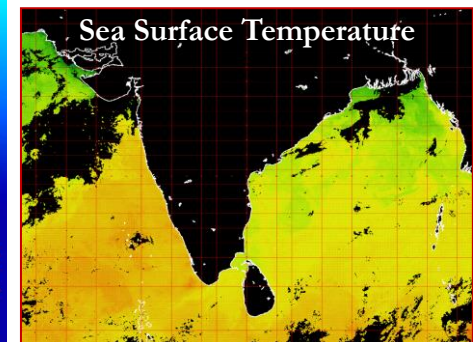
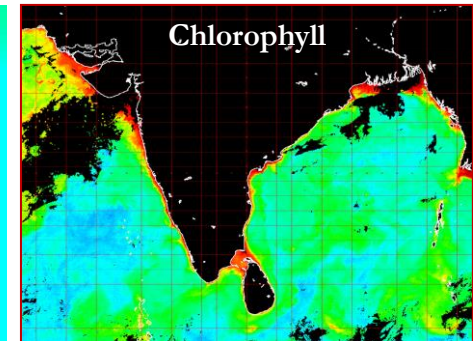
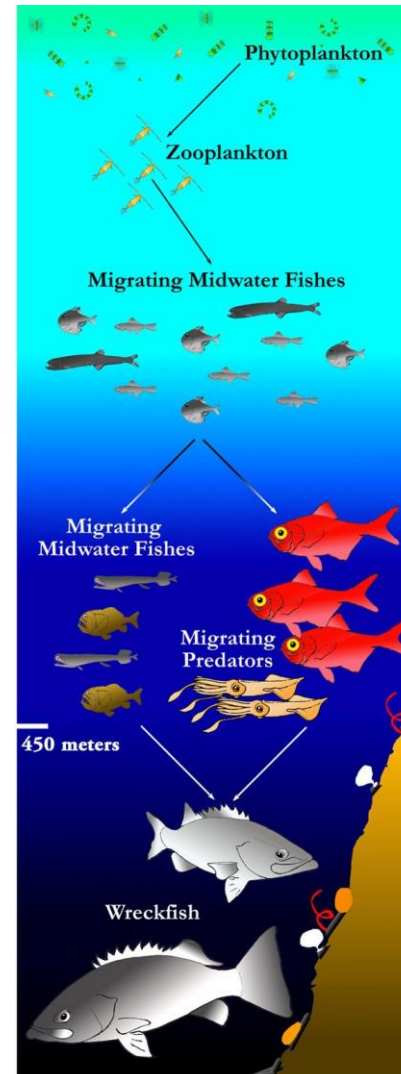
- ❑ Locating and catching fish, as stocks dwindle and move further offshore
- ❑ Increase in searching time for shoals, fuel cost and human effort in fishing operations
- ❑ Increase of atmospheric Carbon Dioxide by burning of fuels
- ❑ A reliable and timely forecast on the potential zones of fish aggregation, helps reduce time and effort spent in searching fishing grounds

PFZ-The Scientific Basis

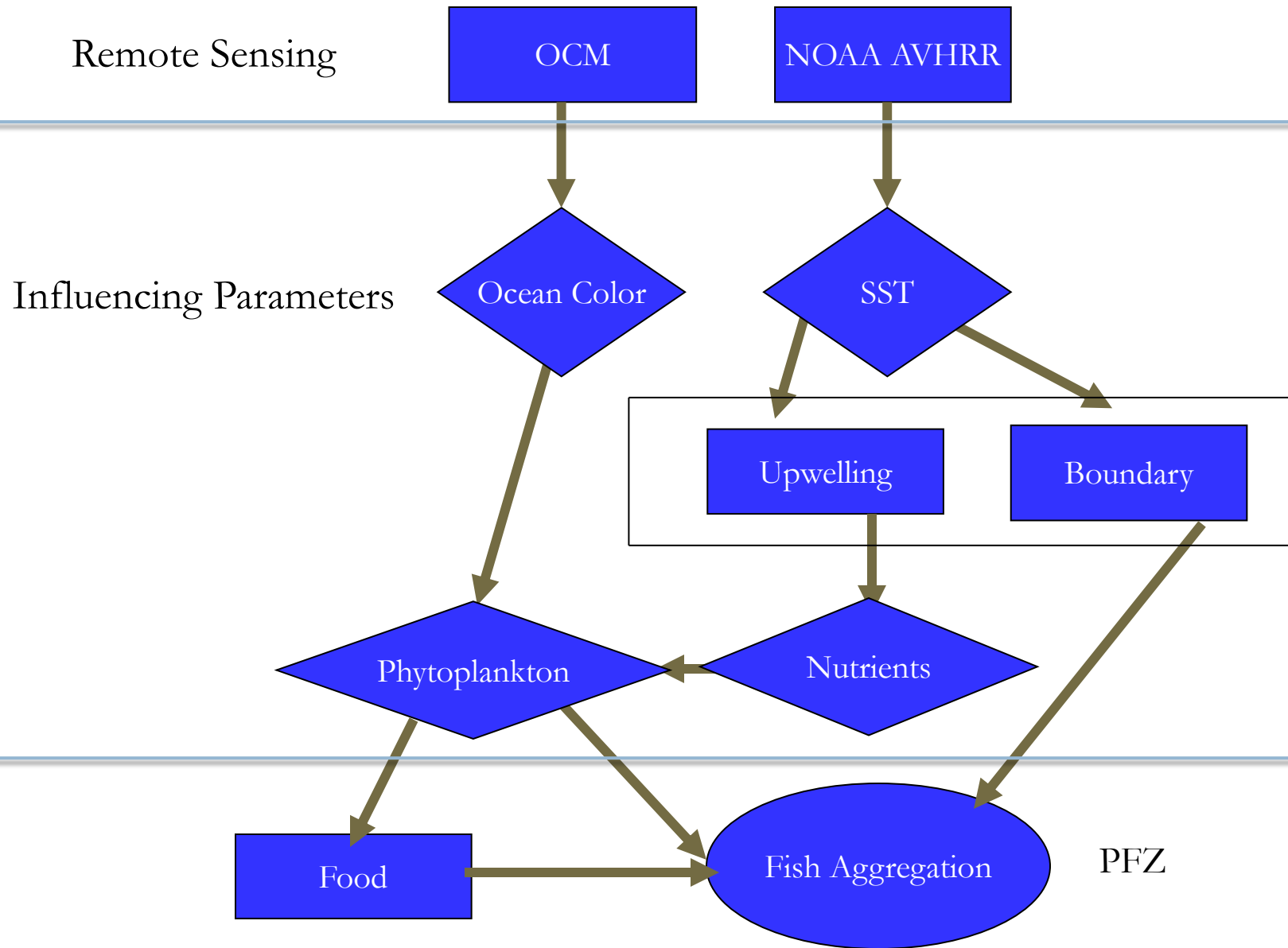


How do we address?

- ❑ Fish schools cannot be seen directly from satellite altitudes
- ❑ Fishes are influenced by various ocean parameters and processes
- ❑ Sea Surface Temperature (SST) and its fluctuations is the one of the most important environment parameter — Conducive environment
- ❑ Chlorophyll-a, which is a measure of phytoplankton density, is the indicator of the availability of food for fishes



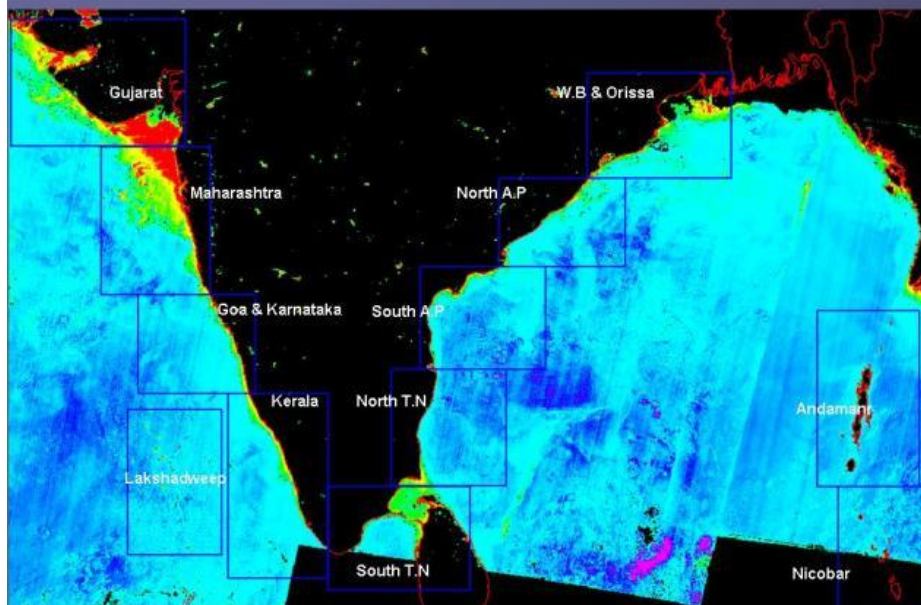
Remote Sensing for Fisheries



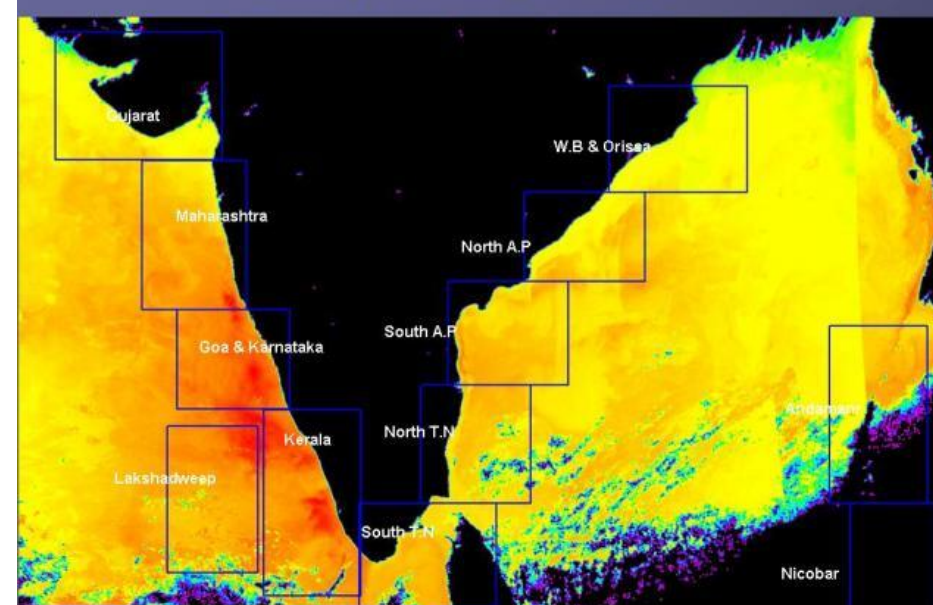
SST and Chlorophyll Images

- Image Processing techniques for
 - Geometric correction
 - Filtering
 - Geo-coding

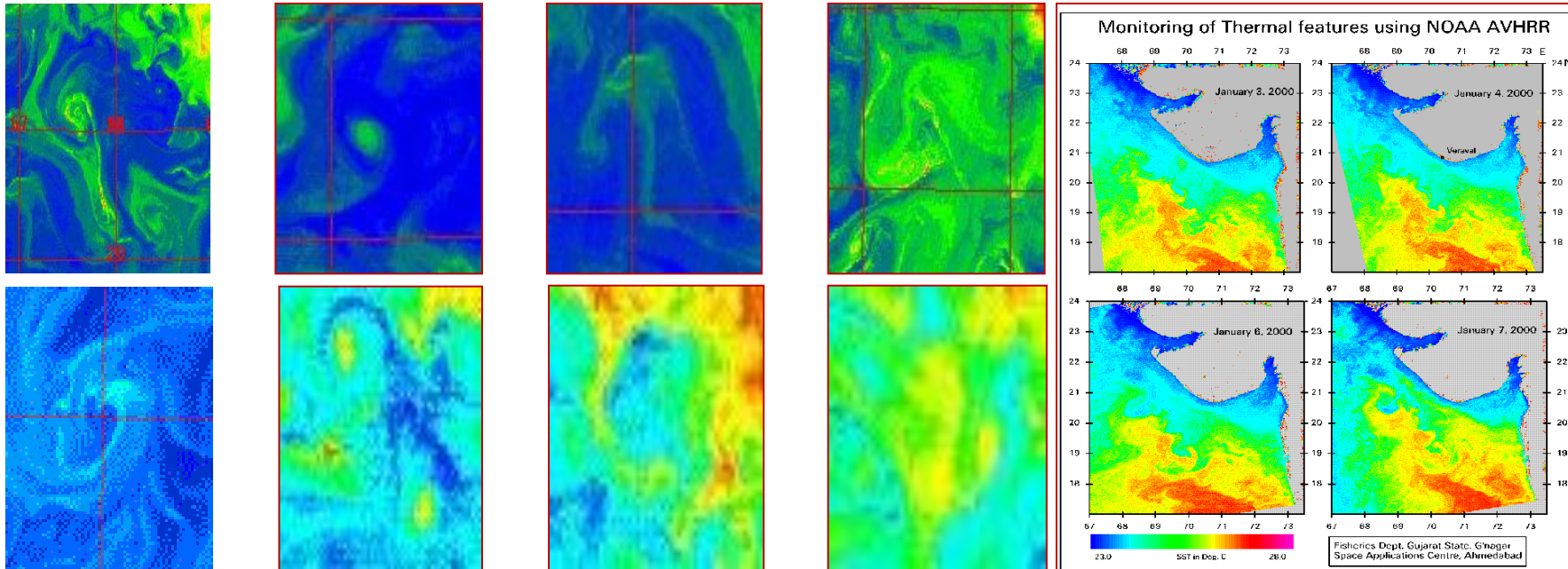
Sample Image of Chlorophyll



Sample Image of SST



The Identification Keys

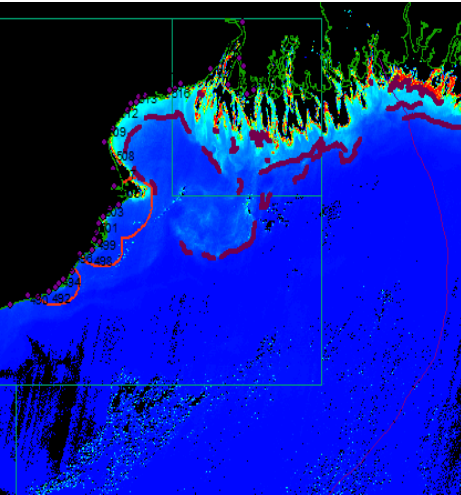


Oceanic Fronts, Meandering Patterns, Eddies, Rings, Mushroom shaped features, Tongue shaped features, Coastal Upwelling, Shelf Break fronts, Plume fronts, Diverging fronts, Converging fronts

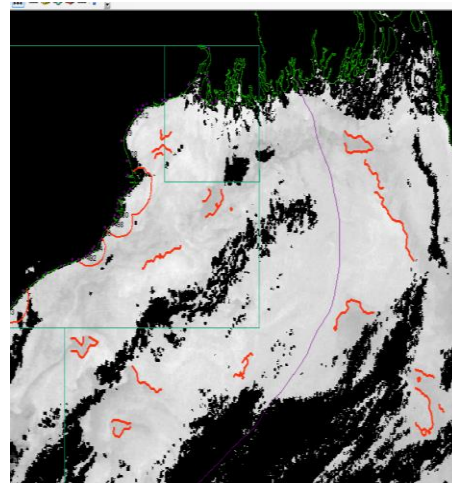
Before daily operational services from INCOIS using real-time satellite data, check for any Fishermen Warning from IMD website, Advisory will issue on non-monsoon, non-ban season, no-high wave, no-cyclone.

GIS Models

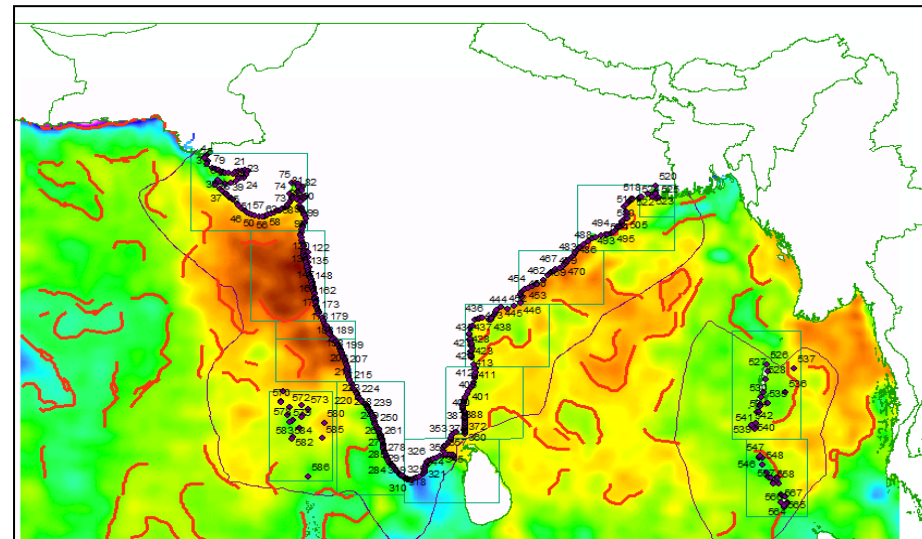
CHL



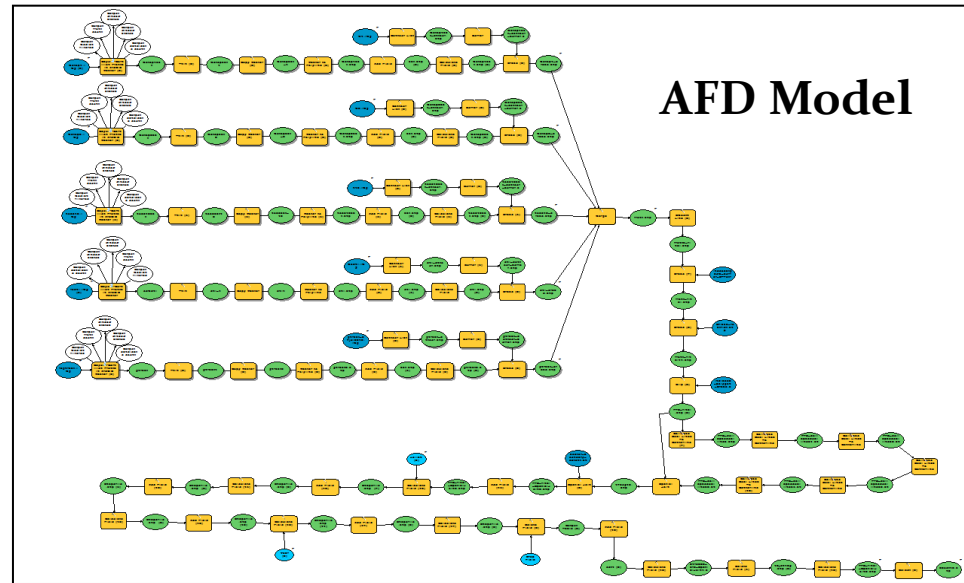
SST



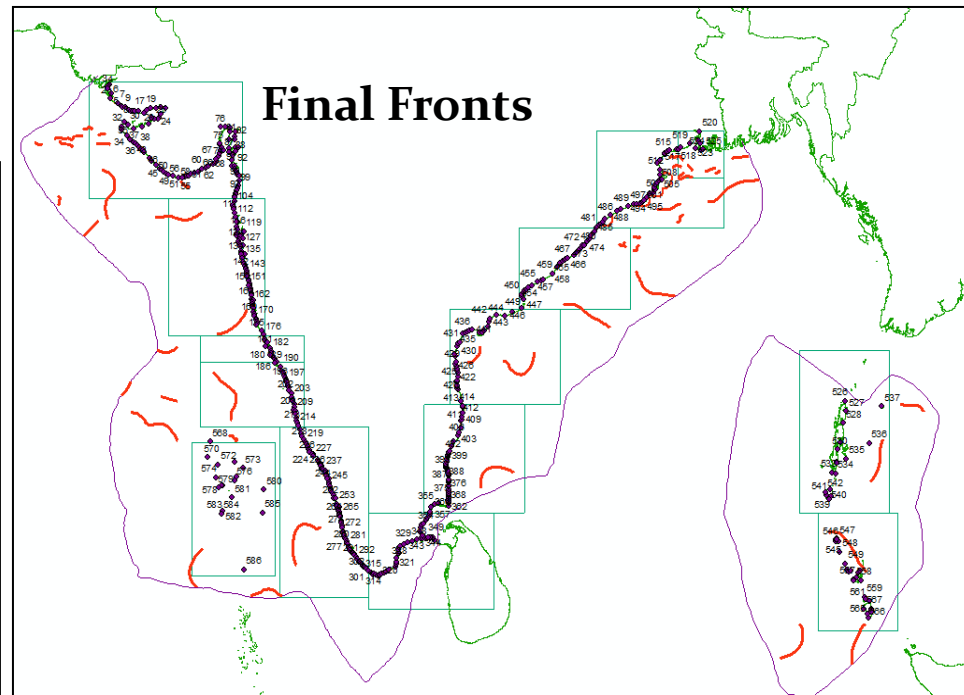
GHRSSST



AFD Model



Final Fronts



The PFZ Advisories

PFZ Maps contains information on

Most probable fishing areas	Surface Currents
Bathymetry	Indian EEZ
Indian Coastline	Coastal Districts
Restricted Zones for Fishing	Fishing Villages

PFZ Advisories for Gujarat

5/20/24, 6:48 PM

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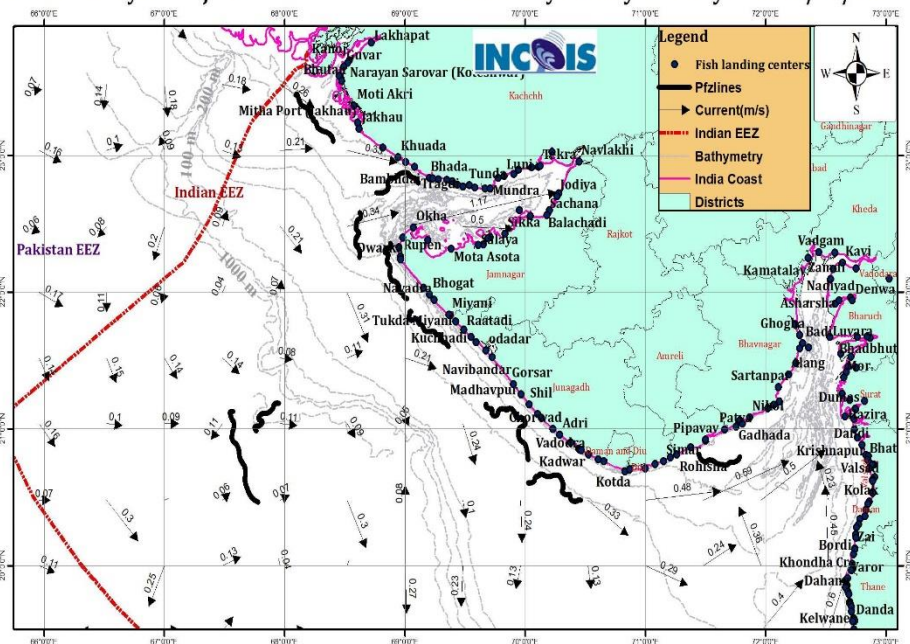
Date updated on: 20-05-2024 18:47:31

Potential Fishing Zone

GUJARAT
ગુજરાત
Gujarat

PFZ Advisory for Gujarat

Advisory validity: One day from 20/05/ 2024



SATELLITE DATA SHOWS LIKELY AVAILABILITY OF FISH STOCK TILL 21 MAY 2024
 उपग्रह से प्राप्त सुचना अनुसार 21 मई 2024 तक मत्स्य भंडार की उपलब्धता
 ઉપગ્રહથી મળતી માહિતી મુજબ 21 મે 2024 સુધી મત્સ્ય ભંડારની ઉપલબ્ધતા

દરીયા કિનારો	કિશા	હોકાયન (કંપાસ) ની ડીગ્રી-બેરીન	અંતર (કિલોમીટર) બી-સુધી	ઉંડાઇ (મીટર) બી-સુધી	અક્ષાંશ (ડી. મિ. સે.)	રેખાંશ (ડી. મિ. સે.)
Moti Akri મોટી અક્રી	દક્ષિણ- પશ્ચિમ	247	38-43	10-15	23 14 41 ઉત્તર	68 15 27 પૂર્વ
Pipavav પીપાવાવ	દક્ષિણ-પૂર્વ	141	22-27	12-17	20 44 11 ઉત્તર	71 40 15 પૂર્વ
Patva પટવા	દક્ષિણ-પૂર્વ	171	25-30	12-17	20 45 11 ઉત્તર	71 41 58 પૂર્વ
Madhvad Lighthouse માધવદ લાઇટહાઉસ	દક્ષિણ- પશ્ચિમ	248	51-56	54-59	20 31 7 ઉત્તર	70 22 7 પૂર્વ
Diu Island દીવુ અંદલેહ	ઉત્તર-પૂર્વ	80	48-53	13-18	20 46 58 ઉત્તર	71 27 21 પૂર્વ
Bhutau બુટાઉ	દક્ષિણ- પશ્ચિમ	226	38-43	11-16	23 17 40 ઉત્તર	68 12 56 પૂર્વ
Saiyad Rajpara સૈયદ રાજપરા	દક્ષિણ-પૂર્વ	93	35-40	11-16	20 46 19 ઉત્તર	71 32 39 પૂર્વ
Gadhada ગધડા	દક્ષિણ- પશ્ચિમ	184	26-31	12-17	20 45 28 ઉત્તર	71 43 55 પૂર્વ
Lakhi Bandar લખી બંદર	દક્ષિણ- પશ્ચિમ	231	41-46	9-14	23 21 4 ઉત્તર	68 10 36 પૂર્વ
Harshad Miyani હર્ષદ મિયાની	દક્ષિણ- પશ્ચિમ	261	27-32	41-46	21 47 15 ઉત્તર	69 6 24 પૂર્વ
Khuada કુખડા	દક્ષિણ- પશ્ચિમ	201	21-26	15-20	22 47 7 ઉત્તર	68 51 29 પૂર્વ
Nana Lajja નાના લાજા	ઉત્તર- પશ્ચિમ	272	16-21	12-17	22 50 26 ઉત્તર	69 3 47 પૂર્વ
Kachechigadh કાચેચિગઢ	પશ્ચિમ	270	34-39	22-27	22 19 34 ઉત્તર	68 36 29 પૂર્વ
Sutrapada સુત્રાપઢા	દક્ષિણ- પશ્ચિમ	230	30-35	48-53	20 39 34 ઉત્તર	70 14 0 પૂર્વ

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Accounting entry		Real balance at 12/31/2010	
Debit	Credit	Debit	Credit
<p>NOTE: THE DEBIT AND CREDIT BALANCES OF THE ACCOUNTS IN THE FOLLOWING TABLE MUST ALWAYS BE EQUAL TO THE BALANCE OF THE RETAINED EARNINGS ACCOUNT.</p>			
Payroll and related expenses for 2010 (all amounts in dollars)			
Salaries	100,000	Salaries	100,000
Wages	20,000	Wages	20,000
Payroll taxes	10,000	Payroll taxes	10,000
Employer's share of FICA taxes	5,000	Employer's share of FICA taxes	5,000
Unemployment taxes	2,000	Unemployment taxes	2,000
Health insurance	15,000	Health insurance	15,000
Life insurance	5,000	Life insurance	5,000
Retirement plan	10,000	Retirement plan	10,000
Workers' compensation	3,000	Workers' compensation	3,000
Disability insurance	2,000	Disability insurance	2,000
Other benefits	1,000	Other benefits	1,000
Total	173,000	Total	173,000

Advisories in Multi-Lingual & in Local Units



The map displays the following states and union territories with their respective colors:

- GUJARAT** (Yellow)
- WEST BENGAL** (Purple)
- ODISHA** (Orange)
- MAHARASHTRA** (Red)
- ANDHRA PRADESH** (Light Green)
- KARNATAKA** (Purple)
- TAMIL NADU** (Yellow)
- KERALA** (Green)
- Andaman & Nicobar Islands** (Red)

Surrounding water bodies are labeled: **ARABIAN SEA**, **BAY OF BENGAL**, and **INDIAN OCEAN**.

A scale bar at the bottom indicates distances in **Kilometers** (0, 100, 200, 400, 600, 800).

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SARAJEVO		BOSNIA		SERBIA		CROATIA		MONTENEGRO		ALBANIA		MACEDONIA		BULGARIA		ROMANIA		POLAND		CZECH REPUBLIC		SLOVAKIA		HUNGARY		SLOVENIA		CROATIA		SERBIA		MONTENEGRO		ALBANIA		MACEDONIA		BULGARIA		ROMANIA		POLAND		CZECH REPUBLIC		SLOVAKIA		HUNGARY		SLOVENIA																																																																																																																																																																																																																																																																																																																																			
1999	1998	1997	1996	1995	1994	1993	1992	1991	1990	1989	1988	1987	1986	1985	1984	1983	1982	1981	1980	1979	1978	1977	1976	1975	1974	1973	1972	1971	1970	1969	1968	1967	1966	1965	1964	1963	1962	1961	1960	1959	1958	1957	1956	1955	1954	1953	1952	1951	1950	1949	1948	1947	1946	1945	1944	1943	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929	1928	1927	1926	1925	1924	1923	1922	1921	1920	1919	1918	1917	1916	1915	1914	1913	1912	1911	1910	1909	1908	1907	1906	1905	1904	1903	1902	1901	1900	1899	1898	1897	1896	1895	1894	1893	1892	1891	1890	1889	1888	1887	1886	1885	1884	1883	1882	1881	1880	1879	1878	1877	1876	1875	1874	1873	1872	1871	1870	1869	1868	1867	1866	1865	1864	1863	1862	1861	1860	1859	1858	1857	1856	1855	1854	1853	1852	1851	1850	1849	1848	1847	1846	1845	1844	1843	1842	1841	1840	1839	1838	1837	1836	1835	1834	1833	1832	1831	1830	1829	1828	1827	1826	1825	1824	1823	1822	1821	1820	1819	1818	1817	1816	1815	1814	1813	1812	1811	1810	1809	1808	1807	1806	1805	1804	1803	1802	1801	1800	1799	1798	1797	1796	1795	1794	1793	1792	1791	1790	1789	1788	1787	1786	1785	1784	1783	1782	1781	1780	1779	1778	1777	1776	1775	1774	1773	1772	1771	1770	1769	1768	1767	1766	1765	1764	1763	1762	1761	1760	1759	1758	1757	1756	1755	1754	1753	1752	1751	1750	1749	1748	1747	1746	1745	1744	1743	1742	1741	1740	1739	1738	1737	1736	1735	1734	1733	1732	1731	1730	1729	1728	1727	1726	1725	1724	1723	1722	1721	1720	1719	1718	1717	1716	1715	1714	1713	1712	1711	1710	1709	1708	1707	1706	1705	1704	1703	1702	1701	1700	1699	1698	1697	1696	1695	1694	1693	1692	1691	1690	1689	1688	1687	1686	1685	1684	1683	1682	1681	1680	1679	1678	1677	1676	1675	1674	1673	1672	1671	1670	1669	1668	1667	1666	1665	1664	1663	1662	1661	1660	1659	1658	1657	1656	1655	1654	1653	1652	1651	1650	1649	1648	1647	1646	1645	1644	1643	1642	1641	1640	1639	1638	1637	1636	1635	1634	1633	1632	1631	1630	1629	1628	1627	1626

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Fishermen Awareness Campaigns



In addition to small to medium level awareness campaigns, INCOIS has been conducting

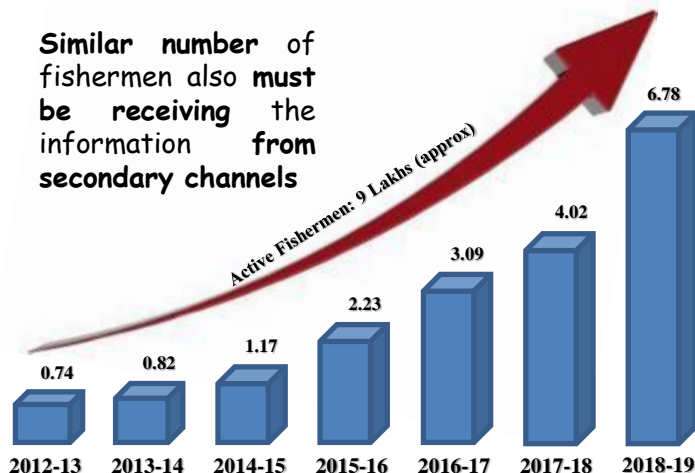
1. National and State Level User Interaction Workshops
2. Partnerships with NGOs
 - Master Trainers in every State / District
 - More than 100 awareness campaigns / capacity building per annum
3. Technological Trainings to other Countries.

ICT to Reach End Users

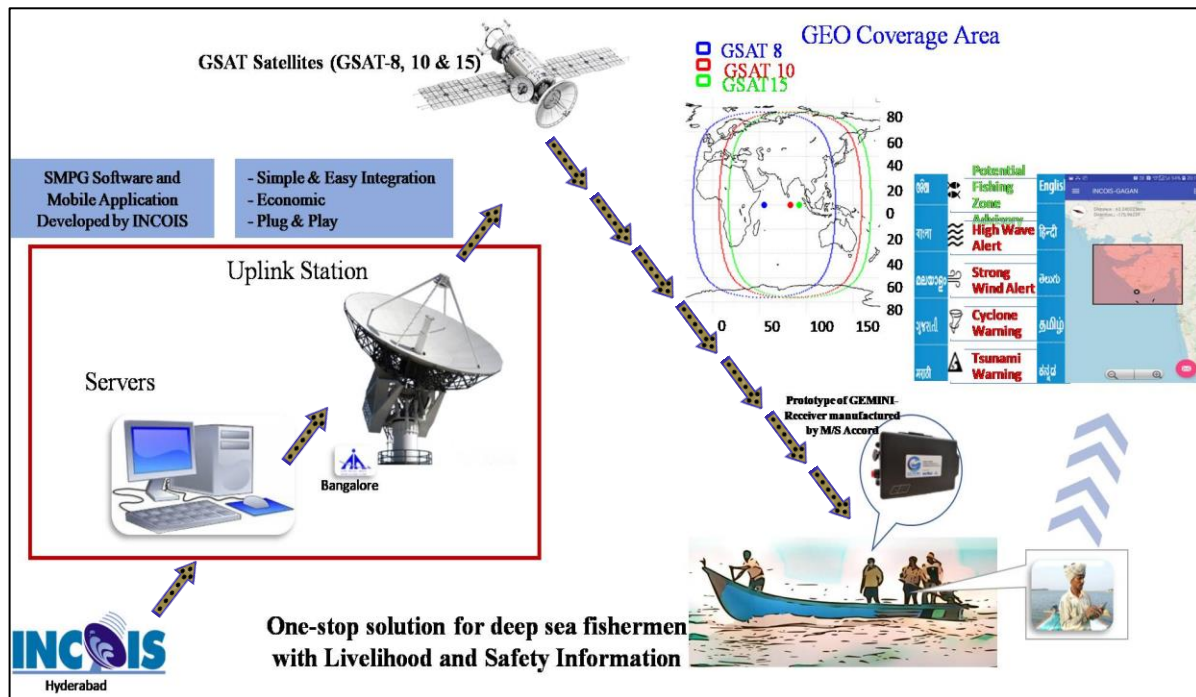


Serving ~6.78 Lakhs of Registered Fishermen

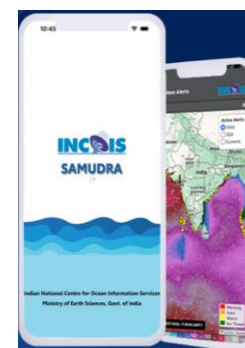
Similar number of fishermen also must be receiving the information from secondary channels



GAGAN based GEMINI: Satellite based Solution

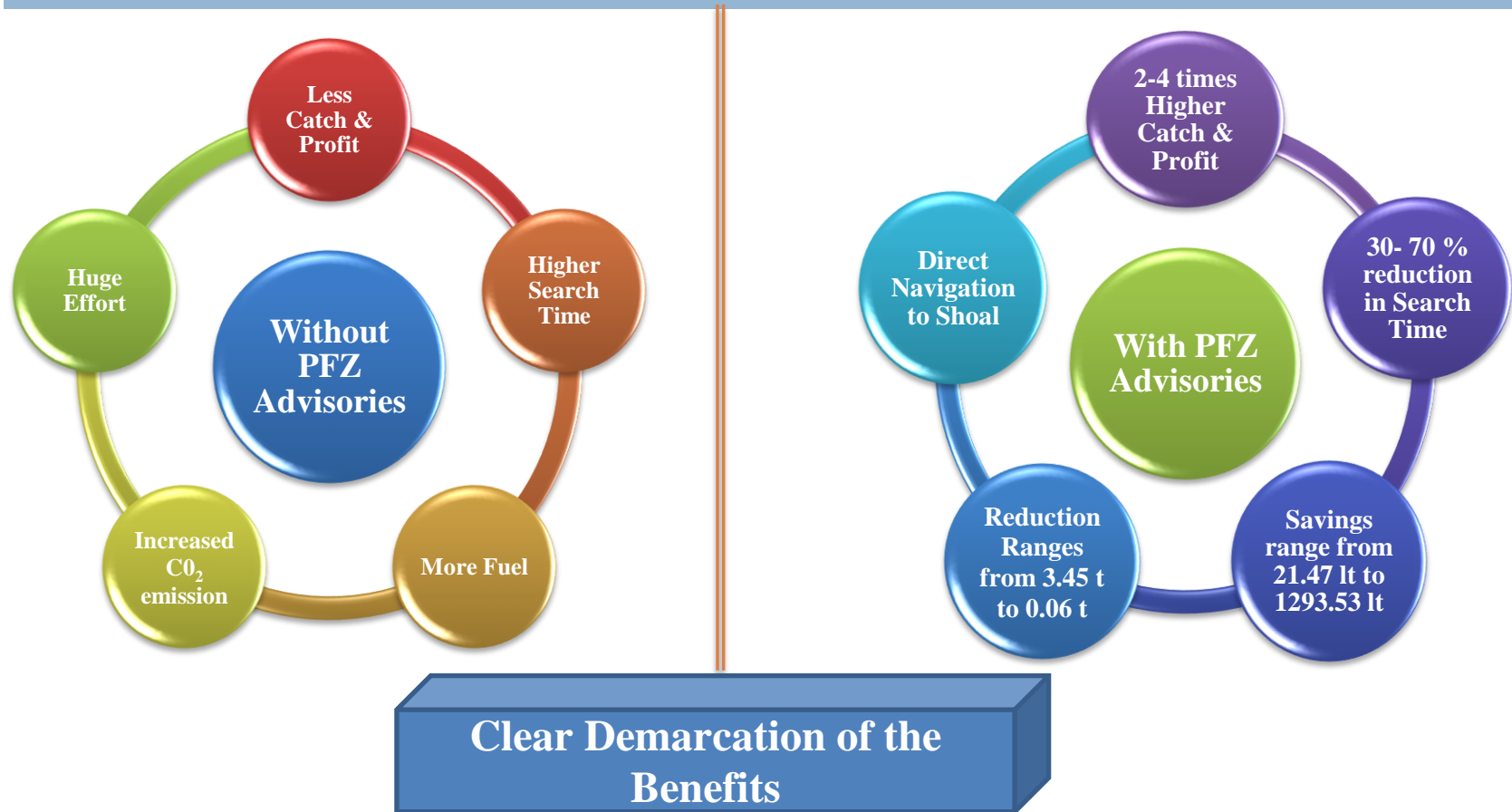


- Key role by Mobile based dissemination methods
- Active catalyst role by NGO's and Partner institutes



SAMUDRA –
Smart Access to Marine Users for
ocean Data Resources and
Advisories

Impact of PFZ Advisory Services



**Recognized by the International Community as a matured operational application of satellite remote sensing for providing timely and reliable advisories to fishermen
(a Lab – to – Land Service for common man)**

PFZ Benefits

- Preliminary study conducted in the Gilakaladinidi village in Krishna District, Andhra Pradesh on use of Potential Fishing Zone Advisories and Conversion from Bottom Trawling to Gillnetting
 - ✓ Gilakaladindi Village has witnessed a rapid change in the fishing practices particularly since November 2011 after the initiation of MSSRF-INCOIS intervention
 - ✓ Majority of the fishers, who hitherto have been practicing bottom trawling method of fishing, upgraded their fishing technique based on PFZ advisory and shifted to gillnetting so as to enable them to engage in pelagic fishing
 - ✓ It is interesting to note that the conversion has happened in such a rapid manner that by July 2013, out of 65 boats owned by our 23 respondents 50 fishing vessels have already been converted (and are under use) and three boats have been newly constructed

* The woman respondent who was earlier a small fish trader has constructed a new boat with gillnetting during this year

Study by M S
Swaminathan Research
Foundation

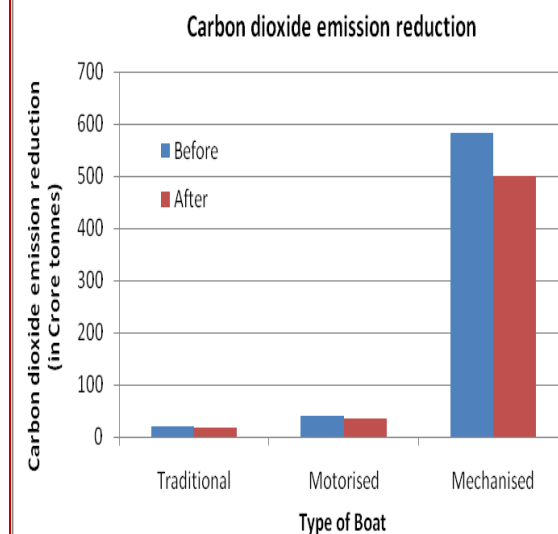
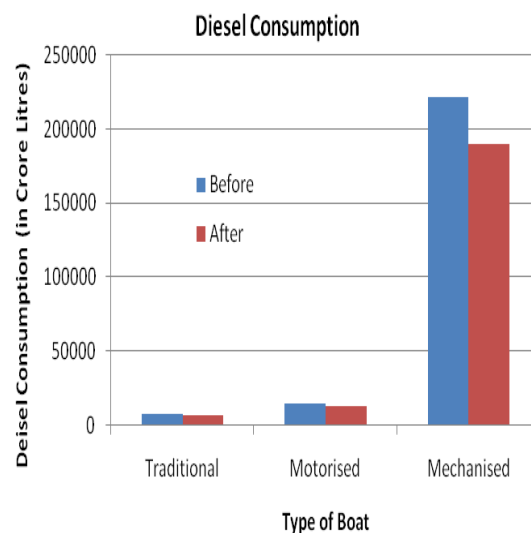
Year of Conversion	No of Respondents*
2011	3
2012	18
2013	1
Total	22



PFZ Benefits

- 27% fishermen reported to have prevented loss of life due to timely decision making with the aid of OSF information – **MSSRF Survey**
- Identifications of PFZs and OSF by INCOIS are found to be both timely, accurate and of significant value to the fishing community. The economic benefits resulting from identification of PFZ is estimated as 34,000 to 50,000 Crore - **NCAER in 2010**

Market Study by National Council for Applied Economic Research: The environmental effect of savings in diesel consumption computed as carbon credit would work out to an annuity of Rs 36,200 crore or a present value of around Rs.2.84 trillion over the 25-year useful life, which is quite significant



Thank you

