

Geospatial Mapping of Fisheries Profile of Chhattisgarh state through GIS

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Abstract: Geospatial technology is fast growing segment of information technology that combines multiple applications like GIS, remote sensing, cad, and imaging tools. The geospatial technology capabilities in combination like other technologies can be decision making tools for planning. In the present times fisheries and aquatic science professionals are using GIS as a resource management tools. In this context, a study was performed where mapping of fisheries profile of Chhattisgarh state was performed through GIS tools having critical geographic dimensions. The mapped information can be used for the purpose of planning and decision making as each aspect of the map has different components involved. For this purpose, at the core of the system the data was assessed at an integrated level from disparate sources mainly level statistical hand book of Chhattisgarh state at district level. Data was brought in tabular form through Microsoft Excel and then joined to Arc info version 9.3.1 GIS Software with digitized map of Chhattisgarh state to enable mapping. This was further synchronized and integrated to generate four thematic maps searchable on several criteria.

Map 1 Contains fish production growth rate over the period 2001-04 fish import and fish export. With this mapping, planners and various stakeholders have accessible information as regards the various components of fisheries in the state of Chhattisgarh.

Map 2 Contains the searchable criteria as regards the fisher populations as well as their classified categories as per the computation in the state of Chhattisgarh. It also contains the searchable credible water resources of fishery, district wise private and public which are (Govt.) owned.

Introduction

Chhattisgarh one of the thirty five constituents of the country, occupies 135194 square km which in 4.14% of the geographical area of India. Uttar Pradesh in North, Jharkhand in North East Orissa in East, Andhra Pradesh in South, Maharashtra in South West and M.P. and Maharashtra in West form its borders. 43% land is covered by forests. There is 3 agro climatic zones comprising northern hills central plateau zone and Bastar plateau zone.

Northern Hills: The area of this agro climate zone accounts for 21% of the total geographical area. Koriya, Surguja, Jaspur, Raigarh, and Korba are districts situated in this zone.

Central plain Region: This agro climate zone covers 50% of the geographical area of the state. Raipur, Bilaspur, Champa Janjgir, Kabirdham, Rajnandgaon Durg, Dhamtar, and Mahasbund are the districts included in this plain zone.

Baster Plateau Zone: It accounts for 29% of the total geographical area of the state. Kanker (North Baster), Bijapur and Naragampur are districts included in this zone.

Objective:

- (i) To digitize the Chhattisgarh State on district level.
- (ii) To feed secondary data in Microsoft Excel and find out the fish production growth rate since 2000-2012.
- (iii) Join the different Excel sheets with the digitized map of Chhattisgarh state in Arc GIS 9.3.1 and create different thematic maps.
- (iv) On the basis of data analysis and results finding give the suitable suggestion for more fish production.

Sources of Data and Methodology

- Fish production data at districts level has been taken from Chhattisgarh Matsay Udog Sankhiki

- Bas map has been taken from Census Map of India.
- After scanning the Map of Chhattisgarh state (district wise) is reregistered in Arc GIS software (9.3.1)
- Excels table of Chhattisgarh states are Joined with the digitize map of Chhattisgarh state in Arc GIS software are (9.3.1)
- After Joining the Excel table with digitize map of Chhattisgarh, different thematic maps relating to fish growth production, fishermen population, Inland water area maps have been prepared.
- This study has been done with an objective of developing a GES tool for Indian fisheries growth rate based on state level Indian fisheries data collected from secondary sources viz.; hand-book of fisheries statistics 2003 published by Ministry of Agriculture, Government of India. Here, marine, inland and total fish production data of all the states of the period 1990-91 to 2003-04 have been brought in tabular form through Microsoft Excel and their rate has been calculated by using the following growth-rate mode in Microsoft excel sheet.

Growth in fish production (y) has been analyzed by using the exponential growth function of the form

$$Y = ab^t \quad \dots(1)$$

Where a = intercept, b= Regression Co-efficient, t=Time

The above mentioned equation has been used to obtain the growth-rate (r) of marine, inland and total fish production of all the states of India separately for the period[1990-91 to 2003-04]. Linear form of the equation is obtained by taking logarithms of both sides which is given by

$$\log_e Y = \log_e a + t \log_e b \quad \dots(2)$$

The exponential growth rate (r) can be computed by using the relationship

$$r = [\text{Anti log}_e \text{ of } b - 1] \times 100 \quad \dots(3)$$

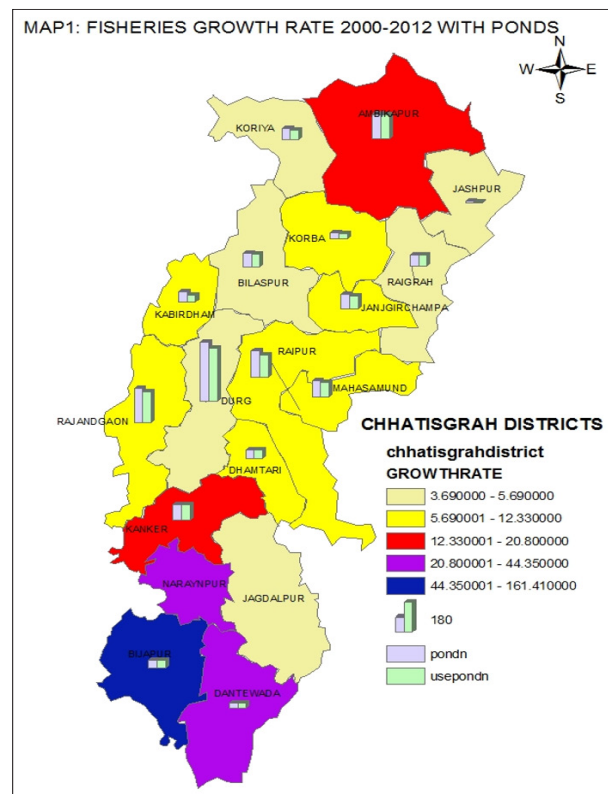
Growth rate have been calculated in Micro Soft Excel. The excel sheet is joined to digitized map of India by allotting a location code (LC) number to each state. After joining of the excel

sheet, geocoding process is adopting customized layering system in the GIS-Software Map Info, first layer in thematic map was created for fisheries profiles of India, the second layer in thematic map represents fish consumption for the year 2003.

Results and Discussion

1. Map 1 Fisheries growth rate with utilization of Ponds resources: According to Map 1 there are five categories of growth rates. The lowest growth rate is below 6.0 5% found in five districts namely Durg, Bilaspur Koriya Jaspurand Raigrath.

The second category of growth rate (5.69% to 12.33%) belong seven districts namely Rajandgan, Kabirdhan, Korba, Jamjir Chanpa, Raipur, Mahasmund and Dhamtami. The third growth 20.85%-44.35% belong to only two districts namely Ambikapur and Kanker, Forth category (20.80-44.35) Contain only two districts Narayanpur and Dantewada. The highest growth rate 74.4 to observed only Bijapur.



(ii) Layer Utilization of Ponds (Water Resources): The biggest (100%) water resources utilized by following districts Raigarh, Baster,, Naraynpura, Kanker, and Dandewada (Fig. 1).

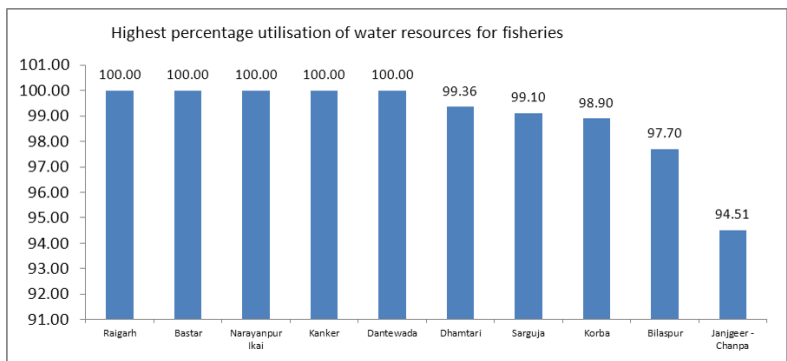


Fig. 1 Highest percentage utilization of water resources for fisheries

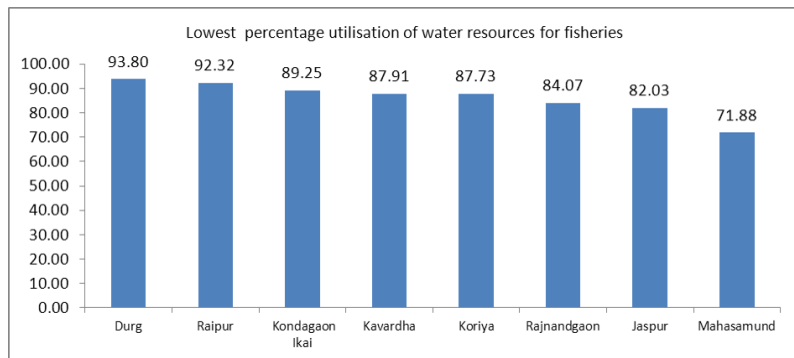


Fig. 2 Lowest percentage utilization of water resources for fisheries In Chattisgarh

In the said district the growth rate is highest except Raipur where the fishers growth rate is 9.20 where Birapur (Baster) 161.41, Kanker 20.66, Narayanpura 44.35

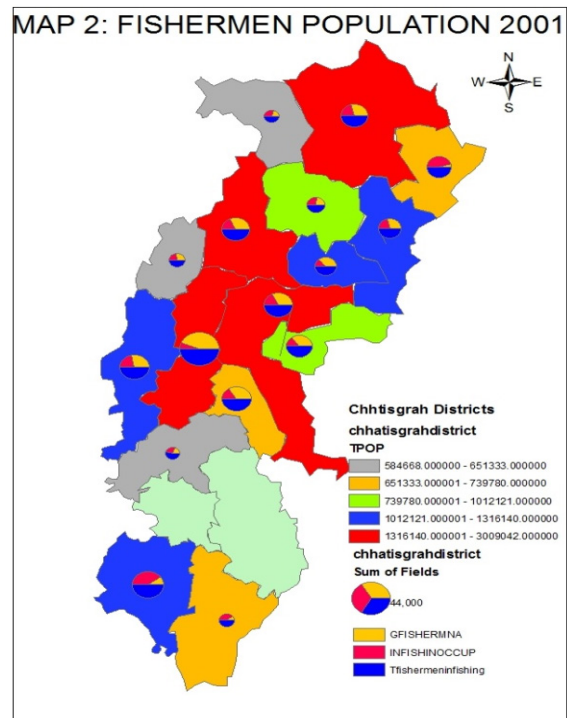
The lowest percentage of use of water resources has been identified Mahasamund (71.88 %) Jaspur (8.03%), Rajandgon (84.07 %) Koriya (87.73%) and Kavardha (87.91%) (Fig. 2).

2. Map 2 Fishermen population (2001): According to Map 2 and figure 3 Highest fishermen population is found in Durg, Baster, Raipur, state Rajandgoen, Dhamaturi belong to maximum fishermen population. Where in Durg general fishermen (by caste) is more and in Baster professional fishermen population become more. Likely Raipur, Rajandgaen, Dhamtaur and Bilaspur contain more general (Fig. 3).

Lowest fishermen population in the State: Koriya, Dantewada, Kavardha, and Korba containg less fishermen population across the state. In these districts by professional fishermen population become more. In Korba, Kavardha and Kanker by professional fishermen population become more (Fig. 4).

3. Imports and Export fish status in Chhattisgarh state (2002-03): It has been

observed that some districts where population is more and fish consumption is also high they imports fish from their surrounding states. Their districts are Raipur, Kanker, Koriya, Baster and Sarguja (Fig. 5).



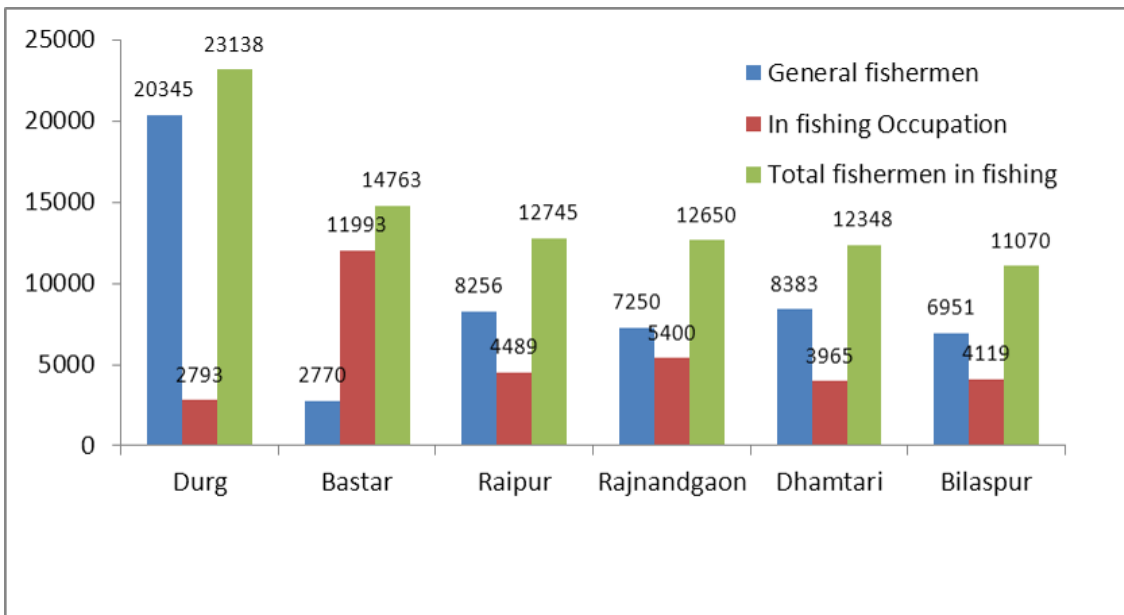


Fig. 3. Fishermen population across districts (Highest)

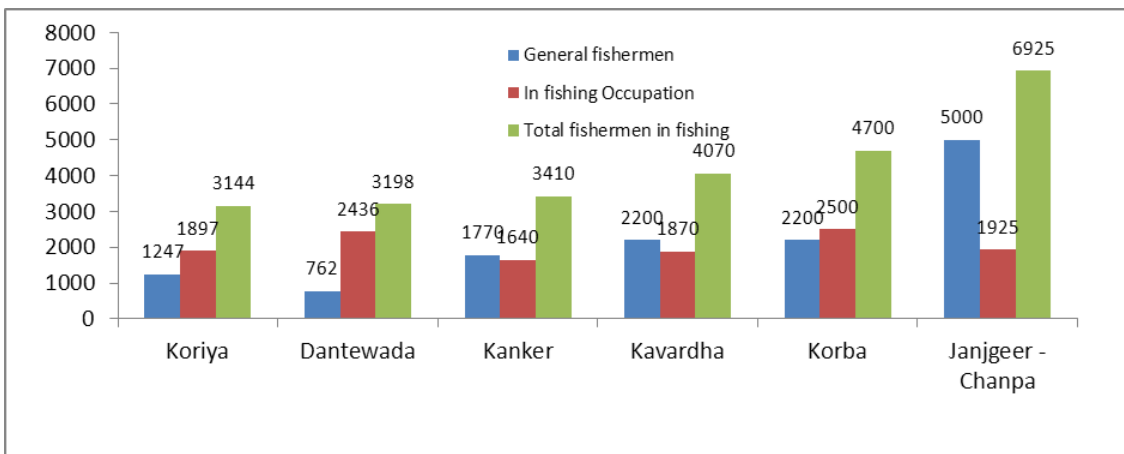


Fig. 4 Fishermen population across districts (Lowest)

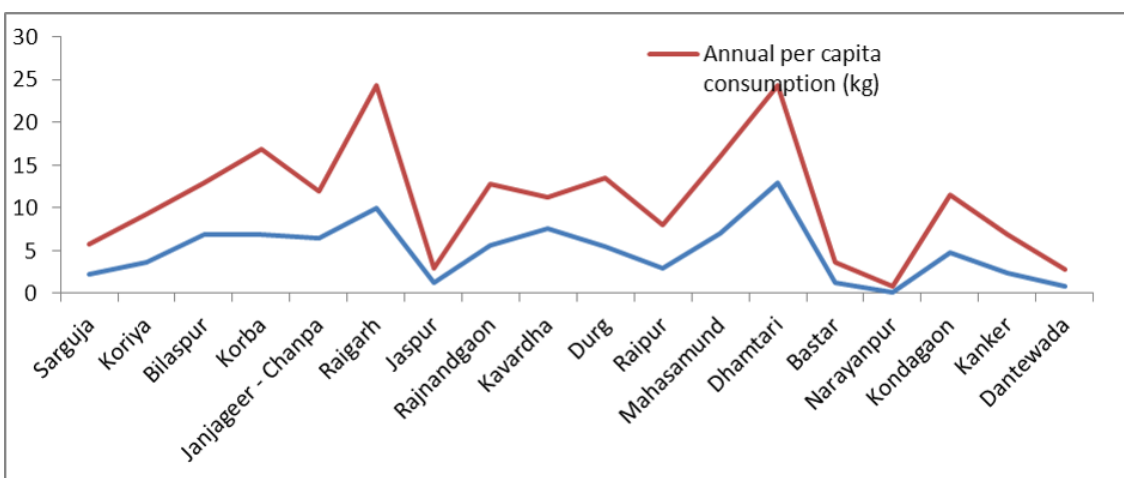


Fig. 5: Percapita production-consumption across coastal districts in Chattisgarh (kg)

Some districts where important fishespecieses are available they exports to U.P, West Bengal and Mumbai (Maharashtra). These districts are Bilaspur, Dhamtari, Janjnageera, Mahasmunda and Durg.

Fish production (per person production in kg./ Year) Fish consumption (consumption in Kg. per person in a Year) 2002-2003 According to data at state level production is less them consumption. According to data per person production per year is 501 kg where consumption per person per year is 6.4 kg. at state level. 70% population of Chhattisgarh states habituate of fish eating. Raigrah, Korba, Mahasmunda, Koriya Raipur ad Durg, there are the districts where consumption is more than production. Dhamtari, Sangirchapa, Bilaspur

there are the districts where production is more than consumption.

Conclusion and Suggestion

Chhattisgarh is situated in the middle part of the country. There are enormous potential for fisheries development. It is climate & meteorological condition is favorable for fisheries. Suggestions for more production of fishes in the state are following.

- Production and distribution of fish seed.
- Supply of quality seed for stocking.
- Development of Reservoir & Reverine fisheries.
- Training to farmers and out of the state study tour to learn new techniques.