

## **Density of Population and the Human Labour Available in and around Pichavaram for Conservation of the Mangrove Forest.**

**Dr.M.Sakthivel\*\* and Debapriya Dutta\***

*Research Scholar, Department of Geography, University of Madras, Chepauk-05\**  
*Associate Professor, Department of Geography, University of Madras, Chepauk-05\*\**  
*Corresponding Author:Dr.M.Sakthivel*

---

**Abstract:**The Community Participation for Conservation of Pichavaram Mangrove Ecosystem in Tamil Nadu Coastal Region has been explained in the Forth Chapter. The comparison of Population has been shown in and around Pichavaram from 2001 to 2011, of the year 2001 and 2011 using GIS technologies. The comparison has been shown between the maps, as to how the population has increased or decreased in different villages in Cuddalore district which include Pichavaram and its surround villages. The study area of this Project Work is Pichavaram, but the surrounding villages have been considered in the study because of the pull and push factors, i.e community participation takes place at the Pichavaram Mangrove region from the surrounding villages of the Cuddalore district. This well-considered model directly engages local community participation, and has proven extremely successful. Contrary to popular belief, mangroves require some freshwater to grow well, and they are submerged only around one third of the time. Planting mangroves along an exposed coastline, in too-deep water without fresh water input, is a recipe for failure. The resulting failure of many restoration projects is discouraging to all parties involved, not least the local communities which need positive encouragement to restore and protect mangroves, rather than discouragement over project failure. At that point the Population Projection Model was utilized for evaluating the future populace of 2021 through factual recipes appeared previously. In this way in the populace anticipating model it is watched that the populace is increment in 10 years by 15-17% . Subsequently the populace in the year 2021 will be 1,07835-1,08951 roughly.

**Key words:**Community participation, Local community, total Population, Population Projection Model

-----  
Date of Submission: 07-06-2018

Date of acceptance: 26-06-2018  
-----

### **I. INTRODUCTION:**

MANGROVE wetland is a numerous utilization environment, covering 8% of the world's drift and 25% of the tropical coastline<sup>1</sup>. It plays out various defensive and gainful capacities. It goes about as a boundary against cyclonic storms and maintains a strategic distance from waterfront disintegration. It gives nursery reason for various economically imperative species. It is a living space for various extensive untamed life and a store of biodiversity for littler life forms. As of late, mangrove vegetation has been recognized as giver of salt-tolerant qualities that can be used for the advancement of saltiness safe product assortments through recombinant DNA technology<sup>2</sup> if fish, prawn and crab. Be that as it may, till ahead of schedule 1980s, mangrove wetlands were considered as no man's land both by the strategy creators and organizers all through the world, which brought about extensive scale corruption due to over abuse and change of mangrove wetlands for different purposes. The mangrove wetlands of India are likewise no special case to this uncontrolled abuse. (**V.Selvam et.al.**)

The components affecting the structure and elements of mangrove woodlands fluctuate in connection to worldwide, provincial, and neighborhood levels over various time scales. At the worldwide level, mangroves are at last constrained by temperature, yet at the provincial level the region and biomass of mangrove woodlands differ in connection to precipitation, tides, waves and streams. The security of the mangrove is impacted by saltiness, soil compose and science, supplement substance and elements, physiological resistance, predation and rivalry (**Smith et al., 2003**). It is more probable that a couple of these variables in blend come together (into play) over various worldly and spatial scales to control mangrove conveyance. Hurricanes and typhoons are normal in the Bay of Bengal and the Caribbean Sea and demolition of mangrove woods like Bhitarkanika due to the twister is very much archived (**Kathiresan, 2005; Chauhan, 2008**). There is affidavit of enormous amount of seaward dregs and also the salt-water immersion in the estuarine biological systems. A conspicuous ecological effect of the torrent is the physical harm of the mangroves that has come about because of waves and discharge. The store of sediment may prompt the stopping up of pores of the airborne underlying foundations of mangroves and causes add up to obliteration of the plant species and in addition changing the geochemistry of

mangrove biological systems (Ramesh et al., 2006; Ranjan et al., 2008; 2008a). The Aila typhoon on May 25, 2009 devastatingly affected the Indian Sundarbans, wrecking vegetation, slaughtering individuals, their domesticated animals and rendering a huge number of individuals destitute. The interruption of saline water through broken banks overwhelmed the towns, demolished mud houses and contaminated rice fields (Mukhopadhyay, 2009). Sicknesses additionally make pulverizing harms mangroves. For instance, Top Passing on sickness has harmed around 45 million Heritiera notorieties (Sundari) trees (about 20% of the whole woods) in Bangladesh (Hussain and Acharya, 1994). In like manner, - 7 - noteworthy harm is caused by the brushing of wild oxen, sheep, goats and camels in dry seaside regions of Gujarat. Youthful plants are harmed by barnacles and leaf eating crabs of the sesarimid family. A few caterpillars are parasites of Rhizophora organic products, and they restrain seed germination. Tamil Nadu has a coastline of 950 km. Broad mangrove wetlands are situated in two spots – in Pichavaram, Cuddalore locale and Muthupet in Thiruvavur and Thanjavur locale. Little fixes of mangroves have moreover been found along the Palk Strait and in addition in a portion of the islands of the Gulf of Mannar Biosphere Reserve. All these mangrove wetlands have been announced as Reserve Forests (total property of the legislature) and are overseen by the Tamil Nadu Forest Department. The Pichavaram mangrove wetland is situated in the northern extraordinary of the Cauvery delta, close to the mouth of Stream Coleroon. Its aggregate territory is around 1,350 ha, its numerous little islands are colonized by 13 genuine mangrove species. Nearness of Rhizophora species in expansive number is one of the vital highlights of this mangrove wetland from the point of view of biodiversity. The Pichavaram mangrove wetland is additionally rich in fishery assets. Yearly about 245 tons of fishery create is reaped from this mangrove wetland, of which prawns alone constitute 208 tons (85%) of the catch). The general population having a place with 17 villas of five income towns use the fishery and ranger service assets of the Pichavaram mangrove wetlands. An aggregate number of 1,900 fishers are every year reliant on the fishery assets for their employment; nearly 1,000 fishers fish occasionally in the mangrove waters. Nearly 800 to 900 steers touch the mangrove wetlands occasionally. (Reports at one time demonstrated that around 3,000 dairy cattle nibbled in these mangroves).

It is a **vulnerable prone zone** as flood might occur anytime and the people in the vicinity villages can be **impacted**. The following are the impact of the tsunami Loss of lives; Loss of and damage to fishing gears and crafts; Loss of thatched houses with mud walls and huts; Damage to houses; Loss of all livestock; Loss of all household items, including cooking vessels; Loss of personal properties including jewels and hard cash; Loss of textbooks and other items of school students; Total salinization of lands and water resources, including drinking water.

## II. REVIEW OF LITERATURE:

- **A.Rogers “Shrinking Large-Scale Population-Projection Models by Aggregation and Decomposition” August 1, 1976:** Amid the previous two decades social researchers have come to demonstrate dynamic financial frameworks of developing size and intricacy. In spite of an overwhelming dependence on perpetually refined rapid advanced PCs, notwithstanding, PC limit with regards to taking care of such frameworks has not kept pace with the developing requests for more point by point data. Thus, it is winding up always essential to recognize those parts of a framework which allow one to manage parts of it freely from the rest or to regard connections among specific subsystems just as they were autonomous of the connections inside those subsystems. These inquiries are, separately, those of disintegration and total, and their application toward 'contracting' vast scale populace projection models is the focal point of this paper.
- **Stanley K.Smith; “Further thoughts on simplicity and complexity in population projection models” Volume 13, Issue 4, December 1997:** This article is an audit of—and reaction to—a unique issue of Mathematical Population Studies that concentrated on the relative execution of less complex versus more unpredictable populace projection models. I don't endeavor to abridge or remark on every one of the articles in the extraordinary issue, yet rather show an extra viewpoint on a few focuses: meanings of straightforwardness and many-sided quality, observational proof with respect to populace conjecture exactness, the expenses and advantages of disaggregation, the potential advantages of consolidating gauges, criteria for assessing projection models, and issues of monetary proficiency in the generation of populace projections. I trust that further exchange of these and related themes will extend our comprehension of the projection procedure and make populace projections more helpful for arranging and examination.
- **Rogers A, Regional population projection models. 1985. 96 p. (Scientific Geography Series, Vol. 4.):** This monograph demonstrates to gauge subnational, or provincial, populace projections. National populaces are spatially disaggregated, and the creator dissects the advancement of numerous territorial populaces, each interconnected by interregional relocation streams. Section 1 displays the bend fitting and the part strategies for populace projections and additionally the UN's technique for producing urbanization projections. Part 2 considers the results of partitioning a total populace into spatially particular, interfacing provincial populaces that trade relocation in the two bearings. An out-movement in 1 locale turns into an in-relocation in another district, making a connection between the 2 territorial populaces. Section 3 portrays the demographer's

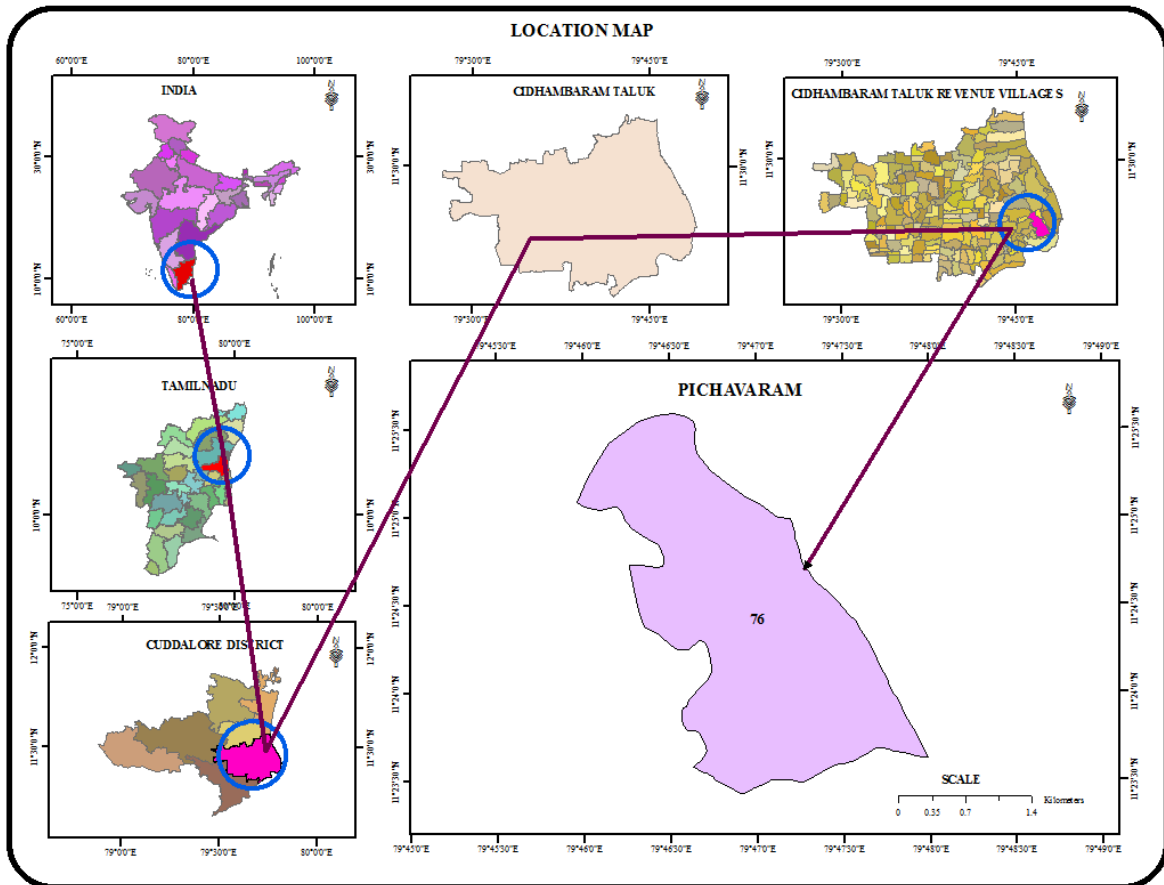
established age-disaggregated single-locale way to deal with populace projection, both the life table and the accomplice survival models and their application to subnational populace projection. Part 4 incorporates the age measurement of the demographer with the locational measurement of the geographer. Populaces disaggregated by age and district of home are progressed after some time and crosswise over space. At that point a reinterpretation of relocation between districts as a progress between conditions of presence sums up the multiregional or multistate model's consensus is given with a populace projection that is disaggregated by 4 distinctive conjugal statuses and 2 districts of habitation. Various cases in the test demonstrate to figure local populace development rates, age pieces, and spatial appropriation utilizing information from a few created and less created nations.

- **M. Rajkumar, "Phytoplankton diversity in Pichavaram mangrove waters from south-east coast of India"; April 24, 2007:** The consequences of an examination completed amid September 2002 to August 2003 on hydrography, arrangement and group structure of phytoplankton including chlorophyll 'a' (Chl-a) substance and essential profitability (PP) of the Pichavaram mangrove (South-east bank of India) are accounted for. Air and surface water temperatures changed from 30.0 to 34.8oC and from 29.7 to 34.2oC individually while the light annihilation coefficient esteems (LEC) (K) ran in the vicinity of 3.2 and 14.9. Saltiness esteems differed from 9.6 to 35.4‰ and the pH extended in the vicinity of 7.2 and 8.6. Variety in disintegrated oxygen content was from 3.2 to 6.5 ml l-1. The scopes of inorganic supplements viz., nitrate, nitrite, phosphate and silicate were: 7-36.23, 0.31-5.46, 0.28-3.70 and 12.26-56.64 µM individually. Chlorophyll 'a' substance went in the vicinity of 0.20 and 105.60 µg l-1 and the scopes of gross and net essential productivities (PP) were: 16.54-826.8 and 11.52-610.2 mg C m-3 hr-1 respectively. By and by a sum of 94 types of phytoplankton were recognized. Among these, the diatoms shaped prevalent gathering. Populace thickness of phytoplankton changed from 400 to 3,21,000 cells-l. While the pinnacle decent variety (5.23 bits/ind.) of the phytoplankton was seen amid summer season, the greatest populace thickness was found amid summer season agreeing with the stable hydrographical condition.

- **V. Selvam, "Assessment of community-based restoration of Pichavaram mangrove wetland using remote sensing data". VOL. 85, NO. 6, 25 SEPTEMBER 2003:** The effect of rebuilding of the debased regions of Pichavaram mangrove wetland was examined by looking at TM computerized information of 1986 (preceding reclamation) what's more, LISS III advanced information of 2002 (after reclamation). The investigation demonstrates that the region of the mangrove woodland cover has expanded by around 90%. A sciencebased, group focused and process-situated approach taken after for the rebuilding of the Pichavaram mangrove wetland in a joint effort with the Forest Division, Government of Tamil Nadu and cooperation of neighborhood mangrove client groups is primarily in charge of achievement of the exertion. This examination demonstrates that remote detecting information can be utilized as a checking apparatus to survey the adequacy of rebuilding also, preservation projects of the mangrove wetland, where immediate and normal physical checking is troublesome because of damp nature of the dirt and nearness of various tidal rivulets and waterways.

### **III. BACKGROUND OF THE STUDY**

Cuddalore district of Tamil Nadu is spread over 3,678 Sq. kilometers of Tamil Nadu. As per 2001 census, the district has the population of 22,85,395, comprising of 11,50,908 male and 11,34,487 Female population. Major food crops grown in Cuddalore district are paddy, groundnut, sugarcane, cholam, cambu, redgram, tapioca, greengram, blackgram, coriander, banana, maize, varagu, and cashewnut. Some other crops that are grown in the region are gingelly, cotton, groundnut, and coconut.



**Profile of the Study Area**

The Pichavaram mangrove is arranged around 240 km south of Chennai and around 45 km south of Cuddalore. It is situated between the velar stream in the north, the colroon in the south and the Uppanar in the west. It comprises of number of little and extensive islets encompassed by various rivers, trenches and channels. Vedaranya is one of the beach front pieces in Thanjavur locale. It falls inside the directions of - .Vedaranyam is one of the major sox real natural life havens and furthermore critical beach front wetland in Tamil Nadu. Bay of Mannar is the south east shore of India reaches out from Rameshwaram Island in the north to Kanyakumari in the south. The biosphere save was set up on eighteenth February 1989 mutually by legislature of India and administration of Tamil nadu.

**Aims:**

To calculate the Density of Population and the Human Labour Available in and around Pichavaram for Conservation of the Mangrove Forest

**Objectives:**

- To identify the Human labour in an around Pichavaram by calculating the population density, for conserving the Mangrove forest.
- To estimate the future population growth and percentage by Population Projection Model.

**IV. METHODOLOGY:**

In this study the maps of 2001 & 2011 has been made of PopluationDensityof the year 2001 and 2011 using GIS technology has been done in order to portray the community participation. The Total Population guide of 2001 and 2011; of all the 31 villages in and around the Pichavaram mangrove Forest. At that point the Population Projection Model was utilized for evaluating the future populace of 2021 through factual recipes appeared previously.

The formula used for the Population Projection Model :

For decade growth:

$$(1 + R_D) = \text{Population 2011} / \text{Population 2001}$$

Thus according to the formula above

$R_D$  = is found

As  $R_D$  is the decade growth rate.

Hence  $R_D\%$  = is found

This represents population increase in a decade.

Therefore according to the above formula the Population of 2021 could be found.

$R_D$  = 2011 population  $\times$  (1 +  $R_D$  %)

2021 Population = will be found

The estimated population of 2021 will be anticipated

**There is another method with the compounded annual average growth rate.**

$(1+R_D)^{1/n}$

N is the number of years

We will take the log of  $(1+R_D)^{1/n}$

$(1+R_A) = n^{1/n} \log(1+R_D)$

$R_A$  = Compounded annual average growth rate.

$R_A$  = will be found

$R_A\%$  = is the average percentage of growth rate per year.

$R_A\% \times 10$  = This is the percentage growth rate in 10 years.

Thus the population of 2021 can be calculated.

$R_A$  = 2011 population (1 +  $R_A\% \times 10/100$ )

2021 population will be derived.

**Data source:**

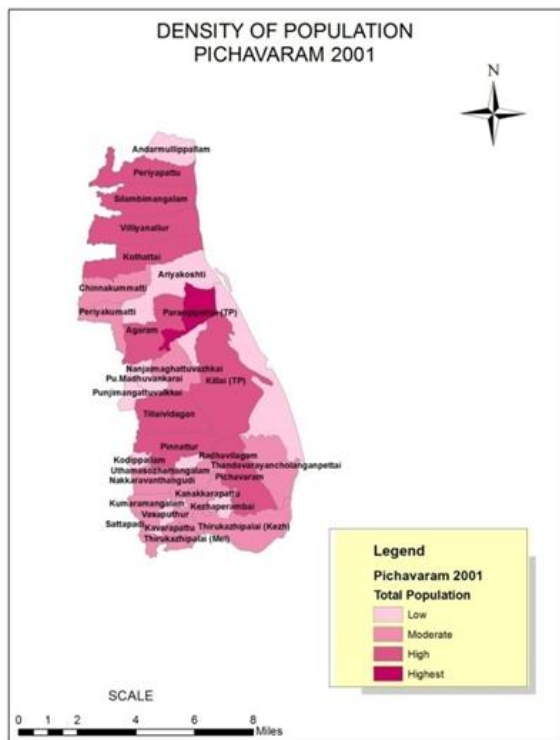
For the present study the population data has been collected from Census of India Handbook. The population data of about two decades have been collected; for the year 2001 & 2011 from the Census book information. The toposheet from survey of India for making the study area Map. Village maps, from the site [tnmaps.tn.nic.in](http://tnmaps.tn.nic.in). Mapping and spatial analysis: ARC GIS 10.1.

**Table : No. 1: Population 2001 and 2011 in percentage .**

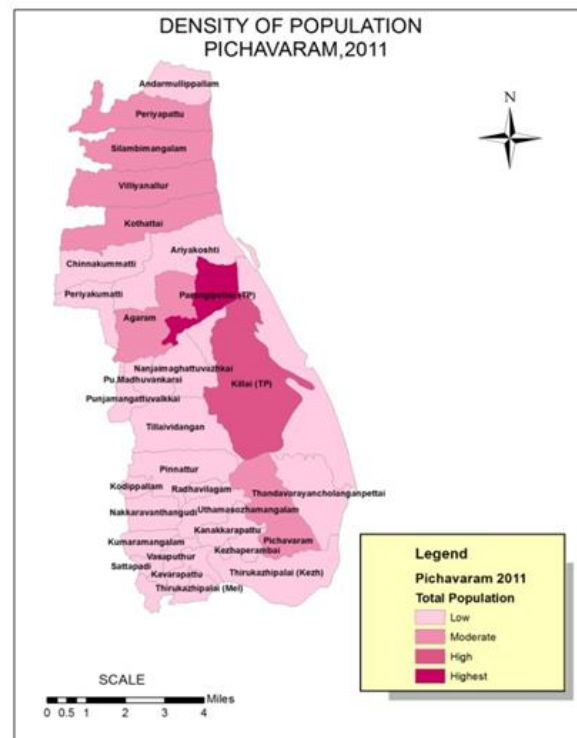
Sl.No	Village Name	Total Population 2001	Total Population 2011
1.	Vandiyampalayam	0.00%	0.00%
2.	Periyapattu	4.74%	4.75%
3.	Silambimangalam	6.62%	6.12%
4.	Villiyannallur	4.51%	4.41%
5.	Kothatai	4.70%	4.22%
6.	ChinoorPudupettai	0.00%	0.00%
7.	Chinnakomatti	2.80%	2.65%
8.	Parangipettai	26.34%	27.46%
9.	Agaram	6.24%	6.14%
10.	Periyamomatti	1.49%	1.62%
11.	Killai	12.47%	14.63%
12.	C.Manambadi	0.00%	0.00%
13.	Nanjamugathuvazhkai	2.06%	1.95%
14.	Maduvankarai	0.00%	0.00%
15.	Punjaimahathuvalkai	0.61%	0.56%
16.	Thillavidangan	3.92%	2.52%
17.	Pinnathur	3.94%	2.65%
18.	ThandavarayaSholaganPettai	1.16%	1.34%

19.	Pichavaram	3.75%	3.72%
20.	Kodipallam	0.86%	2.21%
21.	Radhavilagam	0.50%	1.49%
22.	Uthamacholamangalam	1.80%	0.69%
23.	Nakkaravanthankudi	2.01%	1.85%
24.	Kanakarapattu	1.42%	1.20%
25.	Keelaperambai	0.55%	0.56%
26.	Kumaramangalam	1.02%	0.94%
27.	Vasaputhur	0.89%	0.89%
28.	Keelathirukalipallai	1.40%	1.19%
29.	Kavarapattu	1.67%	1.72%
30.	Sithalapadi	1.41%	1.42%
31.	Melathirukazhipalai	1.11%	1.10%

**DENSITY OF POPULATION IN PICHAVARAM, 2001-2011**



**Fig:2**



**Fig:3**

**4.4.1. Density of Population in Pichavaram District 2001 and 2011:**

Pichavaram is a large village located in Tamil Nadu. In the year 2001 the total population was 2978 in Pichavaram village, while in the year 2011 the population of Pichavaram had become 3463. Pichavaram has 31 villages around it, which are considered for the study as because to observe that the other village people are also engaged in the Pichavaram forests activities, and how the pull and push factors are working here. Pichavaram Mangrove wetland has been demarcated into three zones viz. Agriculture zone, Wetland zone with vegetation and Non Vegetated wetland. The vegetated wetland can be classified in to two types; Mangroves and tidal swamps. Aquaculture of shrimps is carried out in about 40 ha area, around Pichavaram. Traditional and semi-intensive type of aquaculture is practised. Species of *Penaeus* are cultured in aquafarms. No mangrove area has

been converted for aquaculture. In the year 2001 Fig 2 it is observed that the highest population is in Parangipettai with 20,912 population. While many village have comparatively moderate population Periapattu, Silambimangalam, Villiyannallur, Kothattai, Agaram, Killai, Thillaividagan, Pinnattur, Pichavaram Chinnakummati, Periyakumati, Nanjaimaghattuvazhkai, Kavarapattu, Thirukazhipalai, Sattapadi; and the low populated villages are Andamullipallam, Ariyakosti, Radhavillagam, Kezhaperambai. Of these Radhavillagam has the lowest population 397. Thus it can be empirically derived that the places which has high population has the pull factor or in other words, due to more available activities population tend to cluster in Parangipettai. While in Pichavaram the population is moderate, since the primary activity is practiced in Pichavaram. Therefore the people of Pichavaram and some of the other village people must be maintaining the activities of the Pichavaram Mangrove region. Similarly in 2011 Fig 3 again it is observed that the population is high in Parangipettai with the population 25541 and low in Punjaimahathuvalkai with the population of 520. While the population in Pichavaram had also increased from 2001 to 2011 that is from 2978 to 3463. Therefore it is derived that in Pichavaram Mangrove forest the workers has increased from 2001 to 2011, which was very important order to stop the degradation of the mangrove forest in Pichavaram.

### **Population Projection Model**

PPM method has been used to anticipate the future population of Pichavaram mangrove forest and its villages around. Populace projection, in the field of demography, is a gauge of a future populace. Interestingly with intercensal evaluates and censuses, which more often than not include a type of field information gathering, projections ordinarily include scientific models construct just in light of prior information might be made by an administrative association, or by those unaffiliated with a legislature.

#### **4.15.1. Uses and Limitations of population Projection**

It is progressively vital to have fantastic insights on the populace and projections of the populace, for strategy advancement and for arranging and giving open administrations in various geographic regions. They are utilized for focal and nearby fund assignment; illuminating the arrangement of nurseries or day mind focuses; illuminating nearby and national approach; lodging and land utilize arranging; medicinal services arranging; displaying and anticipating human services markers; weighting studies; benchmarking different projections and as a control for littler territory projections.

Educator workforce models both at a national and nearby level; taking a gander at the ramifications of a maturing population; and making national and universal examinations, and so forth.

However, populace projections have impediments. A projection is an estimation indicating what happens if specific suspicions are made. The populace projections are drift based. They are, in this way, not approach based conjectures of what the administration hopes to happen. Numerous social and financial elements impact populace change, including arrangements embraced by both focal and nearby government. The connections between the different variables are mind boggling and to a great extent obscure.

#### **4.15.2. Consequences of Projection**

Population projections, similar to some different kinds of projections, may demonstrate that current patterns and arrangements are probably going to prompt results which are judged bothersome. In the event that new approaches are then presented, they may bring about the first projections not being figured it out. Be that as it may, this implies the projections will have satisfied one of their prime capacities, to demonstrate the outcomes of present statistic patterns with adequate notice for any vital move to be made.

Here we see that the Total population of 31 villages in 2001 was 79,398; while in 2011 the total population of 31 villages were 93009. We will anticipate the total population of 31 villages in the years 2021; thus for estimating the future population 2021 few assumptions should be taken they are like.

#### **4.15.3. ASSUMPTIONS:**

- Growth rate is constant.
- Change is only experienced at the end of unit time.
- Resultant change (i.e. interest) does not yield any change.

#### **Local population projection Model.**

For decade growth:

$$(1 + R_D) = \text{Population 2011} / \text{Population 2001}$$

Thus according to the formula above

$$R_D = 0.1714$$

As  $R_D$  is the decade growth rate.

$$\text{Hence } R_D\% = 17.14\%$$

This represents population increase in a decade.

Therefore according to the above formula the Population of 2021 could be found.

$$R_D = 2011 \text{ population} \times (1 + R_D \%)$$

$$2021 \text{ Population} = 1,08,951.$$

The estimated population of 2021 will be 108951 with the decadal growth method

**There is another method with the compounded annual average growth rate.**

$$(1 + R_D)^{1/n}$$

N is the number of years

$$=(1.1714)^{1/10}$$

$$=(1.1715)^{0.1}$$

We will take the log of  $(1 + R_D)^{1/n}$

$$\text{That is } \log (1 + R_D)^{1/n} = \log (1.1715)^{0.1}$$

$$= 0.00687$$

$$(1 + R_A) = n^{1/n} [1/n \log (1 + R_D)]$$

$R_A$  = Compounded annual average growth rate.

$$R_A = 0.01594$$

$R_A\%$  = 1.594% this is the average percentage of growth rate per year.

$R_A\% \times 10$  = 15.94% This is the percentage growth rate in 10 years.

Thus the population of 2021 can be calculated.

$$R_A = 2011 \text{ population} (1 + R_A\% \times 10/100)$$

$$2021 \text{ population} = 1,07,835$$

$$\text{The Actual population} = 1,08,951 + 1,07,835/2$$

$$= 1,08,393$$

Thus the Population of 2021 is estimated 1,08,393

## V. CONCLUSION:

Thus in this chapter the human strength that could be availed in and around Pichavaram forest that has been determined by showing the existing population, population growth and also the upcoming population growth. Maps have been made with the help of Census data and digitizing them on ARC GIS software by entering the values on attribute table and then projecting the values on the maps, as a thematic map. the Total Population map of 2001 and 2011; of all the 31 villages in and around the Pichavaram mangrove Forest. Population in 2001 was 79398 and on 2011 was 93009.

Then the Population Projection Model was used for estimating the future population of 2021 through statistical formulas shown above. With the former formal it is been derived that the population has been increased. Thus in the population projecting model it is observed that the population is increase in 10 years by **15-17%** . Hence the population in the year 2021 will be **1,07,835-1,08,951or 1,08,393** approximately.

## REFERENCE

- **Kathiresan. k. (2000)**, "A Review of Studies on Pichavaram Mangrove, Southeast India", Hydrobiologia, Vol.430, pp. 185-205.
- **Nagelkerken. I. et al (2000)**, " Importance of Mangroves, Seagrass Beds and the Shallow Coral Reef as a Nursery for Important Coral Reef Fishes", Estuarine, Coastal and Shelf Science, Vol.51, pp. 31-44.
- **Satyanarayana. B et al (2002)**, "Mangrove Floristic and Zonation Patterns of Coringa, Kakinada Bay, East Coast of India" Wetlands Ecology and Management, Vol.10, pp. 25-39.
- **Rogers, A, 1971** Matrix Methods in Urban and Regional Analysis (Holden-Day, San Francisco) Google Scholar
- **Rogers, A, 1975** Introduction to Multiregional Mathematical Demography (John Wiley, New York) Google Scholar
- **V. Selvam\***, K. K. Ravichandran, L. Gnanappazham and M. Navamuniyammal; "Assessment of community-based restoration of Pichavaram mangrove wetland using remote sensing data"
- Census of India, <http://censusindia.gov.in/>

IOSR Journal of Humanities and Social Science (IOSR-JHSS) is UGC approved Journal with Sl. No. 5070, Journal no. 49323.

Dr.M.Sakthiveland Debapriya Dutta "Density of Population and the Human Labour Available in and around Pichavaram for Conservation of the Mangrove Forest.IOSR Journal Of Humanities And Social Science (IOSR-JHSS). vol. 23 no. 06, 2018, pp. 18-25