Assessment of Health Care Centers Using Geospatial Tools

Mr. Sandip. N. Deshmukh

Mr. Maruti. A. Sose

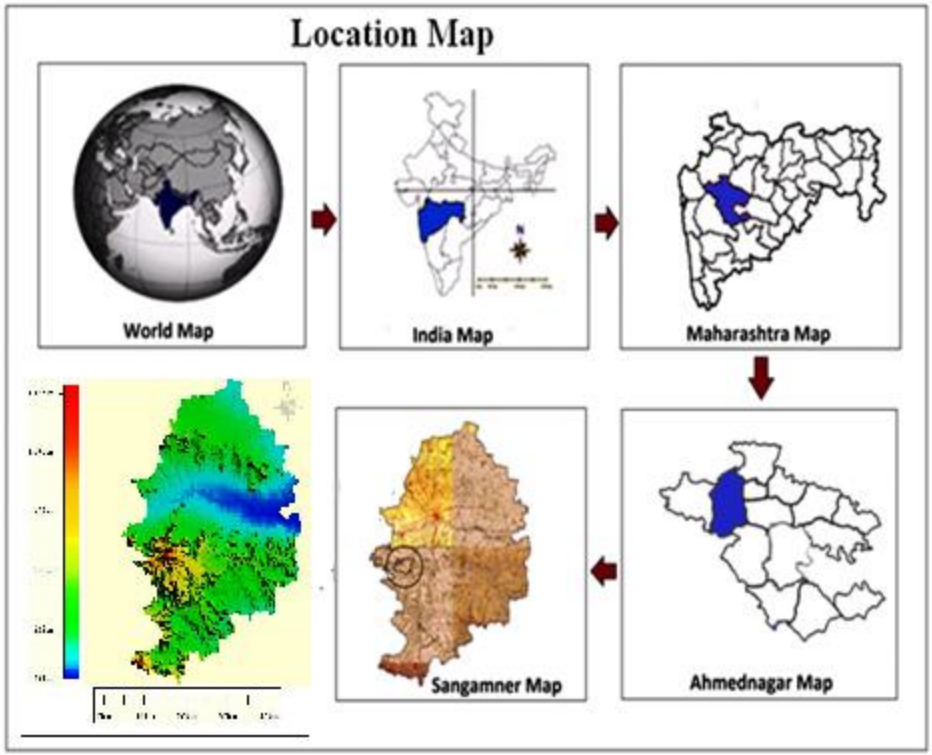
P.G., Department of Geography,

S. N. Arts, D. J. M. Commerce and B. N. S. Science College(Autonomous), Sangamner, Dist. Ahmednagar

(Maharashtra, India)

- The ‘Bhore Committee’ in 1946 introduced the concept of a Primary Health Center (PHCs) .
- Since 1951, PHCs have been established as an integral part of community development programs.
- For the first time, the National Rural Health Mission (NRHM) made an effort to develop Indian Public Health Standards (IPHS) with a vast network of peripheral public health institutions in the country(2007).
- This paper investigates the analysis of health centers at the microlevel, and with the help of this analysis, we are preparing a new ideal plan for health centers..
- An ideal model has been created using GIS and GPS techniques for PHC’s and sub centers for Sangamner tahsil (Maharashtra, India), considering population size, accessibility, local needs, and IPHS rules developed under NRHM.

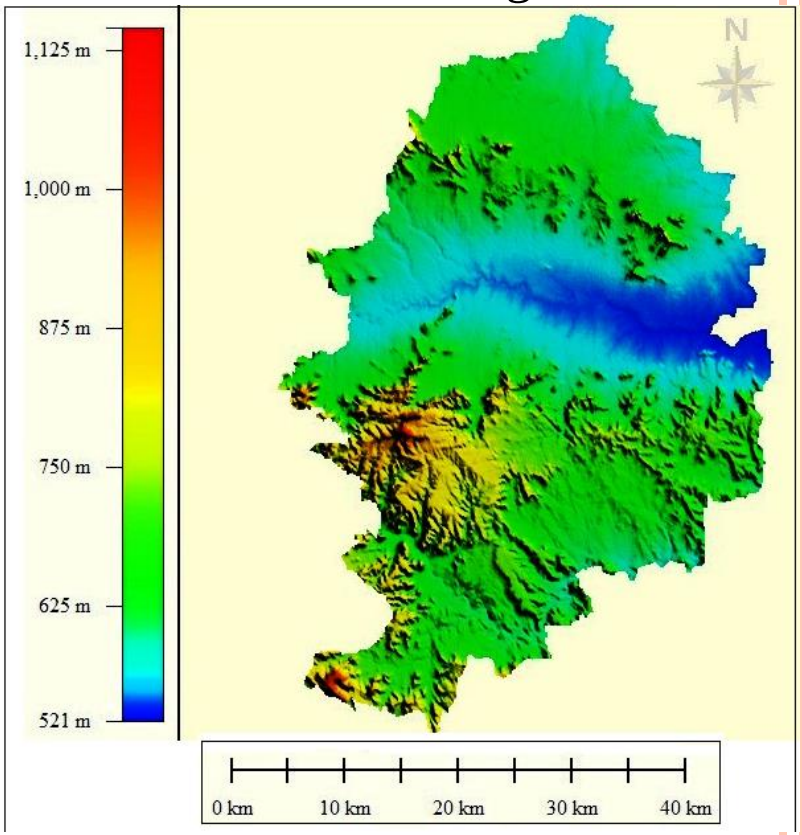
Study Area :



- Latitude $19^0 12' 52''$ N to $19^0 45' 58''$N and
- Longitude $74^0 00' 28''$E to $74^0 29' 17''$ E.
- Total rural geographical area:

  1703.648 sq. km.
- Minimum height : 521 met.
- Maximum height : 1156 m (Baleshwar)

- Sangamner Tahsil occupies a 9.79% area (1705.6 sq km) out of the district Ahmednagar, which covers an area of 17,048 sq km.
- It is located in the northwest direction of the Ahmednagar district.



Objectives:

- To analyze the spatial distribution of health care centers in Sangamner Tahsil, (MS, India).

- To examine the facilities available in the PHC's of the study region.

- To develop a suitable accessibility plan for health care centers with the help of the Geographical Information System (GIS).

Data Base and Methodology:

- **Primary Data: Personal** Interviews, Questionnaires, and Field Visits
- **Secondary Data:** District Census Handbook, Block Development Medical Office, and other important offices; satellite data; GIS and GPS Techniques.

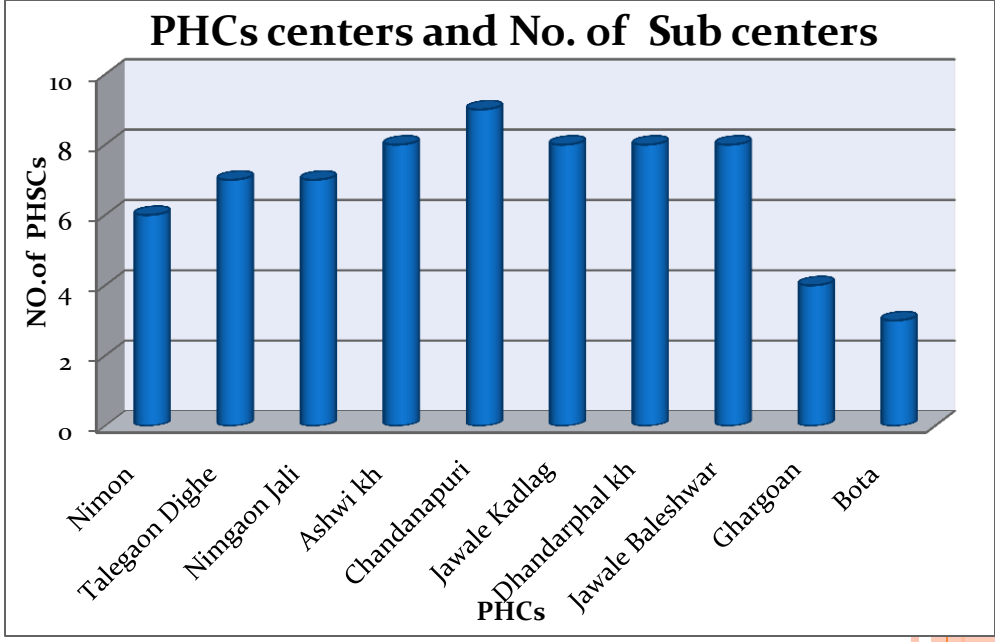
Indian Public Health Standards (IPHS) Guidelines norms ((2012)

Area	PHCs	PHSCs
Hilly/Tribal/Desert	20,000	3,000
Plain area	30,000	5,000
Average Radial Distance (Km)	6.37	2.67
Average Rural Area (Sq Km)	127.55	20.56
Average Number of Villages	26	4

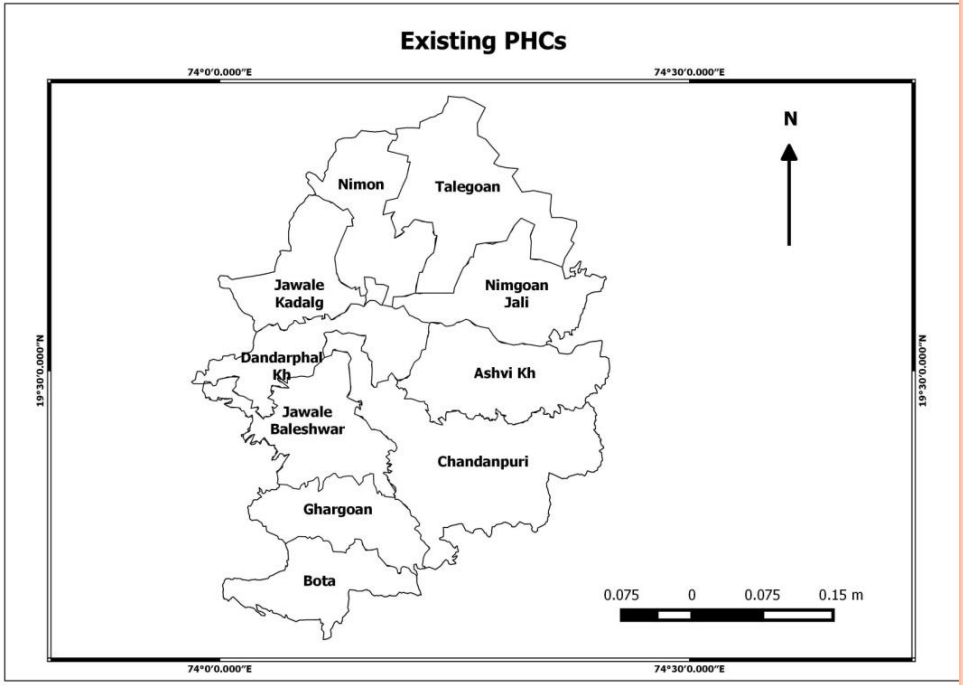
- But as per norms like distance, area, and population, some health centers are established in unsuitable locations that are inaccessible to people.
- Population size is increasing, therefore the more burden on PHCs and PHSCs centers.

Distribution of PHC's:

- Uneven distribution of the PHCs and sub centers
- 10 PHCs and 68 sub centers are located in different locations in Sangamner Tahsil.
- As per Norms, the number of sub centers per PHC is = 06.



Sr. No.	PHCs	No. of Sub centres (2019)
1	Nimon	06
2	Talegaon Dighe	07
3	Nimgaon Jali	07
4	Ashwi kh	08
5	Chandanapuri	08
6	Jawale Kadlag	08
7	Dhandarphal Kh	08
8	Jawale Baleshwar	07
9	Ghargaon	04
10	Bota	03
	Total	66



Availability of Services & Manpower :

Sr. No.	Facilities	%	Sr. No	Facilities	%
I	Buildings	100	VI	Availability of Wards	100
II	OPD	100	VII	Availability of Beds	100
III	Operation Theatre	100	VIII	Dispensary	90
IV	**X-ray Unit**	**00**	IX	Staff Quarters	100
V	Pathological Lab	90	X	**Vehicles**	**50**

- A few of the services are unavailable as per norms.

  i.e. X-ray Unit, Vehicles, etc

Availability of Manpower :

Sr. No	Staff	Requirement	Actual	Essential
1	Medical Officer-MBBS	29	17	12
2	MO-AyUSH#	2	1	1
3	Accountant/Clerk	14	8	6
4	Pharmacist	14	7	7
5	Pharmacist Ayush#	-	-	-
6	Nurse-midwife(Staff-Nurse)	20	12	8
7	Health workers(F)	47	22	25
8	Health Asstt.(Male)	24	13	11
9	Health Asstt. (Female)/LHV	20	11	9
10	Health Educator##	4	1	3
11	Data entry cum computer operator	11	6	5
12	Laboratory technician	9	5	4
13	Cold Chain & Vaccine Logistic Assistant	3	1	2
14	Multi-skilled Group D worker	20	10	10
15	Sanitary worker cum watchman	4	1	3

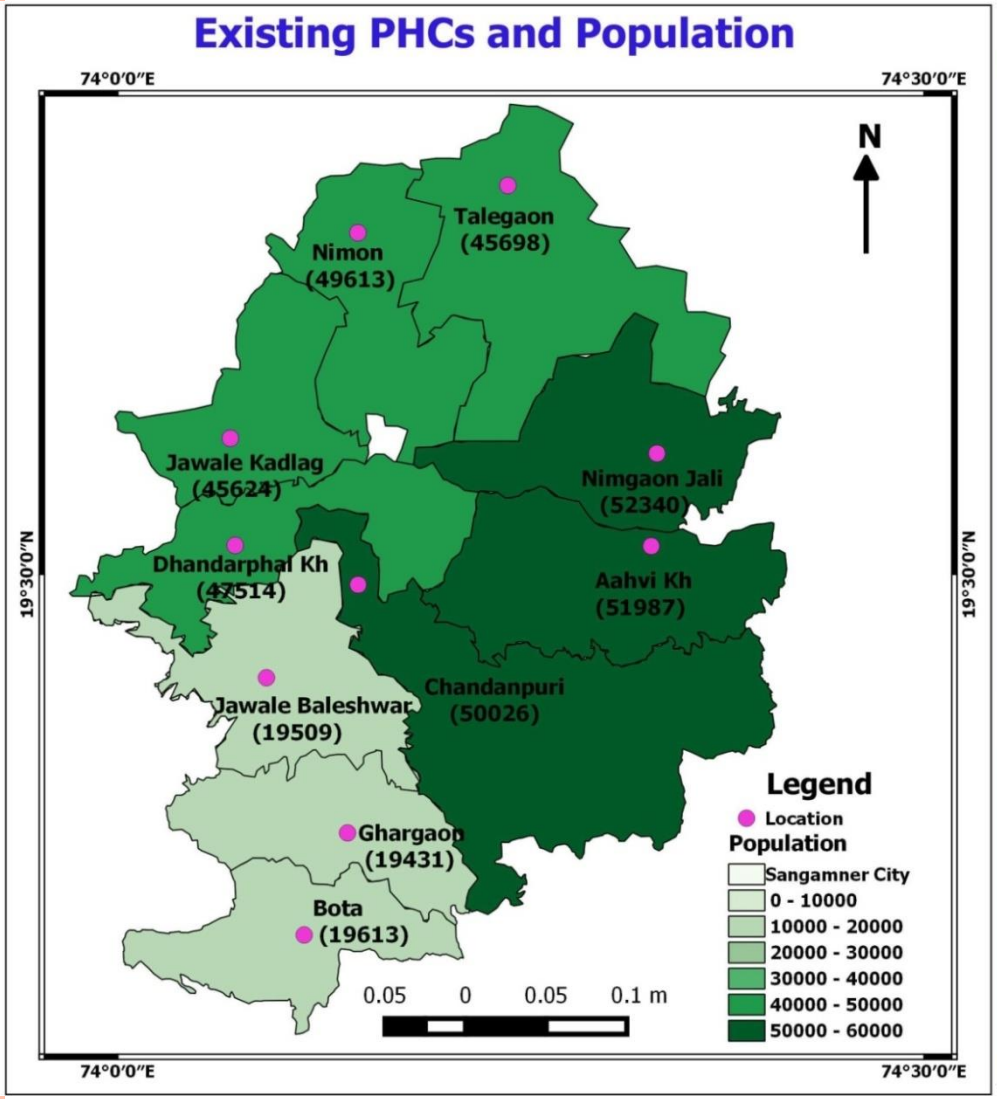
- There is insufficient staff in the study area.
- All PHC's centers have required 221 staff.
- But it has an actual 115.
- Therefore, in the study area, there is a need for 106 staff members PHC's centers in the study area.

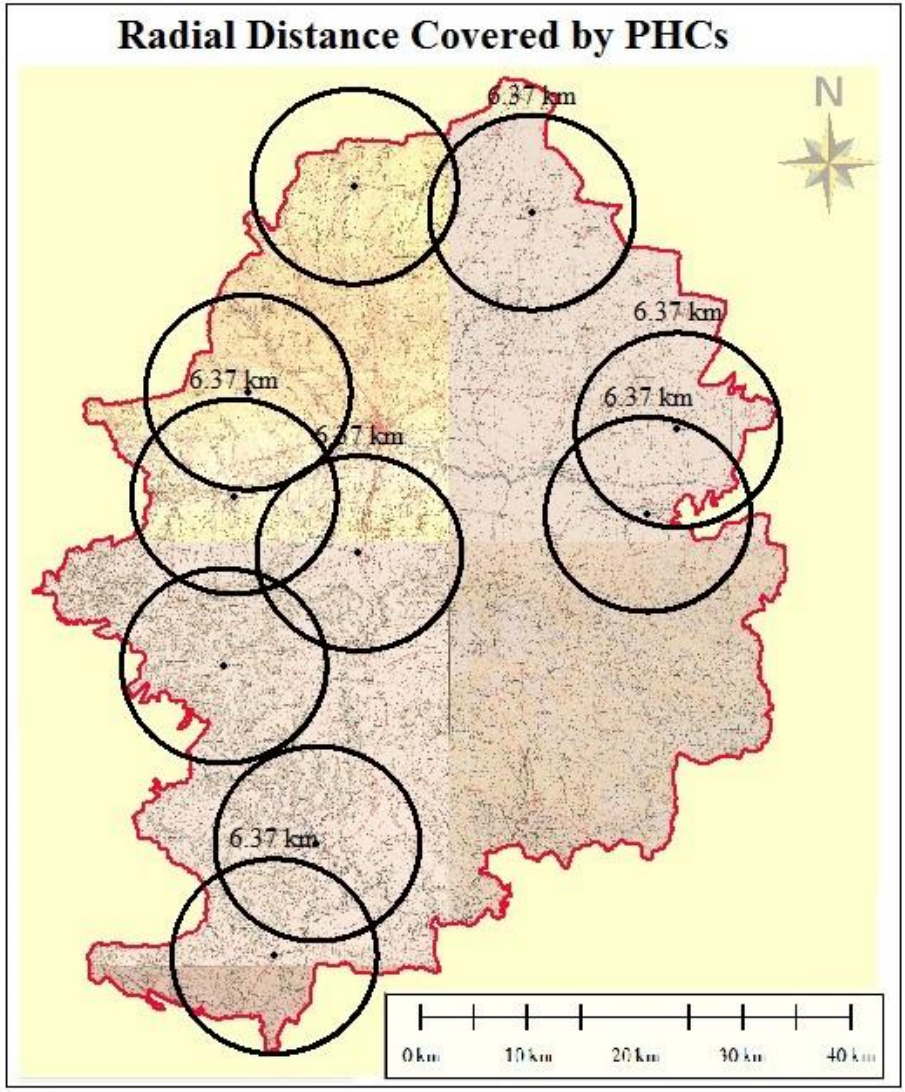
Primary Health Centers and Outdoor Patients

No. of Patients	<50	50 to 100	100 to 150	>150	Total
No. of PHCs	1	4	3	2	10

- According to IPHS norms, the average number of patients attending the PHCs is 40 per doctor per day.
- Outdoor patients: highest in Dhandarphal Kh (186) and lowest in Ghargaon (45).

PHCs	Population (2019)	OP Averagely Per day	No. of Beds
Nimon	49613	100	06
Talegaon Dighe	45698	70	12
Nimgaon Jali	52340	126	06
Ashwi kh	51987	70	06
Chandanapuri	50026	100	06
Jawale Kadlag	49613	175	06
Dhandarphal Kh	45698	186	06
Jawale Baleshwar	52340	50	06
Ghargoan	51987	45	06
Bota	50026	60	06



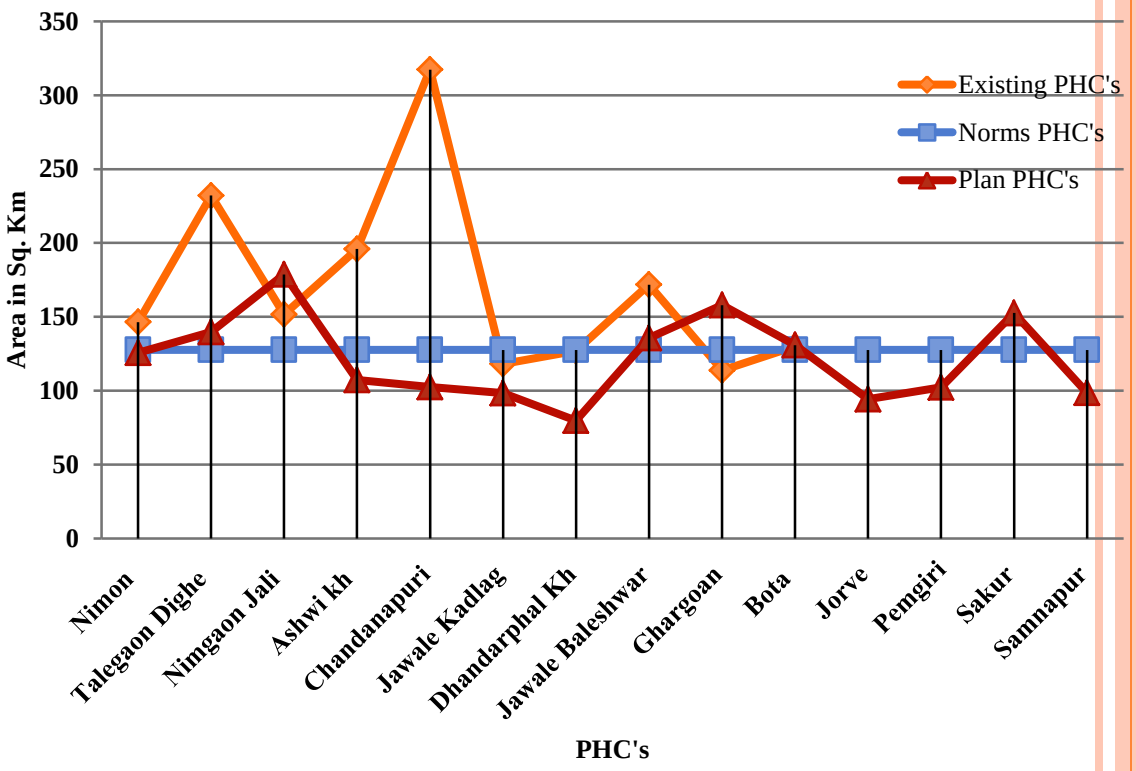


- 3 PHC's more than 50,000 Population
- 4 PHC's between 45,000 to 50,000 Population
- 3 PHC's near to 20,000 Population

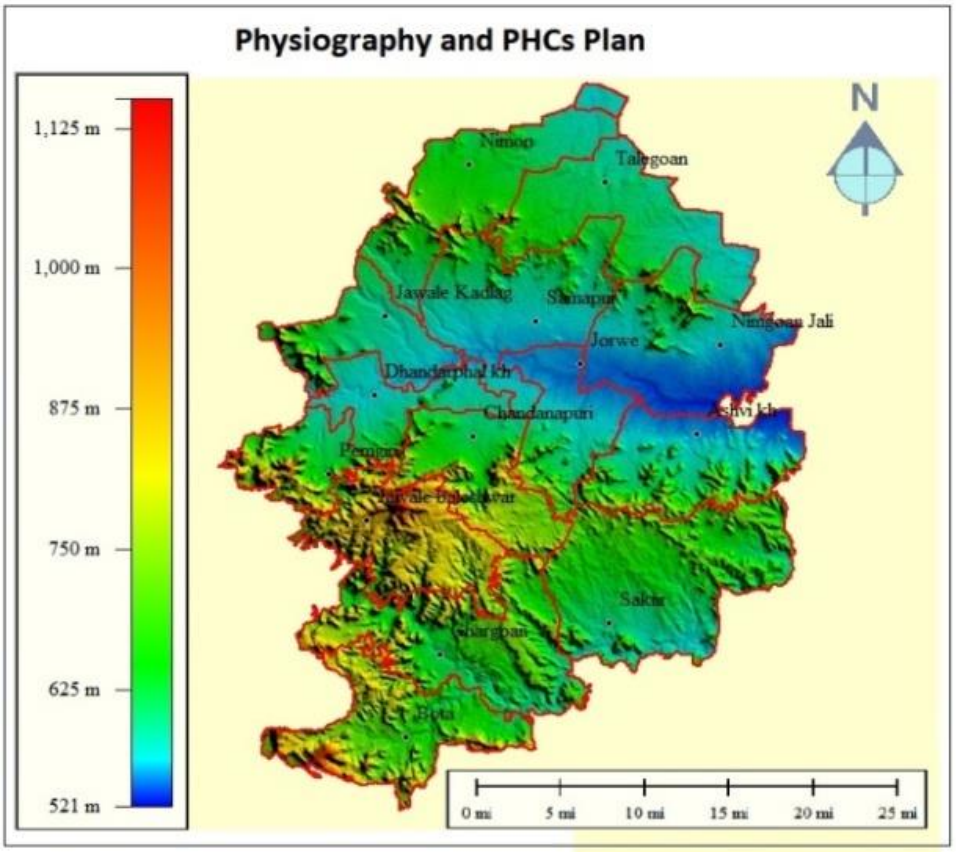
- Average radial distance 6.37 km for PHC's.
- Average radial distance 2.67 km for Sub-centers .

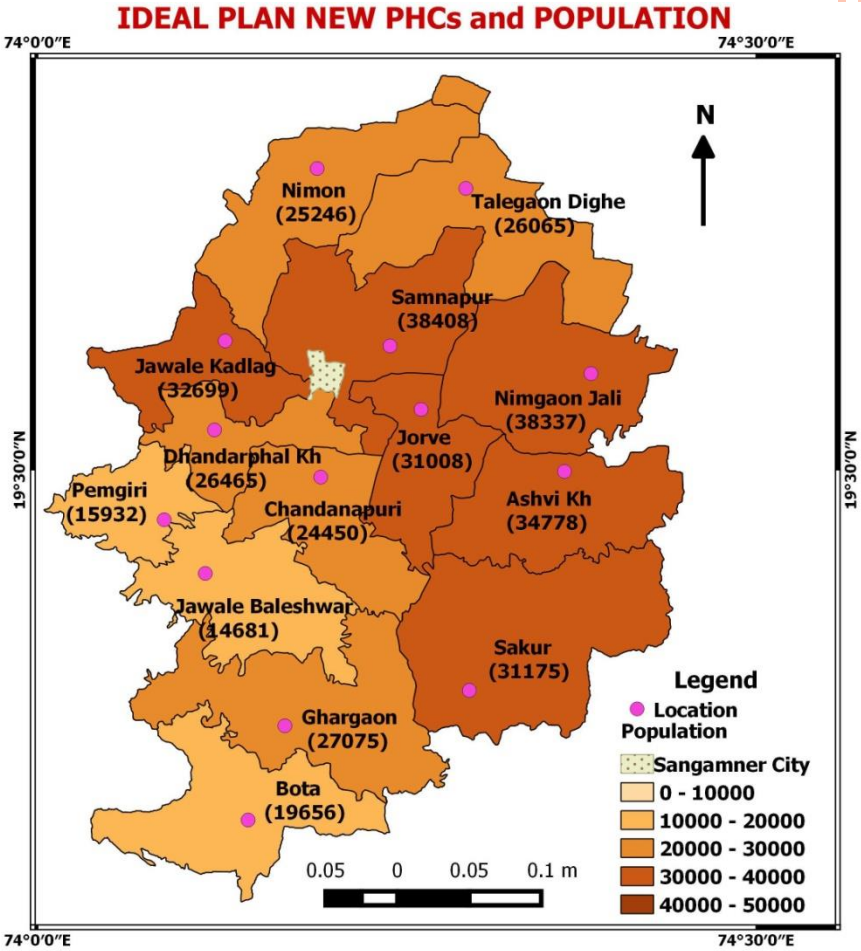
Comparative Graph of PHC's Area : Existing, Plan & Norms

PHC's	Area Sq km (old)	Area sq km (New)
Nimon	146.4	125.55
Talegaon Dighe	232.04	139.72
Nimgaon Jali	151.58	178.69
Ashwi kh	195.87	107.21
Chandanapuri	317.34	102.44
Jawale Kadlag	118.11	98.31
Dhandarphal Kh	127.04	79.74
Jawale Baleshwar	171.7	135.67
Ghargoan	113.65	157.85
Bota	129.91	130.8
Jorve	-	94.21
Pemgiri	-	102.3
Sakur	-	152.62
Samnapur	-	98.53



- According to Norms – average rural area 127.55 sq km



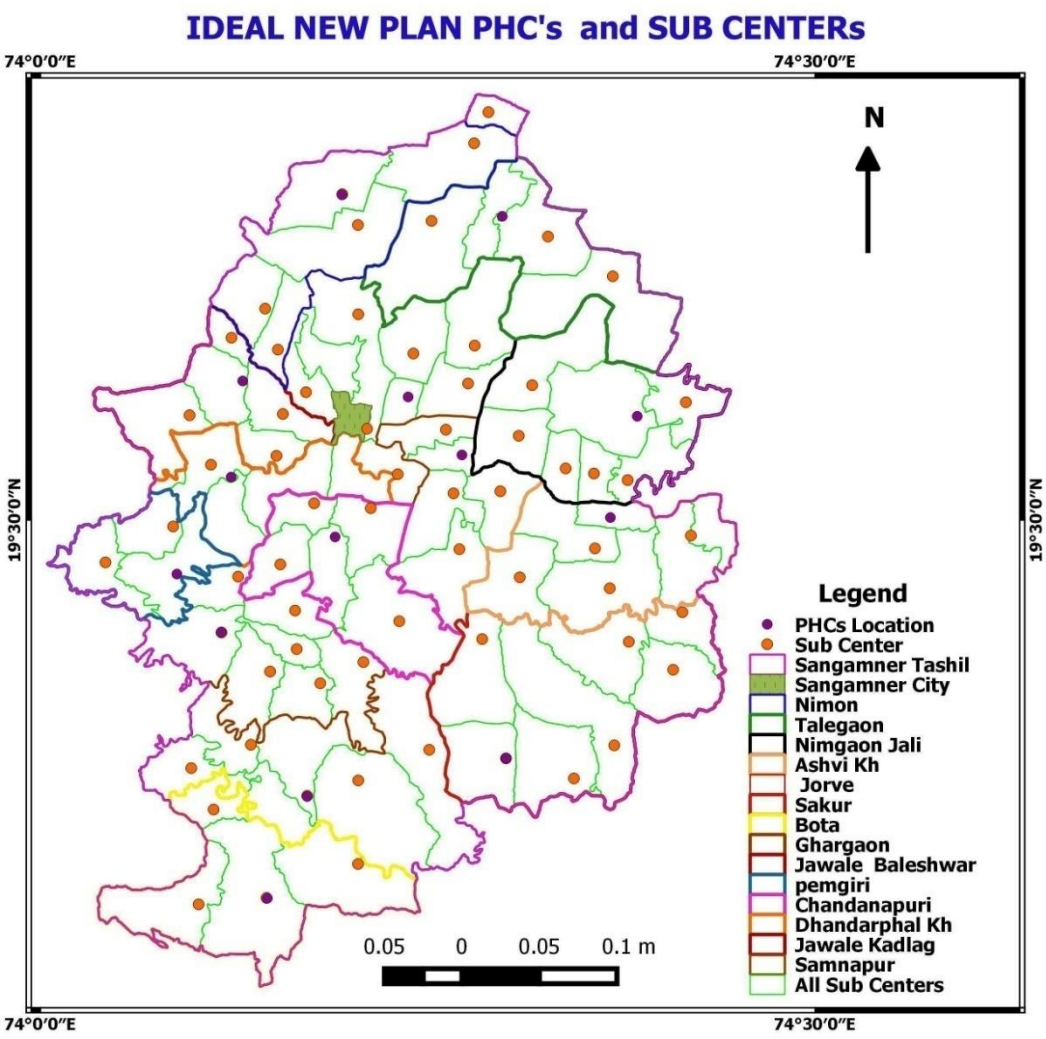


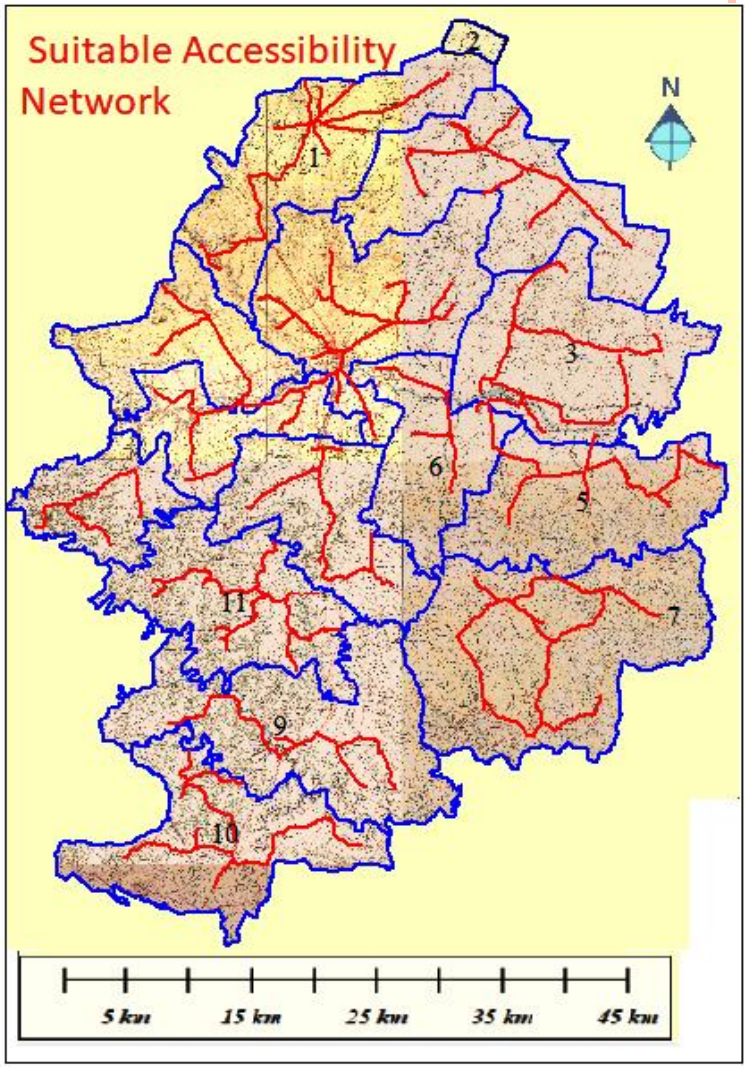
- Total geographical area of Sangamner tahsil 1705.6 sq km & Rural area 1703.648 sq.km.

❖ Minimum height : 521 met.

❖ Maximum height : 1156 met (Baleshwar)

❖ Ideal 14 PHC,s location in Sangamner Tahsil


IDEAL NEW PLAN PHC's and SUB CENTERs
74°0'0"E
74°30'0"E
19°30'0"N
N
0.05 0 0.05 0.1 m
Legend
PHCs Location
Sub Center
Sangamner Tashil
Sangamner City
Nimon
Talegaon
Nimgaon Jali
Ashvi Kh
Jorve
Sakur
Bota
Ghargaon
Jawale Baleshwar
pemgiri
Chandanapuri
Dhandarphal Kh
Jawale Kadlag
Samnapur
All Sub Centers


Suitable Accessibility Network
N
1
2
3
5
6
7
9
10
11
5 km
15 km
25 km
35 km
45 km

Conclusions

- As per norms in the study area, there is an uneven distribution of health centers.
- Various PHC's are inaccessible to the patients due to the maximum distance, physiography, and transport connectivity.
- As per the norms, the existing PHCs are meant for larger populations.
- Hence, there is a scarcity of available facilities, staff, and doctors.
- Manpower is unfulfilled.
- There is a need for well-defined planning by the government to fulfill the health care needs of the people in rural areas.

Suggestions

- There is a need for additional 3 CHC's, 4 PHC's, 12 sub centers, 106 supporting staff, and infrastructure facilities.
- We are preparing the new ideal plan of PHC's and sub center distribution as per norms and considering the local need, accessibility, distance, relief, etc. with the help of GIS and GPS.

Significance :

- This plan is applicable to the local factors of each tahsil in the country, and it will be a role model to create a new ideal plan for PHC's for that tahsil.


Thank You...