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Determinants of Food Security and Population Growth with reference to Palghar District, Maharashtra

Kokane P.P^{1*} and Jaybhaye R.J²

¹Assistant Professor, Department of Geography, University of Mumbai
Email Id. kokanep2010@gmail.com , Mb:9767032930

² Professor and HOD, Department of Geography, Savitribai Phule Pune University
Email Id. jaybhayerg@gmail.com

ABSTRACT:

Food security in the present time has importance issue and more on the development agenda of developing countries than in developed countries. Exponential population growth in developing country like India increases the risk of food insecurity not only in the long term but also in the short term. In this case, it becomes a difficult task to attain food security at the regional level due to complexity of patterns in population and food security. Regional inequalities in context of food insecurity coupled with population growth have remained a critical issue of discussion in the rural area of Maharashtra. Comprehensive analysis of food security in the form of availability, accessibility and absorption needs to undertake for the understanding of patterns involved in it. In this way, present study takes into account and analyze determinants of food security in relation to population growth in Palghar District. The result reveals that levels of food availability, accessibility and absorption are highly influenced by growth in population of the study area.

KEY WORDS: Population Growth, Availability, Accessibility, Absorption of food.

***Corresponding Author:**

Mr. Kokane P.P.

Department of Geography,

University of Mumbai,

Santacruz (E) 400098.

Email id:kokanep2010@gmail.com,

Mobile No:9767032930

INTRODUCTION:

In his work on essay of population, Thomas Malthus argued that increase in population is in geometric proportion whereas food production grows in arithmetic proportion (Malthus, 1878). It is forecasted that the world's population exceed 9 billion in the year 2050 (United Nations, 2011). Similarly, it is also a big challenge to feed the world population in the wake of changing diets, increasing non-food demand for agricultural products, declining growth in agricultural productivity and uncertainties arising from changing weather patterns. To commensurate with the rising world population, a widely cited study (FAO, 2006) projects that it needs to increase food production with 70 per cent between 2005-07 to 2050 to feed the global population. On the other side, a population already peaked in Europe, and it is leveling off in the Americas and Asia, whereas the population in Africa will grow rapidly at least 2050 and like India where more than 33% percent population is estimated to be absolutely poor and almost 50% per cent of all children malnourished directly or indirectly. (Dev M. and Sharma, 2010). Despite increasing production of food grain in the range of 51 million tones (1950-51) to 234 million tones (2010-11), has increased four times but a major proportion of the population in India progressively undergo from malnutrition and lack of food grains (NRAA, 2011). The stark contrast in the patterns of food security and population growth drives the researcher to investigate relationship and patterns between them. This paper tries to evaluate the association between population growth and food security determinants in Palghar District of Maharashtra.

Food security- Definition and its determinants

Food Security is dynamic and ever-demanding issue of study in the 21st Century. Definition of food security takes into consideration several aspects like “physical, social as well as economic access to food to all populace at all times” and in addition to “sufficient, safe and nutritious food” which “fulfill dietary requirements and food preferences” for “active and healthy life”. Above definition (FAO, 1996) takes into account three food security determinants namely: i) Availability of safe and nutritionally adequate food; ii) physical as well as economic access to food to every household on a sustainable basis; iii) absorption of food to have sufficient nutrition from food supply (FAO, 2015).

OBJECTIVES:

Present studies specify the following objectives:

1. To analyze the relation between availability, accessibility, absorption of food and population growth in Palghar District.
2. To find out patterns of food security and its determinants score viz-a-viz population growth of the study area.

DATABASE AND METHODOLOGY OF RESEARCH:

Main data sources for present study are secondary in nature. Most of the data is derived from sources namely Census data of 2011, Economic Survey of Maharashtra, Socio-Economic Survey of Palghar, District Statistical Handbook and respective departmental report of Government of Maharashtra. The various statistical techniques and methods used for this study are percentage, ratio, composite Z-score test and correlation matrix. All output data and results have been represented in suitable diagrams and maps.

STUDY AREA:

Newly formed district i.e 36th district of the Maharashtra is Palghar. Its extent is between 19°41' to 44°76' North latitude and 49°16' to 72°25' East longitude respectively. It covers 5344 square kilometers area which accounts about 1.74 per cent area to state total area. It lies between Valsad to its North, Nashik is to its East, Thane is to its South while the Arabian Sea is to its west. Total Population as per 2011 census for Palghar is 29,90,116 person. 559 persons per square kilometers is population density while sex-ratio of study area is 987 female per 1000 male. In the study region, SC population accounts 2.91 per cent and ST population 37.39 per cent together contributing 40.3 percent of total population. Most of the population in Palghar District is occupied in agriculture activities(Kokane and Jaybhaye,2019).

DISCUSSION AND RESULTS

Population Growth

As compared to the population growth of Palghar between the year 2001 and the year 2011, there is 0.29 percentage increase in it(Table-1). In terms of number, high population growth is seen in Vasai Tehsil of Palghar District. Generally, coastal parts of the Palghar district show a high population growth rate than central plain, eastern hilly and forest part of Palghar district due to peri-urbanisation and transportation facilities in the surrounding region. Population growth of the study region is classified into three types based on z-score value, tehsils with z-score between 2.61 to -0.10 are categorized into high population growth region, medium population growth regions are those tehsils with population growth between -0.10 to -0.53 whereas below -0.53 population growth are low population growth regions (Fig-1).

Population Growth and Food Availability

In this work, food availability determinants are analyzed with the help of indicators such as production, productivity, irrigation extent and connectivity (Table-2). All these indicators are

intimately allied with food security and they help to understand broader framework of status of food availability in Palghar district.

Rice is major crop of Palghar district whereas minor crops are nachani and pluses. Most of the agricultural production by farmers is for subsistence purpose. In terms of total production is concerned, Palghar tehsil is having highest production whereas Mokhada is with lowest production in the study region. Same pattern of production repeats with productivity in Palghar district i.e. Palghar with high yield per hectare and Mokhada is with lowest yield per hectare. Level of production and productivity are very well reflected in irrigation extent with Dahanu and Palghar are having high area under irrigation. Tehsils with low irrigation area are Vada, Mokhada and Vikramgad respectively. Connectivity through roads and different mode of transportation help to connect food production area with food distribution. In Palghar district, Talasari rank first in high road per hundred square kilometers. Tehsils located in eastern part of study area with hilly and undulating topography have less connectivity of roads. Such tehsils are Mokhada, Jawhar and Vikramgad.

Status of food availability in Palghar district is derived in context of the relationship between population growth and indicators of food availability among tehsils in the study region. Out of eight tehsils in Palghar District, Talasari, Vikramgad and Vasai show the high status of food availability, the medium status of food availability are in Dahanu, Jawhar, Vada and Palghar while the low status of food availability is in Mokhada Tehsil (Table3 and Fig.2).

Population Growth and Food Accessibility

Food security is not merely product of food availability but also ‘physical and economic access’ to matter lot in attaining food security of region. Indicators of food accessibility are taken into consideration in such a way that they reflect social as well as economic access to food. Accessibility indicators are PCI(per capita income), % of BPL population, % of ST population to total population, % of rural female literacy, % of main workers to total population, % of agricultural laborer to total population and FPS(fair price shops) per lakh population respectively(Table-4).

PCI and % of BPL population are inversely proportionate with each other in study area. Tehsil Vasai has high PCI and low BPL population, while Mokhada, Jawhar and Vikramgad situation is vice-versa. In the economic access of food ,PCI and % of BPL population are two determinants of food security. Percentage of ST population to total population of district is more than state average. High distribution of tribal population to total population is seen in in tehsils namely Mokhada, Jawhar, Vikramgad and Talasari. Educated females play important role in accessibility and nutrition of food at household level. Positive relation is seen among female literacy

and accessibility and absorption of food at households especially in rural area. Rural female literacy is high Vasai and Palghar tehsils while it is low in hilly, forest and tribal tehsils located in eastern part of study area namely Mokhada and Jawhar.

Percentage of main workers to total population reflect status of working population of area which in turn help to understand level of livelihood opportunities available in that particular area. In this context, Vikramgad, Mokhada and Dahanu are having high percent of main workers and Talasari tehsil have low proportion of it. Same picture is continuing with agricultural labourers and their distribution. Physical access to food is attainable through PDS coverage of study area, FPS per lakh population are distributed highly in Vada(87.5%), Mokhada (77.6%) and Jawhar (70.61%). Similarly it is lowest in Vasai tehsil (14%)

Based on z-score values, the status of food accessibility in Palghar district is divided into high, medium and low population growth region. There is a close association among population growth and seven indicators of food accessibility. Status of food accessibility in relation to population growth is high in Talasari, Dahanu and Palghar respectively (Table-5). Medium status of food accessibility is in Vada and Vasai while low status is in Vikramgad, Jawhar and Mokhada respectively (Fig-3).

Population Growth and Food Absorption

Percentage of households with access to toilets and safe drinking water are taken into consideration as determinants of food absorption. Sanitation, hygiene and assimilation of food are essential requirement for proper absorption and nutrition of food. It is seen that Talasari, Dahanu, Jawhar and Mokhada have high percent of household with toilet facility, and it is low for Vasai tehsil. 55.39 percent household of Palghar district has access toward potable drinking water facility. Inter-tehsil variation in food absorption is better represented in relation to population growth with the help of z-score values. High status of food absorption in relation to population growth is in Talasari and Vasai respectively, Vada, Palghar and Dahanu tehsils are with medium status of food absorption while the low status of food absorption is in Vikramgad, Jawhar and Mokhada respectively (Table-7 and Fig-4).

Population Growth and composite Food Security

In the resultant outcome, there is a close connection between food security and population growth. Status of food security has to improve to match with growing needs of the population. All the 13 indicators of food security and population growth in Palghar District give the complete status of food security in the study region. Eight tehsils of Palghar district have been categorized into high, medium and low population growth region in terms of Z-score values ranges from 1.20 to -0.70.

Dahanu and Talasari fall between the class intervals of 1.20 to 0.26 which indicates the high status of food security among them. Vasai, Palghar and Vikramgad fall into the moderate category and depicted with a class interval of 0.26 to -0.49. Tehsils which are with the low status of food security are depicted with a class interval of -0.50 to -0.70. Jawhar, Mokhada and Vada fall in this low category (Table-8 and Fig-5).

Rank Correlation between Population Growth and Food Security Dimension Score

The final Rank correlation between population growth and food security dimension scores give a positively correlated with availability and accessibility while it has a negative association with absorption. Significant rank correlation of population growth is observed with food absorption (Table-9) whereas the negative correlation of it with accessibility. Accessibility of food shows negative correlation with availability and absorption respectively. This pattern signifies that mere socio-economic accessibility is not sufficient to achieve food security without proper consideration of food availability and food absorption aspects. It is requisite to reckon with population growth in the backdrop of food security for a better understanding of food security of Palghar district.

CONCLUSION

Population growth in relation to food security determinants namely food availability, food accessibility and food absorption are explored and mapped in relation to population growth. Total of 13 indicators are used to explore these food security determinants. Composite map of food availability and population growth give high availability in Talasari. Vasai and Vikramgad respectively and low in Mokhada tehsil. Composite map of food accessibility and population growth give the high status of food accessibility in Palghar, Dahanu and Talasari while low in Vikramgad, Jawhar and Mokhada respectively. Status of food absorption and population growth through composite map gives high absorption in Vasai and Talsari while low in Jawahar, Vikramgad and Mokhada. Cumulative status of food security and population growth gives high food security in Dahanu and Talasari while low in Jawhar, Mokhada and Vada. Rank correlation among population growth and food security determinants indicate mere socio-economic accessibility is not sufficient to achieve food security without proper consideration of food availability and food absorption aspects.

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Table-1 Population Growth (%) in Palghar District

Tehsil	Total Population (2011)	Total Population (2001)	Population Growth (%)
Talasari	154818	121217	0.28
Dahanu	402095	331829	0.21
Vikramgad	137625	114254	0.20
Jawhar	140187	111039	0.26
Mokhada	83453	67319	0.24
Vada	178370	142753	0.25
Palghar	550166	454635	0.21
Vasai	1343402	795863	0.69
District Total	2990116	2138909	0.29

Source: District Census Handbook, 2001 and 2011.

Table-2 Population Growth and Indicators of Food Availability in Palghar District

Tehsil	Population Growth	Per Capita Food Grain Production	Yield per hectare(Quintal)	Net Irrigated Area in Percent	Road length Hundred Sq.Km
Talasari	0.28	118	12.05	2.51	281
Dahanu	0.21	85	8.9	15.24	168
Vikramgad	0.20	127	16.54	0.2	199
Jawhar	0.26	142	6.81	1.8	238
Mokhada	0.24	105	3.51	0.2	148
Vada	0.25	158	13.15	0.25	172
Palghar	0.21	76	18.29	6.14	107
Vasai	0.69	14	14.74	6.13	150

Source: District Statistical Abstract, Palghar District 2015

Table-3 Relation between Population Growth and Food Availability in Palghar District

Tehsil	Population Growth	Food Availability	Status of Food Availability
Talasari	-0.10383	0.10	High
Dahanu	-0.53627	0.11	Medium
Vikramgad	-0.58385	0.12	High
Jawhar	-0.20093	0.06	Medium
Mokhada	-0.35184	-0.83	Low
Vada	-0.28684	0.07	Medium
Palghar	-0.54702	-0.19	Medium
Vasai	2.61057	0.22	High

Notes:Index Value of Population Growth and Food Availability [High(0.11 &above),Medium (0.11 to -0.82), Low (below-0.82)]

Table-4 Population Growth and Indicators of Food Accessibility in Palghar District

Tehsils	Population Growth	Per Capita Income	% of BPL	Proportion of ST population to total	Rural Female literacy	Main workers to total population	Agriculture workers to total population	PDS per lakh population
Talasari	0.28	10309	68.73	90.61	45.37	27.14	13.9	44.68
Dahanu	0.21	26775	69.7	69.11	44.84	36.2	15.8	52
Vikramgad	0.20	9164	71.1	91.82	53.76	41.87	18.16	66.84
Jawhar	0.26	9335	70.88	91.64	46.18	31.79	26.32	70.61
Mokhada	0.24	5557	66.27	92.08	47.56	41.37	31.96	77.88
Vada	0.25	11877	54.95	57.02	61.88	32.94	21.18	87.45
Palghar	0.21	36635	37.1	30.56	67.69	34.89	8.8	40
Vasai	0.69	89455	19.55	7.32	69.44	33.02	2.06	14

Source: District Statistical Abstract,Palghar District 2015

Table-5 Relation between Population Growth and Food Accessibility in Palghar District

Tehsil	Population Growth	Food Accessibility	Status of Food Accessibility
Talasari	-0.10383	-0.33	High
Dahanu	-0.53627	-0.09	High
Vikramgad	-0.58385	0.28	Low
Jawhar	-0.20093	0.11	Low
Mokhada	-0.35184	0.41	Low
Vada	-0.28684	0.11	Medium
Palghar	-0.54702	-0.32	High
Vasai	2.61057	-0.17	Medium

Notes:Index Value of Population Growth and Food Accessibility [High(0.17 &above),Medium (0.17 to -0.27), Low (below-0.28)]

Table-6 Population Growth and Indicators of Food Absorption in Palghar District

Tehsil	Population Growth	% of population with access to toilets	% of population with access to safe drinking water
Talasari	0.28	78	59
Dahanu	0.21	60	65
Vikramgad	0.20	46	44
Jawhar	0.26	58	39
Mokhada	0.24	62	14
Vada	0.25	52	58
Palghar	0.21	35	79
Vasai	0.69	8	86

Source: District Statistical Abstract, Palghar District 2015

Table-7 Relation between Population Growth and Food Absorption in Palghar District

Tehsil	Population Growth	Food Absorption	Status of Food Absorption
Talasari	-0.10383	0.46	High
Dahanu	-0.53627	0.13	Medium
Vikramgad	-0.58385	-0.41	Low
Jawhar	-0.20093	-0.17	Low
Mokhada	-0.35184	-0.51	Low
Vada	-0.28684	-0.02	Medium
Palghar	-0.54702	-0.06	Medium
Vasai	2.61057	0.60	High

Notes: Index Value of Population Growth and Food Absorption [High(0.13 &above),Medium (0.13 to -0.40), Low (below -0.41)]

Table-8 Relation between Population Growth and Food Security in Palghar District

Tehsil	Population Growth	Food Security	Status of Food Security
Talasari	-0.10383	0.3	High
Dahanu	-0.53627	0.1	High
Vikramgad	-0.58385	0.2	Medium
Jawhar	-0.20093	0.1	Low
Mokhada	-0.35184	-0.1	Low
Vada	-0.28684	0.1	Low
Palghar	-0.54702	-0.2	Medium
Vasai	2.61057	-0.3	Medium

Notes: Index Value of Population Growth and Food Security [High (0.26 &above), Medium (0.26 to -0.49), Low (below -0.50)]

Table -9 Rank Correlation between Population Growth and Food Security dimension scores

Index	Population Growth	Availability	Accessibility	Absorption
Population Growth	1			
Availability Sig(2-tailed)	0.190 (.65)	1		
Accessibility Sig(2-tailed)	- 0.381 (.35)	-0.214 (.61)	1	
Absorption Sig(2-tailed)	0.619* (.10)	0.595* (.12)	-0.762 (.28)	1

Source: Author's calculations

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Fig-1 Population Growth in Palghar District

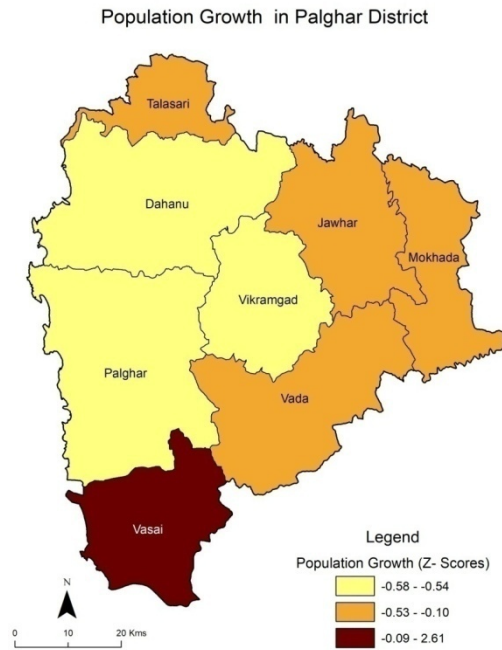


Fig-2 Composite map of Population Growth and Food Availability in Palghar District

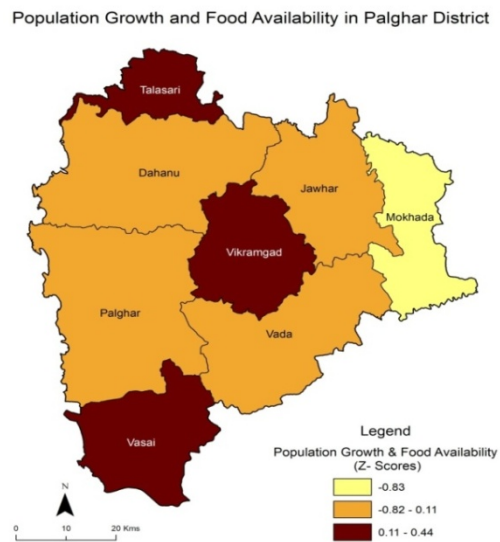
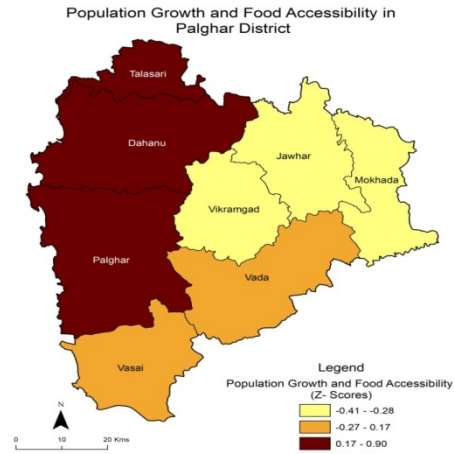


Fig-3 Composite map of Population Growth and Food



Accessibility in Palghar District

Fig-4 Composite map of Population Growth and Food Absorption in Palghar District

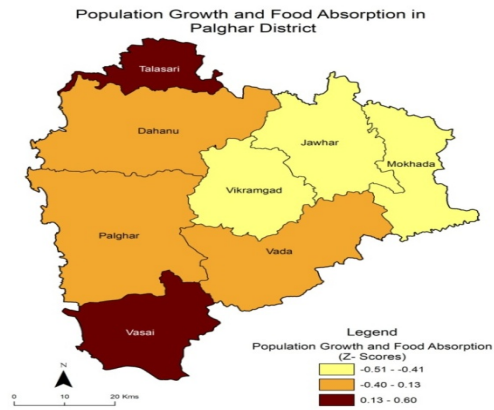


Fig-5 Composite map of Population Growth and Food Security in Palghar District

