

Population And Food Grain Production In Aligarh District: A Block Wise Study

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Abstract

Food-grain availability and production is an important aspect of life in India which is predominantly an agricultural and overpopulated country. India suffers from an appalling inequality in income and food grain availability. In India roughly 70% of its population has remained occupied by agriculture. In spite of such a huge percentage of population engaged in agriculture most of the people are ill fed and in ill health because of the shortage of food grain availability in the country. For a country, to be well feed it is important to have a positive strong correlation between the population growth and food grain production. The paper tries to analyse the block wise population growth and pattern of food grain production on the basis of secondary data which was obtained from the District Statistical Handbook. The population within the district in last 2 decades has grown at a healthy rate, more than 22 percent while the food grain production has a very less growth rate. The study area has 12 blocks and only 2 blocks Dhanipur and Chandaus have shown an equal growth in population and food grain, while in other blocks the growth of population is much higher than the food grain production. The difference in population growth and food grain production is a worrying sign for the district as it shows the declining rate of food grain availability per head. The major reason for the gap in food grain production and population growth is the decline in total cultivated area in each block which has gone down with each decade.

Keywords: Food grain production, Population growth rate, cultivated area, Irrigation facilities.

Introduction

Our country is predominantly agricultural and overpopulated that suffers from an appalling inequality in income and food grain availability. In India roughly 70% of its population has remained engaged in agriculture during the post-independence period. In spite of such a huge percentage of population engaged in agriculture most of the people are facing the problem of food insecurity because of low productivity and shortage of food grain. In our country there is a need to improve both the quality and quantity of diet to feed more people a better diet, agricultural production has to be increased through increased productivity. The importance of

agricultural development in the early stage of economic growth of India obtains from the fact that agriculture is the main source of food, the increase in demand of food is directly related to the rapid growth of population, thus the population growth is an important pervasive phenomena and its survival depends upon food items, as it is universally accepted that food is one of the basic and critical need of human being for survival and is listed even before clothing and shelter. Self-sufficiency in food grain is to be achieved by increasing both production and productivity in the agricultural sector, the concept of productivity as used here represent production raised per unit of land. In other words, productivity represents yield of crop per hectare.

To feed the ever increasing population of the country, the food availability and food security has now become a serious issue. Food security is to be interpreted as means for adequate availability of food items particularly food grain. In 1996 the Food and Agriculture organization (FAO) defines food security as a situation which exists when “All people at all times have physical and economic access to sufficient safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.

Over population, poverty, lack of capital, shrinkage of agricultural land, decline of fertility, crop production, land degradation, failure of crops in rain fed area and mismanagement of irrigation facilities are main threats for food grain production and productivity. These threats should be checked to give proper emphasis upon irrigation, fertilizers, HYV seeds, farm mechanisation, and check of Population growth rate.

Related Works:

Y. S Hanafi (1999) elucidates the declining trend of food grain availability and food security. He tried to examine the regional aspect of surplus and deficit availability of food grain in UP at district level, and has taken 482 grams/head/ day as a standard requirement. He has analysed the variation in the level of nutrition within the state and observed that the deficit area depend upon the surplus one for their food grain requirement. Finally he suggested that the greater emphasis should be given on food grain production especially in deficit areas.

M.E.A Begum (2010) has made study of Bangladesh using secondary source of data for analysing demand-supply gap in food items during the period 1971-2008. She found that in 1970, 1990, 2000 and in 2009 the food grain production rate were higher than the population growth rate, but the decade of 1980 was characterized by higher population growth than the food grain production thus Bangladesh has pursued for a strategic goal of achieving self-sufficiency in food crops.

Firdos Ahmad (2012) made an attempt to define the food grain production during Pre and Post Reform period. According to him the growth rate of food grain production and productivity has decelerated when India has entered in the era of globalization. He analysed that the production of food grain was 2.80% per annum in Pre reform period which declined to 1.98% in

Post reform period. In his study, he found that the declined food grain production was mainly because of change in cultivated area, change in irrigated area and change in climatic condition.

S.P Mishra et al (2013) in his work on “Agriculture Productivity and the level of Agriculture Development in Chandauli district of U.P” tried to examine the relationship between limited crop land and tremendous population growth. His main objective was to define both the traditional and modern technique of agriculture and analysed the main cause of spatial imbalances in crop productivity and agricultural development. His work was mainly based upon three indices, 1.Standard yield Index 2.Weight crop equivalent Index.3. Cropping intensity Index, on the basis of that he analysed labour productivity. As a result he found that several factor like limited fertile land, water logging, scarcity of irrigation and salinity played a negative role and act as a hindrance for the betterment of agricultural productivity.

Kalyan Sunder Som (2015) tried to define the problem of food scarcity due to uncontrolled and unregulated growth of population in the state of Madhya Pradesh. His main objective was to find out the deficit or surplus production of food availability in total terms of their total population. He found that during 2005-06, 57.78% districts had insufficient food in terms of their population growth and after 5 years there were only 22% district which showed deficit food grain availability. The drastic change in food grain production is possible because of government intervention in agricultural sector.

Some researchers in their work have defined the availability of food grain in terms of food security. According to them, massive food production provides the base for food security, as the food security is a key determinant of food availability. Finally they concluded that there was a continuous improvement in food security situation, but still a huge chunk of population is suffering from serious food insecurity. Thus the special attention should be given by the government to provide bank credits to farmers, cash transfer, increase the area under food crops, availability of HYV seeds, and direct delivery of food grain to the poor people through specified Ration shops etc., this would help to transform the state or districts from agriculturally underdeveloped, food insecure to advanced food secure region, (R. Radhakrishna et al 2002; Ahmad. M. Siddiqui 2012; M.S Swaminathan et al 2013; Sadhna Singh 2014).

Objectives:

The main objectives of the study are as follows:

- To find out trends and pattern of population growth across district and their relationship with food grain production
- To analyse the demand of food grain in the Aligarh district on the basis of present availability
- To suggest the appropriate guideline for the augmentation of food grain production and future agricultural development.

Study Area:

Aligarh district is located in the central part of the Ganga -Yamuna Doab region of western part of Uttar Pradesh. It lies between latitudes 27°34' and 28°11' North latitude between 77°29' and 78°38' East longitudes and encompasses an area of 3700.4sq km. Total population of the district is 3,673,849 persons (Rural 2,456,698 persons and Urban 1,217,191 persons) the percentage share of rural population in the district is 66.87 percent as against 33.13 percent of the population in urban areas of the state. The population density of the study area is 1,007 persons per sq. km. which is more than the state average 829 persons per sq. km. Decadal population growth rate of the district is 22.8 percent which is higher than the state average of 20.2 percent. Aligarh district ranked 19th in terms of population in the state (Census 2011). The district has been divided into five tehsils namely Atrauli, Ghabana, Khair, Koil and Iglas. These tehsils are further subdivided into twelve blocks viz. Atrauli, Gangiri, Bijauli, Jawan, Chandaus, Khair, Tappal, Dhanipur, Lodha, Akrabad, Iglas and Gonda (fig.1)

Aligarh district is made-up of fertile alluvium which is remarkable for its uniformity and a levelled surface. Geologically, these deposits are of older alluvium. The region has a tropical monsoon type climate. In terms of population growth and vast area the economic development of Aligarh district play an important role in the country. There is high potential of agricultural development in Aligarh district of UP that is why the district was selected for the study to know the situation of food grain production and population growth rate and to explain the factors which are responsible for the steady growth of food grain in the district.

Location Map of the study Area

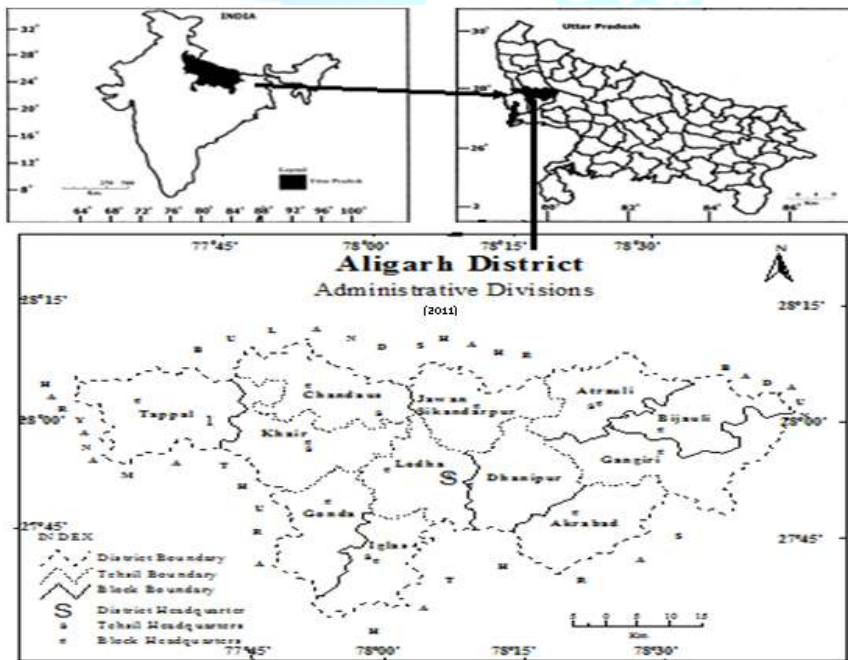


Fig. 1

The paper is mainly based upon secondary sources of data obtained from various reliable sources. The data regarding the population was taken from census of India. Data related to production of food grain was obtained from Sankhyiki Patrika and District Statistical Handbook of Aligarh district U.P. The food availability for 1991 and 2001 was calculated from the data of food production and population of the respective year.

The formula used for the calculation was:

$$FA = (Pr \times 1000 \times 1000) / \{(Po \times 365) \times 1000\}$$

Where,

FA: Food grain Availability

Pr: Production of food grain

Po: Population

Population Growth rate was calculated by the following formula:

$$PG = \{(Pf - Pi) \times 100\} / Pi$$

PG: Population Growth

Pf: Population of Final Year

Pi: Population of Initial Year.

The following formula used for the analysis of coefficient of correlation between the population growth and food grain production for each block.

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}}$$

Where:

r = Coefficient of correlation

n: Number of terms

x: Population growth rate

y: Food grain production growth rate

The comparative analysis of the growth rate of the population and food grain production in each block has also been made. The data were processed on computer using MS excel and MS word software.

Trends and Distribution of Population in Aligarh District:

The total geographical area of Aligarh district is 3649.31 sq. km. It is 32nd largest district of the state and 38th largest in India in terms of total area. Along with the huge geographical area the population of the district has been increasing over the last decades. With the continuous increase in population there is an immediate need to increase the food production to fulfil the demand of population in the district. The table 1.1 shows the demographic characteristics of the district at glance.

Table 1.1: Demographic Characteristics of the District.

DESCRIPTION	2001	2011
Actual Population	2,992,286	3,673,849
Male	1,607,402	1,958,536
Female	1,384,884	1,715,313
Population growth in percentage	22.15	22.78
Area in/sq.km	3,649	3,649
Density persons/sq.km	820	1007
Percentage share to U.P Population	1.80	1.84
Year 2011 Population Rural & Urban		
Description	Rural	Urban
Population percent share	66.89%	33.11%
Total population	2,457,268	1,216,581
Male population	1,312,501	646,035
Female population	1,144,767	570,546

(Source: Census of India (2001-2011))

Table 1.2: Population Growth Rate in Aligarh District (1991-2011).

Year	Total Population	Decadal Variation	Growth Rate (%)
1991	2449597	-125328	-4.86%
2001	2992286	542689	22.15%
2011	3673849	681563	22.18%

(Source: Census of India 1991, 2001, 2011)

The table 1.2 shows the population growth rate in Aligarh District during 1991 to 2011. It shows that there has been a rapid increase in population from the year 1991 to 2011. The growth rate of population increased from -4.86% to 22.18%.

The block wise population growth rate during 1991 to 2001 varies between 25.31% in Lodha block(highest) and 9.03% in Tappal block (lowest), (table 1.3).The blocks Lodha, Iglas, Dhanipur, Gonda and Jawan come under higher growth rate with the value above 19.88%. While the other five blocks namely Chandaus, Khair, Bijauli, Gangiri and Akkrabad come under medium categories which ranges between 14.46% and 19.88% and the remaining two blocks Tappal and Atrauli comes under low category of population growth rate, which is below 14.46%.

Dynamics of Growth of Population and Food grain in Aligarh District:

The rapid urbanization and continuous growth of population in Aligarh district has led to less food grain per head availability. In last decade the number of towns in the district was almost 13 (2001) which increased near to double, 24 towns in (2011).

Table 1.3:Block-Wise Rural Population Growth in Aligarh (1991- 2001)

Block	Population		Variations	Growth of Population (%)
	1991	2001		
Tappal	155646	169705	14059	9.03
Chandaus	148406	174333	25927	17.47
Khair	144360	166015	21655	15.00
Jawan	176187	211390	35203	19.98
Lodha	160114	200642	40525	25.31
Dhanipur	144371	175008	30637	21.22
Gonda	138455	166915	28460	20.56
Iglas	127126	155032	27906	21.95
Atrauli	164313	180899	16586	10.09
Bijauli	132593	155285	22692	17.11
Gangiri	196257	227328	31071	15.83
Akrabad	122466	145040	22574	18.43
Aligarh	1810294	2127592	317298	17.53

(Source: District statistical handbook, Aligarh, 1991, 2001)

The population growth of the district in last 2 decades has been around 22% which is massive. If we consider the growth rate of other factors like industrialization, employment and several other social indicators, the low availability of food grains a matter of concern. The growth in total food grain production within the district is almost negligible in last 5 years.

Table 1.4 Growth Rates of Population and Food grain Production.

Block	1991-2001		2001-2011	
	Population Growth (%)	Food grain Production Growth (%)	Population Growth (%)	Food grain Production Growth (%)
Tappal	9.03	3.58	14.46	5.21
Chandaus	17.47	14.57	06.10	4.20
Khair	15.00	7.85	14.05	5.24
Jawan	19.98	9.15	3.56	1.27
Lodha	25.31	12.35	27.14	14.61
Dhanipur	21.22	17.60	12.50	9.84
Gonda	20.56	12.60	11.63	7.62
Iglas	21.95	11.69	24.25	14.34
Atrauli	10.09	4.24	16.52	6.82
Bijauli	17.11	6.28	19.57	9.54
Gangiri	15.83	5.89	18.76	7.64
Akrabad	18.43	9.21	17.93	10.26

(Source: calculated by the author on the basis of data of population and food grain production from Sankhyiki Patrika Uttar Pradesh Year 1991, 1995, 2001, & 2012, Census 2001 & 2011)

Table 1.4 clearly depicts that the growth of food grain production in the blocks of the district has been on lower side as compared to its population growth. Only Chandaus and Dhanipur have shown some encouraging numbers, rest of the blocks have really worrying sign. Chandaus and Dhanipur have been among the best blocks which are growing well in terms of food grain production in relation to its population growth. Tappal, Khair, Atrauli and Bijauli has the most alarming growth rate of food grain. When we see the growth rate of food grain production in last 2 decades, only a few blocks viz Tappal, Lodha, Iglas, Atrauli, Bijauli, Gangiri and Akrabad has shown an increased growth rate in the food crops, but along with that there is a continuous growth of population within these blocks. The differences between population and food grain production growth rate shows a wide gap, that is a distressing sign for future as if the same trend continues, there would be a time when the demand for the food grain would be much higher than the supply. Notably, there are only 3 blocks which have a noticeable decline in the growth rate of population namely Jawan, Chandaus and Gonda. The growth rate of population in Khair has also gone down but by a very mere rate.

Growth Rate of Population and Food grain, 1991-2001

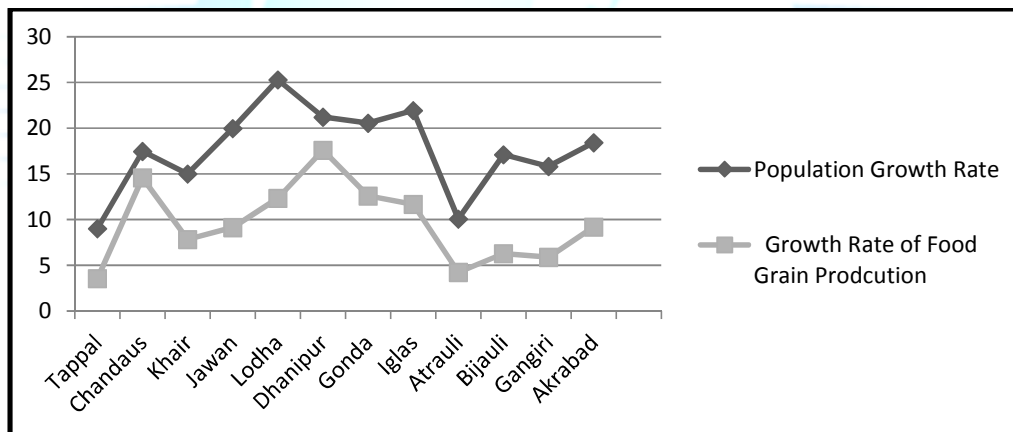


Fig. 2

Growth Rate of Population and Food grain, 2001-2011

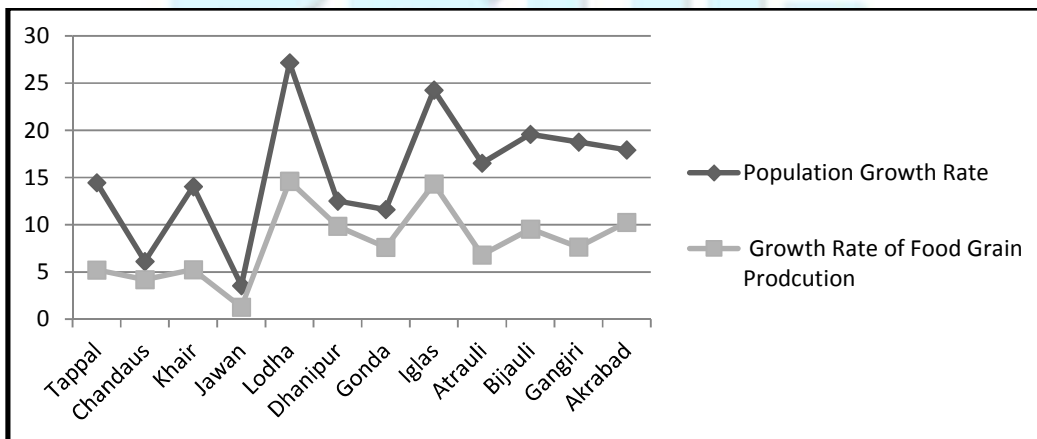


Fig. 3

Both the aforementioned figures clearly depicts that the line of population growth rate is much higher than the food grain production in both the decades among all the blocks of Aligarh district, the minimum gap between the lines is in Chandaus followed by Dhanipur in both the decades. .

Correlation between Population Growth and Food grain Production:

After examining the growth rate of population and food grain production separately, it would be worthwhile to study population growth in relation to food grain production in the study area. An attempt is made to identify relationship between population growth and food grain production. The relationship between population and food grain production is presented with the help of coefficient of correlation. The formula is given below:

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}}$$

Where:

r = Coefficient of correlation

n: Number of terms

x: Population growth rate

y: Food grain production growth rate

Table 1.5: Coefficient of Correlation within the Blocks.

Block	Coefficient of correlation
Tappal	0.08
Chandaus	0.42
Khair	0.05
Jawan	0.16
Lodha	0.13
Dhanipur	0.38
Gonda	0.14
Iglas	0.18
Atrauli	0.03
Bijauli	0.09
Gangiri	0.07
Akrabad	0.11

(Source: Calculated by the author, data taken from Sankhyiki Patrika year 1995, 2001, 2002, 2011 & 2012)

Table 1.5 clearly shows that the correlation between population and food grain production within the blocks of Aligarh district is not encouraging. Only 2 Blocks Chandaus and Dhanipur have shown a positive correlation with a little high values but rest of the blocks have very little correlation. The population grows at a much faster pace than the food grain. The blocks viz. Khair, Atrauli, Bijauli and Gangiri have the weakest correlation. The food grain production in relation with population growth rate has been almost negligible within these

blocks. On contrary the blocks viz. Gonda, Iglas, Jawan and Akrabad are growing and have a better growth rate.

Most of the blocks in the district have shown stressful sign as the correlation between food grain and population growth rate is not strong, some block represents the positive correlation with a very mere value. Thus it indicates that the growth of population is much higher than the food grain production within the district.

Analysis of Block Wise Food grain Availability:

The prime concern of the policy maker is not only the production of food grains rather the availability of food grain to the people. Food grain availability is the quantity of food grain available in an area for each person each day. The availability of food grain is affected by both population growth and production of food grain, thus it difficult to predict the food grain availability within the blocks without analyzing the recent trend of population and food grain production.

To calculate the food grain availability per grams per head in the district the following formula was used:

$$FA = (PR \times 1000 \times 1000) / \{(PO \times 365) \times 1000\}$$

FA: Food grain Availability

PR: Production of food grain

PO: Population

Table 1.6: Food grain Availability within the Blocks.

Blocks	Food grain Availability Per grams per head per day		Food grain Availability Growth in %
	2001	2011	2001-2011
Tappal	572.11	553.40	-3.25%
Chandaus	1022.15	1019.69	-0.24%
Khair	478.25	465.09	-2.75%
Jawan	724.64	686.67	-5.24%
Lodha	622.04	595.72	-4.23%
Dhanipur	922.52	913.12	-1.02%
Gonda	721.67	695.82	-3.57%
Iglas	684.25	670.95	-2.10%
Atrauli	549.25	540.52	-1.59%
Bijauli	621.25	604.70	-2.68%
Gangiri	427.85	419.88	-1.97%
Akrabad	578.25	565.84	-2.31%

(Source: Calculated by the author, data taken from Sankhyiki Patrika year 2001 & 2011)

Table 1.6 shows the block-wise food grain availability and percentage growth of food grain from 2001-2011. The production data of food grain for the period of 2001-2011 reveals that there is an overall decline in the food grain availability within the blocks of Aligarh district. The maximum decline in food grain availability was measured in Jawan (-5.24%) and Lodha (-4.23%), while the minimum was observed in Chandaus (-0.24%) and Dhanipur (-1.02).

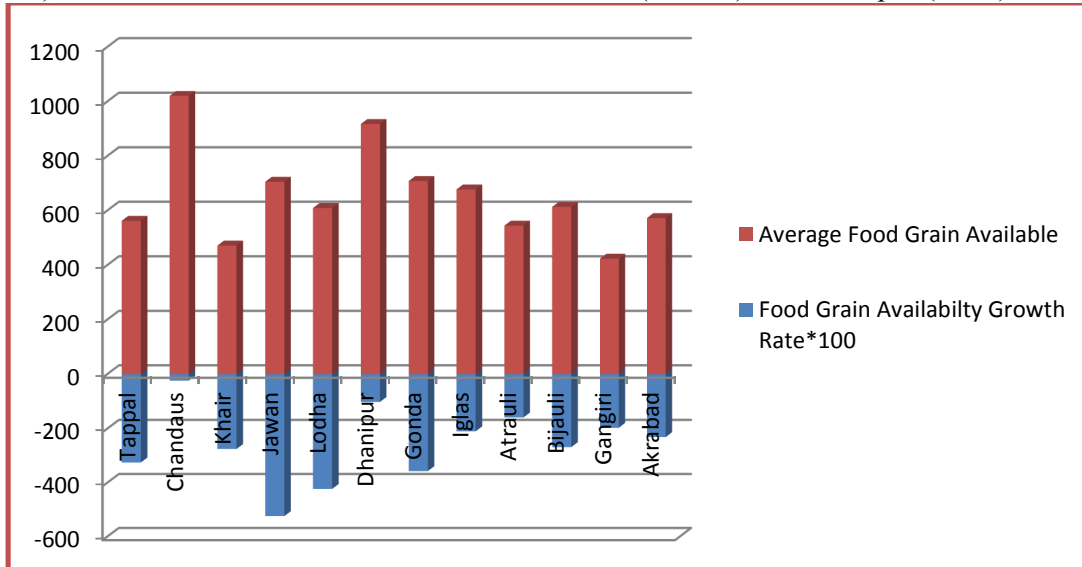


Fig. 4

The aforesaid figure clearly exhibit that food grain availability is at high level in Chandaus and Dhanipur, while Jawan, Lodha, Gonda, Iglas, and Bijauli blocks have acceptable food grain availability and are as per the states' and country's food grain availability. Gangiri and Khair have the most alarming sign as the food grain production is around 400 grams only which is quite below the average of India and Uttar Pradesh which is 580 and 571 grams respectively.

None of the blocks have shown positive growth rate in the availability of food grain in last decade. All the blocks have negative growth rate and the availability of the food grain has declined throughout the district. Only Chandaus and Dhanipur has shown very low decline rate while Jawan, Lodha and Gonda have a worrying decline rate of food grain availability. A trend of decline in food grain availability throughout the district is quite visible by the figure and table as each block has shown the decline in food grain availability.

Causes of Low Growth Rate of Food grain Production:

There are many reasons for the low growth rate of food grain production in the district and the most important reason is the rapid urbanization within the district.

Table 1.7

Particulars	2001	2011
No of Towns	13	24
No of Villages	1210	1199
% of Rural Population	71.10%	66.89%
% of Urban Population	28.90%	33.11%

(Source: District Statistical Handbook of Aligarh)

The above chart clearly shows the urbanization in the district in last decade. The rural population of the district declined by around 5% and number of towns in the district grown up by 90% which shows the people are engaged in the process of urbanization and industrialization and that has been one of the major causes for the decline in food grain production in the district. Another major reason is the negligible growth in total sown area and decline in the farming workers in the district:

Table 1.8

Particulars	2001	2011
Net Sown Area	300293	303954
% of Agricultural workers in Rural Areas	30.20%	28.35%
% of Agricultural workers in Urban Areas	5.80%	5.60%

(Source: District Statistical Handbook of Aligarh & Sankhyiki Patrika Year 2001 & 2011)

The Net sown area in the district is almost same as it was a decade ago. The only growth is around 1% which is negligible looking at the population growth rate of 22%. Also the agricultural workers percentage has gone down despite increase in the population and the major reason has been the process of urbanization in the district as only 5.8% person in the urban areas are doing the farming and rest are engaged in some other work.

The food grain production cost in the district has also gone up which does not motivate the farmers and the life of the farmers have been very tough. Although the number of equipment and availability of the necessities like fertilizers, insecticides, HY seeds, water etc. for the farming practices has increased within the district but that has also caused the higher price of production.

Conclusion:

In an overpopulated and underdeveloped country like India the demand for food grain increases automatically due to rapid population growth. If the same trend continues in every district of each state of India then it is an alarming sign for the country that must be taken care of at the earliest. The above analysis of food grain production and population growth clearly indicates that the shortage of food grain has emerged continuously due to uncontrolled and unregulated growth of population in the study region. The study highlights that, each block of Aligarh district has witnessed the continuous growth of population except Tappal block that has witnessed the lowest growth of population. The Chandaus and Dhanipur are the two blocks which somehow have managed to match the growth rate of food grain along with the population growth rate and the availability of the food grain within these blocks are appreciable. Rest of the blocks has shown very little or negligible growth in food grain production. Food grain availability in the blocks of Gangiri and Khair is distressing as both are also among the lowest growth rate of food grain production. The correlation between food grain production growth and population growth is to a respectable level in Chandaus and Dhanipur and there is almost no correlation between the two in Khair, Bijauli, Atrauli and Gangiri which is very much disturbing for their future. The study reveals that population growth and food grain production are directly and significantly associated with the agricultural development. But it should not be concluded that population growth encourages the agricultural development.

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