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ANALYSE AND INTERPRETATION OF DATA OCCUPATION AND MARRIAGE FACTORS INFLUENCINTG FERTILITY IN INDIAN SOCIETY IN THE CONTEXT OF TRANSITION MODEL

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INTRODUCTION

In the year 1900, there were approximately 1.6 billion people living on Earth. One hundred years later, the world population totaled just over 6 billion people. In 2011, the world total is likely to reach 7 billion, on its way to a projected 9 billion before 2050. The increase in the size of the human population in the last half-century is unprecedented. But that increase did not occur evenly in different places, nor were the consequences of this growth the same in every place. And in the 21st century, some places are concerned more about population decline than growth.

This module examines the growth, decline, and movement of human populations over time and space, and how this affects the availability of resources such as food and water. Demography is the study of the characteristics of human populations, including fertility, mortality, and health. Geographers use demographic data to analyze the spatial variations in demographic characteristics and trends, linking these to their social consequences, seeking explanations for differences and solutions for inequalities. For example, geographers ask questions such as: Why do population growth rates vary from place to place? How does population growth affect the availability of resources at local, national, and global scales? How can countries achieve sustainable use of environmental resources? Is population control necessary to raise the quality of life in poorer countries? Are wealthy countries consuming a disproportionate share of the world's resources, thereby depriving people living in the more populous developing regions? These are just some of the issues you will consider in this module.

POPULATION GROWTH

Later in this Conceptual Framework, you will explore major population theories of the 19th and 20th centuries and apply those theories to a set of specific historical circumstances (famine in Ethiopia). To provide context for this discussion, we turn first to a discussion of why population rates have "exploded" in recent history. We then look at a model that explains how and why population dynamics change in response to increased economic development.

Three "revolutions" in technology - the agricultural (approximately 6,000 BCE until 1,800 CE), industrial (beginning in the late-18th century), and "green" (beginning in the mid-20th century) – have affected population numbers and their interactions with natural resources (Figure 2). Notice, however, that the pace of world population growth dramatically increased following the Industrial Revolution, peaking in the years after World War II. From the mid-20th century, the world population began to increase at unprecedented rates, a phenomenon known as the "population explosion".

The Green Revolution generated new techniques of crop production, including increased use of chemical fertilizers and the application of genetic engineering to crop research, making it possible to increase food production by dramatic rates. During the 20th century large tracts of land, for example in the United States, were dedicated to the cultivation of grains with increased production and improved quantity and quality. The same thing happened in countries like Argentina and Brazil from the beginning of the 20th century. Rice production in East and Southeast Asia increased at rates over even the peak rates of population growth

experiences in the 1960s and 1970s. New technologies were also introduced to more effectively distribute food among people. Furthermore, natural resources were found in much of the world and new agricultural technologies were developed.

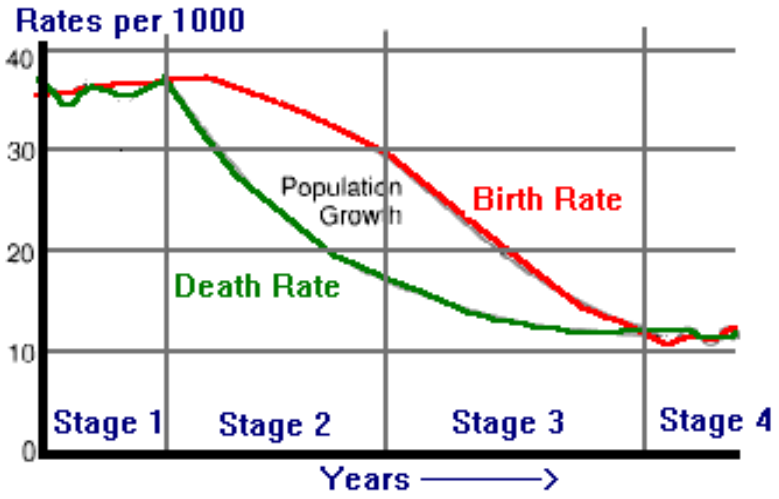
MEASURING POPULATION CHANGE

Measuring population change is necessary to determine the impact of human activity on the Earth's surface. Population change can be described using words, statistics, and graphics. Two common statistical measures of population change are the Crude Birthrate (CBR) and the Crude Death Rate (CDR). CBR and CDR are usually expressed as the number of births or deaths per 1000 people in a given population, which allows geographers to compare population dynamics in countries with different population sizes. The number of births and deaths per year in a country can be used to calculate the Rate of Natural Increase (RNI), which describes the percentage annual growth of a population.

THE DEMOGRAPHIC TRANSITION MODEL

The Demographic Transition Model (DTM) is a popular method for analyzing the evolution of the world population. It shows the expected changes in birth and death rates over an unspecified timeframe. The DTM is based on the historical experience of Europe, as birth and death rates declined, beginning in the case of those nations in the late-18th and early-19th centuries. The only variables that are forecast by this model are birth and death rates, but many scientists believe that economic development is the major factor causing the birth and death rates to fluctuate. They argue that with economic development, people gain better access to birth control; public health and sanitation improves; women become more independent; and food and basic necessities become more plentiful. These improvements, in turn, increase life expectancy and eventually prompt women to have fewer children.

What evidence is there to support the theory that economic development leads to a decline in death and birth rates? Some population geographers point to the population histories of Western European countries as examples, where populations that once grew rapidly experienced a gradual decline and stabilization of birth and death rates as a result of improved food supplies, public health, and technology. Historically, population changes in Western Europe corresponded to the four stages described on the next page.



Source: Internet Geography (www.learnontheinternet.co.uk)

EXPLAINING THE DEMOGRAPHIC TRANSITION MODEL

Here are the characteristics associated with each stage of the classic four-stage DTM. In parentheses, the approximate dates of the onset of each stage are shown as they occurred in Europe, but there was much variation even across that region, so these dates are approximate.

Stage 1: Both birth and death rates are high and population grows slowly, if at all (Europe between pre-history and about 1650).

Stage 2: Birthrates remain high, but death rates fall sharply as a result of improved nutrition, medicine, health care, and sanitation. Population begins to grow rapidly (began in Europe slowly after 1650, then more rapidly after the Industrial Revolution spread in the early 19th century).

Stage 3: Birthrates begin to drop rapidly, death rates continue to drop, but more slowly. Economic and social gains, combined with lower infant mortality, reduce the desire for large families (in Europe, birthrates in some nations began to fall in the 19th century and spread across the region by the early 20th century).

Stage 4: Both birth and death rates are in balance, but at a much lower rate; population growth is minimal if at all (Europe since the 1970s).

The theory of demographic transition assumes that a country will move from a pre-industrial (agricultural) economic base to an urban, industrial one, with a corresponding decrease in family size and population growth. The slowing of population growth theoretically results from better standards of living, improvements in health care, education (especially for women), sanitation, and other public services. Although this four-stage pattern has been repeated in other places besides Europe, there are local variations, sometimes significant, as the trajectory of development is everywhere different and by no means inexorable. For example, many of today's least-developed countries still retain the high birth rates characteristic of Stage 2. Also, parts of Europe, Russia and Japan may be entering a new, fifth stage, where birth rates are below death rates, and the population ages and begins to decline.

HYPOTHESIS

1. Fertility level (size of the family norms) is influenced by the occupation of females in Indian society.
2. Fertility level (size of the family norm) is also influenced by the occupation of male member Indian society.

METHODOLOGY

In this paper on attempt has been made to analyses and interpret those set of data related to fertility levels.. The present paper has been divided into four sections, each section dealing with the analyse is of one variable, these four variables are :(i) occupation of females, (ii) Occupation of males, (iii) Age at marriage, and (iv) period of marriage. For the analyse of these four set of data a non - parametric test, Chi-square, has been employed in view of the fact that these four variables are not in the form of interval or ration scale, but in frequencies. A brief description of Chi - square is given below to make us familiar with this statistical test.

Chi - square Test (χ^2):–

There are several different tests, which use the Chi-square distribution as a basis for statistical decisions. The two most common include (i) the one group test and (ii) The independent more than one group test, In both cases Chi - square test in used to answer the question. Is there a significant (non - chance) relationship between two or more variables?

THE ONE - GROUP TEST:

The one - group test is used to determine significance of the correspondence between a set of sample proportion and a set of theoretical proportions. That is, we collect data from a single sample and see if it is distributed as some theory suggests it should be. The two variables involved in such a study are (1) the response categories Normal or greater level of measurement) and (2) the behavior of the respondents - the frequency with which they fall into the categories.

LOGIC AND METHOD:

The χ^2 test is a test of the significance of the difference between the observed frequencies (number of individuals) and the expected frequencies falling in each category. In the one - group x^2 test, the null hypothesis states the proportion of individuals expected to fall in each category. When we know the size of the group, we can determine the expected frequencies by multiplying the expected proportions by the total sample size. Given a test of expected and observed frequencies, the x^2 test is used to determine if the observed differences between frequencies in each category are likely to have occurred if the null hypothesis is true. The null hypothesis is tested with the following formula: $x^2 = (f_o - f_e)^2/F_e$

Where f_o is the observed frequency in each category, and f_e is expected frequency in each category and sigma indicated that the squared differences divided by E for each category should be summed across all categories. The difference for each category must be squared and then divided by the expected frequency for that category. If the differences between the observed and expected frequencies are small, the larger the difference between the two sets of frequency the larger will be the value of χ^2. In general as the value of χ^2 (Chi - Square) increases, the likelihood of support for the null hypothesis decreases.

THE INDEPENDENT TWO - GROUP TEST:

The independent two group test is used to determine the significance of the differences between two independent groups of subjects. We must have two or more response categories. We want to know that if two groups of individuals significant differ in term of the proportion of each group falling in each category. The three variables involved in such a study are (i) the response categories (nominal or greater level of measurement, (2) the two independent groups of individuals (independent variable), and (3) the behaviour of the respondents – the frequency with which they fall into the categories.

INTERACTION EFFECT OF OCCUPATIONS OF FEMALES AND FAMILY SIZE

The fertility level of females was further analyzed with regards to family size i.e., small size (0–3 children), medium size (4–7 children) and large size (8 and above). The data in terms of number of females, falling in the three categories of family size norms, i.e., small size (0–3) medium size (4–7) and large size (8 and above) have been presented in Table – 1.1.

Occupation of Females	Size of family			Total
	0–3	4–7	8 & above	
	small size	medium size	large size	
House wife	100	415	16	531
Nurse/ Teacher/Clerk	105	80	8	193
Doctor/Engineer/Advocate	41	9	0	50
Administrative officer	29	7	0	36
	275	511	24	810

Table – 1.1 is a 3x4 contingency table i.e.,, four categories of occupation of females (1) House wife (2) Nurse/Teacher/Clerk, (3) Doctor / Engineer/Advocate and (4) Administrative officer and three family

size norms, i.e., small size (0–3) children), medium size (4–7) children) and large size (8 & above). This table reveals that 810 females have been classified into four occupational categories and three family size norms. Reading down category of small size family, having up to 3 children (o–3). Out of these 275 females 100 females are house wives, 105 Nurse/Teachers/Clerks, 41 are Doctors/Engineer/Advocates and 29 are Administrative officers. Across the first row we find 531 females working as house small size family (0–3) children), 415 females are having medium size (4–7 children) and 16 females are having large family size (8 and above). In the second column we find that out of 511 females of medium size family norm (4–7children). 415 females are house wives, 80 are Nurse/Teachers/Clerks, 9 females are Doctors/Engineers/Advocate and 7 females are Administrative officers. Across the second row we find 193 females with occupation of Nurses/Teachers/Clerks of whom 105 females are having large family (8 and above). In the third column we find out that out of 24 females of large size family (8 and above), 16 females are house wives, 8 females are Nurses/Teachers/ Clerks. No females of Doctors/Engineers/Advocate and Administrative Occupation has fallen in the large size family (8 and above) norms. Across the third row we find 50 females who are in the occupation of Doctor/Engineer/Advocate of whom 41 females have small size family (0–3 children) and none has large size family (8 and above) In the fourth category of occupation, i.e., Administrative officer, we find that out of 36 females 29 females are having small size family (0–3 children), and none has large size family (8 and above). The data of Table 1.1 have been presented in graphical form for visual inspiration of the fact.

Occupation of Females	**Size of family**			**Total**
	0–3	**4–7**	**8 & above**	
	small size	**medium size**	**large size**	
House wife	Fe = 180 Fo = 100	Fe = 334.98 Fo = 415	Fe = 11.73 Fo = 16	531
Nurse/ Teacher/Clerk	Fe = 61.52 Fo = 105	Fe = 121.75 Fo =80	Fe = 1.72 Fo = 8	193
Doctor/Engineer/Advocate	Fe = 16.97 Fo = 41	Fe = 31.54 Fo = 9	Fe = 1.48 Fo =0	50
Administrative officer	Fe = 12.22 Fo = 29	Fe = 22.11 Fo = 7	Fe = 1.06 Fo = 0	36
Total	275	511	24	810

In may be noted from Table 1.2– that Chi–square value was 179.75, with 6 degree of freedom. The chi–square value was significant at .01 level of confidence on the basis of this significant chi–square value (a comparison of expected and observed frequency). it may be stated that the number of females having 4 different occupation differ in family size norms. This also confirms the differences in the distribution of females of different occupational groups in three categories of family size norms i.e., small, medium and large size family norms.

INTERACTION EFFECT OF OCCUPATION OF MALE AND FAMILY SIZE:

The interaction effect of five occupational categories of male i.e. (1) Agriculture, (2) Business (3) Clerk/Teacher, (4) Doctor/Engineer/Advocate, and (5) Administrative officer and three family size i.e., small size (0–3 children), medium (4–7 children) and large size (8 and above children), on fertility level of females, was analyzed by organizing the data in terms of number of females of in 15 cells. A 3 x5 contingency table was prepared and females were categorized into three family size norms, i.e., small size (0–3), medium size (4–7) and large size (8 and above) and five categories of occupation, the females of total

sample were classified into fifteen cells. The obtained frequencies of each cell have been recorded in Table – 1.3.

Table 1.3 – SHOWING THE NUMBER OF FEMALES IN THREE SIZE OF FAMILY NORM IN RELATION TO OCCUPATION OF MALE

Occupation of males	Size of family			Total
	0–3	4–7	8 & above	
	small size	medium size	large size	
Agriculture	54	208	10	272
Business	40	106	6	152
Clerk/ Teacher	58	161	6	225
Doctor/Engineer/Advocate	76	24	2	102
Administrative Officer	47	12	0	59
Total	**275**	**511**	**24**	**810**

Table 1.3 is a 3x5 contingency table i.e., five categories of occupation of male i.e., (1) Agriculture, (2) Business (3) Clerk/Teacher/ (4) Doctor/Engineer/Advocate, (5) Administrative officer, and three family size norms, i.e., small size (0–3 children, medium size (4–7 children) and large size (8 and above children). This table reveals that 810 females have been classified into five occupational categories of males and three family size norms. Reading down the first column, we find that there are 275 females in the category of small size family, having children (0–3), out of this 275 females of 54 females are from first occupational category of male i.e. Agriculture, 40 are from second occupational category of male, i.e., Business, 58 females are from third occupational category i.e., Clerk/Teacher 76 females are related to fourth occupational category of male, i.e., Doctor/Engineer/Advocate and in the last 47 females are fifth occupational category of male as Administrative officer. Across the first row we find that 272 females are related to agriculture category of male. Out of this 272 females, 54 females are having small size family (0–3 children), 208 females are having medium size family (4–7 children), and 10 females, are having large size family(8 and above). In second column we find that out of 511 females of medium size family norm (4–7 children), 208 females are related to agricultural occupation of male. 106 females are related to second occupational category of male i.e., business 161 females are related to third occupational. Category of male i.e., Clerk/Teacher, 24 females are related to fourth occupational category of male, i.e., Doctor/Engineer/Advocate and 12 females are related to Administrative officer occupation of male.

INTERACTION EFFECT OF AGE AT MARRIAGE OF FEMALES AND FAMILY SIZE:

The fertility level of females was further analysed which regards to four categories of age at marriage, i.e., less than 20 year, 20 to 29 years and 40 years and above and three categories of family size i.e., small size (0–3 children), medium size (4–7 children) and large size (8 and above). The data in terms of family size norms, i.e. small size (0–3), medium size (4–7) and large size (8 and above), have been presented in Table 1.5

Table 1.5: Showing the number of females in three size of family norms in relation to age at marriage

Age at marriage of females	Size of family			Total
	0–3	4–7	8 & above	
	small size	medium size	large size	
Less than 20 years	50	296	13	359
20 to 29 years	70	181	10	261
30 to 39 years	102	34	1	137
40 years & above	53	0	0	53
Total	**275**	**511**	**24**	**810**

Table 1.5 is a 3x4 contingency Table i.e., three family size norms, i.e., (1) small size (0–3 children), (2) medium size (4–7 children) and (3) large size, (8 & above and four group of females related to age at marriage (1) less than 20 years (2) 20 to 29 years, (3) 30 to 39 years and (4) 40 years and above. This table reveal that 810 females have been classified in four age group of marriage and three family size norms, Reading down the first column we find that there are 275 females in the category of small size family. Out of these 275 females, 50 females were married at the age of less than 20 years, 70 females were married in the age between 20 to 29 years, 102 females were married between 30 to 39 years of the age and 53 females were married at the age of 40 years and above. Across the first row we find 359, females, who were married at the age of less than 20 years, out of these 359 females, 50 females are having small size (0–3 children), 296 females, are having medium size family (8 & above). In the second column we find that out of 511 females of medium size family norm (4-7 children) 296 females were married at the age of less than 20 years, 181were married between 20 to 29 years of age. 34 females were married at the age between 30 to 39 years and no female married at the age of 40 years and above has fallen in the medium size family norms. Across the second row we find 261 females were married between 20 to 29 years. Out of these 261 females, 70 female are having small size family (0–3 children), 181 females are having small size family (8 & above). In the third column we find that out of 24 females of large size family norms (8 and above) there are 13 females who married at the age between 20 to 29 years, 1 female was married at the age between 30 to 39 years, and no female was married at the age of 40 years and above. Across the third row we find 137 female who were married between 30 to 39 years of age. Out of these 137 females, 102 females have small size (0–3 children), 34 females have medium size family and 1 female has large size (8 and above) family norm. In the fourth age group, 40 years and above age at the time of marriage, we find that 53 females are having small size family (0–3 children) and none has medium size (4–7 children) and large size family (8 and above) norms.

CONCLUSION AND FINDINGS

Although food production in different world regions has generally increased at similar rates, there has been much more variability in the rate of population growth from place to place. In countries where populations are growing rapidly, there is some concern that this growth threatens the local availability of resources. Indeed, some scientists warn that the Earth has a carrying capacity that limits the number of people that the environment can support. But not all scientists share this view. Whereas some point out that the environmental "doomsday" scenarios that were predicted many decades ago have failed to materialize, others believe the world's poor are the victims of a global economy that distributes power and resources unequally.
On the basis of above discussion we may summaries our findings that:

(1) Fertility level (size of the family norms) is influenced by the occupation of females.
(2) Fertility level (size of the family norm) is also influenced by the occupation of male member.
(3) Fertility level (size of the family norm) is influenced by the age. at the marriage time.
(4) Fertility level (size of the family norm) is also influenced by the period of marriage.

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