International Variation In Fertility In Nepal

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1.1 Introduction

This study tries to see the levels of fertility for different regions instead of viewing it at national level owing to the fact that the impact of socio– economic difference on the process of population growth remains concealed when trends at national level alone are considered.[1] It is of interest to know which group, categories and sub–population in the society have been demonstrating high level and relatively low level of fertility. Probably there exist differences in fertility among different population[2] group and these differences should be sought in social and economical differences.[3] Moreover, these variations from region to region are an account of geographic, economic and cultural dissimilarities.[4]

Keeping the above expressed views in mind, this study focusses on the variation in fiertility in different geographic and administrative regions. The level of income and education differs in different geographic as well as development regions. Nepal is a country of diversities, ethnic diversities and cultural diversities. These diversities are likely to generate fertility diversities among the sub–populations. They are in fact of very great importance.[5]

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1· UN world population Conference, New York, 1965, Vol 1. 36

2. P.J. Bhattacharya & G.N. Shasrti **Population in India**, Vikash Publishing House. Banglore 1976. P 1

3. W.S. Thompson & David T. Lewis, **Population Problems,** Tata McGraw Hill Publishing Co. Ltd. New Delhi, 1976, P 272.

4· P.J. Bhattacharya & G.N. Shastri, **Op. Cit.,** P. 40.

5. W.S. Thmposon & David T. Lewis, **Op Cit.,** P. 274

1.2 Techniques of Analysis

The techniques of analysis of data and use of tools are discussed below :

a. The kingdom is divided into four geographical regions :

(i) Mountain (ii) Hill (iii) Inner Terai and (iv) Terai or plain

b. To see the east–west variation the kingdom is divided into a number of north–south contiguous regions.

Necessary adjustments have been made for the zones whose boundaries do not run from northern border to southern border. This is done because of the fact that all the 14 administrative regions (zones) don't have the same geographical background.

c. To see whether the variations in ASFR are significant the Friedman two way ANOVA list is applied. The Friedman two way ANOVA is given by the statistics:

$$\text{(i)} \quad H = \frac{12}{NK(K+1)} \quad \sum_{j=1}^{K} R_j^2 - 3N(K+1);$$

Where,

N = Number of rows

K = Number of columns

R_j = Sum of the ranks for j^{th} column

The H is distributed as X^2 (Chi-square) with K—1 degrees of freedom.

1.3 Smoothing of Data

Central Bureau of Statistscs, Nepal, has after smoothing the data calculated different measures of fertility for the kingdom.[6] Instead of smoothing the data for each–region, the fertility is calculated using the following multipliers (with asumption that under-enumeration is homogenous throughout the kingdom):

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6. CBS. The Analysis of the Population Statistics of Nepal, Feb., 1977.

Age	Multiplier
15 – 19	1.8261
20 – 24	1.96578
25 – 29	2.0458
30 – 34	2.12328
35 – 39	2.05511
40 – 44	2.09038
45 – 49	1.7372

Abriviations and formula for the calculation of different measures of fertility:

(a) CBR = Crude birth rate = $\dfrac{B}{P}$ 1000

Where B = Number of births during the calendar year,

P = Mid-year total population

(b) GFR = General fertility rate = $\dfrac{B}{E} \times 1000$

Where E = Female Population of age 15 – 49

(c) ASFR = Age specific fertility rate

$$f_{X-n} = \frac{B_{X-n}}{E_{X-n}} \times 1000$$

Where,

f_{X-n} = age specific rate of women aged X to n

B_{X-n} = number of births to woman aged X to n

and E_{X-n} = total number of women aged X to n years at mid-year

(d) TFR = Total fertility rate = $\sum\limits_{15}^{49} \dfrac{B_{X-n}}{E_{X-n}}$

(e) CWR = Child woman ratio = $\dfrac{P_{0-4}}{t} \times 1000$

Where,

P_{0-4} = number of child of age 0 to 4.

2.1 Vertical (North-South) Variation

The whole kingdom is divided into four geographical regions: Mountain, Hill, Inner Terai and Terai. The following table shows the different measures of fertility for different geographical regions:

Table No. 1

Measures	Mountain	Hill	Inner Terai	Terai
CBR	40	43	49	40
GFR	162	176	212	168
CWR	536	565	698	606
TFR	5,860	6,385	7,640	6,100

From the table it can be inferred that Inner Terai is a region of highest fertility and mountain is a region of lowest fertility when the kingdom is divided in the way mentioned above. This is because each measure of fertility in the table yields highest value for Inner Terai and each measure yields a lowest value for mountain. Hill and Terai have more or less same fertility level. Only CWR is higher in Terai than in Hill, and CWR being a very weak measure, it cannot be concluded that Terai has a higher fertility than Hill.

The following table will throw light on the fertility for different age groups of women of child bearing age by different geographical regions:

Table No. 2

Age group	Mountain	Hill	Inner Terai	Terai
15 – 19	59	39	110	106
20 – 24	200	276	340	256
25 – 29	290	325	361	282
30 – 34	257	279	310	228
35 – 39	206	214	230	164
40 – 44	121	108	128	102
45 – 49	59	16	49	82
TFR	5,860	8,385	7,640	6,100

Table 2 supports the facts discussed above because each age group in Inner Terai has a higher level of fertility except that of age group 45 – 49 which affects least in overall fertility level. The age group 25 – 29 has a highest level of fertility for each group. From age group 15 – 19 to 45 – 49 the fertility is more homogenous in Terai than in other regions.

When the values of ASFR are ranked for each group in such a way that rank 1 is assigned to the lowest value and 4 to the highest value, the sum of the ranks for Mountain, Hill, Inner Terai and Terai are respectively 14, 17, 26, and 13. This confirms the higher fretility in Inner Terai. These facts show that fertility varies along North--South direction. To see whether this variation in ASFR is statistically significant the null hypothesis–"the age specific fertility rate does not differ significantly between different geegraphical regions"–is tested with Friedman two way ANOVA test.

The calculated value of X (Chi–quare) turns out to be 9. The tabulated value of X^2 for 3 degrees of freedom at 0.05 % level of significance is 7.8 %. Thus it may be concluded that age specific birth rates differ significantly in different geographical regions.

Next, the north–south variation is examined according to the four development regions. For this purpose, only the general fertility rate is considered. The following table shows the GFR for Eastern Development Region (hereafter EDR), Central Development Region, (CDR), Westrn Development Region (WDR), and Far–Western Development Region (FWDR):

Table No. 3
OFR for different region

Development regions	Geographical regions		
	Mountain	Hill	Terai
Eestern	139	178	187
Central	135	171	159
Western	142	183	174
Far Western	187	183	151

When the variation in fertility is considered for the development region, it is seen from the above table that for Eastern Development Region general fertility level increases from

Mountain to Terai, but it decreases from Mountain to Terai for Far Western Development. Region. Fertility fluctuates for remaniing two development regions as if they show the resultant of opposite trend of two regions, Eastern and Far Western. Both Central and Western Regions exhibit highest level of fertility and Far Western and Eastern Terai has overall highest fertility in the kingdom. But it should be kept in mind that it is very difficult to reach at a conclusion with three data (i. e. for Mountain, Hill and Terai).

2.2 Horizontal (East-West) Variation

To detect the variation in fertility along East-West, Nepal is divided into ten north-south continuous regionsviz. (1) Mechi Zone (2) Koshi Zone (3) Sagarmatha Zone (4) Janakpur, Zone (5) Bagmati and Narayani Zones (6) Gandaki and Lumbini Zones + Dhaulagiri Zone (excluding Dolpa District which was in Dhulagiri), (7) Rapii Zone and Dolpa District (8) Bheri Zone and Tumla District and Tibrikot District (no more in existence) and Mugu District (9) Seti Zone and Humla District, (10) Mahakali Zone. Such adjustment is made with the view that all these regions (adjusted) may represent more or less same geographical background. For example, Lumbini Zone contains no mountain and Dhaulagiri contains no Terai whereas Koshi contains both.

The followiug table shows the level of fertility in ten adjusted north-south contiguous regions :

Table No. 4.

S. No.	Regions	GFR
1.	Mechi Zone	202
2.	Koshi Zone	192
3.	Sagarmatha Zone	188
4.	Janakpur Zone	194
5.	Narayani and Bagmti Zones	163
6.	Gandaki, Lumbini and Dhaulagiri Zones	175
7.	Rapti Zone and Dolpa District	217
8.	Bheri Zone and, Jumla Tibrikot and Mugu Districts	182
9.	Seti Zone and Humla District	147
10.	Mahakali Zone	163

It is seen from the above table that fertility ceases to decrease in Sagarmatha Zone and after slight increase in Janakpur Zones it fluctuates westwardly and this fluctuation halts in Gandaki – Lumbini – Dhaulagiri regions. After an increase in Rapti Zone and Dolpa District region, it again decreases gradually towards west to a minimum level.

Thus a general view on fertility reflects the fact that fertility in eastern part of Nepal is higher than in western part. The differential, most probably, may not be significant, but still the level of fertility does vary with direction (east–west). Since each measure of fertility is highly correlated with other, the other measures of fertility also will follow more or less the same trend as shown by GFR.

The GFR in table 4 is categorized as falling above and below the median. Those values falling above median are designated as H and those falling below the median are designated as L. Then the hypotheses whether the H and L occur randomly, i. e., whether fertility varies with the help of run test. There were 4HS and 6LS and number of runs = 4. From the table F_1 and F_{11} for $n_1 = 4$, and $n_2 = 6$, $r = 4$ lie in the region of acceptance.[7]

The hypothesis whether the ASFR differs significantly in east-west direction, is tested considering the ASFR for four development regions. The null hypothesis being tested, there is no significant differences in ASFR for four development regions; Friedman two–way ANOVA test is applied as in the case of geographical variation and the sum of ranks for Eastern, Central, Western and Far Western Development Regions is respectively 17.5, 13, 19.5 and 20. The calculated value of $X^2 = 2.614$ for 3 d. f. which does not provide the evidence to reject the null hypothesis and it suggests that probably there exists no variation in ASFR for four develop-ment regions. The magnitude of ASFR and other measure of fertility are given below:

7. Sidney Siegal, "Non–Parametric Statistics", for the Behavioral Science, International Student Edition, McGrow Hill, Kogakusha, Ltd., Tokyo, pp. 252–253.

Table No. 5

Measures ASFR	Development Regions			
	Eastern	Central	Western	Far Western
15 – 19	67	81	71	75
20 – 24	291	258	266	358
25 – 29	323	299	325	299
30 – 34	267	242	277	265
35 – 39	200	183	204	206
40 – 44	109	106	109	119
45 – 49	42	43	38	56
TFR	6495	6060	6500	6390
CBR	42	42	44	44
GFR	180	175	179	179
CWR	610	587	554	594

It has already been mentioned that probably there is no significant difference in ASFR for different development regions. Though insignificant statistically the differential can be seen from the above table. So far the ASFR is considered the fertility for each group in Central Development Region is equal to or lower than other regions with the exception for the groups 15-19 and 45–49. Both these groups have little significance on overall fertility. That is why, TFR for Central Development Region is less than the TFR for other Development Regions. The above table suggests that eastern and western parts of the kingdom have more or less same level of fertlity and the central part is a region of low fertility compared to the remaining parts. In each region fertility for the age group 25–29 scores highest point. In the Eastern Development Region and Central Development Region the fertility for the age group 25–29 is followed by the age groups 20–24, 30–34, 35–39, 15–19 and 45–49 respectively. The same pattern is exhibited by WDR and FWDR with the difference that for both regions age groups 20–24 and 30-34 are interchanged. It is the child-woman-ratio that tries to indicate that central part is not a region of low fertility than other part; but it is a very weak measure of fertility and thus is not much reliable.

Now again to see whether the zones lying in different development regions have same fertility, GFR for zones are taken and Kruskal Wallis one way test is applied; the null hypothesis being there is no significant difference in fertility between the different development regions.

The following table shows the ranking of fertility level. Rank 1 is attached to the lowest and rank 14 to the highest value of fertility since there are altogether 14 zones:

Table No. 6

	Deveelopment Region			
	Eastern	Central	Western	Far Wastern
	10	9	5	14
	8	4	7	11
	2	1	2	6
				13
				3
R_J	20	14	14	47

The last row gives the sum of the ranks which is obtained by summing up the ranks of those zones which fall under that development region. The calculation shows that there is no significant fertility differention for different development regions, (the level of significance being 5%).

2.3 East-West Variation by Geographical Regions

East–West variation along three geographical regions nemely Mountain, Hill and Terai is considered. After a slight decrease in central mountain the GFR goes on increasing to its highest level in Far Western Mountain (Table 3). Thus so far the mountain fertility is concerned it seems that the level of fertility shows an incereasing trend towards west though the variation is negligible. Table 3 shows that central hill has a minimum level of fertility and

eastern part of the kingdom, in general, exhibits a lower level of fertility than the western part. Terai shows a reverse trend of Hill and Mountain. Eastern Terai has a maximum level of fertility and the Far western Terai has a minimum level. From maximum in Eastern Terai, fertility decreases in Central Terai and again increases in Western Terai but does not attain the level of Eastern Terai and then again it decerases to a minimum level. Therefore, it is seen from the table 2 that the level of fertility, with some flnctuation, shows an westwardly increasing trend in Terai belt.

2.4 Comparison of North-South (Geographical) and East-West (Development Regions) variation

To see the pattern of dispersion of fertility in different geographical and devlopment regions the following table or range is constructed. The table below not only shows the range of variation within a "region" (geographical and devlopment) but also compares range of variation between the two:

Table No. 7

Range of Fertility

Measures	Devlopment Region	Geographical Region
CBR	2	9
GFR	5	48
CWR	56	156
TFR	440	1,820

Table 7 ahows that the variation in fertility in geographical regions is higher than the variation in development regions. Each measure of fertility has a higher range for geographical regions.

Book Review

Surya Ratna Shakya, "The Sajha (Co-operative) Movement in Nepal" (Nepali version), Y.D. publishing House, New Road, Kathmandu, Srawana 2040 (August, 1983), pages 194, Price Rs. 40/-(N.C.), Tables, Charts, Refereneces.

The book "The Sajha (Co-operative) Movement in Nepel" is the recent addition to the few existing publications on the co-operratives in Nepal. The author, Mr. Shakya, is an elderly man of the subject. His experience as a principal of the Co-operative Training Centre, HMG, whose task force is to inculcate knowledge about co-operative and also his fund of resource on co-operative development stands in his merit for recapatulating, disceminating ideas on co-poeratives and making correct analysis of the slow development of the subject in Nepal. His old book, 'Co-operative System' (a Nepali version) was more theoretical, whereas the present one is conglomeration of both-the theoretical flavour mixed with the practical aspects of the subject.

In this book, Shakya quotes a good number of eminent authors on the subject while trying to identify meaningful concept of co-operation. Hubert Calbut, M.T. Herich, Seligman Games, Peter, V.S. Videy are quoted; because, for him, co-operative is a golden mean between capitalism and communism. For Sir Horace Planket, co-operative means three things-good management, improved agriculture and good living conditions. And P.W. Walkins is quoted because of his emphasis on educational aspect of co-operative.

The author, Shakya, refers to the famous world agency, viz., the International Co-operative Alliance (I.C.A.) which, in 1934, had made some important co-opertive constituents public. In its approved disclosure, I.C.A. issues a list comprised of open membership, democratic control, limited dividend, cash transaction, political and religious neutrality, unadulteration, co-opcrative education always with the modifications made by the Helshinki Conference of Sept., 1966. It is notable that the Helshinki Conference agreed to disagree few points of the approved list of the I.C.A. Experience of our organised co-operative in Nepal is around four

deoades old. During these days, Nepal has had her own strategies and regional approaches to co-operative development. Nepal, though small, has a very rugged geographical setting, high mountains and hills. These hills, mountains and valleys happended to develop their own kind of conception about the co-operatives. We had and have different kinds of organizations, not very different with those of modern co-operatives. We have Perma (an agency to pool money and labour), the Dhikuri (to pool food for distribution), the Guthi (philanthropic and religious organisation), the Manka-Jya (co-opertive work) and the Dharma Bhakari (grain storage). Money or food grains should be pooled specially during time of surplus subject to be borrowed in times of need. So savings thus drawn should be repaid with some amount of interest. Thise indigenous organisations do still operate in iemote areas like Baglung, Mustang, etc., and in the metropolitan area like the Kathmandu Valley.

The book also deals with the fundamenjal eauses which led to introduction of the guided co-operatives introduced by His Majesty's Government with objectives of good operation, gradual extension, security to loaning agenciss, facilitate institutional credit, sale and service facilities in the villages. The objeetives constitute a kind of package or an integrated deal; not only loans were to be floated, but their repayment also were parts of the guided co-operatives. Leakage, wastage were to be checked.

The author tries to recapatulate the 1950's when HMG/N, even without registration provision, made a modest beginning in the cause of co-operative development in favour of flood-sticken hilly people whe had rushed to the Rapti Valley, now known as the Chitwan Valley for resettlement. These people were rehabilitated in a dense jungle surrounded by different beasts of prey. So they needed multifarious services, including cousumption goods and agricultural loans which were made possible by co-operative, initiated under the U.S. aid.

Unlike in other countries, Nepal, as in India, developed co-operatives under impetus of the government. So major works were/are done by government people were/are still adamant to do themselves; but take off stage was never developed in Nepal. So, HMG/N on 3 May, 1976, introduced a new, brisk, package programme called 'Sajha' synonimous to co-operative. Co-operative should be a people's organization based on celebrated piinciples of the ICA, but a political flavour mixed with economically heterogenous members is found embodied in Sajha, a product of Land Act of 1964 in which we find provision of many, including compulsory savings. This high amount was found misused due to lack of stern ogranisation, backed by strong policy and programmes. The unused money was diverted to serve as the capital of the Sajha·

The book is also found to analyse the programme made in the sector under Nepal's different plans (ranging from first plan to sixth plan). The analysis in terms of total number of co-operatives, members, amount of credit, deposit, repayment, has been made. The evaluation report, it brought under a big volume, really will make an intersting picture about co-operative movement in Nepal. Even if sometimes quatittative aspoct of the co-operative organisation is found to make steady headway, at other time, the same brisk picture because of some government measure seems not to be much growing. Somewhere there is retardation too.

The Nepalese co-operative scenario even after about 4 decades' operation has not much improved. So, in the end, the author cites examples of quality which ean enhance co-opertive development in favour of rural poor. In thls context, he quotes India's co-operative venture specially in the case of milk and sugar, which is above reproach. Similarly, fulfilment of people's needs, skilful management, business diversification, package deal, members with] good umderstanding, people's active support, healthy and dynamic legislative provisions, effective co-ordianation, and the like, will always lead co-operative to right direction with fruitful impaot on the desperately poor, the teeming millions.

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