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# SEX RATIO AND ITS DETERMINANTS

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ABSTRACT: The studies pertaining to sex composition are of great interest to population geographers as males and females play partly contrasting and partly complementary role in the economy and society of an area. The sex composition is normally expressed in various forms of ratio and is also termed as sex ratio. In the present study, however, the practice followed in India, of expressing it in terms of number of females per thousand males has been adopted. The sex ratio at birth, the differential in the mortality rates of males and females and the sex selectivity of the migrants have been recognized as the three basic determinants of sex ratio in any area at a specific point in time. Besides, the factors like wars, famines, relative status enjoyed by the two sexes etc. also influence the sex ratio. The socio-economic factors influencing the basic determinants of sex ratio have been highlighted with a view to understanding the regional differences in the sex composition. However, the focus of the present study is more on the understanding of the working of the determinants of sex ratio rather than on the regional variations in the sex composition.

In view of the partly contrasting and partly complementary roles of the two sexes in the economy and society, the study of their ratio to each other becomes of great interest to a population geographer. Sex ratio is an index of the socio-economic conditions prevailing in an area and is a useful tool for regional analysis (Franklin, 1956). In itself, the ratio is a function of three basic factors of sex ratio at birth, differential in mortality of the two sexes at different stages of life and sex selectivity among the migrants (Clarke, 1960). In its own turn sex ratio has a profound effect on other demographic elements like growth of population, marriage rates, occupational structure etc. The knowledge of sex ratio helps in understanding the employment and consumption patterns, social needs, and perhaps the psychological characteristics of a community. Equally significant is the relationship between change in sex ratio, on the one hand, the trends in socio-economic life of a region, on the other, it reveals the changes in birth and mortality pattern of the two sexes and their migrational behaviour. Thus, sex ratios are fundamental to the geographic analysis of an area for they are not only important features of the landscape but also influence the other demographic elements significantly and as such provide additional means and materials for analysing regional landscape (Trewartha, 1953).

## Definitions

It is a common practice to express the sex composition of a population in terms of ratio. However, the method of expressing the ratio is not universal, some countries express it in terms of proportion of each sex in their total population like U. S. S. R. (e. g. 55 per cent of the population consists

of females and 45 per cent of males); others like U. S. A. express it in terms of number of males per hundred females (e. g. 95 males per 100 of females); and still others like New Zealand express it in terms of females per hundred males (e. g. 99 females per 100 of males). There are also countries like India, Malaysia etc. which prefer to express sex ratio in terms of number of females per thousand males (e. g. 930 females for every 1000 males). The terms like **Primary** sex ratio, **Secondary** sex ratio, and **Tertiary** sex ratio have often been used to denote the ratio between two sexes at the time of conception, birth and enumeration, respectively. The secondary sex ratio is also known as natural sex ratio.

**Determinants of Sex Ratio**

It has been observed that sex ratio varies both in time and space. These variations in sex composition of a population in time and space are governed by three basic factors: sex ratio at birth, differential in the mortality rate of the two sexes, and sex selectivity among the migrants. Besides, such factors as wars, relative status accorded to males and females, and under or over enumeration of either sex are other factors that influence the pattern of sex-composition of a population in any area. Thus, the problem of analysing sex ratio – its imbalance, temporal trends and spatial patterns – is confined to the comprehension of the composite working of the three basic factors of sex ratio at birth, at death and among migrants.

**Sex Ratio at Birth**

It is a documented fact of genetics that in case of most of the mammals including human population more males are born than the females. The primary sex ratio (at the time of conception) is still higher than what the figures pertaining to natural sex ratio reveal. It has been recognized that number of male still-births is higher than that of the female still-births (Clarke, 1965). Why nature is partial to man has been a question that has intrigued not only the population geographers but also the scholars from the field of genetics. Various explanations that have been advanced for the universal excess of male over female births include: (i) the environment of the female ducts may be more favourable to the survival of Y sperm (or male embryos) than the X sperm; (ii) Y sperm may be intrinsically more capable of reaching the egg than the X sperm; (iii) the egg may react more favourably to the approach of a Y sperm than that of an X sperm; and (iv) more Y sperms may be produced than the X sperms because of neiotic irregularities, thus increasing the chance of more XY embryos (Stern, 1968). At present, of course, there is no evidence to support any of these contentions but the more frequently discussed is the view that the male chromosome Y being lighter and swifter is more likely to achieve fertilization of the egg (Hill & Hill, 1955). Still another possible cause for masculinity at birth may lie in a psychological factor that in almost all the countries of the world a family is considered complete on the birth of a son (Clarke, 1960). Although the excess of males over females at the time of birth is true of almost all the societies (Ghosh, 1946) yet not all the countries in the world have same natural sex ratio. Rather there are wide regional variations in the sex ratio at birth (Table I). It has often been pointed out that those countries where pre-natal losses are low, the sex ratio at birth is low and in those countries where the pre-natal losses are high, the ratio is also high (Thompson & Lewis, 1965). Similarly, Muslim countries where the status of women in the society is relatively low exhibit highest degree of masculinity at birth (Table I). The enquiry as to why the masculinity of birth is the highest among the Muslim and Asian countries, moderate in Europe and North America and lowest in Latin American countries though does not fall within the

scope of present study yet provides challenging field of research not only for the population geographers but also for scholars from discipline like genetics. If some such correlates of natural sex ratio are discovered as race, standard of living, nutritional value of diet, religion, matriarchal/patriarchal system of society etc. it may answer many questions which still bewilder a population geographer and thus may reduce the burden of question marks on his maps. One is tempted to think of such correlates because even within the same country different communities having adherence to varied socio-cultural and economic norms display differences in natural sex ratio. For instance, in Peninsular Malaysia the Chinese, the Indians and the Malays have a natural sex ratio of 946, 949 and 952, respectively. Similarly, in India too the Muslims, the Christians and the Hindus have different sex ratio at the time of birth. How far their differences in natural sex ratio are the function of their socio-cultural and economic background is a debatable point.

**Sex Differential at Death**

Biologically, the two sexes have different resistence power with regard to various diseases. The gentler sex is said to be the stronger sex biologically. Consequently, the females tend to outlive men in most societies. In almost all the countries of the world more males die than the females at all ages. In the developed countries like the U. S., the U. K., New Zealand etc. where the birth rate is moderate to low, where nursing facilities and medical aid are available in abundance, where the maternity death rate is low, and where the female children are as well cared for as the male children, the male mortality rates are higher than the female mortality rates at all ages and more so among the infants (Franklin, 1956). As the male infants have higher mortality rate than the females (United Nations, 1949-50), the sex ratio becomes almost balanced at about 4 years of age and beyond that the sex ratios continue to increase, so much so that it becomes 2000 females for every 1000 males at the age around 95 years. In contrast to the developed countries, the conditions in the developing and the less developed countries are such that the females die in more numbers than the males. The reasons for higher female mortality in these countries are not far to seek in the context of their socio-economic set up. The females here suffer a neglect in their infancy, childhood and old age (Gosal, 1961). During the reproductive period, frequent pregnancies not only result in many maternity deaths but also undermine the longevity of the life of females. In countries like India the health af an Indian wife is adversely affected also by her own pious self denial of life's comforts for the sake of her husband and children (Krishan and Chandna) and in the Islamic countries by the confinement of females to the four walls of the house for most of the time. In most of the less developed countries the females are looked down upon as an economic and social liability by the parents while a male child is credited as an asset to the family. This further adds to their general neglect which ultimately tells upon their health. Higher mortality among the females in such context is not difficult to understand.

**Sex Selectivity Among Migrants**

Migrations often are sex selective. Some migrations, like, the migrations for matrimony in India involve the movement of females from the place of residence of their parents to the place of residence of their spouse which in most cases may not be the same village or town, and those migrations which are motivated by economic factors may be heavily loaded in favour of males. Since there is sex-selectivity among the migrants depending upon the purpose, distance, motivation etc., the migration alters significantly the sex composition of the two areas involved. Smith ( 1960) points out that colonial areas to which a large

**Table I**
**WORLD**

**Sex Ratio* at Birth of Selected Countries**

| Country | Years | Sex Ratio at Birth |
|---|---|---|
| Panama | 1949–58 | 981 |
| Mauritius | 1949–58 | 981 |
| Surinam | 1949–56 | 972 |
| Chile | 1949–56 | 971 |
| Equador | 1949–58 | 970 |
| Columbia | 1949–58 | 969 |
| Bolivia | 1949–55 | 967 |
| Sri Lanka | 1949–57 | 966 |
| Argentina | 1949–58 | 962 |
| Venezuela | 1949–57 | 959 |
| Austria | 1949–58 | 953 |
| France | 1949–58 | 953 |
| Guatemala | 1949–58 | 952 |
| U. S. A. | 1949–58 | 951 |
| Iran | 1966 | 951 |
| Malaysia | 1970 | 950 |
| Australia | 1949–58 | 949 |
| Italy | 1949–58 | 948 |
| Japan | 1949–58 | 948 |
| Switzerland | 1949–58 | 948 |
| Canada | 1949–58 | 946 |
| United Kingdom | 1949–58 | 944 |
| Singapore | 1949–58 | 940 |
| West Germany | 1949–58 | 939 |
| Mexico | 1949–58 | 939 |
| India** | 1964–65 | 937 |
| East Germany | 1949–58 | 936 |
| Czechoslovakia | 1949–58 | 934 |
| Hungary | 1949–58 | 932 |
| Jordan | 1949–58 | 929 |
| Nigeria | 1952–58 | 929 |
| Belgium | 1949–57 | 924 |
| Indonesia | 1949–51 | 882 |
| Iraq | 1949–58 | 881 |
| Thailand | 1949–56 | 878 |
| Pakistan | 1949–53 | 866 |
| Syria | 1949–58 | 851 |

Source : Calculated from U. N. *Demographic Year Book,* 1959, pp. 218-238.

* The term sex ratio in this writing has been used to denote number of females per thousand males.

** Figures for India have been calculated from data given in Table 3.40 of *The National Sample Survey,* Nineteenth Round : July, 1964 – June 1965, Manager of Publications, Delhi, p. 26. Similarly, the figure for Iran has been taken from A. A. Nazari's unpublished Ph.D. thesis, *Demographic Characteristics of Iran,* 1978.

number of workers were attracted or carried for highly commercialised plantations, are, of course, among those areas of the world where males greatly out-number the females. Peninsular Malaysia provided one such example, especially in early decades of the present century. While the sex ratios for the native Malays were always near balanced, these were strinkingly unbalanced for the immigrant population. For example, in 1921, there were 371 females for 1000 males for the Chinese and 424 females for 1000 males for the Indians. Such imbalances in sex ratio did create serious problems. The prostitution was legalised till 1930's and when the Alien Act was passed in 1933 in order to check free immigration, it applied only to the males while females could still enter the country freely. Consequently, during 1933–38 alone, Malaysia received 190,000 Chinese female immigrants ( Blythe ) which went a long way in improving the sex composition of the Chinese in Malaysia. The paucity of females among the immigrants in Peninsular Malaysia could be associated with two factors. Firstly, the European plantations and mines preferred males whom they considered more efficient. Secondly, the early immigrants did not intend to settle in Malaysia rather their aim was to make sufficient money and return. Later on, however, many settled permanently in the Peninsula and their sex ratios improved gradually ( Table II ).

**Table II**
**Peninsular Malaysia**
**Sex Ratio, 1921–70.**

| Ethnicity | 1921 | 1931 | 1947 | 1957 | 1970 |
|---|---|---|---|---|---|
| Total | 648 | 703 | 886 | 939 | 982 |
| Malays | 960 | 973 | 1010 | 1013 | 1011 |
| Chinese | 371 | 486 | 815 | 926 | 927 |
| Indians | 424 | 514 | 687 | 746 | 882 |

Source : Sidhu M. S. and Ahmad Asmah, *Sifat Geografi Penduduk* ( in Malay), Penerbit Universiti Malaya, Kuala Lumpur, 1977, p. 45.

Apart from these basic factors of sex differential at birth, death and in migration, the sex composition of a population is also affected significantly by such factors like wars, famines, and relative status enjoyed by two sexes in a society. In wars it is the male population which has to bear the brunt of fighting and it has been observed that those countries which have suffered directly during the two World Wars or have had prolonged war conditions have their populations heavily loaded in favour of females. The European countries involved in the wars fall in the former category while Vietnam may belong to the latter category. The long continued wars not only cause high mortality among males but also reduce the birth rates which in its own turn reduces the number of male births. Similarly, recurrence of epidemics like plague, influenza and malaria in early years of the present century in India showed a selective lethal influence on the females as has been the case with famine stricken areas of the same country (Gosal,1961). Furthermore, though it may be difficult to say as to how much is the influence of differential status granted to the two sexes yet it has been observed that those societies where the women are assigned a relatively low status are characterised by low sex ratio. In the earlier days it could be related to the then prevailing practice of female infanticide but now-a-days with tightening control over the female infanticide,

the low sex ratios in such areas may be the legacy of the past.

The factors governing the sex ratio do not operate uniformly. Instead, there are vital international differences in their intensity and effectiveness and these differences have produced significant international contrasts in the pattern of sex ratio. However, it may be pointed out that while the differences at international level are the function of sex differential at the time of birth, death, and among the migrants, the intra-national differences in sex ratio may have their explanations more in the patterns of migration prevalent in the country concerned, for there may be little to differentiate between various parts of the same country with regard to natural sex ratio and the sex ratio at the time of death, particularly if the country is small in size. An analysis of the differential in the sex composition of rural and urban areas in various countries offers a typical example of as to how migratory ethos of the people affects the intra-national patterns of sex composition. In most of the countries of the world sex composition of rural population is typically different from that of their urban populations. It is interesting to note that rural-urban differential in sex ratio in the United States and in Western European countries is just the opposite of what prevails in Asiatic countries like India. While in the Western countries the males outnumber the females in rural areas and the females outnumber the males in urban areas, in countries like India reverse is the case. The excess of females in the urban communities of the U. S. and Europe is primarily the result of influx of females from their rural areas to avail of the vast employment opportunities for women in the urban areas while the farming in their rural areas remains largely a masculine occupation. By contrast, the sex ratio in urban areas of the countries like India remains male dominated due to preponderance of males among the rural-urban migrants. The male excessive in-migration into the urban areas of the Asian World is attributable to (i) prejudice against female employment and mobility, (ii) scarcity of jobs suitable for females, and (iii) problems of housing and high cost of living in cities which discourage many male migrants from taking their families along. The prevalence of joint family system in rural areas facilitates this type of migration (Krishan & Chandna, 1973) as the male migrants are assured of the safety and security of their families left behind. Similarly, in case of Malay Peninsula too, rural sex ratios are higher than the urban sex ratios. Not only that, the Malays and the Indians, who have large proportions of their population in rural Malaysia, have higher sex ratios in rural areas than in urban areas, while in case of the Chinese population which is largely urban-based, the reverse is the case, a reflection upon the migratory patterns of these communities in Malaysia.

The analysis of space-time variations in sex composition is still marked by vital question marks. The enquiry as to why even the natural sex ratios vary from area to area and community to community, though, strictly speaking, may fall into the field of an anthropologist yet shall reduce the burden of question marks on the maps of a population geographer and may render better understanding of the existing spatial patterns of sex ratio.

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