Regional Variations in Sex Composition in Gandaki Province, Nepal

Gopi Krishna Pandey, Ph.D.*

Abstract

Sex ratios are commonly used to predict or model population growth and are typically expressed as the number of males per 100 females. The sex composition of a population is a crucial characteristic in various demographic analyses. Separate data for males and females are vital not only for understanding the population structure but also for assessing the accuracy and completeness of population counts. Sex composition refers to the distribution of males and females within a population. Although the numbers of the two sexes are often not vastly different, their disparity has long been of interest to population geographers due to the contrasting roles of males and females in the economy and society of a region. This study is descriptive and based on secondary data, specifically from the 2021 census. The sex ratio data, readily available and accurately recorded during census enumeration, have been analyzed to assess changes in the sex ratio between 2011 and 2021. Gandaki Province, a leading and prominent region in Nepal in terms of population size, serves as the focus of this study. The findings of this research may be valuable for informing future development programs, particularly in terms of controlling population growth and understanding migration patterns.

Keywords: Regional Variation, Sex ratio, Masculinity, Gender, Gandaki Province.

Introduction

The sex ratio, which is the ratio of males to females in a population, is a crucial demographic variable for studying the composition of any given population. Understanding the sex ratio is important in demographic analysis because it influences vsarious aspects of the population, such as marriage rates, birth rates, death rates, and overall population growth. The concept of population composition, often used in demographic literature, encompasses the measurable characteristics of people within a population. This composition forms the framework upon which the institutional structure of society rests (CBS, 1998; CBS, 1966). Typically, the term "composition" refers to the distribution within a population of one or more individual traits or characteristics.

It is important to distinguish between “sex” and “gender.” “Sex” refers to the biological and reproductive characteristics that differentiate females from males, while “gender” pertains to the social and psychological attributes associated with the roles of men and women (Rossi, 1998). While it is often claimed that the only differences between men and women are that women menstruate, lactate, and give birth, this research assumes that biological sex is a significant factor that profoundly influences the social roles and psychological attributes of men and women.

Population geographers have a vital interest in data concerning sex composition because the balance of the sexes affects social and economic relationships within a society, potentially altering social roles and cultural patterns. For example, the male shortage brought about by World War II led to significant changes in the labor force participation and occupational distribution of women in the United States, Canada, and several European countries, resulting in a new pattern of social relationships between the sexes, including increased independence of women from the home (Shryock & Siegel, 1976).

In Nepal, the census data from 1971 and 1981 indicated a slightly higher percentage of males compared to females. However, from 1991 onwards, a shift occurred, with the female population surpassing the male population. For instance, the male population constituted 49.95 percent in 2001, which further decreased to 48.5 percent in 2011. The 2021 census also recorded the male population at 48.5 percent, while the female population stood at 51.5 percent. The sex ratio, which was above

* Assoc. Prof. Geography, Padmakanya Multiple Campus, T.U., Email: pandeygk2000@gmail.com

100 until 1981, decreased to 99.47 in 1981, 99.8 in 2001, and 94.2 in 2011. However, there was a slight increase in the sex ratio in 2021, reaching 95.59. Notably, the rural-urban variation in the sex ratio was 104 in urban areas and 92 in rural areas in 2011, highlighting a sex imbalance. By 2021, this variation had adjusted to 96.06 percent.

Gandaki Province, with a population of 2,466,427, accounts for approximately 9.06 percent of Nepal's total population, with an annual population growth rate of about 0.25 percent (CBS, 2021). Although sex is primarily a biological variable, it holds significant social and cultural implications. Understanding the sex composition of the population is essential for a nation's development planning. No nation can effectively implement development plans without comprehensive knowledge of the population's sex composition. The government should focus its efforts on regions with higher population burdens (CBS, 2075) and implement control measures and various development and construction initiatives.

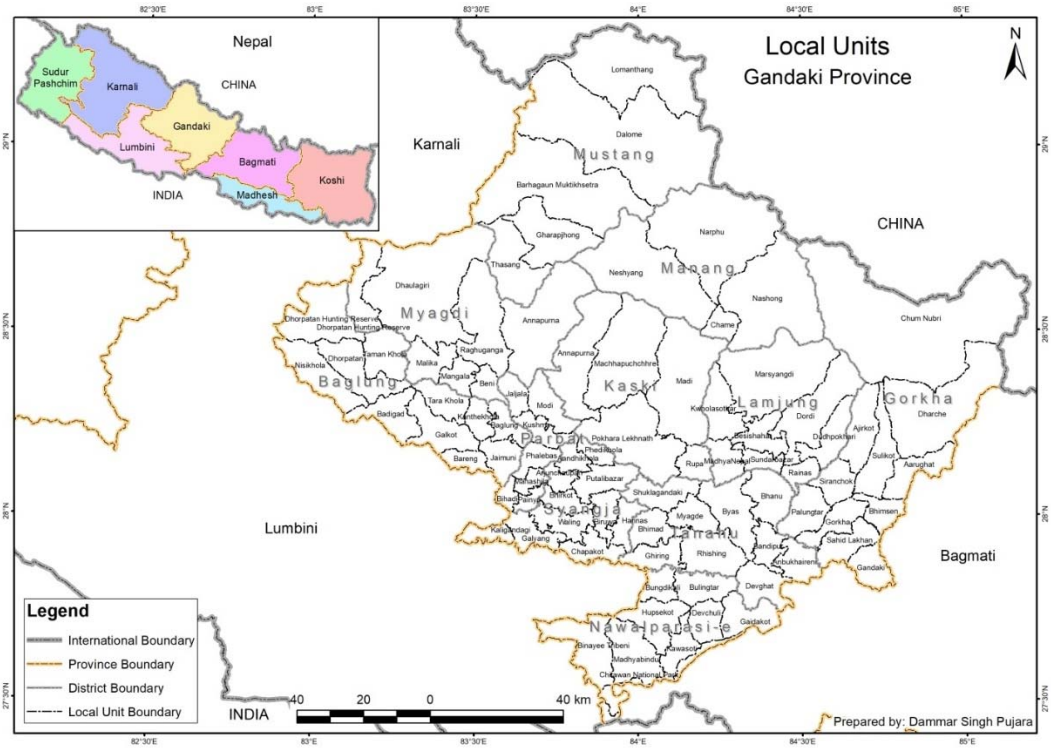
In the context of Nepal's recent federalization, information about the regional distribution of sex composition is essential for various development activities and planning in Gandaki Province. This research paper aims to identify the district-wise sex ratio and its implications in this region. Additionally, it seeks to highlight the regional variations in sex composition and sex ratio, along with their broader implications.

Methods and Materials

Gandaki Province (Figure 1) is selected for this study. This province is located in the western part of Nepal, bordered by the Trishuli River, Budhigandaki River, and Bagmati Province to the east, Lumbini Province and Uttar Pradesh of India to the south. Geographically, the province stretches between 27°20' N to 29°20' N latitude and 82°52' E to 85°12' E longitude. It covers a total area of 21,504 km², accounting for approximately 14.57 percent of the country's total area. According to the latest data, the population of the province is 2,479,745, with Pokhara Metropolitan City as its capital. Topographically, Gandaki Province is situated along the fragile, rugged, and unstable Himalayan region, but it also encompasses hilly and Terai areas. This study covers 11 districts within the province: Baglung, Gorkha, Kaski, Myagdi, Parbat, Lamjung, Manang, Mustang, Syangja, Tanahun, and East Nawalpur. Among these, Manang district had the lowest population, with approximately 5,645 people according to the 2021 census. Similarly, Mustang district had the second lowest population, with 14,596 people in the 2021 census. This indicates significant regional population variation across the districts.

The study area was chosen to reflect the diverse topographies - Tarai, hills, and Himalayas -found within the province. The census is the only source of comparable secondary data on sex composition and sex ratio in Gandaki Province. The 2011 census data were tabulated according to province and district and analyzed to review the existing status of the sex ratio in each district. This study adopts the definition of the sex ratio used in the Nepal Census 2011. Although this is a descriptive study based on secondary data, the sex composition of the population data was used to calculate the sex ratio. The sex ratio is defined as the number of males per 100 females in a population (Hali & Rao, 1992; Jacob et al., 2004). It is calculated using the following formula:

(Fig.no.1) Location Map of Gandaki Province



Technique of Analysis:

The numerical measures of sex composition are few and simple to compute. They are (Shryock & Siegel, 1976):

i. The percentage of males in the population or the masculinity proportion;
ii. The sex ratio or the masculinity ratio; and
iii. The ratio of the excess or deficit of males to the total population;

The simple excess or deficit of males is influenced by the size of the population and is, therefore, not a very useful measure for comparing one population group to another. The three major indicators (not specified in this passage) are all useful for inter-area comparisons because they eliminate the effects of variations in population size.

The masculinity proportion is the most commonly used measure of sex composition in non-technical discussions. The formula for calculating the masculinity proportion is as follows:

Pm\pt *100

Where pm represents the numbers of males and Pt represent the total population. Let us apply this formula to the Gandaki Province's 2021 census. The 2011 population census showed that the Gandaki had 1,170,833 males in a total population of 24, 66,427. Therefore,the masculinity proportion is:

1,170,833\24, 66,427*100= 47.47 percent

It is common knowledge that 47.8 percent is the point of balance for the sexes according to this measure. A figure higher than this indicates an excess of males, while a lower figure suggests an excess of females. The sex ratio of a population can be expressed either as the number of males per 100 females or as the number of females per 100 males. This discussion on sex composition will be based on the former definition of the sex ratio, as it is the one commonly used worldwide, although the 2021 Nepal census has also adopted this definition. When the sex ratio is defined as the number of males per 100 females, a ratio above 100 indicates a higher proportion of males, while a ratio below 100 signifies a higher proportion of females. The sex ratio of the total population at a given point in time is referred to as the "overall sex ratio." For consistency, males are represented as the numerator and females as the denominator in this calculation. Therefore, the sex ratios are:

Pm\Pf*100

1,295,594\1170833*100 =110.6

These means, there were 110.6 males for every female in the province population. Now, 100 is the point of balance between the sexes. A sex ratio above 100 denotes an excess of males. Accordingly, the greater is the access of males the higher will be the sex ratio and the greater the excess of females the lower the sex ratio. For the study of the sex composition of any population, define as the number of females per 100 males. This form of the sex ratio is sometimes called the masculinity ratio. In the context of USA,Eastern Europe as well as most countries flow the former definition.

The third measure of sex composition, the excess (deficit) of males as a percent of the total population, is given by the following formula.

Pm-Pf/Pt*100 here we obtained the data of Gandaki Province:

1,295594-1170833\24,66472*100 = 5.1 percent

The figure indicates that the excess of males amounts to 5.1 percent of the total population.

Theoretical Consideration

The sex ratio of population is the product of its demographic and social behavior. In general, the sex ratio is defined as numbers of males per hundred female populations. The overall sex ratio of population of Nepal counted in 2021 is 95.9 this means there are 995 males in every thousand female's population. The relationship between sex composition with fertility, mortality, migration and other economic as well as social variables has always been of immense importance to population geographers. It is a universal phenomenon that migrations are always sex selective: meaning that more males migrate than females. In present time, this situation is changing. Since, with the improvement in transportation facilities and need to earn, females are likely to migrate more than females in some developed areas of the world as well as low in Nepal. But in the context of Nepal majority of males population migrated. Materials available from countries with adequate statistics on the sex composition of migrants confirms this general impression. In the United States since 1810 when immigration statistics were first available to the period following World War 1, males have exceeded females among immigrants of every nationality. Approximately 75 percent of the immigrants between 1820 and 1824 were males. During the following decades the proportion of males declined, averaging about 60 percent from 1840 to the end of the century. The 'new immigration' after the turn of the century increased the proportion of males to 70 percent during the period 1900- 1909 and 67 percent during 1909-1914 (UN., 1953).

To fully understand the implications of the deficit of women, it is important to examine the available recent data on sex ratio at birth and if girls are not allowed to be born, it is important to understand why, when, which of the female children and what means are used to avoid having daughters. There is some evidence from hospital births in major cities like Delhi that in recent years the sex ratio at birth has become more masculine (Raju and Premi, 1992). Some evidence of sex ratio at birth becoming increasingly masculine is also available from the recent sample registration surveys (SRS) and the National Sample Survey (NSS) as well as the two National Family Health Survey (NFHS) conducted in the 1990s. All these surveys have reported around 110 boys per 100 girls at birth or at age 0.

In a study conducted by the Christian Medical Association of India analysing the sex ratio at birth of hospitalized deliveries during 2000-2001 in Delhi indicated that if the first birth was a male child, the female to male sex ratio of the second birth was 959. But if the first birth was a female child, the sex ratio of the second birth was 542. Among the women who had delivered two daughters, the sex ratio of the third birth dropped to 219 (Literacy and Population Newsletter, 2005). These are clearly not chance occurrences.

Mortality rates are high in the case of males as compared to females due to certain biological factors. With respect to sex differences, inspection of the mortality data compiled by the United Nations

reveals that in almost all countries males have a higher mortality than females. The excess of male mortality in most countries appears at every age level, though in some cases women of child bearing ages have higher mortality rates than men in the same age groups (U.N., 1953). The number of women seeking foreign employment is increasing. Historically, women have migrated for marriage or as dependents, however, this now appears to be changing and many more are migrating independently for employment overseas. In 2016/2017, the number of labour permits issued to women increased by 8.8 percent, while for men seeking labour permits the number dropped by 8.83 percentage points continuing and existing trend.

Female labour migration from Nepal have overwhelmingly chosen Malaysia, the United Arab Emirates and Kuwit as destinations. Among the different countries the United Arab Emirates, Quatar and Malasya are the most popular destination for women migrant workers. Females were more likely to internally migrate than males. Around 47 percent of females migrated from their current location, compared to 23.4 percent of males. This may explain the fact that, over all marriage is the pre dominant reasons given for migration. Over 90 percent of women migrants currently residing in rural areas indicated that the main reason for moving was marriage while 60.9 percent of women migrants residing in urban areas cited this reason as their main reason for moving.

Results and Discussion

The analysis of regional distribution of sex ratio in Gandaki province. Similarly, the sex ratio of Nepal has been studied in general. Although, district wise sex ratio and sex composition are analyzed. On the other hand, the implication of sex ratio has also discussed in this study. This article is based on secondary data which was collected 2021 census and other valuable population report, Health Survey Report of the Gandaki Province of 2076/2077. In this research the result and discussion are as follows.

Sex Ratio in Nepal

The sex ratio discusses in terms of Nepal since 1911 to 2021. It has decreased in 1952/054, 1961 and in 1991. The lowest sex ratio is found in 96.80 in 1952/054. Similarly, between 1961 and 1981 there was slightly increase sex ratio from 97 in 1961 to 105 in 1991. But it has gradually decrease sex ratio in 1991 up to 99.78 (CBS, 1993). After 2011 the sex ratio of Nepal has significantly decreased (Table 1).

Table 1.1 Sex Ratio in Nepal 20211- 2021

Census Year	Male	Female	Sex ratio
1911	2620220	2815829	100.06
1920	280042	2774714	100.06
1941	2107709	210770	104.28
1952/054	4060607	4184472	96.80
1961	4636033	4406063s	97.05
1971	5817203	5738780	101.37
1981	7695336	7327503	105.62
1991	9220914	9241169	99.78
2001	11563921	11587502	100.00
2011	12849041	13645463	94.16
2021	14253551	14911027	95.59

Source: Population Census of Nepal 1911---2021

The above table (1.1) indicated that the sex ratio slightly increases in 2021 census. During this census the percentage of sex ratio would reach 95.59. During last four decades decreasing rate of sex ratio is because of outmigration of male population from Nepal.

Table 1.2 Sex ratio by Province in Nepal 2021

Provinces	Total	Male	Female	Sex ratio
Koshi Province	4961412	2417328	2544084	95.02
Madesh Province	6114600	3065751	3048849	100.55
Bagmati Province	6116866	3048684	3068682	99.36
Gandaki Province	2466427	1170833	1295594	90.37
Lumbini Province	5122078	2454408	2667670	92.01
Karnali province	1688412	823701	864651	95.27
Sudurpaschhim province	2694783	1272786	1421997	89.51

Source: National Census Report 2021

The distribution of sex ratio by provinces is shown in above table (2.1). The study shows that female has outnumbered male population in all provinces besides province two. Province 2 is located in plain area where presence of male seems greater as comparative to another province of Nepal. Higher value of sex ratio in province 3 due to the presence of capital city of Kathmandu, where male population has highly outnumbered female because of the higher male migration to city region from many parts of the country. Province 4 has the lowest number of sex ratio presented in (Table 1.2). This indicates that majority of the sex ratio of provinces of Nepal are homogeneous.

Table 1.3 Sex Composition of Gandaki provinces 2011—2021(Male per 100 Female)

\Provinces	Census year		Change (Percentage Point)
	2011	2021	
Koshi province	91.48	25,02	- 3.54
Madesh Pradesh	101.18	100.55	0.63
Bagmati Province	98.77	99.36	- 0.59
Gandaki Province	83.08	90.37	+ 7.29
Lumbini Province	90.73	92.01	_1.28
Karnali Province	95.69	95.27	0.42
Sudurpashim Province	91.25	89.51	1.74
Nepal	94.16	95.59	

Source: Computed from National Statistical Book Government of Nepal 2011 and 2021.

The above table 1.3 shows that sex ratio of seven provinces of Nepal. A change, particularly sex ratio internal mobility is the most important factor. It may be seen that in general, the overall sex ratio of the provinces is on the average size ,but majority of the sex ratio is belonged to Sudurpushim Province is below 89.51 while those of Karnali, Lumbini, province, Gandaki province have values which exceed 95.27, 92.01, 90.37 respectively.

Migration is typically sex-selective, meaning that individuals of one sex are more likely to participate in migration than individuals of the opposite sex, rather than both sexes participating equally. Internal migration in Nepal also exhibits this sex-selective pattern, with males more frequently engaging in migration than females. When one sex dominates among internal migrants, it impacts the sex ratio in different regions of the country. In the context of Nepal's provinces, it is observed that among those migrating from rural to urban areas, the proportion of males is higher. Consequently, the sex ratio in urban populations across various provinces has consistently been higher (96.06 in 2078) than in rural populations (94.68 in 2078).

The rapid population growth in urban areas like the Kathmandu Valley, as well as other major cities such as Pokhara, Butwal, and Bharatpur, reflects this migration trend. The high sex ratios in Madhesh

and Bagmati provinces suggest that these areas have been significant recipients of migrants from different parts of the country, largely due to Kathmandu being the capital city of Nepal. Similarly, Madhesh Province, located in the Tarai plains and bordering India, has also attracted migrants from India and other regions, contributing to its higher sex ratio compared to other provinces (Table 1.3).

This province is not a homogeneous region with different aspects like, economic, social, economic and environmental. The above sections deal with sex composition in the context of Nepal, different provinces during the period 2011 to 2021 an attempt has been made to explore whether there exist regional differences in the sex composition in the Gandaki. The most puzzling aspect of the study of sex composition in the Gandaki province is the smaller proportion of female population in all districts.

Sex Ratio

It is number of males per 100 females in a population and is the most universal measure of sex composition. The following table (1.4) helps in making the following observations regarding differences in sex ratios of the Gandaki‘s population at various districts level during 2011-2021 period. There is mark a difference in sex ratios pertaining to different districts. The 2011 census reflects that the range of sex ratio among the districts of the Gandaki province is 111. 54 (Mustang) to 77.04 (Syangja) while in others it various between 80.33 (Parbat) to 109.87 (Manang) while in others it varies between 92.44 and 78.34 males per 100 females. Simalarly, according to the 2021 Census, range is 85.57(Syangja) to 121.72 (Mustang) on the other hand, other large number of districts sex ratio varies between 87.5 to106. 87 males per 100 females. The following table (1.4) shows the regional differences in sex ratio according to 2011 and 2021 Census of different district of Gandaki province. The table also clear that there are marked differences in sex ratio from one district to another district for example, five districts have sex ratio below 77,8 males per 100 females.

Table 1.4 Sex composition of the Gandaki‘s population By District 2011--- 2021

Districts	**Sex ratio (Males/100 Females**		**Change percentage point**	**Masculinity proportion**		**Change percentage point**
	2011	**2021**		**2011**	**2021**	
Baglung	**78.34**	**87.35**	**9.01**	**43.9**	**46.6**	**- 2.7**
Gorkha	**80.68**	**88.92**	**8.24**	**44.6**	**47.0**	**2. 4**
Syangja	**77.04**	**85.57**	**8.53**	**43.5**	**46.1**	**- 2.6**
Tanahun	79.72	87.74	8.02	44.3	46.7	- 2.4
Kaski	**92.44**	**91.45**	**1.04**	**48.3**	**48.8**	**--- 0.5**
Myagdi	**82.56**	**95.03**	**+ 12.47**	**45.5**	**48.7**	**- 3.2**
Mustang	**111.54**	**121.72**	**10.18**	**52.72**	**54.7**	**- 2.8**
Manang	**109.87**	**106.87**	**3.0**	**48.3**	**56.4**	**- 8.1**
Lamjung	**82.68**	**90.59**	**-- 7.91**	**45.2**	**47.5**	**--1.9**
Parbat	**80.33**	**89.12**	**-- 8.97**	**44.5**	**47.1**	**- 2.6**
Nawalparasi East	**84.7o**	**88.86**	**-- 4.2**	**45.89**	**47.0**	**-1.1**

Source: Computed from Province and District level Statistics of Nepal 2011-2021

Masculinity Proportion

For the sake of further analysis and to observe regional variation in Gandaki province’s sex composition in 1981,we have applied another measure i.e, masculinity proportion or the percentage of males in the total population, the results of which have also been shows the above table (1.4). The table shows that the masculinity proportion of different district of Gandaki province based on 2011 Census and 2021 Census. In 2011 Census this measure has the maximum value of 52.72 percent in

Mustang to a minimum of 48.3 percent in Manang. While majority of the districts have masculinity proportion ranging between 52.0 and 45.89 percent. Similarly, in 1981 Census masculinity proportion has dropped considerably in some districts of the province. It ranges between 56.4 and 54.7 percent for Manang and Mustang. It ranges between 56.4 and 44.5 percent for Manang and Parbat respectively. Although,the vaue for majority of other districts very between 46.0 to 47.0 percent respectively.

The above table 1.4 shows that the districts having minimum values of masculinity proportion in 2021 Census, other districts for example, Baglung (43.9) Lamjung (43.7) Myagdi (48.8) Nawalparasi east (47.0) Kaski (48.8) Tanahun(46.7) percent. It may be due to migration of the young people from these districts.

Conclusion

In 2021 Census majority of districts of Gandaki province the sex ratio has shown increase for example, Syangja in 2011 census the sex ratio lowest 77.04 percent there has been remarkable change in 2021 census 85 .57 percent. An overview regarding the masculinity proportion in the Gandaki province by districts raveled that in 2011 this measure has the value of 52.4 percent minimum to 44.3 percent. While according to 2021 Census masculinity proportion has increased considerably in every district of the provinces and the minimum and maximum values for the measure for the districts of the Gandaki 46.6 percent and 56.4 percent respectively. Finally, it also can be concluded that with the help of two measure used we have obtained more or less same results. The sex ratio of a region may also be affected by different development activities of the region. For instance, construction work undertaken in a big way in an area attracts the labor from another economically depressed area of the country. This could be affect the sex ratio both at the place of origin and destination of migrants. It shows that the sex composition of population not only plays an important role in population analysis but also in development planning. The causes and consequence of variations in sex ratio in Gandaki province one is females are more than males is caused by outmigration of male then female in search for job outside the country.

Finally, this study provides a comprehensive analysis of sex composition and regional disparities in Gandaki Province, Nepal, using recent census data. The findings reveal significant variations in the sex ratio across different regions, highlighting the influence of socio-cultural factors, migration patterns, and demographic dynamics. The analysis underscores the need for targeted policy interventions to address gender imbalances, particularly in areas with extreme disparities. Further research is recommended to explore the underlying causes and long-term implications of these patterns, which are critical for developing equitable and inclusive social policies in Nepal.

References

CBS. (2002*). Population census* 2001, National report, National Planning Commission (NPC), Kathmandu, Nepal.

CBS. (1966). *Population census* 1961,Vol.1 National Planning Commission (NPC), Kathmandu, Nepal.

NSD. (2021). *Population census* 2021, National Planning Commission (NPC), Kathmandu, Nepal.

CBS .(1987). *Population monograph of Nepal*. National Planning Commission of Nepal (NPC), Kathmandu,Nepal.

Halli,S.S. and Rao,K.V. (1992). *Advanced techniques of population analysis*. Plenum Press.

Shryock, H,and Siegel, J. (1976). *The methodes and materials of demography*: Academic Press Newyork, 105.

Rossi, A.S. (1986). Daedalus, *Journal of the American Academy of Arts and Science*, 143

UNO, (1953*). The determinants and consequences of population, trends department of Social affairs, Population*, 291