

**Ministry of Education  
Department of Higher Education  
Yangon University of Distance Education**

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Research Journal**

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## A Study on Mortality and Fertility levels of Myanmar and its Neighbouring Countries

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### Abstract

Fertility and mortality decline has changed with Asian population over the later period of last century. During the 21<sup>st</sup> century, Asians had the highest fertility and mortality decline in the world. During the late 1970's, significant changes have occurred in the most part of some Asia countries. This research paper respects the trend of fertility and mortality levels in Myanmar and its neighbouring countries during the period from 1960-1965 to 2010-2015. Lao's, China, Bangladesh, Thailand and India are Myanmar's neighbouring countries. Crude birth rate and total fertility rate are studied as a measure of fertility and crude death rate and infant mortality rate are studied as a measure of mortality. The series of population for these countries are studied in five-year interval as 1960 to 2015. The population growth rate per decade and per annum for Myanmar and its neighbouring countries are calculated by using constant growth model. It is found that the population growth rate per annum for Bangladesh is the highest and China has the lowest growth rate. Among the studied countries, Myanmar's population growth rate was median with 0.82 per annum.

**Key words:** Crude Birth Rate(CBR), Crude Death Rate(CDR), Infant Mortality Rate(IMR), Total Fertility Rate(TFR), Constant Growth Rate

### Introduction

Population growth and economic development are very closely related. A rapid growth of population is likely to slow down the rate of growth of economy. The levels of fertility and mortality are key factors of population changes. Most of the population in Myanmar and its neighbouring countries increased in later years. This research paper represents the trend of fertility and mortality in Laos PDR, Thailand, China, India, Bangladesh and Myanmar. The study period is 1960-1965 to 2010-2015. Moreover, the trend of fertility and mortality rates are studied in detail.

### Aim and Objectives

The aim of the studies is to explore the growth rate of population. The objectives of the studies are to review the fertility and mortality of Myanmar and its neighbouring countries.

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### **Methodology and Sources of Data**

This study was based on the secondary data and information received from world population prospects 2019. The conditions of fertility rate variation are also studied in terms of CBR and TFR respectively. The conditions of mortality rate variation was compared and contrasted with CDR and IMR. By using constant growth model, the population of Myanmar and its neighbouring countries was calculated.

### **Scope and Limitation of the Study**

In this study, the data on fertility for Myanmar and its neighbouring countries was based on the secondary data and information received from world population prospects 2019. In addition, some information was obtained from Myanmar and its neighbouring countries demography and website link.

### **Organization of the Study**

This paper comprises five chapters. Chapter 1 is the introduction, aim and objectives, methodology and sources of data, scope and limitation of the study and organization of the study. Chapter 2 expresses brief profiles of Myanmar and its neighbouring countries. Chapter 3, trends of fertility and mortality in Myanmar and its neighbouring countries are compared. Chapter 4 presents trends for CBR, TFR, CDR, IMR and life expectancy of birth for Myanmar and its neighbouring countries and the population growth rates of these countries are also calculated by using constant growth model. The following chapter is conclusion.

## **2. Brief Profiles of Myanmar and its neighbouring countries**

### **2.1 Location of Myanmar and its neighbouring countries**

The coastal region of Myanmar stretches a length of 1335 miles from the Rakhine coast, via the Ayeyarwady Delta Region to the Thanintharyi coastal strip. Myanmar shares common borders with five countries Bangladesh and India on Northwest, China on the Northeast, Laos PDR on the East and Thailand on the Southeast.

### **2.2 Geographic and Demographic Background in Myanmar**

Myanmar is situated in Southeast Asia between east longitudes  $92^{\circ} 10'$  and  $101^{\circ} 11'$  and between north latitudes  $9^{\circ} 30'$  and  $28^{\circ} 31'$ . Myanmar also known as the golden land for its rich natural resources, rich cultural heritage, glittering temples and pagodas, un-spoilt beauty and diversity of attraction, has a total area of 676,577sq.km and boasts a coastline of 2,832 km. Geographically, Myanmar is the largest country in South-east Asian Peninsula sharing borders with Bangladesh, India, China, Laos and Thailand. The population of Myanmar is about 54.05 million in 2019. Nay-Pyi-Taw is Myanmar's capital city and Myanmar has a big union of nationalities as well as 135 groups. The official language is Myanmar. The major religion is Theravada Buddhism. Country currency is accepted as Kyat.

### **2.3 Geographic and Demographic Background in Laos**

Laos people's Democratic Republic occupies a strategic position in Southeast Asia. Laos capital is Vientiane and area of the country is 236800sq.km. It has used in many languages. Buddhism and tribal beliefs are the major religions. The population of Laos PDR is about 7.17 million in 2019. The currency is Kip.

### **2.4 Geographic and Demographic Background in Thailand**

Thailand formerly known as Siam is a Southeast Asian country. An ancient autocracy, it became a constitutional monarchy in 1932. In 1948, the country assumed its present name Thailand. The capital is Bangkok and area of the country is 515,115 sq. km. The population of Thailand is about 69.63 million in 2019. The currency is Bath.

### **2.5 Geographic and Demographic Background in China**

China is situated between latitudes  $18^{\circ}$  and  $54^{\circ}$  and longitudes  $73^{\circ}$  and  $135^{\circ}$  East which is in Eastern Asia. The total land boundaries of China are measure 22,117 Kilometers (13,743 miles) long. The population of China is about 1.43 billion in 2019. China consists of twenty-

two provinces, four municipalities, five autonomous regions and two specially administered regions. China is a big country in South East Asia and the capital of China is Beijing.

## 2.6 Geographic and Demographic Background in India

India is located in Southeast Asia, bordering the Arabian Sea and the Bay of Bengal between latitudes 8°4' and 37°6' north and longitudes 68°7' and 97° 25' east. The population of India is about 1.37 billion in 2019. New Delhi is the capital city of India and has approximately 10.2 million residents. Delhi, the capital of India is the third largest city of the world. It is the second most populous country in the world, with a density of 416 persons per sq.km in 2019.

## 2.7 Geographic and Demographic Background in Bangladesh

Bangladesh is situated in Southeast Asia on the two largest rivers on the Indian subcontinent the Ganges and Jamuna. The capital city of Bangladesh is Dhaka. The estimated population of Bangladesh is 163.05 million in 2019. It is one of the ten most populous countries in the world. Population growth rate of Bangladesh is 2% and the expectation of life at birth is 63 years.

## 3. Trends of Fertility and Mortality in Myanmar and its neighbouring countries

### 3.1 Trends of Population

The following table shows the total population of Myanmar and its neighbouring countries.

**Table (3.1) Trends of Population in Myanmar and its neighbouring countries (Thousand)**

Year	Myanmar	Laos PDR	Thailand	China	India	Bangladesh
1960	21737	2121	27397	660408	450548	48014
1965	24259	2383	31823	724219	499123	55385
1970	27269	2688	36885	827601	555190	64232
1975	30611	3052	42326	926241	623103	70066
1980	34224	3258	47374	1000089	698953	79639
1985	37977	3688	52027	1075589	784360	90764
1990	41335	4258	56558	1176884	873278	103172
1995	43902	4846	59467	1240921	963923	115170
2000	46720	5324	62953	1290551	1056576	127658
2005	48950	5752	65416	1330776	1147610	139036
2010	50601	6249	67195	1368811	1234281	147575
2015	52681	6741	68715	1406848	1310152	156256

Source: World Population Prospects 2019

In table (3.1), it can be observed that all population of Myanmar and its neighbouring countries were increased in every decade. According to table (3.1), Myanmar's population was 21,737 in 1960. It can be seen that 37,977 populations had increased in 1985. After 35 years, exactly in 2015, it had been increased 52,681. Laos PDR's population was 2121 in 1960. It can be seen that 3688 populations had increased in 1985. After 35 years, exactly in 2015, it had increased up to 6741. Thailand's population was 27,397 in 1960. It can be seen that 52,027 populations had increased in 1985. After 35 years, exactly in 2015, it had been increased 68,715. China's population was 660,408 in 1960. It can be seen that 1,075,589 populations had increased in 1985. After 35 years, exactly in 2015, it had been increased 1,406,848. India's population was 450,548 in 1960. It can be seen that 698,953 populations had increased in 1985. After 35 years, exactly in 2015, it had been increased 1,310,152. Bangladesh's population was 48,014 in 1960. It can be seen that 90,764 populations had increased in 1985. After 35 years, exactly in 2015, it had been increased 156,256. Bangladesh has the largest population and Laos PDR has the smallest population in 2015.

### 3.2 Crude Birth Rate (CBR)

The crude birth rate per 1,000 populations represents the ratio of the total number of live births reported in a calendar year to the estimated mid-year population.

### 3.2.1 Trends of Crude Birth Rate (CBR)

Trends of Crude Birth Rate (CBR) from 1960-1965 to 2010-2015 for Myanmar and its neighbouring countries are presented in Table (3.2).

**Table (3.2) Trends of CBR in Myanmar and its neighbouring countries (Thousand)**

Year	Myanmar	Laos PDR	Thailand	China	India	Bangladesh
1960-1965	42.7	43.0	42.2	39.4	41.4	48.4
1965-1970	40.9	42.9	40.4	39.5	39.8	47.9
1970-1975	38.8	43.1	34.7	31.9	38.4	46.3
1975-1980	36.5	42.7	29.0	22.5	36.7	44.1
1980-1985	33.9	42.9	24.2	21.2	35.5	41.6
1985-1990	29.4	42.7	20.5	24.8	33.0	37.5
1990-1995	26.0	41.5	18.2	17.4	30.0	32.8
1995-2000	24.9	34.8	15.7	14.6	27.6	29.2
2000-2005	24.0	29.9	13.6	13.1	25.2	25.9
2005-2010	21.2	28.8	12.3	12.8	22.8	22.4
2010-2015	18.6	25.6	11.2	12.7	19.6	20.1

Source: World Population Prospects 2019

Table (3.2), shows that CBRs for Myanmar and its neighbouring countries range between 11.2 and 48.4 live births per thousand populations during the study period. CBR for the Myanmar and its neighbouring countries were the highest at the beginning of the period 1960-1965. After this year, the CBR for all countries were gradually declined. The maximum CBR for Bangladesh was 48.4 and the minimum CBR for China was 39.4 in 1960-1965. But CBR for Thailand is the lowest and CBR for China is the second lowest at the end of the study period.

### 3.3 Total Fertility Rate (TFR)

The total fertility rate may be interpreted as the total number of five births that would occur to a woman, if she was to go through her reproductive years, bearing children at the age specific fertility rate prevailing in a given year. In other words, it is the number of children a woman would have if she experienced the prevailing age specific fertility rates of women in a given year. It is a summary index of period fertility that is the fertility of a particular year or period of a given population.

#### 3.3.1 Trends of Total Fertility Rate (TFR)

Fertility is generally expressed as a Total Fertility Rate (TFR), which indicates the average number of children that a woman would bear at current fertility rates. Trend of TFR during 1960-1965 and 2010-2015 for Myanmar and its neighbouring countries are shown in Table (3.3).

**Table (3.3) Trends of TFR in Myanmar and its neighbouring countries (Thousand)**

Year	Myanmar	Laos PDR	Thailand	China	India	Bangladesh
1960-1965	6.10	5.97	6.13	6.15	5.89	6.80
1965-1970	6.10	5.98	5.99	6.30	5.72	6.92
1970-1975	5.74	5.99	5.05	4.85	5.41	6.91
1975-1980	5.15	6.15	3.92	3.01	4.97	6.63
1980-1985	4.60	6.36	2.95	2.52	4.68	5.98
1985-1990	3.78	6.27	2.30	2.73	4.27	4.98
1990-1995	3.20	5.88	1.99	1.83	3.83	4.06
1995-2000	2.95	4.81	1.77	1.62	3.48	3.43
2000-2005	2.80	3.90	1.60	1.61	3.14	2.94
2005-2010	2.50	3.40	1.56	1.62	2.80	2.48
2010-2015	2.25	2.93	1.53	1.64	2.40	2.21

Source: World Population Prospects 2019



Table (3.4) indicates the changes of TFR in Myanmar and its neighbouring countries from 1960-1965 to 2010-2015. The high rate of total fertility of Myanmar and its neighbouring countries are found at the beginning of the studied period 1960-1965. TFR of Myanmar, it declined from about 6 per woman in 1960-1965 to about 5 per woman in 1980-1985 and continued to decline still at the end of 2010-2015. TFR of Laos PDR, it declined from about 6 per woman in 1960-1965 to about 5 per woman in 1995-2000 and continued to decline still at the end of 2010-2015. TFR of Thailand, it declined from about 6 per woman in 1960-1965 to about 5 per woman in 1970-1975 and continued to decline still at the end of 2010-2015. TFR of China, it declined from about 6 per woman in 1960-1965 to about 5 per woman in 1970-1975 and continued to decline still at the end of 2010-2015. TFR of India, it declined from about 6 per woman in 1960-1965 to about 5 per woman in 1975-1980 and continued to decline still at the end of 2010-2015. TFR of Bangladesh, it declined from about 6 per woman in 1960-1965 to about 5 per woman in 1985-1990 and continued to decline still at the end of 2010-2015. During the end of the period of 2010-2015, the TFR of Thailand and China can be seen significantly declined.

### 3.4 Crude Death Rate (CDR)

The crude birth rate per 1,000 populations represents the ratio of the total number of live deaths reported in a calendar year to the estimated mid-year population.

#### 3.4.1 Trends of Crude Death Rate (CDR)

Trends of Crude Death Rate (CDR) during 1960-1965 to 2010-2015 for Myanmar and its neighbouring countries are presented in Table (3.4).

**Table (3.4) Trends of CDR in Myanmar and its neighbouring countries(Thousand)**

Year	Myanmar	Laos PDR	Thailand	China	India	Bangladesh
1960-1965	20.7	19.8	12.3	20.7	20.9	19.3
1965-1970	17.6	18.8	10.9	12.8	18.4	17.8
1970-1975	15.7	17.8	9.2	9.2	16.1	19.8
1975-1980	14.2	17.0	7.8	7.1	14.0	15.5
1980-1985	12.9	16.1	6.8	6.6	12.7	13.7
1985-1990	11.5	14.5	5.6	6.7	11.6	11.4
1990-1995	10.7	13.0	6.1	6.7	10.2	9.3
1995-2000	10.1	10.8	6.6	6.7	9.1	7.4
2000-2005	9.7	9.1	7.0	6.6	8.4	6.5
2005-2010	9.2	7.9	7.2	6.8	7.8	7.3
2010-2015	8.5	7.0	7.3	7.0	7.3	5.6

Source: World Population Prospects 2019

Table (3.5) shows that CDRs for Myanmar and its neighbouring countries range between 6.1 and 20.9 per thousand population during the study period. CDR for the Myanmar and its neighbouring countries were the highest at the beginning of the period 1960-1965. The maximum CDR for India was 20.9 and the minimum CDR for Thailand was 12.3 in 1960-1965. But CDR for Myanmar is the highest and CDR for Bangladesh is the lowest at the end of the study period. During the studying period 1960-65 to 2010-2015 the CDR declined.

### 3.5 Infant Mortality Rate (IMR)

The infant mortality rate is the number of deaths of children under 1 year in per 1000 population.

#### 3.5.1 Trends of Infant Mortality Rate (IMR)

Table (3.5) expresses the trends of IMR during 1960-1965 and 2010-2015 in Myanmar and its neighbouring countries.

**Table (3.5) Trends of IMR in Myanmar and its neighbouring countries(Thousand)**

Year	Myanmar	Laos PDR	Thailand	China	India	Bangladesh
1960-1965	156	156	92	135	155	161
1965-1970	123	147	78	94	146	150
1970-1975	111	138	63	72	136	168
1975-1980	100	130	51	55	121	138
1980-1985	90	122	42	45	106	124
1985-1990	81	108	33	42	93	107
1990-1995	73	98	26	41	82	88
1995-2000	65	83	21	35	71	70
2000-2005	58	70	17	27	60	55
2005-2010	52	58	13	18	49	43
2010-2015	44	47	10	12	39	33

Source: World Population Prospects 2019

According to Table (3.5), IMR was too high in the beginning of the study period. The IMR of Myanmar slowly declined from 156 in 1960-1965 to 123 in 1965-1970. Myanmar decreased from 165 per thousand live births in 1960-1965 to 44 per thousand live birth in 2010-2015. The IMR of Laos PDR slowly declined from 156 in 1960-1965 to 147 in 1965-1970. Laos PDR decreased from 156 per thousand live births in 1960-1965 to 47 per thousand live birth in 2010-2015. The IMR of Thailand fairly declined from 92 in 1960-1965 to 78 in 1965-1970. But, Thailand significantly decreased from 92 per thousand live births in 1960-1965 to 10 per thousand live birth in 2010-2015. The IMR of China significantly declined from 135 in 1960-1965 to 94 in 1965-1970. China significantly decreased from 135 per thousand live births in 1960-1965 to 12 per thousand live birth in 2010-2015. The IMR of India slowly declined from 155 in 1960-1965 to 146 in 1965-1970. India decreased from 155 per thousand live births in 1960-1965 to 39 per thousand live birth in 2010-2015. The IMR of Bangladesh slowly declined from 161 in 1960-1965 to 150 in 1965-1970. Bangladesh decreased from 161 per thousand live births in 1960-1965 to 33 per thousand live birth in 2010-2015. According to the above table, IMR fairly declined in studying Myanmar and its neighbouring countries except Thailand and China.

**4. Constant Growth Model in Myanmar and its neighbouring countries**

**4.1 Constant Growth Model**

A linear trend relationship would be modeled as

$$Y_t = \alpha + \beta_t + U_t \tag{4.1}$$

Where, t= indicates time

Taking first differences to Equation (4.1) gives

$$\Delta Y_t = Y_t - Y_{t-1}$$

$$Y_{t-1} = \alpha + \beta_{(t-1)} + U_{t-1} \tag{4.2}$$

$$\Delta Y_t = \beta + (U_t - U_{t-1}) \tag{4.3}$$

Without disturbances a constant growth series is given by the equation

$$Y_t = Y_0(1+g)^t \tag{4.4}$$

Where  $g = (Y_t - Y_{t-1}) / Y_{t-1}$  is the constant proportionate rate of growth per period. Taking logs of both sides of Equation (4.4) gives

$$\ln Y_t = \alpha + \beta_t \tag{4.5}$$

Where,  $\alpha = \ln Y_0$  and  $\beta = \ln(1+g)$  (4.6)

$$b = \ln(1+\hat{g}) \text{ giving } \hat{g} = e^b - 1$$

$$Y_t = Y_0 e^{\beta t} \text{ or } \ln Y_t = \alpha + \beta_t$$

Finally, note that taking first differences of Equation (4.5) gives

$$\Delta \ln Y_t = \beta = \ln(1 + g) \sim g$$

## 4.2 Calculations Constant Growth Model for Population in Myanmar its Neighbouring Countries

According to a constant growth model, it is required to take the logarithm base  $e$  the observed data series. When plotting the logarithm series, it can be seen that there is a linear trend in that series. It can be seen that there is a linear relationship between logarithm of population and time. Therefore, the constant growth model in Equation (4.5) can be assumed to fit the data. According to the equations, when the calculation with data the following result has to outcome.

The growth rate for Myanmar is almost 4.17 percent per decade. Thus, the annual growth rate (agr) of Myanmar increased 0.82 percent per annum. The correlation coefficient ( $r$ ) is computed as 0.9802. The coefficient of determination ( $r^2$ ) was obtained as 0.9608. The growth rate for Laos PDR is almost 5.54 percent per decade. Thus, the annual growth rate (agr) of Laos PDR increased 1.08 percent per annum. The correlation coefficient ( $r$ ) is computed as 0.9975. The coefficient of determination ( $r^2$ ) was obtained as 0.9950. The growth rate for Thailand is almost 4.22 percent per decade. Thus, the annual growth rate (agr) of Thailand increased 0.83 percent per annum. The correlation coefficient ( $r$ ) was computed as 0.9635. The coefficient of determination ( $r^2$ ) was obtained as 0.9283. The growth rate for China is almost 3.52 percent per decade. Thus, the annual growth rate (agr) of China increased 0.69 percent per annum. The correlation coefficient ( $r$ ) was computed as 0.9753. The coefficient of determination ( $r^2$ ) is obtained as 0.9512. The growth rate for India is almost 5.15 percent per decade. Thus, the annual growth rate (agr) of India increased 1.009 percent per annum. The correlation coefficient ( $r$ ) was computed as 0.9969. The coefficient of determination ( $r^2$ ) is obtained as 0.9938. The growth rate for Bangladesh is almost 5.65 percent per decade. Thus, the annual growth rate (agr) of Bangladesh increased 1.105 percent per annum. The correlation coefficient ( $r$ ) was computed as 0.9953. The coefficient of determination ( $r^2$ ) was obtained as 0.9906.

## 5. Conclusion

At present, Asia combines about 60 percent of the world population. Asia is divided into four regions: East Asia, South Central Asia, South East Asia and Western Asia. Myanmar, Thailand, Bangladesh, Lao's PDR are located in South East Asia, India is in Western Asia and China is located in East Asia.

Among the studied countries, population of China is the largest and the second largest populated country is India. Therefore, it can be said that Myanmar is located between two giant countries. Myanmar and Lao's population is the lowest among the studied countries. By comparing the total fertility rates, the TFRs for Thailand and China are below replacement level and the remaining countries have occurred above that level in 2010-2015. It is significantly found that Lao's PDR has the highest TFR with 2.93. Crude birth rates for Myanmar, Thailand and China are over 10 per thousand population in 2010-2015 and these rates are the lowest among the studied population. At the same time, crude birth rates for the remaining countries are over 20 per thousand population. Moreover, Crude birth rate for India is nearly 20 per thousand population. In comparing the CDR in Myanmar and its neighbouring countries, all countries have below 10 per thousand population in 2010-2015. Infant mortality rate is an important indicator to express the development of a country. Thailand has the lowest IMR and China has the second lowest in 2010-2015. But, Myanmar and Lao have the highest IMRs with 44 and 47 per thousand live births.

According to the result from constant growth model, Bangladesh and Lao's PDR population have increased with 1.105 percent and 1.08 percent respectively per year and these are the highest among the studied countries. China's population has increased with the lowest rate of 0.69 percent per annum and Myanmar has the growth rate 0.82 percent per annum.

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