

IMPACT OF CHANGING FERTILITY ON POPULATION AGEING IN KARNATAKA

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Abstract

Population ageing has become a global phenomenon, it starts with birth and ends with death. Basically, it is a biological process but counts in Chronological age. According to the Indian census a person aged 60 and above represent the elderly or aged population. It is a by-product of demographic transitions both fertility and mortality decreases from higher to lower level. The process of Population ageing is determined by the demographic determinants like fertility, mortality, life expectancy and migration. Among these the significant factor is fertility, which plays a major role in the process of population ageing in all the developing countries. In this context the present paper aims to examine the trend of Spatio-Temporal changes in population ageing and level of Fertility in Karnataka. This paper also attempts to examine the relationship between the process change in fertility and population ageing in Karnataka for the period of four decades, i.e. 1981 to 2011. The Pearson's correlation method has been used to examine the relationship between the population ageing and Fertility. The study has revealed, with some exceptions, they are correlated negatively each other; Where the level of 'fertility is high in such places 'youth stage' and 'where the level of fertility is 'ultra-low level' that place has 'Old stage' in the process of population ageing.

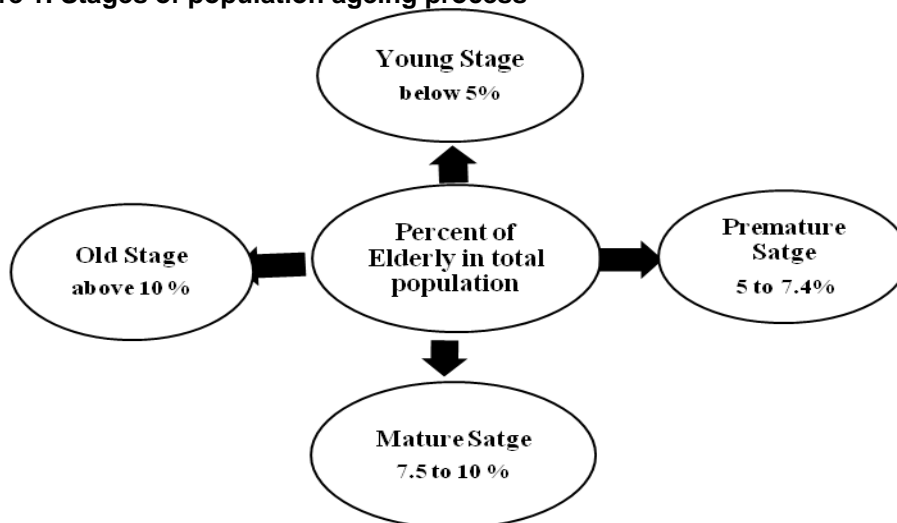
Key Words: Population Ageing, Total Fertility Rates. Youth stage, old stage, ultra-low level

Introduction

The ageing of population is a characteristic of an age distribution and it's importantly affected by the trends of fertility, mortality life expectancy and migration (increased net migration of younger or net out migration of older people) all these demographic components can be involved in a process of population ageing either each components alone or involves combinations. **'Population ageing occurs in the process of modernizations when the fertility decline and life expectancy increases due to a decline in mortality'**. However population can also become aged through fertility decline alone without any increase in life expectancy. Conversely, population might be aged even with constant fertility, if they experience a sustained mortality decline and thus can increase in life expectancy, population may even be aged without any change in fertility or mortality just as a consequence of emigration of young people or immigration of older people. In many developing countries the main driving force of population ageing is the decline of fertility. United Nations Organizations (UNO) has categorised the countries into three groups on the basis of Total Fertility Rate (TFR) they are **High fertility** countries with above 6 children per women, **Moderate fertility** countries with below 6 but above 2.1 children per women and **Low fertility** countries with less than 2.1 children per women. In recent time the replacement level fertility has been classified into **below replacement level** with 2.1 Total Fertility Rate and **Ultra-low fertility level** with less than 1.8 Total Fertility Rate. The proportion of elderly population to total population is one of the indicators to consider whether the population is 'Young', 'Mature' or 'Old'. If the population has 10 or more percent of 60 years and above population is known as 'Old' and those with below 5 percent as 'young' and between 10 and 5 percent as 'Mature stage' (Fig:1). In the present study the mature stage has been

classified into two sub stages they are: '**Premature**' with 5 to 7.4 percent and above 7.5 and below 10 percent is '**Mature**' stage in the process of population ageing in Karnataka.

Figure 1. Stages of population ageing process



Study area

The Southern state of Karnataka is pioneer in many fields among the Indian states. It is located in the Western part of the Deccan plateau. It is surrounded by Maharashtra in the North, Andhra Pradesh in the East, Tamilnadu in the South and Southeast, Kerala in the Southwest and Goa in the Northwest. In the Western part it is flanked by the Arabian Sea. It extends Latitudinally from 11°31' to 18°45' North and longitudinally from 74°12' to 78°40' East. The total geographical area of the state is about 1, 91,791 Sq.km. physiographically the Karnataka state is divided into three regions they are: **Northern Karnataka Region (NKR), Southern Karnataka Region (SKR) and Coastal Karnataka Region (CKR).**

As per 2011 census Karnataka has 6.10 crore population with 3.09 crore males and 3.01 crore females. It has 5.31% of India's total population and ranks ninth in the country. The total elderly population in the state during 2011 was 5.83 million with 2.77 million males and 3.06 million females. As per 2011 census the proportion of elderly population to total population in Karnataka is 9.55% with 8.95% of males and 10.17% of female and 10.47% of rural and 8.10% of urban areas.

Objectives

The objectives of the present research paper are: To identify the Spatio and temporal changes in the Population Ageing and fertility of Karnataka in different regions. To find out the relationship between the process of Population Ageing and level of fertility.

Methodology

The present study is based on the secondary source of information collected from different sources like the tables of Karnataka on age, total fertility rate in Karnataka, census of India and other sources related to population Ageing and total fertility rate for the last four decade from 1981 to 2011. Understand the Spatio and temporal changes in population ageing;

percent of Elderly population to total population has been worked out at district level using the following formula.

$$\text{Percent of Elderly} = \frac{\text{No. of Persons aged 60 years and above in the same period}}{\text{Total population in the Particular period}} \times 100$$

To examine the relation between the process of population ageing and the level of total fertility rate the Pearson's correlation has been worked out for each region.

Discussions

Spatio-Temporal Change of population ageing and Fertility

Table 1. Top ten states in India in Elderly Population and Fertility rate in 2011				
Percent of Elderly population in 2011			Total fertility rate in 2011	
1	Kerala	12.7	Goa	1.5
2	Goa	11.4	Kerala, Tamil Nadu	1.6
3	Andhra Pradesh	10.7	Andhra Pradesh	1.8
4	Tamil Nadu	10.5	Sikkim	1.9
5	Punjab	10.5	Karnataka, west Bengal, Chandigarh, Himachala Pradesh	2.0
6	Himachal Pradesh	10.4	Punjab	2.1
7	Maharashtra	10.3	Maharashtra, Tripura, Delhi,	2.2
8	Odisha	9.8	Gujarat, Odisha	2.4
9	Karnataka	9.6	Manipur	2.5
10	Gujarat	9.1	Uttaranchal	2.6
	INDIA	8.4	INDIA	2.7

The number of elderly population in the developing regions have been growing at a phenomenal rate compared to the more developed regions because the transition in fertility towards the lower level continues in the developing regions from 6.2 children per women in 1950-55 to 2.9 in 2000-2005. However in the more developed regions it has dropped from low level of 2.8 children per women in 1950-55 to an extremely low level of 1.5 children per women in 2000-2005. In India the rate of population ageing varies between the Northern and Southern states. The North Indian states are low performance of population ageing than the South Indian states. Amongst the South Indian states Karnataka ranks fourth in population ageing after Kerala, Andrapradesh and Tamilnadu in 2011 with 9.6% of elderly population. In Karnataka population ageing is slowly picking up its momentum in the past two decades due to fast declining in the fertility level. In 2001 for the first time in the history of Karnataka some districts of the SKR and CKR entered into the 'below replacement level' in Total Fertility Rate and 'old stage' in terms of population ageing in Karnataka.

As per 2011 data, at the national level, Karnataka stands 9th in percent of elderly population and 5th in Total Fertility Rate (Table: 4.1). In 2011 the state is very near to 'Old Stage' with 9.55% of elderly population with regional variation due to the variation in the reduction level in the of fertility. As the stages of population ageing, is commonly linked with the level of fertility. An attempt has been made to compare level of fertility with the stages of population ageing. Fertility refers to the occurrence of birth, which 'refers to the reproductive capacity of women during her entire reproductive period'. Various measures of fertility have been coined

like: Crude Birth Rate, General Fertility Rate, Fertility or Child-Women Ratio, Age Specific Birth Rate, Total Fertility Rate, Standardized Birth Rate, Replacement Rate etc. The present study is based on the Total Fertility Rate. It is an age-sex adjusted measures of fertility and most meaningful cross-sectional measures of fertility (R.C.Chandna 2011). *It is an average number of children that could be born to a woman over her lifetime in a given population.* As for the classification of fertility Karnataka entered the '**low level of fertility**' rate in 2001 with 2.4 Total Fertility Rate and '**Below replacement level of fertility**' in 2011 with 2.0 Total Fertility Rate with the regional variation.

In 1952, India become the first country in the world to launch a family planning programme aimed at reducing the population growth but since it has been "a stage of great expectations and poor performance" (P.N.M.Bhat 2010) This statement is also applied for Karnataka state as it had unique history of early start of the family planning programme. The Mysore (earlier name of the Karnataka state) was the first state in India to take up vaccination against small pox in 1806 and a government hospital was setup in Bangalore. The world's first two birth control clinics were setup in Bangalore and Mysore district of the state in 1930 (KHDR-2005, lingaraju 2012). Although Karnataka has experienced considerable reduction in fertility but lower in the scale and slower in pace than in the Southern state of Kerala, Tamilnadu and Andrapradesh. Among the southern states in India, Kerala is the first state to achieve the replacement level of fertility in the year 1988 followed by the Tamilnadu (1993) Andrapradesh (2004) and finally Karnataka in 2006 (Lingaraju 2012). Karnataka is still far behind its neighbouring states further reduction of its Total Fertility Rate. In 2011 the Total Fertility Rate of Karnataka is 2.0, Andrapradesh is 1.8, Kerala is 1.6 and Tamilnadu is also 1.6 (Gullmotto & Rajan 2013), it shown except Karnataka and Andrapradesh remaining two states have ultra-low fertility level (less than 1.8) although compared to the national average with 2.7 Total Fertility Rate it is low but compared to the neighbouring states like Kerala, Tamilnadu and Andrapradesh, it still lagging behind in all aspects like the present of health infrastructure in the state is not sufficient for its existing population. Not only Villages some of the towns and urban also still lagging behind the basic amenities such as approach roads, transportations, safe drinking water, housing and school etc. as a result the decadal growth, trend of fertility is no unique with in the state and region due to Geo-demographic, Socio-economic, cultural and political aspects as a result the process of population ageing is also varies from one region to another with in the state.

The level and stages of fertility decline differ significantly one region to another given this situation it is interesting to have a look at changing level of fertility. The level of fertility and the process of population ageing are opposite with each other, where the fertility is high such region will have low proportion of elderly population and vice versa. In Karnataka the trend of population ageing is negatively correlated with fertility transitions. In the first stage of fertility transitions the society had '**High Fertility Rate**' with more number of children population and less number of aged population called '**Youth stage**' in terms of population. This situation occurs in Karnataka before 1991 because up to 1991 the level of fertility is 5-4 level and it decreased 4-3 level in 1991 so in 1991 Karnataka had 3.9 Total Fertility Rate it is a '**Moderate level**' in terms of classification of fertility and '**Mature stage**' in terms of ageing process with 7.51% of elderly population, after the completion of the two decades (2011) it has entered into the '**below replacement level fertility**' with 2.0 Total Fertility Rate and '**very near to old stage**' in ageing process with 9.6% of elderly population with regional variation (Fig:4.1) it shows in Karnataka the process of population ageing and the level of fertility correlated with each other.

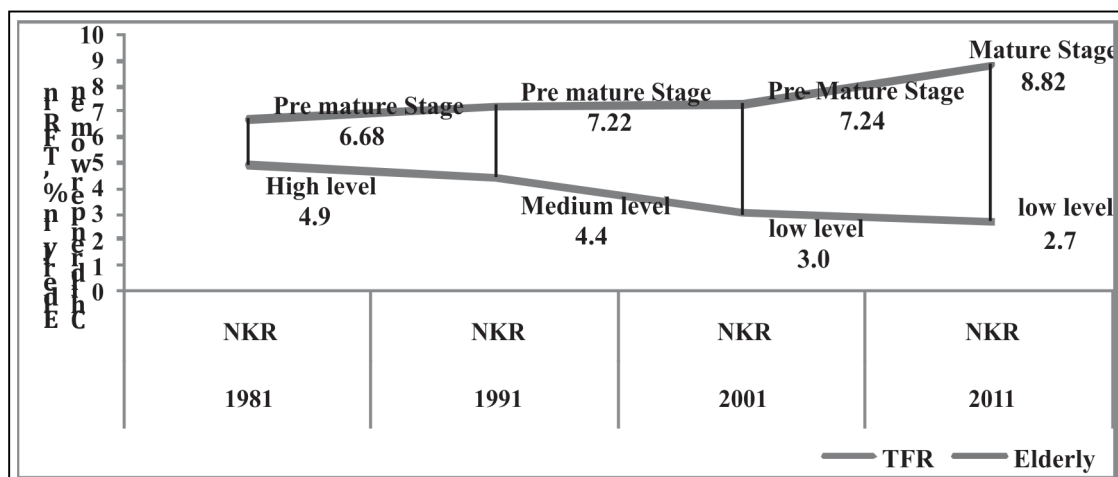
Northern Karnataka Region

In 1981 Northern Karnataka Region was in '**Pre mature stage**' in terms of ageing with high level fertility and entered into the '**Mature stage**' after the 3 decades in 2011 with low level fertility. In 2011, the districts like Belgaum and Bidar lies in '**Old stage**' with more than above 10 percent of elderly population (Map: 4.1 and Appendix. I). It is attributed for the better performance of these districts in the health, education and in the field of income. Even in fertility this region stands in '**Medium fertility level**' with 2.7 Total Fertility Rate. Among the districts of this region none of the districts could reach the below replacement level fertility (Map: 4.2 and Appendix. I) due to the influence of Geographic, Demographic, Socio-Economic, Political and Historical aspects. *Geographically* Northern Karnataka region is arid and semiarid areas so they receive lower rains during the rainy season. As a result the districts of this region face serious scarcity of water during summer. *Historically* this region belongs to the part of the former Hyderabad state which was under the control of Nizam for centuries. So the influence of Muslim customs, traditions and culture is high in this region compared to the other parts of the state, *Demographically*, it is located very near to the parts of high fertility zone in India that extends Northwards of the Maratawada region of the Maharashtra and it had low female first age at marriage years compared to the other regions of the state. *Politically*, most of the districts of this region come under the Gulbarga division; it is the backward division in the state. It is also backward in *Human development* with low performance in the field of income, health and education in Karnataka (KHDR2005). Because of the influence of above factors, this region is still (2011 except Dharwad with 2.1 Total Fertility Rate) show more than replacement level of fertility in spite of the entire state entered into the replacement level of fertility with 2.1 Total Fertility Rate in 2006.

In 2011 the highest and lowest Total Fertility Rate recorded at Yadgir in Northern Karnataka region and Udupi in Coastal Karnataka region. This region shows a '**Strong Negative relationship**' of -0.823 coefficient of correlation (Table: 4.2) between Population ageing and fertility. In terms of population ageing this region is in '**Mature stage**' and in fertility level it is in '**Low level**' in 2011 (Fig: 4.2).

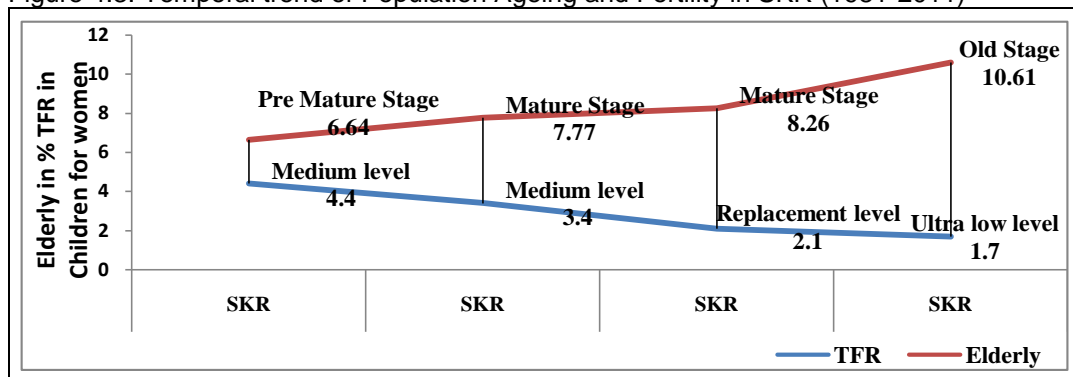
Southern Karnataka Region

In 1981 Southern Karnataka Region stands in the '**Pre mature stage**' in the process of population ageing with medium level of fertility, entered into the '**Mature stage**' in 1991 with medium level Total Fertility Rate and entered into the '**Old stage**' in 2011 with ultralow or



lowest of low fertility (Fig:4.3). In 2011 the districts like Chamarajanagar, Cikkaballapura, Chikkamagalur, Hassan, Mandya, Ramanagara, and Tumkur (Map: 4.1) have shown more than 10.61 percent elderly population because among these districts except Cikkaballapura (1.8 Total Fertility Rate) the remaining have registered less than the average fertility rate of the region (Map: 1 and Appendix. I). In Karnataka, in 1981 all regions showed the same trend in the process of population ageing (6-7 percent) and the level of fertility (5-4). In 1991 SKR, had the 3.4 Total Fertility Rate and CKR had 3.6 Total Fertility Rate although CKR entered the 8-9 level in the process of population ageing with 8.02 percent of elderly but SKR took one more decade to enter into the same level in ageing process (8.26%) due to larger intra-regional variation in the declining trend of fertility. In 2001 SKR stands '**Replacement level**' in Total Fertility Rate and stands '**Mature stage**' in the process of population ageing. In 2011 it entered into the '**Ultra-low level**' in fertility with 1.7 Total Fertility Rate and '**Old stage**' in terms of ageing process with 10.61 percent of elderly population. Among the districts in the region the Bangalore urban, Davangere, Shimoga were in the '**Mature stage**' in ageing process. Bangalore urban entered the ultralow level in Total Fertility Rate but stands in '**Mature stage**' in ageing process due to the influence of immigration of youth and adult population. Davangere had above the ultralow level fertility. So, it stands in mature stage in the process of population ageing. Shimoga entered the 'Ultra-low level' in fertility although it was very near to old stage in the process of ageing. As a result this region has shown **Normal 'Negative Relationship'** with -0.617 coefficient of correlation (Table: 4.2) between process of population ageing and the level of total Fertility rate.

Figure 4.3: Temporal trend of Population Ageing and Fertility in SKR (1981-2011)



Coastal Karnataka Region

In 2001, in the history of Karnataka for the first time the districts like Udupi and Dhakshina Kannada entered into the '**Old stage**' in population ageing with 10.64 and 9.95 percent of elderly population respectively (Map:4.1 and Appendix I) but the entire region stand in '**Mature Stage**' with 9.01 percent of Elderly population. In the same decade the Total Fertility Rate of the region is below replacement level with 1.8 children per women. In 2011 it entered into the '**Old Stage**' in ageing process with 11.11 percent elderly population with '**Ultra-low level**' of Fertility (Fig:4.4). As a result, it has shown a '**Very Strong Negative Relationship**' with -0.937 correlation coefficient (Table: 4.2) between process of population ageing and level of fertility. In Karnataka the trend of lower fertility begin in Southern Karnataka region but the coastal Karnataka region surpassed all other regions. As a result

coastal Karnataka region has entered into the old stage earlier than the other region in the process of population ageing. This is attributed to factors like Geographic location, socio-economic situation and historical aspects. *Historically* this region was exposed with western tradition and customs through the national and international trade and commercial activities. This region receives heavy rain during

Fig 4.4 Temporal Trend of Population Ageing and Fertility in CKR (1981-2011)

Monsoon, the agricultural activities are free from droughts and it has recorded high human development index in the state in 2005.

Table: 4.2 Relationships between Elderly and Fertility in Karnataka by Region (2011)

Regions	Elderly (in %)	TFR (Children per women)	Relationship
NKR	8.82	3	-0.823
SKR	10.61	1.7	-0.617
CKR	11.11	1.5	-0.937
Karnataka	9.55	2	-0.880

Source: Compiled by the Researcher

Map: 4.1 & 4.2. Regional patterns of population Ageing and Fertility in Karnataka by Region (2011)

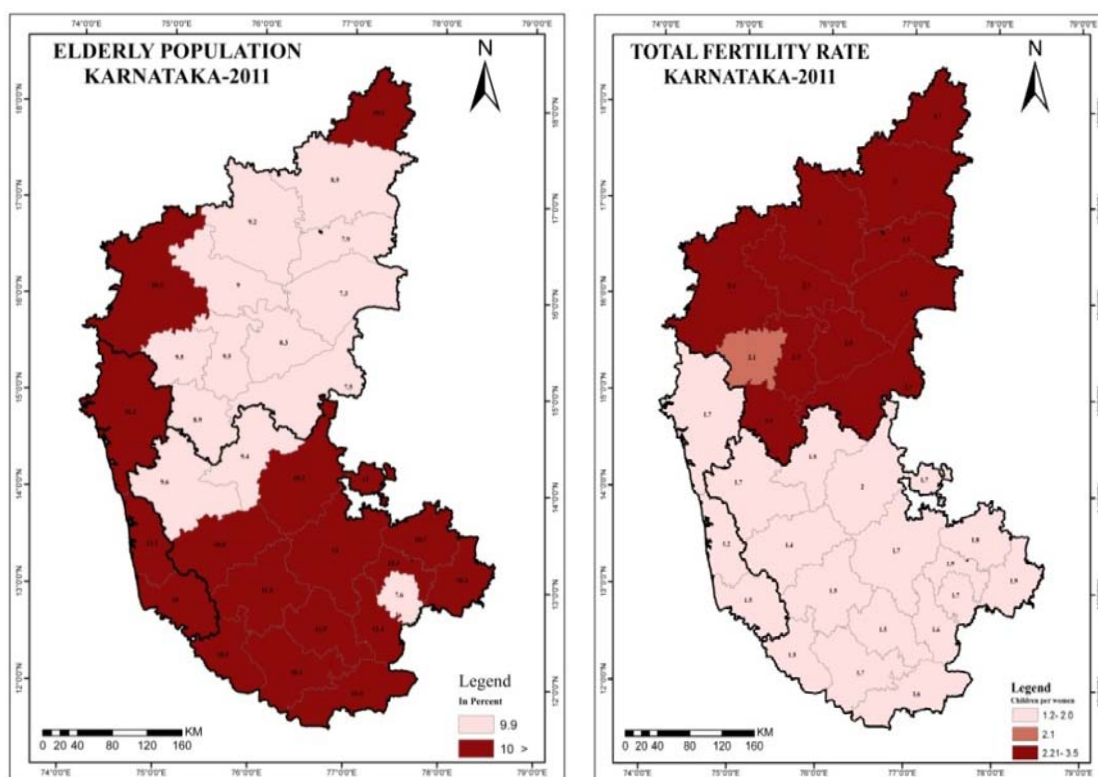


Table:

Aged population and TFR in Karnataka at District level in 2011		
Districts and regions	Aged population in %	TFR for women
Bagalkot	8.98	2.7
Belgaum	10.17	2.4
Bellary	7.48	2.7
Bidar	10.24	2.7
Bijapur	9.17	3
Dharwad	9.45	2.1
Gadag	9.54	2.3
Gulbarga	8.45	3
Haveri	8.87	2.2
Koppal	8.28	2.9
Raichur	7.29	2.9
Yadgir	7.9	3.5
NKR	8.82	2.7
Bangalore	7.64	1.7
Bangalore Rural	10.3	1.9
Chamarajanagar	11.62	1.6
Chikkaballapura	10.68	1.8
Chikmagalur	10.81	1.4
Chitradurga	10.22	2
Davanagere	9.37	1.9
Hassan	11.87	1.5
Kodagu	10.48	1.5
Kolar	10.16	1.9
Mandya	11.93	1.5
Mysore	10.14	1.7
Ramanagara	12.39	1.6
Shimoga	9.48	1.7
Tumkur	11.98	1.7
SKR	10.60	1.7
Dakshina Kannada	9.95	1.5
Udupi	13.2	1.2
Uttara Kannada	10.18	1.7
CKR	11.11	1.5
KARNATAKA	9.55	2
Legend=NKR:Northern KarnatakaRegion, SKR:Southern KarnatakaRegion, CKR:Coastal Karnataka Region.		

Findings and Conclusion

The level of population ageing and fertility are negatively correlated with each other in Karnataka. wherever the level of fertility is high (above 6Total Fertility Rate) that place had youth stage in the ageing process (below 7%), Where the fertility level is moderate (below 6 above 2.1Total Fertility Rate) the ageing process is in Mature (7 to 10%) and fertility level reach the Ultra-low (less than 1.8Total Fertility Rate) the process of population ageing stands

in the old stage (above 10%). From 1981 to 2001 Karnataka stands in the **'Moderate level'** in fertility with 2.4 to 4.4 TFR so it was lies in the **'Mature stage'** in the process of population ageing with 6.6 to 7.8 percent of aged population. In 2011 it has reached below replacement level of fertility with 2.0 Total Fertility Rate and near to the Ultra-low level of fertility. So in 2011 it is one step slow to meet the Old stage in the process of population ageing.

Northern Karnataka Region has not reached the Ultra-Low level of fertility in 2011 also as a result it could not meet 10% of aged population in total population due to the influence of Geographic, Socio-economic, Historical, Political And Demographic factors. It has shown *'Strong Negative relationship'* with -0.823 correlation efficiency between the process of population ageing and the level of fertility in 2011.

Southern Karnataka Region has entered the ultra-low fertility level in 2011 with 1.7 TFR as a result it stands the *Old stage* in the process of population ageing in 2011 with 10.61% of proportion of aged population but in terms correlation efficiency it had *Normal Negative relationship* with -0.617. Because Bangalore and Shimoga had the *'Ultra-low fertility'* level but they stands in the *'Mature stage'* in ageing process due to the immigration of adult population from the other district and states.

Coastal Karnataka Region is the first region in the state to enter the old stage in terms of ageing with ultra-low fertility level in 2011 with 1.5 Total Fertility Rate and it had *'very strong Negative Relationship'* with -0.937 correlations because with the region all district had 10% and above elderly population and less than 1.8 Total Fertility Rate in 2011.

The winds of demographic changes sweeping across the state and neighbouring areas resulting more and more districts attaining the Ultra-low level in fertility and old stage in population ageing process because the level of fertility and the process of population ageing moves opposite in their direction where is the level of fertility is reached the Ultra-low that region had higher proportion of aged population in total population and vice versa.

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