Demographic Transition – Goa's Experience

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Abstract : *The paper attempts to identify the various stages in Goa's demographic transition between 1901–2001. Using a number of variables closely associated with bringing about changes in the growth rates of population, key factors, which have significantly lowered the rate of natural increase, have been identified for Goa. These are compared with the prevailing trends in India and some selected states.*

Introduction

The differentials in birth and the death rates have initiated several models and theories related to growth of population. One of the commonly adopted theories is that of Demographic Transition which accounts for the changing demographic structure of population in society. The continued rapid growth of population in India in the last few decades has brought about growing concern among demographers and planners to work out strategies and policies to control the rapid growth of population. Therefore, it would be an interesting exercise to analyze India's stage in the demographic transition process. Currently, demographers and other social scientists, both at the national and regional levels are discussing about Kerala's achievement in population control, though there is hardly any mention of Goa's success in achieving demographic transition. The present study, therefore, is an attempt to highlight Goa's case in lowering growth rate and stabilizing its population. Following the examples of such success stories, other states in India would be motivated towards lowering birth rates for restricting population growth.

The Theory

Demographic Transition is a function of changing socio–economic developments and modernization in a society (Mahadevan, 1996). This change the population undergoes and its determinants have been referred to as demographic transition.

Shrivastava (1983) terms Demographic Transition as "modern analysis of the principle of population – a transition from a biological state of fertility to an economic or socio-cultural state of fertility". Basically, the theory of demographic transition was put forth by Thompson (1929), and Notestein (1945). The doctrine mainly states that the pattern of population change from high fertility and high mortality to low fertility and low mortality takes place with the transformation of society from a low to high level of development. Over time, the theory of demographic transition was redefined and reformulated to reflect the various stages in transition. For example, Blacker's analysis gives five stages. However, the most commonly used model, depicts the three major stages, omitting the early and last stage of expansion. Some also include the declining stage, where birth rates are lower than the death rate; some western countries are currently passing through this stage.

Stage I : Pre–transition stage

In this stage, both the fertility (CBR), and mortality (CDR), are high and variable. (Usually in excess of 35 per thousand). Population growth at the time is low, stationery or fluctuating and is characterized by a large family size, low productivity, mass illiteracy, insecurity in food supply, constant danger of epidemics, famines, low expectation of life at birth and a fairly conservative society.

Stage II : Transition Stage

This stage is characterized by an initially high fertility (30%), which has yet to respond to declining mortality, thus resulting in a rapid increase in population growth. This is broadly categorized into two phases:

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a) Early Transition Stage

b) Late Transition Stage.

In the early transition stage, there is over all improvement in food supply, progress in medical facilities and sanitation, resulting in a rapid decline in mortality rates, while the birth rate (fertility) starts gradually declining. The widening gap between the two variables leads to high growth of population.

In the late transition stage, fertility under goes further decline, leading to a lowering of the rate of natural increase. Industrialization, coupled with urbanization, promote the small family concept. Greater mobilization of resources, together with economic growth, increasing literacy levels, are all contributory factors for lowering the fertility at this stage.

Stage III: Post–Transition

Low birth rates and death rates are the milestones reached in this stage and therefore population increases are gradually stabilized. This stage is reached when the society is highly urbanized, women work participation rates are high and the small family size becomes the rule.

Yet another stage has been identified in some West European countries, where the birth rate plunges below the death rate and the population starts showing a negative trend and actually starts declining.

Objective

1) To analyse the various stages of demographic transition for Goa and to compare and contrast its status with the situation in India and in some selected states of the country.

2) To analyse the factors affecting the various stages of demographic transition for India and Goa.

Methodology

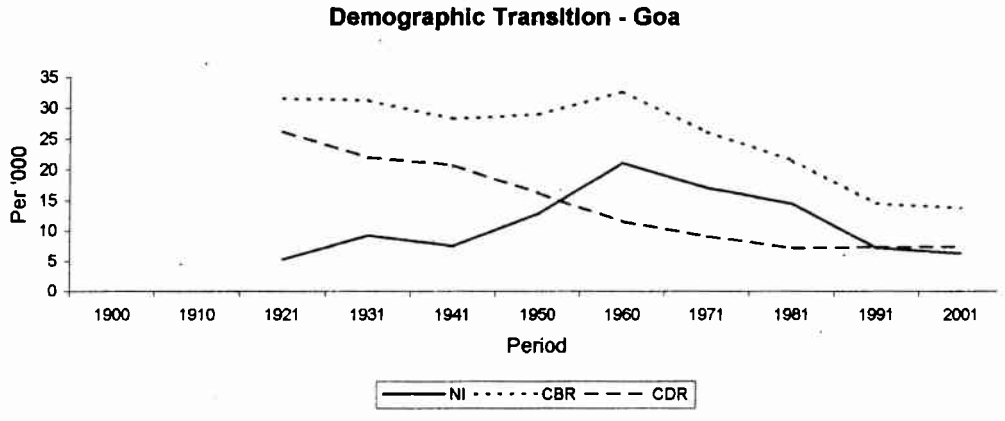
The data for birth rates (CBR) and death rates (CDR) for the various states in India have been collected for the years (1901 to 2001), and these are plotted to identify the different stages of demographic transition.

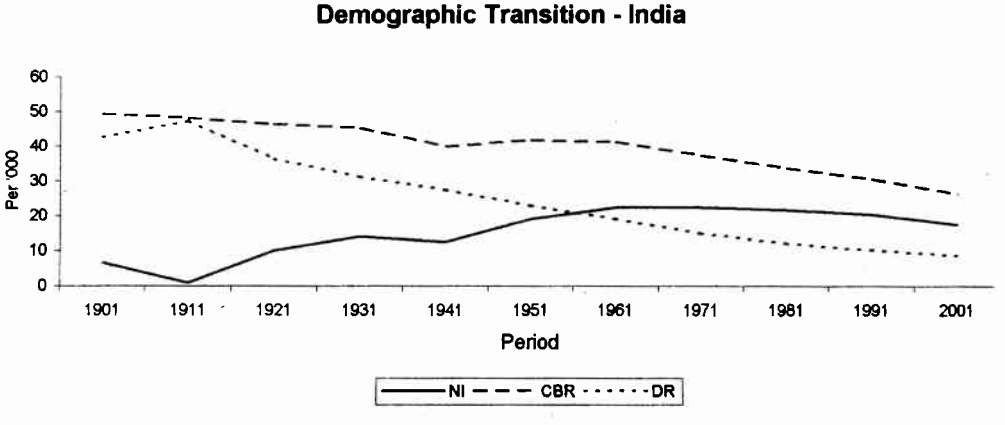
To understand the relationship between the natural increase of population and the various socio–economic and demographic indicators for India and Goa, co-relation matrics were prepared.

The National Scenario

One of the main reasons for widespread concern with the population problem is because growth of population in India is far too rapid as compared with the rate of increase of per capita income (Planning commission, Government of India, 2000). What compounds the problem further is the wide disparity in the levels of socio-economic development, for the various states. The Indian states may therefore be at different stages of demographic transition.

The analysis for selected states in India clearly indicates that some states are in the early transition stage, while some have already reached the late transition phase, while a few others are approaching the post transition stage. The states of the Hindi belt in the Gangetic Plains have high birth rates coupled with fairly low death rates (Fig. 1), which has resulted in high growth of population. The crux of India's population problem thus lies in the high growth rates prevailing in the four states – Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh (BIMARU), where over 40 per cent of India's total population is concentrated, with around 48 per cent illiterates. It is estimated that UP has the highest growth rate, whereas the southern states : Goa, Kerala and Tamil Nadu have much lower birth rates through various family planning programmes. They have successfully curbed their population growth, resulting in a "North – South" demographic divide.





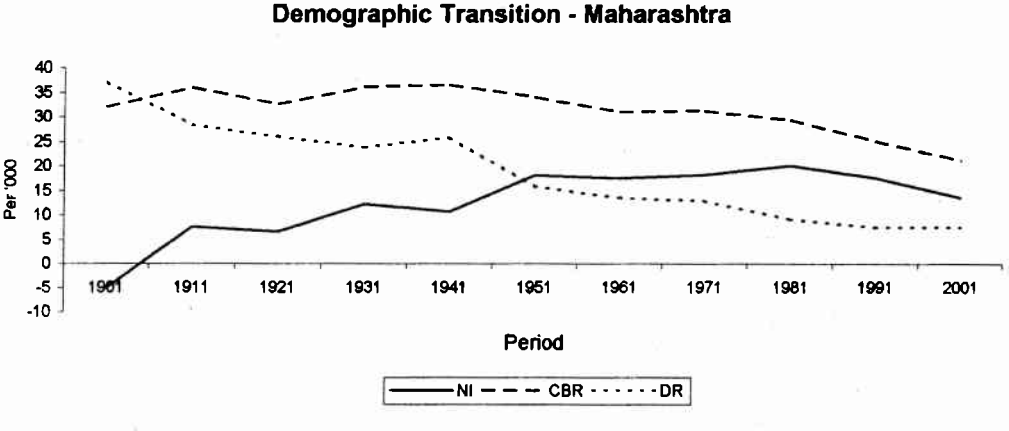


Fig. 1 : Demographic Transition — Goa, India and Maharashtra

The Indian Experience

The pattern of population increase for India, excepting for 1921, shows that the birth rate has been substantially higher than the death rate up to 1941, generally higher than 45 per thousand, and thereafter it showed a decline to 26 per thousand by 2001; while the death rate has declined from 43 per thousand in 1901 to 8.7 per thousand in 2001. This rapid decline in the death rate is attributed to improved medical facilities, transport facilities, assured food supply, decrease in infant mortality rate, increase in life expectancy and eradication of certain killer diseases like the plague, small pox and influenza. Thus, the analysis of data for CBR and CDR for India from 1901-2001 reveals that upto 1911, India was in Stage I, when birth rates and death rates were high and equal i.e. 48.1 and 47.2 per thousand. Thereafter, from 1921 onwards, India entered the second stage of early expanding population, with declining death rates and relatively high birth rates. For example, in 1931 CBR was 45.2 per thousand and CDR was 31.2 per thousand, which led to high rate of natural increase in the population. This phase continued till 1961. Between 1961-71, India entered the late transition stage (II b) where a gradual decrease in both CBR and CDR was recorded, though the death rates declined much faster. The rate of natural increase remains high even in 2001 though the country is heading towards the last stage in the transition model, but the birth rate of 26.1 per thousand is still high in relation to the death rate of 8.7 per thousand population.

Goa's Experience

Goa is somewhat unique due to the legacy of Portuguese rule, which introduced a different set of social and cultural traditions. Prior to 1921, statistics related to CBR and CDR were not available for Goa. In 1921, the birth rate was around 32 per thousand, while the death rate was 26 per thousand. From 1921 onwards upto 1960, there was a continuous fall in the death rate, while the birth rate remained constant, averaging 30 per thousand. Thereafter, the birth rate declined sharply, while there was a gradual or slow decline in the death rate. For 2001, the birth rate was 14.3 per thousand and the death rate, 7.3 per thousand. This has been achieved due to various reasons : the result of emancipation of females through equal property rights, equal age of marriage for both the sexes i.e. 21 years, high female literacy, high per capita income, greater general awareness of rights, better medical facilities and urbanization.

Thus, the analysis of overall growth trends reveal that Goa must have crossed stage I and entered Stage II, somewhere between 1901 and 1911.High birth rate and declining death rates till the 1960s, indicated that Goa at the time was in the early transition stage. But thereafter with decline in birth rates along with death rates marked its entrance into the late transition stage, between 1971–81. From 1981 onwards, the death rate had stabilized, and the birth rate also showed a downward trend, which signifies Goa's entry in the Third Stage. In short, Goa is already in the last stages of demographic transition. This is clearly revealed in the 2001 data, where the CBR is already 14.3 and CDR is 7.2 per thousand. Though, Goa has already entered the final stage, India and many of the northern states are still lagging far behind. From the foregoing analysis, it emerges that India needs to bring about perceptible changes in the socio economic condition of the people, in order to check the growth rate, besides improving the overall economy.

Modern Synthesis

Demographic transition is seen as an interplay of differential CBRs and CDRs. They are projected in distinct stages, which is clearly seen in this analysis. It is also readily apparent, that demographic transition can be interpreted by analyzing the trends of natural increase rates of population, which characterize the

following phases :

i) The natural growth rate remains constant or greatly fluctuates and even declines due to the highly fluctuating death rates.

ii) The natural growth rate increases, as CBR remains significantly high while CDR is on the decline.

iii) The natural growth rate reaches a saturation level or approaches a plateau as the birth rate starts showing a decline.

iv) The natural growth rate also begins to decline. The birth rate declines faster than the death rate.

v) When the birth rate equals the death rate, the natural rate of increase becomes zero.

For India, the analysis of the following phases reveals that India has crossed the first four phases, these can be summarised as follows :

i) Till 1921, the natural growth rate was fluctuating.

ii) From 1921 to 1971,the natural growth rate increased from 0.9 to 22.2 per cent, signifying a steep increase in population.

iii) India attained the plateau level in the growth rates by 1971-81, as both the decades recorded the same rate of natural increase viz. 22.2 per cent i.e. the population growth rate remained fairly constant.

iv) From 1981 onwards the natural growth rate has shown a decline, in which the rate of decline in the case of the birth rate is faster than the rate of decline in death rate.

India has thus demonstrated clearly by entering the fourth phase that population growth can also be brought under control while economic development/growth is still in the early stage. Further inquiry reveals that the birth rate between 1981-91, declined by 6.9 points (37.2–30.9), while the death rate for the corresponding period decreased by 4.2 points (15.0–10.8), which means the birth rate is declining at a faster rate than the death rate. This trend has continued even in the last decade with birth rate declining by 4.8 points and the death rate by 2.1 points.

However, the analysis for Goa shows that the state is ahead in its demographic transition, in comparison to India and also with respect to many of the states :

i) Phase I could not be identified for Goa

ii) There was a continuous rise in the natural increase rate from 1921 to 1960 i.e. from 5.28 to 21.11, an indication of the rapid increase of population, commonly seen in most states during this time.

iii) Goa escaped the third stage and directly progressed into the final stage of transition.

iv) A decline in natural increase rate has been visible from 1960s. When the natural growth rate decreased from 21.11 to 7.5 per thousand between 1960 and 2001.

When the rate of decline of birth rate and the death rate was calculated, the decline of birth rate was much faster than the decline in death rate, for instance, between 1981-91, the birth rate declined by 7.11 points where as the death rate showed an increase of 0.16 points. This itself indicates that Goa is fast heading towards the fifth stage of the demographic transition. This is confirmed by the 2001 census figures in which the birth rates are decreasing, albeit slowly, while the death rate is stabilizing. The socio–cultural factors have indeed played a key role in bringing about demographic transition in the case of Goa.

India and Goa – A comparison

Goa started its transition with the phase reached by India in 1931, in 1910 itself. Upto 1941, the trends were parallel for both, Goa as well as India, though the decline in CBR was steeper for Goa. However, both CBR and

Table 1 : India : Co-rrelation Matrix

	NI	Crude Birth Rate	Crude Death Rate	Infant Mortality Rate	Growth Rate	Total Literacy Rate	Female Literacy	Urban Popul-ation	Family Size	Per Capita Income	Workers	Life Expec-tancy
NI												
Crude Birth Rate	0.055											
Crude Death Rate	-0.26	0.948										
Infant Mortality Rate	-0.22	0.958	0.994									
Growth Rate	0.982	-0.129	-0.44	-0.39								
Total Literacy	0.042	-0.989	0.969	-0.966	0.224							
Female Literacy	0.064	-0.987	-0.97	-0.969	0.246	0.999						
Urban Population	0.271	-0.878	0.934	-0.96	0.428	0.864	0.869					
Family Size	0.099	-0.987	-0.99	-985	0.28	0.995	0.996	0.906				
Per Capita Income	-0.15	-0.988	-0.91	-0.912	0.038	0.982	0.977	0.797	0.966			
Non Agriculture	-0	-0.97	-0.94	-0.965	0.174	0.941	0.94	0.952	0.959	0.927		
Life Expectancy	0.536	-0.805	-0.95	-0.919	0.681	0.865	0.876	0.855	0.888	0.757	0.786	

Table 2 : Goa : Co-rrelation Matrix

	NI	Crude Birth Rate	Crude Death Rate	Infant Mortality Rate	Growth Rate	Total Literacy Rate	Female Literacy	Urban Popul-ation	Family Size	Per Capita Income	Workers	Life Expec-tancy
NI												
Crude Birth Rate	0.989											
Crude Death Rate	0.83	0.905										
Infant Mortality Rate	0.97	0.989	0.908									
Growth Rate	-0.08	-0.184	-0.46	-0.103								
Total Literacy	-0.99	-0.999	-0.9	-0.989	0.176							
Female Literacy	-0.99	-0.977	-0.82	-0.983	-0.025	0.979						
Urban Population	-0.98	-0.997	-0.93	-0.983	0.249	0.996	0.961					
Family Size	0.999	-0.991	-0.85	-0.98	0.08	0.992	0.992	0.98				
Per Capita Income	-0.97	-0.929	-0.7	-0.929	-0.162	0.932	0.98	0.901	0.967			
Non Agriculture	0.248	0.37	0.674	0.322	-0.95	-0.362	-0.172	-0.434	-0.26	-0.01		
Life Expectancy	-1	-0.994	-0.86	-0.977	0.13	0.995	0.984	0.986	0.998	0.955	-0.299	

CDR for Goa were well below the all India level. The phenomenal increase in CBR i.e. 32.6 per thousand and a rapidly declining CDR i.e. 11.49 per thousand in 1961 for Goa, resulted in phenomenal rise in the natural increase rate, which shows that Goa was at the time in the late expanding stage of the demographic transition. The CDR, which plunged to 11.48 per thousand in 1961 was 50 per cent less than the all India figure of 21.2 per thousand. After experiencing the explosive stage of population growth in the 1960's, the CBR for Goa, rapidly declined, reaching 14.3 per thousand by 2001, thus bypassing stage II (b) of the demographic transition, while India continued to experience considerably higher CBRs and declining CDRs. Goa achieving the demographic transition faster could be attributed to its lower CBR and CDR, to begin with.

Co-relation Matrices

In order to find out the significant factors affecting natural increase, a series of correlation matrices were prepared. The secondary sources of data available for different variables were used. The natural increase rate of population has been taken as the dependent variable, while the factors influencing the natural growth rate have been taken as independent variables; like the CBR, CDR, IMR, total literacy, female literacy, level of urbanisation, female's mean age at marriage and per capita income.

The first three variables indicating differentials in birth and death rates, including the infant mortality rate, play a vital role in determining the natural increase of population This shows that birth rate alone does not affect the natural increase, which means that apart from the death rates and infant mortality rates other factors are involved. For Goa, the co-relation is high and significant for all the above mentioned demographic indicators, whereas for India, the correlation is negative and insignificant.

The other variable, total growth of population in any region is accounted for by natural increase and net in migration. For India, the co-relation for both these factors is positive and highly significant i.e. 0.98, which indicates that natural increase is the dominant factor in bringing about rapid growth of population. In case of Goa, the value is - 0.08 which means that other than natural increase i.e. the other component (net migration) plays quite a significant role in contributing to the growth of population.

The other two factors total and female literacy are important indexes to analyse demographic and socio-economic transformation of the society. Several studies have pointed out that literacy, especially female literacy, greatly affects the rate of natural increase, family size, and age at marriage. Literacy and natural increase have an inverse relationship, because lower the literacy, higher is the natural Increase rate. For India, the total literacy and female literacy rates show high and positive correlation. For India as a whole the literacy levels are comparatively low and female literacy is even lower. Lack of literacy results in early marriages, which directly reflects on the rate of natural increase. Thus, education of females is the best investment to delay marriages and subsequently limit motherhood to fewer children (Mahadevan, 1994). Along with Kerala, Goa has shown high literacy for both males and females, which has lowered the rate of natural increase. Therefore for Goa, correlation between total literacy and natural increase is -0.99, which is negative and highly significant. Between female literacy and natural increase a correlation of –0.98, is negative and also significant.

Proportion of urban population is another factor reflecting social change. It leads to an increase in secondary and tertiary economic activities, thereby improving the standard of living and lifestyle of the people. This whole process ultimately lowers natural increase. Goa is among the highly urbanized states of

India, therefore the co-relation is negative and significantly high (-0.97), which means higher the proportion of urban population, lower is the rate of natural increase. Moreover, apart from this, late marriages, higher levels of literacy, modernized outlook and villages showing strong urban characteristics have contributed to lowering the rate of natural increase. In contrast, only a quarter of India's population is urbanized, the majority of its population resides in villages, these are characterized by a high rate of illiteracy, low standard of living, over dependence on agriculture, early marriages and lack of the small family concept. This is clearly reflected in the high rate of natural increase. Thus, the correlation between the level of urbanization and natural increase is positive but insignificant (0.27).

One of the crucial determinants of family size is child–women ratio and the natural increase of population is greatly affected by the female's age at marriage. Natural increase and mean age at marriage show an inverse co-relation. Early marriage positively affects the rate of natural increase. India shows a positive and insignificant correlation (+0.09) since not many efforts were made to raise the age of marriage except in 1929, when the Child Marriage Restraint Act (Sharda Act) fixed the minimum age of marriage as 12 for girls and 15 for boys. In 1978, the minimum age of marriage was raised to 18 and 21 years for females and males, respectively. Moreover in India, marriages are not only early but universal. In some communities, child marriages are still fairly common. Early marriage enables maximum utility of the fertility period, which greatly influences the rate of natural increase. Under the uniform civil code, the age for marriage in Goa for both the sexes was fixed at 21 years. Fertility levels in Goa have rapidly declined due to higher mean age at marriage (Roy *et, al,* .1986.NFHS, 1995) In addition to this, a large proportion of females among the Catholics remain unmarried. Age at marriage is high not only among the Catholics but also among educated Hindus as they prefer to find some employment before marrying. This automatically has brought down fertility rates in Goa (Panandikar and Chaudhari, 1983) Thus the co–rrelation between age at marriage and growth rate is negative and highly significant.

The Per Capita Income (PCI) is again a reflection of the level of economic development in a particular region. The per capita income and rate of natural increase have an inverse relationship. Goa is one of the advanced states in India, with a high per capita income, therefore the correlation, as expected is negative but highly significant (-0.96). For India with a relatively low per capita income, it is hardly surprising that the correlation is negative and low.

Percentage of population engaged in non-agricultural activities and the rate of natural increase have an inverse co- relation. For Goa, the correlation is 0.24 i.e. insignificant and positive, which means a slight variation in the percentage of population in non-agricultural activities will have a greater impact on the natural increase rate.

Life expectancy and the rate of natural increase of population show positive and significant correlation for both India and Maharashtra, this indicates that the life expectancy influences rate of natural increase in case of India and Maharashtra but for Goa, the correlation though high is also negative, which suggests that increase in the life expectancy, decreases the rate of natural increase. Late marriages, lower infant mortality rates and a high per capita income are the other variables which contribute to reduction in growth rates.

Conclusion

Goa, under the Portuguese rule suffered from lack of economic development and industrial progress. In fact the economy had almost come to a standstill. Moreover, Goa did not have the benefit of the first

two - Five Year Plans, i.e. it lost the benefit of a decade of family planning programme. In spite of this, Goa has achieved the targeted goal of low fertility by 1991, which for India was targeted to be reached by 2001.

A whole range of developmental factors of socio–economic importance, together with a high level of small family consciousness among the masses and an absence of strong political opposition to family planning programmes seems to have had the desired impact on fertility behaviour (Panandikar and Chaudhari 1983, NFHS 1995)

To begin with, Goa had a low rate of natural increase, while the literacy rates (Total and Female) were considerably high, which very clearly show the influence of the latter on the former. In other words, literacy has been responsible for a substantial reduction in fertility levels. In rural India, 73 per cent of the population is characterized by high female illiteracy and high economic dependency. Both factors have been obstacles for implementation of the family planning programmes. In fact, India was one of the first countries in the world to implement the family planning programme, but mass illiteracy hindered its success.

Secondly, age at marriage has been the most crucial factor for all related variables. In Goa, the uniform civil code has been in practice for long, which ensures minimum age of marriage for both the sexes as 21 years, as a result the fertility levels have come down. Therefore, what all other states with high fertility require is to raise the age of marriage for girls and ban child marriages altogether.

Cultural homogeneity, between the two dominant religions (Hindus and Christians) in Goa has helped in the implementation and acceptance of the small family norm of one or two children, which again is rather difficult to achieve in the Indian context, because greater importance is attached to having a male child.

Urbanization is yet another factor, which has affected the natural increase rate. Rising cost of living and growing economic needs, restricts the family size, which positively controls the growth rate of population.

In the last decade, Goa has shown a shift in the age structure. Low Infant Mortality Rate, High Life Expectancy and a marginal rise in the death rate, indicate that the age structure is slowly shifting from the conventional pyramid to a rectangular form, which is comparable to the population characteristics in western society.

The above discussion clearly brings out that social factors are more crucial in lowering natural increase rates than the economic factors. For example, though Punjab and Haryana have been economically better off states, their natural increase rate still remains high. In contrast, Goa and Kerala have both shown that the social factors have been more influential in lowering the growth rate of population. The education of the girl child, their emancipation, equal status in society and raising the age of marriage, definitely lowers the natural increase rate of population, as Goa's case has clearly demonstrated.

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