

Population and Society
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Module No. # 01

Lecture No. # 19

Trends in Death and Birth Rate

Well, this is the third lecture on population of India. In the first lecture, I talked about changes in size of population, changes in growth rates of population, and sex ratio. And in the second lecture, I went to some aspects of composition of India's population, with focus on age distribution, distribution according to workers and non workers, marital status and some related issues. We discussed at length the idea of age pyramids and what do age pyramids indicate and how do changes in birth and death rates, form the shape of age pyramid.

Now, today we will talk about trends in death and birth rates. That means we will focus on, what we call processes of population. There are two aspects of populations composition and processes demographic, composition and demographic processes. In demographic composition, may include composition and structure of population according to age, sex, marital status, occupation industry, urban rural residence and so on. About urban rural residence we will talk a little later and focus more on trends in urbanization and implications of that.

In processes we include fertility, mortality, migration, social mobility and marriages. On marriage, I have already made some comment in the last lecture and shown what is the average age of marriage in India, and that it is increasing. And that there is a legal minimum of eighteen, our median is very close to eighteen, but now eighteen, that means more than 50 percent marriages are still taking place below the age of eighteen legal minimum. We will talk about migration a little later and normally in India, demographers seldom talk about social mobility or occupational mobility and issues related with social stratification.

Demographers focus, more on fertility and mortality some time we also talk about migration, but studies of fertility and mortality must be occupying 90 percent of Indian demographic studies. That is because India's population, the process part is more affected by changes in death and birth rates. So, today we will talk about death and birth rates and in the next lecture on Monday in the next lecture, we will be talking about migration and related issues. In related issues, we will particularly focus on projections of populations and implications of them.

When we look at death and birth rate, we talk first about death rate because the decline in death rate started first. This is what the demographic transition theory said and this is also a fact. Fact pertaining to world population, fact pertaining to population of developed countries, developing countries and also effect pertaining to population of India. That death rate starts declining first.

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Falling death rate

- Rise and fall in the growth rate of India is the result of systematic changes in death and birth rates from high levels to moderate levels.
- In the beginning of the last century crude death and birth rates of India were in the vicinity of 50 per thousand (Sharma, 1996).
- Death rate declined to 31 during 1931-41 mostly due to control of infectious diseases.
- After that due to socio-economic development and efforts made by Government of India to provide health facilities to general population, mortality rate started declining further.
- The CDR in 1971-81 was 15. It has declined to 7.4 in 2008.
- Life expectancy which was around 20 in the beginning of the century rose to 31 in 1931-41 and 50 in 1971-81, and has now gone up to 64 for males and above 66 for females.

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It must be understood, that rise and fall in the growth rate of India is the result of systematic changes in death and birth rates from high levels to moderate levels. We have not come to low levels yet. In the beginning of the last century, crude death rates and birth rates of India were in the vicinity of 50 per thousand population, which was maximum? The maximum birth rate normally observed in any country or in the vicinity of 50 per thousand population. In terms of average number of children, this gets

translated into a total fertility rate of about 7, in India also it is believed that 6 to 7 was the fertility rate.

Death rate started declining in the first decade itself, but in the second decade, due to influenza epidemic around 1918, death rate for decayed 11 to 21 grows to a higher level and that is why population of India, experience a negative growth rate. But otherwise on a long term basis, death rates started falling in the first few decades of the last century. And by the year, 41 during 31 to these are all tentative estimates, we did not have very good record keeping at that time. One can say that during the decade 31 to 41, death rate in India had declined to 31, and that was mostly due to control of infection diseases. After that due to socioeconomic development and efforts made by the government of India, to provide health facilities to general population, mortality rate started declining further. So, death rate reach the level of 31 around 31 by 1941 and it started declining further.

The crude death rate of India, during 1971 to 81, which is more accurate. Now, we have few years from sample registration scheme, which are more accurate figures, though not 100 percent accurate. The crude death rate in 71 to 81 was 15. One, less than one third of what it was in the beginning of the century. And it has declined to 7.4 in 2008. The latest S R S bulletin that I have at my disposal from net is, S R S bulletin 2009. And S R S bulletin two 2009 published in october 2009, I suppose gives the birth rate, death rate, growth rates and their confidence intervals, 95 percent confidence intervals for the year 2008.

And it shows that in year 2008, our death rate has declined to 7.4 per thousand population. See, the change that in the beginning of the century, it was around 50 per thousand and this declined to 7.4, a drastic reduction in death rate in only 80 years time. Actually, one can even say in about 60 years time if we take 21 as the base year for high death rate, then between 21 and 81, in only 60 years. Our death rate decline from 50-7.4. This was the point I was making while commenting on growth rate of population in the developed countries earlier.

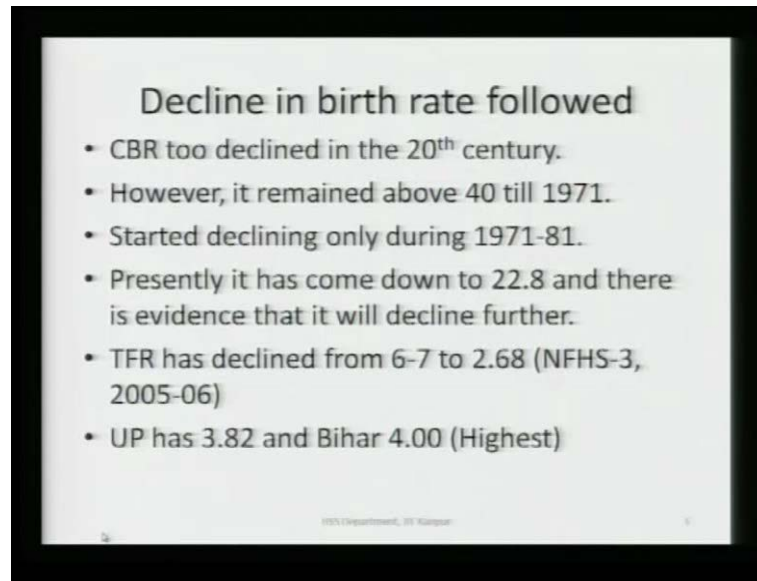
That what the developed countries did in about 300 years time? Say their death rate started declining around second part of 18th century and continue to decline, for some countries even in the beginning of 18th century death rates had started declining. So,

from 18 to 18th full century, 19th, 20th century, death rates continue to decline. Even now they are declining life expectancy is still increasing. So, they took about 300 years time or, at least 250 years time for life expectancy to increase from a low level of around 20 to a high level of around 80. And for death rates to declined from around 40 or 50 to the present low levels of 6 or 7 or 8.

In India, this became possible in only 80 years time or even less than that 60, we say that the major decline occur between 21 to 81 because between 11 and 21 as I said influenza epidemic raise our death rate temporarily. So, in 60 years time, on the front of death rate we have achieved what the developed countries took 300 years to achieve. And that explains why the developed countries did not have this population explosion problem ever, which our country or countries of less developing region had. Life expectancy which was around 20 in the beginning of the century, rose to 31 in 31 to 41, 15 in 71 to 81 and has now gone up to 64 for males and above 66 for female. S R S does not calculate life expectancy directly, but there are technical methods.

By using analytical methods and age specific death rates from S R S and from other sources using indirect data of census and surveys. Different demographers have made estimates of life expectancy for males and females. I think for students like you, it will be good to depend on estimates provided by world health organization. So, if you go to world health organization site, you find life expectancies for all the countries of the world, for which reliable data exist and they have included life expectancy for India also. India's life expectancy today is around 64 for males and 66 for females. So, see the increase in life expectancy from 20 to 66.

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Now, after that, so this part decline in death rate from 50 to 7 and increase in life expectancy from 20 to 66. This explains why population of India started growing at higher and higher rates, up to 1951 at rate 1 percent, and after 1951 at rate more than 2 percent. After that decline in birth rate followed, crude birth rate too declined in the 20th century. However, it remained above 40 till 1971. So, despite the fact that, India was the first country to launch family planning program officially in 1951 or 1950 whatever. In the first plan period itself for independent, you can say as soon as we became independent.

Thanks to vision of the then prime minister Jawaharlal Nehru, extensive who wrote it is quite interesting to see if you read discovery of India. There are several pages devoted to demographic transition theory. When I read discovery of India being a student of population, I was surprised how much Jawaharlal Nehru knew about demographic transitions in the developed countries. So, people like Jawaharlal Nehru, Gandhi and those others associated with planning commission, congress, planning committees, they were all in favor of population control. So, as soon as the country became free we launch an official family planning program. But result in terms of birth rates, this family planning program did not produce much results during first two decades and till 1971 our birth rate remained above 40.

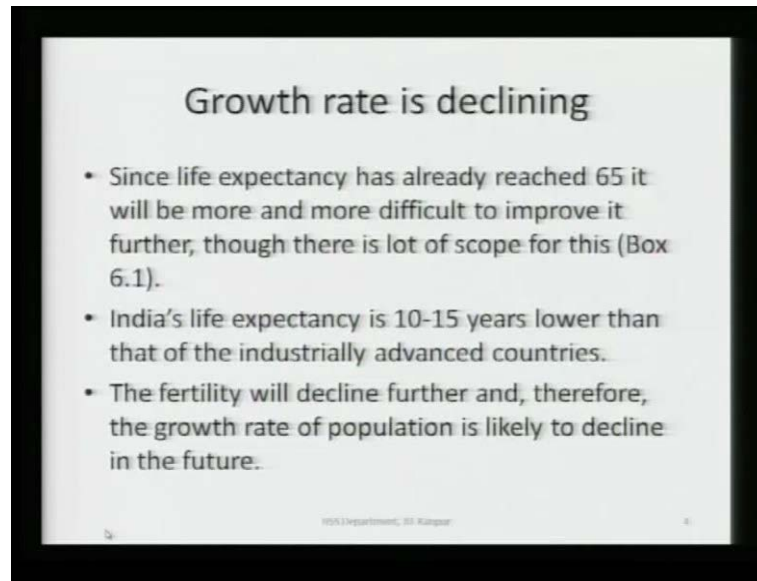
It is stated declining only during 1971 to 81. Presently, it has come down to 22.8 and there is evidence that it will decline further. So, birth rate which was also around 50 in the beginning of the last century, has come to a level of 22.8. Death rate has come to a level of 7 and birth rate has only come to a level of 22 there is a difference of 15 and that is why we have a growth rate of 1.5 percent per year.

Total fertility rate or average number of children declined from 6 to 7 in the beginning of the last century. To 2.68 national family health survey for 2005-06 gives age specific rates, age specific fertility rates on the basis of which by adding 5 year age specific rates and multiplying the sum by 5, you can calculate total fertility rate. The total fertility rate for India as a whole comes out to be 2.68 and as I have been repeating that replacement fertility 2.1, we are yet to reach replacement level fertility of 2.1. But 2.68 is not bad so, we are doing reasonably well looking at the fact that we are a developing country, democratic country, level of poverty is still very high, illiteracy is high, number of illiterate person has hardly declined during last 50 years.

So, keeping in view and the remoteness of areas in Jharkhand Chhattisgarh north east. So, considering everything it is not a small achievement, our growth rate may have not declined, but that is more because death rate has declined more than birth rate, but total fertility rate has also declined to 2.68. But there are some states, where total fertility rate is still quite high, U P and Bihar are two extremes. In U P, you have a fertility of 3.82 and in bihar, the high the highest fertility in terms of total fertility rate is for bihar which is 4.0. That means you know theoretically speaking if these rates continue, then Bihar's demographic scenario is such that in the next generation means say at a gap of say 23 or 24 years, the population of Bihar would be doubling.

So, Bihar has a high rate of growth of population, U P too has a high fertility rate and so, potentially high growth rate of population. Other states, many other states have done well and their fertility rate has declined to less than 2.1.

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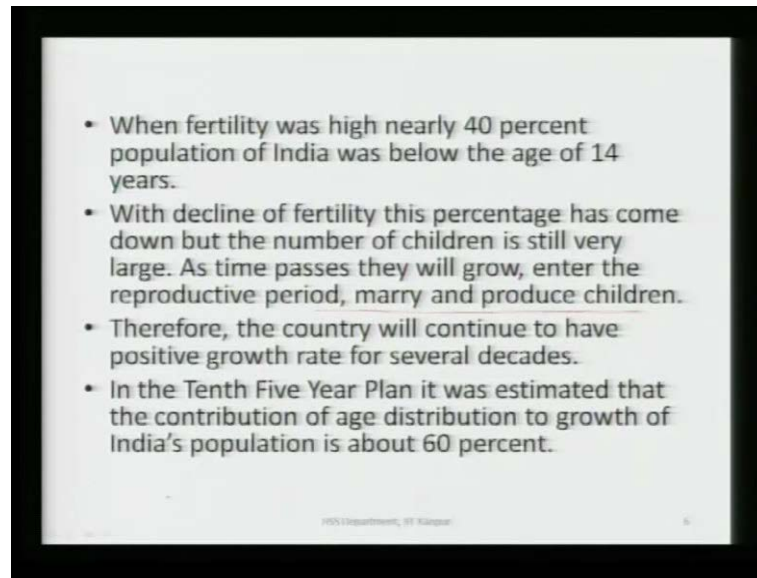


Since, life expectancy has already reached 65 or 66, I said 64 for male, 66 for females. It will be more and more difficult to improve it further. You know we must understand that improvement of life expectancy from 20 to 50 is easier, it depends largely on control of infection diseases. But to move beyond 50 or beyond 60, becomes progressively more difficult because then to move beyond 60, we have to work at the level of socioeconomic development, gender gap, stratification, urban rural gap, class gap and you have to provide healthy living environment and nutritious foods and awareness and political stability and many other things. So that your life expectancy can improve further.

So, for India, in looking at the demographic and socioeconomic and political situation of India, our life expectancy of 66 is quite good. And one can say that in future, it will be difficult to raise it further. So, in the future our growth rate will depend largely on what happens on the front of fertility or family planning program. India is, but one cannot forget the fact that India's life expectancy is 10 to 15 years lower than that of the industrially advanced countries. So, if you are 65, there already countries in the developed world, where life expectancy has reached 80 or more than 80, 82 in some cases, 82. So, we are still 15 years behind those developed countries and that means there is lot more scope for life expectancy to increase.

But that will depend more on socioeconomic political situation rather than on instead of health infrastructure. The fertility will decline further and therefore, the growth rate of population is likely to decline in the future.

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There are more reasons for birth and growth rate to decline. There is one more reason why the growth rate will decline further, that is the effect of age distribution called population momentum? You see in demography, we have concept of population momentum, which is like this. A country which has a total fertility rate of 2.1 is potentially a country where size of population becomes stationary. But this does not happen immediately and that does not happen because of the wastages of the past in terms of age composition. If your age composition is young, then at a lower level of total fertility rate you are producing more number of children. If your age composition is old, then at the same level of total fertility rate you are producing less number of children. That means number of birth depends not only on total fertility rate, but also on the age distribution of population.

So, in the future when total fertility rate will be declining more and our age distribution will also be age-ing. The combined effect of the two factors will reduce the level of birth rate further. It will take a few decades for the population to stabilize because in the mean time more and more people will enter reproductive ages, then produce their first and second child, you know it is simple. Initially, when you motivates some couples for

family planning program, then if the population age distribution is young. That means you motivate n number of persons to go for family planning at a particular age say 30, but next year number of persons are 30 is more than compensated because your age distribution was young.

So, more persons have entered 30, then the persons who are motivated to go for family planning. And that is why initially for sometime, age composition affect can neutralize your efforts in the field of family planning. When fertility was high, nearly 40 percent population of India was below the age of 14, with decline of fertility this percentage has come down. And as time passes this will grow I mean this problem will or this phenomenon will get aggregated and proportion in 0 to 14 will decline further.

Therefore, the country will continue to have, right now because of young age distribution. The country will continue to have positive growth rate for several decades. Even if we achieve a total fertility rate of 2.1 over night suppose, tomorrow when you wake up, you find that India's total fertility rate has declined to 2.1 miracle, it will be miraculous, but this miracle does not mean that India's growth rate of population will become 0. It will still take decades that is because as time passes, children will grow, enter the reproductive period marry and produce children, we are a young age distribution.

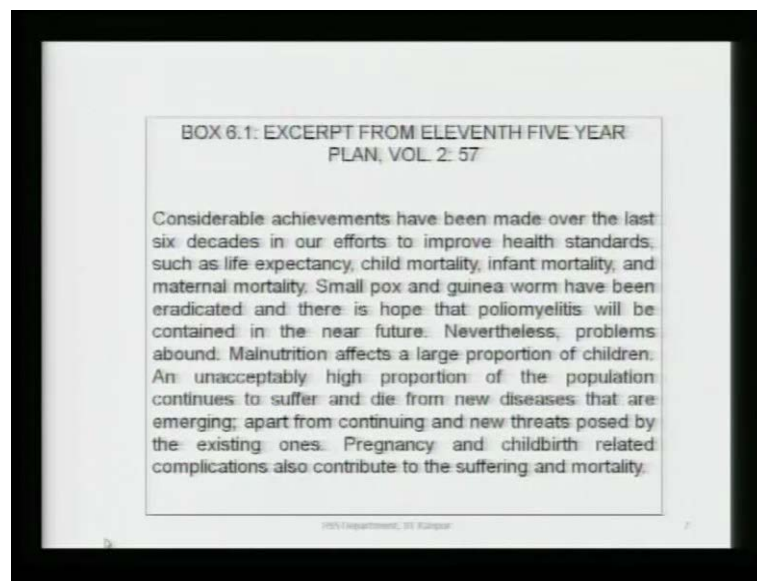
In the Tenth Five years plan it was estimated that the contribution of age distribution to growth of India's population is about 60 percent very interesting. We said that India has high fertility for several reasons; one reason is age distribution, another reason is high mortality and the third reason is unmet need for family planning. High mortality means because we have high mortality so, people want to produce more number of children than they desire. So that at least some of them would survive, that is the effect of mortality. That means if child mortality declines, if infant mortality declines and people are sure that if they produce two children, both of them will survive. Then they need not produce three children, they will produce only two. There is 20 percent contribution of this high mortality.

There is 20 percent contribution of unmet need for family planning. There are several couples 20 percent you can say there are around 20 percent couples in India who do not want to produce any child further. But due to want of acceptable convenient safe method

of contraception of their life, they are not using any family planning method. If you look at statistics of family planning in India, then an overwhelming majority of people are using sterilization and that too female sterilization which effect, which is also connected to what is in sociology call patriarchal society, we are a patriarchal society. If we want to go for sterilization, we force our women only to go for surgical operation. We think that it will not be wise or safe or for men to go for surgical operation. Though the fact is that male sterilization is much much simpler it is two minute job as compare to women sterilization.

And third factor is age distribution. I was surprise to read in Tenth Five year plan, that there is 60 percent contribution of age distribution. There is 20 percent contribution of high fertility of high mortality, 20 percent contribution of unmet need for family planning and 60 percent contribution of age distribution.

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And, I have an interesting quote for you, this is from Eleventh Five year plan. Considerable achievements have been made over the last 6 decades means, after independence. In our efforts to improve health standards such as life expectancy, child mortality, infant mortality and maternal mortality. Small pox and guinea worm have been eradicated and there is hope that poliomyelitis will will be contained in the near future. Nevertheless problems abound malnutrition affects a large proportion of the population sorry, malnutrition affects a large proportion of children. And an

unacceptably high proportion of population continues to suffer and die from new diseases, that are emerging H I V.

Or now, you know about Dengue and you know about Swine flu, Encephaloid, Japanese encephalitis, there are many new diseases. Apart from continuing and new threats post by the existing ones. Pregnancy and child birth related complications also contribute to the suffering and mortality.

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Regional diversity

- Table 6.7 presents the SRS estimates of death rates, birth rates and natural growth rates for different states of India, separately for rural and urban areas, for the year 2008. It also presents the estimates of infant mortality rates for different states. Natural growth rate is simply the difference between birth and death rates.
- The table clearly demonstrates that there is a large variation in birth rate in different States of India. Variations in death rates are comparatively small.
- The table also shows that there are significant variations in birth and death rates by urban-rural residence. As a rule urban areas have lower birth rates as well as death rates.
- Yet, since the urban-rural difference in birth rates is larger than in death rates, urban areas show a lower rate of natural growth than rural areas.

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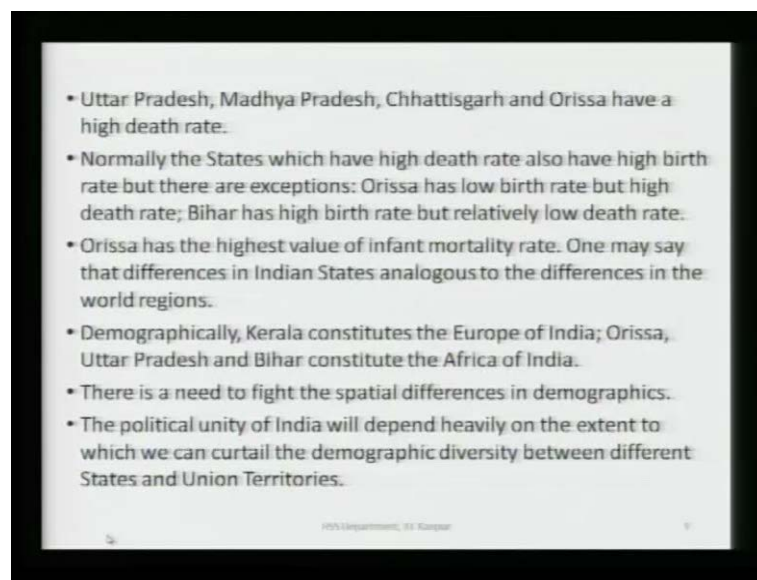
So, we have to do a lot on the field of reduction in death rate, this is overall situation. But overall situation presents a quite optimistic picture, in terms of life expectancy. We have risen from 20 to 66 and in terms of birth rate, in terms of total fertility rate, we have achieved 2.6, we have come down from 7 and our birth rate has come down to around 15. It is not a mean achievement, this is at the national, but I also said that there are some states in in the country like U P and Bihar. Bihar has a total fertility rate of 4. So, Bihar and Kerala present two contrasting pictures within the country.

So, it becomes important for us to look at regional diversity in birth and death rates. I have produced a table for you, which is this presents the S R S means sample registration scheme estimates of death rates, birth rates and natural growth rates for different states of India. Separately for rural and urban areas for the year 2008, it also present the estimates of infant mortality rates for different states, natural growth rate is simply the difference between and death rates. The table clearly demonstrates that there is a large variation of

birth rate in different states of India. And variations in death rates are comparatively small. So, almost all states have achieved lower level of death rate, but birth rate difference remain.

The table also shows that there are significant variations in birth and death rates by urban and rural residence. So, in each states, you find that birth and death rates in urban areas are lower than birth and death rates in rural areas. As a rule urban areas have lower birth rates as well as death rates. Yet, since the urban-rural difference in birth rates is larger than in death rates, urban areas show a lower rate of natural growth than rural areas.

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Specifically about some states like Uttar Pradesh, Madhya Pradesh, Chhattisgarh and Orissa have a high death rate. Normally, the states which have high death rate they also have high birth rate, but there are exception. Orissa has low birth rate, but high death rate. Bihar has high birth rate, but relatively low death rate I do not know how to explain this. Economically their situation seems to be similar, but Orissa has high death rate, low birth rate. Bihar has relatively high birth rate, but relatively low death rate very contrasting picture.

Orissa has the highest value of infant mortality rate among all the states of India. One may say that differences in Indian states are analogues to differences in the world regions. Demographically, Kerala constitute the Europe of India Orissa Uttar Pradesh and Bihar constitute the Africa of India. There is a need to find the special differences in

demography. The political unity of India will depend heavily on the extent to which we can curtail the demographic diversity between different states and union territories.

I remember professor Bose often saying that; if you take per capita income, it is income divided by population. Now, there are some states where income is increasing fast and population growth rate is sinking. So, these are the states which are making rapid stride in development. There are other states where income growth is sluggish or absent not growing as fast as other states, but their population is rising faster. So, due to twin effect of sluggish improvement in numerator, but rapid improvement in denominator. You find that there are increasingly lagging behind, the other states where reverse is the situation.

And, how long can this situation continue? In the same state, if some states improve due to effect of demographics and economics and other states deteriorate, it may become a political problem to keep all types of states, then together. You cannot stop people aspiration, people's aspirations are not depend on the states to which they belong. So, if there is a state where total fertility is high or highest and per capita income is low. We cannot say that people of this states should not aspire the same living standards. They should aspire for lower living standard, then people of those states where income is high and growth rate of population is low.

Reach of media is everywhere, everybody is watching the same T V, same T V programs, same T V channels. Every everyone in all parts of the states in all parts of the country is exposed to the same westernization effect. So, if aspirations are same, but gaps are increasing. It can become politically difficult to keep India united. To keep India united, we have to attack our demographic diversity, look at this state pictures.

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States/Union Territories	Birth rate			Death rate			Natural growth rate			Total fertility rate		
	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban
India	22.8	24.4	18.5	7.4	8.0	5.9	15.4	16.4	12.6	4.9	4.6	5.0
Jammu & Kashmir	18.0	18.0	18.0	7.0	8.0	5.0	11.0	10.0	13.0	3.0	3.0	3.0
Himachal Pradesh	18.0	18.0	18.0	7.0	8.0	5.0	11.0	10.0	13.0	3.0	3.0	3.0
Punjab	18.0	18.0	18.0	7.0	8.0	5.0	11.0	10.0	13.0	3.0	3.0	3.0
Haryana	18.0	18.0	18.0	7.0	8.0	5.0	11.0	10.0	13.0	3.0	3.0	3.0
Uttar Pradesh	22.8	24.4	18.5	7.4	8.0	5.9	15.4	16.4	12.6	4.9	4.6	5.0
Bihar	22.8	24.4	18.5	7.4	8.0	5.9	15.4	16.4	12.6	4.9	4.6	5.0
West Bengal	18.0	18.0	18.0	7.0	8.0	5.0	11.0	10.0	13.0	3.0	3.0	3.0
Jharkhand	18.0	18.0	18.0	7.0	8.0	5.0	11.0	10.0	13.0	3.0	3.0	3.0
Chhattisgarh	18.0	18.0	18.0	7.0	8.0	5.0	11.0	10.0	13.0	3.0	3.0	3.0
Madhya Pradesh	18.0	18.0	18.0	7.0	8.0	5.0	11.0	10.0	13.0	3.0	3.0	3.0
Karnataka	18.0	18.0	18.0	7.0	8.0	5.0	11.0	10.0	13.0	3.0	3.0	3.0
Kerala	18.0	18.0	18.0	7.0	8.0	5.0	11.0	10.0	13.0	3.0	3.0	3.0
Andhra Pradesh	18.0	18.0	18.0	7.0	8.0	5.0	11.0	10.0	13.0	3.0	3.0	3.0
Tamil Nadu	18.0	18.0	18.0	7.0	8.0	5.0	11.0	10.0	13.0	3.0	3.0	3.0
Goa	18.0	18.0	18.0	7.0	8.0	5.0	11.0	10.0	13.0	3.0	3.0	3.0
Union Territories	18.0	18.0	18.0	7.0	8.0	5.0	11.0	10.0	13.0	3.0	3.0	3.0
India	22.8	24.4	18.5	7.4	8.0	5.9	15.4	16.4	12.6	4.9	4.6	5.0

For India as a whole it shows that the birth rate of India is 22.8, rural area it is 24.4, urban areas it is 18.5. Death rate is 7.4 total, rural areas 8.0, urban areas 5.9. There is a significant difference in death rate between rural and urban areas. A difference of two point one points, natural growth total is 15.4 per thousand since it is express more in percentage form so we can say 1.54 percent. In rural areas, growth rate of population is 1.65 percent and in urban areas, it is 1.26 percent. This also shows that growth of population due to natural factors alone is much higher in rural areas than in urban areas. Now, if on the one hand rural population is increasing faster due to effect of the difference between birth and death rates.

But on the other hand, you find that the productivity the resources in rural areas is not improving. Growth rate of agriculture income or contribution to agriculture and total gross domestic product of the country is not increasing. It is actually declining that means, population is increasing and productivity of resources is declining, unemployment is declining. More people are unemployed or under employment underemployed. So, they are forced to migrate to urban area.

You go to any tribal particularly forest area, you find that half of the village has migrated they call it [FT] in Madhya Pradesh, in Jharkhand, Chhattisgarh wherever I went in tribal or forest areas I would find that fifty percent of their houses are locked. Or only old people or small children are living in there. And adults men, women they have migrated

to some city of some other state or the same state or a neighboring district at least in search of employment. Infant mortality is still very high, though it has come down a lot. There was a time when infant mortality in many countries was as high as 250 or 300 or even more. Today infant mortality in India as a whole is 53, in rural areas it is 58 and urban areas it is 36, urban areas have improved a lot in terms of health indicator. So, infant mortality is only 36.

But you find lot of differences in birth rate, death rate, infant mortality rate from state to state. If I try to identify some states where infant mortality rate is very high, then this Orissa 69. In Orissa, in the total population of Orissa infant mortality rate is 69. That means in a year in when 1000 children are born 69 of them die before celebrating first birth day. And only 931 survive. There are urban, rural differences. In rural areas, it is 71. In urban areas it is 49. You must notice that even in the urban areas infant mortality rate in Orissa is quite high.

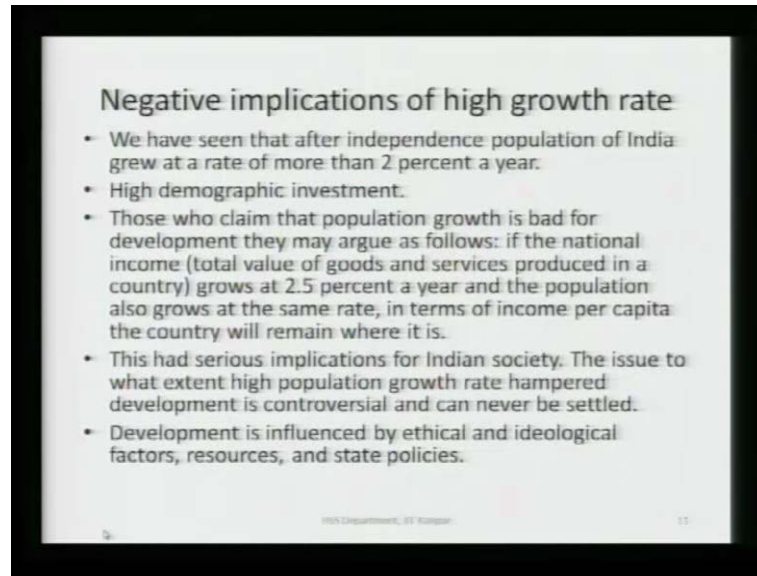
There is another state where urban infant mortality is equally bad 49 and that is Uttar Pradesh. In Uttar Pradesh infant mortality rate in urban areas is as high as in Orissa. And this Chhattisgarh is also not in a good situation 48 at difference of only 1. The difference of 1 may not carry much sense when data have come from sample. S R S also gives us confidence intervals of these rates, but since my purpose was only to compare states. I am not giving you figures of confidence intervals

It is clear that there are some states like Orissa Bihar Uttarpradesh Chhattisgarh where death rates are infant mortality rates are quite high. On the other hand if you look at Kerala, where is Kerala? Because we are all the time talking about Kerala. In Kerala this is Kerala 11. In Kerala you find that the infant mortality rate is 12, in rural areas it is 12. In urban areas it is 10. There is another smaller state Manipur. In Manipur you find that the infant mortality rate in urban areas is as low as 8. So, if we take infant mortality rate of developed countries like Japan to be standard where only one or two children die during infancy.

Then our Manipur state is very close to achieve in that level. That there are other states like Orissa or Chhattisgarh or Uttarpradesh where infant mortality has lot of scope to decline, something has to be done about these states in particular. So that their infant

mortality rate can decline. And when infant mortality rate will decline, this will provide encouragement to couples to produce smaller number of children.

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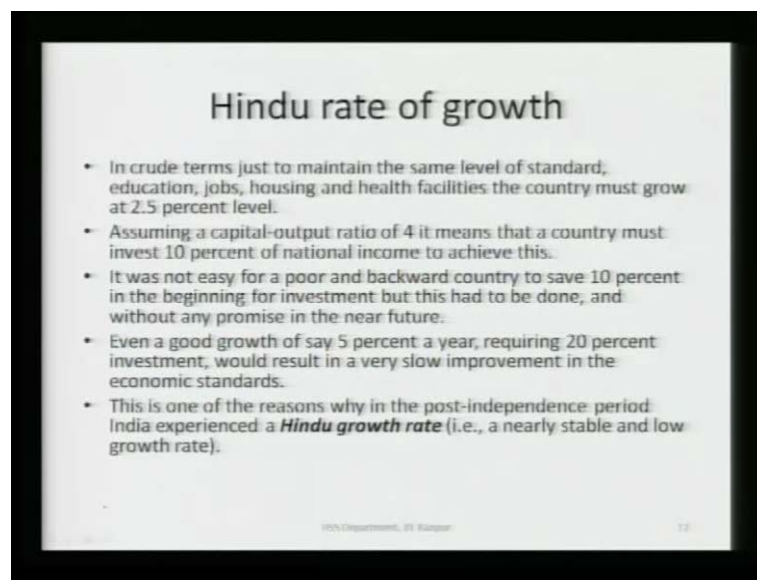


Now, there are negative implications of growth rate, there are positive implications of growth rate. Among the negative implications of growth rate, we have seen that after independence population of India grew at rate more than 2 percent per year, which means high demographic investment. That just to maintain the same level of per capita income, you have to make huge investment in economy. In a poor economy, in which consumption requirements are not satisfied for in large proportion of population. You have to make huge demographic investment even to remain at the same level.

So, rough calculation would show that if capital output ratio is 4 in industry. It is 4 or more, then if a population is increasing at say 2.25 percent per year. Then 10 percent of your investment is required just to maintain the present level. If your economy invest is about 10 percent you remain where you are, there is no change, no improvement. And this explains why after independence for a long period of time. We had a rate of growth in per capita income of only one percent per year, which some people call hindu rate of growth. It was in only in Ninth Five year plan and then in Tenth Five year plan that we became unhindu and our growth rate of per capita started improving. Otherwise, we remained hindu for a long time.

Then those who claimed that population growth is bad for development, they may argue as follows. If the national income or total value of goods and services produce in a country grows at 2.5 percent a year and the population also grows at the same rate, in terms of income per capita, the country will remain where it is. This had serious implication for Indian society. The issue to what extent high population growth can hamper development however, it is controversial. Development is if a factor which is influence not only by demographers, but also by ethical, ideological, factors, resources and state policies. So, this is what I was saying hindu rate of growth. We have had hindu rate of growth for several decades.

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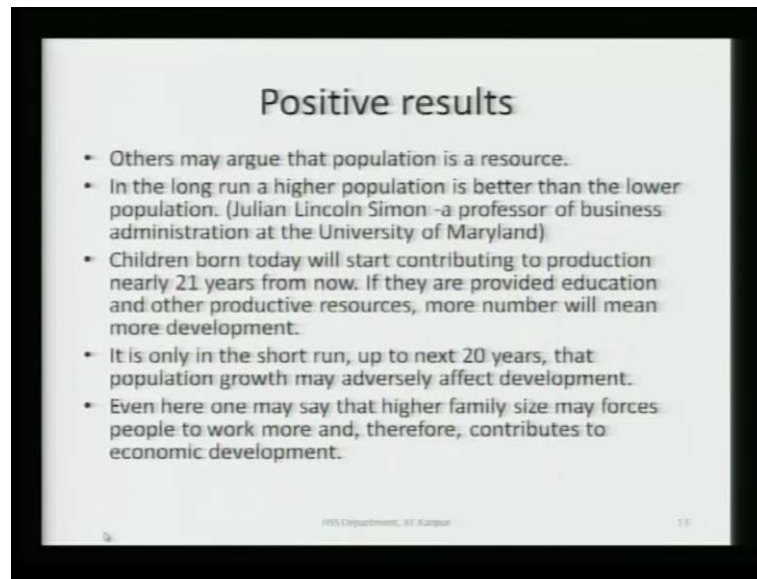


Hindu rate of growth

- In crude terms just to maintain the same level of standard, education, jobs, housing and health facilities the country must grow at 2.5 percent level.
- Assuming a capital-output ratio of 4 it means that a country must invest 10 percent of national income to achieve this.
- It was not easy for a poor and backward country to save 10 percent in the beginning for investment but this had to be done, and without any promise in the near future.
- Even a good growth of say 5 percent a year, requiring 20 percent investment, would result in a very slow improvement in the economic standards.
- This is one of the reasons why in the post-independence period India experienced a **Hindu growth rate** (i.e., a nearly stable and low growth rate).

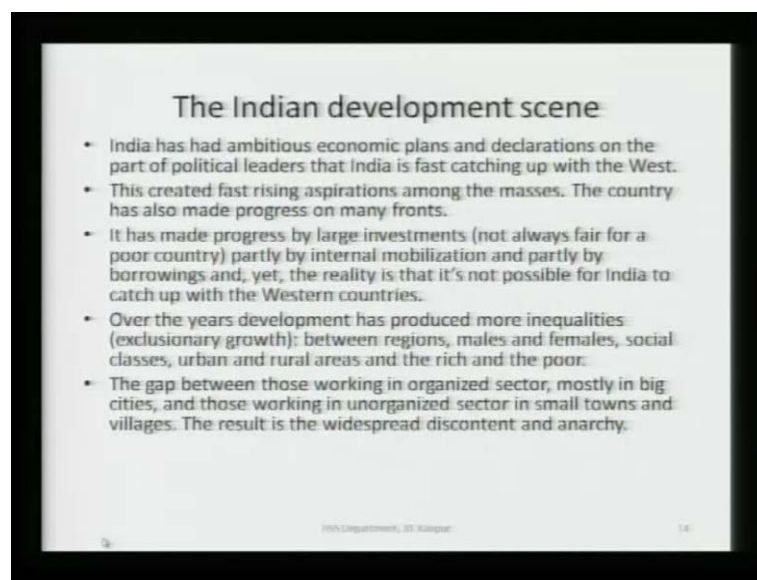
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But there are positive, but there are some positive effects of population growth also among the most vocal person was born Juliansimon, a professor of disease administration, at the university of Maryland. Who argued that in the shorten positive growth rate of population may hamper growth of national income in per capita term, but in the long run say after 20 years or so the population is going to gain, if it has positive rate of growth.

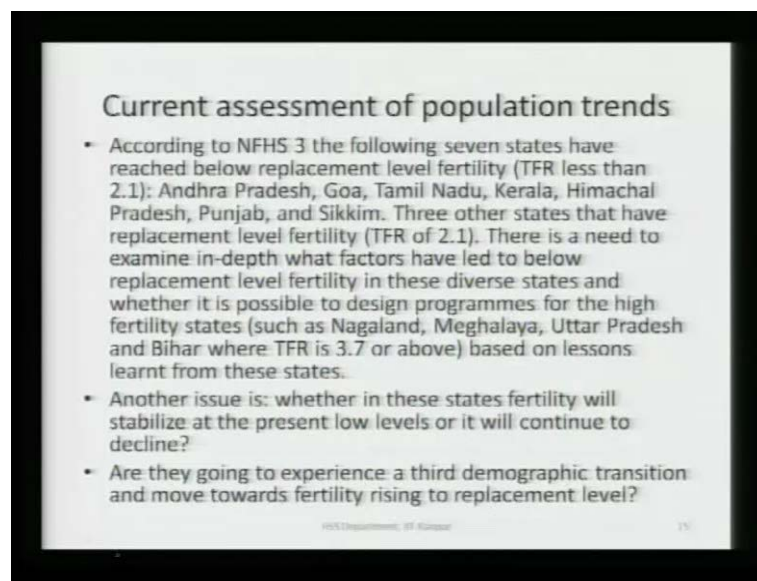
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In case of India, India has had M B C S economic plans and declarations on the part of political leaders that India is fast catching up with the west and this has created aspirations. But it has also produce more inequalities, our economic planning has

produce more inequalities or exclusionary growth, that is why Eleventh Five years plan say that we must go for exclusionary growth. And the gap between those who are working in organize sectors, mostly in big cities and those who are working in unorganized sectors that there are seven states, which have already reached below replacement fertility they are Andhra Pradesh, Goa, Tamilnadu, Kerala, Himachal Pradesh, Punjab and Sikkim.

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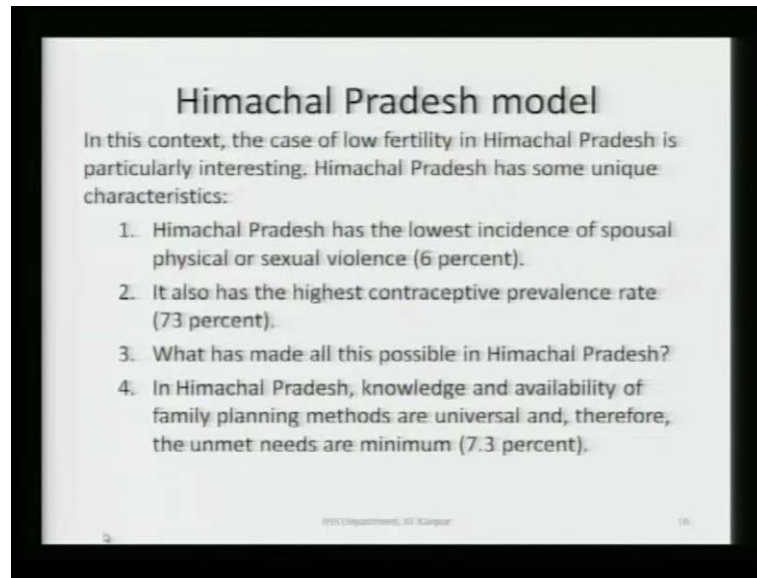
Current assessment of population trends

- According to NFHS 3 the following seven states have reached below replacement level fertility (TFR less than 2.1): Andhra Pradesh, Goa, Tamil Nadu, Kerala, Himachal Pradesh, Punjab, and Sikkim. Three other states that have replacement level fertility (TFR of 2.1). There is a need to examine in-depth what factors have led to below replacement level fertility in these diverse states and whether it is possible to design programmes for the high fertility states (such as Nagaland, Meghalaya, Uttar Pradesh and Bihar where TFR is 3.7 or above) based on lessons learnt from these states.
- Another issue is: whether in these states fertility will stabilize at the present low levels or it will continue to decline?
- Are they going to experience a third demographic transition and move towards fertility rising to replacement level?

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There are three other states that have replacement level fertility and there is a need to examine death, what factors have led to below replacement level fertility in this diverse states. Another is issue is whether in these states fertility will stabilize at the present low level or it will continue to decline further or are they are some states or some pockets, where they are going to experience the third transition. Means, some improvement in fertility after it has declined to a low level.

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Himachal Pradesh model

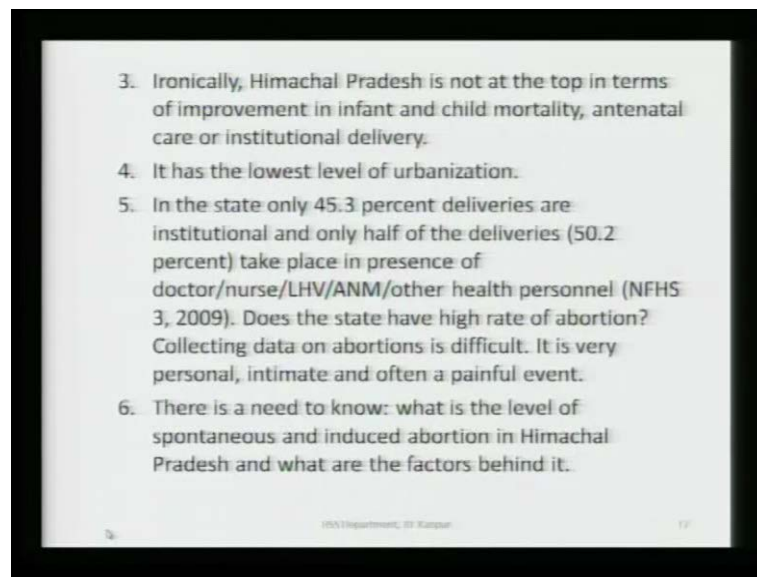
In this context, the case of low fertility in Himachal Pradesh is particularly interesting. Himachal Pradesh has some unique characteristics:

1. Himachal Pradesh has the lowest incidence of spousal physical or sexual violence (6 percent).
2. It also has the highest contraceptive prevalence rate (73 percent).
3. What has made all this possible in Himachal Pradesh?
4. In Himachal Pradesh, knowledge and availability of family planning methods are universal and, therefore, the unmet needs are minimum (7.3 percent).

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The Himachal Pradesh model can be worth considering. It has lowest incidence of domestic violence, highest contraceptive prevalence, what has made all this possible in Himachal Pradesh? Knowledge and availability of family planning methods are universal and the unmet needs of the family planning are minimum.

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3. Ironically, Himachal Pradesh is not at the top in terms of improvement in infant and child mortality, antenatal care or institutional delivery.
4. It has the lowest level of urbanization.
5. In the state only 45.3 percent deliveries are institutional and only half of the deliveries (50.2 percent) take place in presence of doctor/nurse/LHV/ANM/other health personnel (NFHS 3, 2009). Does the state have high rate of abortion? Collecting data on abortions is difficult. It is very personal, intimate and often a painful event.
6. There is a need to know: what is the level of spontaneous and induced abortion in Himachal Pradesh and what are the factors behind it.

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But ironically Himachal Pradesh is not at the top, in terms of improvement in infant child mortality, antenatal care or institutional delivery it also has lowest level of urbanization. My hunch is that perhaps in Himachal Pradesh rate of abortion must be high. Somebody

has to study in-depth, the Himachal Pradesh model why despite certain adverse socioeconomic conditions Himachal Pradesh has joined the group of below replacement fertility recently.

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Causes of transition

- There is vast literature of demographic transition. It is believed that in the West demographic transition occurred in two phases: first, in response to socio-economic development and modernization; and second time in response to developing separation between sex and reproduction due to development of contraception.
- The second transition has produced the below replacement fertility. In a recent article Chesnais (2000) identified the following factors behind demographic transition to below replacement level fertility: (1) social atomization and related feminism; (2) implementation of collectivized pension benefits; (3) globalized nomadism; (4) youth loss of majority; and (5) the "end of work" syndrome.
- In simple terms it means that individualization, increasing freedom of women, pension benefits, migration and economic deprivation (because many youths are earning less than their parents and there is rise in unemployment) have changed the calculus of fertility in favor of low fertility.

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Now, there are some caused of transition demographers say that it has related to individualization, increasing freedom of women, increasing pension benefits or social security program, lessening your dependence on your children and migration and economic deprivation in some cases, then also cause low fertility.

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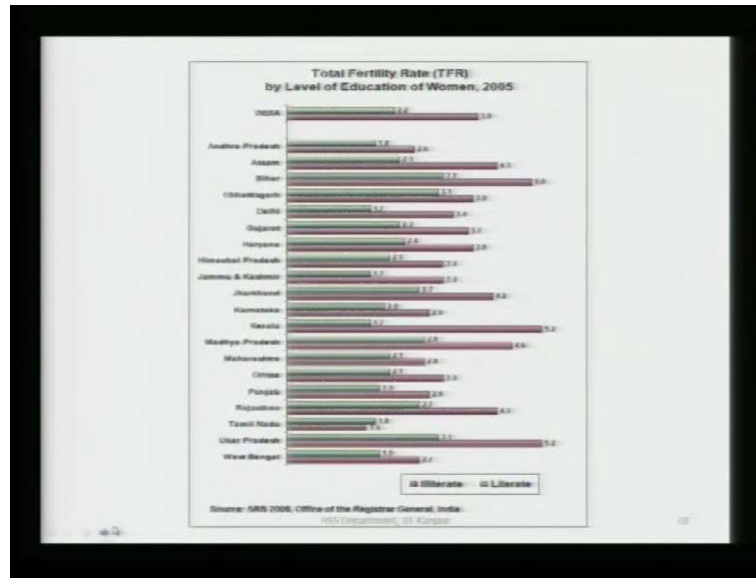
TABLE 1.4: EDUCATION AND TOTAL FERTILITY RATE, NFHS-3

Education	Total fertility rate	Percentage currently pregnant	Mean number of children ever born to women age 40-49 years
No education	3.55	5.9	4.71
<5 years complete	2.45	4.4	3.64
5-7 years	2.51	5.2	3.52
8-9 years	2.23	4.9	2.97
10-11 years	2.08	4.4	2.63
12 or more years complete	1.80	4.1	2.15

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One of the interesting aspects of fertility is that, in the country as a whole if you look at those who are high school pass women who are high school pass their total fertility rate has already gone to below replacement level. So, perhaps education of women is a major factor.

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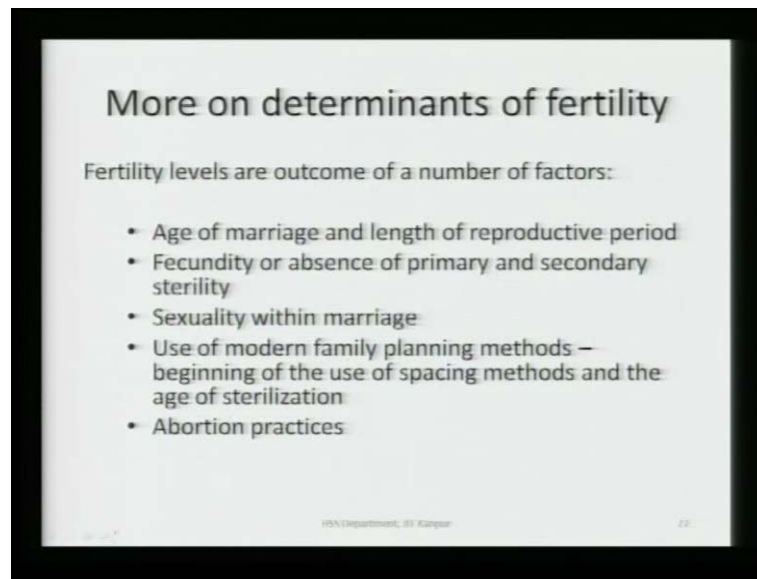
This diagram shows the differences in total fertility rate, which I have already commented upon and the diagram is obvious.

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Level	Uttar Pradesh			India		
	Boys	Girls	Total	Boys	Girls	Total
Classes I-V (6-11 years)	117.92	109.24	113.75	114.59	108.00	111.40
Classes VI-VII (11-14 years)	59.64	46.89	53.62	77.59	69.64	73.78
Classes IX-X (14-16 years)	59.37	36.28	48.60	58.57	47.44	53.27
Classes XI-XII (16-18)	24.25	19.38	22.00	31.53	26.09	28.96

In state like Uttar Pradesh, where fertility is high. You can may guess that one of the reasons is high dropout rate, you see enrolment rate in age group 11 to 14 among girls drops to 46. Initially, it is 109 that means initially in age group 6 to 11 most girls or all girls are going to school, but by the time they reach 11 to 14, more than half of them dropout. So, enrolment rate reduces to 46. 14 to 16 years, it reduces to 36.28 and in the age group 16 to 9 16 to 18, it reduces to as lower level as 19.3, 80 percent or more than 80 percent of girls in age group 16 to 18 are outside school or university.

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More on determinants of fertility depends on age of marriage, fecundity, sexuality, modern, family planning methods, abortion practices, we have discussed them at length earlier.

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Family planning and beyond

- In literature, the above factors are divided into two categories: family planning; and beyond family planning factors.
- Family planning factors include knowledge, attitude and practice (KAP) of contraceptive methods –spacing and terminal.
- The beyond family planning factors include the whole matrix of socio-economic factors which impinge upon value of children, reproductive decision making, and motivation to limit family size.

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We can broadly divide all these factors into family planning and beyond there is direct effect of family planning, there other factors education, empowerment of women etcetera or infant mortality which comes under.

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Family planning acceptance in India, NFHS-3 (India-64.0)

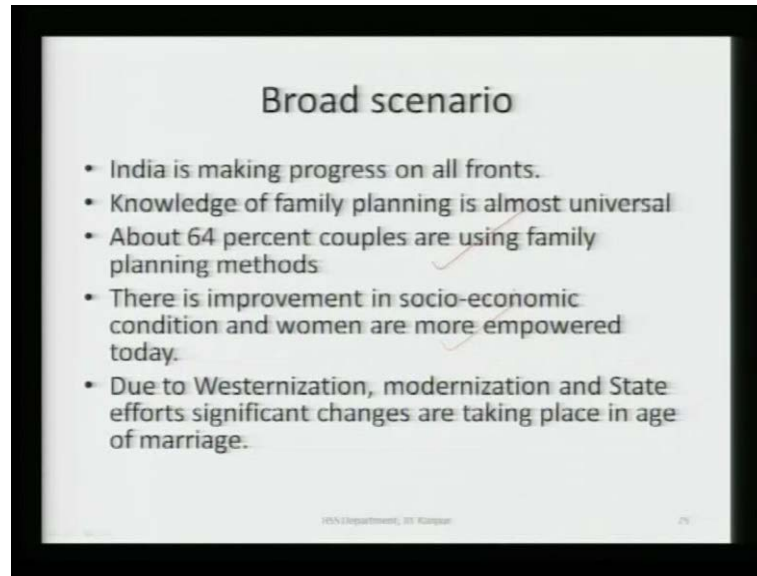
High couple protection rate		Low couple protection rate	
West Bengal	75.5	Nagaland	41.9
Himachal Pradesh	73.7	Moghhalaya	43.7
Kerala	68.9	Arunachal Pradesh	47.3
J&K	68.3	Bihar	50.6
Andhra Pradesh	67.7	Goa	51.3
Gujarat	67.6	Uttar Pradesh	56.3

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Beyond family planning and the differences in birth and death rates. Particularly, birth rates are more due to both family planning and beyond family planning. You see there are tremendous differences in family planning. On the one hand we have West Bengal where close to three fourth of all the married couples are using contraceptive practices.

And there is Nagaland in which only 41.9 percent couples are using family planning methods, in Bihar 50 percent couples are using family planning methods.

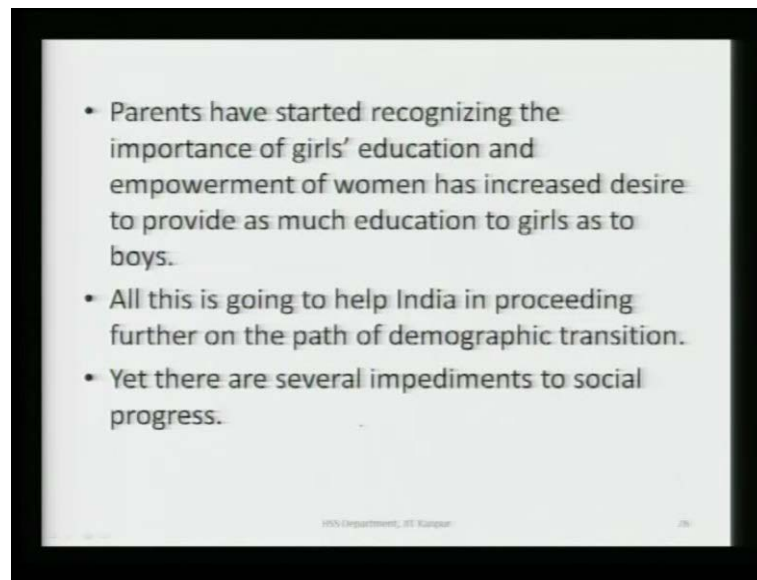
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So, the broad scenario is that India is making progress in all fronts. Knowledge of family planning has already become universal. And 64 percent couple are using family planning methods, there is also improvement in socioeconomic condition and women are more empowered today, this is family planning, this is beyond family planning.

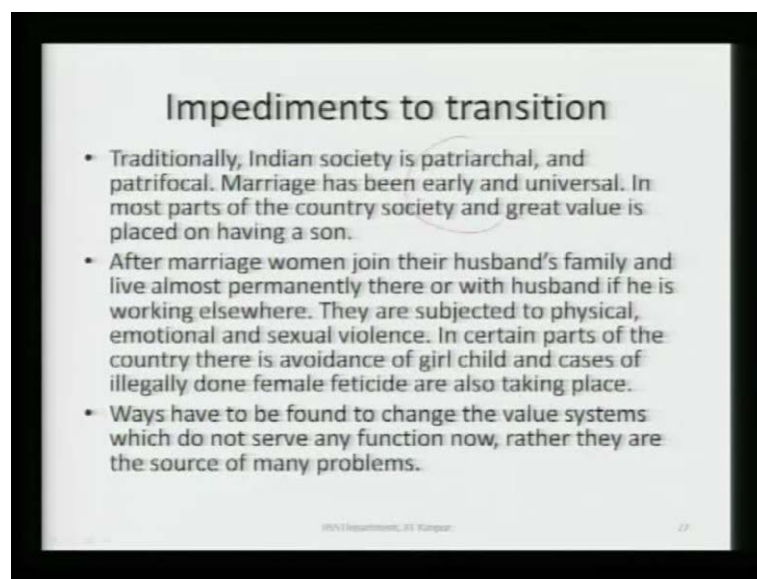
Due to westernization modernization and state efforts, significant changes are taking place in the age of marriage, again beyond family planning.

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Parents have started recognizing the importance of girl's education and empowerment
And all this is going to help India in proceeding further on the path of demographic transition. Yet there are several impediments to social progress.

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And they can broadly be divided into these factors tradition, patriarchal society, low age of marriage, then after marriage women joining their husband's family. In sociological language we say patriarchal and patrifocal, we are not only patriarchal, but we are also patrifocal and that effects status of women. So, ways have to be found to change the

value system which do not serve any function now, may be at one time this help some function, but today they do not serve any function, rather they have become source of many problem.

So, this is all that in brief I told today that in terms of death rate, we have made tremendous progress our death rate has declined to nearly 7, our life expectancy has gone up to 65. In fertility we also have made significance progress in our fertility has declined from 7 to nearly 2.6. But there are noticeable differences between states and for the future of for a good future of India for unity and integrity of India, for political stability. Not only for economic development, but for political stability. We have to fight these differences in demographics between different states of India. Otherwise, with rising and similar aspirations for development in all the states of India, this demographic and economic differences can lead to secessionism, son of soil and many problems of that kind.

So, there is a connection between demographic, socioeconomic and political problems. And today I focus particularly on differences in birth and death rates. And I also said that difference in birth rates are partly due to differences in family planning and partly due to differences in beyond family planning. Beyond family planning covers age of marriage, empowerment of women, education, enrolment rates and related issues social development in brief. I think you have some questions in your mind at this stage so, please ask your question.

Thank you sir, for giving such a good lecture on the demographic processes, I think due to paucity of time we could not discuss on about certain terms. So, my first question is what exactly is natural growth rate? And how is it estimated the natural growth rate?

You see there are two types of growth rates; one growth rate which is estimated from population data obtained from censuses. In censuses you have figures of population at two census dates. And by using either using simple decadal growth rate method population, say in population of 2001 minus population, population of 2001 minus population of 1991 divided by population of 91 multiplied by 100. The usual method of calculating percentage increase in population. That is called decadal growth rate.

And if you divide that decadal growth rate by 10, you get something like percent increase per year because there is gap of 10 years at which census is conducted. That

tells us the overall every year on the average, what percent of change is taking place in the population. Natural growth rate has a different connotation. This natural growth rate refers the difference between birth rate and death rate. Now, this birth rate and death rate and when S R S gives you natural growth rate of 1.5, it means the birth rate of 2008 minus death rate of 2008, it is not for a decade. Since, in 2008 birth rate is much lower than the birth rate that has that may have been during the period 1991 to 2001. So, you will have a lower natural rate of growth.

In absence of migration, natural growth rate and growth of population will be same. So, if India's population is not effected by international migration. Then the natural growth and overall growth rate of population will be same and which is the case. So, you can better rely on S R S figures rather than census figures. Census figures tell us about the decade and S R S figures tell us about the contemporary situation. So, I can say that today population of India is growing at a rate 1.5 percent per year because the difference in birth rate of India and death rate of India as of today is of 15 per thousand.

Sir, what could be the reasons behind high in urban areas in some of the sates of India?

This is this for this we have to look into two things, one the definition of urban population. Normally, when I use a term urban population, immediately it can among students of sociology it can evoke the image of Bombay Mumbai or Calcutta now Kolkata or Delhi or Bangalore. But urban areas can have very rural like character because by definition any place with a size of population more than 5000 can be classified as urban. So, there are many urban areas, which are rural in character small, there are tiny towns, there are small towns and there are casbahs, notified areas, town area committee, they are also urban areas. So, in those states where there are very few metropolitan centers and most of the urban population is concentrated in a smaller town, smaller cities notified areas, they are urban rural difference would be less.

And second thing that in these states where urban infant mortality or urban mortality is higher, that also mean that these are the states where even in the urban areas health infrastructure is not properly developed, public health system is not properly developed. It is inefficient may be there is problem of governance, there is problem of corruption, there is problem of lack of commitment or lack or resources so it is on both account. The character of urban population in those states and lack of health infrastructure and

something wrong with governance of the states. So, combine effect of all these things is that urban areas too have high death rate.

And sir, lastly in current scenario most of the couples are going for late marriages so does this have it is re-precaution on fertility and growth rate?

Yeah, it will have. If people go for late marriage that means the reproductive period which is available for reproduction is truncated on the left hand side of the distribution. So, they they are not constantly reproducing for 30 years from 15 to 45. They marry at say 27 or 28, and so it is from 27 or 28 to 45 not from 15 to 45, that they have time for reproduction. And the factors because of which age of marriages risen, from 14 to 28 or also associated with the factors because of which reproduction closes at say 35 or 36 it does not go up to 45. So, the reproductive period is truncated from both sides left hand side, right hand side and normally women produce two or three children.

And lastly sir, you mentioned about a term fecundity, could you explain what is fecundity?

In population literature, we make a difference between fertility and fecundity and fecundability, there are three terms. Fertility, fecundity and fecundability. Fertility refers to actual birth performance. So, when I say that total fertility rate of India is 2.6 it means on the average a woman is producing 2.6 children. The term fecundity refers to biological capacity to reproduce. Biological capacity to reproduce is much higher know the other day using the model of bongaart, I was saying that as far as capacity to produce children is concerned.

Theoretically a woman can produce 40 children in entire life time. This fecundity is biological capacity to reproduce, it may not be 40 children, it may be 30 25 or 20 or whatever. Or at considering socio cultural and all kinds of factors say 15 so, fecundity is 15, fertility is 2.6 that is the difference. Which truth that a fertility is declining it is not because biological capacity to produce baby is declining, no. Actually, changes in certain cultural factors like now, women spend more time with their husbands, there is improvements in nutrition, leading to reduction in, spontaneous abortion and so. Biological capacity to produce babies is increasing, but total birth performance is decreasing. Fecundity is increasing and fertility is declining. And the third term fecundability refers to probability of conceiving during a month of exposure.

Means, if husband and wife are living together and they are having sex, then in a month what is the probability of getting conceived? Usually, the probability of getting conceived that also, that depends on so many behavior patterns, but we can take it to be around 0.3 which means that if husband and wife is living together, then on the average waiting time for conception would be around three months or three and a half months. So, these are three different things. When demographic transition is occurring, it is not because of it is a good question you ask it is not because of decline in biological capacity to reproduce children. It is more because of use of family planning or or beyond family planning things empowerment. Ultimately, conscious limitation of family size that fertility is declining. Thank you.