

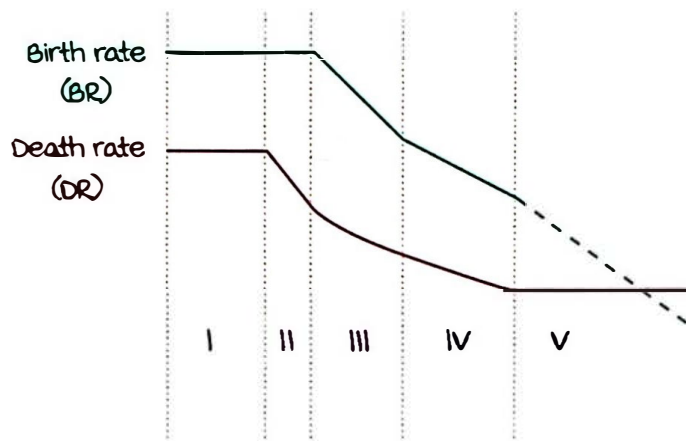
DEMOGRAPHIC CYCLE

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Phases Of Demographic Cycle

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Phases of demographic cycle :



Demographic gap in different phases

Stages	Phase	Birth rate	Death rate (BR-DR)	Demographic gap	Population	Examples
I	High stationary	High	High	Stable	Stable	Rural Bangladesh, West Africa (Niger)
II	Early expanding	High	Start declining	max, (d/t ↓ in DR) starts ↑	Explosive growth	Developing countries
III	Late expanding	Start declining	Slow declining	Starts ↓ (d/t ↓ in BR)	Increasing (But < stage 2)	
IV	Low stationary	Slow declining	Slow declining	Stable	Stable	Developed countries (US, Canada, UK)
V	Declining	Slow declining	very low declining/stable	minimum, negative value, BR can be < DR	Declining	Italy, Japan, Norway



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DEMOGRAPHIC TRENDS

Demographic process/variables :

- Fertility/birth rates.
- mortality/death rates
- marriage rates.
- migration rates (Immigration & emigration).
- Social migration (based on socioeconomic classes).

Annual Growth Rate

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$$\text{Annual growth rate (AGR)} = \frac{\text{Birth rate} - \text{Death rate}}{10}$$

Annual growth rates of different population

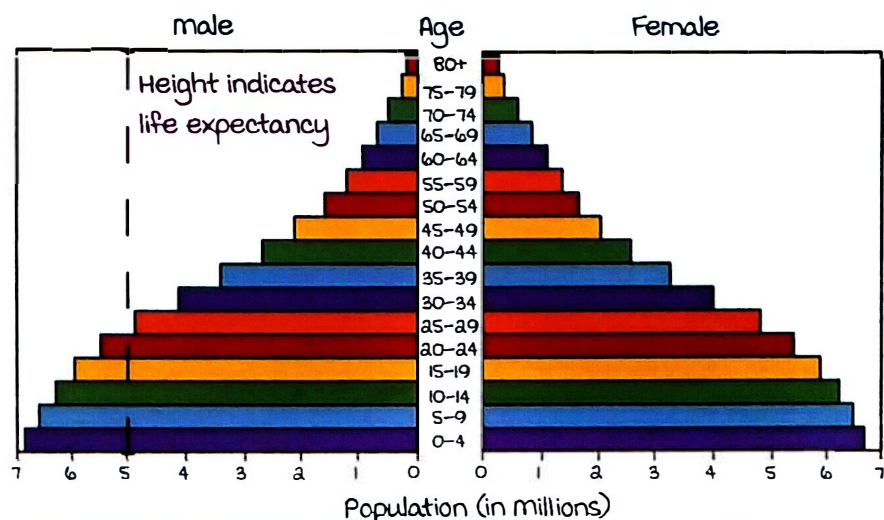
Population	Annual growth rate
Slow growing	<0.5%
Moderate growing	0.5 - 1%
Rapid growing	1 - 1.5%
Very rapid growing	1.5 - 2%
Explosive growing	>2%

Malthusian growth model

Annual growth rate	Population doubles in
1%	70 years
2%	35 years
0.5%	140 years
1.5%	47 years

Age Pyramids

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Classification :

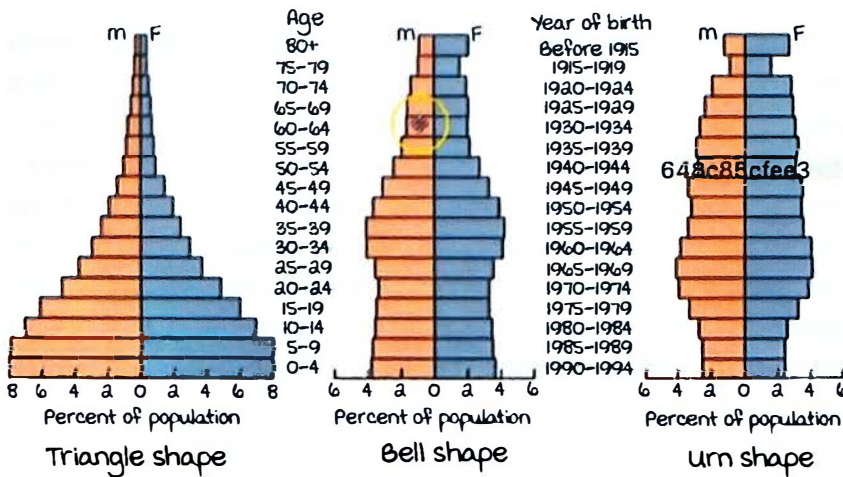
Based on developing vs developed country :

	Developing country	Developed country
Fertility rate	Higher	Lower
Type of age pyramid	Broad base	Broad belly
Image		

- Pre-reproductive
- Reproductive
- Post-reproductive

Based on shape of age pyramid :

	Triangular shaped	Bell shaped	urn shaped
Birth & Death rate	↑ Birth rate	↑ Birth rate & ↓ Death rate	Birth rate ≤ Death rate
Population	↑ / growing	Stable	Declining
Image			



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Demography and Family Planning

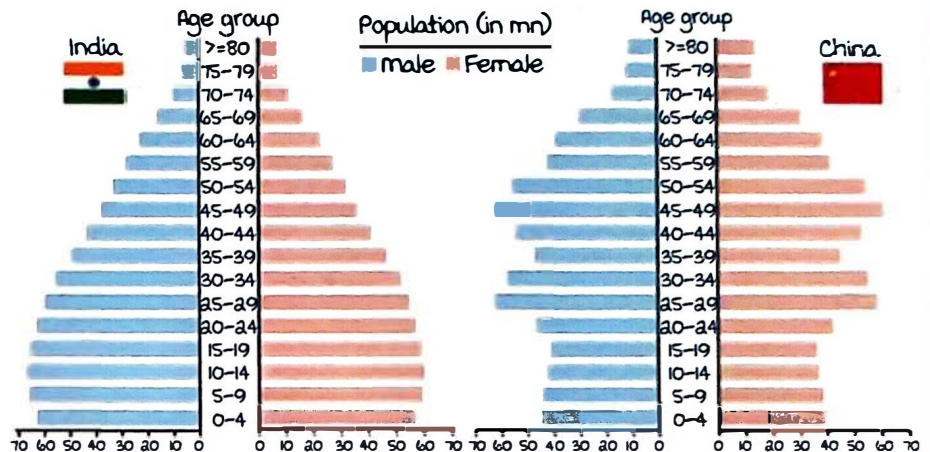
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Demographic Gift, Liability & Dependency ratio

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Demographic gift vs Liability :

	Demographic gift	Demographic liability
Population	Economically productive	Elderly
Occurs d/t	↓ Birth rate	↓ Birth rate & ↓ Birth rate
Stage of demographic cycle	III	V



Demographic gift :

- AKA Demographic bonus/divident.
- Leads to in ↓ dependency ratio.

Dependency Ratio :

$$\text{Formula : } \frac{\text{Total no. of dependent population}}{\text{Total no. of independent population}} = \frac{\text{Age } <14\text{y \& age } >65\text{y} \times 100}{\text{Age of } 15-64\text{y}}$$

Dependency ratio in India :

- Younger age : 38.9%.
- Old age : 9.7%.
- Total : 48.6%.

FERTILITY RATES

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Fertility and Reproduction Indicators

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Women of Reproductive Age (WRA) group : 15 - 49 years.

FERTILITY INDICATORS

1. General Fertility Rate (GFR) : $\frac{\text{Total number of live births in the area}}{\text{WRA in that area}} \times 1000$

If GFR is same in population A and B → Categorise WRA according to age groups (eg; 15-25, 25-35, 35-49) → Group with higher population of younger women chosen for area development.

2. Total Fertility Rate (TFR) : GFR calculated for Age specific fertility rates (ASFR).

If both group A & B has same TFR → Look for no. of daughters born.

REPRODUCTION INDICATORS

1. Gross Reproduction Rate (GRR) : $\frac{\text{Total number of daughters born in the area}}{\text{WRA in the area}}$ (With ASFR)

In two groups with similar GRR → Look for NRR.

2. Net Reproduction Rate (NRR) :

- Total no. of daughters a newborn girl child will bear in her lifetime assuming ASFR & Age Specific Death Rates (ASDR).

TARGETS

Net reproduction rate :

- Target NRR = 1 (Replacement level)
- Best indicator to evaluate National Family Planning Program (NFPP).
- Aka final impact indicator.



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Total fertility rate :

- Target TFR < 2.1 (0.1 is adjustment for gender bias).
- most important indicator
- Epidemiological indicator.
- TFR of India is 2.0 (NHFS-5 data).
- Proxy indicator for complete family size.

Couple protection rate :

- Target CPR $> 60\%$.
 - If CPR is $> 60\% \rightarrow \text{TFR} < 2.1 \rightarrow \text{NRR} = 1$ (Target of NFPP).
- Functional & operational indicator.
- Implementation of NFPP at grass root levels (ASHA) : Contraceptize 60% of population.
- CPR of India : 66% (NHFS-5 data).

SURVEY TECHNIQUES

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Types

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1. CRS : Civil Registration System.
2. SRS : Sample Registration System.
3. NFHS : National Family Health Survey.
4. DLHS : District Level Household Survey.
5. Census: Preterm correction.

Defacto vs De jure survey

Defacto Survey (obselete)	De jure Survey
"As and where" basis.	uses legal proof of permanent residency.

CIVIL REGISTRATION SYSTEM

- Aka Vital registration system, Not a survey technique.
- Birth & death registration in India.
 - Birth registered within 21 days.
 - Death registered within 21 days.
 - NRI : Birth & death within 90 days.
- under the ministry of Home Affairs : Office of Registrar General of India.

SAMPLE REGISTRATION SYSTEM

Aka Dual/Biannual system.

Conducted every 6 months at two levels.
 National level
 State level
 (PHC → District → State)
 Data matching/ Triangulation → Presented to the citizens of country.

Use :

Assesment of Indicators (Based on 2019 survey)

- a. Crude birth rates (CBR) : 19.7.
- b. Crude death rate (CDR) : 6.0.
- c. Natural growth rate : 30.
- d. Infant mortality rate (IMR) : 30/1000 live births.
- e. maternal mortality ratio (MMR) = 113/ lakh live births.
- f. Neonatal mortality rate : 23/1000 live births.
- g. Under 5 mortality rates : 36/ 1000 live births.



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NATIONAL FAMILY HEALTH SURVEY - 5 :

Conducted :

- Between 2019-21.
- Every 5 years by MoHFW.
- By International Institute for Population Sciences (IIPS) in Mumbai.

Recent update :

HIV testing has been dropped (Done by NACO), BP & Blood glucose has been included.

Questionnaires/Schedules assessed on :

- | | |
|----------------|-----------|
| 1. Biomarkers. | 3. Men. |
| 2. Household. | 4. Women. |

Indicators assessed :

- Literacy rate.
- Sex ratio.
- Prevalence of anemia.
- Anemia rates in 15-49 y females : 57%.
- Contraceptive use : 66.7% of women of reproductive age, m/c contraception is tubectomy (India).
- Immunisation rates.

Sex Ratio

- No. of females per 1000 males.
- NFHS-5
 - 1020 females per 1000 males
 - At birth : 929 daughters born per 1000 male children.

Literacy rate (LR)

- Effective LR = $\frac{\text{No. of people who can read \& write in any language}}{\text{Population with age } > 7 \text{ years}} \times 100$
- Adult LR = $\frac{\text{No. of people who can read \& write in any language}}{\text{Population with age } > 15 \text{ years}} \times 100$

Other rates and ratios :

- Diabetes prevalence : 13-15%.
- Tobacco use in males : 38%.
- Alcohol use in males : 18.8%.
- Total dependency ratio : 48.7.



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DISTRICT LEVEL HOUSEHOLD SURVEY

- **Adhoc survey** at district level.
- use : To assess MCH, growth & social parameters which affect health.

CENSUS

- Conducted under **ministry of Home Affairs** every 10 years.
- use : Determines demographic structure of the population.
- method : De jure method.
- First official census : **1881**.
- First census with disability accounted : **1981**
- **Year of big divide** (Peaks in annual growth rate) : 1921.

2021 Census :

- Digital census.
- Differentiated population based on **industrial & occupational** categories.

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FAMILY PLANNING AND CONTRACEPTION : PART 1

TERMS

Eligible couples	Couples in whom female is in reproductive age group (15-49 years) • Contraception given
Target couples	Couple who has completed family & has at least one live child • Sterilization done
Planned family	a. 1 st child born after 2 years of marriage b. 2 nd child born 3 years after 1 st child (Or 5 yrs after marriage) c. Couple adopts permanent method of family planning after 2 children
Failure of contraception	a. Lifetable analysis (Best method) b. Pearl's index (m/c) } methods of assessment • $\frac{\text{Number of accidental pregnancy}}{\text{Total woman years of exposure}} \times 100$ (multiply by 1200 for exposure in months) • unit : HWY (Hundred woman years) • Pearl's index of contraceptive methods - Condoms : 2-20% - Intrauterine device : 0.7-1.5% - OCP : <0.01% (most effective contraception under 50) - Implants : <0.05% (Nexplanon : Least failure rate in implants)

Methods Of Contraception

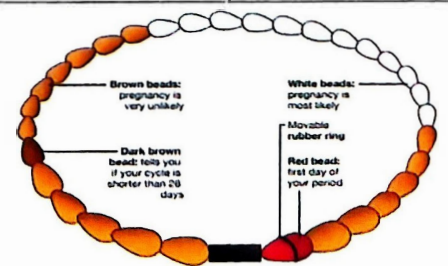
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NATURAL METHODS :

1. Abstinence/coitus interruptus.
2. Withdrawal method.
3. Calendar/Rhythm method
 - Based on normal menstrual physiology.
 - Safe period : First & last seven days of cycle.
 - Type : Tirumala method/Cycle beads.

Types of contraception

Temporary	Permanent methods
<ul style="list-style-type: none"> • Natural methods • Barrier methods • Intrauterine devices • Oral contraceptive pills • Other methods 	<ul style="list-style-type: none"> • Tubectomy • Vasectomy • Other



Tirumala method