Measures of Fertility

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  - General Fertility Rate (GFR)
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  - Total Fertility Rate (TFR)
  - Gross Reproduction Rate (GRR)
  - Net Reproduction Rate (NRR)
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Introduction

- Fertility
  - Natural capacity of reproduction
  - Fertility determines population growth
  - Uncontrolled fertility may adversely affect economic, physical and psychosocial health of populations/ family units
  - Measurement of fertility is important for studying population change over time
- Fecundity
  - The physiological capacity to women to reproduce
  - Influenced by gamete production, fertilisation and carrying a pregnancy to term

Determinants of Fertility

- Age at marriage
- Duration of married life
- Family planning
- Nutritional status
- Education
- Religion
- Culture

Measures of Fertility

- Crude Birth Rate (CBR)
- General Fertility Rate (GFR)
- Age Specific Fertility Rates (ASFR)
- Total Fertility Rate (TFR)
- Gross Reproduction Rate (GRR)
- Net Reproduction Rate (NRR)

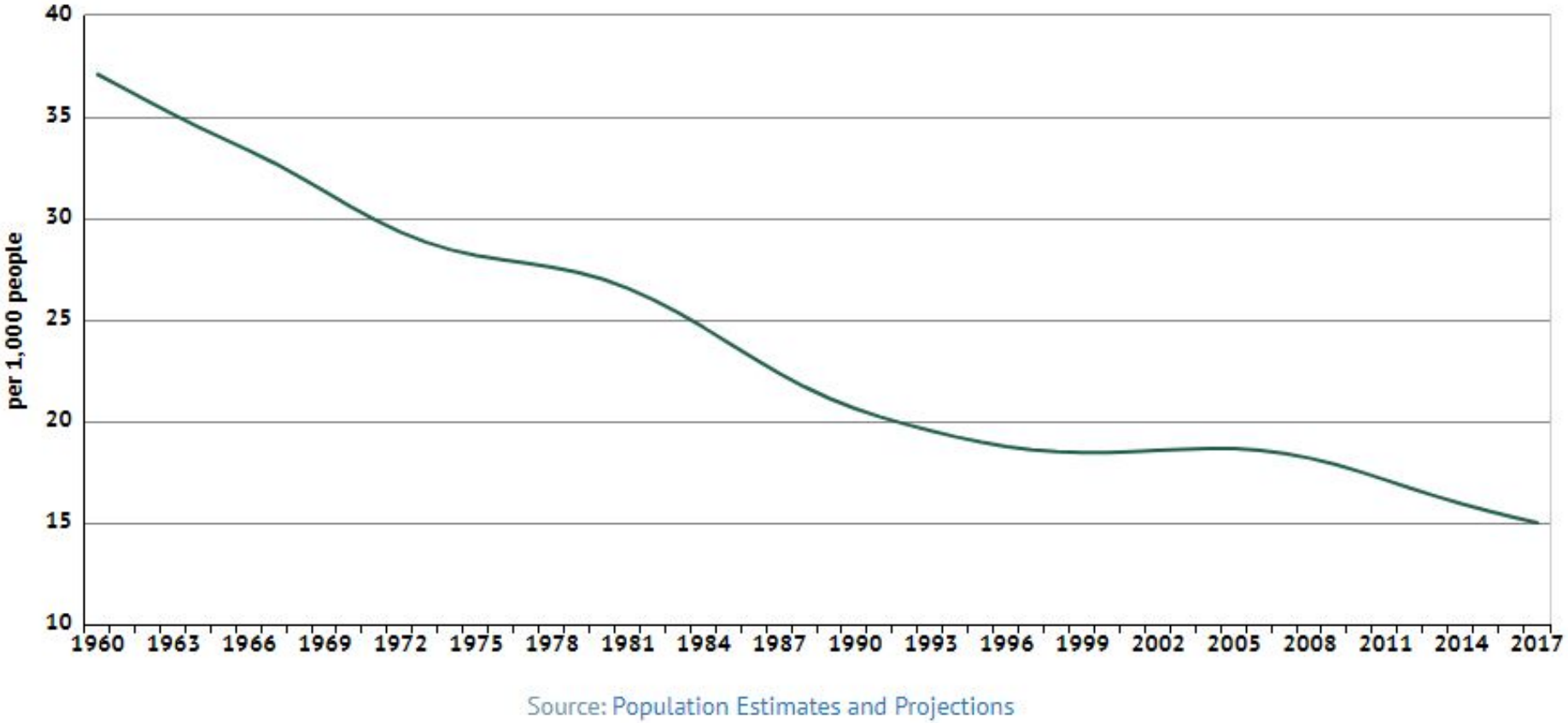
Crude Birth Rate(CBR)

- Ratio of total number of live births to the average population ever lived during a given year and a geographical area

$$CBR = \frac{Total\ number\ of\ live\ births\ during\ the\ calender\ year}{Mid-year\ estimated\ population} X\ 1,000$$

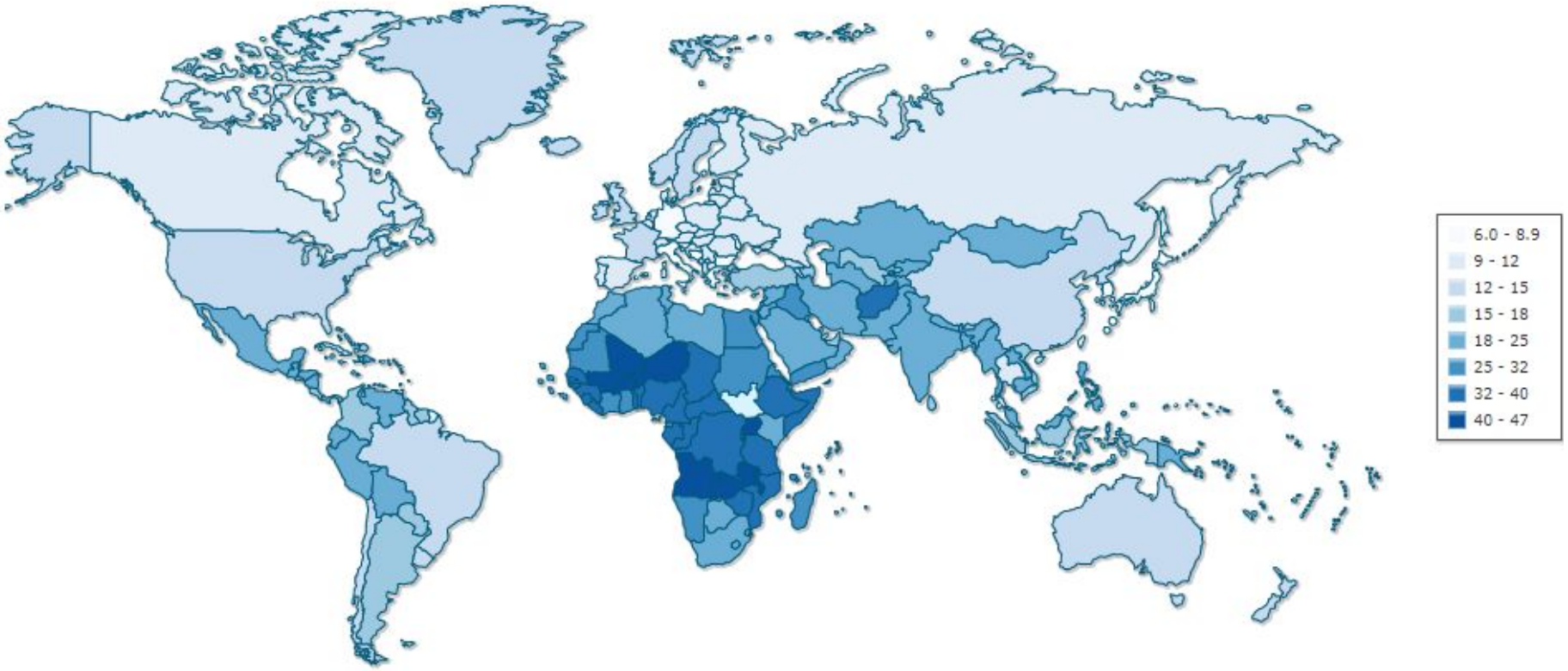
- Associated with the socioeconomic status of the population
- Sri Lanka 15.6 (AHB -2016)
  - Afghanistan - 33.0
  - India -19.0
  - U.S. -12.0
  - U.K. -11.0

Crude Birth Rate(CBR) -Sri Lanka



https://knoema.com/atlas/Sri-Lanka/topics/Demographics/Fertility/Crude-birth-rate

Crude Birth Rate(CBR) - World



Crude Birth Rate(CBR)

- Advantages
  - Requires minimum data on fertility
  - Easy to interpret
- Disadvantage
  - Cannot be used to compare the levels of fertility for any two populations because they may differ widely in their age-sex composition.
  - It is not a fertility rate as it includes all the population either exposed or not exposed to the risk of child bearing.

General Fertility Rate

- Simplest Measure of fertility
- Number of births per year per 1000 midyear women of childbearing age

$$GFR = \frac{Total\ number\ of\ live\ births\ during\ the\ calender\ year}{Mid\ year\ female\ population\ aged\ 15-49\ years\ in\ the\ same\ area} X\ 1,000$$

- Advantages
  - It includes the female population in their reproductive ages who are supposed to be exposed to the risk of giving birth
  - Generally used in population projections.
- General Marital fertility Rate (GMFR) -Overall fertility of married women

Age Specific Fertility Rates(ASFR)

- Number of births per year per women in a given age group in a given year and geographical area.
- Age pattern of child bearing in any population is the best revealed by computing age specific fertility rates.
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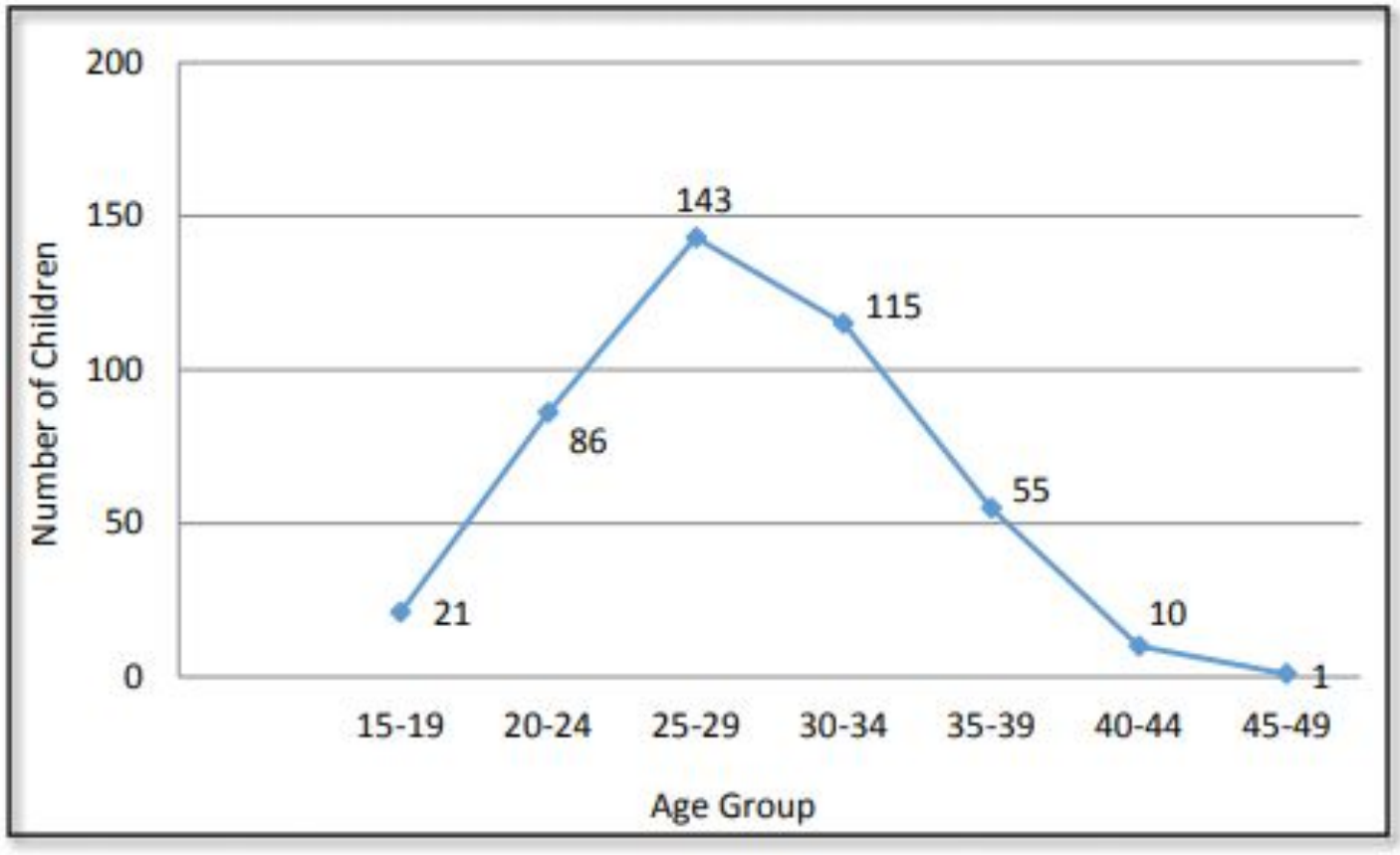
$$ASFR = \frac{Total\ number\ of\ live\ births\ for\ female\ \ aged\ (x-y) years\ during\ the\ calender\ year}{Mid\ year\ female\ population\ aged\ (x-y)\ years\ in\ the\ same\ area} X\ 1,000$$

$$ASFR = \frac{Total\ number\ of\ live\ births\ for\ female\ \ aged\ (15-20) years\ during\ the\ calender\ year}{Mid\ year\ female\ population\ aged\ (15-20)\ years\ in\ the\ same\ area} X\ 1,000$$

Age Specific Fertility Rates(ASFR)-SL

Figure 4.1 Age Specific Fertility Rates



The measures of fertility presented in this chapter refer to the three-year period prior to the survey. Table 4.1 shows the current fertility levels of women in Sri Lanka. The ASFRs are indicative of a late fertility population with low fertility levels.

DHS -2016

Total Fertility Rate (TFR)

- Number of children born to a female if she passes through her reproductive years conforming to the Age Specific Fertility Rates of a given year
  - She was to experience the exact current age-specific fertility rates (ASFRs) through her lifetime
  - She was to survive from birth to the end of her reproductive life
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- Sri Lanka - 2.2
  - Afghanistan - 4.5
  - India - 2.3
  - U.S. - 1.8
  - U.K. - 1.8

Total Fertility Rate (TFR)

- Calculation

$$TFR = Age\ group\ gap\ X \frac{\sum(ASFR)}{1,000}$$

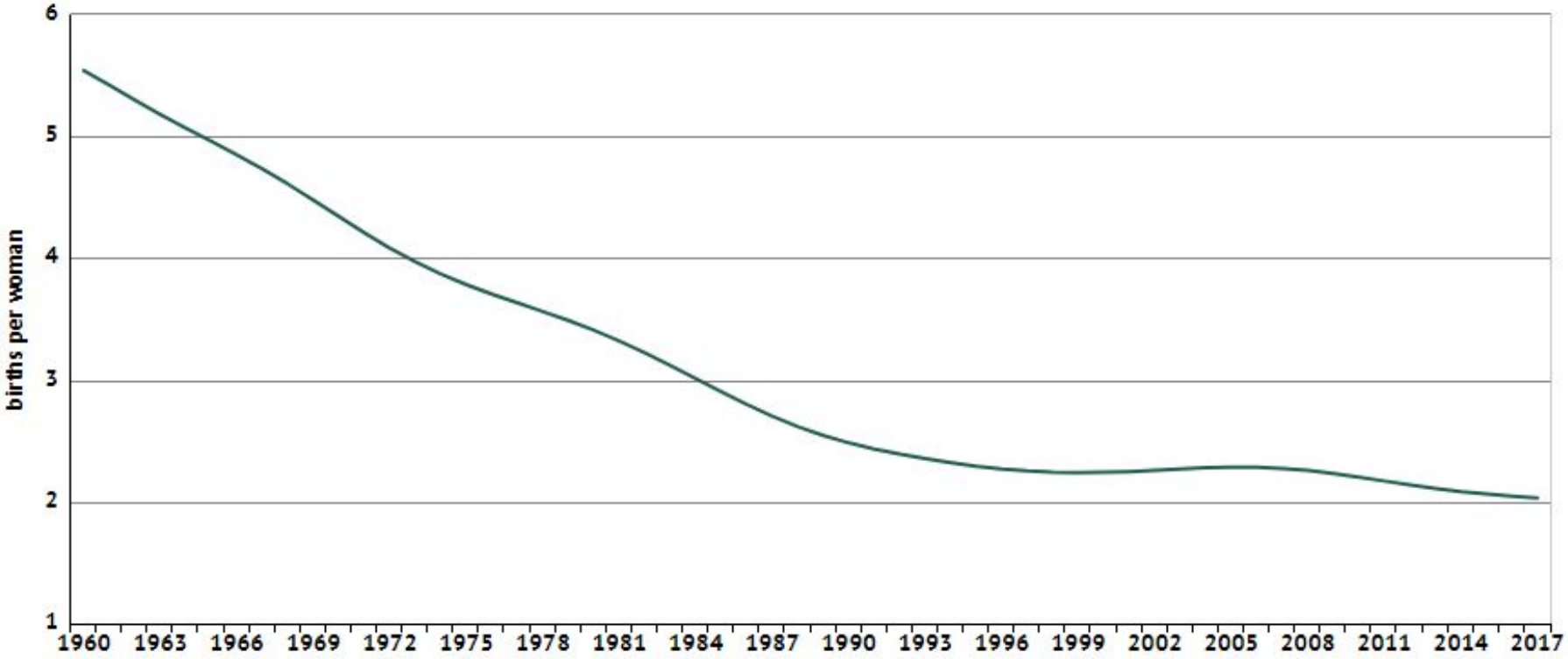
- For 5 year Age groups

$$TFR = 5\ X \frac{(ASFR_{15-19\ years} + ASFR_{20-24\ years} + \cdots + ASFR_{45-49\ years})}{1,000}$$

Total Fertility Rate (TFR) -Sri Lanka

Calculate TFR using ASFRs given ???

Total Fertility Rate (TFR) -Sri Lanka

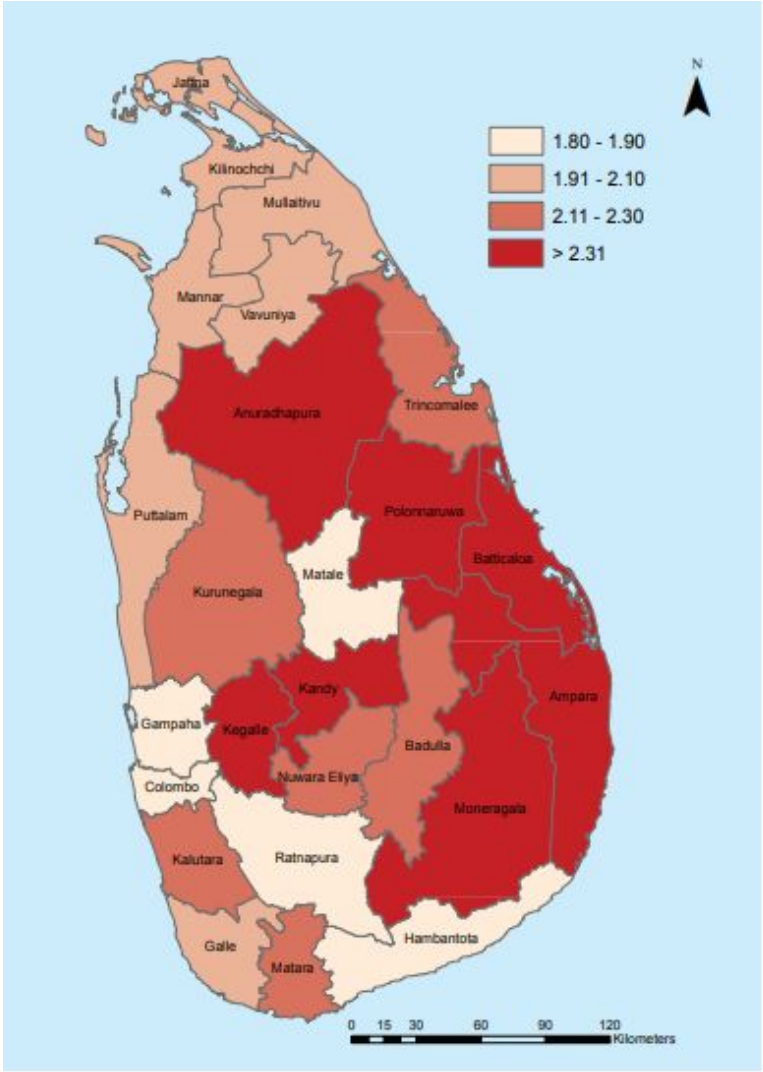


https://knoema.com/atlas/Sri-Lanka/Fertility-rate

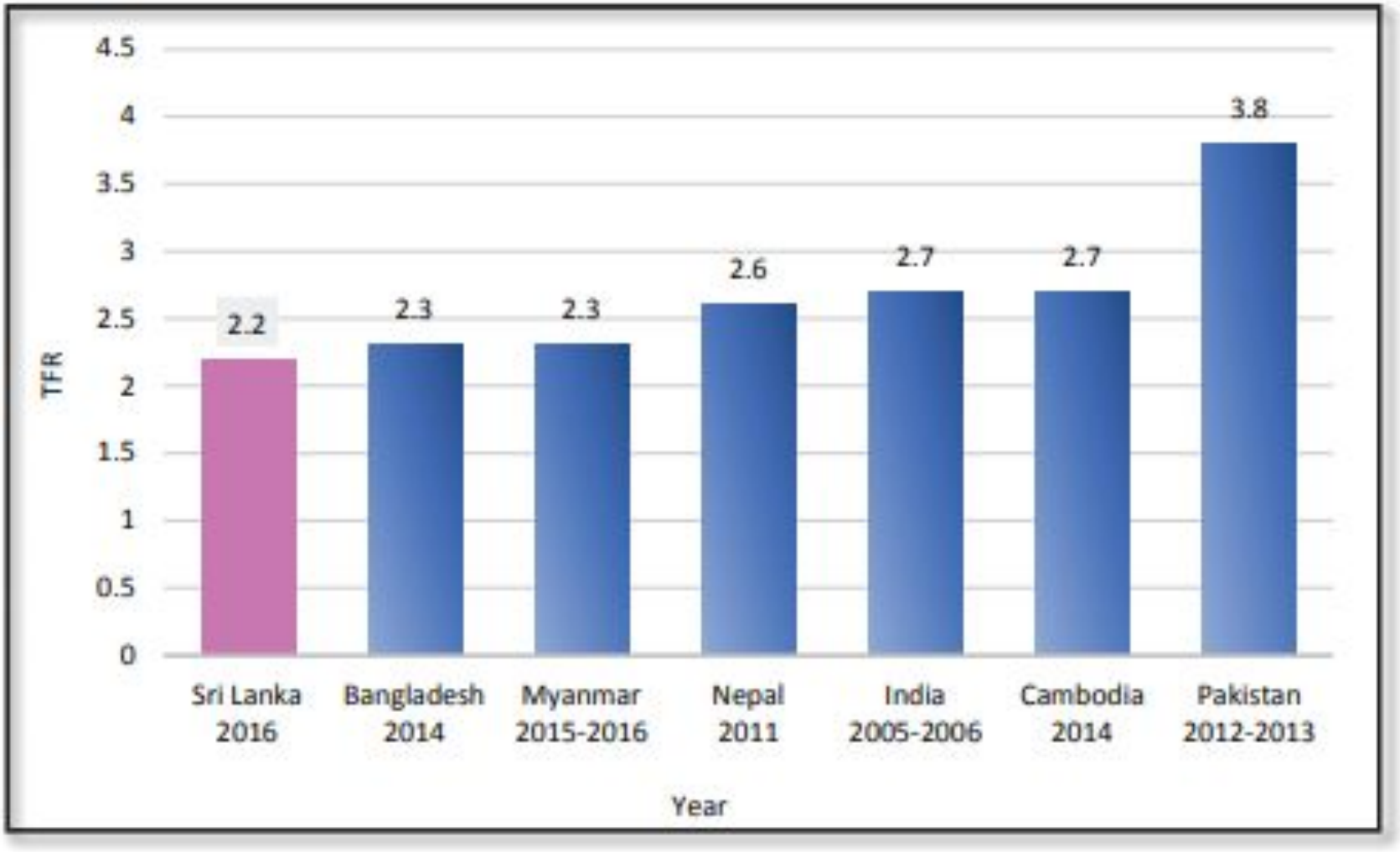
Total Fertility Rate (TFR) -Sri Lanka

DHS -2016

District wise TFR

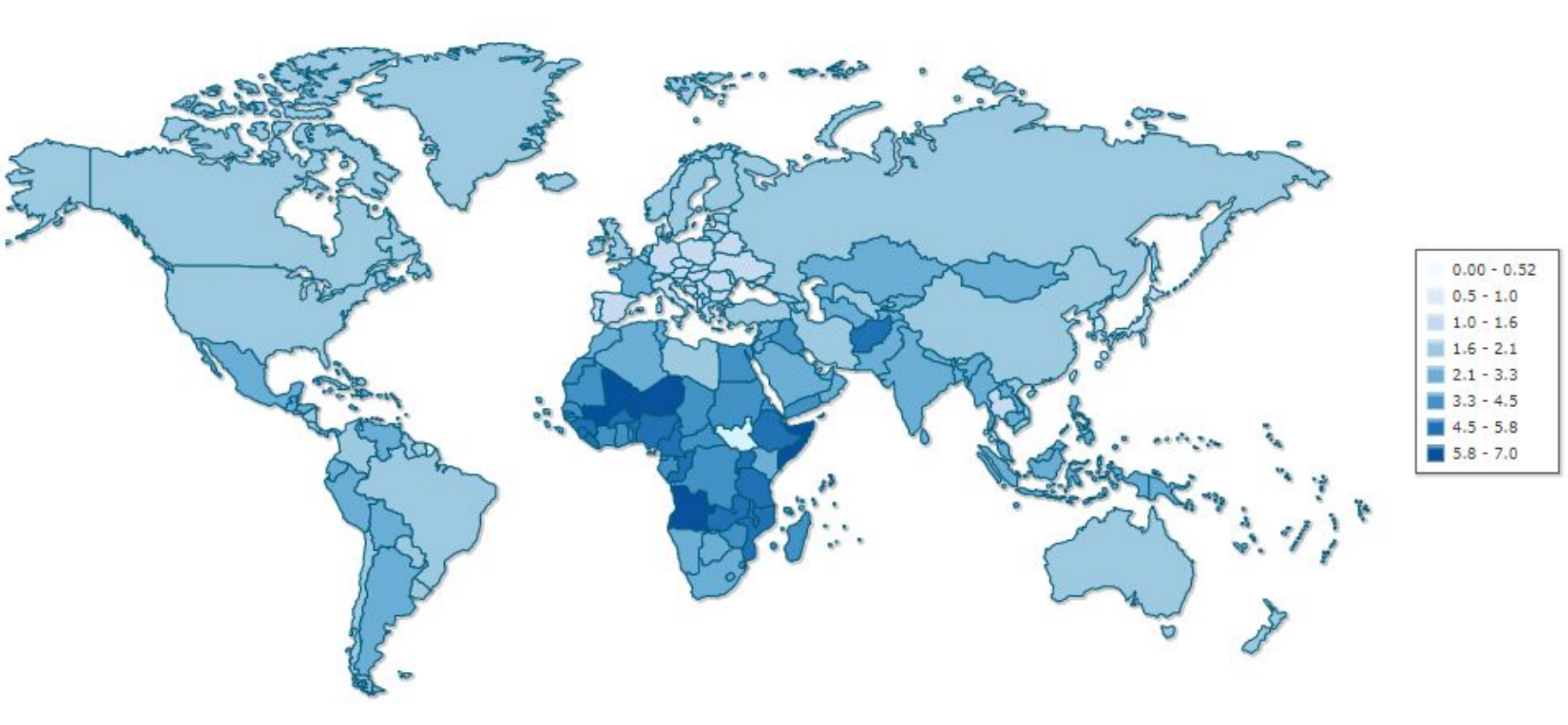


Total Fertility Rate (TFR) -South Asia



DHS -2016

Total Fertility Rate (TFR) - World



www.indexmundi.com/map/?t=0&v=31&r=xx&l=en

Gross Reproduction Rate (GRR)

- Number of female children born to a female if she experiences the current fertility pattern throughout her reproductive span assuming no mortality
- Measure of population replacement
- Limitation: It does not consider the mortality
- of the cohort of women.

$$GRR = TFR \times \frac{Number\ of\ female\ births}{Total\ number\ of\ births}$$

Net Reproduction Rate (NRR)

- Number of female children born to a female assuming current fertility and mortality
- NRR is GRR adjusted for mortality schedule of cohort of women
- Number of daughter that would be born to a cohort of women during their lifetime if they experience a fixed scheduled of ASFR and ASMR

$$NRR = GRR \times \frac{Mean\ cohort\ size\ of\ female\ of\ child\ bearing\ age}{Intial\ Cohort\ size\ \ of\ female\ of\ child\ bearing\ age}$$

Replacement Level Fertility

- Level of fertility at which a population exactly replaces itself from one generation to the next
  - Women replace with their offspring
  - This is the level of fertility that gives NRR=1.
  - Generally takes the value, the total fertility rate of level 2.1 children per women in a population.
  - It is the precondition for population stabilization (process to achieve zero growth of population)

References

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- Demographic and Health Survey -2016
- www.health.gov.lk
- World bank Data from https://data.worldbank.org/indicator/sp.dyn.cdrt.in
- World Map indicators from https://www.indexmundi.com/map/?v=29
- Graphs - https://knoema.com/atlas/Sri-Lanka

Thank you