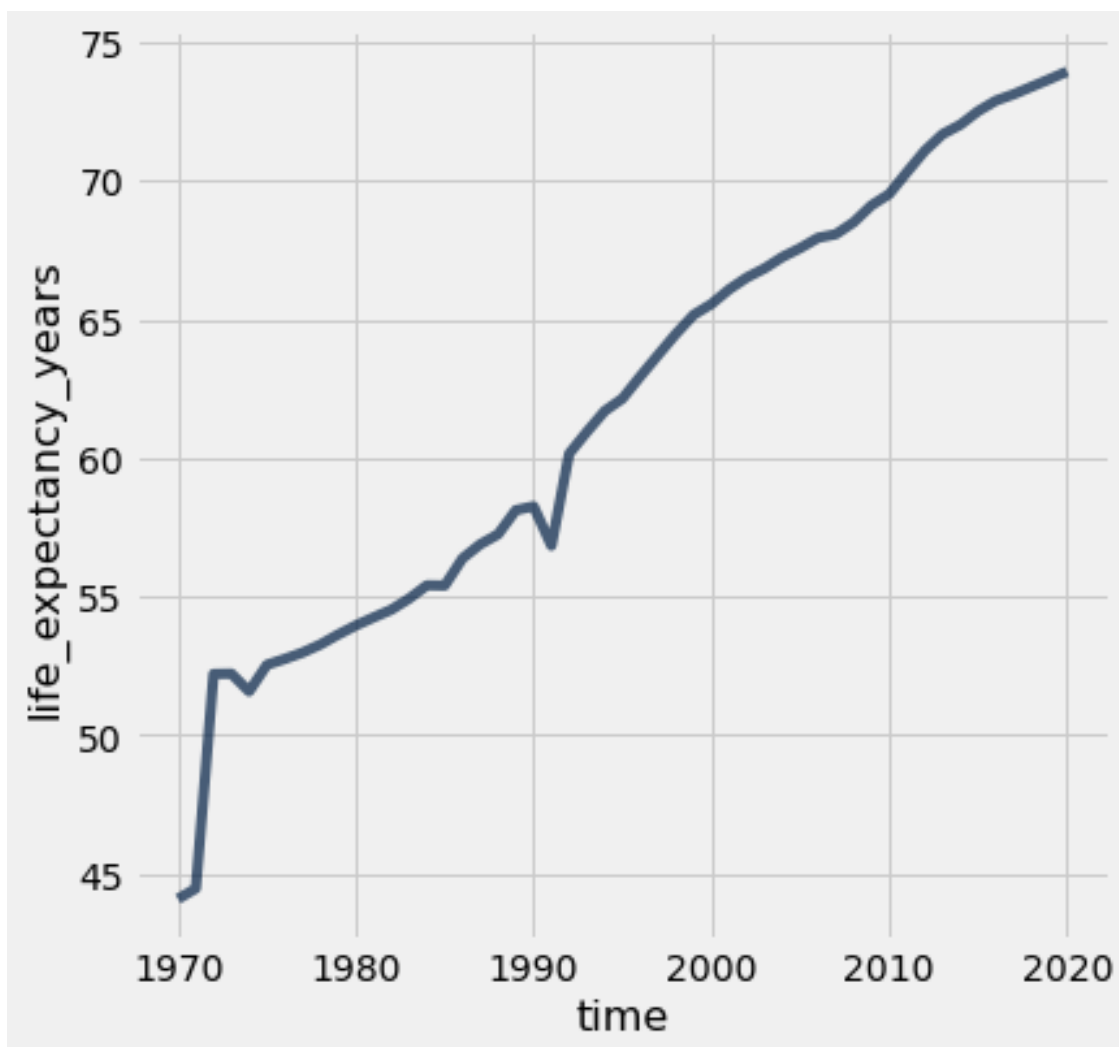**Question 3.** Perhaps population is growing more slowly because people aren't living as long. Use the `life_expectancy` table to draw a line graph with the years 1970 and later on the horizontal axis that shows how the *life expectancy at birth* has changed in Bangladesh.

```
In [20]: #Fill in code here
         life_expectancy.where("geo", are.equal_to("bgd")).where("time", are.above(1969)).plot("time",
```

**Question 4.** Assuming everything else stays the same, do the trends in life expectancy in the graph above directly explain why the population growth rate decreased from 1985 to 2015 in Bangladesh? Why or why not?

Hint: What happened in Bangladesh in 1991, and does that event explain the overall change in population growth rate? This webpage provides relevant context.

*Type your answer here, replacing this text.*

**SOLUTION:** This graph indicates that people are living longer, which would increase population growth if everything else stayed the same. The tragic cyclone in 1991 certainly affected population size, but life expectancy continued to increase shortly afterward, so it does not explain the 30-year trend in population growth rate decline.

**Question 6.** Assuming everything else is constant, do the trends in fertility in the graph above help directly explain why the population growth rate decreased from 1980 to 2020 in Bangladesh? Why or why not?

*Type your answer here, replacing this text.*

**SOLUTION:** Yes, a declining fertility rate shows that fewer babies are being born each year, which directly explains decreasing population growth.

**Question 8.** In one or two sentences, describe the association (if any) that is illustrated by this scatter diagram. Does the diagram show that reduced child mortality *causes* parents to choose to have fewer children?

*Type your answer here, replacing this text.*

**SOLUTION:** We can observe a very strong linear association between fertility rate and child mortality rate. It is strong because the points fall so near to a line drawn through the diagram. However, this association does not tell us whether one of these changes caused a change in the other.

**Question 10.** Draw a line plot of the world population from 1800 through 2020 (inclusive of both endpoints). The world population is the sum of all of the countries' populations. You should use the `population` table defined earlier in the project.

```
In [43]: #Fill in code here
         population.where('time', are.between(1800, 2021)).drop('geo').group('time', sum).plot('time',
```
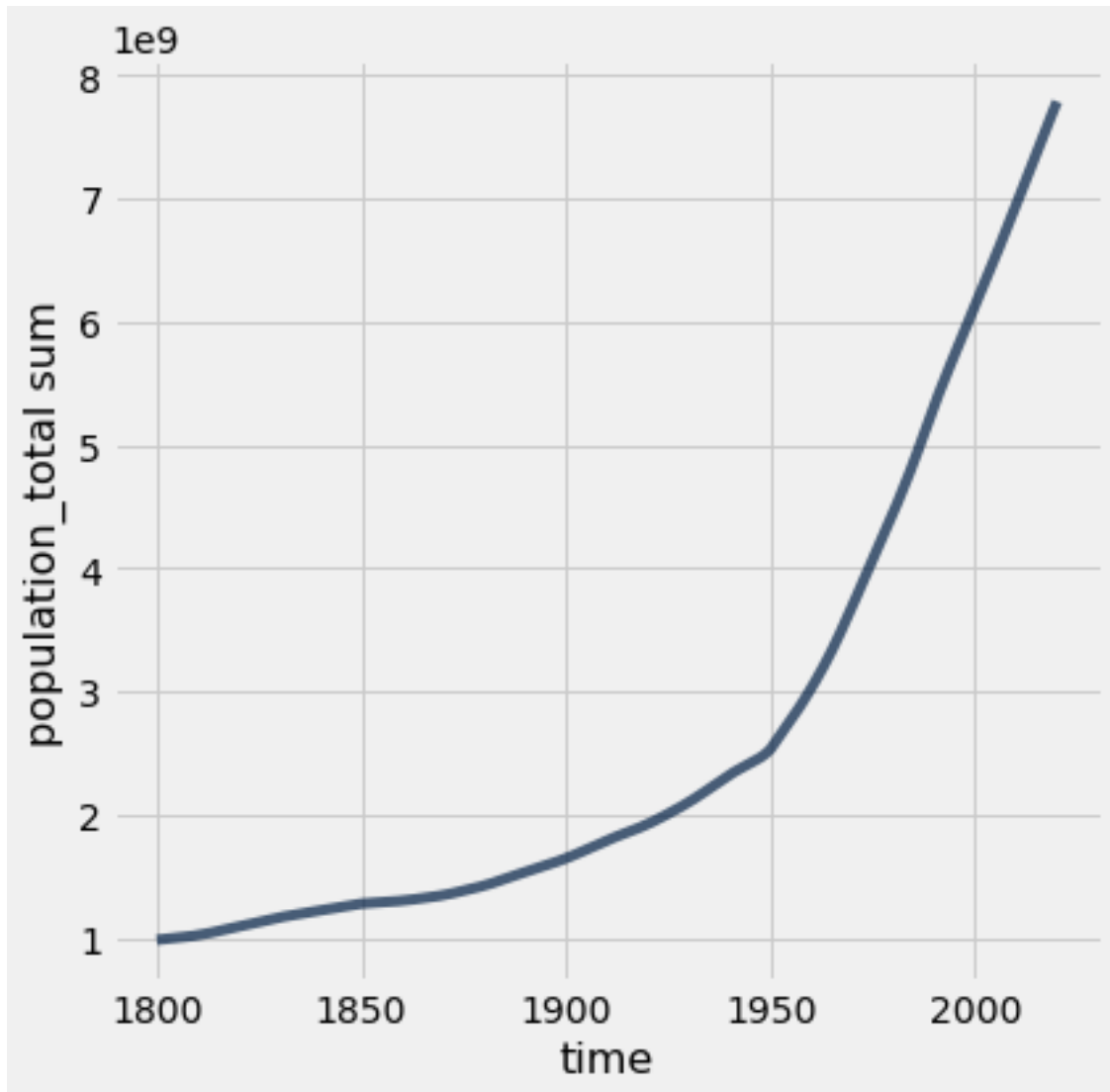
**Question 6.** It is important to study the absolute number of people living in poverty, not just the percent. The absolute number is an important factor in determining the amount of resources needed to support people living in poverty. In the next two questions you will explore this.

In Question 7, you will be asked to write a function called `poverty_timeline` that takes **the name of a country** as its argument (not the Alpha-3 country code). It should draw a line plot of the number of people living in poverty in that country with time on the horizontal axis. The line plot should have a point for each row in the `poverty` table for that country. To compute the population living in poverty from a poverty percentage, multiply by the population of the country **in that year**.

For this question, write out a generalized process for Question 7. What should this function output, and what steps will you take within the function?

*Type your answer here, replacing this text.*

**SOLUTION**: The function should output a line plot of people living in extreme poverty in a country. To generate the line plot, we first filter the `countries` table to find the country code of the country we passed into our function. Then, we filter the `poverty` and `population` tables to only contain the rows with our desired country code, and then drop the `geo` columns from each table. Next, we join `poverty` and `population`. Then, we perform array operations to multiply the population with the percent of the population living in extreme poverty to get the number of people living in extreme poverty. Finally, we can add a column to our joined table that contains the number of people in poverty, which will allow us to create a plot.

Finally, draw the line plots below to see how the world is changing. Pay attention to the axes! You can check your work by comparing your graphs to the ones on gapminder.org.

```
In [100]: poverty_timeline('India')
          poverty_timeline('Nigeria')
          poverty_timeline('China')
          poverty_timeline('Colombia')
          poverty_timeline('United States')
```

Nigeria

China

Colombia

United States

Number in Poverty vs time