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# Scenarios for the demographic future of the BRICS+ countries

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# Materials & Methods

## Primary data:

UN Population Division

## Forecasting method:

Reference cohort-component model (female-based):

1. Calculating the number of live births
2. Calculating the number of survivors to the next age
3. Process repetition

**Migration** is assumed to be static

**Fertility and mortality** are brought to a reference level by a logistic function

Calculation by **one-year groups**

Forecast **step is 1 year (2021-2100)**

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# Materials & Methods

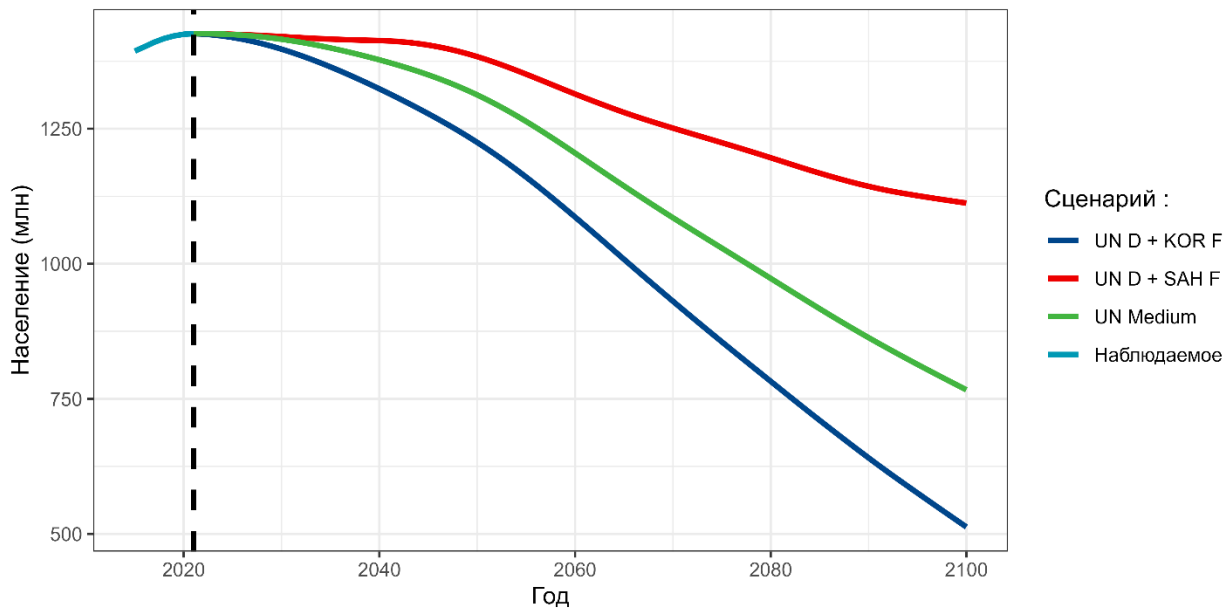
1. Calculating the number of survivors to the next age ( $x$ ) for males ( $M$ ) and females ( $F$ ):

$$P_x^M(t+1) = \left[ P_{x-1}^M(t) + \frac{I_{x-1}^M(t, t+1)}{2} \right] * \frac{L_x^M(t)}{L_{x-1}^M(t)} + \frac{I_{x-1}^M(t, t+1)}{2}$$

2. Calculating the number of live births for males and females:

$$P_0^M(t+1) = \sum_{x=15}^{49} \left[ F_x * \frac{P_x^F(t) + P_x^F(t+1)}{2} \right] * \frac{105}{205} * \frac{L_0^M(t)}{l_0^M(t)}$$

# China



Сценарий :

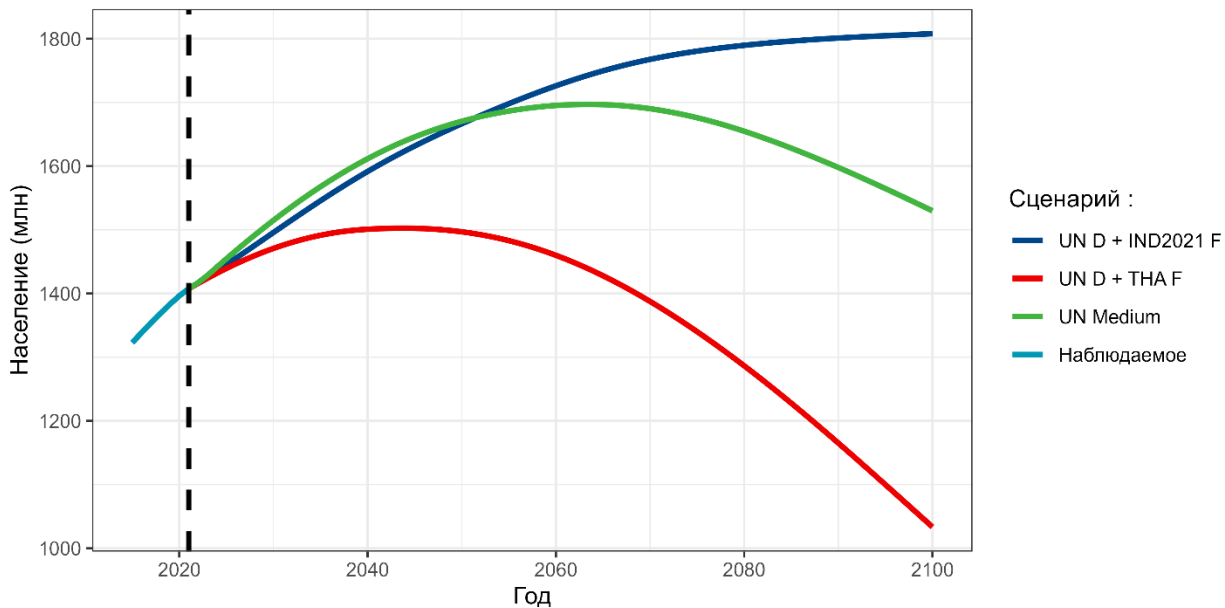
- UN D + KOR F
- UN D + SAH F
- UN Medium
- Наблюдаемое

"UN D + KOR F" – TFR by 2035 at South Korea 2021 level (from 1.16 to 0.88), UN death rate (510 million)

"UN D + SAH F" - TFR by 2035 at Sakhalin level (from 1.16 to 1.94), UN death rate (1125 million)

**Gap** = 615 mln

# India



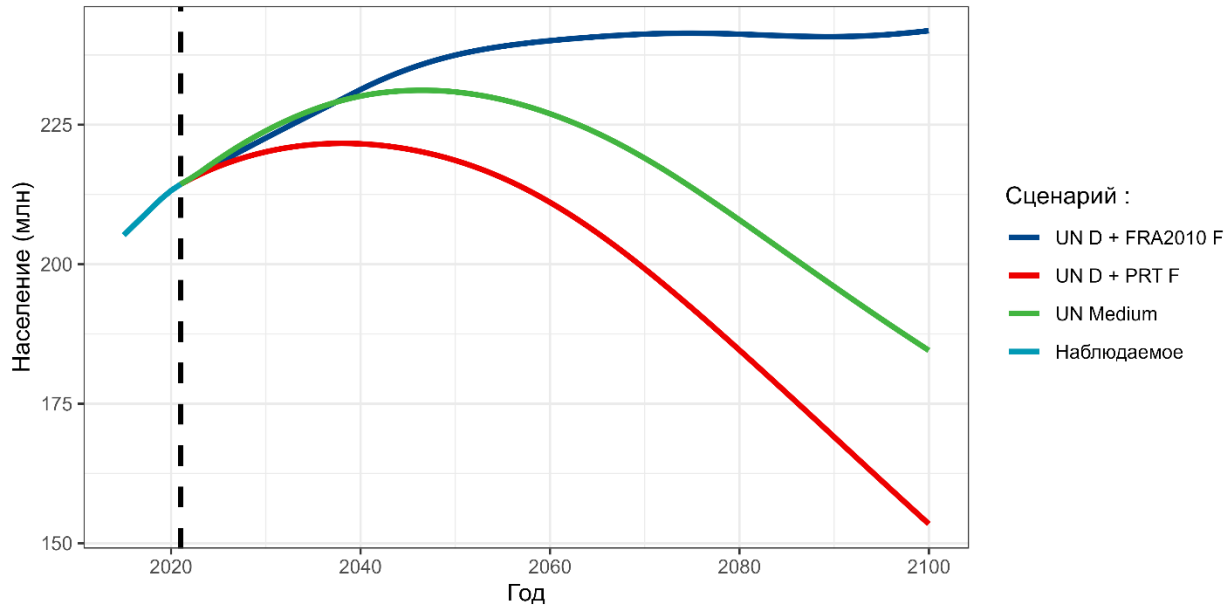
Сценарий :  
— UN D + IND2021 F  
— UN D + THA F  
— UN Medium  
— Наблюдаемое

"UN D + IND2021 F" – constant TFR (2.03), UN death rate (1800 million)

"UN D + THA F" - TFR by 2040 at Thailand level (from 2.03 to 1.33), UN death rate (1050 million)

**Gap** = 750 mln

# Brazil

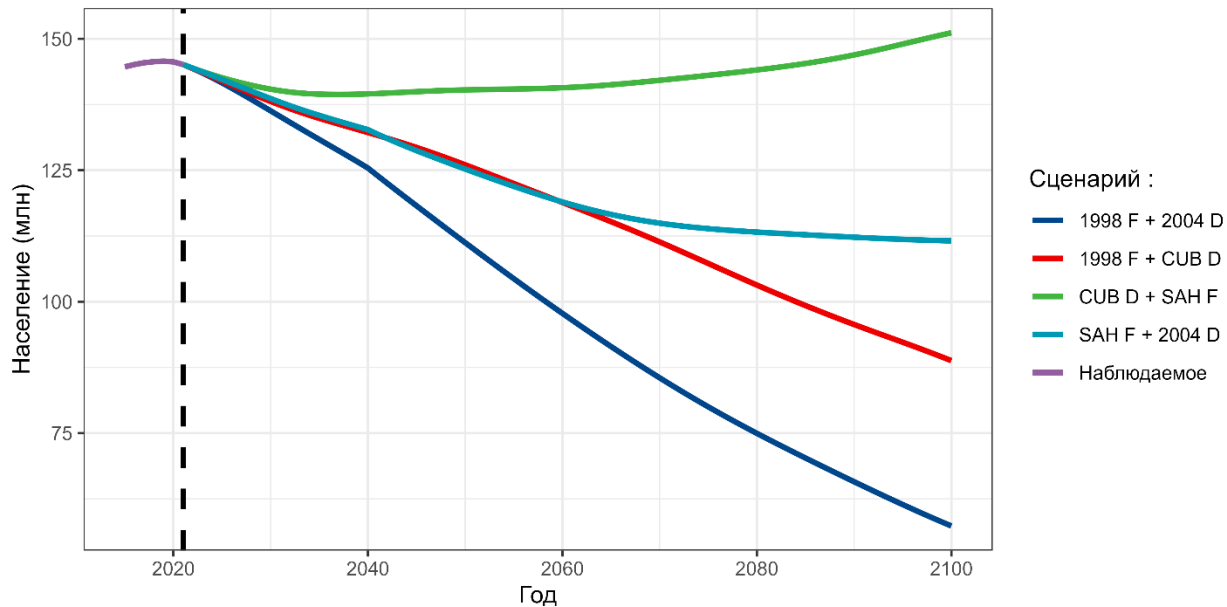


"UN D + FRA2010 F" – TFR by 2035 at France level (from 1.63 to 2.02), UN death rate (240 million)

"UN D + PRT F" - TFR by 2035 at Portugal level (from 1.63 to 1.36), UN death rate (157 million)

**Gap** = 80 mln

# Russia

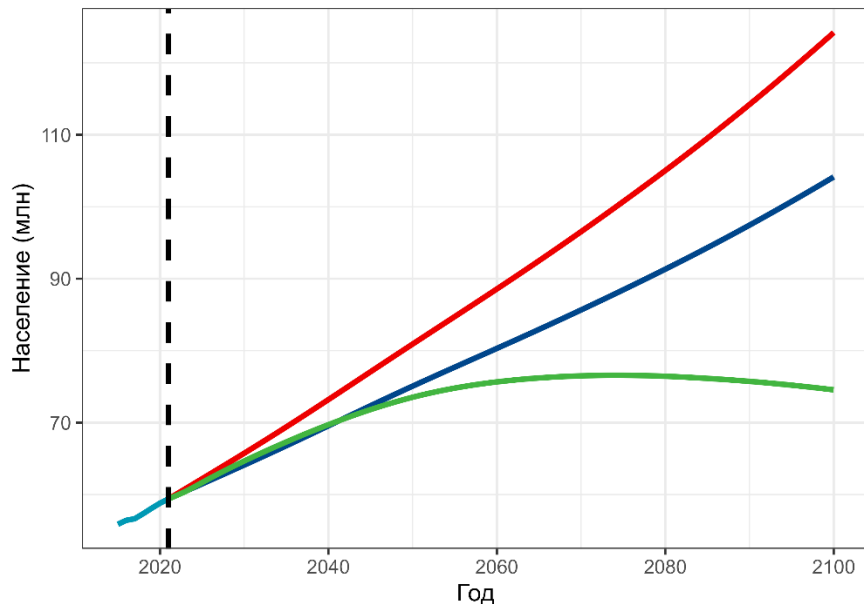


"1998 F + 2004 D" - TFR at 1998 level by 2030 (from 1.49 to 1.24), mortality at 2004 level by 2040 (56 million)

"SAH F + CUB D" – TFR at Sakhalin level by 2030 (from 1.49 to 1.94), death rate declines at Cuban rate (150 million)

**Gap** = 104 million

# South Africa



Сценарий :

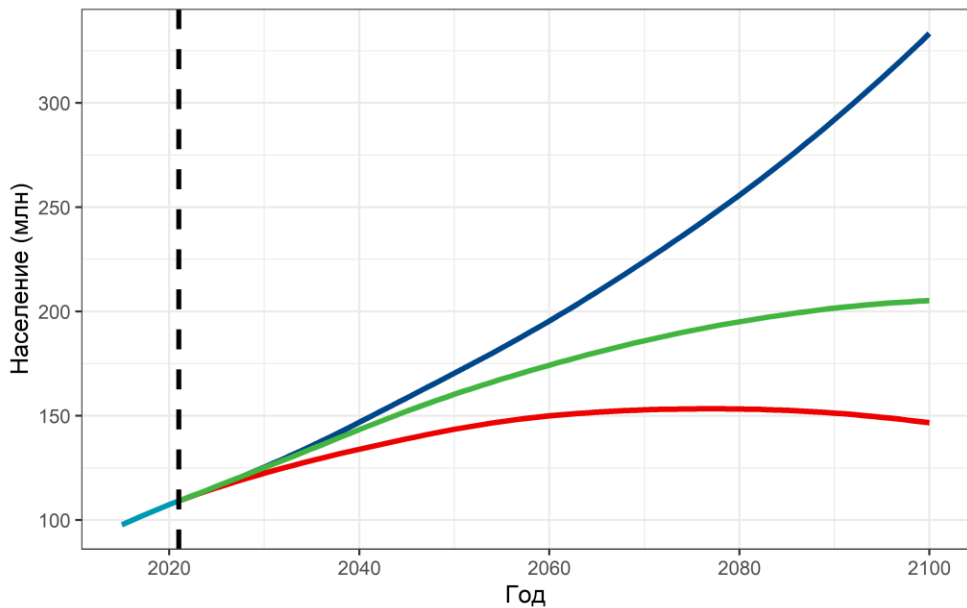
- UN D + ZAF2021 F
- UN D + ZAF2021 F + migration
- UN Medium
- Наблюдаемое

“UN D + ZAF2021 F” – constant TFR (2.36), UN mortality (105 million)

“UN D + ZAF2021 F + migration” – constant TFR (2.36), UN mortality, high immigration (125 million)

**Gap** = 20 million

# Egypt



Сценарий :

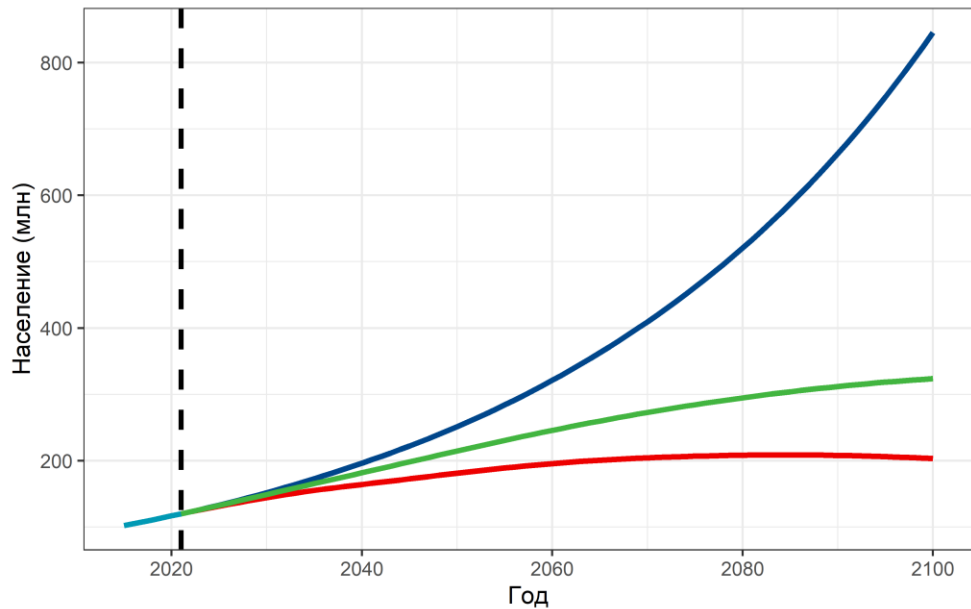
- UN D + Constant F
- UN D + IRN2010 F
- UN Medium
- Наблюдаемое

“UN D + constant F” – constant TFR (2.91), UN mortality (330 million)

“UN D + IRN2010 F + migration” – TFR at Iran level by 2040 (from 2.91 to 1.73), UN mortality (150 million)

**Gap** = 180 million

# Ethiopia



Сценарий :

— UN D + Constant F

— UN D + IRN2010 F

— UN Medium

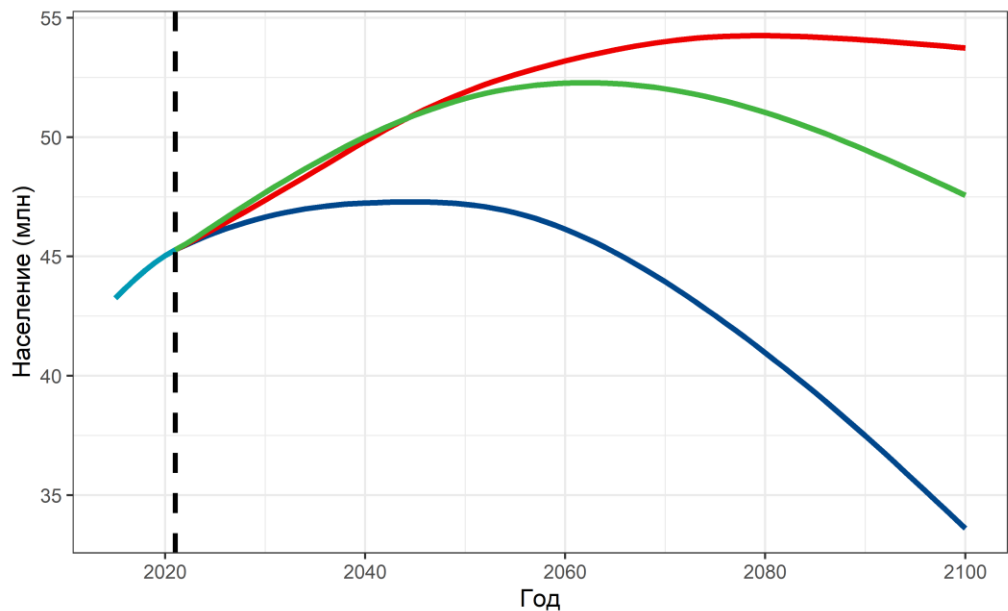
— Наблюдаемое

“UN D + constant F” – constant TFR (4.14), UN mortality (850 million)

“UN D + IRN2010 F + migration” – TFR at Iran level by 2040 (from 4.14 to 1.73), UN mortality (200 million)

**Gap** = 650 million

# Argentina



Сценарий :

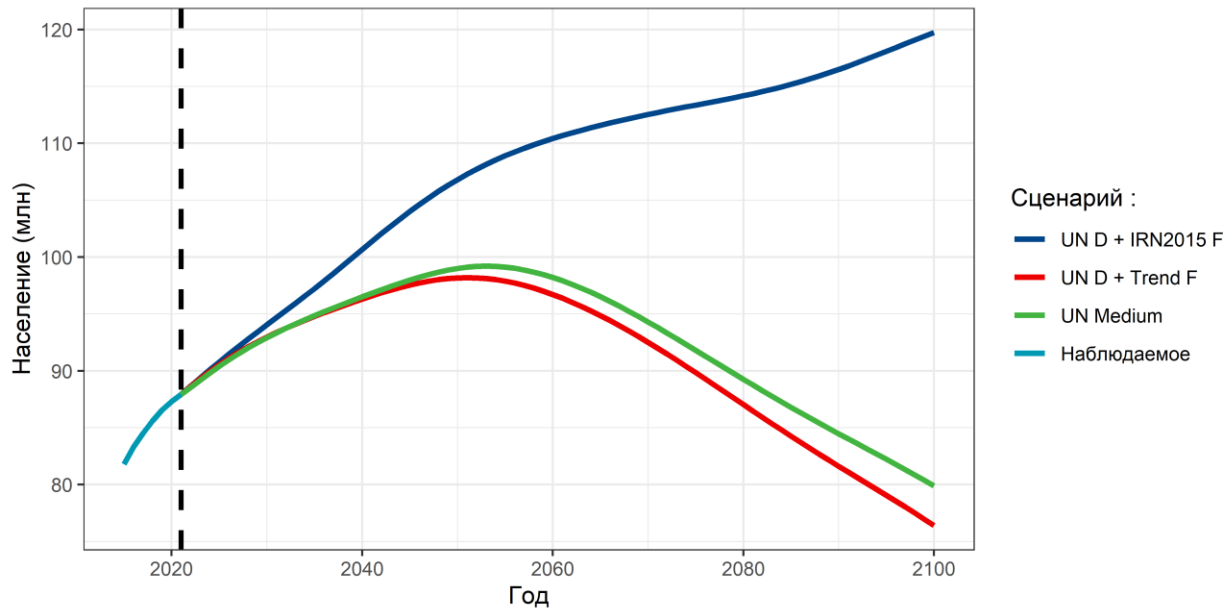
- UN D + ESP F
- UN D + SAH F
- UN Medium
- Наблюдаемое

“UN D + ESP F” – TFR at Spain level by 2040 (from 1.88 to 1.28), UN mortality (54 million)

“UN D + SAH F + migration” – TFR at Sakhalin level by 2040 (from 1.88 to 1.94), UN mortality (34 million)

**Gap** = 20 million

# Iran



“UN D + IRN2015 F” – TFR at 2015 level by 2040 (from 1.68 to 2.01), UN mortality (120 million)

“UN D + SAH F + migration” – TFR trend (from 1.68 to 1.39), UN mortality (76 million)

**Gap** = 44 million

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## Conclusion

In all countries excluding Egypt, Ethiopia, and South Africa, there is **a critical issue regarding fertility support** (which will become relevant in India by mid-century)

In Russia, **excess mortality** resulting from alcohol and tobacco is a significant factor

South Africa's potential for growth may be boosted by **increased migration**

China should prioritize maximum efforts **towards fertility support and immigration stimulation**

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