Richard Nelson's model

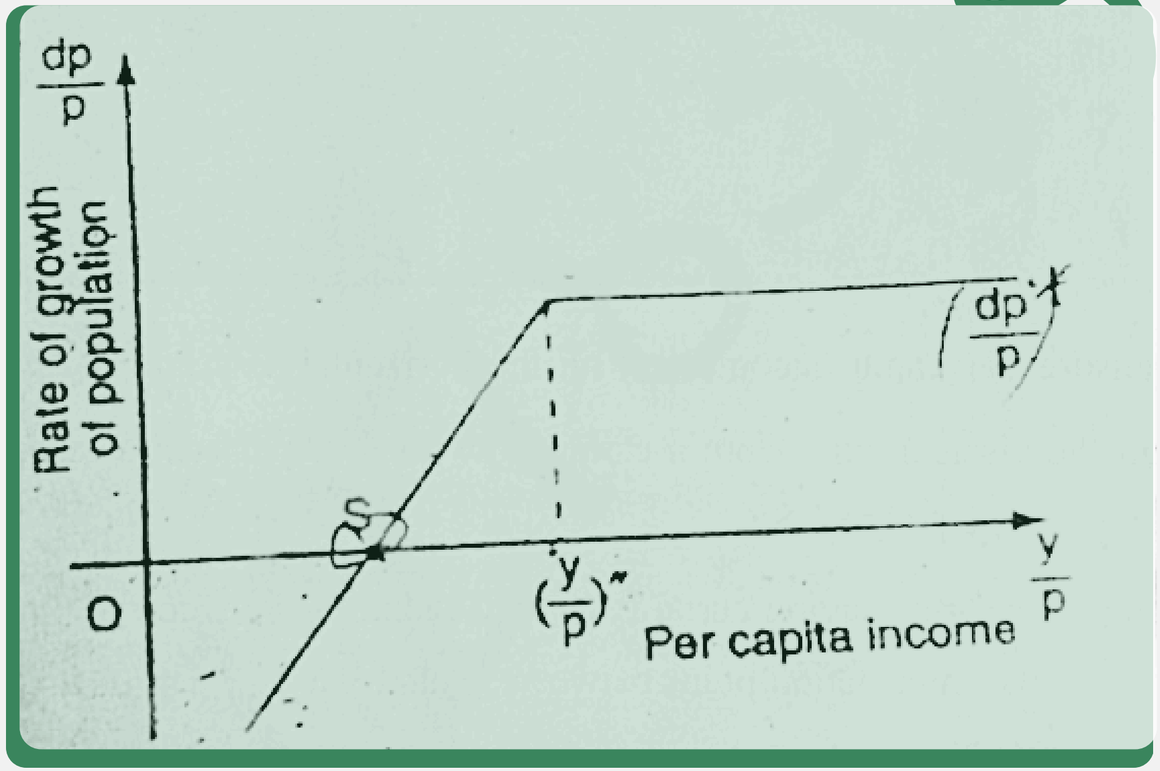
Richard Nelson's model explains why underdeveloped economies struggle to break free from poverty.

Core idea:
Per capita income is a measure of development.

Per capita income =
National Income / Population

- If income grows faster than population → per capita income rises.
- If the population grows faster → per capita income falls.

The model shows how certain levels of income and population growth trap economies in low development.



Introduction to the Low-Level Equilibrium Trap

Defination

A low-level equilibrium trap is a situation where an economy is stuck in a state of low income, low savings, and low investment, making it difficult to break into sustained economic growth.

Main Idea:

The population grows faster than income, so per capita income stays low, which in turn limits savings and investment, resulting in stagnant development.

$$Y = R(K, P)$$

Where,
Y = Total income/output
K = Capital
P = Population
R = Production function dependent on K and P

Per capita income depends on per capita capital (K/P).

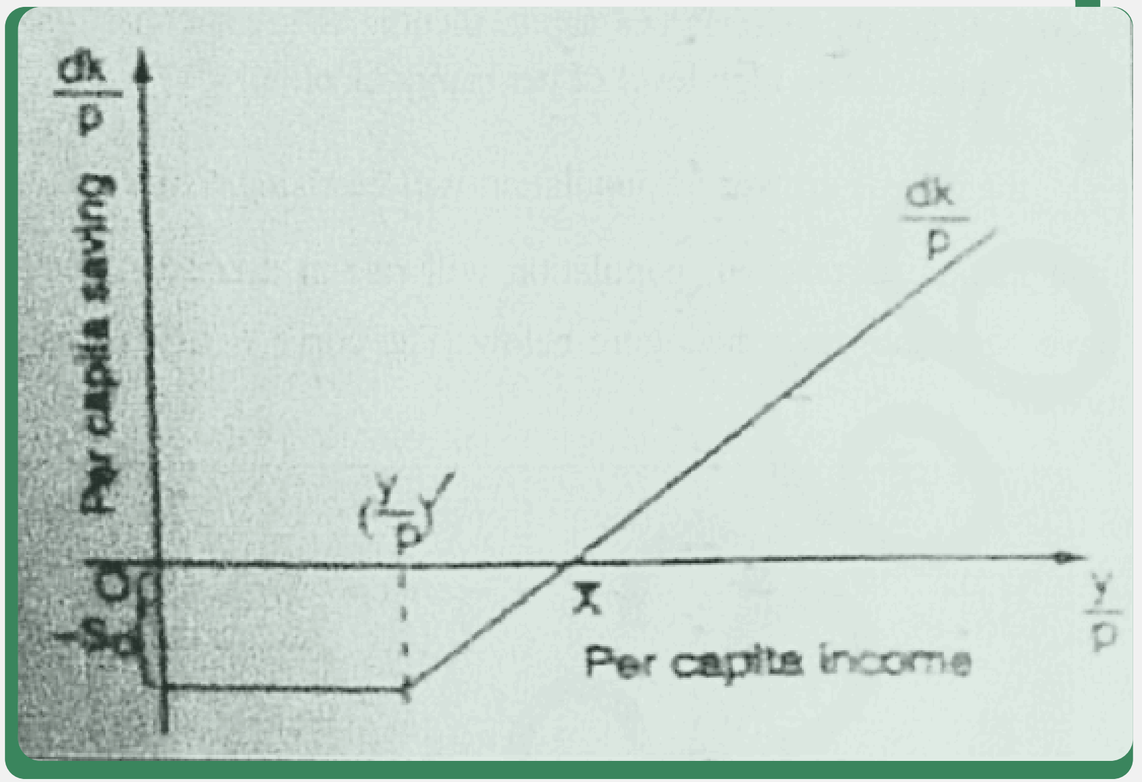
Per Capita Saving & Investment Relationship

Output Function:
Y = F(K, P) (Capital & Population)
Savings = Investment = dK

Per capita saving (dK/P) depends on per capita income (Y/P).

Equation:

- **If Y/P > (Y/P)' → dK/P = b[Y/P – X] (savings increase)**
- **If Y/P ≤ (Y/P)' → dK/P = -S_0 (dissaving occurs)**



X = Zero-saving income level.

As Y/P increases past a point, per capita saving starts to rise

Population Growth vs Per Capita Income

Population growth rate (dP/P) also depends on Y/P:

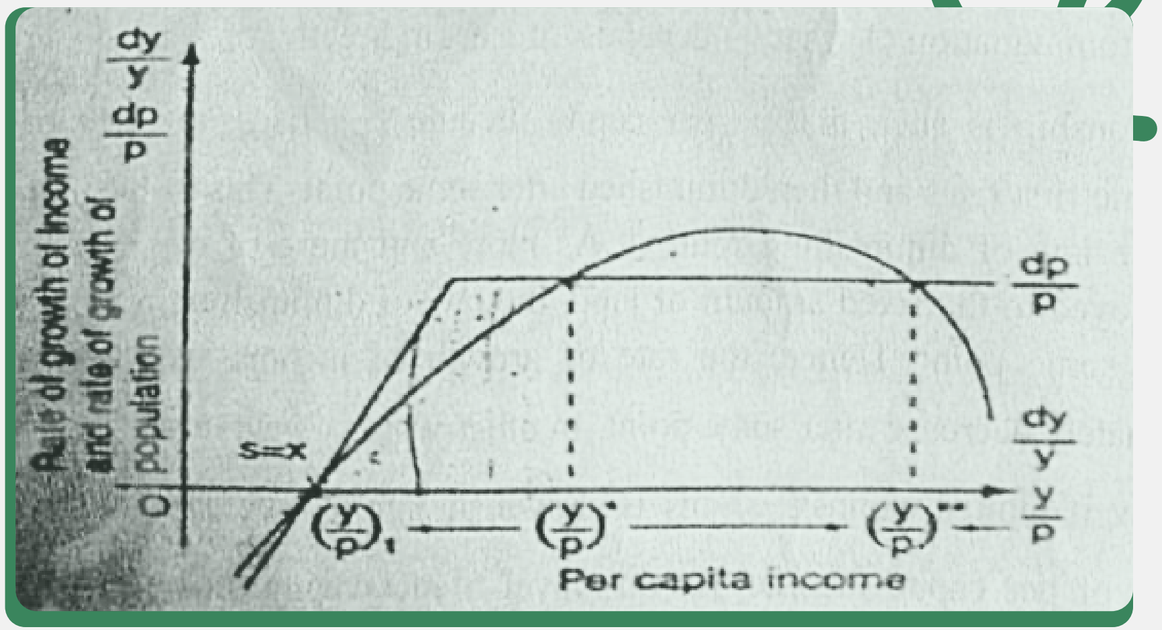
If Y/P < S (subsistence level) → population falls.

If S < Y/P < (Y/P)″ → population rises.

If Y/P ≥ (Y/P)″ → population grows at max rate.

Equation:

- **dP/P = p[Y/P – S] when Y/P < (Y/P)″**
- **dP/P = (dP/P)′ when Y/P ≥ (Y/P)″**



Trap Equilibrium and How it Works

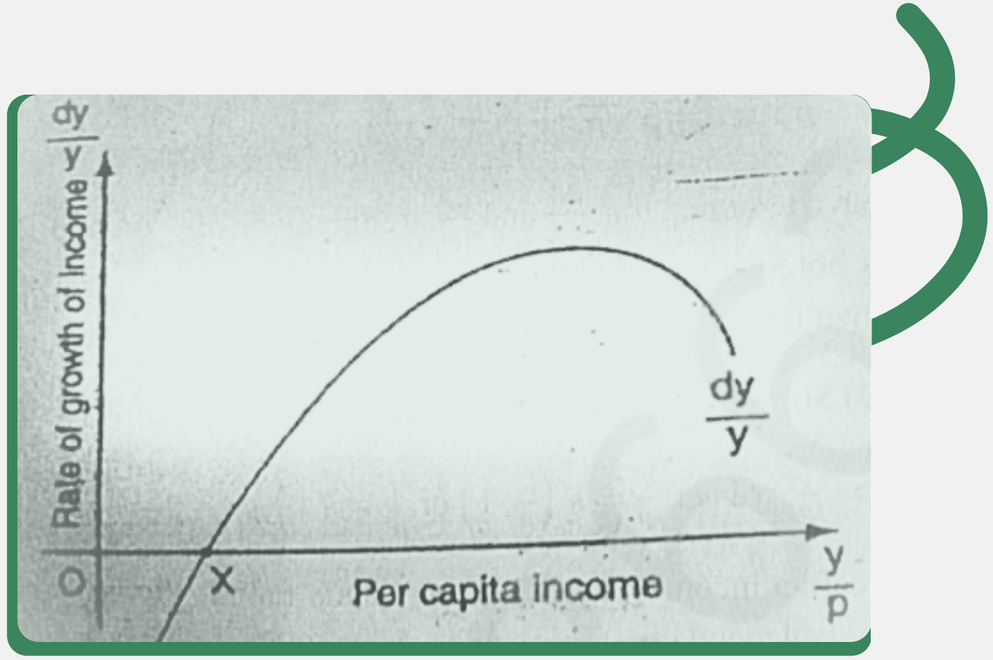


Fig. 3 Plotting dY/Y and dP/P together shows interaction.

- If an economy starts at $(Y/P)_1$, small increases fall back.
- Only large jumps beyond (Y/P)* allow escape to growth.

Equilibrium points

01. $(Y/P)_1 \rightarrow$ Low-Level Equilibrium (Stable)

02. (Y/P)* → Unstable Equilibrium

03. (Y/P)** → High-Level Equilibrium (Stable)

Strength of Trap = Distance between $(Y/P)_1$ and (Y/P)*.

Breaking the Trap & Model's Limitation

Ways to Escape the Trap:

- Technical progress (shifts dY/Y upward)
- Lower birth rate (shifts dP/P downward)
- Foreign capital/investment
- Emigration of labor
- Strong social institutions & favorable policies

Limitations of Nelson's Model:

- Ignores demand-side factors
- Static model – time not considered
- Assumes saving = investment
- Population growth is treated as fully endogenous
- Oversimplifies the reasons for underdevelopment

Conclusion:

Despite limitations, Nelson's model helps understand how overpopulation hampers development in poor economies.

Thank you very much!