

Handout #1

Concepts of Development: criteria and indicators

Development is a controversial and multidimensional concept.

I. The UN Millennium Development Goals

Set by the UN in 2000 for 2015. Indicators + goals = yardsticks to measure development progress.

Goal 1: Eradicate extreme poverty and hunger: Halve between 1990 and 2015 the proportion of people whose income is less than 1\$/day.

Goal 2: Achieve universal primary education.

Goal 3: Promote gender equality and empowerment: Eliminate gender disparity in primary and secondary education.

Goal 4: Reduce child mortality: Reduce by 2/3 the under-five mortality rate in 1990-2015.

Goal 5: Improve maternal health: Reduce by 3/4 the maternal mortality ratio in 1990-2015.

Goal 6: Combat HIV/AIDS, malaria, and other diseases: Have halted by 2015 and begun to reverse the spread of HIV/AIDS.

Goal 7: Ensure environmental sustainability: Integrate the principles of sustainable development into policies and programs; halve the proportion of people without sustainable access to safe drinking water; achieve by 2020 a significant improvement in the lives of at least 100 million slum dwellers.

Goal 8 (mean): Develop a global partnership for development: Open trading and financial system; increase foreign aid; reduce debt.

Progress toward the MDG by region: UNDP, *Human Development Report 2003*.

II. The dimensions of development

While there is no single definition, development can be characterized by the following seven categories of indicators.

1. Income and income growth

GNP = GDP + Net factor income from abroad. Better to measure income than GDP.
GNI = GNP – depreciation – indirect business taxes. Best to measure income earned.

1.1. Comparisons over time: need adjust for inflation

Real GDP in prices of base year = (Nominal GDP)/(Price index = 1 in base year)
Real GDP growth = Nominal GDP growth – Rate of inflation

1.2. Change over time: compounded growth rate formulas

If an initial value X_0 is compounded at the annual growth rate g for T years, the terminal value is:
 $X_T = X_0(1+g)^T$. Alternatively, the growth rate that has transformed X_0 into X_T over T years of compounded growth is: $g = (X_T/X_0)^{1/T} - 1$. Taking logarithms, a useful approximation to the growth formula is: $\ln X_T = \ln X_0 + T \ln(1+g) \sim \ln X_0 + Tg$. This allows to solve for T , the time needed to get out of poverty, for a given initial level of income y_0 , a given poverty line z , and a given growth rate in income: $T = \frac{\ln z - \ln y_0}{g}$.

1.3. Comparisons across countries: need bring to single currency

1.3.1. At official exchange rate: $GDP^{\$} = \frac{1}{e} GDP^{Pesos}$, $e = Pesos / \$$ exchange rate

Hence, devaluation lowers $GDP^{\$}$ for a given GDP^{Pesos} . Overvaluation exaggerates $GDP^{\$}$.

1.3.2. At Purchasing Power Parity adjusted exchange rate (PPPe):

$$PPP GDP^{\$} = \frac{1}{PPPe} GDP^{Pesos}$$

where PPPe is the number of Pesos required to buy the same amount of goods and services (quality adjusted) as 1 US\$ in the U.S.

In low income countries, $PPP GDP^{\$} > GDP^{\$}$ (e.g., India, 1999: \$2149 vs. 450)

In the US, $PPP GDP^{\$} = GDP^{\$}$, by construction (\$30,600)

In high income countries (Japan, Germany), $PPP GDP^{\$} < GDP^{\$}$ (Japan: \$24,041 vs. \$32,230)

1.4. Genuine Progress Indicator (GPI): Green and social national accounting

GPI = GDP + Value of unpaid work – Costs of crime and social breakdown – Cost of ecological damage.

U.S.: GPI < GDP.

2. Poverty

Measured as percentage of people with income below a poverty line (headcount ratio) = P_0 (we will see other indicators later in the course)

World poverty: 2.8 billion < 2\$/day = 47% of humanity

World destitution: 1.2 billion < 1\$/day = 20% of humanity

$$P_0 = f(-\bar{y}, +\sigma_y), \bar{y} \text{ average income, } \sigma_y \text{ inequality in distribution of income.}$$

With zero growth of average income, falling inequality reduces poverty; rising inequality increases poverty. Growth of average income with constant inequality reduces poverty.

Growth of average income with falling inequality reduces poverty even more.

Growth of average income with rising inequality reduces poverty less than at constant inequality.

Growth of average income with sharply rising inequality may increase poverty (immiserizing growth).

Hence, growth is only useful to reduce poverty if not accompanied by too much increase in inequality.

The less increase in inequality, the higher the elasticity of poverty reduction with respect to average income growth.

Note: special focus on rural poverty as 75% of the world poor are rural.

Note: special focus on employment as labor is the main asset of the poor.

3. Inequality and inequality

Equality (ex-post): e.g., share of income held by bottom X% relative to share of income held by top X% (we will see other indicators later in the course); Gini coefficient (see later). E.g., share of poorest 40%/Share of richest 20% = India: 51%; Senegal : 19%; Brazil: 11%; U.S.: 34%; Japan: 42%

Equity (ex-ante): equality of opportunities

Sen: equity = distribution of capabilities (assets) and freedoms (power).

Note: different dimensions of inequality of opportunities: gender, age, ethnic, regional, rural/urban.

Why is equality a relevant criterion for development?

Aggregate rate of saving may rise with greater inequality (Keynes). But poor can save if they have access to financial instruments for saving.

Incentives may rise with inequality (incentive wages, rewards for taking risks)but also decline with inequality (sense of fairness, sabotage).

Cost of social control may fall with equality.

Cost of welfare programs may fall with equality.

Solidarity and cooperation may rise with equality.

Participatory development and democracy may rise with equality.

4. Vulnerability

Vulnerability = Probability of falling in poverty.
 E.g., food insecurity: Probability(Consumption < Minimum consumption requirement).
 If poor have lower average consumption relative to minimum needed, they are more exposed to disaster, and will have a higher level of risk aversion in their behavior, limiting their options.

Sources of risk:
 Natural disasters: drought, flooding, pests.
 Health: illness, accidents, epidemics.
 Social: crime, war.
 Economic: international prices, unemployment, inflation, recession.
 Political: policy change, discontinuation of social programs.
 Environmental: pollution.

Types of risks:
 Economy-wide
 Region-wide
 Idiosyncratic (easier to insure as not covariates)

Categories of poor:
 (Non-poor: on average above poverty line and never in poverty)
 Transient poor: on average above poverty line, but sometimes in poverty.
 Chronic poor: on average below poverty line, but sometimes out of poverty.
 Persistent poor: always in poverty.

Means of reducing vulnerability:
 Risk reduction: actions to reduce the probability of a shock (preventive health, investment in irrigation)
 Risk management (ex-ante): actions to decrease the impact of a shock on income (portfolio diversification, insurance, invest in liquid assets as opposed to fixed assets)
 Risk coping (ex-post): actions to relieve the impact of an income shock on consumption (sell assets, take loans, receive transfers and social assistance).

Risks of irreversibility: take children out of school, malnutrition and stunting, fire sales of assets (land), move to refugee camps, homelessness.
 Note: cost of globalization may be increasing vulnerability due to greater exposure to international price fluctuations (e.g., coffee prices).

5. Basic needs (human development)

Includes: health, education, nutrition, social infrastructure.
 Note: have a large public goods component as opposed to income poverty.

- Include:
- Health
 - Life expectancy at birth: males, females
 - Infant mortality rate
 - Maternal mortality rate, reproductive health
 - Access to health services
 - Access to safe water and sanitation
 - Education
 - Net enrollment ratio, primary
 - Net enrollment ratio, secondary
 - School attainment: completed years of education
 - Literacy rate
 - Nutrition
 - Prevalence of malnutrition and hunger: low birth weight; height and weight deficits.
 - Micronutrient deficiencies: Iron (anemia), iodine (mental impairment), Vitamin A (blindness)

Indicators:

- i) Health: z-scores
 - Stunting: below 2 standard deviations in height-for-age ratio
 - Wasting: below 2 standard deviations in weight-for-age ratio
- ii) Global burden of disease (GBD): measured in DALY (disability-adjusted life years)
 - GBD = Years of life lost due to premature death relative to life expectancy (80 for men, 83 for women) + Years of healthy life lost due to disability
 - Example: Africa: 77% of GBD due to death, 23% due to disability
 - China and Latin America: 56% of GBD due to death, 44% due to disability.
- iii) Malnutrition: Food insecurity (FAO)
 - Prevalence of hunger: % of population below nutritional norm (2,800 kcal/person/day for adult men; 2,000 cal/person/day for adult women). Example: 75% Somalia, 31% Nicaragua
 - Depth of hunger: average calorie deficit of the undernourished (not population as a whole) relative to nutritional norm. Example: 490 kcal/person/day Somalia, 300 Nicaragua.

iv) UNDP Human Development Index (HDI):

$$HDI_k = 1 - \frac{1}{3} \sum_{i=1}^3 \frac{H_{i,max} - H_{i,k}}{H_{i,max} - H_{i,min}}$$

for country k

H_1 = life expectancy at birth (from 39 years in Sierra Leone to 80 in Japan)

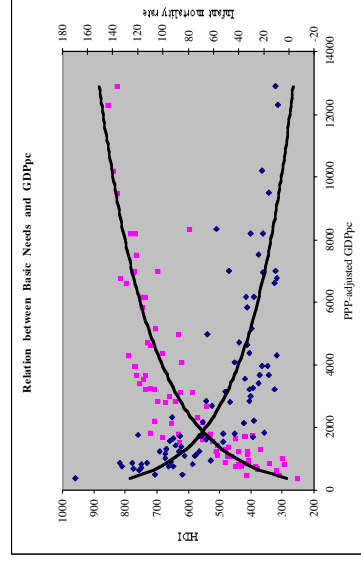
H_2 = educational attainment index

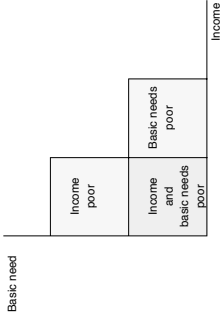
Adult literacy rate with weight 2/3 (from 15% in Niger to 99.8 in the Russian Federation).
 Primary, secondary, and tertiary gross enrollment ratio with weight 1/3 (from 15% in Niger to 113 in Australia).

H_3 = PPP-adjusted income from \$458 in Sierra Leone to \$29,605 in the U.S.)

Example:

- Maximum life expectancy = 80
- Minimum life expectancy = 39
- Singapore life expectancy = 77.3; China life expectancy = 70.1
- $H_{1,Singapore} = \frac{80 - 77.3}{80 - 39} = .07$, $H_{1,China} = \frac{80 - 70.1}{80 - 39} = .24$
- Singapore remaining life expectancy gap = 7% of maximum gap.
- China remaining life expectancy gap = 24% of maximum gap.





Multidimensionality of poverty: who is poor?

6. Sustainability in use of natural resources

Negative externalities: environmental impact assessment to identify and internalize externalities.
 Sustainability = inter-generational equity = welfare of future generations not inferior to welfare of current generation as a consequence of behavior of current generation toward use of natural resources and the environment (Brundtland Commission).

Welfare includes: income, option value, existence value, valuation of non-marketed resources, stock of natural resource.

Strong sustainability: maintenance of resource flow from natural resources.

Weak sustainability: maintenance of income stream from natural resource including technical change and substitutions in activities.

All inter-generational debts are symptoms of non-sustainability (Sen).

7. Quality of life

- Political freedoms: fair elections, community and local decision-making, participatory democracy.
- Empowerment: participation, social incorporation (Voices of the Poor, capacity to influence the state).
- Human rights: torture, disappearances, arbitrary detention, political prisoners.
- Freedom of expression: media censorship, freedom of speech.
- Rule of law: impartial tribunals, fair and public hearings, protection from corruption.
- Congeniality: social tensions, security, stability, belonging (attachment to place), cooperation, household stability.

8. Conclusions

1. Development (welfare) is multidimensional (seven dimensions above)

Concept of development has been broadened beyond income or expenditures (per capita income or consumption) to other dimensions of welfare.

No possible agreement on optimum weighting scheme of the dimensions of development to create a universal development index: heterogeneity of situations and ideological differences (critique of UNDP approach).

Potential agreement if:

First order dominance: one situation (period, country) is better than another in all dimensions of development.

Win-win policy reforms or projects: Pareto optimum, possibly after compensation.

Otherwise, use array of indicators, without weighting of relative importance of criteria.

Income poor

Basic needs poor

Poor in both income and basic needs.

Agreement on the importance of some aspects of development may be strong, e.g. growth, poverty, basic needs, and vulnerability. Agreement on other aspects may be weak: equality, sustainability, quality of life.

2. Normative approaches to development:

WDR 1990: Labor-intensive growth
 Health and education for the poor
 Safety nets

WDR 2000/01: Opportunities for all
 Empowerment of the poor
 Security