

Econ 253/PP 253, Fall 2007
International Economic Development Policy

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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*.

Is it useful to have development goals?

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

GDP = Sum of value added by all firms

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: $\ln X_T = \ln X_0 + T \ln(1+g) \sim \ln X_0 + T g$. This allows to solve for T , the time needed to go from X_0 to X_T at a growth rate g .

Example 1: Time 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: $T = \frac{\ln z - \ln y_0}{g}$.

Example 2: Time to double X : $T = \frac{\ln 2X - \ln X}{g} = \frac{\ln 2}{g}$. $g = 10\%$, $T = 7$ years.

1.3. Comparisons across countries: need bring to single currency (e.g., US\$)

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):

$$PPP GDP^{\$} = \frac{1}{PPP_e} GDP^{Pesos},$$

where PPP_e 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 income or consumption relative to a poverty line.

Headcount ratio = Percentage of people with income below the selected poverty line = R_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

Note: Economic growth is the main instrument to reduce poverty. But not all growth is equally poverty-reducing. Growth does not have to be “pro-poor” (in the UNDP sense of benefiting more the poor than the non-poor) to reduce poverty. Growth in China was not “pro-poor” since inequality increased. However, it was exceptionally poverty reducing, taking 500 million (mainly rural) people out of poverty between 1881 and 2001 through the household responsibility system and market liberalization creating incentives for agriculture.

With 75% of the world poor rural and depending mainly on agriculture for their incomes, agricultural growth can be strongly poverty reducing. However, the elasticity of poverty reduction with respect to growth

($E = \frac{\Delta Poverty / Poverty}{\Delta Growth / Growth}$) depends on distribution of the land and labor intensity of farming.

Greater equality in the distribution of income will increase the poverty reducing value of growth.

With unskilled labor the main asset of the poor, unskilled labor intensive growth tends to be good for poverty reduction.

Growth can make poverty reduction Pareto optimum (no losers), and hence more politically feasible than redistributive growth.

3. Inequality and inequity

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 richest 20%/Share of poorest 40% = India: 1.7; Senegal : 5.3; Brazil: 9.1; U.S.: 2.9; Japan: 2.4%

Equity (ex-ante): equality of opportunities.

Sen: equity = distribution of capabilities (assets) and functionings (what people do).

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

Why is equality a potential determinant of growth?

- (-,+) 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.
- (+) Greater share of the population with collateralizable assets.

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 and expected income.

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 (short political time).
- Environmental: pollution, climate change

Types of risks: Covariate risks: Economy-wide, region-wide. Cannot be insured locally.
Idiosyncratic risks: easier to insure locally.

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 (poverty traps)

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 management implies sacrificing expected income to reduce the variance of income.
- Risk coping** (ex-post): actions to relieve the impact of an income shock on consumption (sell assets, take loans, receive transfers and social assistance). Risk coping leads to the decapitalization of assets, indebtedness, and social obligations of reciprocity.

Risks of irreversibility (fall into poverty traps): children taken out of school (child labor used as a short run risk coping instrument with long term loss in human capital for the child), malnutrition and stunting, fire sales of assets (land), move to refugee camps, homelessness (hard to reenter the labor force).

Note: cost of globalization may be increasing vulnerability due to greater exposure to international prices fluctuations (e.g., coffee prices). But, for staple foods, international market prices are likely more stable than closed economy prices.

5. Basic needs (BN): human development

Includes: health, education, nutrition, social infrastructure.

Note: BN have a large public goods component as opposed to income poverty (hence subject to market failure).

Indicators:

Health

Ex-post: Life expectancy at birth: males, females

Infant mortality rate (e.g., under 5)
Maternal mortality rate, reproductive health
Access to health services. Quality of health services (quacks in rural India)
Access to safe water and sanitation

Education

Ex-post: Net enrollment ratio, primary and secondary
Grade repetition rate
School attainment: completed years of education
Literacy rate

Ex-ante: Availability of schools
Quality of education (teacher absenteeism)

Nutrition

Prevalence of malnutrition and hunger: low birth weight; height and weight deficits.
Micronutrient deficiencies: Iron (anemia), zinc (morbidity), iodine (mental impairment), Vitamin A (blindness). Role of biofortification.

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 kgca/person/day for adult men; 2,000 ca/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 kgca/person/day Somalia, 300 Nicaragua.

iv) **UNDP Human Development Index (HDI):**

$$HDI = \frac{1}{3} \sum_{i=1}^3 \frac{H_{ik} - H_{i\min}}{H_{i\max} - H_{i\min}} \text{ for country } k$$

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

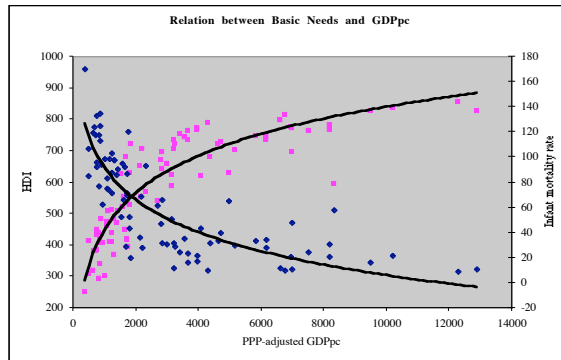
H_2 = educational attainment index

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).

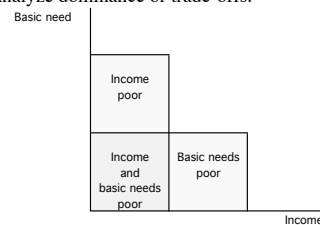
H_3 = PPP-adjusted income (from \$458 in Sierra Leone to \$29,605 in the U.S.)

Example:

Maximum life expectancy = 80
Minimum life expectancy = 39
Singapore life expectancy = 77.3; China life expectancy = 70.1
 $H_{1, Singapore} = \frac{77.3 - 39}{80 - 39} = .93$, $H_{1, China} = \frac{70.1 - 39}{80 - 39} = .76$
Singapore remaining life expectancy gap = 7% of maximum gap.
China remaining life expectancy gap = 24% of maximum gap.



Evaluation of HDI: 1/3 weighting scheme arbitrary. Hence, either aggregate arbitrarily, or keep separate H_1 , H_2 , H_3 as separate indicators and analyze dominance or trade-offs.



Multidimensionality of poverty: who is "poor"? Income poor, basic needs poor, both?

6. Sustainability in the 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).
 Market failure for sustainability: next generations are not here to bid on markets for conservation.

7. Quality of life/well-being

- Range of economic and social choices available to an individual and a nation. Sen: Functionings (what people can do) and capabilities (choice of functionings, freedoms)
- 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.
- Self-esteem: identity, dignity, respect, honor, recognition
- Aspirations vs. culture of poverty, resignation

- Happiness: absolute and relative position

8. Conclusions

1. Development is multidimensional (seven dimensions above)

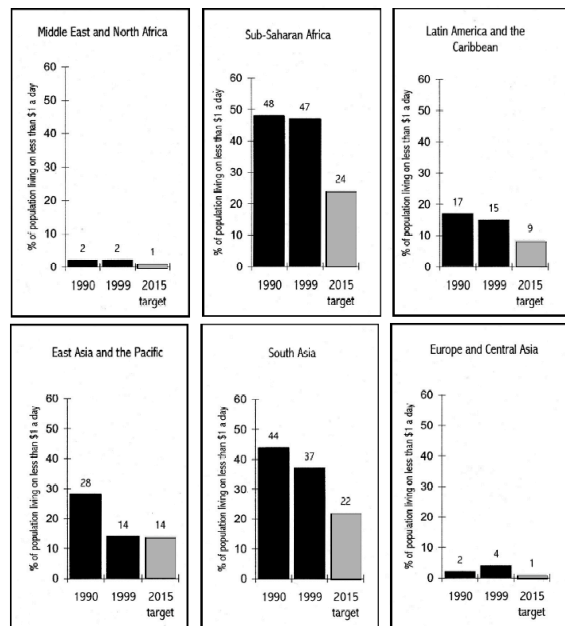
Concept of development has been broadened beyond income or expenditures (per capita income or consumption) to other dimensions of well-being.
 No possible agreement on optimum weighting scheme of the dimensions of development to create a universal development index: heterogeneity of situations and ideological differences (critique of UNDP's HDI 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 (Sen), 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
- Millennium Development Goals 1900-2015: Poverty reduction
Basic Needs
Sustainability

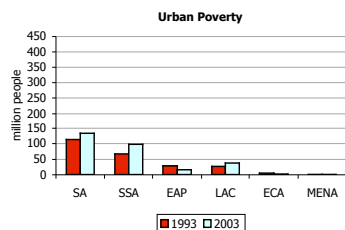
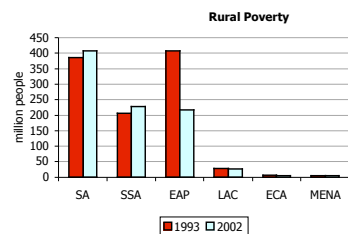
POPULATION LIVING IN EXTREME POVERTY BY REGION



Ravallion \$1/day

	Number of poor in millions			Headcount index (%)			Share of poor in rural areas (%)	Rural share of population (%)
	Urban	Rural	Total	Urban	Rural	Total		
1993								
EAP	28.3	404.1	432.4	5.5	35.2	26.0	93.5	68.9
China	11.0	331.4	342.4	3.3	39.1	29.1	96.8	70.2
ECA	6.1	6.4	12.5	2.1	3.7	2.7	51.0	36.9
LAC	26.1	28.6	54.6	7.8	22.4	11.9	52.3	27.7
MNA	0.8	4.3	5.1	0.6	3.8	2.1	84.7	47.2
SAS	113.8	385.0	498.8	37.4	43.7	42.1	77.2	74.3
India	100.5	326.2	426.7	42.7	49.1	47.5	76.5	73.8
SSA	66.4	206.7	273.2	40.2	53.1	49.2	75.7	70.2
Total	241.5	1035.0	1276.5	13.8	36.5	27.9	81.1	61.9
Less China	230.5	703.6	934.1	16.3	35.5	27.5	75.3	58.4
2002								
EAP	15.8	219.5	235.3	2.2	19.5	12.8	93.3	61.2
China	4.0	175.0	179.0	0.8	22.4	14.0	97.8	62.3
ECA	2.5	4.9	7.4	0.8	2.9	1.6	66.6	36.6
LAC	38.3	26.6	64.9	9.5	21.2	12.3	41.0	23.8
MNA	1.2	4.9	6.1	0.8	3.8	2.1	80.1	44.3
SAS	134.8	407.0	541.8	34.6	40.3	38.7	75.1	72.2
India	115.9	328.9	444.7	39.3	43.6	42.4	74.0	71.9
SSA	98.8	228.8	327.6	40.4	50.9	47.2	69.8	64.8
Total	291.4	891.7	1183.2	13.2	29.6	22.7	75.4	57.7
Less China	247.4	716.7	1004.2	16.8	32.1	25.5	71.4	56.6

Source: Ravallion et al., 2007



Source: WDR 2008