

# Population and Society - Sustainability Indicators

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## Section 1: Introduction: Meaning of Sustainability Indicators

Population and its direct implications on Society and the Social Fabric incorporate one of the fundamental issues that impinge any sustainable development issue. It is seen as the basis for any sustainability study in human intervention both through its direct and indirect impacts. United Nations' Agenda 21 identifies population growth as one of the crucial elements affecting long-term sustainability<sup>i</sup>.

Population and its physical distribution has been seen by such initiatives (UN, OECD and Blue Plan), as the main capital element comprising resource take-up. In fact, it is seen as the dynamic factor affecting any type of environmental pressure due to its inherent nature, being the immediate provision of basic needs to support itself. Populations are in themselves living entities and their survival depends on the availability of immediate resources and sustaining those same resources.

Demographic change is synonymous with its impact on a country's capacity on a wide range of economic, social, cultural and environmental issues. Its fluctuations are dependant on a number of variables such as fertility and mortality rates, attractiveness for migrants, and other related issues such as health. Other issues having a direct change on the demographic status of a country include family size, perceptions on contraception, movements towards individualistic norms, such as single person households, amongst others.

Each of these issues places a strain on resources and may prove unsustainable, particularly where rapid changes in both population growth and loss occurs in conjunction with poverty and lack of access to resources. This is compounded by unsustainable patterns ranging from excessive production and consumption scenarios. In addition, rapid changes on infrastructure such as rural abandonment in favour of city life on one hand and depopulation of city cores outcomes which leave dying cities in its wake, as exemplified by rust-belt cities and urban core neglect.

In view of this, the different impacts that these changes are having on society needs to be analysed also in terms of other 'negative' pressures on the environment such as resource consumption, effluent generation and waste generated as well as the more visible issues such as settlement expansion, loss of agricultural land and a rapidly shrinking countryside.

Due to the fact that most populations have taken up a sedentary way of life, divorcing themselves from the nomadic lifestyles, the dependency on the immediate surroundings has grown exponentially, with successive waves of social, cultural and technological advances. Intra-country and international transactions have helped eased some of the strains on local resources but have generated myriad other problems such as waste generation and increased in-migration. These latter-day situations have caused high rates of population growth in the urban areas and depopulation in the rural areas. This has caused an upheaval in the former land-use issues leading to rapid urban growth in conjunction with extreme population densities.

These changes have caused a number of upheavals such as the need for energy materials, transportation infrastructures, the construction of schools and hospitals, employment provision and education. Thus, it is imperative that population studies are seen in line with other indicators, rather than in isolation, since there are close linkages between population change and other demographic and social indicators, as well as all indicators expressed in per capita terms (for example, GDP per capita). Population growth usually has implications for indicators related to education, infrastructure, employment, including the provision of housing, community facilities (education, health and social services), and utilities, the management of traffic and communications, leisure and recreational needs and the quality of the urban

and environmental fabric. In view of this, population indicators are seen as directly related to human settlements and the use of natural resources.

This document looks at sustainability in relation to population, society and settlements and refers to Blue Plan/MAP, OECD and UN Agenda 21 Sustainability Indicators for the production of a list of indicators that need to be analysed in the local context.

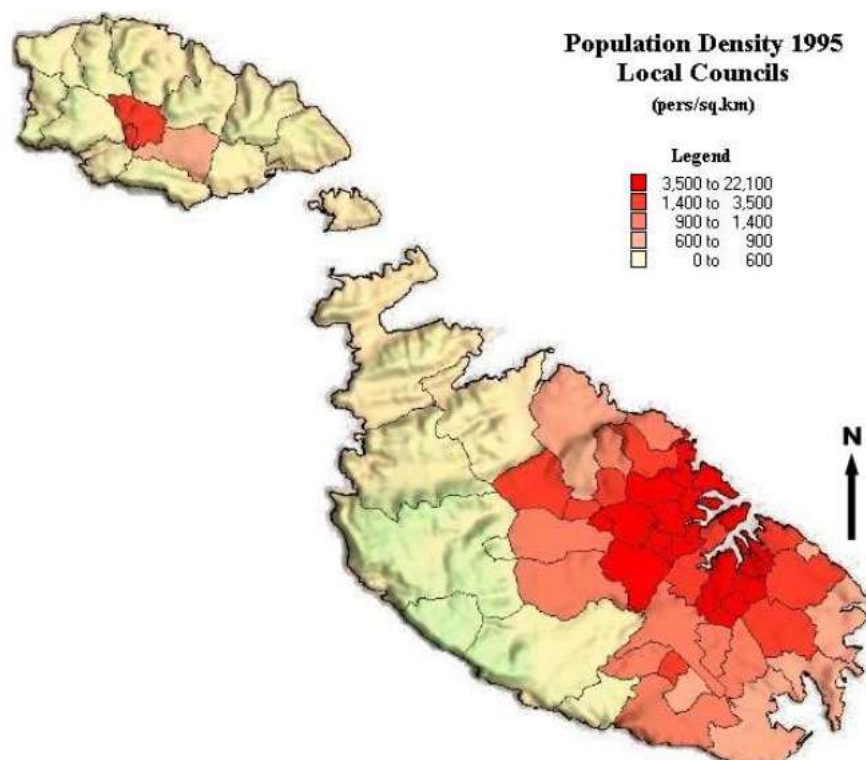
## Maltese Situation

### Population

The Maltese Islands comprise a complex issue when demographic studies are carried out. Due to their extremely small size and very high population density, the impact on the relative indicators requires in-depth studies. Malta ranks as the second-most dense country in the world, second only to Singapore. With over 1,200 persons per square kilometre, this density varies over the regions making up the islands as well as between the islands themselves, with low densities in Gozo and Comino and a high density in Malta.

This issue is compounded by the fact that regional densities are fluctuating in that the Grand Harbour Local Plan Area has been continuously losing population since the early 1950s and is expected to follow this trend unless drastic action to do otherwise is taken. However, some areas within the Grand Harbour still have the highest density rates in Malta, with Senglea registering 22,000 persons per square kilometre, though down from a 48,000 persons per square kilometre in 1931<sup>ii</sup>.

The immediate repercussions on the social and physical fabric of the areas are immediately apparent, with gross depopulation in the old areas, increasing number of vacant dwellings, high crime rates, migration to as yet pristine areas and loss of the community soul of the towns in question.



Source: Census of Malta 1995 Web-Mapping Project: <http://CensusofMalta1995>

As per demographic structure, the Maltese Islands have been experiencing low birth and mortality rates for some time, a situation that is characteristically late transitional in character. In the near future, it is expected to reach a post-transitional stage, in which natural increase will be either very low or zero.

This means that population change will not be very large but may reach replacement ratios that would create sustainable issues in themselves, such as the lack of working age cohorts, and an increase in resource consumption of a very specific nature due to a rapid increase in the elderly component.

Life expectancy is anticipated to rise further, at a relatively faster rate for males than for females. Fertility rates are expected to fluctuate slightly in the till 2005, and later on increase till 2020.

Migration will remain a volatile component of population change. International migration in the Maltese islands is based on returning migrants and a small number of emigrants, with an average annual positive migration component of 700 persons. On the other hand, internal migration is the main component of change in the regional population studies. Studies on internal migration based on WSC<sup>iii</sup> data and Census figures<sup>iv</sup> indicate and that internal migration pivots around a preference to move primarily within the town of origin, then to neighbouring towns and lastly to other regions, though the nearest regions are still preferred. Thus, projections for future movements may to a certain extent be predictable, but there are also unpredictable factors such as economic prospects, the state of the environment, the quality of the urban fabric, and availability of housing that may impinge on the changes.

The Maltese population is expected to increase to 434,000 by 2020 at an average increase of 2,300 persons per year, from a base population of 378,132 in 1995. This increase will place further pressures on the socio-economic and socio-cultural structures in the Maltese Islands mainly due to the following factors<sup>v</sup>:

1. A larger population: From 378,132 in 1995, to 434,260 in 2020
2. A higher proportion of males:females, from a ratio of 97:100 in 1995, to 100:100, in 2020
3. A higher proportion of persons aged over 60 years: from 16 per cent in 1995, to 25 per cent in 2020 as well as an increase in the 80+ year component
4. A slightly lower birth rate: from 12.5 per 1,000 in 1995, to 12.3 per 1,000 in 2020 (rising between 1995 and 2010, then falling again)
5. A higher death rate: from 7.8 per 1,000 in 1995, to 9.8 per 1,000 in 2020, mainly due to the higher number of elderly persons
6. A higher fertility rate: from 1.81 in 1995, to 1.97 in 2020, though still below replacement levels, indicating a dying out population should these trends be sustained for a number of decades
7. A higher life expectancy for males: from 74.9 years in 1995, to 76.5 in 2020 and a marginally higher life expectancy for females: from 80.25 years in 1995, to 81.5 in 2020
8. An assumed average international migration of 775 in 2020, as opposed to 600 in 1995

## **Households**

Household structure in Malta has been undergoing changes particularly during recent years where changes in lifestyle have caused a decline in household size and in turn an increased related request for dwellings. Malta is expected to experience an increase in 40,000 households from the 1995 Census figures to 2020.

The main factors that are expected to cause this change include an increased female independence, continued secularisation of Maltese society and a greater number of separations/divorces that all contribute to an increase in the number of households. In addition, single parents, particularly mothers, “are also increasing for a number of reasons including unplanned pregnancies, as well as planned pregnancies by single females. Single motherhood tends to occur either among young females or among older economically independent females seeking motherhood”<sup>vi</sup>.

These factors will have a direct impact of the need for smaller residences, as well as a diversified housing market. The islands has a major stock of available units that are currently vacant and could

accommodate these new households. In addition, there needs to be a mentality change for persons to purchase and sell of dwellings in relation to changes within their household structure, moving from small to larger units and eventually to small units. The current use of dwelling results in diverse problems relating to consumption patterns: energy consumption for the heating of large homes in winter, deterioration of the stock and unavailability of stock for younger families.

The elderly make up a very high percentage of the Maltese population (16% as at 1995) and are expected to increase to 25% in 2020. This factor that will contribute to an increase in the number of smaller households and may be brought to fulfilment by government policy encouraging family care for the elderly. Studies conducted locally show that 80 per cent of the Maltese elderly prefer to live at home (Delia, 1993), thus increasing the need for more suitable dwellings.

The forecasts indicate that the Maltese Islands will experience the following factors<sup>viii</sup>:

1. A smaller household size: from 3.1 in 1995 to 2.7 in 2020
2. More households: from 119,479 in 1995 to 159,926 in 2020
3. More persons in institutions: from 4,087 in 1995 to 8,747 in 2020
4. A large percentage of under-utilised houses unless dwelling size fits household size

### **Settlement**

Whilst the percentage of built-up land has increased from 4% in 1956 to 22% in 1997, this has been compounded by the fact that the rate of land take-up for dwelling purposes is higher than the demand. For a demand of an average of 2,500 new dwellings per year an average of 4,000 units are being developed during the same period. This, together with antiquated rent laws and a high rate of speculation has resulted in a vacant dwelling stock of 35,723 as at 1995, inclusive of summer homes.

The land available for future dwelling stock is being rapidly taken-up at an alarming rate, thus further straining the Temporary Provision Schemes as outlined in 1988.

At the same time, cities like Valletta, Floriana, and Cottonera are rapidly losing their population and increasing their vacant stock.

In view of the above, the need for indicators identifying the need for analysis is being listed below. Each indicator relates to the demographic and social situation of the Maltese Islands.

## **Section 2: List of Population and Society Sustainability Indicators**

This section looks at the indicators as identified by the OECD, MAP/Blue Plan and the UN.

Whilst the MAP/Blue Plan and the UN outline specific Indicators as listed below, the OECD tend to look at the social aspect as an add-on to their environmental performance indicators. This was indicated by “emphasising that the three dimensions of sustainable development - economic, environmental, and social – should be reflected in the set of OECD indicators, and that in general, further attention has to be dedicated to the social aspect of sustainable development. Several issues such as tourism, urban environmental quality, transport, sewage treatment, and energy efficiency in buildings, were identified by delegates as possible candidate areas for further study”<sup>viii</sup>.

On the other hand, both the Blue Plan and UN initiatives have looked at the social aspects in context, as outlined below.

### **MAP/Blue: Plan indicators and methodology**

The Blue Plan<sup>ix</sup> adopted a list of 130 indicators based on a system of 3 categories of the PSR Model (Pressures, State and Responses). This methodology was based on an outline of 119 indicators that are quantitative in nature and can be computed whilst there are also 11 qualitative indicators. The categorisation relating to this paper is based on the following:

## Population and Society

Demography and population

Standard of life, social inequalities, poverty, employment, unemployment

Culture, education, training, public awareness

Health, public health

Consumption and production patterns

## Territory and Human Settlements

Habitat and urban systems

The chosen indicators that relate to the topic under review include 6 Pressure, 10 State and 5 Response issues.

THEME	PRESSURE	STATE	RESPONSE
<b>1 POPULATION AND SOCIETY</b>			
1.1 DEMOGRAPHY AND POPULATION	1. Population growth rate		2. Total fertility rate
1.2 STANDARD OF LIFE, EMPLOYMENT, SOCIAL INEQUITIES, POVERTY, UNEMPLOYMENT		3. Women per hundred men in the labour force	5. Employment rate
		4. Human poverty index (HPI)	
1.3 CULTURE, EDUCATION, TRAINING, AWARENESS IMPROVEMENT	6. School enrolment gross ratio	7. Difference between male and female school enrolment ratios	9. Share of private and public finances allocated to the professional training
		8. Production of cultural goods	10. Public expenditure for the conservation and value enhancement of natural, cultural and historical heritage
1.4 HEALTH, PUBLIC HEALTH		11. Life expectancy at birth	13. Access to safe drinking water
		12. Infant mortality rate	
1.5 CONSUMPTION AND PRODUCTION PATTERNS	14. Annual energy consumption per inhabitant	16. Main telephones lines per 100 inhabitants	
	15. Number of passengers cars per 100 inhabitants	17. Distribution of food consumption per income decile	
<b>2 LANDS AND AREAS</b>			
2.1 HABITAT AND URBAN SYSTEM	18. Urban population growth rate	20. Urbanisation rate	
	19. Loss of agricultural land due to urbanisation	21. Floor area per person	

## UN: indicators and methodology

Another set of indicators reviewed for the Population and Society Topic are extracted from the UN Indicators for Social Aspects of Sustainable Development. The following list is based on their respective Chapters from the document "Indicators Of Sustainable Development: Framework And Methodologies"<sup>xx</sup>.

Their system of information creation was based on the use of a series of methodology sheets as presented in Background Paper no. 15, at the fourth session of the UN Commission on Sustainable Development, in April/May 1996. Since then additional and revised methodology sheets have been submitted by the lead agencies and were incorporated into the revised edition of the document. In a few instances, methodology sheets are still being developed and in these cases, a "bookmark" has been included, stating the name of the indicator, a brief definition, the unit of measurement, and its

placement in the framework. An annex of these sheets is being included with this document in order to serve as guidance material for the entities responsible for the data-gathering process.

The list of population and Society Indicators is listed below:

#### Combating poverty

- Unemployment rate
- Head count index of poverty
- Poverty gap index
- Squared poverty gap index
- Gini index of income inequality
- Ratio of average female wage to male wage

#### Demographic dynamics and sustainability

- Population growth rate
- Net migration rate
- Total fertility rate
- Population density

#### Promoting education, public awareness and training

- Rate of change of school-age population
- Primary school enrolment ratio--gross
- Primary school enrolment ratio--net
- Secondary school enrolment ratio--gross
- Secondary school enrolment ratio--net
- Adult literacy rate
- Children reaching grade 5 of primary education
- School life expectancy
- Difference between male and female school enrolment ratios
- Women per hundred men in the labour force
- GDP spent on education

#### Protecting and promoting human health

- Basic sanitation: percent of population with adequate excreta disposal facilities
- Access to safe drinking water
- Life expectancy at birth
- Adequate birth weight
- Infant mortality rate
- Maternal mortality rate
- Nutritional status of children
- Immunization against infectious childhood diseases
- Contraceptive prevalence
- Proportion of potentially hazardous chemicals monitored in food
- National health expenditure devoted to local health care
- Total national health expenditure related to GNP

#### Promoting sustainable human settlement development

- Rate of growth of urban population
- Per capita consumption of fossil fuel by motor vehicle transport
- Human and economic loss due to natural disasters
- Percent of population in urban areas
- Area and population of urban formal and informal settlements

- Floor area per person
- House price to income ratio
- Infrastructure expenditure per capita

There are overlapping indicators between these 2 lists, with the UN list being more exhaustive. To this effect, an exercise has been carried out whereby the two lists have been integrated and some indicators that are not relative to the Maltese context or are too complex to work out, have been omitted.

### **Section 3: Proposals on which Population and Society Sustainability Indicators are suitable for Malta**

In view of the particular situation of the Maltese Islands, the indicators that could be taken from both the Blue Plan and UN lists have been identified and are listed below:

#### **Standard of Life, Employment, Social Inequities, Poverty, Unemployment**

Employment rate  
 Head count index of poverty  
 Poverty gap index  
 Ratio of average female wage to male wage  
 Women per hundred men in the labour force

#### **Demography and Population**

Population growth rate  
 Net migration rate  
 Total fertility rate  
 Population density  
 Ageing growth rate

#### **Culture, Education, Training, Awareness Improvement**

Rate of change of school-age population  
 Primary school enrolment ratio--gross  
 Secondary school enrolment ratio--gross  
 Adult literacy rate  
 Difference between male and female school enrolment ratios  
 GDP spent on education  
 Production of cultural goods  
 Share of private and public finances allocated to the professional training  
 Public expenditure for the conservation and value enhancement of natural, cultural and historical heritage

#### **Health**

Basic sanitation: percent of population with adequate excreta disposal facilities  
 Access to safe drinking water  
 Life expectancy at birth  
 Infant mortality rate  
 Contraceptive prevalence  
 National health expenditure devoted to local health care  
 Total national health expenditure related to GNP

#### **Urban System**

Rate of growth of urban population  
 Urbanisation rate

Per capita consumption of fossil fuel by motor vehicle transport  
Area and population of urban formal and informal settlements  
Loss of agricultural land due to urbanisation  
Floor area per person  
House price to income ratio  
Annual energy consumption per inhabitant  
Number of passenger cars per 100 inhabitants  
Main telephone lines per 100 inhabitants  
Main personal computers per 100 inhabitants  
Distribution of food consumption per income decile

#### **Section 4: Classification of indicators as per ease of data mining for analysis processes**

This section gives an outline of the indicators chosen, the computation parameters, the data creators/custodians and comments as necessary. 3 indicators have been added over and above the listed Blue Plan and UN indicators, as they were seen to be more indicative of the situation on Malta: mainly Ageing growth rate, Dwelling density and Vacant dwellings. These indicators should reflect the expected changes as well as identify a holistic approach to the solution of a number of demographic and social issues.

Refer to document *UN Blue Plan List Demog.xls* attached

#### **Section 5: Executive Summary**

Population and its direct implications on Society and the Social Fabric is considered to be the basis on which any sustainability study in human intervention builds upon as it is one of the crucial elements affecting long-term sustainability. Demographic change is synonymous with its impact on a country's capacity on a wide range of economic, social, cultural and environmental issues and its fluctuations are dependant on a number of variables such as fertility and mortality rates, attractiveness for migrants, and other related issues such as health.

The Maltese Islands comprise a complex issue when demographic studies are carried out, mainly due to its small size and very high population density. Demographic studies form the basis for related issues such as housing, transport, employment, consumption, each of which require analysis on the impact of demographic change.

The Maltese population is expected to increase to 434,000 by 2020 at an average increase of 2,300 persons per year, from a base population of 378,132 in 1995.

Household structure in Malta has been undergoing changes particularly during recent years where changes in lifestyle have caused a decline in household size and in turn the related request for dwellings. Malta is expected to experience an increase in 40,000 households from the 1995 Census figures to 2020.

Whilst the percentage of built-up land has increased from 4% in 1956 to 22% in 1997, this has been compounded by the fact that the rate of land take-up for dwelling purposes is higher than the demand. Whereas annual demand averages 2,500 new dwellings, on average 4,000 units are being developed during the same period, resulting in an ever-increasing vacant dwelling stock that stood at 35,723 in 1995, inclusive of summer homes.



Indicator	Easily Computed	Somewhat difficult to compute	Very difficult to compute	Impossible to compute	Data Sources	Comments on computations
<b>Standard of life, employment, social inequities, poverty, unemployment</b>						
Employment rate	■				ETC, NSO, PA	
Head count index of poverty		■			NSO	
Poverty gap index		■			NSO	
Ratio of average female wage to male wage		■			ETC, NSO	
Women per hundred men in the labour force	■				ETC, NSO, PA	
<b>Demography and Population</b>						
Population growth rate	■				NSO, PA	
Net migration rate	■				NSO, PA	
Total fertility rate	■				NSO, PA	
Population density	■				NSO, PA	
Ageing growth rate	■				NSO, PA	Indicator specific to Malta
<b>Culture, education, training, awareness improvement</b>						
	■					
Rate of change of school-age population	■				NSO, Education Department	
Primary school enrolment ratio--gross	■				NSO, Education Department	
Secondary school enrolment ratio--gross	■				NSO, Education Department	
Adult literacy rate	■				NSO, Education Department	
Difference between male and female school enrolment ratios	■				NSO, Education Department	
GDP spent on education	■				NSO, Education Department	
Production of cultural goods		■			NSO, Education Ministry	
Share of private and public finances allocated to the professional training		■			NSO, Education Department	
Public expenditure for the conservation and value enhancement of natural, cultural and historical heritage	■				NSO, Education Ministry, Museums Department	
<b>Health</b>						
Basic sanitation: percent of population with adequate excreta disposal facilities	■				WSC, NSO, Health Ministry, Health Department	
Access to safe drinking water	■				WSC, NSO, Health Ministry, Health Department	
Life expectancy at birth	■				NSO, PA	
Infant mortality rate	■				NSO	
Contraceptive prevalence			■		NSO, Health Ministry, Health Department	
National health expenditure devoted to local health care	■				NSO, Health Ministry, Health Department	
Total national health expenditure related to GNP	■				NSO, Health Ministry, Health Department	
<b>Urban System</b>						
Rate of growth of urban population	■				PA	

	Urbanisation rate				PA	
	Per capita consumption of fossil fuel by motor vehicle transport				NSO, PA, Enemalta	
	Area and population of urban formal and informal settlements				PA	
	Loss of agricultural land due to urbanisation				NSO, PA, Agriculture Department	
	Floor area per person				NSO, PA	
	House price to income ratio				NSO, PA, Estate Agents, Housing Ministry	
	Dwelling density				PA	Indicator specific to Malta
	Vacant dwellings				NSO, PA	Indicator specific to Malta
	Annual energy consumption per inhabitant				NSO, PA, Enemalta	
	Number of passengers cars per 100 inhabitants				NSO, PA, Transport Ministry	
	Main telephones lines per 100 inhabitants				NSO, Maltacom. Vodafone	
	Main personal computers per 100 inhabitants				NSO	
	Distribution of food consumption per income decile				NSO	

Out-migration from the old cities and towns such as Valletta, Floriana, and Cottonera is increasing the vacant stock component, aiding the deterioration of the dwelling stock and in turn leaving behind a disrupted social structure.

This study has identified a number of indicators that would help in the monitoring of the demographic and social fabric of the Maltese Islands. These are categorised as follows:

- Standard of life, employment, social inequities, poverty, unemployment 5 Indicators
- Demography and Population 5 Indicators
- Culture, education, training, awareness improvement 9 Indicators
- Health 7 Indicators
- Urban System 14 Indicators

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# Annex

## Demography and Society Sustainability Indicators:

Document extracted from the UN Sustainability website at:

<http://www.un.org/esa/sustdev/agenda21.htm>

### [Chapter 3: Combating poverty](#)

- Unemployment rate
- Head count index of poverty
- Poverty gap index
- Squared poverty gap index
- Gini index of income inequality
- Ratio of average female wage to male wage

## Chapter 3: Combating poverty

UNEMPLOYMENT RATE		
Social	Chapter 3	Driving Force

### 1. Indicator

- (a) **Name:** Unemployment rate.
- (b) **Brief Definition:** Unemployment rate is the ratio of unemployed people to the labour force.
- (c) **Unit of Measurement:** %.

### 2. Placement in the Framework

- (a) **Agenda 21:** Chapter 3: Combating Poverty.
- (b) **Type of Indicator:** Driving Force.

### 3. Significance (Policy Relevance)

(a) **Purpose:** The unemployment rate measures the part of the labour force which, during the survey reference period, was neither (i) at work nor temporarily absent from work (i.e. not in paid or self-employment); (ii) available for work; or (iii) seeking work.

(b) **Relevance to Sustainable/Unsustainable Development:** Unemployment is useful and relevant to measuring sustainable development, especially if uniformly measured over time, and considered with other socioeconomic indicators. It is one of the main reasons for poverty in rich and medium income countries and among persons with high education in low income countries (no work, no income but compensation from insurance schemes or other welfare state systems whenever they exist). It should be noted, however, that it is common to find people working full-time but remaining poor due to the particular social conditions and type of industrial relations prevalent in their country, industry, or occupation.

(c) **Linkages to Other Indicators:** This indicator is linked to other socioeconomic indicators such as poverty measures and adult literacy.

(d) **Targets:** National targets for unemployment are common.

(e) **International Conventions and Agreements:** See 7 iii below.

#### 4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** The definitions for labour force, employed population, and unemployed population are well established by international agreements (see section 7 below).

i) Labour Force: The current economically active population or labour force has two components: the employed and the unemployed population. The international standard definition of labour force established by the Thirteenth International Conference of Labour Statisticians (ILO, 1982) is based on the following elements:

--The survey population: All usual residents (de jure population) or all persons present in the country at the time of the survey (de facto population). Some particular groups, such as the armed forces or other populations living in institutions, nomadic people, etc. may be excluded.

--An age limit: In countries where compulsory schooling and legislation on the minimum age for admission to employment have broad coverage and are widely respected, the age specified in these regulations may be used as a basis for determining an appropriate minimum age limit for measuring the economically active population.

In other countries the minimum age limit should be determined empirically on the basis of (i) the extent and intensity of participation in economic activities by young people, and (ii) the feasibility and cost of measuring such participation with acceptable accuracy. Some countries also determine a maximum age for inclusion in the labour force.

--The involvement in economic activities during the survey reference period: The concept of economic activity adopted by the Thirteenth International Conference of Labour Statisticians (1982) is defined in terms of production of goods and services as set forth by the United Nations System of National Accounts, (revised in 1993).

-- A short reference period: For example, one week or a day.

ii) Employed population: According to the 1982 international definition of employment (ILO, 1983) the employed comprise all persons above the age specified for measuring the labour force, who were in the following categories:

--Paid employment: (i) at work: persons who, during the reference period, performed some work (at least one hour) for wage or salary, in cash or in kind; (ii) with a job but not at work: persons who, having already worked in their present job, were temporarily not at work during the reference period but had a formal attachment to their job;

--self-employment: (i) at work: persons who, during the reference period, performed some work (at least one hour) for profit or family gain, in cash or in kind; (ii) with an enterprise but not at work : persons with an enterprise, which may be a business enterprise, a farm or a service undertaking, who were temporarily not at work during the reference period for some specific reason.

iii) Unemployed population: According to the 1982 international definition of employment (ILO, 1983) the unemployed comprise all persons above the age specified for measuring the labour force, who during the survey reference period were at the same time: (i) not in paid employment or self-employment, not even for an hour; (ii) available for work; and (iii) seeking work.

#### (b) **Measurement Methods:**

--Sources may be grouped into two broad categories: (i) population censuses and household sample surveys; and (ii) various types of administrative records, such as employment exchange registers, unemployment insurance records or social security files, which cover different segments of the target population (numerator of the indicator) through different conceptual frameworks.

Estimates according to the international standards can in practice be made most reliably on the basis of data collected through household surveys and population censuses. Some of the criteria specified in the international standards can only be implemented precisely through personal interviews. This is the only

data source which, on a regular basis and with an appropriate survey design, can cover virtually the entire population of a country, all branches of economic activity, sectors of the economy, types of activity status and categories of workers and which allow joint, mutually exclusive measurement of the employed, unemployed and economically inactive.

--The one hour criterion is necessary to cover all regular and irregular types of employment that may exist in a given country; to have the total employment corresponding to aggregate production; and to justify the international definition of unemployment as a total lack of work, so that the two components of the labour force are mutually exclusive categories.

--Temporary absence from work is a notion which refers to situations in which a period of work is interrupted by a period of absence, i.e. persons have already worked at their current activity and are expected to return to their work after the period of absence.

For paid employment, temporary absence from work is ascertained on the basis of the concept of formal job attachment according to one or more of the following criteria: continued receipt of wage or salary; an assurance of a return to work following the end of the contingency, or an agreement as to the date of return; the elapsed duration of absence from the job which, wherever relevant, may be that duration for which workers can receive compensation benefits without obligation to accept other jobs.

For self-employment, the concept of temporary absence from work is based on two criteria: the continued existence of the enterprise and the duration of absence.

--Availability for work means that, given a work opportunity, a person should be able and ready to work during the survey reference period. In practice, many countries prefer to use a slightly longer reference period for availability (not everyone who is seeking work can be expected to take up a job immediately one is offered).

--Seeking work means having taken specific active steps in a specified recent period to seek paid employment or self-employment. This specified period may be longer than the survey reference period (e.g. one month or the four weeks before it) to take account of the time-lags which often follow initial steps to obtain work, and during which jobseekers may not take any other initiatives to find work.

The 1982 international standards introduced a provision which allows for the relaxation of the seeking work criterion in situations where the conventional means of seeking work are of limited relevance, where the labour market is largely unorganised or of limited scope, where labour absorption is at the time inadequate, or where the labour force is largely self-employed .

--Particular groups: (i) Future starts i.e. persons who have made arrangements to take up paid employment or to undertake self-employment activity at a date subsequent to the reference period, if currently available for work, are to be considered as unemployed whether or not they continue to seek work. (ii) Lay-offs without formal job attachment but seeking and currently available for work are to be classified as unemployed. (iii) Students seeking and available for work are unemployed (the availability of full-time students seeking full-time work, however, may be questionable). (iv) Persons seeking and available for apprenticeship are to be classified as unemployed if the apprenticeship is an economic activity in the sense of SNA. (v) Beneficiaries of employment creation schemes are unemployed if the training does not take place within the context of an enterprise nor is associated with the productive activities of the enterprise, and no formal job attachment exists; but there is a definite commitment to employment after the end of the training.

(c) **The Indicator in the DSR Framework:** In the DSR framework the unemployment rate (%) has been put into the Driving Force indicators category.

(d) **Limitations of the Indicator:** The concept of poverty refers to a long lasting situation while the number of unemployed can change very fast depending of various short term circumstances. Therefore, it may be interesting to use the concept of usual unemployment and usual economically active population instead of current unemployment and labour force. The difference is that the survey reference period is a long one (e.g. one year) and that a person is to be classified in one category (employed, unemployed or inactive) according to the category in which he or she is classifiable for the greatest amount of time.

National capacity to collect data related to unemployment varies considerably. There are often severe problems with data quality. In addition, the informal sector, and unpaid labour in, for example, households and the agricultural sector are not captured by this indicator.

(e) **Alternative Definitions:** The unemployment rate is more meaningful when shown by age, sex and other relevant variables such as the educational level, previous work experience etc.

#### 5. Assessment of the Availability of Data from National and International Sources

(a) **Data Needed to Compile the Indicator:** Labour force (total number of persons) and total number of unemployed persons, derived from the same survey.

(b) **Data Availability:** The availability of the rate of unemployment in recent years (1992, 1993 or 1994) is ascertained for 80 countries. The sources are labour force surveys or general household surveys for 57 countries (3 do not give the distribution by gender; 15 also use employment office statistics of which 13 provide the distribution by gender); employment office statistics exclusively for 18 countries (5 do not give the distribution by gender); and official estimates for 4 countries (3 give the distribution by gender).

(c) **Data Sources:** See section 7i below.

#### 6. Agencies Involved in the Development of the Indicator

The lead agency involved is the International Labour Office (ILO) of the United Nations, located in Geneva. The contact point is the Focal Point for Environment and Sustainable Development, ILO; fax no. (41-22) 798 8685.

#### 7. Further Information

(a) **Data:**

Yearbook of Labour Statistics, ILO, Geneva;

Bulletin of Labour Statistics (quarterly) and its Supplement (January/February, April/May, July/August and October/November), ILO, Geneva;

Statistical yearbooks and other publications issued by the national statistical offices.

(b) **Methodology:**

Surveys of Economically Active Population, Employment, Unemployment and Underemployment -An ILO Manual on Concepts and Methods, ILO, Geneva, 1992.

Sources and Methods: Labour Statistics, Volumes 3 and 5, ILO, Geneva, 1991 and 1990, currently updated.

System of National Accounts 1993, Commission of the European Communities, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations, World Bank, Brussels/Luxembourg, New York, Paris, Washington, D.C., 1993;

Current international recommendations on labour statistics, ILO, Geneva, 1988. See particularly the Resolution Concerning Statistics of the Economically Active Population, Employment, Unemployment and Underemployment, adopted by the Thirteenth International Conference of Labour Statisticians (October 1982).

(c) **International Conventions and Recommendations:**

Labour Statistics Convention (No. 160) and Recommendation (No. 170), 1985.

<b>HEAD COUNT INDEX OF POVERTY</b>
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Social	Chapter 3	State
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#### 1. Indicator

- (a) **Name:** Head Count Index of Poverty.
- (b) **Brief Definition:** The proportion of the population with a standard of living below the poverty line.
- (c) **Unit of Measurement:** %.

#### 2. Placement in the Framework

- (a) **Agenda 21:** Chapter 3: Combating Poverty.
- (b) **Type of Indicator:** State.

#### 3. Significance (Policy Relevance)

(a) **Purpose:** The most important purpose of a poverty measure is to enable poverty comparisons. These are required for an overall assessment of a country's progress in poverty alleviation and/or the evaluation of specific policies or projects. An important case of a poverty comparison is the poverty profile which shows how the aggregate poverty measure can be decomposed into poverty measures for various sub-groups of the population, such as by region of residence, employment sector, education level, or ethnic group. A good poverty profile can help reveal a number of aspects of poverty-reduction policies, such as the regional or sectoral priorities for public spending. Poverty comparisons are also made over time, in assessing overall performance from the point of view of the poor.

(b) **Relevance to Sustainable/Unsustainable Development:** Measures of poverty are a very significant consideration of sustainable development. The eradication of poverty remains a major challenge for policy decision makers. Furthermore, an integrative viewpoint which simultaneously takes account of development issues, resource use and environmental quality, and human welfare must be taken if sustainable progress is to be achieved.

The Head Count Index of poverty captures the prevalence of poverty by measuring the proportion of population for whom consumption (or any other suitable measure of living standard) is below the poverty line. An increase in this indicator implies a worsening of the poverty situation with a greater proportion of the population falling below the poverty line.

(c) **Linkages to Other Indicators:** In general, this indicator is linked to many other sustainable development measures, for example, net migration rate, adult literacy rate, Gross Domestic Product per capita, and population living below the poverty line in dryland areas. In particular, the Head Count Index is closely associated to the Poverty Gap Index and the Squared Poverty Gap Index which capture successively more detailed aspects of the poverty situation. The Head Count Index measures how widespread poverty is, the Poverty Gap Index measures how poor the poor are, and the Squared Poverty Gap Index measures the severity of poverty by giving more weight to the poorest of the poor.

(d) **Targets:** Not available.

(e) **International Conventions and Agreements:** Not available.

#### 4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** A poverty measure is a summary statistic on the economic welfare of the poor in a society. There is no one universally accepted single measure of poverty. A number of different approaches exist (see, for example, the methodology sheets for the Poverty Gap Index and the Squared Poverty Gap Index). This methodology sheet guides the reader along certain key issues, such as the different approaches to measuring individual welfare, without prescribing decisions. Consequently, it is directed at comparability over time within a given country, as it helps national practitioners specify poverty indicators that match their specific situation and preferred approach. However, this is at the expense of international comparability.

To compute poverty measures, the following questions related to identifying and defining the poor must be addressed first:

i) How do we measure an individual's economic welfare?

ii) At what level of measured welfare is a person considered poor?

(b) **Measurement Methods:** The Head Count Index (H) is the proportion of the population whose economic welfare ( $y$ ) is less than the poverty line ( $z$ ). If  $q$  people are deemed to be poor in a population of size  $n$  then  $H=q/n$ . For computing the Head Count Index, estimates of individual economic welfare and the poverty line are required.

i) **Measuring Individual Welfare:** There are a number of different approaches to measuring welfare. The approaches differ in terms of the importance attached to the individual's own judgment of well-being versus a concept of welfare decided upon by somebody else. The former would focus on measuring an individual's consumption of a bundle of goods and services. An example of the latter would be defining welfare by the level of nutritional intake, even though people do not live on food alone, or make food choices solely on the basis of nutrition. Approaches in practice also differ according to how difficult it is to obtain certain types of data in specific settings.

Typically one finds that poverty comparisons in developing countries put a high weight on nutritional attainments, consistent with the behaviour of poor people in a specific society. A comprehensive measure of consumption (for example, total expenditure on all goods and services consumed, including non-market goods, such as consumption from a farmer's own product) has been more popular than using current income in the development literature. This is due in part to the fact that incomes are harder to measure accurately. Current consumption is also likely to give a better indication than current income of a household's typical, long-term, economic welfare; income may fluctuate greatly over time, particularly in rural economies (see Ravallion reference in section 7a below).

The following methods can be used for measuring individual standards of living:

--Consumption per equivalent male adult: Since households differ in size and composition, a simple comparison of aggregate household consumption can be misleading about the welfare of individual members of the household. Therefore, for any given household, an equivalence scale is used to approximate the number of single adults, based on observed consumption behaviour. There are a number of value judgments embedded in this practice; for example, differences in needs are reflected in differences in consumption. Adult females and children are assigned a male equivalence of less than one since they typically consume less; however, that may not mean that they have lower "needs" but rather have less power within the household. The existence of size economies in consumption may also mean that two people can live more cheaply together than apart (for a further discussion of these issues, see Ravallion reference in section 7a below).

--Undernutrition: This is a distinct concept, although closely associated with poverty. Undernutrition can be viewed as a specific type of poverty, namely food energy poverty. There are a number of arguments for and against using this as a measure of well-being. A practical advantage is that this measure does not have to be adjusted for inflation and would not be constrained by any inadequacy of price data. Measures of child nutritional status can help capture aspects of welfare, such as distribution within the household which are not adequately reflected in other indicators. However, nutrition is not the only aspect that matters to the well-being of people, including the poor. Thus, poverty comparisons based solely on nutrition alone may be limited and deceptive.

ii) **Defining the Poverty Line:** In practice, there are a number of alternative approaches to defining poverty lines:

--Absolute poverty lines: An absolute poverty line is one which is fixed in terms of the living standard indicator being used (consumption, nutrition). It is fixed over the entire domain of comparison, that is, a poverty line which assures the same level of economic welfare would be used to measure and compare poverty across provinces or different situations. The poverty line may still vary, but only so as to measure the differences in the cost of a given level of welfare. Absolute poverty lines are more common in developing country literature.

The most common approach to defining absolute poverty lines is to estimate the cost in each region or at each date of a certain bundle of goods necessary to attain basic consumption needs (this is called the



basic needs approach). The most important component of basic needs is a recommended food energy intake, supplemented by essential non-food goods. To measure food energy requirements, one needs to make an assumption about activity levels which in turn determine energy requirements to maintain the body's metabolic rate at rest. Once the food energy intake has been determined, and its cost has been calculated, an allowance for non-food spending can be added by finding the total expenditure level at which a person typically attains the food component of the poverty line. An alternative (lower) allowance for non-food goods is to use the average non-food spending of people who can just afford the food component of the poverty line: it can be argued that this is a reasonable lower bound for the non-food component of the poverty line (see Ravallion reference in section 7a below).

--Relative poverty lines: These have dominated developed country literature where many studies have used a poverty line which is set at, for example, 50% of the national mean income. When the poverty line is fixed as a proportion of the national mean, if all incomes increase by the same proportion, there would be no change in relative inequalities and the poverty line would simply increase by the same proportion; that is, the poverty measure will not change. This can make such poverty lines deceptive for some purposes, such as assessing whether poor people are better or worse off.

A cross-country comparison of 36 countries, both developed and developing, revealed that real poverty lines will tend to increase with economic growth, but they will do so slowly for the poorest countries. Therefore, the concept of absolute poverty appears to be more relevant to low income countries, while relative poverty is of more relevance to high income countries.

(c) **The Indicator in the DSR Framework:** In the DSR Framework, this indicator represents a measure of the State of poverty.

(d) **Limitations of the Indicator:** In practice, most applications in developing countries have used consumption per person. This probably overstates the extent to which poverty is associated with larger family sizes. But other aspects of the poverty profile (such as assessments of the regional or sectoral poverty profiles) tend to be more robust as a measurement choice.

It is important to note that a certain amount of arbitrariness and value judgement are unavoidable in defining individual welfare and any poverty line. Therefore, the overall assessment of the poverty situation should pay particularly attention to how the choices made affect poverty comparisons, since these are generally what matter most to policy implications. An increasingly common practice is to recalculate the poverty measures using various poverty lines, and to test whether the qualitative poverty comparisons are robust to the choice.

It should be noted that there are several comparability problems across countries in the use of data from household surveys (see section 5 below). In addition, definitions of poverty are lacking in some countries or vary from country to country. These problems are diminishing over time as survey methodologies are improving and becoming more standardized, but they remain.

(e) **Alternative Definitions:** The Poverty Gap Index and the Squared Poverty Gap Index represent alternative definitions for a poverty indicator (see section 3c above and the relevant methodology sheets for these indicators).

## 5. Assessment of the Availability of Data from International and National Sources

The most important source of data on living standards is household surveys. The results of these surveys can be obtained from government statistical agencies, often via published reports. About two thirds of the developing countries have done sample household surveys which are representative nationally, and some (but certainly not all) of these provide high-quality data on living standards.

Data can also be obtained from international agencies such as The World Bank (mostly data for low and middle income countries emerging from the Living Standards Measurement Study and Social Dimensions of Adjustment Project for Sub Saharan Africa). Data for developed countries can be obtained from the Statistical Office of the European Union (Eurostat), the Luxembourg Income Study, or the Organisation for Economic Co-operation and Development (OECD).

## 6. Agencies Involved in the Development of the Indicator

The lead agency involved is The World Bank (WB). The contact point is the Chief, Indicators and Environmental Valuation Unit, Environment Department, WB; fax no. (1-202) 477 0968.

## 7. Further Information

### (a) Further Readings:

Ravallion, M. Poverty Comparisons. Fundamentals in Pure and Applied Economics, Volume 56, Harwood Academic Press, Switzerland. 1994.

POVERTY GAP INDEX		
Social	Chapter 3	State

#### 1. Indicator

(a) **Name:** Poverty Gap Index.

(b) **Brief Definition:** The mean over the population of the proportionate poverty gap, where the poverty gap is given by the distance of the poor below the poverty line, as a proportion of the line. The non-poor are counted as having zero poverty gap.

(c) **Unit of Measurement:** Fraction bounded by 0 and the Head Count Index.

#### 2. Placement in the Framework

(a) **Agenda 21:** Chapter 3: Combating Poverty.

(b) **Type of Indicator:** State.

#### 3. Significance (Policy Relevance)

(a) **Purpose:** The most important purpose of a poverty measure is to enable poverty comparisons. These are required for an overall assessment of a country's progress in poverty alleviation and/or the evaluation of specific policies or projects. An important case of a poverty comparison is the poverty profile which shows how the aggregate poverty measure can be decomposed into poverty measures for various sub-groups of the population, such as by region of residence, employment sector, education level, or ethnic group. A good poverty profile can help reveal a number of aspects of poverty-reduction policies, such as the regional or sectoral priorities for public spending. Poverty comparisons are also made over time, in assessing overall performance from the point of view of the poor.

(b) **Relevance to Sustainable/Unsustainable Development:** Measures of poverty are a very significant consideration of sustainable development. The eradication of poverty remains a major challenge for policy decision makers. Furthermore, an integrative viewpoint which simultaneously takes account of development issues, resource use and environmental quality, and human welfare must be taken if sustainable progress is to be achieved.

The Poverty Gap Index measures the depth of poverty in a country or region, based on the aggregate poverty deficit of the poor relative to the poverty line. Since the Head Count Index (see section 3c below) is not sensitive to changes in the status of those already below the poverty line, it is inadequate in assessing the impact of specific policies on the poor. On the other hand, the Poverty Gap Index increases with the distance of the poor below the poverty line, and thus gives a good indication of the depth of poverty. A decline in the Poverty Gap Index reflects an improvement in the current situation.

(c) **Linkages to Other Indicators:** In general, this indicator is linked to many other sustainable development measures, for example, net migration rate, adult literacy rate, Gross Domestic Product per capita, and population living below the poverty line in dryland areas. More specifically, the poverty measures discussed in this and two other methodology sheets; namely the Head Count Index, the Poverty Gap Index, and the Squared Poverty Gap Index; capture successively more detailed aspects of the poverty situation. The Head Count Index measures how widespread poverty is, the Poverty Gap Index measures how poor the poor are, and the Squared Poverty Gap Index measures the severity of poverty by giving more weight to the poorest of the poor.

(d) **Targets:** Not available.

(e) **International Conventions and Agreements:** Not available.

#### 4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** A poverty measure is a summary statistic on the economic welfare of the poor in a society. There is no one universally accepted single measure of poverty. A number of different approaches exist (see, for example, the methodology sheets for the Poverty Gap Index and the Squared Poverty Gap Index). This methodology sheet guides the reader along certain key issues, such as the different approaches to measuring individual welfare, without prescribing decisions. Consequently, it is directed at comparability over time within a given country, as it helps national practitioners specify poverty indicators that match their specific situation and preferred approach. However, this is at the expense of international comparability.

To compute poverty measures, the following questions related to identifying and defining the poor must be addressed first:

i) How do we measure an individual's economic welfare?

ii) At what level of measured welfare is a person considered poor?

(b) **Measurement Methods:** The Poverty Gap Index is the mean across the population of a household poverty measure (weighted by household-size). The Index takes the value zero if the average economic welfare (for example, consumption) is above the poverty line, and is measured by the function  $1-y/z$  if it is at or below the line, where  $z$  is the poverty line and  $y$  denotes the mean consumption of the poor. For computing the Poverty Gap Index, estimates of individual economic welfare ( $y$ ), and the poverty line ( $z$ ) are required.

i) **Measuring Individual Welfare:** There are a number of different approaches to measuring welfare. The approaches differ in terms of the importance attached to the individual's own judgment of well-being versus a concept of welfare decided upon by somebody else. The former would focus on measuring an individual's consumption of a bundle of goods and services. An example of the latter would be defining welfare by the level of nutritional intake, even though people do not live on food alone, or make food choices solely on the basis of nutrition. Approaches in practice also differ according to how difficult it is to obtain certain sorts of data in specific settings.

Typically one finds that poverty comparisons in developing countries put a high weight on nutritional attainments, consistent with the behaviour of poor people in a specific society. A comprehensive measure of consumption (for example, total expenditure on all goods and services consumed, including non-market goods, such as consumption from a farmer's own product) has been more popular than using current income in the development literature. This is due in part to the fact that incomes are harder to measure accurately. Current consumption is also likely to give a better indication than current income of a household's typical, long-term, economic welfare; income may fluctuate greatly over time, particularly in rural economies (see Ravallion reference in section 7a below).

The following methods can be used for measuring individual standards of living:

--Consumption per equivalent male adult: Since households differ in size and composition, a simple comparison of aggregate household consumption can be misleading about the welfare of individual members of the household. Therefore, for any given household, an equivalence scale is used to approximate the number of single adults, based on observed consumption behaviour. There are a number of value judgments embedded in this practice; for example, differences in needs are reflected in differences in consumption. Adult females and children are assigned a male equivalence of less than one since they typically consume less; however, that may not mean that they have lower "needs" but rather have less power within the household. The existence of size economies in consumption may also mean that two people can live more cheaply together than apart (for a further discussion of these issues, see Ravallion reference in section 7a below).

--Undernutrition: This is a distinct concept, although closely associated with poverty. Undernutrition can be viewed as a specific type of poverty, namely food energy poverty. There are a number of arguments for and against using this as a measure of well-being. A practical advantage is that this measure does not have to be adjusted for inflation and would not be constrained by any inadequacy of price data.

Measures of child nutritional status can help capture aspects of welfare, such as distribution within the household which are not adequately reflected in other indicators. However, nutrition is not the only aspect that matters to the well-being of people, including the poor. Thus, poverty comparisons based solely on nutrition alone may be limited and deceptive.

ii) **Defining the Poverty Line:** In practice, there are a number of alternative approaches to defining poverty lines:

--**Absolute poverty lines:** An absolute poverty line is one which is fixed in terms of the living standard indicator being used (consumption, nutrition). It is fixed over the entire domain of comparison, that is, a poverty line which assures the same level of economic welfare would be used to measure and compare poverty across provinces or different situations. The poverty line may still vary, but only so as to measure the differences in the cost of a given level of welfare. Absolute poverty lines are more common in developing country literature.

The most common approach to defining absolute poverty lines is to estimate the cost in each region or at each date of a certain bundle of goods necessary to attain basic consumption needs (this is called the basic needs approach). The most important component of basic needs is a recommended food energy intake, supplemented by essential non-food goods. To measure food energy requirements, one needs to make an assumption about activity levels which in turn determine energy requirements to maintain the body's metabolic rate at rest. Once the food energy intake has been determined, and its cost has been calculated, an allowance for non-food spending can be added by finding the total expenditure level at which a person typically attains the food component of the poverty line. An alternative (lower) allowance for non-food goods is to use the average non-food spending of people who can just afford the food component of the poverty line: it can be argued that this is a reasonable lower bound for the non-food component of the poverty line (see Ravallion reference in section 7a below).

--**Relative poverty lines:** These have dominated developed country literature where many studies have used a poverty line which is set at, for example, 50% of the national mean income. When the poverty line is fixed as a proportion of the national mean, if all incomes increase by the same proportion, there would be no change in relative inequalities and the poverty line would simply increase by the same proportion; that is, the poverty measure will not change. This can make such poverty lines deceptive for some purposes, such as assessing whether poor people are better or worse off.

A cross-country comparison of 36 countries, both developed and developing, revealed that real poverty lines will tend to increase with economic growth, but they will do so slowly for the poorest countries. Therefore, the concept of absolute poverty appears to be more relevant to low income countries, while relative poverty is of more relevance to high income countries.

(c) **The Indicator in the DSR Framework:** In the DSR Framework, this indicator represents a measure of the State of poverty.

(d) **Limitations of the Indicator:** In practice, most applications in developing countries have used consumption per person. This probably overstates the extent to which poverty is associated with larger family sizes. But other aspects of the poverty profile (such as assessments of the regional or sectoral poverty profiles) tend to be more robust as a measurement choice.

It is important to note that a certain amount of arbitrariness and value judgement are unavoidable in defining individual welfare and any poverty line. Therefore, the overall assessment of the poverty situation should pay particularly attention to how the choices made affect poverty comparisons, since these are generally what matter most to policy implications. An increasingly common practice is to recalculate the poverty measures using various poverty lines, and to test whether the qualitative poverty comparisons are robust to the choice.

It should be noted that there are several comparability problems across countries in the use of data from household surveys (see section 5 below). In addition, definitions of poverty are lacking in some countries or vary from country to country. These problems are diminishing over time as survey methodologies are improving and becoming more standardized, but they remain.

(e) **Alternative Definitions:** The Head Count Index and the Squared Poverty Gap Index represent alternative definitions for a poverty indicator (see section 3c above and the relevant methodology sheets for these indicators).

## 5. Assessment of the Availability of Data from International and National Sources

The most important source of data on living standards is household surveys. The results of these surveys can be obtained from government statistical agencies, often via published reports. About two thirds of the developing countries have done sample household surveys which are representative nationally, and some (but certainly not all) of these provide high-quality data on living standards.

Data can also be obtained from international agencies such as The World Bank (mostly data for low and middle income countries emerging from the Living Standards Measurement Study and Social Dimensions of Adjustment Project for Sub Saharan Africa). Data for developed countries can be obtained from the Statistical Office of the European Union (Eurostat), the Luxembourg Income Study, or the Organisation for Economic Co-operation and Development (OECD).

## 6. Agencies Involved in the Development of the Indicator

The lead agency involved is The World Bank (WB). The contact point is the Chief, Indicators and Environmental Valuation Unit, Environment Department, WB; fax no. (1-202) 477 0968.

## 7. Further Information

### (a) Further Readings:

Ravallion, M. Poverty Comparisons. Fundamentals in Pure and Applied Economics, Volume 56, Harwood Academic Press, Switzerland. 1994.

SQUARED POVERTY GAP INDEX		
Social	Chapter 3	State

### 1. Indicator

- (a) **Name:** Squared Poverty Gap Index.
- (b) **Brief Definition:** The mean of the squared proportionate poverty gap.
- (c) **Unit of Measurement:** Fraction bounded by 0 and the Poverty Gap Index.

### 2. Placement in the Framework

- (a) **Agenda 21:** Chapter 3: Combating Poverty.
- (b) **Type of Indicator:** State.

### 3. Significance (Policy Relevance)

(a) **Purpose:** The most important purpose of a poverty measure is to enable poverty comparisons. These are required for an overall assessment of a country's progress in poverty alleviation and/or the evaluation of specific policies or projects. An important case of a poverty comparison is the poverty profile which shows how the aggregate poverty measure can be decomposed into poverty measures for various sub-groups of the population, such as by region of residence, employment sector, education level, or ethnic group. A good poverty profile can help reveal a number of aspects of poverty-reduction policies, such as the regional or sectoral priorities for public spending. Poverty comparisons are also made over time, in assessing overall performance from the point of view of the poor.

(b) **Relevance to Sustainable/Unsustainable Development:** Measures of poverty are a very significant consideration of sustainable development. The eradication of poverty remains a major challenge for policy decision makers. Furthermore, an integrative viewpoint which simultaneously takes account of development issues, resource use and environmental quality, and human welfare must be taken if sustainable progress is to be achieved.

In addition to the Head Count and Poverty Gap Indices, a third measure which better reflects changes in the severity of poverty is the Squared Poverty Gap Index. This is defined similar to the Poverty Gap Index except that the poverty gaps are squared, thus giving the highest weighting to the largest poverty gap. The need for this Index arises because the Poverty Gap Index may not adequately capture concerns over distribution changes within the poor. For example, if a policy resulted in money transfer from someone just below the poverty line to the poorest person, the Squared Poverty Gap Index will reflect this change, while the Poverty Gap Index will not.

(c) **Linkages to Other Indicators:** In general, this indicator is linked to many other sustainable development measures, for example, net migration rate, adult literacy rate, Gross Domestic Product per capita, and population living below the poverty line in dryland areas. More specifically, the poverty measures discussed in this and two other methodology sheets; namely the Head Count Index, the Poverty Gap Index, and the Squared Poverty Gap Index; capture successively more detailed aspects of the poverty situation. The Head Count Index measures how widespread poverty is, the Poverty Gap Index measures how poor the poor are, and the Squared Poverty Gap Index measures the severity of poverty by giving more weight to the poorest of the poor.

(d) **Targets:** Not available.

(e) **International Conventions and Agreements:** Not available.

#### 4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** A poverty measure is a summary statistic on the economic welfare of the poor in a society. There is no one universally accepted single measure of poverty. A number of different approaches exist (see, for example, the methodology sheets for the Poverty Gap Index and the Squared Poverty Gap Index). This methodology sheet guides the reader along certain key issues, such as the different approaches to measuring individual welfare, without prescribing decisions. Consequently, it is directed at comparability over time within a given country, as it helps national practitioners specify poverty indicators that match their specific situation and preferred approach. However, this is at the expense of international comparability.

To compute poverty measures, the following questions related to identifying and defining the poor must be addressed first:

i) How do we measure an individual's economic welfare?

ii) At what level of measured welfare is a person considered poor?

(b) **Measurement Methods:** The Squared Poverty Gap Index is the mean of a measure (weighted by household-size) that is zero if the household's welfare ( $y$ ) is above the poverty line ( $z$ ), and represented by the squared poverty gap, that is  $[1-y/z] \times [1-y/z]$ , if  $y$  is at or below  $z$ .

For computing the above indicator, estimates of individual economic welfare ( $y$ ), and the poverty line ( $z$ ) are required.

i) **Measuring Individual Welfare:** There are a number of different approaches to measuring welfare. The approaches differ in terms of the importance attached to the individual's own judgment of well-being versus a concept of welfare decided upon by somebody else. The former would focus on measuring an individual's consumption of a bundle of goods and services. An example of the latter would be defining welfare by the level of nutritional intake, even though people do not live on food alone, or make food choices solely on the basis of nutrition. Approaches in practice also differ according to how difficult it is to obtain certain sorts of data in specific settings.

Typically one finds that poverty comparisons in developing countries put a high weight on nutritional attainments, consistent with the behaviour of poor people in a specific society. A comprehensive measure of consumption (for example, total expenditure on all goods and services consumed, including non-market goods, such as consumption from a farmer's own product) has been more popular than using current income in the development literature. This is due in part to the fact that incomes are harder to measure accurately. Current consumption is also likely to give a better indication than current income of a household's typical, long-term, economic welfare; income may fluctuate greatly over time, particularly in rural economies (see Ravallion reference in section 7a below).

The following methods can be used for measuring individual standards of living:

--Consumption per equivalent male adult: Since households differ in size and composition, a simple comparison of aggregate household consumption can be misleading about the welfare of individual members of the household. Therefore, for any given household, an equivalence scale is used to approximate the number of single adults, based on observed consumption behaviour. There are a number of value judgments embedded in this practice; for example, differences in needs are reflected in differences in consumption. Adult females and children are assigned a male equivalence of less than one since they typically consume less; however, that may not mean that they have lower "needs" but rather have less power within the household. The existence of size economies in consumption may also mean that two people can live more cheaply together than apart (for a further discussion of these issues, see Ravallion reference in section 7a below).

--Undernutrition: This is a distinct concept, although closely associated with poverty. Undernutrition can be viewed as a specific type of poverty, namely food energy poverty. There are a number of arguments for and against using this as a measure of well-being. A practical advantage is that this measure does not have to be adjusted for inflation and would not be constrained by any inadequacy of price data. Measures of child nutritional status can help capture aspects of welfare, such as distribution within the household which are not adequately reflected in other indicators. However, nutrition is not the only aspect that matters to the well-being of people, including the poor. Thus, poverty comparisons based solely on nutrition alone may be limited and deceptive.

ii) Defining the Poverty Line: In practice, there are a number of alternative approaches to defining poverty lines:

--Absolute poverty lines: An absolute poverty line is one which is fixed in terms of the living standard indicator being used (consumption, nutrition). It is fixed over the entire domain of comparison, that is, a poverty line which assures the same level of economic welfare would be used to measure and compare poverty across provinces or different situations. The poverty line may still vary, but only so as to measure the differences in the cost of a given level of welfare. Absolute poverty lines are more common in developing country literature.

The most common approach to defining absolute poverty lines is to estimate the cost in each region or at each date of a certain bundle of goods necessary to attain basic consumption needs (this is called the basic needs approach). The most important component of basic needs is a recommended food energy intake, supplemented by essential non-food goods. To measure food energy requirements, one needs to make an assumption about activity levels which in turn determine energy requirements to maintain the body's metabolic rate at rest. Once the food energy intake has been determined, and its cost has been calculated, an allowance for non-food spending can be added by finding the total expenditure level at which a person typically attains the food component of the poverty line. An alternative (lower) allowance for non-food goods is to use the average non-food spending of people who can just afford the food component of the poverty line: it can be argued that this is a reasonable lower bound for the non-food component of the poverty line (see Ravallion reference in section 7a below).

--Relative poverty lines: These have dominated developed country literature where many studies have used a poverty line which is set at, for example, 50% of the national mean income. When the poverty line is fixed as a proportion of the national mean, if all incomes increase by the same proportion, there would be no change in relative inequalities and the poverty line would simply increase by the same proportion; that is, the poverty measure will not change. This can make such poverty lines deceptive for some purposes, such as assessing whether poor people are better or worse off.

A cross-country comparison of 36 countries, both developed and developing, revealed that real poverty lines will tend to increase with economic growth, but they will do so slowly for the poorest countries. Therefore, the concept of absolute poverty appears to be more relevant to low income countries, while relative poverty is of more relevance to high income countries.

(c) **The Indicator in the DSR Framework:** In the DSR Framework, this indicator represents a measure of the State of poverty.

(d) **Limitations of the Indicator:** In practice, most applications in developing countries have used consumption per person. This probably overstates the extent to which poverty is associated with larger family sizes. But other aspects of the poverty profile (such as assessments of the regional or sectoral poverty profiles) tend to be more robust as a measurement choice.

It is important to note that a certain amount of arbitrariness and value judgement are unavoidable in defining individual welfare and any poverty line. Therefore, the overall assessment of the poverty situation should pay particular attention to how the choices made affect poverty comparisons, since these are generally what matter most to policy implications. An increasingly common practice is to recalculate the poverty measures using various poverty lines, and to test whether the qualitative poverty comparisons are robust to the choice.

It should be noted that there are several comparability problems across countries in the use of data from household surveys (see section 5 below). In addition, definitions of poverty are lacking in some countries or vary from country to country. These problems are diminishing over time as survey methodologies are improving and becoming more standardized, but they remain.

(e) **Alternative Definitions:** The Head Count Index and the Poverty Gap Index represent alternative definitions for a poverty indicator (see section 3c above and the relevant methodology sheets for these indicators).

## 5. Assessment of the Availability of Data from International and National Sources

The most important source of data on living standards is household surveys. The results of these surveys can be obtained from government statistical agencies, often via published reports. About two thirds of the developing countries have done sample household surveys which are representative nationally, and some (but certainly not all) of these provide high-quality data on living standards.

Data can also be obtained from international agencies such as The World Bank (mostly data for low and middle income countries emerging from the Living Standards Measurement Study and Social Dimensions of Adjustment Project for Sub Saharan Africa). Data for developed countries can be obtained from the Statistical Office of the European Union (Eurostat), the Luxembourg Income Study, or the Organisation for Economic Co-operation and Development (OECD).

## 6. Agencies Involved in the Development of the Indicator

The lead agency involved is The World Bank (WB). The contact point is the Chief, Indicators and Environmental Valuation Unit, Environment Department, WB; fax no. (1-202) 477 0968.

## 7. Further Information

### (a) Further Readings:

Ravallion, M. Poverty Comparisons. Fundamentals in Pure and Applied Economics, Volume 56, Harwood Academic Press, Switzerland. 1994.

<b>GINI INDEX OF INCOME INEQUALITY</b>		
<b>Social</b>	<b>Chapter 3</b>	<b>State</b>

1. Indicator

(a) **Name:** Gini Index of Income Inequality.

(b) **Brief Definition:** A summary measure of the extent to which the actual distribution of income, consumption expenditure, or a related variable, differs from a hypothetical distribution in which each person receives an identical share.

(c) **Unit of Measurement:** A dimensionless index scaled to vary from a minimum of zero to a maximum of one; zero representing no inequality and one representing the maximum possible degree of inequality.

## 2. Placement in the Framework

(a) **Agenda 21:** Chapter 3: Combating Poverty.



(b) **Type of Indicator:** State.

### 3. Significance (Policy Relevance)

(a) **Purpose:** The Gini Index provides a measure of income or resource inequality within a population. It is the most popular measure of income inequality.

(b) **Relevance to Sustainable/Unsustainable Development:** This indicator is particularly relevant to the equity component of sustainable development. Income or resource distribution have direct consequences on the poverty rate of a country or region. Broadly speaking, average material welfare can be defined by the per capita Gross Domestic Product (GDP). However, statistical averages can mask the diversity that exists within any country. Therefore, from a sustainable development perspective, it is informative to examine income and wealth distribution throughout a population. A country can, for example, have a high per capita GDP figure, but its income distribution so skewed that the majority of people are poor. This indicator is useful both to measure changes in income inequality over time and for international comparisons.

(c) **Linkages to Other Indicators:** This indicator is linked to several other sustainable development measures, including the poverty indicators, women per 100 men in the labour force, GDP per capita, population dynamics in mountain areas, and sustainable development strategies.

(d) **Targets:** Not available.

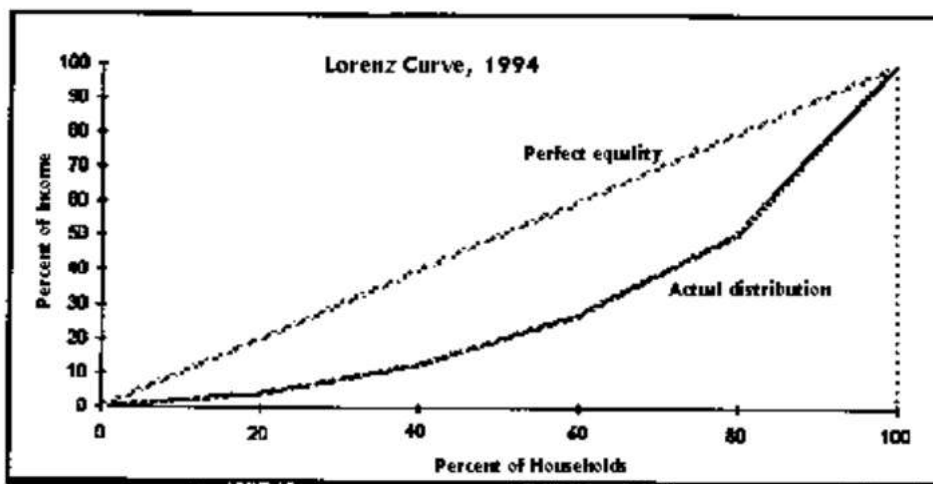
(e) **International Conventions and Agreements:** Not available.

### 4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** The concept and definition of this indicator are well understood and readily available. The Gini Index measures the area between the Lorenz Curve and a hypothetical line of absolute equality, expressed as a percentage of the maximum area under the line of perfect equality (see Figure 1 in section 4b below). The Gini Index is defined as one half of the average value of the absolute differences between all possible pairs of "incomes".

(b) **Measurement Methods:** The Lorenz Curve plots the cumulative percentages of total income received (on the vertical axis) against the cumulative percentage of recipients, starting with the poorest individual or household (see Figure 1).

Figure 1: The Lorenz Curve and Gini Index of Income



There are a number of choices about data which can influence the precise value of the Gini Index obtained. For example, a Gini Index for consumption expenditure will typically be lower in value than one for income, even within the same population. This is because households smooth their consumption over time in response to income changes. At any one date, there will be some households with

unusually low incomes and others with unusually high ones; with some opportunities for saving and/or borrowing. Thus, household consumption will be less unequal.

It is important how "income" is measured, for example whether it is total household income or per capita household income, or income per equivalent adult. In addition, it matters whether or not the incomes are weighted by household size, since households with lower income per person tend to be larger. Thus, the income share of the poorest 20% of households will be higher than the income share of the poorest 20% of persons.

The World Bank, for example, prefers to weight by household size and calculate the shares held by persons rather than households for most purposes. As a general rule, the Bank also considers consumption expenditure to be the more reliable indicator of welfare than income, which can be excessively variable over time, and is also more difficult to measure accurately, particularly in developing countries. Looking at the sample of 67 low and middle income countries for which Gini indices of income are reported in the World Bank's draft report World Development Indicators, this coefficient ranges from a low of 22% to a high value of 64%.

There are a number of ways of estimating the Gini Index of income, and the choice depends in part on the type of data available. Distributional data are often available in grouped form, such as the income share of the lowest decile of households, where households are ranked by income per person. To estimate the Lorenz Curve, and thus the Gini Index, from such data, the World Bank often uses a software package called POVCAL. Having specified the type of data, the program calculates both the General Quadratic specification for the Lorenz Curve and the Beta specification. It then calculates the Gini Index and various other statistics, including poverty measures for each Lorenz Curve. The program also advises which is the better specification for the Lorenz Curve for the specific data used.

(c) **The Indicator in the DSR Framework:** In the DSR Framework, this indicator represents a measure of the State of income inequality.

(d) **Limitations of the Indicator:** The Gini Index is not a very discriminating indicator. Two very different distributions--one having more inequality amongst the poor, the other having more amongst the rich--can have exactly the same Gini Index.

Measurement errors in data sets are thought to be greater for incomes compared to consumption expenditure, which will add to measured inequality (see section 4b above). Differences between countries in the measured Gini index may thus reflect in part differences in the welfare measures used.

While the Gini Index of income (in common with most other measures of inequality) captures information on the pattern of relative levels of wellbeing in the population, it is independent of any considerations of absolute living standards. So there is nothing to guarantee that a lower Gini Index of income entails higher social welfare in any agreed sense, since the mean income may have also fallen. The Gini Index is at best a partial indicator, and other measures will be needed to complete the picture of how levels of economic welfare are evolving in a society.

It should be noted that there are several comparability problems across countries in the use of data from household surveys (see section 5 below). These problems are diminishing over time as survey methodologies are improving and becoming more standardized, but they remain.

(e) **Alternative Definitions:** There are many other measures of inequality, with various strengths and weaknesses. These are discussed in Sen (1973) (see section 7a below).

## 5. Assessment of the Availability of Data from International and National Sources

The most important source of data on living standards is household surveys. The results of these surveys can be obtained from government statistical agencies, often via published reports. About two thirds of the developing countries have done sample household surveys which are representative nationally, and some (but certainly not all) of these provide high-quality data on living standards.

Data can also be obtained from international agencies such as The World Bank (mostly data for low and middle income countries emerging from the Living Standards Measurement Study and Social Dimensions of Adjustment Project for Sub Saharan Africa). Data for developed countries can be obtained from the Statistical Office of the European Union (Eurostat), the Luxembourg Income Study, or the Organisation for Economic Co-operation and Development (OECD).

## 6. Agencies Involved in the Development of the Indicator

The lead agency involved is The World Bank (WB). The contact point is the Chief, Indicators and Environmental Valuation Unit, Environment Department, WB; fax no. (1-202) 477 0968.

## 7. Further Information

### (a) Further Readings:

Chen, S., G. Datt, M. Ravallion. POVCAL: A Program for Calculating Poverty Measures from Grouped Data. Poverty and Human Resources Division, Policy Research Department, Washington DC: World Bank. 1992.

Ravallion, M., and S. Chen. What Can New Survey Data Tell Us About Recent Changes in Living Standards in Developing and Transitional Economies?. Working Paper 1. Research Project on Social and Environmental Consequences of Growth-Oriented Policies, Washington DC: World Bank.

Sen, A. On Economic Inequality. Oxford: Oxford University Press. 1973.

The World Bank. World Development Indicators. Draft Report. 1996.

RATIO OF AVERAGE FEMALE WAGE TO MALE WAGE		
Social	Chapter 3	State

### 1. Indicator

(a) **Name:** Ratio of average female wage to male wage.

(b) **Brief Definition:** Obtained as the quotient of average wage rates paid to female and male employees at regular intervals for time worked or work done for particular occupations.

(c) **Unit of Measurement:** %.

### 2. Placement in Framework

(a) **Agenda 21:** Chapter 3: Combating Poverty

(b) **Type of Indicator:** State.

### 3. Significance (Policy Relevance)

(a) **Purpose:** It is important to have an assessment of remuneration offered women vis-a-vis their male counterpart to ultimately determine the level of women's participation in the economy.

(b) **Relevance to Sustainable/Unsustainable Development:** The lower the ratio of wages offered to women, the less the attraction for women to join the labor force, which in turn deprives the economy of a vital component of development. This disadvantage could also be attributed to inequalities in educational opportunities for women and the need for policy makers to correct this inequity. It is generally acknowledged that if women are more educated, it is likely to result in a corresponding reduction in infant mortality rates.

(c) **Linkages to Other Indicators:** The indicator has close linkages with the unemployment rate indicator because both deal with employment as a principal generator of production. It is also closely linked to indicators pertaining to education.

(d) **Targets:** Not available.

(e) **International Conventions and Agreements:** The resolution covering the institution of an integrated system of wages statistics, including defined earnings and wage rates, was adopted by the Twelfth International Conference of Labor Statisticians in Geneva in 1973 (see section 7 below).

#### 4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** The UN International Labour Office (ILO) and the UN System of National Accounts (SNA) provide two sources for this section.

i) The concept of earnings, as applied in wages statistics, relate to remuneration in cash and in kind paid to employees, usually at regular intervals, for time worked; or work done together with remuneration for time not worked, such as for annual vacation, other paid leave or holidays. Wage rates, as part of earnings, include basic wages, cost-of-living allowances and other guaranteed and regularly paid allowances, but exclude overtime payments, bonuses and gratuities, family allowances and other social security payments made by employers. Ex gratia payments in kind, supplementary to normal wage rates are also excluded (ILO).

ii) Wages and salaries, as part of compensation to employees, are payable in cash or in kind and include the values of any social contributions, such as income taxes, payable by the employee even if they are actually withheld by the employer for administrative convenience or other reasons and paid directly to social insurance schemes, tax authorities, etc. on behalf of the employee. Wages and salaries in cash include payments at regular intervals, supplementary allowances payable regularly, payments to employees away from work for short periods such as holidays, and ad hoc bonuses linked to performance, commissions, gratuities and tips (SNA).

(b) **Measurement Methods:** The indicator is measured by taking the average wage rates per day, week or month received by female employees as a ratio of the corresponding average wage rates for males. It could be classified further according to major divisions of economic activity, for example, agriculture, mining and quarrying, etc., to facilitate measurement of sectoral impact on the development process. Similarly, breakdowns according to age classes would provide additional information related to sustainable development trends.

(c) **The Indicator in the DSR Framework:** This indicator deals with the participation of labor in the economic process, and stresses the importance of human activities to sustainable development. It fits ideally within the DSR Framework as a State indicator.

(d) **Limitations of the Indicator:** A serious limitation is the reliability and comprehensiveness of wage rate data paid to female labor. Although data is available for many countries, the quality varies significantly among countries. Wage rates determine total remuneration and measure women's contribution to total production. However, since most of the basic remuneration for women's economic and social activities remain unreported or unrecorded--and even if reported, are grossly undervalued--only imputations are possible in many countries. The indicator will be greatly influenced by the selection of wage sectors, and type and level of job. The cost of collecting the data from questionnaires and surveys can be significant.

Another limitation is that female wage rates do not tell the whole story. Wages, particularly for females, may reflect under-employment. Women, especially in developing countries, may participate in informal activities where they are not classified as wage earners. They do not receive income in the SNA sense and therefore these activities are not covered by this indicator.

(e) **Alternative Indicator Definitions:** An alternative indicator to the male-female wage would be the percentage contribution of women to GDP which measures activities in the production boundary that incorporate the contribution of women in the economic process as proposed in the 1993 SNA. This would include the production and processing of agricultural, dairy and fishery products and flour by milling; weaving, dress making, production of footwear, baskets, mats, etc.

#### 5. Assessment of the Availability of Data from National and International Sources

The average wage rates paid to female and male employees provide the basic information to compile this indicator and are mainly reported by departments or ministries of labor in most countries. It is obtained either through questionnaires or surveys from the different economic sectors of the economy. Average earnings are usually derived from payroll data supplied by a sample of establishments together with data on hours of work and on employment. Occasionally, wage indices are reported in the absence

of absolute wage data. In some other cases, information is compiled on the basis of social insurance statistics. The extent of data availability is published by the ILO in the Yearbook of Labor Statistics.

## 6. Agencies Involved in the Development of the Indicator

The International Labor Office (ILO) is the principal agency and contact point in the development of this indicator. The contact is the Focal Point for Environment and Sustainable Development; fax no. (41 22) 798 8685.

## 7. Further Information

The full text of the resolution listed in section 3e above can be found in Current International Recommendations on Labor Statistics (Geneva 1988).

Further information can be obtained from other ILO publications, as follows:

An Integrated System of Wages Statistics: A Manual on Methods (Geneva 1979).

Statistical Sources and Methods; Vol. 2 Employment, Wages and Hours of Work (Establishment Surveys) (Geneva 1987); Vol. 4 Employment, Unemployment, Wages and Hours of Work (Administrative Records and Related Sources) (Geneva 1989).

[Chapter 5: Demographic dynamics and sustainability](#)

- Population growth rate
- Net migration rate
- Total fertility rate
- Population density

## ***Chapter 5: Demographic dynamics and sustainability***

POPULATION GROWTH RATE		
Social	Chapter 5	Driving Force

### 1. Indicator

- (a) **Name:** Population growth rate.
- (b) **Brief Definition:** The average annual rate of change of population size during a specified period.
- (c) **Unit of Measurement:** Usually expressed as a percentage.

### 2. Placement in the Framework

- (a) **Agenda 21:** Chapter 5: Demographic Dynamics and Sustainability.
- (b) **Type of Indicator:** Driving Force.

### 3. Significance (Policy Relevance)

- (a) **Purpose:** The population growth rate measures how fast the size of the population is changing.

(b) **Relevance to Sustainable/Unsustainable Development:** Agenda 21 identifies population growth as one of the crucial elements affecting long-term sustainability (see especially paragraphs 5.3 and 5.16). Population growth, at both national and subnational levels, represents a fundamental indicator for national decision makers. Its significance must be analyzed in relation to other factors affecting sustainability. However, rapid population growth can place strain on a country's capacity for handling a wide range of issues of economic, social, and environmental significance, particularly when rapid population growth occurs in conjunction with poverty and lack of access to resources, or unsustainable patterns of production and consumption, or in ecologically vulnerable zones (see paragraphs 3.14, 3.25 and 3.26 of the ICPD Programme of Action).

(c) **Linkages to Other Indicators:** There are close linkages between this indicator and other demographic and social indicators, as well as all indicators expressed in per capita terms (for example, GDP per capita). Population growth usually has implications for indicators related to education, infrastructure, and employment. It is also related to human settlements and the use of natural resources, including sink capacities. Population growth can increase environmental degradation, although this is not always the case.

(d) **Targets:** International agreements do not establish national or global targets. A number of national governments have adopted numerical targets for the rate of population growth. In 1993, 11 percent of governments considered their rates of population growth to be too low, 45 percent were satisfied with the rate, and 44 percent considered it to be too high.

(e) **International Conventions and Agreements:** Not available (See 3d above).

#### 4. Methodological Description and Underlying Definitions

The underlying concept of population growth rate as an indicator is well-known. For a country, it is generally based on either (i) an intercensal population growth rate calculated from two censuses, each adjusted for incompleteness; or (ii) from the components of population growth (adjusted for incompleteness, when necessary) during a period, namely, numbers of births, deaths and migrants.

#### 5. Assessment of the Availability of Data from International and National Sources

As indicated above, the population growth rate can be calculated either from census data or from registration data (births, deaths and migrants). The United Nations recommends that countries take censuses every 10 years, and these data can be used to calculate an intercensal population growth rate. In recent decades most countries have carried out censuses and is widely available. For example, 204 countries or areas carried out a census during the 1990 census decade (1985 to 1994). Data on births, deaths and migrants may come from national registration systems or from special questions in demographic surveys and censuses.

National and sub-national census data, as well as data on births, deaths and migrants, are available for the large majority of countries from national sources and publications; as well as from special country questionnaires sent to national statistical offices from the Statistical Division, UN Department of Economics and Social Information and Policy Analysis (DESIPA). For all countries, census and registration data are evaluated and, if necessary, adjusted for incompleteness by the Population Division, DESIPA as part of its preparations of the official United Nations population estimates and projections. Past, current and projected population growth rates are prepared for all countries by the Population Division, DESIPA and appear in the United Nations publication, *World Population Prospects: The 1994 Revision* (see item 7, below).

#### 6. Agencies Involved in the Development of the Indicator

The lead organization is the United Nations DESIPA. The contact point is the Director, Population Division, DESIPA; fax no. (1 212) 963 2147.

#### 7. Further Information

Further references include:

Population Division, DESIPA, *World Population Prospects: The 1994 Revision* (United Nations publication Sales No. E.95.XIII.16, New York, 1995).

Population Division, DESIPA, Manual X: Indirect Techniques for Demographic Estimation (United Nations Sales No. E.83.XIII.2, New York, 1983).

Population Division, DESIPA, World Urbanization Prospects: The 1994 Revision (United Nations publication Sales No. E.95.XIII.12, New York, 1995).

Population Division, DESIPA, MORTPAK-LITE - The United Nations Software Package for Mortality Measurement (United Nations, New York, 1988).

Statistical Division/DESIPA, 1993 Demographic Yearbook, (United Nations Sales No. E/F.95.XIII.1, 1995).

For information about government policies regarding this indicator see:

United Nations, World Population Monitoring, 1993 (United Nations Sales No. E.95.XIII.8., New York, 1995).

United Nations, Results of the Seventh United Nations Population Inquiry Among Governments (New York, 1995, ST/ESA/SER.R/140).

NET MIGRATION RATE		
Social	Chapter 5	Driving Force

1. Indicator

(a) **Name:** Net migration rate.

(b) **Brief Definition:** Ratio of the difference between the number of in-migrants and out-migrants from a particular area during a specified period to the average population of that area during the period considered. International and internal migration are discussed separately in sections 4 and 5 below.

(c) **Unit of Measurement:** The indicator is usually expressed as per thousand population.

## 2. Placement in the Framework

(a) **Agenda 21:** Chapter 5: Demographic Dynamics and Sustainability

(b) **Type of Indicator:** Driving Force.

## 3. Significance (Policy Relevance)

(a) **Purpose:** The net migration rate measures geographical mobility of population. Migration is one of the basic demographic events -- birth and death are the others -- that directly influence the size of population in an area.

(b) **Relevance to Sustainable/Unsustainable Development:** Net migration is a major force of demographic redistribution. At the international level, migration (people) is one of three important flows along with commodities (goods and services), and capital (money), that go beyond the traditional boundaries of a sovereign state. Within countries, migration both influences and is influenced by economic, social, environmental and political events. Increases of net migration linked to a loss of livelihood can be a symptom of unsustainability.

Migration is often seen as an economic phenomenon--in discussions of labour migration from rural to urban areas or from the developing countries to the developed countries, for example. It can also be a political phenomenon, as with asylum seekers and refugees. Recently, linkages with environmental factors are receiving increasing attention, as in the cases of "environmental refugees" and migration to ecologically fragile areas. The significance of migration to national policy makers does not rest only in its size, but also in its composition. Such migrant characteristics as age, sex, fertility level, educational

background, occupation, and skill levels have profound implications for development in both the sending and the receiving areas or countries.

(c) **Linkages to Other Indicators:** The net migration rate is considered to have strong associations with economic, social, and environmental indicators. There are close linkages between this indicator and other demographic indicators, including urbanization-related indicators. In addition, migration rates can be associated with natural resource depletion, desertification, and land use change.

(d) **Targets:** International agreements do not establish national or global targets. Nearly all national governments regulate international migration, and many governments have policies intended to influence internal migration flows.

(e) **International Conventions and Agreements:** Not available.

#### 4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** See section 4b below.

(b) **Measurement Methods:**

i) Net internal migration rate: The net migration rate for particular areas within a country is usually estimated on the basis of the number of persons reporting that they changed residence from outside to within the area of interest during a given period and those reporting that they changed residence from within to without the area of interest during the same period. Those reports are usually made only at the time of a census. A few countries maintaining continuous population registers have access to the required information on a yearly basis. Both censuses and population registers also produce information on the total population in the area of interest that allows the estimation of the denominator for the calculation of a net migration rate. When reliable direct information about in- and out-migration is unavailable, net migration can be estimated indirectly, as a residual factor when other sources of population change--births, deaths, and, in some cases, changes of boundaries of cities or other units--have been estimated separately (see section 5b below).

ii) Net international migration rate: Ideally, the net migration rate for a country should be derived directly from the number of immigrants to and emigrants from that country over a given period, and a count of the average population size of the country during that period. However, few countries gather sufficiently comprehensive international migration statistics on a continuous basis to allow direct calculation of the net migration rate. Therefore, the rate must often be estimated indirectly from other information. The most common estimation approach is to calculate the net migration rate as the difference between the growth rate of a country's population over a certain period and the rate of natural increase of that population (itself being the difference of the birth rate and the death rate). Such calculations are usually made for intercensal periods. Before estimating the net migration rate in this way, data must be evaluated and, if necessary, adjusted for differential levels of census under-enumeration between censuses and for errors in the estimation of the birth or death rates of a country. Other indicators of migration such as the percentage of the population born outside the country (a "stock" measure) are often used instead of the net migration rate.

(c) **The Indicator in the DSR Framework:** The indicator is a subcomponent of population change. As such it is regarded as a Driving Force indicator.

(d) **Limitations of the Indicator:** The definitions of immigrant and emigrant used by different countries and even for different data sources within a single country vary considerably, thus compromising the comparability and interpretation of the indicator. The data are often poorly measured restricting the usefulness for modelling purposes. Illegal immigrants are not captured by the census or survey statistics.

(e) **Alternative Definitions:** Alternative indicators of international migration, such as the stock of foreign-born persons in a country, are often used.

#### 5. Assessment of the Availability of Data from National and International Sources

i) Net internal migration rate: Censuses are the major source of information on internal migration. They vary, however, in the type of data they collect and the way in which the information obtained is coded



and tabulated. The questions most commonly included in censuses that indicate the occurrence of some change of residence are: current place residence and place of residence at a specific time before the census; current and previous place of residence, and length of stay in current residence; place of birth. Most countries code place of residence in terms of major geographical subdivision (state, department, province etc.) although use of a finer subdivision of the territory is often useful. Some countries record the urban or rural nature of the place of residence involved. However, net rural-urban migration is more likely to be derived from indirect estimation procedures than directly from census data. In general, data on internal migration gathered by censuses remain underexploited and there is no comprehensive source of information of net migration rates between different units within countries, except for countries with a population register.

(ii) Net international migration rate: Direct and comprehensive data on international migration movements are not available for most countries or areas of the world. However, the Population Division, UN Department of Economics and Social Information and Policy Analysis (DESIPA) takes into account the available direct and indirect evidence to derive net migration estimates, which are published as part of the biennial estimates and projections of population. Population registers are the data sources most likely to yield the information needed to calculate the net migration rate, but only a few developed countries maintain such registers. Immigration statistics derived from the administrative procedures involved in admitting foreigners for residence do not provide good measures of flows nor are they sufficiently comprehensive to permit the estimation of migration rates as they do not reflect the migration of citizens. In a few countries, arrival and departure statistics derived as part of migration control at ports of entry provide information on the number of immigrants and emigrants. However, most countries gathering arrival and departure statistics fail to differentiate international migrants from other travellers and consequently those data cannot be used to derive net migration rates.

For both internal and international migration, both absolute data and rate of change are required by policy makers. The composition of migrants would also be useful.

#### 6. Agencies Involved in the Development of the Indicator

The lead organization is the United Nations DESIPA. The contact point is the Director, Population Division, DESIPA; fax no. 1 212 963 2147.

#### 7. Further information

##### i) Net internal migration rate

Patterns of Urban and Rural Population Growth (United Nations publication, Sales No. E.79.XIII.9).

Internal Migration of Women in Developing Countries (United Nations publication, Sales No. E.94.XIII.3).

Courgeau, Daniel, Méthodes de Mesure de la Mobilité Spatiale (Institut National d'Etudes Démographiques, Paris, 1988).

##### ii) Net international migration rate

World Population Prospects: The 1994 Revision (United Nations publication, Sales No. E.95.XIII.16, New York, 1995).

1989 Demographic Yearbook (United Nations publication, Sales No. E/F.90.XIII.1).

Trends in Total Migrant Stock, Revision 1, database maintained by the Population Division, DESIPA, 1995 (POP/1B/DB/95/1).

Recommendations on International Migration Statistics (United Nations publication, Sales No. F.79.XVII.18).

Consolidated Statistics of all International Arrivals and Departures: A Technical Report (United Nations publication, Sales No. E.85.XVII.8).

National Data Sources and Programmes for Implementing the United Nations Recommendations on Statistics of International Migration (United Nations publication, Sales No. E.86.XVII.22).

Measuring International Migration: Theory and Practice, International Migration Review (Staten Island, New York), vol. 21, No. 4 (Winter).

TOTAL FERTILITY RATE		
Social	Chapter 5	Driving Force

### 1. Indicator

(a) **Name:** Total fertility rate.

(b) **Brief Definition:** The average number of children that would be born to a woman in her lifetime, if she were to pass through her childbearing years experiencing the age specific fertility rates for a given period.

(c) **Unit of Measurement:** The total fertility rate is usually expressed as per woman or per thousand women.

### 2. Placement in the Framework

(a) **Chapter 5:** Demographic Dynamics and Sustainability.

(b) **Type of Indicator:** Driving Force.

### 3. Significance

(a) **Purpose:** This is one of the most commonly used summary indicators of the level of fertility. An important property of the total fertility rate is that it is not affected by the age distribution of the population, although it can be affected by rapid changes in birth timing.

(b) **Relevance to Sustainable/Unsustainable Development:** The International Conference on Population and Development (ICPD) Programme of Action encourages countries to take the necessary steps to complete a demographic transition, understanding that an imbalance between demographic rates and social, economic and environmental goals, together with unsustainable patterns of production and consumption, has serious implications for sustainable development. In countries where fertility is still high, large young populations create major challenges for health services, education and employment (paragraphs 6.3, 6.4, and 6.6). As such it represents a leading indicator of future change.

(c) **Linkages to Other Indicators:** This indicator has close linkages with other demographic indicators, particularly with the population growth rate. The ICPD Programme of Action also emphasizes the interrelationships between fertility and mortality levels, the empowerment of women, and education particularly of women and girls.

(d) **Targets:** International agreements do not establish specific national or global targets, although the ICPD Programme of Action encourages Governments to bring about the demographic transition. Some national governments have established quantitative goals for total fertility rate. As of 1993, 12 per cent of governments perceived their levels of fertility as being too low, 44 per cent as satisfactory, and 45 per cent as too high (sec DESIPA, World Population Monitoring, 1995 listed in section 7 below).

(e) **International Conventions and Agreements:** See section 3d above.

### 4. Methodological Description and Underlying Definitions

Where data on births by age of mother are of good quality, or adjustments for age miss-statement and incompleteness can be made, the total fertility rate is directly calculated as the sum of age-specific fertility rates, or five times the sum if data are given in five-year age groups. (An age-specific fertility rate is calculated as the ratio of annual births to women at a given age to the population of women of the

same age.) When data on births by age of mother are unavailable from registration systems or maternity history data in sample surveys, the total fertility rate can be calculated through indirect methods based on special questions asked in censuses or demographic surveys. For information on these indirect estimates, see Manual X and U.C. - LITE (see section 7 below).

## 5. Assessment of the Availability of Data from National and International Sources

Collected by the United Nations on a regular basis and available for most countries from vital registration systems or surveys. For all countries, census and registration data are evaluated and, if necessary, adjusted for incompleteness by the Population Division, Department of Economics and Social Information and Policy Analysis (DESIPA) as part of its preparations of the official United Nations population estimates and projections. Past, current and projected population growth rates are prepared for all countries by the Population Division, DESIPA and appear in the United Nations publication, World Population Prospects: The 1994 Revision (see section 7 below).

Most countries tabulate data from birth registration systems at the sub-national level. Surveys are generally designed to provide estimates for major regions within countries as well as at the national level. Less frequently the sample design permits the examining action of this indicator at state, provincial or lower administrative levels.

## 6. Agencies Involved in the Development of the Indicator

The lead organization is the United Nations Department of Economics and Social Information a Policy Analysis (DESIPA). The contact point is the Director, Population Division, DESIPA; fax no. (1 212) 963-2147.

## 7. Further Information

Population Division, DESIPA, World Population Prospects: The 1994 Revision (United Nations Sales No. E.95.XIII.16, New York, 1995).

Population Division, DESIPA, Manual X: Indirect Techniques for Demographic Estimation (United Nations Sales No. E.83.XIII.2, New York, 1983).

Population Division, DESIPA, MORTPAK-LITE - The United Nations Software Package for Mortality Measurement (United Nations, New York, 1988).

Population Division, DESIPA, World Population Monitoring, 1993 (United Nations publication, Sales No. E. 95.XIII.8, New York, 1995).

Programme of Action of the International Conference on Population and Development, Report of the International Conference on Population and Development, Cairo, Egypt, September 5-13, 1994. (United Nations Document - A/CONF. 171/13).

Statistical Division, DESIPA, 1993 Demographic Yearbook (United Nations Sales No.E/F.95.XIII.1,1995).

<b>POPULATION DENSITY</b>		
<b>Social</b>	<b>Chapter 5</b>	<b>State</b>

1. Indicator

(a) **Name:** Population density.

(b) **Brief Definition:** The total population size of a country or area divided by its surface area.

(c) **Unit of Measurement:** Usually expressed as population per square kilometer.

## 2. Placement in the Framework

(a) **Agenda 21:** Chapter 5: Demographic Dynamics and Sustainability.

(b) **Type of Indicator:** State.

## 3. Significance (Policy Relevance)

(a) **Purpose:** This indicator measures concentration of the human population in reference to space. Population density can be used as a partial indicator of human requirements and activities in an area. More refined indicators--such as number of persons per unit of habitable or cultivable land--may be more useful for analytic purposes. Similarly, disaggregation of the indicator to urban size categories would be useful in conjunction with other human settlement indicators.

(b) **Relevance to Sustainable/Unsustainable Development:** This indicator is most useful at the sub-national level. Agenda 21 makes specific references to population density in relation to desertification (Chapter 12) and to freshwater and solid wastes in urban areas (Chapters 18 and 21). In rural areas, demographic factors, working interactively with other factors such as ecological endowments and commercialization of agriculture, may place pressure on land resources. Higher or growing population density can threaten sustainability of protected forest area and ecologically fragile or marginal land. At the same time, population density is considered by some to be a driving-force of technological change in production, and high concentration of population in a limited area is the main defining feature of urban areas. High concentration of population also means more local demand for employment, housing, amenities, social security and services, and environmental infrastructure for sanitation and waste management, which may tax governments' management ability.

(c) **Linkages to Other Indicators:** This indicator has close linkages with other demographic indicators, particularly the population growth rate, net migration rate, life expectancy at birth and total fertility rate as well as human settlement indicators. In order to understand impacts of this indicator, it should be examined in conjunction with location of resources and systems of production and distribution. Higher population densities generally mean increased reliance on resource imports and the export of goods, as well as environmental impacts such as solid waste disposal, and emissions to air and water. Areas with high population densities tend to rely on the resources of less populated hinterlands, and thereby increase the risk of exceeding regional carrying capacities for stock and sink resources. With sub-national data, relationships to ecosystems, urban issues, and arable land, for example, can be addressed at a more local level.

(d) **Targets:** International agreements do not establish national or global targets.

(e) **International Conventions and Agreements:** Not available (see section 3d above).

## 4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** This indicator is well established.

(b) **Measurement Methods:** By definition, population density is calculated as population size divided by surface area. Surface area data, as collected by the Statistical Division, UN Department of Economics and Social Information and Policy Analysis (DESIPA), represent the total surface area, comprising land area and inland waters (assumed to consist of major rivers and lakes) and excluding only polar regions and uninhabited islands. In practice, the definition differs among countries, but is sufficiently comparable for interpretation and analysis.

(c) **The Indicator in the DSR Framework:** Population density represents a demographic State indicator.

(d) **Limitations of the Indicator:** The significance of the indicator is limited in countries which serve as international hinterlands importing all their food and natural resources. Large uninhabited areas, such as deserts, tend to distort the indicator. Disaggregation to the ecumene, or other sub-national areas, may be difficult in many countries.

(e) **Alternative Definitions:** Total land area instead of total area could represent a useful alternative definition.

## 5. Assessment of the Availability of Data from International and National Sources

Collected by the United Nations on a regular basis and available for all countries at the national level. For all countries, the population data, which provide the numerator for calculating density, are evaluated and, if necessary, adjusted for incompleteness by the Population Division/DESIPA as part of its preparations of the official United Nations population estimates and projections. Past, current and projected population figures for population density are prepared for all countries by the Population Division/DESIPA and appear in the United Nations publication, World Population Prospects: The 1994 Revision (see section 7 below).

Population density can be calculated for sub-national areas from census data available in most countries. The United Nations does not produce sub-national estimates of population density. However, such estimates are available from certain regional institutions, such as Eurostat.

## 6. Agencies Involved in the Development of the Indicator

The lead agency is the United Nations Department for Economic and Social Information and Policy Analysis (DESIPA). The contact point is the Director, Population Division, DESIPA; fax no. (1 212) 963 2147).

## 7. Further Information

Population Division, DESIPA, World Population Prospects: The 1994 Revision (United Nations Sales No. E.95.XIII.16, New York, 1995).

Statistical Division, DESIPA, 1993 Demographic Yearbook (United Nations Sales No.E/F.95.XIII.1, 1995).

[Chapter 36](#): Promoting education, public awareness and training

- Rate of change of school-age population
- Primary school enrolment ratio--gross
- Primary school enrolment ratio--net
- Secondary school enrolment ratio--gross
- Secondary school enrolment ratio--net
- Adult literacy rate
- Children reaching grade 5 of primary education
- School life expectancy
- Difference between male and female school enrolment ratios
- Women per hundred men in the labour force
- GDP spent on education

## **Chapter 36: Promoting education, public awareness and training**

RATE OF CHANGE OF SCHOOL-AGE POPULATION		
Social	Chapter 36	Driving Force

### 1. Indicator

- (a) **Name:** Rate of change of school-age population.
- (b) **Brief Definition:** The average annual rate of change of school-age population size during a specified period.
- (c) **Unit of Measurement:** Usually expressed as a percentage.

## 2. Placement in the Framework

(a) **Agenda 21:** Chapter 36: Promoting Education, Public Awareness and Training.

(b) **Type of Indicator:** Driving Force.

## 3. Significance (Policy Relevance)

(a) **Purpose:** This indicator measures how fast the school age population is changing.

(b) **Relevance to Sustainable/Unsustainable Development:** Education is a process by which human beings and societies reach their fullest potential. It is critical for promoting sustainable development and improving the capacity of people to participate in decision making to address their sustainable development concerns.

Knowledge of the rate of change in the school-age population assists in planning for educational facilities and services at the national and local levels. In most developing countries, growth in the school-age population represents a major component of the increase in educational services. For instance, in the least developed countries, between 1990 and 1995, the annual increase in numbers at the primary and secondary-school ages averaged around 2.5 per cent; the number of enrolled students must grow this rapidly merely to maintain enrolment ratios at their current levels. However, the school-age population is not increasing in all countries. Fluctuations in the school-age population may produce a need to adjust educational resources and infrastructure.

(c) **Linkages to Other Indicators:** This indicator has close linkages with other socioeconomic indicators such as the population growth rate, the fertility rate, and net migration. The size of the school age population provides the base (denominator) for calculation of school enrolment ratios. It could influence education response indicators, such as the share of Gross Domestic product devoted to education.

(d) **Targets:** International agreements do not establish specific national or global targets for this indicator.

(e) **International Conventions and Agreements:** Not applicable, see section 3d above.

## 4. Methodological Description and Underlying Definitions

The school-age population is generally defined in three age groups, ages 6-11, ages 12-17 and ages 18-23, which are used by the United Nations Educational, Scientific and Cultural Organization (UNESCO) for comparative purposes, since they correspond to the main educational levels of many countries. Other age groupings are used in some countries. The population figures should also be tabulated by sex, as a basis for calculating gender-specific enrolment ratios.

The rate of change of the school-age population for a country is generally based on an intercensal population growth rate calculated from two censuses, each adjusted for incompleteness and age misstatement. For periods following the most recent census, the changing numbers at each school age can be estimated, first, by applying estimated survival rates to the adjusted numbers of persons enumerated at the census. For dates more than 5 or 6 years since the census, account must be taken of children of school age born since the census. Finally, it is necessary to estimate the amount of net migration, which tends to be an important factor for smaller areas, even if it is unimportant at the national level. The difficulty of estimating the components of population change make estimates of growth of the school-age population increasingly subject to doubt as the time since the last population enumeration increases.

## 5. Assessment of the Availability of Data from International and National Sources

As indicated in section 4 above, the rate of change of population of school age can be calculated for national and sub-national areas from census data. The United Nations recommends that countries take censuses every 10 years, and these data can be used to calculate an intercensal population growth rate. In recent decades most countries have carried out censuses; 204 countries or areas carried out a census during the 1990 census decade (1985 to 1994).

National and sub-national census data are available by sex and age for the large majority of countries from national sources (country publications) as well as from special country questionnaires sent to

national statistical offices from the Statistical Division of the United Nations Department of Economics and Social Information and Policy Analysis (DESIPA). For all countries, national census data are evaluated and, if necessary, adjusted for incompleteness by the Population Division, DESIPA as part of its preparations of the official United Nations population estimates and projections. Past, current and projected school age populations are prepared for all countries by the Population Division, and appear in the United Nations publication, World Population Prospects: The 1994 Revision (see section 7 below).

## 6. Agencies Involved in the Development of the Indicator

The lead organization is the United Nations Department for Economic and Social Information and Policy Analysis (DESIPA). The contact point is the Director, Population Division, DESIPA; fax no. (1 212) 963 2147.

### 7. Further Information

Population Division, DESIPA, MORTPAK-LITE - The United Nations Software Package for Mortality Measurement (United Nations, New York, 1988).

Population Division, DESIPA, The Sex and Age Distribution of the World Populations - the 1994 Revision (United Nations publication, Sales No. E.95.XIII.2, 1994).

Population Division, DESIPA, World Population Prospects: The 1994 Revision (United Nations publication Sales No. E.95.XIII.16, New York, 1995).

Statistical Division, DESIPA, 1993 Demographic Yearbook (United Nations Sales No. E/F.95.XIII.1, 1995).

UNESCO, Trends and Projections of Enrolment by Level of Education, by Age and by Sex, 1960-2025 (as assessed in 1993), CSR-E-63.

PRIMARY SCHOOL ENROLMENT RATIO - GROSS		
Social	Chapter 36	Driving Force

### 1. Indicator

- (a) **Name:** Primary school enrolment ratio - gross.  
 (b) **Brief Definition:** Total enrolment in primary education as a proportion of the population of primary school-age according to national regulations.  
 (c) **Unit of Measurement:** %.

### 2. Placement in the Framework

- (a) **Agenda 21:** Chapter 36: Promoting Education, Public Awareness and Training.  
 (b) **Type of Indicator:** Driving Force.

### 3. Significance (Policy Relevance)

- (a) **Purpose:** The gross enrolment ratio is a general indicator of the level of participation in primary education. It provides at the same time a measure of the availability and utilization of school places to satisfy the educational needs of the eligible school-age population.

(b) **Relevance to Sustainable/Unsustainable Development:** Education is a process by which human beings and societies reach their fullest potential. Education is critical for promoting sustainable development and improving the capacity of people to address their sustainable development concerns. While basic education provides the underpinnings for any environmental and development education, the latter needs to be incorporated as an essential part of learning. It is also critical for achieving awareness, values, skills and behaviour consistent with sustainable development and for effective participation in decision making. It is during the primary educational stage when children become aware of the basic knowledge and values regarding sustainable development.

This indicator is used in monitoring the general status and trends of participation in primary education, and in assessing the relation between demand and supply of educational opportunities. Gross enrolment ratios of less than 100% identify situations in which there is a need for more school places to respond to unsatisfied educational needs, and/or for measures to encourage increase in enrolment. When the indicator has a value in excess of 100, it highlights the incidence of under-aged and/or over-aged enrolment. As regards over-aged students, their presence may be explained by late entrance or the incidence of repetition.

The relevance of this indicator in many developed countries is limited as primary school is compulsory with an enrolment ratio of usually 100%. If the enrolment is lower it usually indicates a data problem.

(c) **Linkages to Other Indicators:** Education is closely linked to other indicators reflecting basic needs, capacity building, information and science, and the role of the major groups. By including under-aged and over-aged students, gross enrolment ratio can only provide broad indications of the level of participation and school capacity utilization. For more precise assessments the net enrolment ratio should be used which is however conditioned by the availability of data on enrolment by age.

(d) **Targets:** The value of gross enrolment ratios can vary from less than 10% to more than 100%, reaching 130% in some countries when there are sizable under-aged and/or over-aged enrolment. For countries with low gross enrolment ratios, the target is to reach and cross the 100% threshold. For those posting 130 or 140% gross enrolment ratio, the target would be to lower it to 100%, by reducing in particular over-aged enrolment and grade repetition.

(e) **International Conventions and Agreements:** The International Covenants on Human Rights and Optional Protocol.

#### 4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** Gross enrolment ratio for primary education is the most frequently used education indicator. By relating actual total enrolment in primary education, irrespective of age, to the population who according to the prevailing national regulations should be enrolled, this indicator of participation in primary education is conceptually simple as well as easy to derive. The lower limit of the population age-group is the entrance age to primary education and the upper limit is obtained by adding as many single ages as there are grades.

(b) **Measurement Methods:** The ratio is calculated as follows:

$$\frac{\text{Total enrolment in primary education}}{\text{Population in age-group } e} \times 100$$

where *e* is the age-group of the population eligible to participate in primary education according to national regulations. For sound measurement, the ratio must be supported by consistent data for gender and area (such as rural/urban zones).

(c) **The Indicator in the DSR Framework:** This indicator stresses the importance of education to the sustainable development process. It is recognized as a Driving Force indicator.

(d) **Limitations of the Indicator:** The gross enrolment ratio gives only broad indications of the availability of school places and the level of participation in primary education. It is important to point out that school age varies from country to country. The official entry age may not be adhered to by large sectors of the population in many developing countries because of lack of funding.



(e) **Alternative Definitions:** If data on enrolment in primary education by age are available, net enrolment ratio can be derived as a more precise alternative indicator of participation in education.

## 5. Assessment of the Availability of Data from National and International Sources

(a) **Data Needed to Compile the Indicator:** Total enrolment in primary education; and the corresponding school-age population according to national regulations, classified by sex. The number of school places available would provide additional meaning to this indicator.

(b) **Data Availability:** Data on total enrolment are normally available for most countries on an annual basis, collected through national school censuses. The corresponding data on primary school-age population are available only during national population censuses. Many national statistical offices produce inter-censal estimates as well as projections. United Nations population estimates and projections can also be obtained for most countries except for those with less than 150 000 inhabitants.

(c) **Data Sources:** Data on enrolment can be collected from the schools during school censuses organized by national ministries of education. Data on primary school-age population can be either derived from national population census results, or estimated and projected for the intervening years by national statistical offices or by the United Nations Population Division, Department of Economics and Social Information and Policy Analysis.

## 6. Agencies Involved in the Development of the Indicator

The lead agency for this indicator is the United Nations Educational, Scientific and Cultural Organization (UNESCO). The contact point is the Director, Division of Statistics, UNESCO, fax (33-1) 45 66 48 44.

## 7. Further Information

### (a) Further Readings:

UNESCO, Statistical Yearbook (annual editions); World Education Report, editions 1991, 1993, 1995. UNESCO, Paris.

### (b) Other References:

UNESCO, Statistics of Education in Developing Countries - An Introduction to their Collection and Analysis. Book 3. Division of Statistics, UNESCO, Paris 1983.

### (c) Status of the Methodology:

This indicator has the status of a recommendation since the basic data elements to derive it are included in the Revised Recommendation concerning the International Standardization of Education Statistics adopted by the UNESCO General Conference at its twentieth session, Paris, 1978.

PRIMARY SCHOOL ENROLMENT RATIO - NET		
Social	Chapter 36	Driving Force

## 1. Indicator

- (a) **Name:** Primary school enrolment ratio - net.  
(b) **Brief Definition:** This is the proportion of the population of the official age for primary education according to national regulations who are enrolled in primary schools.  
(c) **Unit of Measurement:** %.

## 2. Placement in the Framework

- (a) **Agenda 21:** Chapter 36: Promoting Education, Public Awareness and Training.  
(b) **Type of Indicator:** Driving Force.

### 3. Significance (Policy Relevance)

(a) **Purpose:** The net enrolment ratio provides a measure of the extent to which the population eligible to participate in primary education is actually enrolled. By deduction, it can be used in gauging the size of the non-enrolled primary school-age population.

(b) **Relevance to Sustainable/Unsustainable Development:** Education is a process by which human beings and societies reach their fullest potential. Education is critical for promoting sustainable development and improving the capacity of people to address their sustainable development concerns. While basic education provides the underpinnings for any environmental and development education, the latter needs to be incorporated as an essential part of learning. It is also critical for achieving awareness, values, skills and behaviour consistent with sustainable development and for effective participation in decision making. It is during the primary educational stage when children become aware of the basic knowledge and values regarding sustainable development.

This indicator is used in monitoring the level of participation in primary education and in identifying the non-enrolled school-age population. Net enrolment ratios approaching 100% indicate availability of adequate primary school capacities and active enrolment of school-age children. Low net enrolment ratios signal inadequacies in universalizing participation in primary education, due to either the lack of school places or other factors that prevent children from enrolling in school. This indicator when disaggregated by sex highlights the extent of gender disparities.

The relevance of this indicator in many developed countries is limited as primary school is compulsory with an enrolment ratio of usually 100%. If the enrolment is lower it usually indicates a data problem.

(c) **Linkages to Other Indicators:** Education is closely linked to other indicators reflecting basic needs, capacity building, information and science, and the role of the major groups. By including under-aged and over-aged students, gross enrolment ratio can only provide broad indications of the level of participation and school capacity utilization. For more precise assessments the net enrolment ratio should be used which is however conditioned by the availability of data on enrolment by age. Net enrolment ratio is more precise than gross enrolment ratio for assessing the level of participation in primary education. When combined in use with the latter, it provides an order of magnitude of the over-aged and under-aged enrolment. If data on enrolment and population by single years of age are available, the concept can be extended to derive age-specific enrolment ratios and school life expectancy.

(d) **Targets:** At both the international and national levels, the target of primary education programmes is to reach a 100% net enrolment ratio, or full participation in primary education of the school-age population.

(e) **International Conventions and Agreements:** The International Covenants on Human Rights and Optional Protocol; and the World Declaration on Education for All.

### 4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** The basic for this indicator is well-known. The numerator for the net enrolment ratio only includes those students enrolled in primary education whose ages are within the nationally prescribed age-range for primary education. The denominator is the population of the same official primary school-age.

(b) **Measurement Methods:** The ratio is calculated as follows:

$$\frac{\text{Enrolment within the age-group } e \text{ for primary education}}{\text{Population in age-group } e} \times 100$$

where  $e$  is the age-group of the population eligible to participate in primary education according to national regulations. As children enrolled within the age-range  $e$  may be a subset of the population of the same age-range, the value of this ratio can only lie in the range from 0 to 100%.

(c) **The Indicator in the DSR Framework:** This indicator stresses the importance of education to the sustainable development process. It is recognized as a Driving Force indicator.

(d) **Limitations of the Indicator:** The net enrolment ratio, compared to gross enrolment, is more precise in measuring participation in education, but it also requires more basic data to derive the indicator, namely: enrolment by age. However, these data are not collected by all countries, or may be unreliable.

(e) **Alternative Definitions:** The net enrolment ratio can be further used to determine the size of the non-enrolled school-age population, and over-aged and under-aged enrolment. If data on enrolment in primary education by single years of age are available, age-specific enrolment ratios can also be derived, as well as school life expectancy.

#### 5. Assessment of the Availability of Data from National and International Sources

(a) **Data Needed to Compile the Indicator:** Data on enrolment in primary education and population either by single years of age or corresponding to the official primary age-range, and classified by sex.

(b) **Data Availability:** Enrolment data are normally available for most countries on an annual basis, collected through national school censuses. Some countries do not collect data on enrolment in primary education by age, at least not on a regular basis. The corresponding data on primary school-age population are available only during national population censuses or from inter-censal estimates. United Nations estimates and projections can also be obtained for most countries except for those with less than 150,000 inhabitants.

(c) **Data Sources:** Data on enrolment by age can either be collected from the schools during school censuses organized by national ministries of education, or derived from data on school attendance by age collected during population censuses. Data on primary school-age population can be derived from national population census results, or estimated and projected for the intervening years either by the national statistics office or by the United Nations Population Division, Department of Economics and Social Information and Policy Analysis.

#### 6. Agencies Involved in the Development of the Indicator

The lead agency for this indicator is the United Nations Educational, Scientific and Cultural Organization (UNESCO). The contact point is the Director, Division of Statistics, UNESCO, fax (33-1) 45 66 48 44.

#### 7. Further Information

##### (a) Further Readings:

UNESCO Statistical Yearbook (annual editions); World Education Report, editions 1991, 1993, 1995. UNESCO, Paris.

##### (b) Other References:

Statistics of Education in Developing Countries - An Introduction to their Collection and Analysis. Book 3. Division of Statistics, UNESCO, Paris 1983.

##### (c) Status of the Methodology:

This indicator has the status of a recommendation since the basic data elements to derive it are included in the Revised Recommendation concerning the International Standardization of Education Statistics adopted by the UNESCO General Conference at its twentieth session, Paris, 1978.

<b>SECONDARY SCHOOL ENROLMENT RATIO - GROSS</b>		
<b>Social</b>	<b>Chapter 36</b>	<b>Driving Force</b>

#### 1. Indicator

- (a) **Name:** Secondary school enrolment ratio - gross.  
(b) **Brief Definition:** Total enrolment in secondary education as a proportion of the population of

secondary school-age according to national regulations.  
(c) **Unit of Measurement:** %.

## 2. Placement in the Framework

- (a) **Agenda 21:** Chapter 36: Promoting Education, Public Awareness and Training.  
(b) **Type of Indicator:** Driving Force.

## 3. Significance (Policy Relevance)

(a) **Purpose:** The gross enrolment ratio is a general indicator of the level of participation in secondary education. It provides at the same time a measure of the availability and utilization of school places to satisfy the educational needs of the eligible school-age population.

(b) **Relevance to Sustainable/Unsustainable Development:** Education is a process by which human beings and societies reach their fullest potential. Education is critical for promoting sustainable development and improving the capacity of people to address their sustainable development concerns. While basic education provides the underpinnings for any environmental and development education, the latter needs to be incorporated as an essential part of learning. It is also critical for achieving awareness, values, skills and behaviour consistent with sustainable development, and for effective participation in decision making. It is during the secondary educational stage when more detailed knowledge regarding sustainable development is gained, and its multiple interactions with environment, society and the individual clarified.

This indicator is used in monitoring the general status and trends of participation in secondary education, and assesses the relation between demand and supply of educational opportunities. Gross enrolment ratios of less than 100% identify situations in which there is a need for more school places to respond to unsatisfied educational needs, and/or for measures to encourage increase in enrolment. When the indicator has a value in excess of 100, it highlights the incidence of under-aged and/or over-aged enrolment. As regards over-aged students, their presence may be explained by late entrance into secondary schools or the incidence of repetition.

The relevance of this indicator in many developed countries is limited as primary school is compulsory with an enrolment ratio of usually 100%. If the enrolment is lower it usually indicates a data problem.

(c) **Linkages to Other Indicators:** Education is closely linked to other indicators reflecting basic needs, capacity building, information and science, and the role of major groups. By including under-aged and over-aged students, gross enrolment ratio can only provide broad indications of the level of participation in secondary education and school capacity utilization. For more precise assessments, the net enrolment ratio should be used which is however conditioned by the availability of data on enrolment by age.

(d) **Targets:** The value of gross enrolment ratios can vary from less than 10% to more than 100%, reaching 110% in some countries when there are under-aged and/or over-aged enrolment. For countries with low gross enrolment ratios, the target is to reach and cross the 100% threshold. For those posting 110% gross enrolment ratio, the target would be to lower it to 100%, by reducing in particular over-aged enrolment and grade repetition.

(e) **International Conventions and Agreements:** Not available.

## 4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** By relating actual total enrolment in secondary education, irrespective of age, to the population who according to the prevailing national regulations should be enrolled, this indicator of participation in secondary education is conceptually simple as well as easy to derive.

(b) **Measurement Methods:** The ratio is calculated as follows:

$$\frac{\text{Total enrolment in secondary education}}{\text{Population in age-group}} \times 100$$

where **e** is the age-group of the population eligible to participate in secondary education according to national regulations. For sound measurement; the ratio must be supported by consistent data for gender and area (such as rural/urban zones).

(c) **The Indicator in the DSR Framework:** This indicator stresses the importance of education to the sustainable development process. It is recognized as a Driving Force indicator.

(d) **Limitations of the Indicator:** The gross enrolment ratio gives only broad indications of the level of participation in secondary education. There may be different stages and streams in secondary education giving different degrees of emphasis on environment and sustainable development. These important details that are not reflected in a general gross enrolment in secondary education. This indicator may not capture the secondary education changes taking place in many countries, particularly with respect to vocational education and second-chance programmes.

(e) **Alternative Definitions:** To meet the limitations expressed in 4d above, the use of participation rates in secondary and tertiary education could be used as an alternative indicator. In the majority of countries, secondary education is disaggregated into two stages. In many countries the end of the first stage coincides with the end of compulsory education. This gross enrolment ratio may thus be adapted and calculations derived to produce gross enrolment ratios by cycle for secondary education, when appropriate.

## 5. Assessment of the Availability of Data from International and National Sources

(a) **Data Needed to Compile the Indicator:** Total enrolment in secondary education; and the corresponding school-age population according to national regulations, classified by sex. The number of school places available would provide additional meaning to this indicator.

(b) **Data Availability:** Data on total enrolment are normally available for most countries on an annual basis, collected through national school censuses. The corresponding data on secondary school-age population are available only during national population censuses or from inter-censal estimates. United Nations population estimates and projections can be obtained for most countries except for those with less than 150 000 inhabitants. For sound measurement, the ratio must be supported by consistent data for gender and area (such as rural/urban zones).

(c) **Data Sources:** Data on enrolment can be collected from the schools during school censuses organized by national ministries of education. Data on secondary school-age population can be either derived from national population census results, or estimated and projected for the intervening years by national statistical offices or by the United Nations Population Division, Department of Economics and Social Information and Policy Analysis.

## 6. Agencies Involved in the Development of the Indicator

The lead agency for this indicator is the United Nations Educational, Scientific and Cultural Organization (UNESCO). The contact point is the Director, Division of Statistics, UNESCO; fax (33-1) 45 66 48 44.

## 7. Further Information

(a) **Further Readings:**

UNESCO, Statistical Yearbook (annual editions); World Education Report, editions 1991, 1993, 1995. UNESCO, Paris.

(b) **Other References:**

Statistics of Education in Developing Countries: An Introduction to their Collection and Analysis. Book 3. Division of Statistics, UNESCO, Paris 1983.

(c) **Status of the Methodology:**

This indicator has the status of a recommendation since the basic data elements to derive it are included in the Revised Recommendation concerning the International Standardization of Education Statistics adopted by the UNESCO General Conference at its twentieth session, Paris, 1978.

SECONDARY SCHOOL ENROLMENT RATIO - NET		
Social	Chapter 36	Driving Force

#### 1. Indicator

- (a) **Name:** Secondary school enrolment ratio - net.  
 (b) **Brief Definition:** This is the proportion of the population of the official age for secondary education according to national regulations who are actually enrolled in secondary schools.  
 (c) **Unit of Measurement:** %.

#### 2. Placement in the Framework

- (a) **Agenda 21:** Chapter 36: Promoting Education, Public Awareness and Training.  
 (b) **Type of Indicator:** Driving Force.

#### 3. Significance (Policy Relevance)

(a) **Purpose:** The net enrolment ratio provides a measure of the extent to which the population eligible to participate in secondary education is actually enrolled. By deduction, it can be used in gauging the size of the non-enrolled secondary school-age population.

(b) **Relevance to Sustainable/Unsustainable Development:** Education is a process by which human beings and societies reach their fullest potential. Education is critical for promoting sustainable development and improving the capacity of people to address their sustainable development concerns. While basic education provides the underpinnings for any environmental and development education, the latter needs to be incorporated as an essential part of learning. It is also critical for achieving awareness, values, skills and behaviour consistent with sustainable development, and for effective participation in decision making. It is during the secondary educational stage when more detailed knowledge regarding sustainable development is gained, and its multiple interactions with environment, society and the individual clarified.

This indicator is used in monitoring the level of participation in secondary education and in identifying the non-enrolled school-age population. Net enrolment ratios approaching 100% indicate availability of adequate secondary school capacities and active enrolment of school-age youth. Low net enrolment ratios signal inadequacies in ensuring full participation of the school-age population in secondary education, either for the lack of school places or due to other factors that prevent young people from enrolling in secondary schools. This indicator when disaggregated by sex highlights the extent of gender disparities.

The relevance of this indicator in many developed countries is limited as primary school is compulsory with an enrolment ratio of usually 100%. If the enrolment is lower it usually indicates a data problem.

(c) **Linkages to Other Indicators:** Education is closely linked to other indicators reflecting basic needs, capacity building, information and science, and the role of major groups. Net enrolment ratio is more precise than gross enrolment ratio for assessing the level of participation in secondary education. When combined in use with the latter, it could provide indications on the magnitude of over-aged and under-aged enrolment. If data on enrolment and population by single years of age are available, the concept can be extended to derive age-specific enrolment ratios and school life expectancy.

(d) **Targets:** At both the international and national levels, the target is to reach a 100% net enrolment ratio, or full participation of the school-age population in secondary education.

(e) **International Conventions and Agreements:** Not available.

#### 4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** The basis for this indicator is well known. The numerator for the net enrolment ratio only includes those students enrolled in secondary education whose ages are within the nationally prescribed age-range for secondary education. The denominator is the population of the same official secondary school-age.

(b) **Measurement Methods:** The ratio is calculated as follows:

$$\frac{\text{Enrolment within the age-range } e \text{ for secondary education}}{\text{Population in the age-group } e} \times 100$$

where **e** is the age-group of the population eligible to participate in secondary education according to national regulations. As young persons enrolled within the age-range **e** may be a subset of the population of the same age-range, the value of this ratio can only lie in the range of 0 to 100%.

(c) **The Indicator in the DSR Framework:** This indicator stresses the importance of education to the sustainable development process. It is recognized as a Driving Force indicator.

(d) **Limitations of the Indicator:** The net enrolment ratio, compared to gross enrolment, may be more precise for measuring participation in education, but it also requires more basic data to derive the indicator namely: enrolment by age. In some countries these data are either not collected, or collected but are not reliable.

(e) **Alternative Definitions:** In the majority of countries, secondary education is disaggregated into two stages. In many countries the end of the first stage coincides with the end of compulsory education. The net enrolment ratio may thus be adapted and calculations derived to produce net enrolment ratios by cycle for secondary education, when appropriate.

## 5. Assessment of the Availability of Data from International and National Sources

(a) **Data Needed to Compile the Indicator:** Data on enrolment in secondary education and population either by single years of age or corresponding to the official secondary age-range, and by classified sex.

(b) **Data Availability:** Enrolment data are normally available for most countries on an annual basis, collected through national school censuses. Some countries in the world do not collect data on enrolment in secondary education by age, at least not on a regular basis. The corresponding data on secondary school-age population are available only during national population censuses or from intercensal estimates. United Nations estimates and projections can be obtained for most countries except for those with less than 150 000 inhabitants. For sound measurement, the ratio must be supported by consistent data for gender and area (such as rural/urban zones).

(c) **Data Sources:** Data on enrolment by age can either be collected during school censuses organized by national ministries of education, or derived from data on school attendance by age collected during population censuses. Data on secondary school-age population can be derived from national population census results, or estimated and projected for the intervening years either by the national statistics office or by the United Nations Population Division, Department of Economics and Social Information and Policy Analysis.

## 6. Agencies Involved in the Development of the Indicator

The lead agency for this indicator is the United Nations Educational, Scientific and Cultural Organization (UNESCO). The contact point is the Director, Division of Statistics, UNESCO; fax (33-1) 45 66 48 44.

## 7. Further Information

(a) **Further Readings:**

UNESCO, Statistical Yearbook (annual editions); World Education Report, editions 1991, 1993, 1995. UNESCO, Paris.

(b) **Other References:**

Statistics of Education in Developing Countries: An Introduction to their Collection and Analysis. Book 3. Division of Statistics, UNESCO, Paris 1983.

(c) **Status of the Methodology:**

This indicator has the status of a recommendation since the basic data elements to derive it are included in the Revised Recommendation concerning the International Standardization of Education Statistics adopted by the UNESCO General Conference at its twentieth session, Paris, 1978.

ADULT LITERACY RATE		
Social	Chapter 36	Driving Force

1. Indicator

- (a) **Name:** Adult literacy rate.  
(b) **Brief Definition:** The proportion of the adult population aged 15 years and over which is literate.  
(c) **Unit of Measurement:** %.

2. Placement in the Framework

- (a) **Agenda 21:** Chapter 36: Promoting Education, Public Awareness and Training.  
(b) **Type of Indicator:** Driving Force.

3. Significance (Policy Relevance)

(a) **Purpose:** In determining this indicator it provides a measure of the stock of literate persons within the adult population. It reflects the accumulated accomplishment of education in spreading literacy. Any shortfall in literacy would provide indications of efforts required in the future to extend literacy to the remaining adult illiterate population.

(b) **Relevance to Sustainable/Unsustainable Development:** Literacy is critical for promoting and communicating sustainable development and improving the capacity of people to address environment and development issues. It facilitates the achievement of environmental and ethical awareness, values, and skills consistent with sustainable development and effective public participation in decision making.

(c) **Linkages to Other Indicators:** Literacy is closely linked to indicators reflecting basic needs such as education, capacity building, information and communication, and the role of major groups. The literacy rate indicates the status, or stock of iterates at a given point in time. It is often linked to school enrolment ratios and population reaching grade 5 of primary education, both of which influence the accumulation of the stock of iterates.

(d) **Targets:** The general target is full literacy, i.e. 100% adult literacy rate. This is the goal of most national efforts and international campaigns to eradicate illiteracy.

(e) **International Conventions and Agreements:** The World Declaration on Education for All to be achieved by the year 2000.

4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** The Revised Recommendation concerning the International Standardization of Educational Statistics suggests the following definitions for statistical purposes:

i) A person is **literate** who can with understanding both read and write a short simple statement related to his/her everyday life.

ii) A person is **functionally literate** who can engage in all those activities in which literacy is required for effective functioning of his/her group and community and also for enabling him/her to continue to use reading, writing and calculation for his/her own and the community's development.



Persons who do not fulfill (i) or (ii) are termed illiterates or functional illiterates respectively. Adult literacy, in international practice, applies only to the population aged 15 years and over, classified by sex, by five-year age-groups, and by urban/rural zones.

(b) **Measurement Methods:** To calculate the adult literacy rate, the number of literates aged 15 years and over is divided by the corresponding total population aged 15 years and over and multiplied by 100.

(c) **The Indicator in the DSR Framework:** Literacy is a reflection of the total education experience. It is an essential element for effective participation in sustainable development processes, and represents a Driving Force indicator within the DSR Framework.

(d) **Limitations of the Indicator:** As literacy is a relative concept, no single measure can separate the literate from the illiterate. A cut-off point is not totally appropriate because there are many different forms of literacy. A person might be literate in numeric terms, but have difficulty with comprehension. Literacy can be defined in terms of work, school, home, and social spheres. Each area of life requires different skills.

Therefore, literacy ideally should be determined by the measurement of reading, writing and numeracy abilities of each person within a social context. It may however be too time-consuming, costly and operationally complex to organize such measurements during national population censuses. Literacy status is therefore usually based on self-declaration or declaration of the head of household, which sometimes gives rise to concerns about data reliability and consequently comparability, especially for females in many developing countries.

(e) **Alternative Definitions:** To meet the limitations discussed in 4d above, the definition of functional literacy represents an alternative indicator. This is usually measured for four or five components of literacy such as "prose", "document", and "quantitative" domains. The aim is to measure the degree of functionality, rather than the dichotomy literate vs. illiterate.

## 5. Assessment of the Availability of Data from International and National Sources

(a) **Data Needed to Compile the Indicator:** Data on the number of literates or illiterates and the population aged 15 years and over as collected during population censuses and household surveys.

(b) **Data Availability:** Data are usually collected during national population censuses, or from household surveys. Official statistics exist for most countries in the world but are often out-of-date due to late census data release. The United Nations Educational, Scientific and Cultural Organization (UNESCO) carries out periodical estimations and projections to fill data gaps. In principle literacy data are available at both the national and sub-national levels. For sound measurement, the ratio must be supported by consistent data for gender and area (such as rural/urban zones).

(c) **Data Sources:** The primary data sources are national population censuses and household surveys. International data sources include the Statistical Division of the United Nations Department of Economics and Social Information and Policy Analysis (DESIPA); and UNESCO's Division of Statistics.

## 6. Agencies Involved in the Development of the Indicator

(a) **Lead Agency:** The lead agency for this indicator is the United Nations Educational, Scientific and Cultural Organization (UNESCO). The contact point is the Director, Division of Statistics, UNESCO; fax (33-1) 45 66 48 44.

(b) **Other Organizations:** The Statistical Division of DESIPA also collects statistics on literacy from national population censuses and provide the data to UNESCO for processing and dissemination.

## 7. Further Information

UNESCO Statistical Yearbook (annual editions); Compendium of Statistics on Illiteracy: 1995 Edition. . UNESCO, Paris. 1995.

This indicator has the status of a recommendation since the basic data elements to derive it are included in the Revised Recommendation concerning the International Standardization of Education Statistics adopted by the UNESCO General Conference at its twentieth session, Paris, 1978.

<b>CHILDREN REACHING GRADE 5 OF PRIMARY EDUCATION</b>		
<b>Social</b>	<b>Chapter 36</b>	<b>State</b>

1. Indicator

- (a) **Name:** Children reaching grade 5 of primary education.  
(b) **Brief Definition:** The estimated proportion of the population entering primary school who reach grade 5.  
(c) **Unit of Measurement:** %.

2. Placement in the Framework

- (a) **Agenda 21:** Chapter 36: Promoting Education, Public Awareness and Training.  
(b) **Type of Indicator:** State.

3. Significance (Policy Relevance)

(a) **Purpose:** This indicator provides an estimate of the proportion of children entering primary school who reach grade 5 of primary education and thereby acquire basic literacy.

(b) **Relevance to Sustainable/Unsustainable Development:** Education is a process by which human beings and societies reach their fullest potential. Education is critical for promoting sustainable development and improving the capacity of people to address environment and development issues. It is also critical for achieving environmental and ethical awareness, values, and skills consistent with sustainable development and effective public participation in decision making.

Policy makers concerned with children's retention in schools and their eventual acquisition of basic literacy and numeracy skills would find this indicator particularly useful as it indicates the functioning, or internal efficiency, of the education system and its ability to turn out literates. Appropriate policies and measures could then be adopted to address problems of grade repetition and drop-out as well as bottlenecks with regard to retention in school. Indirectly, this indicator reflects the quality and performance of schools.

(c) **Linkages to Other Indicators:** Literacy is closely linked to indicators reflecting basic needs such as education, capacity building, information and communications, and the role of major groups. Besides assessing the functioning of the education system, this indicator is often used together with enrolment ratios to depict respectively the complementary aspects of participation and retention in education. It can be cross-referenced with adult literacy rate which reflects the cumulative output of the education system over the years.

(d) **Targets:** With values that can vary from 0 to 100%, the general target would be 100%. This implies complete retention of children in school to grade 5 (or zero drop-out).

(e) **International Conventions and Agreements:** Not available.

4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** Efforts to extend literacy depend on the ability of the education system to ensure full participation of school-age children and their successful progression to reach at least grade 5, which is the stage when they are believed to have firmly acquired literacy and numeracy. By estimating the percentage survival to grade 5, this indicator measures the proportion of the population entering primary school who eventually reach grade 5.

(b) **Measurement Methods:** This indicator can be derived using the reconstructed cohort student flow method, which is analogous to that used in demography to determine survival rates from one age to the next. This method first derives the grade promotion, repetition and drop-out rates based on available data on enrolment and repeaters by grade for two consecutive years using Markov chain calculations. It then applies these rates to a cohort of 1,000 students in grade 1 to reconstruct their passage through the education system assuming that these student flow rates by grade remain unchanged throughout

the life-time of the cohort. From the reconstructed cohort student flow, the percentage survival to grade 5 can be derived.

If  $p_i$ ,  $r_i$  and  $d_i$  represent respectively promotion rate, repetition rate and drop-out rate at grade  $i$  of primary education, they can be derived but the following conditions on the flow rates have to be satisfied:

$$p_i + r_i + d_i = 1$$

$$0 < p_i, r_i, d_i < 1$$

When these conditions are not satisfied, the method used to derive survival is no longer valid since it is not possible to isolate the original cohort and any inferences made will be of a dubious nature.

A fundamental assumption is that the probability of the cohort entering primary school, irrespective of the age of the pupils not reaching grade 5 is the same as that of the entrance age population for this level of education. That is, the drop-out rate is the same for all pupils regardless of the age at which they enter school.

(c) **The Indicator in the DSR Framework:** As explained in section 3c above, this indicator highlights the functioning of the education system. As such it represents a State indicator within the DSR Framework.

(d) **Limitations of the Indicator:** The measurement method described in 4b above is rather a cumbersome one to administer. In addition, in some countries such as Germany and Austria the concept of grade 5 does not exist in primary education. Data on enrolment and repetition by grade may not be available for consecutive years for some countries and certain regions or schools within a country. The reconstructed cohort student flow method assumes that promotion rates, repetition rates and drop-out rates do not change from year to year. When applying this method to sub-national and school levels, the derived drop-out rates by grade may sometimes present a negative value due to transfers between schools. A suggested solution to this problem is to collect data on transferred students by grade, and to deduct them from the corresponding enrolment figures before applying the reconstructed cohort method.

(e) **Alternative Definitions:** In the absence of data on repeaters, the methodology outlined in section 4b above may be adjusted by assuming that the repetition rate is 0. However, this assumption, in addition to those described in 4 (b), presupposes that the repetition rates are quite low and that their magnitude does not vary much between grades.

An alternative indicator for education effectiveness would be school drop-out rates, grade by grade.

## 5. Assessment of the Availability of Data from International and National Sources

(a) **Data Needed to Compile the Indicator:** Basic data required to derive this indicator include: enrolment and repeaters by grade for at least two consecutive years.

(b) **Data Availability:** Data on enrolment and repeaters by grade in primary school are general available in most countries and also at sub-national and school levels. For sound measurement, this indicator must be supported by consistent data for gender and area (such as rural/urban zones).

(c) **Data Sources:** Data on enrolment and repeaters by grade and new entrants by age are generally those collected during school censuses conducted by national ministries of education.

## 6. Agencies Involved in the Development of the Indicator

The lead agency for this indicator is the United Nations Educational, Scientific and Cultural Organization (UNESCO). The contact point is the Director, Division of Statistics, UNESCO, fax (33 1) 45 66 48 44.

## 7. Further Information

(a) **Further Readings:**

Not available.

(b) **Other References:**

Not available.

(c) **Status of the Methodology:**

This indicator has the status of a recommendation since the basic data elements to derive it are included in the Revised Recommendation Concerning the International Standardization of Education Statistics adopted by the UNESCO General Conference at its twentieth session, Paris, 1978.

SCHOOL LIFE EXPECTANCY		
Social	Chapter 36	State

1. Indicator

- (a) **Name:** School life expectancy.  
(b) **Brief Definition:** Estimated average number of years a student will remain enrolled in an educational institution.  
(c) **Unit of Measurement:** Number of years.

2. Placement in the Framework

- (a) **Agenda 21:** Chapter 36: Promoting Education, Public Awareness and Training.  
(b) **Type of Indicator:** State.

3. Significance (Policy Relevance)

(a) **Purpose:** The indicator provides an estimate of the expected number of years of education that a child can expect to receive if enrolled at school. This indicator can be used to gauge the overall level of development and performance of an education system, in terms of the average duration of participation in education of every child enrolled in school.

(b) **Relevance to Sustainable/Unsustainable Development:** Education is a process by which human beings and societies reach their fullest potential. Education is critical for promoting sustainable development and improving the capacity of people to address their sustainable development concerns. While basic education provides the underpinnings for any environmental and development education, the latter needs to be incorporated as an essential part of learning. It is also critical for achieving awareness, values, skills and behaviour consistent with sustainable development and for effective participation in decision making. It is during the primary educational stage when children become aware of the basic knowledge and values regarding sustainable development. It is believed that the longer a young person can remain in the education system, the more he/she is likely to learn about sustainable development and to form the right attitude conducive to its future implementation.

The relevance of this indicator in many developed countries is limited as primary school is compulsory with an enrolment ratio of usually 100%. If the enrolment is lower it usually indicates a data problem.

(c) **Linkages to Other Indicators:** Education is closely linked to other indicators reflecting basic needs, and capacity buildings, information and science, and the role of major groups. This indicator is closely related to the enrolment ratios by level of education.

(d) **Targets:** Higher school life expectancy generally implies more exposure to education. It is increasingly suggested that school life expectancy should be at least 10 to 12 years corresponding to the total duration of primary and secondary education. However, it should be underlined that this indicator does not measure the number of grades completed but the number of years a student is enrolled.

(e) **International Conventions and Agreements:** Not available.

#### 4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** The school life expectancy is defined as the total number of years of schooling which a child who is enrolled can expect to receive, assuming the probability of his or her being enrolled in school at any particular future age is equal to the current enrolment ratio for that age.

(b) **Measurement Methods:**

$$SLE = \sum_{a=i}^n \frac{E_a^t}{P_a^t}$$

where  
a = age;  
t = the year for which the indicator is derived  
E = enrolment  
P = population  
i = school starting age  
n = school ending age

(c) **The Indicator in the DSR Framework:** The indicator focuses on the importance of education to the sustainable development process. It represents a measure of the State of education within the DSR framework.

(d) **Limitations of the Indicator:** This indicator requires data on enrolment and population by single years of age, which certain countries have yet to collect on a systematic basis. The estimated number of years enrolled does not necessarily reflect the number of grades of the regular educational system completed. Besides, as it is based on cross-sectional data by level of education at a point in time rather than on longitudinal time-series, it does not take into consideration differences among successive school cohorts over time.

(e) **Alternative Definitions:** An alternative indicator for education effectiveness would be school drop-out rates, grade by grade.

#### 5. Assessment of the Availability of Data from International and National Sources

(a) **Data Needed to Compile the Indicator:** Enrolment and population by single years of age corresponding to all levels of education.

(b) **Data Availability:** Data on enrolment and population by age are not available on a regular basis for certain countries. Based on data from the population censuses, the Population Division of the United Nations Department of Economics and Social Information and Policy Analysis (DESIPA) and certain national statistical offices carry out estimations and projections of population by age. For sound measurement, this indicator must be supported by consistent data for gender and area (such as rural/urban zones).

(c) **Data Sources:** Data on enrolment by age can be obtained from the national ministries of education. The source of the data on population by age can be either the national statistical offices or DESIPA. The latter updates their estimates and projections every two years for countries with a population of more than 150 000 in 1990.

#### 6. Agencies Involved in the Development of the Indicator

The lead agency for this indicator is the United Nations Educational, Scientific and Cultural Organization (UNESCO). The contact point is the Director, Division of Statistics, UNESCO; fax (33 1) 45 66 48 44.

#### 7. Further Information

(a) **Further Readings:**

Not available.

(b) **Other References:**

Not available.

(c) **Status of the Methodology:**

This indicator has the status of a recommendation since the basic data elements to derive it are included in the Revised Recommendation Concerning the International Standardization of Education Statistics adopted by the UNESCO General Conference at its twentieth session, Paris, 1978.

DIFFERENCE BETWEEN MALE AND FEMALE SCHOOL ENROLMENT RATIOS		
Social	Chapter 36	State

1. Indicator

- (a) **Name:** Difference between male and female school enrolment.
- (b) **Brief Definition:** The arithmetical difference between male and female enrolment ratios.
- (c) **Unit of Measurement:** %.

2. Placement in the Framework

- (a) **Agenda 21:** Chapter 36: Promoting Education, Public Awareness and Training.
- (b) **Type of Indicator:** State.

3. Significance (Policy Relevance)

(a) **Purpose:** This indicator indicates the extent of gender disparities with regard to the degree of participation in education between male and female.

(b) **Relevance to Sustainable/Unsustainable Development:** Education is a process by which human beings and societies reach their fullest potential. Education is critical for promoting sustainable development and improving the capacity of people to address their sustainable development concerns. While basic education provides the underpinnings for any environmental and development education, the latter needs to be incorporated as an essential part of learning. It is also critical for achieving awareness, values, skills and behaviour consistent with sustainable development, and for effective participation in decision making. Differences in educational participation between male and female draw attention to the likely existence of gender disparities.

The relevance of this indicator in many developed countries is limited as primary school is compulsory with an enrolment ratio of usually 100%. If the enrolment is lower it usually indicates a data problem.

(c) **Linkages to Other Indicators:** Education is closely linked to other indicators reflecting basic needs, a capacity building, information and science, and the role of major groups. Differences between male and female enrolment ratios can be calculated for primary and secondary education, and for gross and net ratios. Such differences may also be applied to adult literacy rates and other indicators which are derived by gender and expressed in terms of ratios or percentages. In practice, this indicator of gender differences is to be presented and interpreted together with the corresponding indicators of enrolment ratio by sex, so as to examine concurrently the overall level of participation in education for both sexes as well as the degree of disparity between them.

(d) **Targets:** The value of this indicator can vary from +35% to -20% in countries for primary school gross enrolment, with positive differences indicating higher educational participation for male than for female, and negative differences showing the reverse. The target is for a balance where both male and female have the same level of participation in education.

(e) **International Conventions and Agreements:** Not available.

4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** Various concepts exist for indicators or indices of gender disparity (see section 4e below). The concept chosen here is based on the criteria of simplicity of computation and interpretation as well as the discriminatory power of the indicator derived.

(b) **Measurement Methods:** This indicator is calculated by subtracting the enrolment ratio for female from the corresponding enrolment ratio for male, i.e. ENRM - ENRF

(c) **The Indicator in the DSR Framework:** The indicator focuses on the importance of education to the sustainable development process. It represents a measure of the State of education within the DSR framework.

(d) **Limitations of the Indicator:** This indicator provides an idea of the magnitude of gender disparities in the level of participation in education, based on enrolment ratios. As mentioned in section 3c above, this indicator should be presented and interpreted together with the corresponding enrolment ratios so as to give a more comprehensive picture of the extent of gender disparities in the light of the overall level of educational participation.

(e) **Alternative Definitions:** Other indicators and indices of gender disparity include:  $(ENRM - ENRF)/ENRM$ ;  $(ENRM - ENRF)/ENRF$ ;  $(ENRM - ENRF)/ENRMF$ ; Gini coefficient; and the index of gender disparity in the Human Development Report 1995 published by the United Nations Development Programme.

## 5. Assessment of the Availability of Data from International and National Sources

(a) **Data Needed to Complete the Indicator:** Enrolment by sex (and also by age in the case of net enrolment ratio) and by level of education; and the corresponding school-age population according to national regulations, classified by sex.

(b) **Data Availability:** Data on enrolment by sex, age and by level of education are normally available for most countries on an annual basis, collected through national school censuses. The corresponding data on primary school-age population are available only during national population censuses. Many national statistical offices produce inter-censal estimates as well as projections. United Nations population estimates and projections can also be obtained for most countries except for those with less than 150 000 inhabitants.

(c) **Data Sources:** Data on enrolment can be collected from schools during school censuses organized by national ministries of education. Data on primary school-age population can be either derived from national population census results, or estimated and projected for the intervening years by the national statistics office or by the Population Division of the United Nations Department of Economics and Social Information and Policy Analysis.

## 6. Agencies Involved in the Development of the Indicator

The lead agency for this indicator is the United Nations Educational, Scientific and Cultural Organization (UNESCO). The contact point is the Director, Division of Statistics, UNESCO; fax (33 1) 45 66 48 44.

## 7. Further Information

(a) **Further Readings:**

UNESCO, Statistical Yearbook (annual editions); World Education Report, editions 1991, 1993, 1995. UNESCO, Paris.

(b) **Other References:**

UNESCO, Statistics of Education in Developing Countries - An Introduction to their Collection and Analysis. Book 3. Division of Statistics, UNESCO, Paris 1983.

(c) **Status of the Methodology:**

This indicator has the status of a recommendation since the basic data elements to derive it are included in the Revised Recommendation Concerning the International Standardization of Education Statistics adopted by the UNESCO General Conference at its twentieth session, Paris, 1978.

WOMEN PER 100 MEN IN THE LABOUR FORCE		
Social	Chapter 36	State

#### 1. Indicator

- (a) **Name:** Women per 100 men in the labour force.  
 (b) **Brief Definition:** Women per hundred men in the labour force.  
 (c) **Unit of Measurement:** Number.

#### 2. Placement in the Framework

- (a) **Agenda 21:** Chapter 36: Promoting Education, Public Awareness and Training.  
 (b) **Type of Indicator:** State.

#### 3. Significance (Policy Relevance)

(a) **Purpose:** The ratio measures men and women's respective shares in the labour force structure and should not be confused with the participation rate.

(b) **Relevance to Sustainable/Unsustainable Development:** A small women's share, assuming properly designed surveys, indicates non access to education and inequality of opportunity and treatment, from, for examples, national laws or general social practices. Such situations are usually accepted as unsustainable.

(c) **Linkages to Other Indicators:** This indicator is linked to others reflecting the role and participation of women as a major societal group. It would be better interpreted by age group and according to the number of children to be cared for; and paired with indicators on education and ratio of average female wage to average male wage.

(d) **Targets:** Not available.

(e) **International Conventions and Agreements:** Equality of opportunity and treatment is a basic international standard. International Labour Office (ILO) conventions No. 100, Equal Remuneration Convention, 1951; No. 111 Discrimination Employment and Occupation Convention 1958; No. 156 Workers with Family Responsibilities Convention, 1981 are relevant to this indicator.

#### 4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** The current economically active population or labour force has two components: the employed and the unemployed population. The international standard definition established by the Thirteenth International Conference of Labour Statisticians (ILO, 1982) is based on the following elements:

i) The survey population: This is defined as all usual residents (de jura population) or all persons present in the country at the time of the survey (de facto population). Some particular groups, such as the armed forces or other populations living in institutions, nomadic people, etc. may be excluded.

ii) An age limit: In countries where compulsory schooling and legislation on the minimum age for admission to employment have broad coverage and are widely respected, the age specified in these regulations may be used as a basis for determining an appropriate minimum age limit for measuring the economically active population. In other countries, the minimum age limit should be determined empirically on the basis of: (i) the extent and intensity of participation in economic activities by young people; and (ii) the feasibility and cost of measuring such participation with acceptable accuracy. Some countries use a maximum age limit as well, often linked to the most common age for pensions.



iii) The involvement in economic activities during the survey reference period: The concept of economic activity adopted by the Thirteenth International Conference of Labour Statisticians (1982) is defined in terms of contribution to the production of goods and services as set forth by the United Nations System of National Accounts, revised in 1993.

iv) A short reference period: For example, one week or one day.

(b) **Measurement Methods:** The labour force is distributed by gender. Gender is a basic descriptive variable in censuses or household/labour force sample surveys, questionnaires and administrative records. The total number of women in the labour force is then divided by the total number of men in the labour force and the result compared to 100.

(c) **The Indicator in the DSR Framework:** Equal participation of men and women in society is one of the principles tenets of sustainable development. The ratio women per hundred men in the labour force measures participation and is included as a State indicator within the DSR Framework; along with population reaching grade 5 of primary education, and mean years of schooling. The corresponding Driving Force indicators are the rate of growth of school age population; the primary school enrolment ratio; secondary school enrolment ratio; and adult literacy rate. The remaining indicator, GDP spent on education, is a Response indicator.

(d) **Limitations of the Indicator:** All the indicators in section 4c above relate to improving educational attainment, and strongly suggest a direct link between an increased women's share in the labour force and an higher educational level. This would make more sense for participation rates than for this ratio, though various factors can affect both indicators, which shows only the relative share of both genders in the labour force at a given moment. In addition, the indicator does not capture women's participation in the informal or domestic sectors.

Estimates according to the international standards can in practice be made most reliably on the basis of data collected through household surveys and population censuses. Some of the criteria specified in the international standards can only be implemented precisely from personal interviews - data which is expensive and time consuming to acquire. This is the only data source which, on a regular basis and with an appropriate survey design, can cover virtually the entire population of a country, all branches of economic activity, all sectors of the economy, all types of activity status and all categories of workers, and allows joint and mutually exclusive measurement of the employed, unemployed and inactive persons.

(e) **Alternative Definitions:** Not available.

## 5. Assessment of the Availability of Data from International and National Sources

(a) **Data Needed to Compile the Indicator:** Activity status, gender. The relevance of the indicator would be improved with the use of disaggregated area data, such as urban/rural zones.

(b) **Data Availability:** The availability of recent data is ascertained for 57 countries, 5 in Africa, 15 in America, 13 in Asia, 22 in Europe, and 2 in Oceania. The sources are labour force sample surveys for 40 countries, household sample surveys for 6 countries, censuses for six countries and official estimates for 5 countries.

(c) **Data Sources:** (i) population censuses and household sample surveys; (ii) establishment censuses and establishment sample surveys; and (iii) various types of administrative records.

## 6. Agencies Involved in the Development of the Indicator

The lead agency is The International Labour Office (ILO) of the United Nations, located in Geneva. The contact point is the Focal Point for Environment and Sustainable Development, ILO; fax no. (41 22) 798 8685.

## 7. Further Information

(a) **Data:**

Yearbook of Labour Statistics, ILO, Geneva.

Bulletin of Labour Statistics (quarterly) and its Supplement (January/February, April/May, July/August and October/November), ILO, Geneva.

Statistical yearbooks and other publications issued by the national statistical offices.

**(b) Methodology:**

Surveys of Economically Active Population, Employment, Unemployment and Underemployment - An ILO Manual on Concepts and Methods, ILO, Geneva, 1992.

Sources and Methods: Labour Statistics, Volumes 3 and 5, ILO, Geneva, 1991 and 1990, currently updated.

System of National Accounts 1993, Commission of the European Communities, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations, World Bank, Brussels/Luxembourg, New York, Paris, Washington, D.C., 1993.

Current international recommendations on labour statistics, ILO, Geneva, 1988. See particularly the resolution concerning Statistics of the Economically Active Population, Employment, Unemployment and Underemployment adopted by the Thirteenth International Conference of Labour Statisticians, October 1982.

**(c) International Conventions and Recommendations:**

Labour Statistics Convention (No. 160) and Recommendation (No. 170), 1985.

Equal Remuneration Convention (No. 100) and Recommendation (No. 90), 1951.

Discrimination (Employment and Occupation) Convention (No. 111) and Recommendation (No. 111), 1958.

Workers with Family Responsibilities Convention (No. 156) and Recommendation (No. 165), 1981.

**(d) Other Studies on Gender Issues:**

Women Workers: An Annotated Bibliography, 1983-1994, ILO, Geneva, 1995, XIII, 290 pages (International Labour Bibliography. No. 14). Produced from the LABORDOC database, lists 953 English-language publications, technical reports, working papers and other documents produced at ILO headquarters or in ILO field offices, or prepared in connection with ILO programmes.

<b>GROSS DOMESTIC PRODUCT SPENT ON EDUCATION</b>		
<b>Social</b>	<b>Chapter 36</b>	<b>Response</b>

**1. Indicator**

- (a) **Name:** Gross Domestic Product (GDP) spent on education.
- (b) **Brief Definition:** Education expenditure expressed as a proportion of GDP.
- (c) **Unit of Measurement:** %.

**2. Placement in the Framework**

- (a) **Agenda 21:** Chapter 36: Promoting Education, Public Awareness and Training.
- (b) **Type of Indicator:** Response.

**3. Significance (Policy Relevance)**

- (a) **Purpose:** This indicator provides a measure of financial resource input into education and its share of national revenue support. It enables better assessment of the adequacy and allocation of financial

resource allocated to education within the national economy. It facilitates appropriate policy and decision-making, while taking into account investments in other public sectors.

(b) **Relevance to Sustainable/Unsustainable Development:** Education is a process by which human beings and societies reach their fullest potential. Education is critical for promoting sustainable development and improving the capacity of people to address their sustainable development concerns. While basic education provides the underpinnings for any environmental and development education, the latter needs to be incorporated as an essential part of learning. It is also critical for achieving awareness, values, skills and behaviour consistent with sustainable development, and for effective participation in decision making. Financial resources for education directly determines school capacity and quality, which in turn influences enrolment, retention and learning of children and youth in school. Relevance is increased if disaggregation to primary, secondary, and tertiary education is feasible.

(c) **Linkages to Other Indicators:** Education is closely linked to other indicators reflecting basic needs, capacity building, information and science, and the role of major groups. This measure is also closely linked to other GDP and expenditure indicators. The effect of expenditure on education can be verified by changes in enrolment ratios and literacy rates. These ratios and rates in turn indicate shortfalls and disparities which require modifications in the allocation of financial resource for education.

(d) **Targets:** There is no standard international target for GDP spent on education. A general target referenced, but not sanctioned by international conventions or agreements, suggests that countries should devote at least 5% of GDP to education.

(e) **International Conventions and Agreements:** See section 3d above.

#### 4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** GDP spent on education has been in common use to compare the level of financial resources for education among countries. The basic concept is to measure the share of financial resource devoted to education from total national revenue.

(b) **Measurement Methods:** This indicator can be calculated as follows:

$$\frac{\text{Total expenditure on education}}{\text{GDP}} \times 100$$

Total expenditure comprises both public and private expenditure.

(c) **The Indicator in the DSR Framework:** Adequate fiscal support for education is essential for sustainable development. GDP spent on education represents a Response indicator within the DSR framework.

(d) **Limitations of the Indicator:** The indicator does not capture effectiveness and efficiency in the education system. It does not differentiate, for example, between education expenditure which is relevant for a country's development compared to that which is not. International comparability of the indicator is problematic: GDP spent on education can be affected by the availability and reliability of data covering both public and private expenditure on education, particularly from households, productive and service enterprises, local communities, NGOs, and individuals. Spending by non-government institutions on education, for example, will be elusive to capture.

The indicator also has the following advantages: (i) inflationary and deflationary trends do not affect the comparability of this ratio either over time or between countries since the data refer to the same year; (ii) currency fluctuation does not impinge on the comparability of this ratio.

(e) **Alternative Definitions:** Not available.

#### 5. Assessment of the Availability of Data from International and National Sources

(a) **Data Needed to Compile the Indicator:** Capital and current expenditure on education in the national currency covering both the public and private sectors; and GDP in the national currency.

(b) **Data Availability:** Data or estimates on GDP are generally available for all countries on an annual basis, either from the national ministries of finance or the World Bank. Data on public expenditure on education are usually collected either by the ministries of education, or finance; and/or national statistical offices. Private education expenditures, particularly those made by households, enterprises, local communities, NGOs and individuals are more difficult to obtain and may be very often incomplete.

(c) **Data Sources:** See section 5b above.

## 6. Agencies Involved in the Development of the Indicator

The lead agency for this indicator is the United Nations Educational, Scientific and Cultural Organization (UNESCO). The contact point is the Director, Division of Statistics, UNESCO; fax (33 1) 45 66 48 44.

## 7. Further Information

### (a) Further Readings:

Not available.

### (b) Other References:

Not available.

### (c) Status of the Methodology:

This indicator has the status of a recommendation since the basic data elements to derive it are included in the Revised Recommendation Concerning the International Standardization of Education Statistics adopted by the UNESCO General Conference at its twentieth session, Paris, 1978.

## [Chapter 6:](#) Protecting and promoting human health

- Basic sanitation: percent of population with adequate excreta disposal facilities
- Access to safe drinking water
- Life expectancy at birth
- Adequate birth weight
- Infant mortality rate
- Maternal mortality rate
- Nutritional status of children
- Immunization against infectious childhood diseases
- Contraceptive prevalence
- Proportion of potentially hazardous chemicals monitored in food
- National health expenditure devoted to local health care
- Total national health expenditure related to GNP

## ***Chapter 6: Protecting and promoting human health***

<b>BASIC SANITATION: PERCENT OF POPULATION WITH ADEQUATE EXCRETA DISPOSAL FACILITIES</b>		
<b>Social</b>	<b>Chapter 6</b>	<b>State</b>

### 1. Indicator

- (a) **Name:** Basic sanitation: percent of population with adequate excreta disposal facilities.  
(b) **Brief Definition:** Proportion of population with access to a sanitary facility for human excreta disposal in the dwelling or immediate vicinity.  
(c) **Unit of Measurement:** %.

## 2. Placement in the Framework

- (a) **Agenda 21:** Chapter 6: Protecting and Promoting Health.  
(b) **Type of Indicator:** State.

## 3. Significance (Policy Relevance)

- (a) **Purpose:** To monitor progress in the accessibility of the population to sanitation facilities.
- (b) **Relevance to Sustainable/Unsustainable Development:** This represents a basic indicator useful for assessing sustainable development, especially human health. Accessibility to adequate excreta disposal facilities is fundamental to decrease the faecal risk and the frequency of associated diseases. Its association with other socioeconomic characteristics (education, income) and its contribution to general hygiene and quality of life also make it a good universal indicator of human development. When broken down by geographic (such as rural/urban zones) or social or economic criteria, it also provides tangible evidence of inequities.
- (c) **Linkages to Other Indicators:** The indicator is closely associated with other socioeconomic indicators (see section 3b above), particularly the proportion of population with access to adequate and safe drinking water. These indicators represent two of the eight elements of primary health care.
- (d) **Targets:** International targets for this indicator have been established under the auspices of the World Health Organization (WHO). The Global Strategy for Health and the more recent Ninth General Programme provide targets of 100% by the year 2000 and 75% by the year 2001 respectively. In addition, many countries have established national targets.
- (e) **International Conventions and Agreements:** The International Drinking Water Supply and Sanitation Decade (IDWSSD) 1980-1990 is an international agreement relevant to this indicator. It represents a component of the WHO Global Strategy for Health for All by the year 2000.

## 4. Methodological Description and Underlying Definitions

- (a) **Underlying Definitions and Concepts:** Definitions for sanitary facility and population covered are required.
- i) Sanitary facility: "A sanitary facility is a unit for disposal of human excreta which isolates faeces from contact with people, animals, crops and water sources. Suitable facilities range from simple but protected pit latrines to flush toilets with sewerage. All facilities, to be effective, must be correctly constructed and properly maintained".
- ii) Population covered: This includes the urban population served by connections to public sewers; the urban population served by household systems (pit privies, pour-flush latrines, septic tank, etc); the urban population served by communal toilets; and the rural population with adequate excreta disposal such as pit privies, pour-flush latrines, etc.
- (b) **Measurement Methods:** This indicator may be calculated as follows: The numerator is the number of people with adequate excreta-disposal facilities available multiplied by 100. The denominator is the total population.
- (c) **The Indicator in the DSR Framework:** Basic sanitation is a fundamental factor in the human health component of sustainable development. This indicator reflects the State of access to sanitary facilities within the DSR Framework.
- (d) **Limitations of the Indicator:** The availability of facilities does not always translate into their utilization.

(e) **Alternative Definitions:** This indicator could also be expressed as the percent of people without access to adequate sanitation. The population that must be used in the numerator is the number of people without access to adequate sanitation. If the data available are in terms of proportion of households for which sanitation is available, it should be possible to convert this into a percentage of population, using average figures for household size. Also see section 4d above.

## 5. Assessment of the Availability of Data from International and National Sources

(a) **Data Needed to Compile the Indicator:** The number of people with access to adequate sanitation, and the total population.

(b) **Data Availability:** Routinely collected at the national and sub-national levels in most countries using censuses and surveys.

(c) **Data Sources:** In order to arrive at more robust estimates of sanitation coverage, two main data source types are required. First, administrative or infrastructure data which report on new and existing facilities. Second, population-based data derived from some form of national household survey.

## 6. Agencies Involved in the Development of the Indicator

The lead agency is the World Health Organization (WHO). The contact point is the Director, Office of Global and Integrated Environmental Health, WHO; fax no. (41 22) 791 4123.

## 7. Further Information

### (a) Further Readings:

WHO, Development of Indicators for Monitoring Progress Towards Health for All by the Year 2000. Geneva, WHO, 1981, p. 29.

WHO, Global Strategy for Health for All by the Year 2000. Geneva, WHO, 1981.

WHO, Ninth General Programme of Work Covering the Period 1996-2001. Geneva, WHO, 1994.

World Health Organization, Division of Operational Support in Environmental Health, October 1995.

### (b) Other References:

World Health Organization. National and Global Monitoring of Water Supply and Sanitation. CWS Series of Cooperative Action for the Decade, No. 2, 1982.

World Health Organization. Water Supply and Sanitation Sector Monitoring Report (WSSMR), 1990.

ACCESS TO SAFE DRINKING WATER		
Social	Chapter 6	State

### 1. Indicator

(a) **Name:** Percent of people with safe drinking water available in the home or with reasonable access.

(b) **Brief Definition:** Proportion of population with access to an adequate amount of safe drinking water in a dwelling or located within a convenient distance from the user's dwelling.

(c) **Unit of Measurement:** %.

### 2. Placement in the Framework

(a) **Agenda 21:** Chapter 6: Protecting and Promoting Health.

(b) **Type of Indicator:** State.

### 3. Significance (Policy Relevance)

(a) **Purpose:** To monitor progress in the accessibility of the population to safe drinking water.

(b) **Relevance to Sustainable/Unsustainable Development:** Accessibility to safe drinking water is of fundamental significance to lowering the faecal risk and frequency of associated diseases. Its association with other socioeconomic characteristics, including education and income, also makes it a good universal indicator of human development. When broken down by geographic (such as rural/urban zones), or social or economic criteria, it provides useful information on inequity.

(c) **Linkages to Other Indicators:** This indicator is closely associated with other socioeconomic indicators on the proportion of people covered by adequate sanitation. These indicators are among the eight elements of primary health care. It also has close links to other water indicators such as withdrawals, reserves, consumption, or quality. (See section 3b above.)

(d) **Targets:** International targets for this indicator have been established under the auspices of the World Health Organization (WHO). The Global Strategy for Health and the more recent Ninth General Programme provide targets of 100% by the year 2000, and more than 85% by the year 2001 respectively. In addition, many countries have established national targets.

(e) **International Conventions and Agreements:** The International Drinking Water Supply and Sanitation Decade (IDWSSD) 1980-1990 is an international agreement relevant to this indicator. It is a component of the WHO Global Strategy for Health for All by the Year 2000.

### 4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** This indicator requires definitions for several elements.

i) **Population covered:** This includes urban population served by house connections, urban population without house connections but with reasonable access to public stand posts, and rural population with reasonable access to safe water.

ii) **Reasonable access to water:** This is defined as water supply in the home or within 15 minutes walking distance. Actually a proper definition should be adopted taking the local conditions into account; in urban areas, a distance of not more than 200 metres from a house to a public stand post may be considered reasonable access. In rural areas, reasonable access implies that anyone does not have to spend a disproportionate part of the day fetching water for the family's needs.

iii) **Convenient distance:** Convenient distance and access are distinct in a sense that there may be access to water but it is not necessarily convenient to fetch the water due to distance. The water should be within a reasonable distance from the home that is 200 metres.

iv) **Adequate amount of water:** The amount of water needed to satisfy metabolic, hygienic, and domestic requirements. This is usually defined as twenty litres of safe water per person per day.

v) **Safe water:** The water does not contain biological or chemical agents at concentration levels directly detrimental to health. "Safe water" includes treated surface waters and untreated but uncontaminated water such as that from protected boreholes, springs, and sanitary wells. Untreated surface waters, such as streams and lakes, should be considered safe only if the water quality is regularly monitored and considered acceptable by public health officials.

(b) **Measurement Methods:** This indicator may be calculated as follows: The numerator is the number of persons with access to an adequate amount of safe drinking water in a dwelling or located within a convenient distance from the user's dwelling multiplied by 100. The denominator is the total population.

(c) **The Indicator in the DSR Framework:** Access to water is a crucial influence on human health and sustainable development. The conditions related to water accessibility are contained within this State indicator of the DSR Framework.

(d) **Limitations of the Indicator:** The existence of a water outlet within reasonable distance is often used as a proxy for availability of safe water. The existence of a water outlet, however, is no guarantee in itself that water will always be available or safe, or that people always use such sources.

(e) **Alternative Definitions:** This indicator may be also expressed as the percent of population without access to sufficient and safe drinking water. Thus the population indicated in the numerator would be those who do not have access to adequate and safe drinking water. If these data are available in terms of the proportion of households, it should be possible to convert this into a percentage of the population, using average figures for household size.

## 5. Assessment of the Availability of Data from International and National Sources

(a) **Data Needed to Compile the Indicator:** The number of people with access to adequate and safe water, and the total population. Data on the source of water, for example, house tap or yard pipe, would provide additional meaning to this indicator.

(b) **Data Availability:** Routinely collected at the national and sub-national levels in most countries using censuses and surveys.

(c) **Data Sources:** Two sources are common: administrative data that report on new and existing facilities, and population data derived from some form of household survey or census.

## 6. Agencies Involved in the Development of the Indicator

The lead agency is the World Health Organization (WHO). The contact point is the Director, Office of Global and Integrated Environmental Health, WHO; fax no. (41 22) 791 4123.

## 7. Further Information

### (a) Further Readings:

WHO, Global Strategy for Health for All by the Year 2000. Geneva, WHO, 1981.

WHO, Ninth General Programme of Work Covering the Period 1996-2001. Geneva, WHO, 1994.

WHO, Development of Indicators for Monitoring Progress Towards Health for All by the Year 2000. Geneva, WHO, 1981, p. 40.

### (b) Other References:

World Health Organization. National and Global Monitoring of Water Supply and Sanitation. CWS Series of Cooperative Action for the Decade, No. 2, 1982.

World Health Organization. Water Supply and Sanitation Sector Monitoring Report (WSSMR), 1990.

Program of Action of the Ministerial Drinking Water Conference, 1994.

LIFE EXPECTANCY AT BIRTH		
Social	Chapter 6	State

### 1. Indicator

- (a) **Name:** Life expectancy at birth.  
 (b) **Brief Definition:** The average number of years that a newborn could expect to live, if he or she were to pass through life subject to the age-specific death rates of a given period.  
 (c) **Unit of Measurement:** Life expectancy at birth as expressed in years.

### 2. Placement in the Framework

- (a) **Agenda 21:** Chapter 6: Protecting and Promoting Human Health.  
 (b) **Type of Indicator:** State.



### 3. Significance (Policy Relevance)

(a) **Purpose:** Measures how many years on average a new-born baby is expected to live, given current age-specific mortality risks. Life expectancy at birth is an indicator of mortality conditions and, by proxy, of health conditions. It is also one of the most favoured indicators of social development, and is used as one of the components of United Nations Development Programme's (UNDP) Human Development Index.

(b) **Relevance to Sustainable/Unsustainable Development:** Mortality, with fertility and migration, determines the size of human populations, their composition by age, sex, and ethnicity, and their potential for future growth. Life expectancy, a basic indicator, is closely connected with health conditions, which are in turn an integral part of development. The ICPD Programme of Action notes that the unprecedented increase in human longevity reflects gains in public health and in access to primary health-care services (paragraphs 8.1 and 8.2), which Agenda 21 recognizes as an integral part of sustainable development and primary environmental care (paragraph 6.1). The ICPD Programme of Action highlights the need to reduce disparities in mortality and morbidity among countries and between socioeconomic and ethnic groups. It identifies the health effects of environmental degradation and exposure to hazardous substances in the work-place as an issue of increasing concern.

(c) **Linkages to Other Indicators:** This indicator reflects many social, economic, and environmental influences. It is closely related to other demographic variables, particularly the population growth rate. It also has linkages with indicators of human health and the environment as well as economic indicators. Examples of closely linked indicators would include infant mortality, and water and air quality.

(d) **Targets:** The Declaration of Alma Ata (1978) set a target of life expectancy greater than 60 years by the year 2000, and the ICPD Programme of Action revised the target: life expectancy should be greater than 65 years by 2005 and 70 years by 2015 for countries that currently have the highest levels of mortality; and 70 years and 75 years, respectively, for the other countries (ICPD Programme of Action, paragraph 8.5).

(e) **International Conventions and Agreements:** See section 3d above.

### 4. Methodological Description and Underlying Definitions

Calculation of life expectancy at birth is based on age-specific death rates, which may be calculated separately for males and females, or for both sexes combined. The death rates are commonly tabulated for ages 0 to 1 years, 1 to 5 years, and for 5-year age groups for ages 5 and above. Where data on deaths by age are of good quality, or adjustments for age mis-statement and incompleteness can be made, the life expectancy at birth can be calculated directly from registered deaths and population counts, which are usually based on census enumerations, evaluated and, if necessary, adjusted. Several steps are needed to derive life expectancy from age-specific death rates; the details can be found in demographic or actuarial references that describe construction of life tables, for example, Pressat (1972) or Shryock and Siegel (1980). For a description of the methodology that is linked to computer routines to aid in the calculation, see MORTPAK-LITE (item 7, below).

When data on deaths by age are unavailable from registration systems or sample surveys, the life expectancy at birth can be calculated through "indirect" methods based on special questions asked in censuses or demographic surveys. For information on these indirect estimates, see Manual X and MORTPAK-LITE (section 7, below).

### 5. Assessment of the Availability of Data from National and International Sources

Data is collected by the United Nations on a regular basis and available for most countries from vital registration systems or surveys. For all countries, census and registration data are evaluated and, if necessary, adjusted for incompleteness by the Population Division, United Nations Department of Economics and Social Information and Policy Analysis (DESIPA) as part of its preparations of the official United Nations population estimates and projections. Past, current and projected estimates of life expectancy at birth are prepared for all countries by the Population Division, DESIPA and appear in the United Nations publication, World Population Prospects: The 1994 Revision (see section 7, below).

Most countries tabulate data from death registration systems at the sub-national level. The infant mortality rate and the crude death rate (annual number of deaths per thousand population) is more readily available for sub-national units than is life expectancy at birth.

## 6. Agencies Involved in the Development of the Indicator

The lead organization is the United Nations DESIPA. The contact point is the Director, Population Division, DESIPA; fax no. (1 212) 963 2147. At the World Health Organization, the contact person is the Director, Office of Global and Integrated Environmental Health; fax no. (41 22) 791 4123.

## 7. Further Information

DESIPA. World Population Prospects: The 1994 Revision. Population Division. United Nations Sales No. E.95.XIII.16, New York, 1995.

DESIPA. Manual X: Indirect Techniques for Demographic Estimation. Population Division United Nations Sales No. E.83.XIII.2, New York, 1983.

DESIPA. MORTPAK-LITE - The United Nations Software Package for Mortality Measurement. Population Division. United Nations, New York, 1988.

DESIPA. Demographic Yearbook. Statistical Division. United Nations Sales No.E/F.95.XIII.1,1995. 1993.

Pressat, R. Demographic Analysis: Methods, Results, Applications. London, Edward Arnold; Chicago, Aldine Atherton. 1972.

United Nations. Report of the International Conference on Population and Development. Programme of Action of the International Conference on Population and Development. United Nations Document A/CONF. 171/13. Cairo, Egypt, September 5-13, 1994.

Shryock, H.S, and J.S.Siegel. The Methods and Materials of Demography. U.S. Government Printing Office, Washington, D.C. 1980.

ADEQUATE BIRTH WEIGHT		
Social	Chapter 6	State

### 1. Indicator

- (a) **Name:** Adequate birth weight.
- (b) **Brief Definition:** Adequate birth weight is defined as equal or greater than 2500 grams, the measurement being taken preferably within the first hours of life, before significant postnatal weight loss has occurred.
- (c) **Unit of Measurement:** The indicator is expressed as the number of children per 1000 live births whose birth weight is equal or greater than 2500 grams.

### 2. Placement in the Framework

- (a) **Agenda 21:** Chapter 6: Adequate birth weight.
- (b) **Type of Indicator:** State.

### 3. Significance (Policy Relevance)

- (a) **Purpose:** To monitor the percentage of underweight newborns in a community.
- (b) **Relevance to Sustainable/Unsustainable Development:** Birth weight can be an important indicator of community nutrition. Low birth weights signal insufficient access to adequate food supply. It may also be related to certain diseases such as malaria, and to specific nutritional deficiencies such as endemic goitre.

(c) **Linkages to Other Indicators:** This indicator is closely associated with nutrition related indicators such as measure of weight-for-age and height-for-age for infants and children. Linkages to other health and socioeconomic indicators are also pertinent.

(d) **Targets:** An international target for this indicator has been established by the World Health Organization (WHO). Its Global Strategy for Health establishes a target of at least 90% of newborn infants with a birth weight of at least 2500 grams. National standards are also significant and relevant to countries and sub-national areas.

(e) **International Conventions and Agreements:** WHO's Global Strategy for Health for All by the Year 2000 is an international agreement relevant to this indicator.

#### 4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** Not available.

(b) **Measurement Methods:** In practice the percentage of low birth weight is first calculated as follows: the numerator is represented by live born babies with birth weight less than 2500 grams multiplied by 100. The denominator is the total number of live born babies weighed. This percentage is then subtracted from 100 to give the percentage of newborns weighing at least 2500 grams.

(c) **The Indicator in the DSR Framework:** This proxy measure may be considered as a State indicator of human health and nutrition.

(d) **Limitations of the Indicator:** It may be difficult to obtain data on birth weight. This would apply, for example, where coverage of supervised births by trained personnel is low.

(e) **Alternative Definitions:** Not available.

#### 5. Assessment of the Availability of Data from International and National Sources

(a) **Data Needed to Compile the Indicator:** Number of newborns with a birth weight less than 2500g. Number of newborns weighed.

(b) **Data Availability:** In principle, routinely collected by ministries of health at the national and sub-national levels in most countries.

(c) **Data Sources:** Sources of data would include ministries of health, health centres, hospital records, sample surveys and/or special studies.

#### 6. Agencies Involved in the Development of the Indicator

The lead agency is the World Health Organization (WHO). The contact point is the Director, Office of Global and Integrated Environmental Health, WHO; fax no. (41 22) 791 4123.

#### 7. Further Information

Not available.

<b>INFANT MORTALITY RATE</b>		
<b>Social</b>	<b>Chapter 6</b>	<b>State</b>

##### 1. Indicator

(a) **Name:** Infant mortality rate (IMR).

(b) **Brief Definition:** The number of deaths under 1 year of age during a period of time per 1000 live-births during the same period.

(c) **Unit of Measurement:** Rate per thousand live born.

## 2. Placement in the Framework

(a) **Agenda 21:** Chapter 6: Protecting and Promoting Human Health.

(b) **Type of Indicator:** State.

## 3. Significance (Policy Relevance)

(a) **Purpose:** The purpose of this indicator is to estimate the proportion of newborn who die during the first year of life.

(b) **Relevance to Sustainable/Unsustainable Development:** Beyond its obvious relevance to policy making for healthy children, the IMR is sensitive indicator of availability, utilization and quality of health care, particularly perinatal care. Moreover, given its association with GNP per capita, family income, family size, mothers' education, and nutrition, it is also considered one of the best indicators of overall socioeconomic development of a community.

(c) **Linkages to Other Indicators:** This indicator, associated with access to perinatal health services, is closely linked with life expectancy at birth. It is more generally linked to many other social and economic indicators, including those listed in section 3b above.

(d) **Targets:** The Declaration of Alma Ata (1978) set a target for the IMR to be less than 50 per 1000 live-births by the year 2000. The Global Strategy for Health for All by the Year 2000 (WHO, 1981) aimed to achieve IMR in all identifiable subgroups below 50 per 1000 live-births by the year 2000. The 1990 World Summit for Children Programme of Action adopted a target of reducing the 1990 infant mortality rates by one third, or to 50 per 1000 live births, whichever is less, by the year 2000. The Programme of Action of the International Conference on Population and Development further encouraged countries with intermediate mortality levels to achieve an infant mortality rate below 50 deaths per 1000 births by the year 2005, and all countries to achieve an infant mortality rate below 35 per 1000 live births by 2015.

## 4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** Not available.

(b) **Measurement Methods:** Infant mortality rate is calculated by dividing the number of deaths under one year of age in a given period of time x 1000 by the number of live-births in the same period of time.

(c) **The Indicator in the DSR Framework:** IMR provides a basic reflection of the overall socioeconomic development in a country. It is a State indicator within the DSR Framework..

(d) **Limitations of the Indicator:** There are often problems in collecting the information required for calculating the IMR in many less developed countries where routine data collection in the health services omits many infant deaths. In countries where civil registration of deaths is incomplete, especially in rural areas, many infants dying during the first weeks of life have not even been registered as having been born. For this reason, rates based on civil registration in these countries, or hospital data covering mainly urban areas, are biased to reflect the more privileged in the population. To compound these problems, definitions of live birth differ among countries.

Where data on infant deaths and births are complete, or adjustments for age mis-statement and incompleteness can be made, the infant mortality rate can be calculated directly. When such data are unavailable from registration systems or maternity history data in sample surveys, the infant mortality rate can be calculated through indirect or modelling methods based on special questions asked in censuses or demographic surveys. For information on these estimates, see the Manual X and MORTPAK-LITE (5) references listed in section 7 below.

(e) **Alternative Definitions:** Not available.

## 5. Assessment of the Availability of Data from International and National Sources

(a) **Data Needed to Compile the Indicator:** Number of live births during a given period and number of infant deaths during the same period. Disaggregated data by ethnicity or urban/rural zones support the interpretation of this indicator.

(b) **Data Availability:** Data are now available for most countries thanks to special surveys of representative samples of the population whenever vital registration systems are not available. Surveys that rely on maternity histories, in which women are asked to give the date of birth and age of death (if applicable) of each live-born child, are used in many household surveys, but care must be taken to avoid age mis-reporting and to ensure that there is a complete report of infant deaths. The preceding birth technique, used in antenatal clinics, maternity clinics, and at the time of immunization, can provide a useful recent estimate of the probability of dying by age 2, for children of health service users at the local level. Retrospective questions about the survival of all children born included in censuses and surveys, and analyses using indirect estimation procedures, are also considered to be reliable sources.

(c) **Data Sources:** Original data sources include: vital registrations, sample registration systems, surveillance systems, censuses, and demographic surveys. Information needed for this indicator is collected by the United Nations on a regular basis. For all countries, survey and registration data are evaluated and, if necessary, adjusted for incompleteness by the Population Division, Department of Economics and Social Information and Policy Analysis (DESIPA) as part of its preparations of the official United Nations population estimates and projections. Past, current and projected estimates of infant mortality are prepared for all countries by the Population Division; DESIPA and appear in the United Nations publication, *World Population Prospects: The 1994 Revision*. Demographic monitoring done by government statistical offices often allows desegregation of information to show differences within countries. Surveys are generally designed to provide estimates for major regions within countries as well as at the national level.

## 6. Agencies Involved in the Development of the Indicator

(a) **Lead Agency:** The lead agencies for this indicator are: the United Nations Department of Economics and Social Information and Policy Analysis with the contact point being the Director, Population Division, fax no. (1 212) 963 2147; and the World Health Organization (WHO) with the contact point being the Director, Office of Global and Integrated Environmental Health, fax no. (41 22) 791 4123.

(b) **Other Organizations:** Other contributing organizations include: the United Nations Statistics Division; and the United Nations Children's Fund (UNICEF).

## 7. Further Information

### (a) Further Readings:

WHO. *Development of Indicators for Monitoring Progress Towards Health for All by the Year 2000*. Geneva, 1981, p. 67.

WHO. *Global Health for All Data Base*. Geneva, 1994.

WHO. *Global Strategy for Health for All by the Year 2000*. Geneva, 1981.

DESIPA. *Manual X: Indirect Techniques for Demographic Estimation*. Population Division. United Nations Sales No. E. 83.XIII.2, New York, 1983.

DESIPA. *MORTPAK-LITE - The United Nations Software Package for Mortality Measurement*. Population Division. United Nations, New York, 1988.

DESIPA. *World Population Prospects: The 1994 Revision*. Population Division. United Nations Sales No. E.95.XIII.16, New York, 1995.

United Nations. *Report of the International Conference on Population and Development, Programme of Action of the International Conference on Population and Development*, Cairo, Egypt, September 5-13, 1994. United Nations Document A/CONF. 171/13.

UNICEF. *State of the World Children*. 1994.

(b) **Other References:**

Hill K. Approaches to the measurement of childhood mortality: A comparative review. Population Index 57(3):368-382, Fall, 1991.

WHO and UNICEF. Measurement of overall and cause-specific mortality in infants and children. Report of a Joint WHO/UNICEF Consultation, 15-17 December 1992. Unpublished document WHO/ESM/UNICEF/CONS/92.5.

DESIPA. 1993 Demographic Yearbook. Statistical Division. United Nations Sales No. E/F.95.XIII.1, 1995.

MATERNAL MORTALITY RATE		
Social	Chapter 6	State

1. Indicator

- (a) **Name:** Maternal mortality rate (MMR).  
(b) **Brief Definition:** Number of maternal deaths per 1 000 (or per 10 000 or per 100 000) live births.  
(c) **Unit of Measurement:** Ratio. Due to the considerable decrease of MMR in many countries, this ratio is now increasingly expressed per 10 000 or more often per 100 000 live-births, which is acceptable if preferred and indicated by the country.

2. Placement in the Framework

- (a) **Agenda 21:** Chapter 6: Protecting and Promoting Human Health.  
(b) **Type of Indicator:** State.

3. Significance (Policy Relevance)

(a) **Purpose:** This indicator estimates the proportion of pregnant women who die from causes related to or aggravated by the pregnancy or its management.

(b) **Relevance to Sustainable/Unsustainable Development:** The MMR reflects the risk to mothers during pregnancy and childbirth and is influenced by the following factors: general socioeconomic conditions; unsatisfactory health conditions preceding the pregnancy; incidence of the various complications of pregnancy and childbirth; availability and utilization of health care facilities, including prenatal and obstetric care.

Monitoring MMRs is particularly useful for policy making and decisions regarding the accessibility to and the quality of prenatal and obstetric care.

(c) **Linkages to Other Indicators:** This indicator is closely linked with infant mortality rate, contraceptive prevalence, and health care expenditures.

(d) **Targets:** The Ninth General Programme of Work Covering the Period 1996-2001 calls for a reduction of MMR by half in all countries between 1990 and the year 2000.

(e) **International Conventions and Agreements:** See section 3d above.

4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** Maternal death: The death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental cause. Maternal deaths should be divided into two groups: (i) direct obstetric deaths are those resulting from obstetric complications of the pregnant state (pregnancy, labour, and puerperium), from interventions, omissions, incorrect treatment, or from a chain of events resulting from the above; and (ii) indirect obstetric deaths are those resulting from previous existing disease or disease that developed

during pregnancy and which was not due to direct obstetric causes, but was aggravated by physiologic effects of pregnancy.

The ICD-10 includes two further definitions of maternal mortality: (i) late maternal death: the death of a woman from direct or indirect obstetric causes more than 42 days but less than one year after termination of pregnancy; and (ii) pregnancy-related death: the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the cause of death (includes deaths from accidents).

(b) **Measurement Methods:** The maternal mortality ratio is expressed as follows:

$$\frac{\text{Maternal deaths (direct and indirect)}}{\text{live-births}} \times K$$

$$k = 1\ 000, 10\ 000, \text{ or } 100\ 000$$

For the purpose of international reporting of maternal mortality, only those maternal deaths occurring before the end of the 42-day reference period should be included in the calculation of the rate, although the recording of later maternal deaths is useful for national analytical purposes (see section 4e below).

Published maternal mortality rates should always specify the numerator (number of recorded maternal deaths), which can be given as: (i) the number of recorded direct obstetric deaths; or the number of recorded obstetric deaths (direct plus indirect). It should be noted that maternal deaths from HIV disease and obstetrical tetanus are to be included in the MMR.

(c) **The Indicator in the DSR Framework:** The MMR provides an indication of the State of health care and general socioeconomic conditions in a country.

(d) **Limitations of the Indicator:** The computation of the MMR implies a well-developed registration system of births and deaths, as well as of causes of death. In order to improve the quality of maternal mortality data and provide alternative methods of collecting data on deaths during pregnancy or related to it, as well as to encourage the recording of deaths from obstetric causes occurring more than 42 days following termination of pregnancy, the Forty-third World Health Assembly in 1990 adopted the recommendation that countries consider the inclusion on death certificates of questions regarding current pregnancy and pregnancy within one year preceding death. In the absence of a reliable registration system, a proxy measurement may be used based on a count of deaths among women soon after childbirth. To be used as a health indicator, the rate should preferably be based on observations of at least 50 maternal deaths.

In countries with a small population (for example, less than half a million), and also in some larger countries with very low maternal mortality, the rate should be considered with great caution, as annual rates are subject to considerable random variation.

(e) **Alternative Definitions:** Recording "late maternal death" and monitoring its rate become more important the more developed the country is. In either cases, it is essential to state which definition is used. The definition of "pregnancy-related death" (see section 4a above) is irrespective of cause of death and therefore includes incidental and accidental causes. This avoids the determination of pathogenic causes of death, and strong clinical inputs during data collection. In countries where maternal mortality is high, the bias introduced by the inclusion of external causes is usually low and simplifies data collection.

## 5. Assessment of the Availability of Data from International and National Sources

(a) **Data Needed to Compile the Indicator:** Number of live births; number of maternal deaths.

(b) **Data Availability:** Data are routinely collected at national and sub-national levels in most countries.

(c) **Data Sources:** The primary sources of data are: vital statistics registration; and community-based information (reproductive age mortality survey, case finding, sisterhood method). Hospital maternal mortality ratios should not be interpreted as it is impossible to know the direction of the bias.

## 6. Agencies Involved in the Development of the Indicator

The lead agency is the World Health Organization (WHO). The contact point is the Director, Office of Global and Integrated Environmental Health, WHO; fax no. (41 22) 791 4123.

## 7. Further Information

### (a) Further Readings:

Abouzahr, C. and Royston, E. Maternal Mortality: A Global Factbook. Geneva, WHO, 1991.

WHO. Maternal mortality, Rates and Ratios. A Tabulation of Available Information. 3rd ed. Geneva, WHO/MCH/MSM/91.6, 1991.

WHO. Indicators to Monitor Maternal Health Goals. Report of a Technical Working Group. Geneva, WHO, 1994.

### (b) Other References:

WHO. Development of Indicators for Monitoring Progress Towards Health for All by the Year 2000. Geneva, WHO, 1981.

WHO. International Statistical Classification of Diseases and Related Health Problems, 10th rev. Geneva, WHO, 1992.

WHO. Ninth General Programme of Work Covering the Period 1996-2001. Geneva, WHO, 1994.

WHO. Global Health for All Database. Geneva, WHO, 1994.

NUTRITIONAL STATUS OF CHILDREN		
Social	Chapter 6	State

### 1. Indicator

(a) **Name:** The nutritional status of children in relation to national standards.

(b) **Brief Definition:** Children under age five whose weight-for-age and height-for-age is between either 80% and 120% of the reference value of the country, or within two standard deviations of this value.

(c) **Unit of Measurement:** %.

### 2. Placement in the Framework

(a) **Agenda 21:** Protecting and Promoting Human Health.

(b) **Type of Indicator:** State.

### 3. Significance (Policy Relevance)

(a) **Purpose:** The purpose of this indicator is to measure long term nutritional imbalance and malnutrition, as well as current under-nutrition.

(b) **Relevance to Sustainable/Unsustainable Development:** Health and development are intimately interconnected. Meeting primary health care needs and the nutritional requirement of children are fundamental to the achievement of sustainable development. Anthropometric measurements to assess growth and development, particularly in young children, are the most widely used indicators of nutritional status in a community. The percentage of low height-for-age reflects the cumulative effects of under-nutrition and infections since birth, and even before birth. This measure, therefore, should be interpreted as an indication of poor environmental conditions and/or early malnutrition. The percentage of low weight-for-age reflects both the cumulative effects of episodes of malnutrition or chronic under-nutrition since birth and current under-nutrition. Thus, it is a composite indicator which is more difficult to interpret.



(c) **Linkages to Other Indicators:** This indicator is closely linked with adequate birth weight. It is also associated with such socioeconomic and environmental indicators as squared poverty gap index, access to safe drinking water, infant mortality rate, life expectancy at birth, national health expenditure devoted to local health care, Gross Domestic Product (GDP) per capita, environmental protection expenditures as a percent of GDP, and waste water treatment coverage.

(d) **Targets:** At least 90% of children within a population should have a weight-for-age that corresponds to the reference values given in section 1b above by the year 2000. This target has been established by the World Health Organization's (WHO) Global Strategy for Health for All by the Year 2000.

(e) **International Conventions and Agreements:** The WHO Global Strategy for Health for All by the Year 2000 and its Ninth General Programme of Work, together with the United Nations World Summit for Children represent international agreements relevant to this indicator.

#### 4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** A national or international reference population is used to calculate the indicators for weight-for-age and height-for-age. A WHO Working Group has recommended that the best available data for this has been established by the United States National Center for Health Statistics (see references in section 7 below). This data may be used for children up to five years of age, since the influence of ethnic or genetic factors on young children is considered insignificant.

Low weight and low height are defined as less than the value corresponding to two standard deviations below the median of the respective frequency distributions for healthy children (see WHO, 1981 in section 7 below).

(b) **Measurement Methods:** The proportion of children under five with acceptable weight-for-age (or height-for-age) can be calculated by using the following formula:

Numerator: number of children under five with weight-for-age (or height-for-age) acceptable x 100.

Denominator: total number of children under five weighed.

For height, supine length is measured in children under two, and stature height in older children.

(c) **The Indicator in the DSR Framework:** This indicator, as a proxy measure for access to adequate food supply, is a State indicator within the DSR Framework.

(d) **Limitations of the Indicator:** Available data may be outdated, site-specific, and lack a time series perspective. In some countries, the age of children is difficult to determine. It is also difficult to measure the height of children under two with accuracy and consistency.

(e) **Alternative Definitions:** Not available.

#### 5. Assessment of the Availability of Data from International and National Sources

(a) **Data Needed to Compile the Indicator:** The data needed to compile this indicator are the number of children under five weighed; and the number of children under five with weight-for-age or height-for-age within the national reference values.

(b) **Data Availability:** The data are routinely collected by ministries of health at the national and subnational levels for most countries.

(c) **Data Sources:** The primary national sources of data are the ministries of health.

#### 6. Agencies Involved in the Development of the Indicator

The lead agency for the development of this indicator is the World Health Organization (WHO). At WHO, the contact point is the Director, Office of Global and Integrated Environmental Health; fax no. (41 22) 791 4123.

## 7. Further Information

United States Department of Health, Education, and Welfare. Growth Charts. National Center for Health Statistics, Public Health Service, Health Resources Administration. Rockville, Maryland. 1976.

Waterlow, J.C. et al. The Presentation and Use of Height and Weight Data for Comparing the Nutritional Status of Groups of Children under the Age of Ten Years. Bulletin of the World Health Organization, Volume 55: 489-498. 1977.

WHO. Global Strategy for Health for All by the Year 2000. Geneva. 1981.

WHO. Development of Indicators for Monitoring Progress Towards Health for All by the Year 2000. Geneva. 1981.

WHO. Ninth General Programme of Work Covering the Period 1996-2001. Geneva. 1994.

IMMUNIZATION AGAINST INFECTIOUS CHILDHOOD DISEASES		
Social	Chapter 6	Response

### 1. Indicator

- (a) **Name:** The percent of the eligible population that have been immunized according to national immunization policies.
- (b) **Brief Definition:** The definition includes three components: (i) the proportion of children immunized against diphtheria, pertussis, tetanus, measles, poliomyelitis, tuberculosis and hepatitis B before their first birthday; (ii) the proportion of children immunized against yellow fever in affected countries of Africa; and (iii) the proportion of women of child-bearing age immunized against tetanus.
- (c) **Unit of Measurement:** %.

### 2. Placement in the Framework

- (a) **Agenda 21:** Chapter 6: Immunization against infectious childhood diseases.
- (b) **Type of Indicator:** Response.

### 3. Significance (Policy Relevance)

- (a) **Purpose:** This indicator monitors the implementation of immunization programs.
- (b) **Relevance to Sustainable/Unsustainable Development:** Health and sustainable development are intimately interconnected. Both insufficient and inappropriate development can lead to severe health problems in both developing and developed countries. Addressing primary health needs is integral to the achievement of sustainable development. Particularly relevant is the provision of preventative programmes aimed at controlling communicable diseases and protecting vulnerable groups. Good management of immunization programmes, essential to the reduction of morbidity and mortality from major childhood infectious diseases, is a basic measure of government commitment to preventative health services.
- (c) **Linkages to Other Indicators:** This indicator is linked to other health indicators, particularly those associated with the young, such as infant mortality and life expectancy. It is influenced by such indicators as health expenditure and the proportion of population in urban areas.
- (d) **Targets:** Several international targets have been established for this indicator. In the Global Strategy for Health and the Ninth General Programme at Work, all children and 90% of children respectively, should be immunized against diphtheria, pertussis, tetanus, measles, poliomyelitis, and tuberculosis (see section 7 below). The 1992 World Health Assembly agreed that all children should be immunized

against hepatitis B as part of expanded national programmes of immunization. In addition, all children in affected countries of Africa should be immunized against yellow fever. At the World Summit for Children it was resolved that all pregnant women should be immunized against tetanus.

(e) **International Conventions and Agreements:** See sections 3d and 7.

#### 4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** A child is considered adequately immunized against a disease when he or she has received the following number of doses: tuberculosis (1 dose); diphtheria, pertussis, and tetanus (DPT) (2 or 3 doses according to the immunization scheme adopted in the country); poliomyelitis (3 doses of live or killed vaccine); measles (1 dose); hepatitis B (3 doses); and yellow fever (1 dose). A pregnant woman is considered adequately immunized against tetanus if she has received at least 2 doses of tetanus toxoid during pregnancy or was already previously immunized.

(b) **Measurement Methods:**

i) Infant population: The numerator is the number of infants fully immunized with the specified vaccines x 100, while the denominator is the number of infants surviving to age one. If the national schedule provides for immunization in a different age group, such as measles in the second year of age, the value should be the percentage of children immunized in the target age group. For the proper management of immunization programmes, it is however essential to be able to break down the data in such a way as to show the percentage covered in the first year of life (or second year for measles immunization).

ii) Women of child-bearing age: The numerator is the number of women immunized with two or more doses of tetanus toxoid during pregnancy x 100, while the denominator is the number of live births.

(c) **The Indicator in the DSR Framework:** This indicator focuses on a fundamental aspect of preventative health care. As such, it represents a Response indicator influencing the State indicators of health in the DSR Framework.

(d) **Limitations of the Indicator:** It is useful to have a composite indicator of adequate coverage by immunization. However, it is easier to collect data on the global coverage of a population against one disease than on the immunization of each child against all target diseases at the same time. This is why in most countries only the former data are easily available and collected.

The percent of pregnant women immunized with two or more doses of tetanus toxoid during pregnancy is rather easy to monitor through routine data collection in the health services. However, it underestimates the percent of pregnant women actually immunized against tetanus. It does not take into account women who are already adequately immunized when becoming pregnant and therefore do not require new doses of tetanus toxoid during pregnancy. Women in this category are not numerous in countries where neonatal tetanus is still an issue and where, accordingly, this indicator is mainly used. But in some countries in transition, with long-standing child immunization programmes, the percent of pregnant women receiving tetanus toxoid is misleading as a significant number of them may be already immunized at the moment of pregnancy.

The indicator does not reflect other health preventative measures, such as education, diet, and pollution prevention. The international targets are not very meaningful for many countries.

(e) **Alternative Definitions:** Not available.

#### 5. Assessment of the Availability of Data from International and National Sources

(a) **Data Needed to Compile the Indicator:** The number of infants fully immunized against: DPT; poliomyelitis; measles; tuberculosis; the number of infants surviving to age one year; the number of infants living in African countries exposed to yellow fever; the number of pregnant women immunized against tetanus; and the number of live births.

(b) **Data Availability:** Data is readily available from national immunization programmes of most countries, at least at the national level.

(c) **Data Sources:** Reporting of vaccinations performed annually or nationwide surveys are the most common data sources.

## 6. Agencies Involved in the Development of the Indicator

(a) **Lead Agency:** The lead agency is the World Health Organization (WHO). The contact point is the Director, Office of Global and Integrated Environmental Health, WHO; fax no. (41 22) 791 4123.

(b) **Other Organizations:** The United Nations Children's Fund is a cooperating agency.

## 7. Further Information

WHO. Global Strategy for Health for All by the Year 2000. Geneva, WHO, 1981.

WHO. Ninth General Programme of Work Covering the Period 1996-2001. Geneva, WHO, 1994.

WHO. World Health Assembly Resolution. WHO45.19, 1992.

WHO. Expanded Programme on Immunization Data Base. Geneva, WHO.

WHO. World Summit for Children. Paris, UNICEF, 1990.

CONTRACEPTIVE PREVALENCE		
Social	Chapter 6	Response

### 1. Indicator

- (a) **Name:** Contraceptive prevalence.
- (b) **Brief Definition:** This indicator is generally defined as the percent of women or reproductive age using any method of contraception. It is usually calculated for married women of reproductive age, but sometimes for other base population, such as all women of reproductive age, or for men of a specified age group.
- (c) **Unit of Measurement:** %.

### 2. Placement in the Framework

- (a) **Agenda 21:** Chapter 6: Protecting and Promoting Human Health.
- (b) **Type of Indicator:** Response.

### 3. Significance (Policy Relevance)

(a) **Purpose:** The measure indicates the extent of people's conscious efforts to control their fertility. It does not capture all actions taken to control fertility, since induced abortion is common in many countries.

(b) **Relevance to Sustainable/Unsustainable Development:** Increased contraceptive prevalence, is, in general, the single most important proximate determinant of inter-country differences in fertility, and of ongoing fertility declines in developing countries. Contraceptive prevalence can also be regarded as an indirect indicator of progress in providing access to reproductive health services including family planning, one of the eight elements of primary health care.

Agenda 21 discusses reproductive health programmes, which include family planning, as among the programmes that promote changes in demographic trends and factors towards sustainability. Family planning is discussed in the broader context of reproductive, sexual health, and reproductive rights by Chapter VII of the Programme of Action, International Conference on Population and Development (ICPD); and Strategic Objective C of the Platform for Action adopted at the Fourth World Conference on Women. Health benefits include the ability to prevent pregnancies that are too early, too closely spaced, too late, or too many.

Current contraceptive practice depends not only on people's fertility desires, but also on availability and quality of family planning services; social traditions that affect the acceptability of contraceptive use; and other factors, such as marriage patterns and traditional birth-spacing practices, that independently influence the supply of children.

(c) **Linkages to Other Indicators:** The level of contraceptive use has a strong, direct effect on the total fertility rate (TFR) and, through the TFR, on the rate of population growth. Use of contraception to prevent pregnancies that are too early, too closely spaced, too late, or too many has benefits for maternal and child health. This indicator is also closely linked to access to primary health care services particularly those pertaining to reproductive health care. Furthermore, it has broader and predictive implications for many other sustainable development indicators and issues, such as rate of change of school-age population, woman's participation in the labour force, and natural resource use.

(d) **Targets:** International agreements do not establish specific national or global targets for contraceptive prevalence. Recent international conferences have strongly affirmed the right of couples and individuals to choose the number, spacing and timing of their children, and to have access to the information and means to do so. The ICPD Programme of Action states that "Governmental goals for family planning should be defined in terms of unmet needs for information and services. Demographic goals, while legitimately the subject of government development strategies, should not be imposed on family-planning providers in the form of targets or quotas for the recruitment of clients" (paragraph 7.12).

#### 4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** The standard indicator is the percentage currently using any method of contraception among married women aged 15-49 or 15-44. In this context, the married group usually includes those in consensual or common-law unions in societies where such unions are common. Contraceptive prevalence is also frequently reported for all women of reproductive age, and statistics are sometimes presented for men instead of, or in addition to, women.

Users of contraception are defined as women who are practising, or whose male partners are practising, any form of contraception. These include female and male sterilization, injectable and oral contraceptives, intrauterine devices, diaphragms, spermicide, condoms, rhythm, withdrawal and abstinence, among others.

For this indicator, too early is defined as under age 15. Such adolescents are 5 to 7 times more likely to die in pregnancy and childbirth than women in the lowest risk group of 20-24 years. Too closely spaced means women who become pregnant less than two years after a previous birth. Greater adverse consequences to women and their children are experienced under such circumstances. Women who have had five or more pregnancies (too many) or who are over 35 (too late), also face a substantially higher risk than the 20-24 year old group.

When presenting information about contraceptive use, it is useful to show the data according to specific type of contraception; by social characteristics such as rural/urban or region of residence, education, marital status; by 5-year age group, including specific attention to adolescents aged under 18 years; and by family size.

(b) **Measurement Methods:** Measurements of contraceptive prevalence come almost entirely from representative sample surveys of women or men of reproductive age. Current use of contraception is usually assessed through a series of questions about knowledge and use of particular methods.

(c) **The Indicator in the DSR Framework:** This indicator focuses on individual preventative action to control fertility through family planning. It is a Response indicator with wide implications for many elements of the DSR Framework.

(d) **Limitations of the Indicator:** For surveys, under-reporting can occur when specific methods are not mentioned by the interviewer. This can be the case with the use of traditional methods such as rhythm and withdrawal, and use of contraceptive surgical sterilization. The list of specific methods is not completely uniform in practice, but in most cases is sufficiently consistent to permit meaningful comparison. "Current" use is often specified in surveys to mean "within the last month", but sometimes the time reference is left vague, and occasionally longer reference periods are specified. With statistics from family planning programmes, the accuracy of the assumptions is often difficult to assess. The derived estimates obviously omit contraceptive users who do not use the programme's services, and thus tend to underestimate the overall level of use.

Service statistics maintained by family planning programmes are also sometimes used to derive estimates of contraceptive prevalence. In such cases it is necessary to apply assumptions in order to derive estimates of numbers of current users from the records of numbers of family planning clients. Base population statistics (numbers of women or of married women) are in this case usually derived from census counts, adjusted to the reference date by the Population Division of the Department of Economics and Social Information and Policy Analysis (DESIPA), as part of its preparations of the official United Nations population estimates and projections.

(e) **Alternative Definitions:** Not available.

## 5. Assessment of the Availability of Data from International and National Sources

(a) **Data Needed to Compile the Indicator:** Number of women of childbearing age using family planning methods. Number of women of childbearing age. Both data sets are frequently limited to married women.

(b) **Data Availability:** The most recent United Nations review of contraceptive prevalence includes statistics for 119 countries and areas with information dating from 1975 or later. These countries include 90 per cent of world population. This review includes contraceptive prevalence measures for all women of reproductive age in 64 countries and areas and for samples of men in 27 countries and areas.

Contraceptive prevalence is one of the few topics for which data coverage is more complete and more current for developing than for developed countries. Most surveys provide estimates for major regions within countries as well as at the national level. Less frequently the sample design permits examining prevalence at the state, provincial, or lower administrative levels. In addition to those with national or near-national coverage, surveys covering this topic are sometimes available for particular geographic areas. Data are much less widely available for population groups other than married women, although such information has increased in recent years.

(c) **Data Sources:** Executing agencies for surveys covering this topic vary. National statistical offices and ministries of health are the most common source, but other governmental offices, non-governmental voluntary or commercial organizations are frequently involved. Many surveys are conducted in collaboration with international survey programmes. The Population Division, DESIPA regularly compiles information about contraceptive prevalence and publishes it in the annual World Population Monitoring report.

## 6. Agencies Involved in the Development of the Indicator

The lead agencies are: the United Nations Department of Economics and Social Information and Policy Analysis (DESIPA), with the contact point as the Director, Population Division, fax no. (1 212) 963 2147; and the World Health Organization (WHO), with the contact point as the Director, Office of Global and Integrated Environmental Health, fax no. (41 22) 791 4123.

## 7. Further Information

Levels and Trends of Contraceptive Use as Assessed in 1988 (United Nations, Sales No. E.89.XIII.4).

Levels and Trends of Contraceptive Use as Assessed in 1994 (United Nations, ST/ESA/SER.A/146, forthcoming).

Programme of Action of the International Conference on Population and Development, Report of the International Conference on Population and Development, Cairo, Egypt, September 5-13, 1994. (United Nations Document - A/CONF. 171/13).

World Population Monitoring, 1993 (Sales No. E.95.XIII.8, New York).

World Population Monitoring, 1996 (ESA/PWP.131).

<b>PROPORTION OF POTENTIALLY HAZARDOUS CHEMICALS MONITORED IN FOOD</b>
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Social	Chapter 6	Response
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#### 1. Indicator

- (a) **Name:** Proportion of potentially hazardous chemicals monitored in food.  
 (b) **Brief Definition:** Proportion of potentially hazardous chemicals monitored in food which are appropriate for the country's stage of development.  
 (c) **Unit of Measurement:** %.

#### 2. Placement in the Framework

- (a) **Agenda 21:** Chapter 6: Protecting and Promoting Human Health.  
 (b) **Type of Indicator:** Response.

#### 3. Significance (Policy Relevance)

(a) **Purpose:** The purpose of this indicator is to assess national capacities to monitor, through population-based sampling and analysis, the presence of potentially hazardous chemicals in various food commodities, based on lists of priority chemicals and foods in which they occur, appropriate for the country's stage of development.

(b) **Relevance to Sustainable/Unsustainable Development:** Human health care is integral to the achievement of the goals of sustainable development. Food contamination is a major route of human exposure to a range of chemicals potentially hazardous to health. Food contamination monitoring is essential to protect public health and maintain confidence in the food supply. Taken together with information on food consumption, monitoring provides an assessment of whether human exposure to chemicals in food exceeds established acceptable or tolerable levels. In this way, monitoring provides information to identify problems, establish priorities, and select appropriate interventions. Monitoring can also detect sporadic contamination which is often associated with chemical misuse or accidents. Food contamination monitoring serves to confirm the adequacy of source directed (environmental) measures and other interventions to reduce or prevent the contamination of food.

(c) **Linkages to Other Indicators:** This indicator is closely linked with other measures associated with human exposure to chemicals, such as use of agricultural pesticides, ambient air pollution, unintentional chemically induced acute poisonings, and generation of hazardous waste. It is also linked to other health response indicators, such as total national health care expenditure related to Gross National Product (GNP).

(d) **Targets:** It is generally accepted that at least 90% of the contaminant/food commodity combinations should be monitored.

(e) **International Conventions and Agreements:** The Food Contamination Monitoring and Assessment Programme (GEMS/Food) of the Global Environment Monitoring System is of relevance to this indicator.

#### 4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** The definitions and concepts for this indicator are well known and readily available. Monitoring is the representative (random) sampling and analysis of selected food commodities, including drinking water, to assess the dietary exposure of the population to a potentially hazardous contaminant for comparison with the acceptable or tolerable levels of human exposure established by national and international bodies. Such monitoring should not be confused with compliance monitoring which is performed for regulatory purposes.

(b) **Measurement Methods:** This indicator may be calculated by using: the number of combinations of contaminants and foods which are monitored as the numerator; and the number of combinations of contaminants and foods which should be monitored by the country at its stage of development as the denominator.

Based on over twenty years of GEMS/Food experience, three separate standard lists of contaminant/food combinations have been prepared based on knowledge of potentially hazardous

chemicals and the foods in which they are known to occur. The core list for lesser developed countries contains 153 combinations of contaminants and foods which offer basic protection of the consumer from known chemical hazards. The intermediate list for developing countries contains 358 combinations of contaminants and foods which offer improved protection of the consumer, especially as development increases the number and amount of potentially hazardous chemicals used in the country. The comprehensive list for industrialized countries includes 394 combinations which provide assurance that the full range of potentially toxic chemicals are being monitored in the food supply. For guidance on which list to select, countries with per capita GNP under US\$3 500 should use the core list. For countries with per capita GNP between US\$3 500 and US\$7 500, the intermediate list should be used. For countries with per capita GNP over US\$7 500, the comprehensive list should be used. The lists are attached in Annex 1 below.

(c) **The Indicator in the DSR Framework:** This indicator represents a societal Response to human exposure to potentially hazardous chemicals.

(d) **Limitations of the Indicator:** Frequency of monitoring, which is based on the importance of the food in the diet and to total exposure, is not addressed by this indicator.

(e) **Alternative Definitions:** Not available.

## 5. Assessment of the Availability of Data from International and National Sources

(a) **Data Needed to Compile the Indicator:** The number of contaminant/commodity combinations monitored are required (see section 4b above).

(b) **Data Availability:** The information is available for most countries through the ministries of health, agriculture, and/or environment.

(c) **Data Sources:** The information may be obtained directly from the laboratories with the mandate to collect it. Most countries undertaking monitoring usually publish annual reports, often in professional journals. In over seventy countries, the GEMS/Food Programme maintains a network of Participating Institutions which are involved in this type of monitoring.

## 6. Agencies Involved in the Development of the Indicator

(a) **Lead Agency:** The lead agency is the World Health organization (WHO). The contact point is the Director, Office of Global and Integrated Environmental Health, WHO; fax no. (41 22) 791 4123.

(b) **Other Organizations:** The Food and Agriculture Organization (FAO) and the United Nations Environment Programme (UNEP) are partners with WHO in the GEMS/Food Programme.

## 7. Further Information

World Health Organization. Guidelines for Establishing or Strengthening National Food Contamination Monitoring Programmes. Unpublished Document WHO/HCS/FCM/78.1. GEMS/Food, Geneva.

World Health Organization. Guidelines for Predicting Dietary Intake of Pesticide Residues. GEMS/Food, Geneva. 1990.

World Health Organization. Guidelines for the Study of Dietary Intake of Chemical Contaminants. WHO Offset Publication No 87. GEMS/Food, Geneva. 1985.

## ANNEX 1

CORE LIST	
Contaminant	Food
aldrin, dieldrin, DDT (p,p'- and o,p'-), TDE (p,p'-), TDE (p,p'-), DDE (p,p'-) endosulfan ( and β), endosulfan	whole milk, butter, animal fats and oils, fish, cereals*, human milk



sulfate, endrin, hexachlorocyclohexane ( $\alpha$ and $\beta$ and ), hexachlorobenzene, heptachlor, heptachlor epoxide and polychlorinated biphenyls	
lead	milk, canned/fresh meat, kidney, cereals*, canned/fresh fruit, fruit juice, spices, infant food, canned beverages, wine, drinking water
cadmium	kidney, molluscs, crustaceans, cereals*
mercury	fish
aflatoxins	milk, maize, groundnuts, other nuts, dried figs
diazinon, fenitrothion, malathion, parathion, methyl parathion, methyl pirimiphos	cereals*, vegetables, drinking water

\* Or other staple foods

<b>INTERMEDIATE LIST</b>	
<b>Contaminant</b>	<b>Food</b>
aldrin, dieldrin, DDT (p,p'- and o,p'-), TDE (p,p'-), TDE (p,p'-), DDE (p,p'-) endosulfan ( $\alpha$ and $\beta$ ), endosulfan sulfate, endrin, hexachlorocyclohexane ( $\alpha$ and $\beta$ and ), hexachlorobenzene, heptachlor, heptachlor epoxide and polychlorinated biphenyls (congeners No. 28, 52, 101, 118, 138, 153 and 180)	whole milk, dried milk, butter, eggs, animal fats and oils, fish, cereals*, vegetable fats and oils, human milk, total diet, drinking water
lead	milk, canned/fresh meat, kidney, fish, molluscs, crustaceans, cereals*, pulses, legumes, canned/fresh fruit, fruit juice, spices, infant food, canned beverages, wine, total diet, drinking water
cadmium	kidney, molluscs, crustaceans, cereals* flour, vegetables, total diet
mercury	fish, fish products, total diet
aflatoxins	milk, milk products, maize, cereals*, groundnuts, other nuts, spices, dried figs, total diet
diazinon, fenitrothion, malathion, parathion, methyl parathion, methyl pirimiphos, chlorpyrifos	cereals*, vegetables, fruit, total diet, drinking water
radionuclides (Cs-137, Sr-90, I-131, Pu-239)	cereals*, vegetables, milk, drinking water
nitrate/nitrite	vegetables, drink water

\* Or other staple foods

<b>COMPREHENSIVE LIST</b>	
<b>Contaminant</b>	<b>Food</b>
aldrin, dieldrin, DDT (p,p'- and o,p'-), TDE (p,p'-), TDE (p,p'-), DDE (p,p'-) endosulfan ( $\alpha$ and $\beta$ ), endosulfan sulfate, endrin, hexachlorocyclohexane ( $\alpha$ and $\beta$ and ), hexachlorobenzene,	whole milk, dried milk, butter, eggs, animal fats and oils, fish, cereals*, vegetable fats and oils,

heptachlor, heptachlor epoxide and polychlorinated biphenyls (congeners No. 28, 52, 101, 118, 138, 153 and 180), dioxins (PCDDs and PCDFs)	human milk, total diet, drinking water
lead	milk, canned/fresh meat, kidney, fish, molluscs, crustaceans, cereals*, pulses, legumes, canned/fresh fruit, fruit juice, spices, infant food, total diet, drinking water
cadmium	kidney, molluscs, crustaceans, cereals*, vegetables, total diet
mercury	fish, fish products, mushrooms, total diet
aflatoxins	milk, milk products, eggs, maize, cereals*, groundnuts, other nuts, spices, dried figs, total diet
ochratoxin A	wheat, cereals, meat (pork)
patulin	apples, apple juice, other pome fruit and juice
fumonisin	maize
diazinon, fenitrothion, malathion, parathion, methyl parathion, methyl pirimiphos, chlorpyrifos	cereals*, vegetables, fruit, total diet, drinking water
dithiocarbamates	cereals*, vegetables, fruit, total diet, drinking water
radionuclides (Cs-137, Sr-90, I-131, Pu-239)	cereals*, vegetables, milk, drink water
nitrate/nitrite	vegetables, drinking water

\* Or other staple foods

#### NATIONAL HEALTH EXPENDITURE DEVOTED TO LOCAL HEALTH CARE

Social	Chapter 6	Response
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#### 1. Indicator

- (a) **Name:** National health expenditure devoted to local health care.  
 (b) **Brief Definition:** Proportion of national health expenditure devoted to local primary health care. This is the first-level contact and includes community health care, health centre care, dispensary care, etc., but excludes hospital care.  
 (c) **Unit of Measurement:** %.

#### 2. Placement in the Framework

(a) **Agenda 21:** Chapter 6: Protecting and Promoting Human Health.

(b) **Type of Indicator:** Response.

#### 3. Significance (Policy Relevance)

(a) **Purpose:** This indicator measures the proportion of resources devoted to primary health care.

(b) **Relevance to Sustainable/Unsustainable Development:** Everybody now agrees that significant health progress worldwide can only be achieved through universal access to primary health care, that is essential health care made accessible to all at an affordable cost. The proportion of the national health expenditure devoted to local health care is an indicator of the effort made by a society to finance essential and easily accessible health care.

(c) **Linkages to Other Indicators:** This indicator is closely linked to other health care indicators, such as total national healthcare as a percent of Gross National Product, immunization against infectious childhood diseases, and infant and maternal mortality rates.

(d) **Targets:** Not available.

(e) **International Conventions and Agreements:** Not available.

#### 4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** Local Health Care: first-level contact, including community health care, health centre care, dispensary care and the like, excluding hospital care. National health expenditure includes: Public: current and capital expenditure of ministries of health and other ministries with responsibilities in the health sector, and social security expenditure, including external aid for the health sector; Private: out-of-pocket health expenditure, patient co-payments, private health insurance premiums, and health expenditures by non-government organizations (NGOs).

(b) **Measurement Methods:** Numerator: national health expenditure on local health care; Denominator: total national health expenditure.

(c) **The Indicator in the DSR Framework:** In reflecting the proportion of total health care expenditures devoted to local health care, this is a Response indicator in the DSR Framework.

(d) **Limitations of the Indicator:** The definition does not take into account primary health care activities which are delivered in hospitals, nor the cost of central and regional activities needed to support and guide local health care. Furthermore, each country will have to define what is "local health care" with respect to its own health system.

The indicator says nothing about the quality or efficiency of health actions and services. Household surveys are required to generate the information needed for this indicator which may pose a significant burden for some countries.

(e) **Alternative Definitions:** Not available.

#### 5. Assessment of the Availability of Data from International and National Sources

(a) **Data Needed to Compile the Indicator:** A large amount of financial data are needed from a wide variety of sources, as can be seen from the definition.

(b) **Data Availability:** Data on out-of-pocket health expenditures requires a household survey. All other data should usually be available from responsible institutions at the national level (public or private).

(c) **Data Sources:** The primary sources of data are national ministries of health, finance, and regional development; and NGOs.

#### 6. Agencies Involved in the Development of the Indicator

The lead agency is the World Health Organization (WHO). The contact point is the Director, Office of Global and Integrated Environmental Health, WHO; fax no. (41 22) 791 4123.

#### 7. Further Information

WHO. Development of Indicators for Monitoring Progress Towards Health for All by the Year 2000. Geneva, 1981.

WHO. Global Strategy for Health for All by the Year 2000. Geneva, 1981.

TOTAL NATIONAL HEALTH EXPENDITURE RELATED TO GROSS NATIONAL PRODUCT		
Social	Chapter 6	Response

#### 1. Indicator

- (a) **Name:** Total national health expenditure related to gross national product (GNP).  
(b) **Brief Definition:** This indicator is defined as the share of GNP devoted to health expenditure. It includes public and private expenditure.  
(c) **Unit of Measurement:** %.

#### 2. Placement in the Framework

- (a) **Agenda 21:** Chapter 6: Protecting and Promoting Human Health.  
(b) **Type of Indicator:** Response.

#### 3. Significance (Policy Relevance)

(a) **Purpose:** The purpose of the indicator is to measure the proportion of national resources devoted to health.

(b) **Relevance to Sustainable/Unsustainable Development:** Health and sustainable development are intimately interconnected. This measure provides a first indication of the priorities granted to health as compared to other sectors within the same country. It allows comparisons of the priority given to health between countries.

(c) **Linkages to Other Indicators:** Health expenditures is closely linked to other indicators measuring the fiscal support for the provision of basic needs, such as GDP spent on education.

(d) **Targets:** The Global Strategy for Health for All by the Year 2000 states that at least 5% of the Gross National Product should be spent on health (see section 7 below).

(e) **International Conventions and Agreements:** See section 3d above.

#### 4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** The definitions for national health expenditure are well established and include:

i) **Public:** The current and capital expenditure of the Ministry of Health and other ministries with responsibilities in the health sector; and social security expenditure. It also includes external aid for the health sector.

ii) **Private:** This definition covers out-of-pocket health expenditure, patient co-payments, private health insurance premiums, and health expenditures by non-government organisations.

iii) **Gross National Product:** GNP consists of the Gross Domestic Product (the total output of goods and services for final use produced by residents) plus net factor income from abroad. This second aspect is the income citizens receive from abroad for factor services, less similar payments made to foreigners who contribute to the domestic economy.

(b) **Measurement Methods:** The numerator is the sum of public and private expenditures on health, while the denominator is the GNP, both measured on a national basis.

(c) **The Indicator in the DSR Framework:** This indicator deals with the share of GNP devoted to national health. It provides a summary Response indicator within the DSR Framework.

(d) **Limitations of the Indicator:** The cost of health care, the efficiency of the health care systems, and the quality of the services provided affect the level of health expenditure. It is sometimes difficult to identify all elements of public and private health expenditure, for example military and traditional expenditures. The assessment of out-of-pocket expenditure requires a household survey which may prove to be a burden for some countries. Difficulties could arise with respect to estimating private health expenditure. If estimated via extrapolation of data from small-scale household surveys, mention should be made of the survey scope.

(e) **Alternative Definitions:** Not available.

## 5. Assessment of the Availability of Data from International and National Sources

(a) **Data Needed to Compile the Indicator:** Public current and capital health expenditure (including external aid), together with private health expenditure and GNP.

(b) **Data Availability:** Most are normally available from the ministries of health, finance and/or planning, and any other ministry engaged in health expenditures. Data may not be readily available for private health expenditure.

(c) **Data Sources:** Primary sources of data are the budget of the ministry of health and the national budget.

## 6. Agencies Involved in the Development of the Indicator

(a) **Lead Agency:** The lead agency is the World Health Organisation (WHO), with the contact point as the Director, Office of Global and Integrated Environmental Health, WHO; fax no. (41 22 791 4123).

(b) **Other Organizations:** The World Bank and the Organisation for Economic Co-operation and Development contributed to the development of this indicator.

## 7. Further Information

WHO. Global Strategy for Health for all by the Year 2000. Geneva, WHO, 1981.

### [Chapter 7: Promoting sustainable human settlement development](#)

- Rate of growth of urban population
- Per capita consumption of fossil fuel by motor vehicle transport
- Human and economic loss due to natural disasters
- Percent of population in urban areas
- Area and population of urban formal and informal settlements
- Floor area per person
- House price to income ratio
- Infrastructure expenditure per capita

## **Chapter 7: Promoting sustainable human settlement development**

RATE OF GROWTH OF URBAN POPULATION		
Social	Chapter 7	Driving Force

## 1. Indicator

- (a) **Name:** Rate of growth of urban population.  
(b) **Brief Definition:** The average annual rate of change of population living in defined urban areas during a specified period.  
(c) **Unit of Measurement:** Usually expressed as a percentage.

## 2. Placement in the Framework

- (a) **Agenda 21:** Chapter 7: Promoting Sustainable Human Settlement Development.  
(b) **Type of Indicator:** Driving Force.

## 3. Significance (Policy Relevance)

(a) **Purpose:** This indicator measures how fast the size of urban population is changing. It aggregates impacts of natural increase in urban population, net rural-to-urban migration, and increased land area with urban characteristics.

(b) **Relevance to Sustainable/Unsustainable Development:** Urban areas promise economic efficiency and potential for development deriving from concentration of population, business and industries. However, when needs of a rapidly growing population in urban areas go beyond governments' ability to meet them, sustainability of urban development can be threatened. Needs of a growing population range from food, housing, land, employment, and education to environmental infrastructure including water supply, sanitation, and waste collection services. Demands for more and better urban services present one of the major challenges for local and national governments. The usefulness of this indicator is increased if growth rates are available for selected urban size categories.

(c) **Linkages to Other Indicators:** This indicator has close linkages with other socioeconomic variables, including percentage of population in urban areas, growth in school age population, and overall population growth. It is also linked to many environmental indicators, such as land use change, water withdrawals, and generation of municipal waste.

(d) **Targets:** International agreements have not established specific national or global targets for this indicator.

(e) **International Conventions and Agreements:** Not applicable, see section 3d above.

## 4. Methodological Description and Underlying Definitions

The urban growth rate for a country is generally based on an intercensal urban growth rate calculated from two censuses, each adjusted for incompleteness. The demarcation of urban areas is usually defined by countries as part of census procedures, and is usually based on the size of localities, classification of areas as administrative centres, or classification of areas according to special criteria such as population density or type of economic activity of residents. Data on urban population are characterized by the same limitations as total population, for example, under-enumeration of population in censuses (which may differ between urban and rural areas).

There is no internationally agreed definition of urban areas, and national definitions vary from country to country. Consistency in the breakdown of what constitutes urban and rural areas is problematic. With growth, the boundaries of urban areas change over time.

The Population Division of the United Nations Department of Economics and Social Information and Policy Analysis (DESIPA) evaluates, and adjusts whenever necessary, urban and rural data for under-enumeration and inconsistencies, as part of its biennial revision of the United Nations urban and rural population estimates and projections.

## 5. Assessment of the Availability of Data from National and International Sources

As indicated above, the rate of growth of urban population for a country is generally calculated from data on urban population from two censuses. The Statistical Division, DESIPA recommends that countries take censuses every 10 years, and these data can be used to calculate an intercensal population growth rate. In recent decades most countries have carried out censuses: 204 countries or areas carried out a

census during the 1990 census decade (1985 to 1994). Data is also available from special country questionnaires sent to national statistical offices from the Statistical Division, DESIPA. Such census data also provide the basis for examining urban growth rates for sub-national areas. For all countries, urban data are evaluated and, if necessary, adjusted for incompleteness by the Population Division, DESIPA as part of its preparation of the official United Nations urban and rural population estimates and projections. Past, current and projected urban growth rates are prepared for all countries by the Population Division, DESIPA and appear in the United Nations publication, World Urbanization Prospects: The 1994 Revision (see section 7 below).

## 6. Agencies Involved in the Development of the Indicator

The lead organization is United Nations Department for Economic and Social Information and Policy Analysis (DESIPA). The contact point is the Director, Population Division, DESIPA; fax no. (1 212) 963 2147.

## 7. Further Information

DESIPA. World Urbanization Prospects: The 1994 Revision. Population Division. United Nations publication, Sales No. E.95.XIII.12. New York, 1995.

DESIPA. 1993 Demographic Yearbook. Statistical Division. United Nations publication, Sales No. E/F.95.XIII.1. 1995.

PER CAPITA CONSUMPTION OF FOSSIL FUEL BY MOTOR VEHICLE TRANSPORT		
Social	Chapter 7	Driving Force

### 1. Indicator

- (a) **Name:** Per capita consumption of fossil fuel by motor vehicle transport.  
 (b) **Brief Definition:** Defined as the annual number of litres per person of fossil fuel consumed by motor vehicle transport in urban areas.  
 (c) **Measurement Unit:** Litres.

### 2. Placement in the Framework

- (a) **Agenda 21:** Chapter: 7: Promoting Sustainable Human Settlement Development.  
 (b) **Type of Indicator:** Driving Force.

### 3. Significance (Policy Relevance)

- (a) **Purpose:** This indicator measures surface transport consumption of fossil fuels within urban areas.

(b) **Relevance to Sustainable/Unsustainable Development:** Reduced consumption of non-renewable fossil fuels, and, indirectly, reduced use of motor vehicles, is a prerequisite for sustainable human settlements development, since it affects the whole ecosystem on a substantial scale. This indicator is particularly relevant to decision making for urban areas.

As motor vehicles are the main users of transport fuel, the indicator is highly correlated with motor vehicle usage, which in turn measures indirectly the pressure on the environment through use of resources, energy consumption, air pollutant emission (particularly ozone, particulate matter, carbon monoxide and nitrogen oxide), noise pollution. The indicator also provides indirect information about urban congestion and contamination of land and water. Fuel consumption is highly dependent on urban land use pattern, particularly density, and the fuel efficiency of the vehicle fleet. Increasing fuel consumption may be the consequence of suburbanization of the work force, increasing income and car ownership, and reduction of passenger numbers per vehicle. Fuel consumption is a good indicator of automobile dependence and, for certain countries, of import oil dependence.

- (c) **Linkages to Other Indicators:** This indicator has many linkages to other socioeconomic and environmental indicators, especially those related to consumption, human settlements, and protection of

the atmosphere. There are direct links, for example, to the emission of sulphur oxides (SO<sub>x</sub>) and nitrogen oxides (NO<sub>x</sub>), reductions in the emissions of greenhouse gases, energy use, and land use change. In consequence, there are implications for ambient concentration of pollutants in urban areas, human health, ozone depletion, and expenditure on air pollution abatement.

(d) **Targets:** No international targets have been established. Some countries have fuel consumption targets for the automobile vehicle fleet.

(e) **International Conventions and Agreements:** Not applicable, see section 3d above.

#### 4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** Transport fuel should include fossil fuel such as petrol (gasoline), diesel, liquefied petroleum gas, gasohol, but should exclude aviation fuel.

(b) **Measurement Methods:** Fuel consumption is always available at the national level, but it is more difficult to calculate for the city, as much fuel purchased in the city may be used for intercity hauling. Fuel purchased within the city forms part of the city product, so one approach is to count all fuel purchased within the city. On the other hand, if the emphasis is on resource usage within the city, then only intra urban trips should be counted, and it may be preferable to multiply the size of the vehicle fleet of personal and commercial vehicles by estimated average fuel consumption.

(c) **The Indicator in the DSR Framework:** Transport fuel consumption, as an indicator of automobile dependence (and oil dependence in some countries), measures the consumption of non-renewable resources and the negative pressure and impact of motor vehicle transport on the environment in human settlements. As such, it is a Driving Force indicator within the DSR Framework. It is interlinked with many State and Response indicators (see section 3c above).

(d) **Limitations of the Indicator:** It is conceptually difficult to separate motor vehicle fuel use for urban areas from non-urban areas (see section 4b above). Data for the indicator are not as readily available as for countries as a whole. While the indicator captures most fossil fuel use by motor vehicles, it does not reflect fuel used to generate electricity for transport, neither does it include fuel used for other surface forms, such as rail. Fuel consumption may have various impacts on the environment depending on fuel type, vehicle emissions, urban density, traffic and the road pattern. These factors should be considered in the interpretation of the indicator.

(e) **Alternative Definitions:** In recognition of the difficulties of measuring and defining the scope of the impact of this indicator, it is suggested that per capita consumption of fossil fuel on a national basis represents an alternative indicator. Such an indicator has a broader relevance for consumption pattern, but does not focus on human settlement sustainability.

#### 5. Assessment of the Availability of Data from National and International Sources

(a) **Data Needed to Compile the Indicator:** Consumption of petrol (gasoline), diesel, liquefied petroleum gas, and gasohol, used for transport purposes. Urban population.

(b) **Data Availability:** Fuel consumption is always available at the national level, usually from the ministry responsible for transportation, but it is more difficult to calculate for urban areas (see section 4b above). Data for this indicator are collected by the United Nations Centre for Human Settlements (UNCHS or Habitat) at the city level, as an extensive indicator. They are collected by the following international organizations at the national level: The Statistical Division, the United Nations Department of Economics and Social Information and Policy Analysis (DESIPA) publishes this indicator in its Energy Statistics Yearbook. The International Roads Federation collects and publishes appropriate data, except for alternative fuels such as gasohol, in its World Road Statistics biennial compendium. The Organisation for Economic Co-operation and Development (OECD) publishes a biennial Environmental Data Compendium which includes total final energy consumption by transport sector by mode.

(c) **Data Sources:** See section 5b above.

#### 6. Agencies Involved in the Development of the Indicator



(a) **Lead Agency:** The lead agency is the United Nations Centre for Human Settlements (Habitat). The contact point is the Director, Programme Coordination, Habitat; fax no. (254 2) 624 266.

(b) **Other Organizations:** The International Road Federation and the Statistical Division of DESIPA have assisted with the development of this indicator.

## 7. Further Information

OECD. Transport and the Environment. OECD, Paris, 1988.

OECD. OECD Environmental Data: Compendium 1995. OECD, Paris, 1995.

Newman, Peter W.G. and Jeffrey R.K. Kenworthy. Cities and Automobile Dependence: a Sourcebook. Gower, England, 1991.

UNCHS (Habitat). Monitoring the City. Urban Indicators Review. UNCHS, Nairobi, 1995.

DESIPA. Energy Statistics Yearbooks.

International Roads Federation. World Road Statistics.

HUMAN AND ECONOMIC LOSS DUE TO NATURAL DISASTERS		
Social	Chapter 7	Driving Force

### 1. Indicator

- (a) **Name:** Human and economic loss due to natural disasters.  
(b) **Brief Definition:** The number of persons dead and missing as a direct result of a natural disaster; and the amount of economic and infrastructure losses incurred as a direct result of the natural disaster.  
(c) **Measurement Unit:** Number of bodies or persons; \$US.

### 2. Placement in the Framework

- (a) **Agenda 21:** Chapter 7: Promoting Sustainable Human Settlement Development.  
(b) **Type of Indicator:** Driving Force.

### 3. Significance (Policy Relevance)

(a) **Purpose:** To provide estimates of the human impact and the economic impact of disasters and emergencies over time and across administrative units in order to measure the trends in population vulnerability. The indicators can be used by decision makers at all levels to determine whether their country or province is getting progressively more or less prone to the effects of disasters.

(b) **Relevance to Sustainable/Unsustainable Development:** Natural disasters cause loss of life, disruption of economic activities and urban productivity, particularly for highly susceptible low-income groups; and environmental damage, such as loss of fertile agricultural land, and water contamination. It can result in major re-settlement of populations.

While the number of disaster events may not be increasing, the growing vulnerability of populations (population pressures on land, increasing urbanisation and risky land-use, marginalisation of populations, civil unrest, etc.) imply that the impacts are becoming greater. At the same time, decreasing national and donor budgets reflect the need for better planning, preparedness, and coordination.

The value of this indicator is a function of the different factors that define the risk of death and damage, that is the frequency of events, the size of the population and capital in the affected area, and the capacity of the local population and government to prevent disasters or to respond. This indicator lends itself for use in an assessment that takes into account the changes in each of these components.

(c) **Linkages to Other Indicators:** The immediate and longer term implications of this indicator are linked to a number of other socioeconomic, environmental, and institutional measures, such as population density, access to safe drinking water, population in informal and formal urban areas, development assistance, land use, and access to information.

(d) **Targets:** Not available.

(e) **International Conventions or Agreements:** The General Assembly of the United Nations has proclaimed the 1990s as the International Decade for Natural Disaster Reduction.

#### 4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** The definitions and concepts for this indicator are not well established with common acceptance. However, for the purpose of this indicator, the following definition of natural disaster used by the Global Disaster Database is suggested: a disaster is a situation or event which overwhelms local capacity, necessitating a request to the national or international level for external assistance, or is recognised as such by a multilateral agency or by at least two sources, such as national, regional, or international assistance groups and the media.

All disasters can be identified by several common elements, such as affected country, human and economic impact, etc. Catastrophic phenomena that affect more than one country are regarded as a combination of specific disasters occurring in each affected country and are therefore to be recorded separately for each affected country. For a long-term disaster spanning over a duration of time, some of the relevant data (for example, contributions, affected population) will have to be recorded per year while other characteristics (for example., disaster type, damage) are unique to the disaster and can be stored in one record. In the case of concurrent disasters in the same country or area, events or situations can be linked together, if there is a causal relationship, or identified separately if they require appeals for assistance. For example, cyclonic storms that generate floods can be considered as being part of the same emergency situation, while epidemics occurring several months after a volcanic eruption have to be considered as separate events.

(b) **Measurement Methods:** The measurement methods proposed are based on the criteria used by the Centre for Research on the Epidemiology of Disaster (CRED). The data elements included here have been selected and modified according to the requirements of the sustainable development indicator methodology sheets. Overall, these data should be collected and validated at the country level by a public authority using these standard criteria and methods. Each element is presented first in a concise description, followed by comments and the proposed recording procedure.

i) **Onset Date:** This establishes the date when the disaster situation occurred. This date is well defined for all sudden-impact disasters. For disaster situations which develop gradually overtime (for example, drought) scientific (meteorology and seismology institutes) and governmental (civil defence authorities) sources.

ii) **Declaration Date:** The date when the first call for external assistance concerning the disaster is issued. This call for external assistance mentioned here is defined according to the definition of a disaster situation stated above. This date is available for all disaster situations to be included for the indicator. Only the date of the first appeal for external assistance is recorded.

iii) **Disaster Type:** This describes the disaster according to a pre-defined classification scheme. Disaster types should include all types of natural disasters, for example, earthquakes, cyclones, floods, volcanic eruptions, drought, and storms. Disasters may be further described as sudden onset, such as earthquakes and floods, and long-term, such as drought. Two or more disasters may be related, or other disaster types may occur as a consequence of a primary event. For example, a cyclone may generate a flood or landslide; or an earthquake may cause a gas line to rupture.

iv) **Country:** This defines the country in which the disaster occurred. Every disaster record will be by country. Autonomous regions, not yet recognised as countries, will not be used. The same disaster may affect more than one country, and here separate records are maintained.

v) **Dead:** This includes persons confirmed dead and persons missing and presumed dead. Official figures are used whenever available. The figure is updated as missing persons are confirmed to be dead.

vi) **Estimated Amount of Damage:** This represents the value of all damages and economic losses directly related to the occurrence of the given disaster. The economic impact of a disaster usually consists of direct (for example, damage to infrastructure, crops, housing) and indirect (for example, loss of revenues, unemployment, market destabilisation) consequences on the local economy. Although several institutions have developed methodologies to quantify these losses in their specific domain, no standard procedure to determine a global figure for the economic impact exists. Three different figures are recorded from sources which have a well-defined methodology for the assessment of economic impacts, including the World Bank and other international lending agencies; the host government; and, especially in the case of complex emergency situations, the total budget requirements listed in the consolidated appeals launched by UN agencies and other major non-government organizations.

(c) **The Indicator in the DSR Framework:** Natural disasters can have devastating short and long term impacts on local and national life adversely affecting progress towards sustainable development. They represent a Driving Force indicator in the DSR Framework.

(d) **Limitations of the Indicator:** The validity of these indicators are limited to the quality and the standardised reporting of the data used for its calculation. Use of data from insurance firms for example will introduce serious bias in the data and therefore in its interpretation. Comparability over time represents a particular problem for this indicator.

(e) **Alternative Definitions:** If the indicator has to reflect changing risk, the measurement should be losses per unit of time per capita. This is not possible without further development of the indicator methodology.

## 5. Assessment of the Availability of Data from National and International Sources

Internationally, the data are maintained by the Centre for Research on the Epidemiology of Disasters (CRED) in Brussels. The Centre serves as a reference source for most applications. CRED compiles and validates data from diverse sources, including the Office of Foreign Disaster Assistance (USAID), United Nations Department of Humanitarian Affairs (UNDHA), Munich Re, Suisse Re, Lloyds of England, and Royale Belge, the World Bank, World Health Organization, United Nations Development Programme (UNDP), the International Federation of the Red Cross and Red Crescent Societies, the International Committee of the Red Cross. National agencies and vary from country to country, but generally includes civil defence organizations, ministries of interior and agriculture, etc.

## 6. Agencies Involved in the Development of the Indicator

(a) **Lead Agency:** The lead agency is the United Nations Department of Humanitarian Affairs (UNDHA). The contact point is the Director, Secretariat for the International Decade for Natural Disaster Reduction (IDNDR); fax no. (41 22) 733 8695.

(b) **Other Organisations:** Other contributing organizations include the Centre for Research on the Epidemiology of Disasters, Faculty of Medicine, University of Louvain, Brussels. The following organizations were consulted over the development of this indicator methodology sheet: World Food Programme, United Nations Environment Programme, Pan American Health Organization, International Federation of the Red Cross and Red Crescent Societies, and US Agency for International Development.

## 7. Further information

CRED. Profiles in the World: Summary of Disaster Statistics by Continent. CRED Statistical Bulletin, May 1994.

International Federation of Red Cross and Red Crescent Societies, Centre for Research on the Epidemiology of Disasters. World Disasters Reports for 1993, 1994, and 1995. Martinus Neijhoof Publishers, Dordrecht, Netherlands. 1993, 1994, and 1995.

Sapir, D.G. Natural and Man-made Disasters: the Vulnerability of Women-headed Households and Children without Families. World Health Statistical Quarterly; 46: 227-233, 1993.

CRED. Proposed Principles and Guidelines for the Collection and Dissemination of Disaster Related Data. Report on the IERRIS Workshop, 7-9 September 1992.

Sapir, D.G. & Sato, T. The Human Impact of Floods: Common Issues for Preparedness and Prevention in Selected Asia-Pacific Countries. Paper presented at the Second Asian Pacific Conference on Disaster Medicine, Chiba, Japan. 1992.

Sapir, D.G. and Misson, C. The Development of a Database on Disasters. *Disasters*; 16(1): 80-86. 1992.

CRED. Statistical Update from CRED Disaster Events Database in: *CRED Disasters in the World*. November 1991.

PERCENT OF POPULATION IN URBAN AREAS		
Social	Chapter 7	State

### 1. Indicator

- (a) **Name:** Percent of population in urban areas.  
(b) **Brief Definition:** The percentage of total population of a country or area living in places defined as urban.  
(c) **Unit of Measurement:** %.

### 2. Placement in the Framework

- (a) **Agenda 21:** Chapter 7: Promoting Sustainable Human Settlement Development.  
(b) **Type of Indicator:** State.

### 3. Significance (Policy Relevance)

(a) **Purpose:** This indicator is the most commonly used index of the degree of urbanization. Although national definitions of "urban" vary (see section 4 below), there is sufficient uniformity to permit meaningful comparisons between countries and over time. It is often useful to further classify urban areas by size, since the benefits and problems of cities vary, in part, with their size.

(b) **Relevance to Sustainable/Unsustainable Development:** Agenda 21 calls for a balance between urban and rural development patterns. In addition, urbanization is recognized as an intrinsic dimension of economic and social development by the Programme of Action of the International Conference on Population and Development (ICPD). Urban areas have distinctive characteristics reflecting the social fabric and density of their population, and the nature and scale of economic activities. Urbanization has profound social and economic implications that extend beyond the urban boundaries. Although many urban areas have environmental and developmental problems such as housing shortages, traffic congestion, air and water pollution, and waste, Agenda 21 also notes urban societies' potential for sustainable development if properly managed.

(c) **Linkages to Other Indicators:** This indicator has close linkages with other demographic indicators, particularly the rate of growth of urban population. Since it does not reflect differences in city size, the indicator of the number of mega-cities adds useful information. Urbanization is also linked to economic indicators such as manufacturing value added in GDP. Some of the environmental indicators of solid waste, sewage and pollution are of particular relevance to urban settings.

(d) **Targets:** International agreements have not established specific national or global targets for this indicator.

(e) **International Conventions and Agreements:** Not applicable (see section 3d above).

### 4. Methodological Description and Underlying Definitions

By definition, this indicator is calculated as the population of urban areas divided by total population of a country or area, expressed as a percentage. The demarcation of urban areas is usually defined by countries as part of census procedures, and is usually based on the size of localities, classification of areas as administrative centres, or classification of areas according to special criteria such as population

density or type of economic activity of residents. Data on urban population are characterized by the same limitations as total population, for example, under-enumeration of population in censuses (which may differ between urban and rural areas). The Population Division of the United Nations Department of Economics and Social Information and Policy Analysis (DESIPA) evaluates, and adjusts whenever necessary, urban and rural data for under-enumeration and inconsistencies, as part of its biennial revision of the United Nations urban and rural population estimates and projections.

There is no international agreed definition of urban areas, and national definitions vary from country to country. Consistency in the breakdown of what constitutes an urban area is problematic. With growth, the boundaries of urban areas change over time.

## 5. Assessment of the Availability of Data from National and International Sources

As indicated above, the percentage urban population can be calculated from censuses, and such data are available for nearly all countries. Such data are available from national sources (country publications) as well as from special country questionnaires sent to national statistical offices from the Statistical Division, DESIPA. The United Nations recommends that countries take censuses every 10 years and these data can be used to calculate the percentage urban. The Population Division, DESIPA prepares the official United Nations population estimates and projections of percentage urban. Past, current and projected percentage urban are prepared for all countries by the Population Division, DESIPA and appear in the United Nations publication, World Urbanization Prospects: The 1994 Revision (see section 7 below).

## 6. Agencies Involved in the Development of the Indicator

The lead organization is the United Nations Department for Economic and Social Information and Policy Analysis (DESIPA). The contact point is the Director, Population Division, DESIPA; fax no. (1 211) 963 2147.

## 7. Further Information

DESIPA. World Urbanization Prospects: The 1994 Revision. Population Division. United Nations Sales No. E.95.XIII.12. New York, 1995.

DESIPA. 1993 Demographic Yearbook. Statistical Division. United Nations Sales No.E/F.95.XIII.1. 1995.

AREA AND POPULATION OF URBAN FORMAL AND INFORMAL SETTLEMENTS		
Social	Chapter 7	State

### 1. Indicator:

- (a) **Name:** Area and population of urban formal and informal settlements.
- (b) **Brief Definition:** Urban residential area in square kilometres occupied by formal and informal settlements, and the number of their occupants.
- (c) **Measurement Unit:** Area: km<sup>2</sup>; number of occupants.

### 2. Placement in the Framework

- (a) **Agenda 21:** Chapter 7: Promoting Sustainable Human Settlement Development.
- (b) **Type:** State.

### 3. Significance (Policy Relevance)

- (a) **Purpose:** The indicator measures both the sizes of informal urban settlements and the residential density of both formal and informal settlements. By focusing on the legality of human settlements, this indicator measures the marginality of human living conditions.

(b) **Relevance to Sustainable/Unsustainable Development:** Settlements characterized by illegality of tenure and unauthorized shelter are generally marginal and precarious, and do not cater for basic human needs such as affordable housing. They affect sustainable human settlements development, human health, and socioeconomic development.

Illegal dwellers generally live in an unsafe and precarious environment, lack basic services, suffer from the absence of tenure security, and have no legal claim in case of eviction. Also, numerous illegal settlements are established on lands which are predisposed to natural disasters. Informal settlements have usually a much higher population density than formal settlements and these living conditions constitute a threat to human health.

(c) **Linkages with Other Indicators:** This indicator is closely linked with several other socioeconomic and environmental indicators, such as rate of growth of urban population, human and economic losses due to natural disasters, access to adequate sanitation, primary health care, infant mortality, infrastructure expenditure, and land use.

(d) **Targets:** No international targets have been established for this indicator.

(e) **International Conventions and Agreements:** Not applicable, see section 3d above.

#### 4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** Informal settlements refer to: i) residential areas where a group of housing units has been constructed on land to which the occupant have no legal claim, or which they occupy illegally; ii) unplanned settlements and areas where housing is not in compliance with current planning and building regulations (unauthorized housing). Formal settlements refer to land zoned residential in city master plans or occupied by formal housing.

(b) **Measurement Methods:** Households and population living in informal settlements are generally measured in censuses. Area of informal settlements can be evaluated through aerial photography or land use maps. This indicator should not cover dwelling units which have been regularized, that is those units for which land titles, leases or occupancy permits have been granted. It should only include those units which presently occupy land illegally and/or housing units which are not in compliance with current regulation. Where feasible, the interpretation and meaning of this indicator would be supported by the comparison of informal settlement area and population to total urban area and population.

(c) **The Indicator in the DSR Framework:** This is a state indicator, reflecting the major consequence of unplanned and unsustainable population growth in human settlements.

(d) **Limitations of the Indicator:** The ephemeral nature and lack of an acceptable operational definition for this indicator, limit its usefulness, especially for trend analysis. The legal framework for settlements on which this indicator is based varies from country to country. Informal housing is not registered in official statistics, any measure of informal settlements remains limited. Information may be obtained from specific research studies, but it difficult to obtain and may be of variable quality. Homelessness, which is one of the extreme symptoms of human settlements inadequacy, is not accounted for by this indicator and in fact the existence of illegal settlements may reduce the incidence of homelessness. This indicator does not cover informal settlements in rural areas.

(e) **Alternative Definitions:** Many concepts intended to measure marginality of human settlements have been formulated: unplanned, squatter, marginal settlements, unconventional, non permanent structures, housing in compliance, inadequate housing, slums, etc. "Unconventional dwellings" is one of the most common measures, defined by the number of housing units occupied by households, but considered inappropriate to human habitation. The type of building (permanent, semi-permanent, non permanent) which describe the building structures in which households live is another common measure, but the criteria widely vary from country to country. Alternatively, attempts could be made to include informal rural settlements within the indicator concept. This would be more comprehensive, but detract from its urban focus.

#### 5. Assessment of the Availability of Data from National and International Sources

(a) **Data Needed to Compile the Indicator:** Area and population of informal settlements.

(b) **Data Availability:** These data are more likely to be available at the city level and are generally collected in large cities affected by informal settlements. Data sets at the national level will only occur sporadically.

(c) **Data Sources:** Data from research studies, census data, and aerial photographs.

## 6. Agencies Involved in the Development of the Indicator

The lead agency is the United Nation Centre for Human Settlements (Habitat). The contact point is the Director, Programme Coordination, Habitat; fax no. (254 2) 624 266.

## 7. Further Information

World Bank. Housing: Enabling Markets to Work. A World Bank Policy Paper. The World Bank, Washington D.C., 1993.

UNCHS (Habitat) and The World Bank. The Housing Indicators Programme. Report of the Executive Director (Volume I). UNCHS, Nairobi, 1993.

UNCHS (Habitat). Monitoring the Shelter Sector. Housing Indicators Review. UNCHS, Nairobi, 1995.

FLOOR AREA PER PERSON		
Social	Chapter 7	State

### 1. Indicator

- (a) **Name:** Floor area per person  
 (b) **Brief Definition:** Defined as the median usable living space per person.  
 (c) **Measurement Unit:** m

### 2. Placement in the Framework

- (a) **Agenda 21:** Chapter 7: Promoting Sustainable Human Settlement Development.  
 (b) **Type:** State.

### 3. Significance (Policy Relevance)

(a) **Purpose:** This is a key indicator of housing quality, which measures the adequacy of living space in dwellings. A low value for the indicator is a sign of overcrowding.

(b) **Relevance to Sustainable/Unsustainable Development:** This is a key indicator measuring the adequacy of the basic human need for shelter. Human settlement conditions in many parts of the world are deteriorating mainly as a result of a low level of investment, although such investment has been shown to generate considerable public and private sector investment. Housing policies, particularly in urban areas, greatly affect the living conditions of people. In low income settlements, reduced space per person can be associated with certain categories of health risks.

(c) **Linkages to Other Indicators:** This indicator is closely linked to several other socioeconomic indicators with which it should be considered, including population density, rate of growth of urban population, area and population of informal settlements, and infrastructure expenditure per capita.

(d) **Targets:** No targets have been developed for this indicator.

(e) **International Conventions and Agreements:** This indicator is one of ten "key" housing indicators approved by the Commission on Human Settlements (Resolution 14/13), to be collected in all countries and in a number of cities in each country, to measure progress towards meeting the objectives of the Global Shelter Strategy. Countries are to use the indicators to provide the basis for their country reports to the Second United Nations Conference on Human Settlements.

#### 4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** The floor area should include all living space, along with bathrooms, internal corridors and closets. Covered semi-private spaces such as corridors, inner courtyards or verandas should be included in the calculation if used by the household for cooking, eating, sleeping, or other domestic activities. Floor area refers to a housing unit, defined as a separate and independent place of abode intended for habitation by one household at the time of the census or other inquiry.

(b) **Measurement Methods:** The median floor area of a unit should be divided by the average household size. If data from household surveys or from a recent census are available, these can be used. In the absence of better data, the floor area of the median priced dwelling may be used as an approximation, although this may not be an accurate estimate. If the median cannot be estimated, then the average should be provided.

(c) **The indicator in the DSR Framework:** This indicator is a measure of housing quality, an outcome of housing demand and housing supply, determined by the overall housing policy framework. As such, this indicator is a State measure in the DSR Framework.

(d) **Limitations of the Indicator:** Results for this indicator may vary considerably if collected at the city, national, urban/rural levels, given the variations in land availability and types of human settlements and activities. Informal settlements in particular are likely to have much less space per person, as are disadvantaged groups. Various levels of data collection are necessary to provide a full picture of this specific housing outcome. Housing size and housing quality are usually but not necessarily linked, and floor area per person may not give a complete picture of living conditions. Cultural values affect sensitivity to crowding. For these reasons, interpretation of this indicator is difficult, and should be completed in conjunction with related indicators (see section 3c above).

(e) **Alternative Definitions:** Alternative measures of crowding have been the subject of data collection and reporting in international statistical compendia. The two most common are persons per room and households per dwelling unit, each of which was included among data collected during the first phase of the Housing Indicators Programme (UNCHS, World Bank, 1992). Surveys have shown that floor area per person is more precise and policy-sensitive than the other two indicators. Habitat, the United Nations Centre for Human Settlements (UNCHS) has developed and tested a series of crowding indicators in low-income settlements. They include, among others, percentage of housing units with more than one household, in-house living area per person, percentage of housing units with more than three persons per room, number of households per building and per housing unit, number of persons per building.

#### 5. Assessment of the Availability of Data from National and International Sources

(a) **Data Needed to Compile the Indicator:** Median floor area of housing units; average number of persons per household.

(b) **Data Availability:** The data are generally available at the country level. This indicator was collected in 52 countries (one city per country) by the Shelter Sector Performance Indicators Programme in 1992 (UNCHS, World Bank). It is being collected worldwide by the UNCHS Indicators Programme in preparation for the Habitat II Conference. A detailed set of crowding indicators has been developed and the data collected for Jakarta (Indonesia), Bissau (Guinea Bissau), and Accra (Ghana).

(c) **Data Sources:** Primary data sources include censuses or household surveys. The indicator is reported in the Housing Indicators Programme report listed in section 7 below.

#### 6. Agencies Involved in the Development of the Indicator

(a) **Lead Agency:** The lead agency is the United Nations Centre for Human Settlements (Habitat). The contact point is the Director, Programme Coordination, UNCHS; fax no. (254 2) 624 266.

(b) **Other Organizations:** The World Bank.

#### 7. Further Information



World Bank. Housing: Enabling Markets to Work. The World Bank, Washington D.C., 1993 (A World Bank Policy Paper).

UNCHS (Habitat), World Bank. The Housing Indicators Programme. Report of the Executive Director (Volume I). UNCHS, Nairobi, 1993.

UNCHS (Habitat). Monitoring the Shelter Sector. Housing Indicators Review. UNCHS, Nairobi, 1995.

UNCHS (Habitat). Human Settlement, Interventions Addressing Crowding and Health Issues, UNCHS, Nairobi, 1995.

HOUSE PRICE TO INCOME RATIO		
Social	Chapter 7	State

### 1. Indicator

- (a) **Name:** House price to income ratio.  
(b) **Brief Definition:** This indicator is defined as the ratio of the median free-market price of a dwelling unit and the median annual household income.  
(c) **Unit of Measurement:** Ratio

### 2. Placement in the Framework

- (a) **Agenda 21:** Chapter 7: Promoting Sustainable Human Settlement Development.  
(b) **Type of Indicator:** State

### 3. Significance (Policy Relevance)

(a) **Purpose:** This indicator is a key measure of housing affordability, providing information on the overall performance of housing markets and important insights into several housing market dysfunctions, indicative of a variety of policy failures.

(b) **Relevance to Sustainable/Unsustainable Development:** This is a key indicator measuring human settlements sustainability by determining housing affordability, and therefore the impact of market forces and housing policies on the living conditions of people. It is strongly influenced by government land use policy and is particularly relevant to urban areas.

(c) **Linkages to Other Indicators:** There are close links between this indicator and a number of other socioeconomic Driving Force and Response measures. These would include: infrastructure expenditure per capita, percent of population in urban areas, increase in urban population, population density, area and population of informal settlements.

(d) **Targets:** International agreements have not established specific national and global goals for this indicator.

(e) **International Conventions and Agreements:** This indicator is one of ten "key" housing indicators approved by the Commission on Human Settlements (Resolution 14/13), to be collected in all countries and in a number of cities in each country, to measure progress towards meeting the objectives of the Global Shelter Strategy. Countries are to use the indicators to provide the basis for their country reports for the Second United Nations Conference on Human Settlements (Habitat II).

### 4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** Two intermediate measures are required: median house price and median annual household income.

i) Median household income: Household income is defined as gross income from all sources, including wages, salaries, incomes from businesses or informal sector activities, investment income, and, where

information is available, income in kind such as consumption of agricultural product which might have been sold.

ii) Median house price: The median-priced house is that house which has 50% of the houses priced below it, and 50% of the houses priced above it. Housing value is defined as the price at which a house would be sold if placed on the market for a reasonable length of time by a seller who is not under pressure to sell.

(b) **Measurement Methods:** The following methods for calculating household incomes and the median price house are suggested.

Many countries may have recent household surveys containing information on median household incomes or expenditures which can be used directly. Expenditures data rather than incomes data may be used to estimate incomes if these data are more readily available. In fact, for lower income earners or where incomes are routinely concealed, expenditures may be a better measure of income than reported incomes. Mean household incomes, although less preferable, are often easier to obtain as a recent estimate (for example, by dividing household income or household expenditure in the National Accounts by the number of households).

If a survey is available, which has mean and median incomes, but which is too old to yield good estimates of household income, the ratio of median to mean incomes may still be used to obtain a new median, because the distribution of incomes does not change as rapidly as incomes themselves.

The calculation of the price of the median-priced house should, include all housing, both new and old, and both formal and informal. If, for example, the majority of the housing stock is informal, and the informal housing stock is generally cheaper than the formal housing stock, then the median priced house will probably be an informal unit. For blocks of apartments or multiple-family dwellings which are usually sold as a single building, the value of one dwelling unit should be estimated as a pro rata share of the total sale price. This is particularly relevant for countries in Africa where the majority of housing is of this type.

The following methods are available for estimating the median price.

i) Method 1: Where the informal sector is small and data is reliable, median house price can be determined directly from published (formal) sales figures or from recent surveys.

ii) Method 2: If recent average prices are available, they can be converted to median price by using a median/mean ratio from an older household survey. In much of the research done on housing markets in developing countries, it has been found that median prices are generally about 70% of the average. This figure is higher when housing is more equally distributed and lower when housing is more unequally distributed.

iii) Method 3: If no direct data are available, then prices need to be estimated for each sub-market. Estimate the percentage of all housing units and price range per unit. The median should then be estimated, using a graph, representing the different sub-markets. In some cases, the price ranges of several different kinds of dwellings may overlap around the median, so that the median dwelling could be of either type.

(c) **The Indicator in the DSR Framework:** This indicator is a measure of housing affordability, result of housing demand and housing supply, determined by the overall housing policy framework. As such, this indicator represents a State measure in the DSR Framework.

(d) **Limitations of the Indicator:** Results for this indicator may vary considerably if collected at the city, national, urban/rural levels, given the variations in land availability and type of human settlements and activities. Although median house price is more indicative of general housing affordability than mean price, some population subgroups may find housing much less affordable than the median. Also, although rents generally reflect house prices, rents may be much more or less affordable than this indicator would show, depending on rental market regulation and the availability of rental housing. Various levels of data collection are necessary to provide a full picture of housing affordability. In some countries such as China, no formal housing market exists and a meaningful value for the indicator is difficult to estimate.

The influence of the financial markets are not reflected by this indicator. It is a measure of what the market will pay, rather than a measure of the cost to build housing.

(e) **Alternative Indicator Definitions:** Another key and complementary measure of housing affordability is the rent-to-income ratio, defined as the ratio of the median annual rent of a dwelling unit and the median household income of renters. It may be very relevant in some countries and cities where rental housing is a common tenure type.

## 5. Assessment of the Availability of Data from National and International Sources

(a) **Data Needed to Compile the Indicator:** Median household income; median-priced house.

(b) **Data Availability:** Reliable data are generally available for many countries. Median household income can be extracted from household surveys and the median-priced house estimated based on market research. Such estimates from respondents correspond closely to actual market values. This indicator has been collected in 53 countries (one city per country) by the Shelter Sector Performance Indicators Programme in 1992 (UNCHS, World Bank). It is being collected worldwide by the United Nations Centre for Human Settlements (UNCHS) Indicators Programme in preparation for the Habitat II Conference.

(c) **Data Sources:** Primary data sources exist at the individual urban area. This indicator is reported in the Housing Indicators Programme report listed in section 7 below.

## 6. Agencies Involved in the Development of the Indicator

(a) **Lead Agency:** The lead agency is the United Nations Centre for Human Settlements (Habitat). The contact point is the Director, Programme Coordination, UNCHS; fax no. (254 2) 624 266.

(b) **Other Organizations:** The World Bank

## 7. Further Information

World Bank. Housing: Enabling Markets to Work. A World Bank Policy Paper. Washington D.C., 1993.

UNCHS (Habitat), World Bank. The Housing Indicators Programme. Report of the Executive Director (Volume I). UNCHS, Nairobi, 1993.

UNCHS (Habitat). Monitoring the Shelter Sector. Housing Indicators Review. UNCHS, Nairobi, 1995.

INFRASTRUCTURE EXPENDITURE PER CAPITA		
Social	Chapter 7	Response

### 1. Indicator

- (a) **Name:** Infrastructure expenditure per capita.  
 (b) **Brief Definition:** This indicator is defined as the per capita expenditure in US dollars by all levels of government, including government-owned companies and utilities, on urban infrastructure services during the current year.  
 (c) **Measurement Unit:** \$US

### 2. Placement in the Framework

- (a) **Agenda 21:** Chapter 7: Promoting Sustainable Human Settlement Development  
 (b) **Type of Indicator:** Response

### 3. Significance (Policy Relevance)

(a) **Purpose:** This indicator measures the involvement of the different levels of the government and the private sector in the provision, improvement and maintenance of infrastructure. As such, it is a key measure of provision of basic services, including housing to the population.

(b) **Relevance to Sustainable/Unsustainable Development:** Infrastructure is a major indicator for the monitoring of the Global Shelter Strategy to the Year 2000, which calls for a fundamental shift in government's role in housing from attempting to provide housing directly towards an enabling role, one which facilitates, energises and supports the activities of the private sector, both formal and informal. The enabling strategy provides the basis for a sustainable long term approach to human settlement management.

Total infrastructure expenditure interacts strongly with new land development and construction, and also with improved access to services by households. Low levels of infrastructure expenditures result in land supply bottlenecks and thus in higher prices for land and housing. They also result in inadequate provision of residential amenities, such as water, sewerage, drainage, electricity, and transportation facilities all of which can affect the quality and access to housing.

(c) **Linkages to Other Indicators:** Infrastructure development energizes the shelter sector, and improves housing affordability. It is closely linked with other socioeconomic and environment indicators, especially those associated with human settlements, including house price-to-income ratio, land use change, transport fuel consumption, land and area of informal settlements, access to adequate sanitation, and infant mortality rate.

(d) **Targets:** International agreements have not established specific national and global goals for this indicator.

(e) **International Conventions and Agreements:** This indicator is one of ten "key" housing indicators approved by the Commission on Human Settlements (Resolution 14/13), to be collected in all countries and in a number of cities in each country, to measure progress towards meeting the objectives of the Global Shelter Strategy. Countries are to use the indicators to provide the basis for their country reports for the Second United Nations Conference on Human Settlements (Habitat II).

#### 4. Methodological Description and Underlying Definitions

(a) **Underlying Definitions and Concepts:** Infrastructure includes operations, maintenance, and capital expenditures on physical infrastructure such as urban roads, railways, sewerage, drainage, water supply, electricity, and garbage collection, but not social infrastructure such as health and education expenditure.

(b) **Measurement Methods:** Infrastructure expenditures are comprised of three major components, capital expenditures (construction costs), recurrent expenditures (operations, maintenance, salaries, etc.), and capital servicing (debt service and depreciation). If there were unusually high capital expenditures during the last year for which figures are available, then they should not be included in the indicator. Only their first year depreciation should be considered as current year expenditure. Only real outlays or real transfers should be counted as expenditure. If debts (for example, to the central government) are not actually paid, or depreciation payments are not actually transferred to a sinking fund, they should not be counted as expenditures.

(c) **The indicator in the DSR Framework:** Infrastructure expenditure is a key measure of human settlement management, as infrastructure constitutes the main input for land and shelter development and improvement. It is a major Response to inadequate land development, and therefore housing production, in order to meet the increasing demand of populations.

(d) **Limitations of the Indicator:** The methodology for this indicator requires more work in, for example, defining the scope of infrastructure to be included, and in the treatment of interest payments and depreciation. The interpretation and meaning of this indicator will vary greatly by country and geographic region.

In many countries, infrastructure expenditure is targeted towards certain areas of the city and specific groups of the population. Aggregated data for the city will not show who are the real beneficiaries of infrastructure expenditure. Also, sectoral expenditures on different categories of infrastructure may have very different outcomes for sustainability.

(e) **Alternative Indicator Definitions:** Under the limitations discussed above, it may be advisable to consider a more basic definition of infrastructure to include, for example, water supply, sewerage collection and treatment, roads, communication, and schools. This, however, would increase the overlap with other existing, more disaggregated indicators, such as water and sanitation services.

## 5. Assessment of the Availability of Data from National and International Sources

(a) **Data Needed to Compile the Indicator:** Three data components are required: capital expenditures (construction costs), recurrent expenditures (operations, maintenance, salaries, etc.), capital servicing (debt service and depreciation).

(b) **Data Availability:** This indicator has been collected in 44 countries (one city per country) by the Shelter Sector Performance Indicators Programme in 1992 (UNCHS, World Bank). It is being collected worldwide by the United Nations Centre for Human Settlements (UNCHS) Indicators Programme in preparation for the Habitat II Conference.

(c) **Data Sources:** This indicator is obtained from expenditure accounts of local and central governments, and from major public agencies. International data is available from the Housing Indicators Programme report listed in section 7 below.

## 6. Agencies Involved in the Development of the Indicator

(a) **Lead Agency:** The lead agency is the United Nations Centre for Human Settlements (Habitat). The contact point is the Director, Programme Coordination, UNCHS; fax no. (254 2) 624 266.

(b) **Other Organizations:** The World Bank.

## 7. Further Information

World Bank. Housing: Enabling Markets to Work. A World Bank Policy Paper. Washington D.C., 1993.

UNCHS (Habitat), World Bank. The Housing Indicators Programme. Report of the Executive Director (Volume I). UNCHS, Nairobi, 1993.

UNCHS (Habitat). Monitoring the Shelter Sector. Housing Indicators Review. UNCHS, Nairobi, 1995.

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<sup>i</sup> United Nations Agenda 21: <http://www.un.org/esa/sustdev/agenda21.htm>

<sup>ii</sup> Census Of Malta 1995 Web-Mapping: <http://CensusofMalta1995>

<sup>iii</sup> Internal Migration Report 1996, Planning Authority, unpublished

<sup>iv</sup> Census of Malta, 1995, Central Office of Statistics, 1995

<sup>v</sup> Demography Topic Paper May 2001, Malta Planning Authority

<sup>vi</sup> ibid

<sup>vii</sup> ibid

<sup>viii</sup> OECD: <http://www.oecd.org/>

<sup>ix</sup> Blue Plan, October 2000, 130 indicators for sustainable development in the Mediterranean region

<sup>x</sup> UN Sustainable Development: <http://www.un.org/esa/sustdev/indisd/english/introduc.htm>