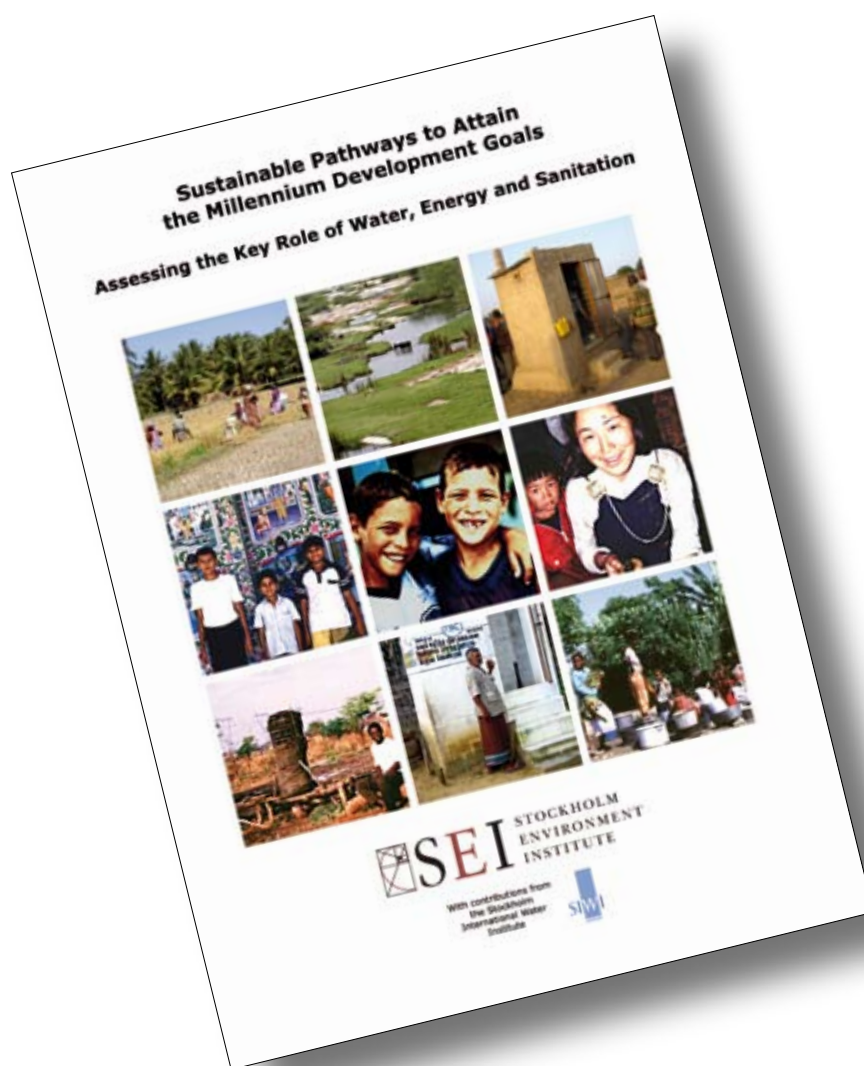


# Sustainable Pathways to Attain the Millennium Development Goals

Assessing the Role of Water, Energy and Sanitation



FOR THE UN WORLD SUMMIT • SEPTEMBER 14, 2005 • NEW YORK



## ABOUT THIS REPORT

Prior to the 2005 UN World Summit Stockholm Environment Institute was tasked by the Government of Sweden to shed some light on the question of how the MDGs could be met using sustainable development approaches.

The objective was to clarify the major environmental investments required to attain the MDGs, and to identify sustainable solutions where synergies between the environment and development can be achieved for more rapid MDG achievement and to secure long-term sustainability also beyond 2015.

The report the SEI team produced highlights the importance of the environment in achieving all MDGs. It focuses on three core aspects of goal fulfilment, namely:

- **freshwater to eradicate hunger and sustain ecosystems**
- **sanitation for poverty alleviation, health improvements and environmental sustainability and**
- **energy for poverty alleviation**

# FOOD & WATER

## SITUATION TODAY

800 million undernourished

## THE MDG TARGET FOR 2015

The target is to halve the prevalence in 1990 of undernourished in developing countries by 2015. Large quantities of additional food are needed to upgrade the diet of 190 million undernourished and another 890 million people following the current population increase.

## WATER REQUIREMENTS FOR FOOD

Producing food is the most water-consuming activity of all, with 4000 liters of freshwater needed per day for each of us to produce an adequate diet, or 1300 m<sup>3</sup>/person/yr. In developing countries a 50% increase in freshwater use will be required over the coming decade to reach the MDG target. This water requirement, 2200 km<sup>3</sup>/year, is larger than the present global water use in irrigation.

## OPTIONS

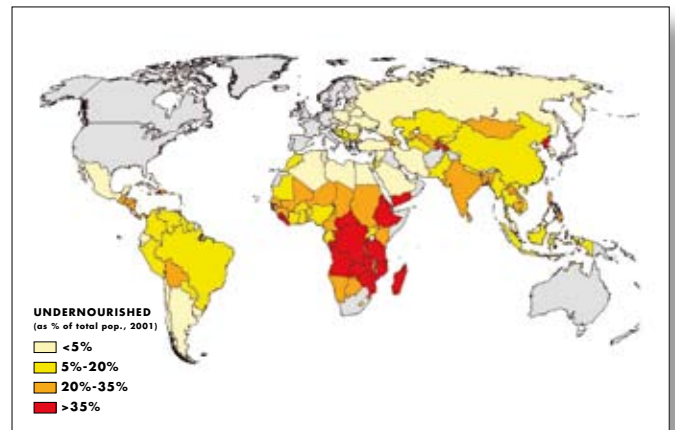
"Crop per drop" improvements with investments in integrated land, water and crop management in current agriculture can reduce the water requirements. The remaining 40% increase by 2015 can only partially be met through increased irrigation and the major part (85%), will have to come from rainfed agriculture. On present rainfed lands more rainwater can be captured locally through investments in existing and innovative management systems appropriate to local rural communities. The remaining growth must come from expansion of agricultural land by 1.2 million km<sup>2</sup>, or an increase of 4%.

## IMPACTS AND TRADE-OFFS

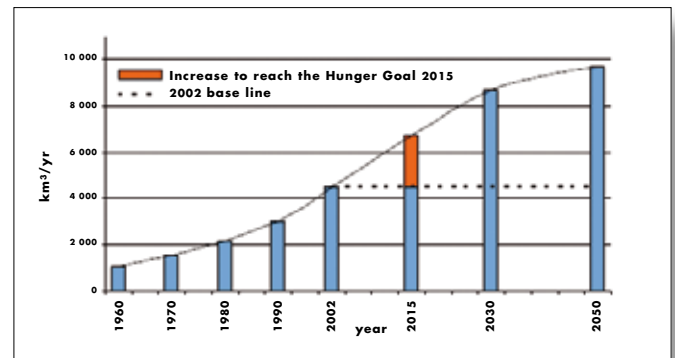
To reach the MDG 2015 target on hunger, environmental trade-offs with terrestrial and aquatic ecosystems are unavoidable. Agricultural expansion is one of the key drivers behind degradation of ecosystem services. This study advises that expansion into terrestrial ecosystems can be restricted to a still challenging 1.2 million km<sup>2</sup>. Innovative management of present rainfed lands is necessary. Increased irrigation will have impacts on downstream needs of water for fish, wetlands and cities.

## CONCLUSIONS

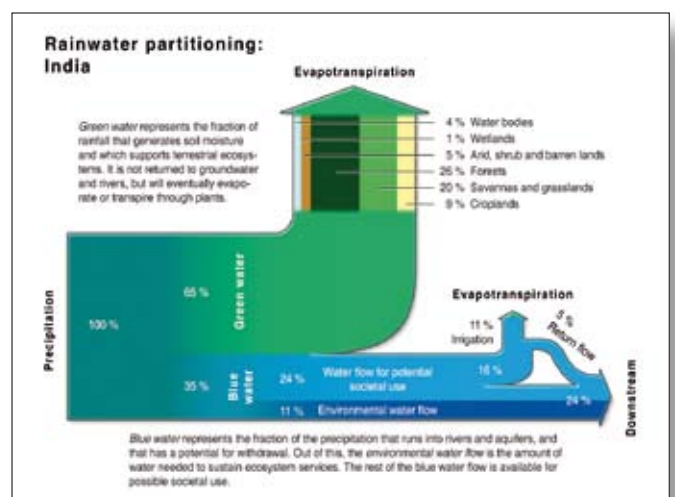
Freshwater is a key prerequisite to attain the MDG on hunger. Considerable and so far underestimated new freshwater allocations are required to attain the 2015 target. New investments are needed in small-holder rainfed farming, which will have to bare the heaviest burden in achieving the hunger target. Environmental trade-offs with terrestrial and aquatic ecosystems are unavoidable. To reach the 2015 target is only a first step and huge freshwater quantities must be appropriated in agriculture the coming decades to eradicate undernourishment and to keep pace with population growth.



*The majority of hunger-prone countries are in the arid savanna zone which faces considerable water challenges in agriculture. Using improved rainfed agriculture, a huge potential for additional food production can be realised.*



*Additional freshwater requirements in 92 countries needed to achieve the Hunger Goal and 2015 Target, through 2030 and 2050.*



**The Case of India:** India's rapid population growth and undernourishment challenge means a 100% increase is required by 2015 to meet the MDG. Environmental trade-offs need to be taken in deciding which water should be appropriated to meet future food demands i.e. expansion into natural terrestrial ecosystems (green water), or further use of blue water resources by irrigation.

# SUSTAINABLE SANITATION

## SITUATION TODAY

- 2.6 billion people lack sanitation
- 1.8 million deaths per year due to diarrhoeal disease (90% children under 5 yrs of age)

## MDG TARGET FOR 2015

- 1.75 billion people (50:50 urban:rural)
- 450 million households (hh) (60:40 urban:rural)

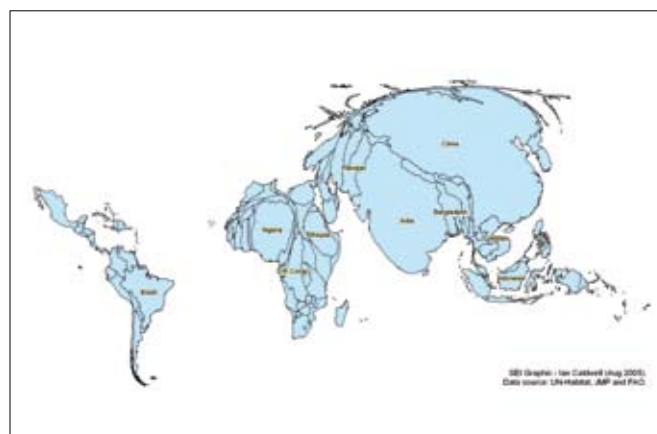
## REGIONAL DIFFERENCES IN TARGET SIZE

Millions of households	UN Region	Urban to rural split
151	East Asia	70:30
112	South Asia	35:65
80	Sub-Saharan Africa	50:50
39	Latin America & Caribbean	80:20
38	Southeast Asia	50:50

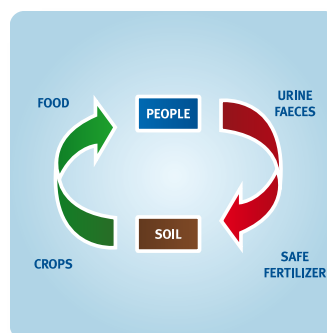
In total 95,000 household installations per day are required between 2003 and 2015 to meet the MDGs.

## INTRODUCING SUSTAINABLE SANITATION

Ecological sanitation has three main features: the **containment** of human excreta, its **sanitisation** and **recycling** back to the soil (closing the loop on both nutrients and water). This represents a paradigm shift in the entire approach to sanitation. Humans produce on the average only 50 L of faeces and 500 L of urine per year. A normal flush toilet uses an additional 15,000 L of drinking water per person per year. The greywater from kitchens and bathrooms adds an additional 35,000 L per person per



Map showing the relative size of the MDG sanitation target for each country based on the number of installations required through to 2015.



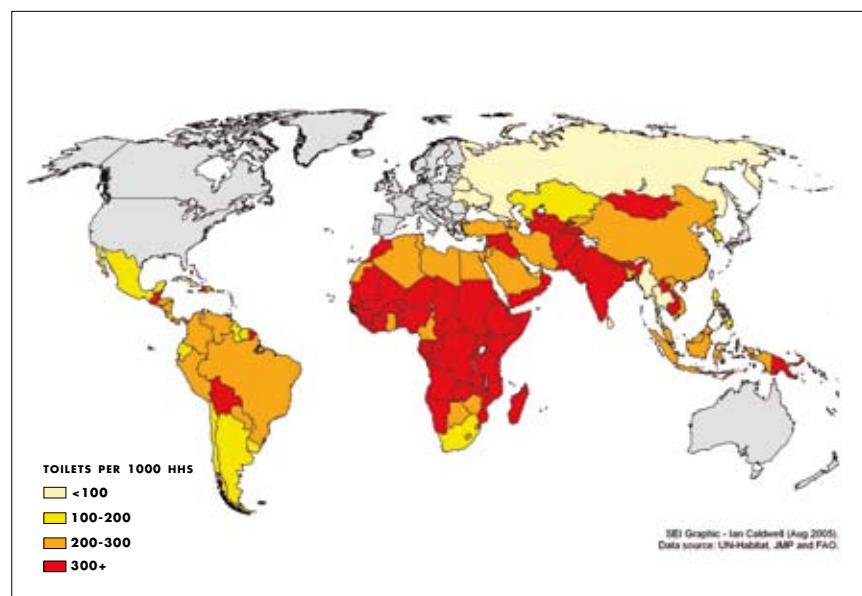
Closing the loop on sanitation.

to agriculture. These include soil composting shallow pit toilets instead of pit latrines, dry toilets with urine diversion for both rural and urban settings, toilets connected to biogas systems, etc. These are less costly than conventional systems and protect

human health and the environment much more effectively. In particular ecosan can be applied in both rural and urban communities, both rich and poor, for young or old, woman or man.

## THE FINANCIAL ADVANTAGES

Sanitation in general pays for itself by reducing the occurrence of diarrhoea by allowing people to be more productive and by reducing morbidity and mortality due to contaminated drinking water. Ecosan if applied as a central MDG would cost about 0.2% of the GDP for the target regions which is about a 50th of what the health costs are today. Also the recycled nutrients can substitute costly chemical fertilisers (for Sub-Saharan Africa this could replace the entire amount used today).



Number of toilets per thousand households to be installed through to 2015 to meet the MDGs.

# ENERGY

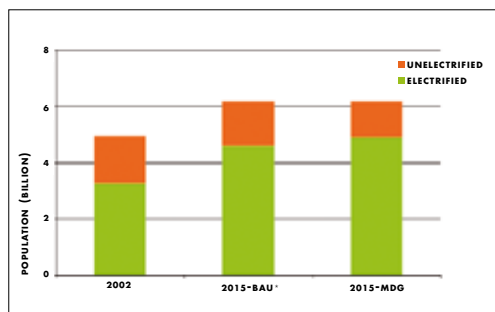
## SCALE OF THE CHALLENGE

This study indicates that in order to meet the Millennium Development Goals (MDGs) a substantial improvement in the types of energy services that the poor have access to is required. Unless concerted actions with more emphasis on providing the poor with basic modern energy services are taken, 1.6 billion people will still be without electricity access and 2.5 billion people will still rely on traditional biomass for cooking by 2015.

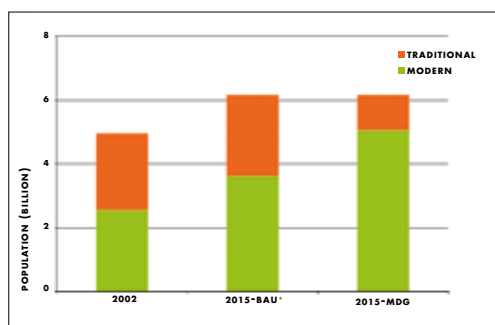
A prerequisite for meeting the MDGs is to reduce the population without access to basic levels of electricity and the population reliant on traditional solid fuels for cooking to no more than around 1 billion people by 2015. The MDG Energy Vision foresees improved access to modern energy to about 1.5 billion people.

**Contrary to what might be expected in light of this challenge, the amount of commercial energy needed is negligible compared to the world's total commercial energy consumption. Reaching the poor with basic modern energy services as envisioned in the MDG Energy Vision would increase global commercial energy consumption by about 900 TWh per year which is less than 1% of global energy demand.**

## THE ELECTRIFICATION CHALLENGE



## THE COOKING FUEL CHALLENGE



\*BAU = Business-as-usual scenario

Source: SEI based on data from UN, FAO and IEA.

## Situation today

*Presently about 2.4 billion people lack access to clean fuels for cooking and approximately 1.6 billion people lack access to electricity.*

*By 2015 the situation will not look much different unless concerted actions are taken to at least bring basic levels of energy services to the world's poor.*

## The targets of the MDG energy vision are that by 2015

- 100% of the world's urban populations and 50% of the world's rural population use modern liquid and gaseous fuels for cooking
- 50% of the world's rural population use improved biomass stoves
- 100% of the biomass used for cooking is produced in a sustainable way
- 100% of the world's urban populations have a basic electricity supply to meet lighting and communication needs
- 100% of the world's health facilities and schools have electricity supply and use modern liquid and gaseous fuels to meet cooking and heating needs
- 100% of all communities have access to mechanical power

## CONCLUSIONS

- Meeting the MDGs will have positive environmental impacts at the local, regional and global levels
- The primary commercial energy requirements for implementing the MDG Energy Vision are small
- In order not to jeopardise the achievement of the MDGs, it is necessary that the non-poor of this world reduce greenhouse gas emissions significantly
- Finding ways to accelerate progress for new technologies, including research and development, demonstration deployment and scaling-up – is a responsibility which lies heavily on developed countries