International Atomic Energy Agency

The Millennium Development Goals: Findings from the Millennium Ecosystems Assessment

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Overview

Introduction: MDG, MAS, caveats

Assessment of prospects under the MA scenarios for:

Goal 1: Poverty and hunger

Goal 7: Environmental sustainability

CBD COP-7: Indicators of progress

Concluding remarks

1. Introduction

UN Millennium Summit in 2000: Millennium Development Goals (MDGs) – derived from agreements and resolutions of relevant UN conferences after Rio'92

Most pressing challenges for humanity:

8 goals, 15 (+1/+3) largely quantitative targets, 48 indicators

Some: very remotely if at all related to ecosystems and the use of their services; e.g.:

Goals 2-5: crucial social (primary education, gender equality) and human health (child mortality, maternal health)

Others: closely related to ecosystems

Goal 1 (halve hunger), Goal 7 (halve non-access to safe water) by 2015

1. Introduction

MA scenarios (MAS) – recall Monika Zurek

Global & economic	Global Orchestration GO
Global & environmental	Technogarden TG
Local & environmental	Adapting Mosaic AM
Local & economic/security	Order from Strength OS

Storylines + Global Models

1. Introduction

Caveats:

MDGs: quantitative targets for 2015, mainly as improvements relative to 1990

MA models: 1995 or 1997 as starting/reference year →

Difficult to assess 2015 achievements according to MDG metric – requires 1990 data, consistent with MA models

MA scenario exercise: global and long term – MODELS:

- Spatial resolution too coarse for ecosystems – wetlands
- Temporal resolution too coarse for 2015 – 2-3 steps
- Scenario dynamics of slow variables hardly distinguishable

VERBAL scenarios: even more difficult to peg to 2015

1. Introduction

Caveats – continued:

MDGs: full span of social, economic, political, institutional, environmental components of sustainable development

MAS: only a subset

- Socioeconomic development shaping human impacts on ecosystems
- Changes in ecosystems status, quantity and quality of services
- Repercussions on human well-being of those changes

Here: selected examples

Goal 1: Poverty and hunger – incomes

Goal 1: Eradicate extreme Poverty and Hunger

Target 1: Halve, between 1990 and 2015, the proportion of people whose income is less than one dollar a day

MDG Indicators

1. Proportion of population below $1 per day (PPP-values)
2. Poverty gap ratio [incidence x depth of poverty]
3. Share of poorest quintile in national consumption

MAS: no breakdown into income groups → no direct info

But: total and pc incomes + track record → prospects

Goal 1: Poverty and hunger – total GDP

GDP (mln 1995$)		Global Orchestration		Technogarden		Adaptive Mosaic		Order from Strength	
	1995	2015	2015	2015	2015	2015	2015	2015	2015
OECD	21469311	37121248	1.73	35323668	1.65	33188698	1.55	33616158	1.57
FSU	854712.2	1724702	2.02	1569936	1.84	1457517	1.71	1374802	1.61
LAC	1711802	3307960	1.93	3189996	1.86	3188751	1.86	3051022	1.78
NAfr+ME	875642	1680016	1.92	1667986	1.90	1670607	1.91	1630184	1.86
Asia	2945748	9667661	**3.28**	8659750	**2.94**	8153848	**2.77**	7495099	**2.54**
SSA	283641.5	527493.3	**1.86**	523395.9	**1.85**	527388	**1.86**	513691.8	**1.81**
World	28140857	54029080	**1.92**	50934732	**1.81**	48186810	**1.71**	47680958	**1.69**

GDP per capita (1995		Global Orchestration		Technogarden		Adaptive Mosaic		Order from Strength	
	1995	2015	2015	2015	2015	2015	2015	2015	2015
OECD	25746.65	40551.43	1.58	38959.82	1.51	37443.82	1.45	37947.73	1.47
FSU	2061.48	4128.259	2.00	3749.355	1.82	3533.299	1.71	3334.714	1.62
LAC	3590.941	5424.253	1.51	5038.366	1.40	4819.088	1.34	4608.171	1.28
NAfr+ME	2501.699	3404.88	1.36	3254.941	1.30	3161.211	1.26	3083.084	1.23
Asia	968.0549	2572.998	**2.66**	2227.778	**2.30**	2033.789	**2.10**	1868.782	**1.93**
SSA	482.1982	598.939	**1.24**	572.4329	**1.19**	557.0183	**1.16**	542.1127	**1.12**
World	4931.473	7637.14	**1.55**	7003.759	**1.42**	6472.349	**1.31**	6402.513	**1.30**

Goal 1: Poverty and hunger – share of population below 1$/day

Region	1990	1996	2001	Prospects - MAS
EAsia-Pacific	29.6	16.6	14.9	Done
China	33.0	17.4	16.6	Done
Eur-CentAsia	0.5	4.2	3.7	Likely in all
LAC	11.3	10.7	9.5	Perhaps in GO
ME-NA	2.3	2.0	2.4	Unlikely in all
South Asia	41.3	36.6	31.3	Li: GO, Unli: OS
India	42.1	42.2	34.7	Li: GO, Unli: OS
SSA	44.6	45.6	46.9	Unlikely in all
Total	27.9	22.8	21.1	Perhaps in GO

Goal 1: Poverty and hunger – hunger

Goal 1: Eradicate extreme Poverty and Hunger

Target 2: Halve, between 1990 and 2015, the proportion of people who suffer from hunger

MDG indicator:

4. Prevalence of underweight children (under five years of age)

    MA: malnourished children

5. Proportion of population below minimum level of dietary energy consumption

    MA: KCalories available

Goal 1: Poverty and hunger – % malnourished children 2015

	1997	GO	TG	AM	OS	Prospect
LatAm	9.1	7.3	6.6	8.1	8.0	Perhaps in TG
SSA	32.8	28.9	28.8	30.3	30.0	Unlikely in all
WANA	13.2	10.4	10.1	11.3	11.0	Unlikely in all
S-Asia	50.8	42.8	42.9	44.9	44.7	Unlikely in all
SE-Asia	34.1	27.6	27.8	29.5	29.5	Unlikely in all
China	17.4	11.9	11.8	14.1	14.0	Likely GO, TG
Devel'ing	31.4	26.5	26.5	28.3	28.1	Unlikely in all

Goal 1: Poverty and hunger – KCalories available per capita per day

	1997	GO	TG	AM	OS	H – Prospect
LatAm	2,928	3,041	3,036	2,953	2,964	distribution
SSA	2,287	2,450	2,402	2,336	2,360	stagnates
WANA	3,061	3,012	2,961	2,920	2,935	distribution
Asia	2,667	2,981	2,895	2,769	2,757	GO, TG: dist
ROW	2,527	1,931	1,916	1,866	1,873	???
Devel'g	2,700	2,931	2,862	2,756	2,755	…

Goal 1: Poverty and hunger – summary

Income growth fastest in GO, slowest in OS
50% poverty reduction (1$/day):
- most likely in GO in many regions
- unlikely in MENA, SSA in all

Hunger: difficult to half undernourishment - slow progress
- not much variation across scenarios
- despite improving average availability of dietary energy

Reconfirms:
- hunger is an economic problem – lack of income or land
- hunger is social equity/distribution problem: deprivation

➔ natural resource, economic, social dimensions together

Goal 7: Environmental sustainability - global

Goal 7: Ensure environmental sustainability

Target 9: Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources

MDG Indicators:

25. Proportion of land area covered by forest: MA: yes
26. Land area protected to maintain biological diversity: MAno
27. Energy use (consumption of energy per $1K GDP (PPP):

    MA: change in energy intensity

28. Carbon dioxide emissions and consumption of CFCs:

    MA: Kyoto gases (GtC-eq)

Goal 7: Environmental sustainability – change in forest areas by 2015 (1995=100)

Region	GO	TG	AM	OS
OECD	*109*	*111*	*105*	*109*
FSU	*103*	*104*	*103*	*103*
LAC	98	*102*	96	98
ME-NA	68	**89**	72	68
Asia	89	**92**	89	89
SSA	67	71	**83**	67
World	97	**100**	98	97

Goal 7: Environmental sustainability – changes in GHG emissions by 2015 GtC-eq (1995=100)

Region	GO	TG	AM	OS
OECD	**120**	**106**	**113**	**123**
FSU	93	82	93	103
LAC	147	115	133	131
ME-NA	177	173	177	186
Asia	*147*	*145*	*147*	*164*
SSA	340	212	207	235
World	141	124	130	142

Goal 7: Environmental sustainability - local

Target 10: halve, by 2015, the proportion of people with out sustainable access to safe drinking water

MDG indicator:

29. Proportion of population with sustainable access to an improved water source

MA indicator:

Percentage of the population with access to treated surface water or untreated but uncontaminated water from another source

Environmental sustainability – safe water
%pop with access to safe water

	1997	GO	TG	AM	OS	W – Prospect
LatAm	77.5	80.2	80.2	80.1	80.2	Slow progr
SSA	47.7	61.6	61.6	60.9	61.6	Fast, but no
WANA	81.9	88.2	88.2	87.9	88.2	Good chance
S-Asia	70.1	79.0	79.0	78.5	79.0	Good change
SE-Asia	67.5	77.8	77.8	77.2	77.8	Almost
China	67.0	75.6	75.6	75.1	75.6	Almost

Goal 7: Environmental sustainability – safe water

Little variation across scenarios → flat end of the corresponding environmental Kuznets curve even in OS

Fast progress in all regions except Latin America

→ Most regions expected to reach target or get very close

CBD indicators for assessing progress towards 2010

CBD COP-6 (2002): Strategic Plan for the Conservation:

"achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional, and national level as a contribution to poverty alleviation and to the benefits of all life on earth" (Dec VI/26)

WSSD (Jo'burg 2002) Plan of Implementation: endorsed

CBD COP-7 (2004): global goals and sub-targets; AND: a balanced set of indicators should be identified and developed (DEC VII/30)

MAS Report Chapter 14: implications of the MA scenarios for the provisional CBD indicators by 2010

Implications of the MAS for the provisional CBD indicators for assessing progress towards the 2010 biodiversity target (CBD Decision VII/30)

Provisional indicators	Evidence from MA scenarios up to 2010
Components of biodiversity	
Trends in extent of selected biomes, ecosystems and habitats	Rate of natural forest loss continues at current rates, or accelerates. Warm mixed forest and savanna most at risk from habitat loss. Some restoration of forest and wetlands in OECD and Former Soviet Union.
Trends in abundance and distribution of selected species	Increased pressures from habitat loss, over-exploitation and pollution. Sub-Saharan Africa, Latin America and Asia most at risk. Temperate and warm mixed woodland most at risk from air pollution.
Change in status of threatened species	Rate of extinction of vascular plants due to habitat loss and fragmentation slows in 3 out of 4 scenarios. Tropical forest, tropical woodland, savanna and warm mixed forest account for 80% of all plant species lost
Trends in genetic diversity of domesticated animals, cultivated plants, and fish species of major socioeconomic importance	Increased pressure from agricultural intensification. Genetic resources decrease in *OS*.
Coverage of protected areas	Coverage of protected areas not modeled. Protected areas at risk from longer-term climate change impacts, air pollution and over-exploitation.

Implications of the MAS for the provisional CBD indicators for assessing progress towards the 2010 biodiversity target (CBD Decision VII/30)

Sustainable use	
Area of forest, agricultural and aquaculture ecosystems under sustainable management	Not modeled. Expected to vary in accordance with scenario storylines – increases in TG and AM scenarios.
Proportion of products derived from sustainable sources	
Threats to biodiversity	
Nitrogen deposition	Increases under all scenarios by 20-50% by 2050.
Numbers and cost of alien invasions	Not modeled. Expected to increase as a result of climate change and increased global trade and mobility.

Implications of the MAS for the provisional CBD indicators for assessing progress towards the 2010 biodiversity target (CBD Decision VII/30)

Ecosystem integrity and ecosystem goods and services	
Marine trophic index	Marine biodiversity modeling results uncertain
Fragmentation	Not modeled
Human-induced ecosystem failure	Not modeled. Expected to vary in accordance with scenario storylines – most significant failures in *OS* and GO scenarios.
Health and well-being of people living in biodiversity-based resource-dependent communities	Not modeled. Expected to vary in accordance with scenario storylines – most significant failures in *OS* and GO scenarios.
Water quality	Decreases under all scenarios by 40 – 200% by 2050.
Biodiversity used in food and medicine	Not modeled. Expected to vary in accordance with scenario storylines – most significant uses in TG and AM scenarios.

Implications of the MAS for the provisional CBD indicators for assessing progress towards the 2010 biodiversity target (CBD Decision VII/30)

Traditional knowledge, innovations and practices	
Linguistic diversity and numbers of speakers of indigenous languages	Not modeled. Expected to vary in accordance with scenario storylines – greatest diversity maintained in AM scenario.
Access and benefit sharing	
To be defined	
Resource transfers	
Overseas development assistance	Not modeled. Expected to vary in accordance with scenario storylines – greatest resource and technology transfers in TG and GO scenarios.
Technology transfer	

Concluding remarks

MAS: lot of relevant information about the prospects for reaching the MDGs under four profoundly different paths

YET: 2015 is too near and the temporal resolution of the MA scenarios and models too coarse for spectacular diversions to emerge

“Fast variables” deforestation, energy efficiency improvements, deterioration of morbidity/mortality when programs collapse or absent → spread across large range

“Slow variables” demographic factors, education achievements, infrastructure development like safe water and sanitation → narrow range

Concluding remarks

Use of MA scenarios:

- Global frameworks for full-blown regional (EU) or national assessments
- Global frameworks for specific issue-oriented assessments (recall ‘not modeled’ in CBD list)
- Global boundary conditions for regional/local models: wetlands, grasslands, other ecosystems
- …