Climate Change and Sustainable Development: Meeting the MDGs

Prof Ogunlade R Davidson

Co-Chair, IPCC Working Group III Dean, Post-Graduate Studies, University of Sierra Leone

Achieving the MDGs and Coping with Climate Change

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Contents of Lecture

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The Climate Change is more a developmental than environmental Problem



- UNFCC Overall Objective
 - Stabilise atmospheric GHG concentration to prevent dangerous levels
 - Enable economic development to progress in a sustainable manner and ensuring that food production is not threatened

Observation: All GHG concentrations has increased making future warming unequivocal



Scientific Observation



Climate change is human induced



Consistent pattern of warming over land, oceans and over each continent (except Antarctica)



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Impacts by sector

		-	-	÷		17
WATER	Increased water availability in moist tropics and high latitudes ¹ Decreasing water availability and increasing drought in mid-latitudes and semi-arid low latitudes ²					
	0.4 to 1.7 billion ³	1.0 to 2.0 billion	3 🏓 1.	I to 3.2 billion ³	Additional people with increased water stress	->
	Increasing amphibian extinction ⁴		% species at inc- risk of extinction ⁴	Мај	or extinctions around the g	lobe ⁴
ECOSYSTEMS	Increased coral bleaching	⁵ Most corals bleached ⁶	Widespread	coral mortality ⁶		
	Increasing species range s	shifts and wildfire risk ⁷	Terrestrial biosphere tends ~15%		rce, as: ⁸ 6 of ecosystems affected	
FOOD	Сгор	Low latitudes Decreases for some cereals	9	All cereals	decrease ⁹	-
	productivity	Increases for some cereals ⁹ Mid to high latitudes		Decreases	in some regions ⁹	-
	Increased damage from floods and storms ¹⁰					
COAST	Additional people coastal flooding e	at risk of	2 📦 2	About 30% loss of coastal wetlands ¹¹ to 15 million ¹²		
		urden from malnutrition, diarr		l infectious diseases ¹³		
HEALTH	Increased morbidity and	d mortality from heatwaves, fl	oods and droughts ¹⁴			
	Changed distribution of	some disease vectors 15	Substantial	burden on health service	s ¹⁶	
SINGULAR EVENTS	Local retreat of ice in Greenland and West Antarctic ¹⁷		Long term commitment to s metres of sea-level rise due sheet loss 17		Leading to reconfiguration of coastlines world wide inundation of low-lying an	and
			Ecosystem changes due to	o weakening of the merid	ional overturning circulation	on 19
0	-	2		3	4	5°C
-		bal mean annual ten				

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Impacts by region

	Global mean a	innual temperature cha	inge relative to 1980-19	99 (°C)	
	0 1	2	3	4 5°C	
AFRICA		10 to 15% ¹ Semi-arid /	25 to 40% ¹ arid areas increase by 5 to 8% ²	Sub-Saharan species at risk of extinction	
AFRICA	75 to 250 million ³ 350	to 600 million ³ Additional peo	ople with increased water stress		
ASIA		5 to 12% decrease crop yie rice in China ⁴ potential to 2 million ⁵ to 1.0 billion ⁶ Additional peo		Additional people at risk of coastal flooding each year	
		leaching of Great Barrier Reef ⁷			
AUSTRALIA /	3,000 to 5,000 m	ore heat related deaths per year	8		
NEW ZEALAND	-10%	Murray-Darling R	River flow ⁹	-50%	
	Decreasing water security in south and	east Australia and parts of east	New Zealand ¹⁰		
EUROPE	+5 to +15% in Northern Europe ¹¹ 0 to -25% in Southern Europe ¹¹	+10 to +20%	Mater quallability		
	+2 to +10% in Northern Europe ¹²		+10 to +30% ¹²	Wheat yield potential	
	+3 to +4% in Southern Europe ¹²	-10 to +20%	-15 to +30% ¹²		
LATIN AMERICA	Many tropical glaciers di 10 to 80 million ¹⁵ 80 t	sappear ¹⁴ Many	of about 25% wanna tree species ¹³ y mid-latitude glaciers disappear ¹ ople with increased water stress	Potential extinction of about 45% Amazonian tree species ¹³	
NORTH	5 to 20% increa crop yield pote	ntial ¹⁶	×*	70 to 120% increase forest area burned in Canada ¹⁷	
AMERICA	Decreased space heating and increased space cooling ¹⁸				
		About 70% increase ozone days ¹⁹	e in hazardous	3 to 8 times increase in heat- wave days in some cities ¹⁹	
POLAR REGIONS	Increase in depth of seasonal thaw of 10 to 15% ²⁰	15 to 25% ²⁰	30 to 50% ²⁰	10 to 50% Arctic tundra replaced by forest ²¹ 15 to 25% polar desert	
	Arctic permafrost	20 to 30% reduction Arctic permafrost		replaced by tundra ²¹	
				20 to 35% decrease annual average Arctic sea ice area ²²	
	Increasing coastal inundation and damage	to infrastructure due to sea-level	rise ²³		
SMALL ISLANDS	Alien species colonise mid- and high latitude islands ²⁴				
		ses up to 5% GDP Ilands, up to 20% iin islands ²⁵			

Climate Extremes projected to WORSEN East Africa

Drought in East Africa



Floods in Mozambique





- Projected sea level rise would increase flooding, particularly on the coasts of eastern Africa;
- Sea level rise will likely increase the high socioeconomic and physical vulnerability of coastal cities.
- The cost of adaptation to sea level rise could amount to at least 5-10% of GDP.
- Climate change and climate variability will only add stress to existing stresses in the continent

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Between 1970 and 2004 global greenhouse gas emissions have increased by 70 %



Projected GHG and Mitigation Potential

- Current climate change mitigation policies and related sustainable development practices (SRES), could increase between 25-90% between 2000 and 2030
- Mitigation potential based on both bottom-up and top-down studies could offset the expected GHG emissions growth
- All sectors could contribute though their potential differ in quantity and sectors



Estimates do not include non-technical options such lifestyle changes

Lower stabilisation level require global emissions to go down early

- Lower stabilization levels (550 ppm CO2-eq or lower) require major policies and government support:
 - RD&D efforts
 - Investments in new technologies
 - Tax credits
 - Standard setting
 - Technology development and transfer
 - Market creation
- An effective carbon-price signal could realize significant mitigation potential







Energy Supply Mitigation Technologies



Non-climate policies can influence carbon emissions as much as specific climate policies

Sectors	Non-climate policies Candidates for integrating climate concerns	Possible influence (% of global emissions)
Macro-economy	Taxes, subsidies, other fiscal policies	All GHG emissions (100 %)
Forestry	Forest protection, sustainable management	GHGs deforestation (7%)
Electricity	Renewable energy, demand management, decreasing losses transport,/distribution	Electricity sector emissions (20 %)
Oil-imports	Diversification energy sources/decrease intensity -> enhance energy security	GHGs from oil product imports (20 %)
Insurance buildings, infrastructure	Differentiated premiums, liability conditions, improved conditions green products	GHG emissions buildings, transport (20 %)
Bank lending	Strategy/policy, lending projects accounting for options emission limitations	Notably development projects (25%)
Rural energy	Policies promoting LPG, kerosene and electricity for cooking	Extra emissions over biomass (<2 %)

Climate Policy alone will not solve the climate change problem

- Macro-economic policy: taxes, subsidies, other fiscal policies, structural adjustment
- *Trade policy: "*embodied carbon", removing barriers for low-carbon products, domestic energy sources
- Energy security policy : efficient energy use, domestic energy sources (low-high carbon)
- Access to modern energy: bio-energy, poverty tariffs
- Air quality policy: clean fuel
- Bank lending policies: lending for efficiency/ renewable energy, avoid lock-in into old technologies in developing countries
- Insurance policy: Differentiated premiums, liability insurance exclusion, improved conditions for green products

Climate Change and Sustainable Development



- The world can be categorized as three distinct societies (developed, developing, survival)
- Societies need different pathways to achieve low carbon society
- There is a strong synergy between achieving low carbon society and attaining sustainable development



LINKAGE BETWEEN ENERGY AND MDGS

	Objectives	Energy Needs for meeting and sustaining MDGs
MDGs linked to Energy		
1. Poverty & Hunger	Half the people that live in hunger and those on less that \$1/day	 -Post-harvest processing for consumption and generate surplus (reduction of on/ off farm losses) - support improved nutrition - improve supporting infrastructure & services to proper utilise surplus - enhance income-generating activities
2. Universal Primary Education	Primary education for all by 2015	 reduction in cost of education provision of electricity for lighting & heating, electricity for teaching aids improved energy efficiency in school buildings
3. Gender Equality & Women Empowerment	Boys & girls to be in primary & secondary schools by 2005 and all levels by 2015	 -provision of better cooking fuels to free task of wood collection - reduce indoor air pollution
4. Maternal Health	Reduce rate of maternal mortality by 75% between 1990 to 2015	 -improved medical facilities for maternal care using modern systems - provision of fully equipped clinics and hospitals - adequate training and housing -reduction of excessive household work load -effective drug manufacture and distribution
5. HIV/Aids, malaria & other deases	Halt & Reverse the trend	 -increased facilities for sterilization, refrigeration, and storage facilities for vaccines - improved re-use facilities - improved blood donation systems -improved distribution systems -improved communication system using IT



Technology development and transfer in Climate Ghange

Strategic Energy Options to Achieve MDGs

- Options to ensure macro-economic growth
 - Improving the overall economy by increasing productivity
 - Mobilisation of local investments
 - Cross-learning among institutions
 - Promotion of external investments
 - Introduction of bio-fuels in the transport sector
- Options for providing targeted energy services for the poor in urban and per-urban areas
 - Widespread use of LPG
 - Use of cross -subsidy in tariff system
- Options for energising rural areas
 - Scaling up existing interventions
 - Provision of low cost, high impact options

Bio-Fuel Option



- Bio-fuels a viable transport energy option
- Co-generation for power is more successful
- Viability is doubtful
- Require large inputs (land, water, fertilizer)
- Choice of land an competition with food
- Choice of crop
- Policy regime crucial regarding outside interests



Cost per Barrel of Fuel by Biofuels feedstock

Co-generation, from sugar waste -40% power in Mauritius



Wider use of LPG in Urban and Rural areas



Growth of LPG in Senegal



Sudden increase use of LPG in Sudan





LPG Cylinder manufacture & distribution in Ghana

Policy Regime is needed



Renewable Energy

- Renewable energy systems can be used as stand alone or minigrid based on
 - Needs assessment
 - Provision of wide technology choice
 - Facilitation of technical back-up
 - Provision of subsidised financial system
 - Support existing cooperatives or promote new ones







Fitting in together in the long term

- Global warming is equivocal and early action by all and governments are needed to reduce serious climate risks
- Large number of technologies are available now and in the near future to offset the GHG emissions
- Linking sustainable development with climate policies provide governments the opportunity to avert the possible climate threats
- An effective climate change strategy will require the integration of development, equity and sustainability
- Conventional economic analysis has to consider both social and environmental aspects for optimal decision-making
- Climate change could worsen the gap in distributional goods and services between and within generations as the poor and dis-advantaged will be the most affected

Concluding comments

- Non-governmental organisations (International and national) are very important
 - Human and institutional capacity building
 - Sensitizing and popularising technological innovations
- Private sector can be involved in development and deployment of technologies
 - Regulations are crucial
 - Competition is necessary
- Addressing equity concerns:
 - Establishment of a equitable and participative framework for decision-making and implementation
 - Reduction of potential social disruption from climate change impacts
 - Protection of cultural diversity and threatened cultures. needed in the future

Thank you for your attention

Further Information Contact University of Sierra Leone Freetown, Sierra Leone. Tel. No. 232-22-223340 Fax. No 232-22-223270 Email: ogunladedavidson@hotmail.com