

Adapting to Climate Change : Issues for South Asia

Presented at

Regional Consultation on

Trade, Climate Change and Food Security in South Asia

Organized

by

South Asia Watch on Trade Economics and Environment (SWATEE)

and

Oxfam Novib

20-21 December, 2012

Kathmandu, Nepal

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Presentation outline

- ✓ Climate change in South Asia
- ✓ Risks and potential impacts
- ✓ Adaptation issues
- ✓ Way forward



Climate change in south Asia

Carbon emission and key observed climate trend and variability in South Asia

Country*	CO2 emission (MT per capita, 2008)	Change in temperature	Change in precipitation
Afghanistan	0.025		
Bangladesh	0.319	Increasing trend of about 1 degree Celsius in May and 0.5 degree Celsius in November from 1985 to 1998	Decadal rain anomalies above long term average since 1960s
Bhutan	1.04		
India	1.46	0.68 degree Celsius increase per century with increasing trends in annual mean temperature and warming more pronounced during post monsoon and winter	Increase in extreme rains in north-west summer monsoon in recent decades and lower number of rainy days along east coast
Maldives	2.99		
Nepal	0.12	0.09 degree Celsius increase per year in Himalayas and 0.04 degree Celsius in Terai region with more in winter	No distinct long-term trends in precipitation records for 1948-1994
Pakistan	0.97	0.6-1.0 degree Celsius increase in mean temperature in coastal areas since early 1900s	10-15 percent decrease in coastal belt and hyper arid plains and increase in summer and winter precipitation over the last 40 years in northern Pakistan
Sri Lanka	0.58	0.016 degree Celsius increase per year between 1961 to 90 over entire country and 2 degree Celsius increase per century in Central high land	An increase trend in February and decrease trend in June

Cruz et al. 2007, World Development Indicators



Climate change in south Asia (2)

Observed changes in extreme events and severe climate anomalies

Climate events	Observed changes
Heat waves	Frequency of hot days and multiple-day heat wave has increased in past century in India with an increase in deaths due to heat stress in recent years
Intense rains and floods	Serious and recurrent floods in Bangladesh, Nepal and north-east states of India during 2002, 2003, 2004 and 2008; floods in Surat Barmer and in Sri Nagar of India during summer monsoon seasons of 2006; floods in north-east Pakistan in 2009, 17 May 2003 floods in southern province of Sri Lanka were triggered by 730 mm rain
Droughts	50 percent of droughts associated with El Nino; consecutive droughts in 1999 and 2000 in Pakistan and Northwest India led to sharp decline in water tables; consecutive droughts between 2000 and 2002 caused crop failures, mass starvation and affected ~11 million people in Orissa, India; droughts in North east India during summer monsoon of 2006
Cyclones/typhoons	Frequency of monsoon depressions and cyclones formation in Bay of Bengal and Arabian Sea on the decline since 1970 but intensity is increasing causing severe floods in terms of damages to life and property

Source: Cruz et al. 2007



Climate change risks (1)

Country level risks of climate change

Country	Risks
Afghanistan	<ul style="list-style-type: none"> • Exposure of agriculture (pasture), ecosystem, and water resources to drought and desertification • Flooding from glacial melt and long run vulnerability of depletion of water supplies glacial-fed rivers • Water and food insecurity, malnutrition, and possible mitigation and conflict
Bangladesh	<ul style="list-style-type: none"> • Combined impacts of sea-level rise and glacial melt lead to increased incidence of flooding and land loss • Drought in some areas • More intense storm surges • Lower agriculture output through diminished yields and loss of land • Increased incidence of heat-related illness, water-borne diseases poverty, child and infant mortality; lower access to safe water and sanitation and possible migration • Loss of biodiversity in coastal ecosystem,

Source World bank 2009



Climate change risks (2)

Country level risks of climate change

Country	Risks
Bhutan	<ul style="list-style-type: none"> • Damage from glacial melt • Impact of increased temperature on rangelands and agriculture • Potential loss of forest biodiversity due to vegetation and increased incidence of forest fire due to temperature increase
India	<ul style="list-style-type: none"> • Exposure of agriculture, water resources, and ecosystems to extreme weather events and more variable precipitation • Impact of glacial melt on water resources, quantity, biodiversity and low-lying agriculture • Impact on urban infrastructure including drainages, water and sanitation • Vegetation shift in forests and biodiversity, regime shifts in rangelands, and decreased agricultural yields in tropics and sub-tropics • Increased exposure to sea rise

Source: World Bank 2009



Climate change risks (3)

Country level risks of climate change

Country	Risks
Maldives	<ul style="list-style-type: none"> • Ecosystem damages and loss afforded by coral reefs • Inundation of island due to sea-level rise and physical damages from flooding • Increased salinity of ground waters resources • Possible migration and large scale relocation
Nepal	<ul style="list-style-type: none"> • Decline in agriculture production in some areas • Glacial lake outburst floods and future desiccation of water resources due to rapid glacial melt and impact on dependent ecosystems and agriculture • Impact of vegetation shift to forest biodiversity • Likely outbreak of malaria and similar diseases

Source; World Bank 2009



Climate change risks (4)

Country level risks of climate change

Country	Risks
Pakistan	<ul style="list-style-type: none"> • Increased intensity and frequency of drought and effects on agriculture (pasture), water resources, and ecosystems (wetlands) • Initial flooding and future drying of water resources due to glacial melt and impact on water consumption • Damages Of sea level rise • 143 Outbreak of heat related and insect-transmitted diseases, malnutrition, food and water insecurity, migration, and conflict
Sri Lanka	<ul style="list-style-type: none"> • Reduced drop yields due to temperature increase • Sea-level rise; damages to settlements, industries; and livelihoods in coastal areas • Saltwater intrusion in agriculture, fresh water, and ground water • Ecosystem degradation and biodiversity loss in coastal and marine ecosystem

Source World Bank 2009



Climate change risks (5)

Climate Change risks

	Afghanistan	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri Lanka
Sea-level rise	-	√	-	√	√	-	√	√
Glacier retreat	√	√	√	√	-	√	√	-
Temperature increase	√	√	√	√	√	√	√	√
Floods more frequent	?	√	√	√	√	√	√	?
Drought more frequent	√	√ (some areas)	?	√	-	?	√	?

Likely: √ Not Present: - Unknown: ?

Source: World Bank 2009



Climate change impacts (1)

Projected climate change impact in South Asia

• Country	Drought			Flood		
	Cost mn \$	<i>Additional</i> cost mn \$	Intensity of impact	Affected people	<i>Additional</i> affected people	Intensity of impact
	2010	2030		2010	2030	
Afghanistan	4	40	Acute	55,000	90,000	Severe
Bangladesh	15	25	Severe	600,000	900,000	Acute
Bhutan		1	High	15000	25000	Acute
India	300	1500	Severe	20,000,000	25,000,000	Acute
Maldives	..	..	High	...	...	Low
Nepal	1	10	High	85,000	100,000	Acute
Pakistan	35	200	Severe	3000,000	450,000	Acute
Sri Lanka	5	25	High	45,000	40,000	High

Source: Climate Vulnerability Monitor 2012



Climate change impacts (2)

Projected climate change impact in South Asia

Country	Storm			Biodiversity		
	Affected people	<i>Additional</i> affected people	Intensity of impact	Contraction of biological zone km ²	Additional contraction	Intensity of Impact
	2010	2030		2010	2030	
Afghanistan	...	...	Low	10,000	20,000	Acute
Bangladesh	400,000	600,000	Acute	100	250	Moderate
Bhutan	...	...	Low	250	450	Acute
India	300,000	350,000	Moderate	15,000	30,000	Moderate
Maldives	5	15	Low	..	..	Low
Nepal	..	..	Low	200	400	High
Pakistan	4,500	8,750	High	2,000	4,000	High
Sri Lanka	2,500	60	Moderate	1,250	2,750	Moderate

Source: Climate Vulnerability Monitor 2012



Adaptation challenges

- ✓ Lack of awareness
- ✓ Inadequate generation and sharing of information
- ✓ Diverse institutional structure
- ✓ Lack institutional capability
- ✓ Ad-hoc Short-term approaches
- ✓ Lack of resources and technology
- ✓ Enhancing livelihood of climate refugees



Way forwards

- ✓ Adapt now- 'a stich in time serves nine'
- ✓ Integrate adaptation plan and strategies with sustainable development planning
- ✓ Create conditions to enable adaptation
- ✓ Increase awareness and knowledge
- ✓ Protect natural resources
- ✓ Involve those at risks
- ✓ Ensure enabling global framework for international cooperation with adequate fund and right technology
- ✓ Collaborate and cooperate at regional level
- ✓ Go for 'no regrets' approach



Thanks for
your kind attention

Suggestions/ comments
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