

Threat to MDGs

The number of malnourished is expected to increase due to climate change.

destroyed one-quarter of all of Honduras' schools.

More frequent and intense weather-related disasters threaten livelihoods, regional food

security is undermined and vulnerability of poor people increases. Water scarcity further

aggravates the problem as vast amount of fresh water is required to halt hunger. Without

the effects of climate change, about 10 million fewer people would live in poverty today.

Loss of livelihoods means more children will be engaged in incomeearning activities

and the displacement and migration of families will make education a low priority.

Infrastructure, such as schools are destroyed. For example, in 1998, Hurricane Mitch

eventually migrate to the nearby urban areas.

Such influx of migration into urban areas not

only creates various social problems but also

brings environ-mentally affected people in close

physical proximity with each other. The local

community life might help them to organize

against the state authority whom they perceive

as the culprit of their misery. In this way, the

organized and motivated environ-mentally dis-

placed people in the cities may bring the struggle to the door step of the state adminis-tration.

Such situation intensifies the intensity of the

conflict in the society and poses threat to the run-

based environmentally displaced people can be

judged from the significant role of the environ-

mental migrants in the urban areas in over-

throwing the Emperor, Haile Selassie of Ethiopia

in 1974. In neighbouring Sudan, drought in coun-

tryside resulted in major migration to urban

areas and the cities exploded in riots and organ-

ized violence, which led to the downfall of

Wherever environmental migrants settle, they

flood the labour market, add to local demand for

food and other basic necessities of life, which put

new burdens on the society. The influx of

migrants is likely to deplete local food supplies

and to drive up food prices. Moreover, migrants

can hurt hosts who depend on labouring for all or

part of their livelihoods, by reducing their oppor-

tunities for work and by driving down wages. The

resulting scarcity of the new situation might help

to generate strong feeling of nativism among the

original inhabitants of the area. Such feeling can

help to organize themselves as a group to protect

their interests on the notion that they as a people

exist only within their own country, while others

have other homes to which they can return and

that itself can breed native-migrants conflict in

Possible Increase in the Number of

"Climate change triggers and amplifies inter-

national security and widening instabilities

The impacts of climate change, such as the threat of

food crisis, water scarcity, extreme weather events

Table 3: Some devastating tropical cyclones since 1960⁴⁹

Storm surge

1960

1961

1963

1965

1970

1985

1988

1991

Height(m)

5.35

7.45

4.7

6.85

7.6

3.95

6.75

Wind speed

Km/hr

211

160

203

160

224

184

These storms generally form

in the months just before and

after the monsoon and intensify

as they move north over the

warm water of the Bay of Bengal.

They are accompanied by high

winds of over 150 kph and can

result in storm surges up to

seven metres high, resulting in

extensive damage to houses and

high loss of life to humans and

livestock in coastal communities.

which adversely affects the liveli-

hood pattern of some parts of the

country is drought. Droughts in

Bangladesh are seasonal and can

devastate crops, causing hard-ship

to poor agricultural labourers and

others who can not find work. In

Another form of disaster

Casualty

(people)

10000

11468

11520

19279

500000

11069

5704

150000

by overstretching the capacities of states". 44

Weak and Fragile States

The power and effectiveness of the urban

ning of a democratically elected regime.

President Nimeri in 1985.43

the society.

c. Group versus Group Conflict

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the future.⁵

permanent inundation and sea level rise is increasing rapidly every year. As a result, resource and effort of gover-nment and people are quickly drained addressing the impact of one event when

another hazard strikes. Impacts of global warming

and climate change thus have the potential to chal-

lenge our development efforts, human security and

Climate change is conceived as any long-term

change in the patterns of average weather of a specific region or the earth as a whole. It reflects

abnormal variations to the earth's climate and subsequent effects on other parts of the earth, such as

ice caps over durations ranging from decades to mil-

lions of years. However, according to IPCC climate

change refers to a change in the state of the climate

that can be identified by changes in the mean

and/or the variability of its properties.

and that persists for an extended period,

typically decades or longer. It refers to

any change in climate over time, whether

due to natural variability or as a result of

human activity.⁶ This definition differs

from the definition of the United Nations

Framework Convention on climate

Change (UNFCC) where climate change

refers to a change of climate that is

attributed directly or indirectly to human

activity that alters the composition of the

global atmosphere and that is in addition

to natural climate variability observed

"We sink or swim together. Climate change

can be a threat to peace and stability. There

is no part of the globe that can be immune to

Climate change is seriously affecting hundreds of

millions of people today and in the next twenty

years those affected will likely more than double-

making it the greatest emerging humanitarian

challenge of our time. Events like weather-related

disasters, desertifi-cation and rising sea levels,

exacerbated by climate change, affect individuals

and communities around the world. They bring

hunger, disease, poverty, and lost livelihoods-reduc-

ing economic growth and posing a threat to social

the water available for farming which can cause

crops to wilt and therefore increased vulnerability

availability in regions that are already struggling

hardest with water scarcity: Africa, South West

Asia, the Middle East and the Mediterranean. In

other regions, such as South Asia, climate change

increases the vari-ability of water supply, leading to

floods during some parts of the year and droughts

in others. These problems add to the vulnerability

of populations in these regions whose existence is

resources can also lead to social destabilization and

violence. 1.1 thousand million people are currently

without access to safe drinking water.²¹ This situa-

tion could worsen for hundreds of millions of people

as climate change alters the variability of precipita-

tion and the quantity of available water. At the

same time demand for water is increasing due to

the world's growing population and its mounting

aspiration. This dynamics triggers distributional

conflicts and poses major challenges to water man-

agement systems in the countries concerned.

However, countries which will suffer the greatest

water stress are generally those which already lack

the political and institutional framework necessary

for the adaptation of water and crisis management

systems. This could overstretch the existing conflict

resolution mechanisms ultimately leading to desta-

bilization and violence.²² This can be illustrated as

1

Boxes 1-6: Dimensions of influence with key fac

Central causal chain

MDGs

poverty

contd.

Goal 1: Eradicate

primary education

extreme hunger and

Goal 2: Achieve universal

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their country or abroad.

lives or living conditions, are obliged to leave their

habitual homes, or choose to do so, either temporal-

ly or permanently, and who move either within

potentiality to trigger different kinds of conflict at

various levels. Ashok Swain has argued that such

The reduced production in the agricultural and

industrial sectors in the environmentally affected

regions might force local small and marginal farm-

ers and labourers to flee their homeland in large

numbers in search of other areas for survival. The

massive deforestation and loss of fishing habitats can

also potentially lead to large scale migration.

Furthermore, the predicted sea level rise will wors-

en the situation undoubtedly. These migrations can

transgress inter-state boundaries, culminating in

mental migration has several conflict inducing

dimensions between the receiver and sender states.

The trans-border environmental migrants pose

structural threat to the host country by increasing

demands on its scarce resources. Competition with

local population over resources leads to conflict with

migrants and bring political problem for the gov-

ernment of the receiving state. The host country

also feels threatened, when the environmental

migrants try to enter into the domestic political

process and exert pressure on the government. Due

to these factors, the receiving state might work for

stopping the migration at its border and/or repatri-

ating them from its territory back to the country of

origin, which can potentially lead to conflict with

the sender state. Moreover, when the environmen-

tal migrants due to various reason indulge them-

selves in the antigovernment activities of the coun-

try of their origin, relations between sender and host countries can usually get strained. Sender

states might regard the host states with suspicion

for giving support to the migrants in their subver-

sive activities, creating negative implication for the

The failure of the ecosystem, which supports the

rural economy might actuate the villagers to

touching off religious conflict, the spread of con-

tagious diseases and vast damage to infra-struc-

ture. "It gets real complicated real quickly," said

Amanda J. Dory, the deputy assistant secretary

regional security.

b. State versus Group Conflict

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of defense for strategy⁴⁶

However, the large-scale trans-border environ-

creation of massive cross-border migration.

migration can generate three kinds of conflict:

a) State versus state conflict

State versus group conflict

c) Group versus group conflict

a. State versus State Conflict

However, the climate-induced migration has the

Regional

Influence of key factors on

Climate induced degradation of freshwater

Climate change exacerbates water quality and

Indeed, climate change reduces access to fresh

over comparable time periods.

Climate Change

the security threat."8

and, even, political stability.

ISSUE BRIEF

of poor rural farmers¹⁹

already precarious.²⁰

follows.

Security Dimensions of

Understanding Climate Change

Declining food

Increasing poverty

Natural disasters

Increases in the number of weak ar

Human rights

fragile states

Health risk

Threat to

Climate change

Global

Melting glaciers

Desertification

Water pressur

Figure 1: Impact of climate change on Human Security

and safe drinking water, negatively affects health

and poses a real threat to food security in many countries in Africa, Asia, and Latin America. In

some areas where employ-ment and crop choices are

limited, decreasing crop yields have led to famines.

Droughts

Figure 2: Selected hotspots of security risks associated with climate change⁹

Desertification and other forms of land degradation

have led to migration. Gradual environmental

degra-dation due to climate change has also affect-

ed long-term water quality and quantity in some

parts of the world, and triggered increases in

hunger, insect-borne diseases such as malaria,

other health problems such as diarrhea and respi-

ratory illness. It is a contributing factor to poverty,

and forces people from their homes, sometimes per-

manently. Likewise, health outcomes and food inse-

cu-rity lead to displacement and poverty which

might result in competition for scarce resources and

strains on mostly already limited government

capacity to deal with deterio-rating conditions and

Climate change compounds existing poverty by

destroying livelihoods. Specifically, rising tempera-

tures, changing rainfall patterns, floods, droughts

and other weather-related disasters destroy crops

and weaken or kill livestock. Climate change drives

poverty through a vicious circle of reduced crop

yield and resulting lower income, which leaves

fewer resources for the following year's planting

season. About 60 percent of developing nations'

workforce, about 1.5 billion people, are employed in

agriculture, livestock, fisheries and tourism.24

Indeed, most of the farmers live on bare minimum

production and losing a small amount of their yield

More than ten million people have fallen into

poverty today because of climate change The major-

ity of the people suffering from the impacts of cli-

mate change are already extremely poor. Currently

about 2.6 billion people — two thirds of them

women — live in poverty (below \$2 a day) with

almost 1 billion living in extreme poverty (less than

\$1 a day). About 12 million additional people are

destabilize the society. It has been appeared from

a study that scarcity-induced loss of livelihood in

agricultural societies increases the pool of potential

rebel recruits, resulting in a higher conflict risk.

Climate related phenomenon, such as more fre-

quent droughts, increased soil degradation, and

higher temperatures, may decrease the expected

returns of farming compared to joining criminal

Risk to Human Health

"Climate change threatens to slow,

halt or reverses progress towards

reducing the spread of diseases

and aggravates already enormous

health problems, especially in the

Current weather conditions heavily impact

the health of poor people in developing

nations, and climate change has a multiply-

ing effect. A changing climate further affects

the essential ingredients of maintaining

good health: clean air and water, sufficient

food and adequate shelter. A warmer and

more variable climate leads to higher levels

poorest parts of the world"27

and insurgent groups.26

However, the increases in poverty can also

pushed into poverty because of climate change.²⁵

even

further

 $_{
m them}$

pushes

into poverty.

might ultimately lead to conflict.¹⁰

Increasing Poverty

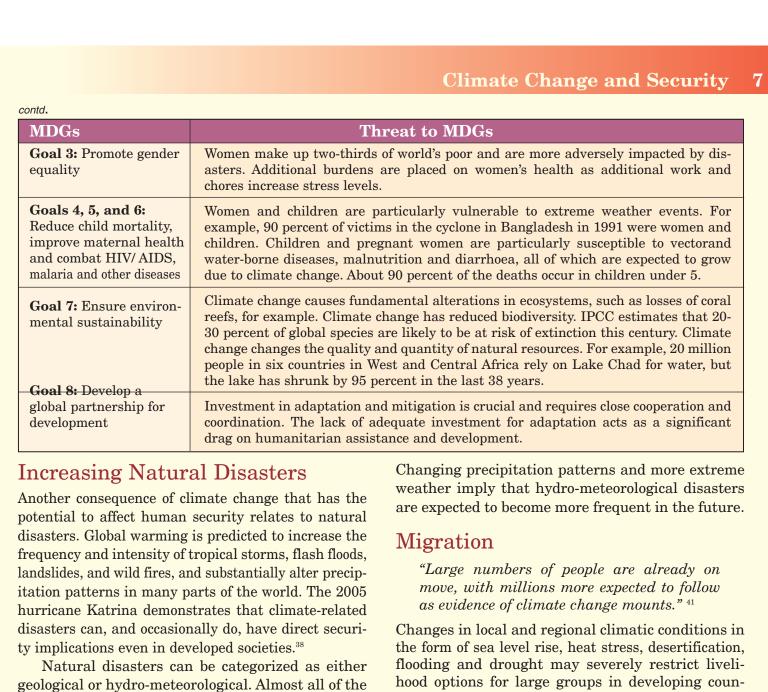
effects Rising surface

oceans, Changing in local rainfall and other

run-off patterns, Accelerated species extinction

rates, Loss of biodiversity and

services



the hazards of weather-related disasters. Therefore

global warming, together with the changes in food

and water supplies it causes, can indirectly spurs

increases in such diseases as malnutrition, diar-

rhoea, cardiovascular and respiratory diseases, and

water borne and insect-transmitted diseases. This

is especially worrisome because a massive number

of people are already impacted by these diseases for example upwards of 250 million malaria cases

are recorded each year and over 900 million people

is likely to be seriously affected by gradual environ-

(Programa Nacional de Cambios Climaticos

Figure 7: Frequency and severity of hydro-meteorological (cli-

matic) disasters since 1946⁴⁰

guarantee the core functions of the state, notably

the state's monopoly over the use of force, and

therefore already pose a major challenge for the

international community. Moreover, the impacts of

unabated climate change would hit these countries

especially hard, further limiting and eventually

overstretching their problem solving capacities.

Undermining the Conditions of

Climate change affects the situation of human

rights adversely. Food security and access to

drinking water could be challenged by the

impacts of climate change in affected countries

and regions, destruction caused by rising sea lev-

els and extreme weather conditions could put peo-

ple's livelihoods at risk, and all this could trigger

strong environmen-tally induced migration.

Unabated climate change could threaten natural

life support systems, erode human security and

thus contribute to the violation of human rights.

Climate Change and Security:

According to the Fourth Assessment Report of IPCC following

changes have been observed in climate trends, variability and

• In Bangladesh, average temperature has registered an increasing

trend of about 1°C in May and 0.5°C in November during the 14

The annual mean rainfall exhibits increasing trends in

Bangladesh. Decadal rain anomalies are above long term averages

Serious and recurring floods have taken place during 2002, 2003,

and 2004. Cyclones originating from the Bay of Bengal have been

Frequency of monsoon depressions and cyclones formation in Bay

Water shortages has been attributed to rapid urbanization and

industrialization, population growth and inefficient water use,

which are aggravated by changing climate and its adverse impacts

Salt water from the Bay of Bengal is reported to have penetrated

100 km or more inland along tributary channels during the

The precipitation decline and droughts has resulted in the drying

causes of concern about agriculture in Bangladesh.

Over the course of the 21st century and beyond, sea

level rise will threaten hundreds of thousands if not

more than a million hectares of agricultural land. It

is estimated that in eastern Bangladesh alone

14,000 tons of grain production would be lost to sea

level rise in 2030 and 252,000 tons would be lost by

2075. Threatening the richest and most productive

region of the country, sea level rise could have dra-

matic consequences for the Bangladeshi economy. A

recent study estimates that a GDP decrease in the

range of 28% to 57% could result from a 1m sea

level rise. 50 Increased flooding from glacial melt,

more intense monsoons, or more intense cyclones

could also adversely affect agriculture in the near

term by periodically inundating much agricultural

Bangladesh, one of the world's poorest nations is

also the country most vulnerable to see level rise.

Being a low lying deltaic country, Bangladesh will

face the serious consequences of sea level rise

including permanent inundation of huge land

masses along the cost line. Over the last 100 years

Bangladesh has warmed up by about 0.50 and 0.5

m rise of sea level in the Bay of Bengal (BUP 1993).

In the South western Khulna region 5.18-mm/year

sea level rise is recorded which may reach to 85 cm

by 2050. World Bank's study on the impact of Sea

level rise in Bangladesh reveals that, 100 cm sea

level rise within next 100 years will inundate 15 to

like land, construction materials etc to rebuild

squeezed to 3400 km from 6400 km in 1960.

This mean, Bhola suffered net loss of 3000 km.

A huge number of households and commercially

important places in Bhola island like

Daulatkhan, Mirzakalu, Molongchara, Sarajgonj,

Chowmohoni, Tazumiar have completed been

eroded within couple of decades. If this pace of

erosion continues, it has been apprehending that

Bhola may disappear completely by next 40 years.⁵⁹

south-eastern part of the Bay of the Bengal, has

been eroding fast due to strong tidal action, as

well as by cyclonic action and storm surges.

This island, once which was 250-squire kilome-

ter is size, lost around its 65 percent during last

The coastal areas of Bangladesh have already been

facing salinity problem which is expected to be

exacerbated by climate change and sea level rise, as

sea level rise is causing unusual height of tidal water.

In dry season, when the flows of upstream water

reduce drastically, the saline water goes up to 240

kilometers inside the country. Presently around

31 upazillas of Jessore, Satkhira, Khulna, Narail,

Bagerhat and Gopalganj districts are facing severe

salinity problem. Agricultural activities as well as

cropping intensities in those upazillas have been

changing; now farmers can't grow multiple crops

duce salinity impacts in three fronts: surface water,

groundwater and soil. Increased soil salinity due to

climate change would significantly reduce food

grain production. Even at present, some parts of

coastal lands are not being utilized for crop produc-

tion, mostly due to soil salinity; and this situation

would aggravate further under a climate change

scenario. However, due to changing climate the

ingression of salinity might be increased through

— Increased sea level will cause water ingression in

— Decreasing trend of fresh water flow from the

upstream will cause intrusion of saline water.

— Upward pressure of the saline and fresh water

interface in the level of underground Aquifer.

— Downward seepage of saline water from surface

Bangladesh is vulnerable to outbreaks of infec-

tious, waterborne and other types of diseases.

Records show that the incidence of malaria

increased from 1556 cases in 1971 to 15 375 in

1981, and from 30 282 cases in 1991 to 42 012 in

2004 (WHO, 2006). Other diseases such as diar-

rhoea and dysentery, etc. are also on the rise espe-

cially during the summer months. It has been pre-

dicted that the combination of higher temperatures

and potential increase in summer precipitation

may cause the spread of many infectious diseases.

Climate change also brings about additional stress-

es like dehydration, malnutrition and heat-related

morbidity especially among children and the elder-

ly. These problems are thought to be closely inter-

linked with water supply, sanitation and food pro-

duction. Climate change has already been linked to

land degradation, freshwater decline, biodiversity

loss and ecosystem decline, and stratospheric ozone

depletion. Changes in such factors may have a

direct or indirect impact on human health as well.

the potential to present serious threat to the stability

of the government. Particularly, if the situation

becomes pandemic, the whole system related to health

service might be crumbled down due to the limited

capacity of the state to respond to such crisis. As a

result, it can also influence the political direction of

the country. For instance, the inability or perceived

unwillingness of political leaders to stop the spread of

disease or to provide adequate care for the afflicted

will undermine support for the government. In coun-

tries with functioning democracies, this could lead to

the election of new leaders with political agenda radi-

cally different from their predecessors. It could also

breed greater support for populist candidates whose

politics resonate in a society that believes that its eco-

nomic and social hardships are due to neglect or mis-

management by the government. In countries with

weak or non-democratic political foundations, the risk

lead to civil war or a toppling of the government alto-

gether. Under these economic and social circum-

stances, a country's political direction can change rap-

idly. Besides, it also has the potential to generate dis-

putes among neighbouring nations over the movement

that

this

may

heightened

This increase in the incidence of disease also has

and salinization of underground water

Indeed, the anticipated sea level rise would pro-

100 years⁶⁰

in a year.61

following ways:

Salinity Intrusion

Kutubdia, an outreach island situated in the

During last 40 years, Bhola Island has been

the school elsewhere in the community.⁵⁸

Shortage of Safe Drinking Water

The availability of fresh-

water will be reduced by

increased salinity intru-

sion into fresh water

sources during the low

flow conditions. In the

coastal regions this is

brought about by sea

level rise resulting in

saline water intrusion in

the estuaries and into

erbated by greater evap-

oration of freshwater as

temperatures increase,

coupled with a greater

demand for fresh water

in times of water stress.

Sea Level Rise

The effects are exac-

the groundwater.

up of wetlands and severe degradation of ecosystems.

noted to decrease since 1970 but the intensity has increased.

The Case of Bangladesh

extreme events in Bangladesh:

year period from 1985 to 1998.

of Bengal has increased

on demand, supply and water quality

Human Rights

Every year the health of 235 million people

Table1: National health impact assessment of climate change³¹

are hungry today.³⁰

Country

Australia

Bolivia

Bhutan

Canada

Finland

Germany

(Zebisch et al., 2005)

(Riedel, 2004)

(McMichael et al., 2003b

(National Environment

Commission et al., 2006)

(Hassi and Rytkonen, 2005)

Componente Salud et al., 2000)

tries. On the one hand, these changes may directly temporal increase in disaster frequency is accounted challenge basic subsistence of already disadvanfor by the hydro-meteorological (or climatic) category. taged communities in the region, thereby further Hence, floods constitute the most prevalent disaster increasing their vulnerability across social, economtype. More than one-third of the world's landmass and ic and institutional settings. On the other hand, 82% of the world's population live in flood prone areas. increasing local vulner-ability could potentially In 2006, floods accounted for 55% of all registered trigger large-scale displacement and migration disasters. Drought is the second most frequent type, from one region to other in search of new avenues threatening about 70% of the world's population.³⁹ for employment and/or settlement. Figure 8: Environmental Destruction, population migration and types of conflict 42

million cases annually, resulting in almost 95,000

fatalities, particularly due to sanitation issues linked

to water quality and quantity. Climate change-trig-

gered malaria outbreaks are estimated to affect over

"The drops in growth and prosperity are like-

ly to be very substantial if climate change

continues unabated and causes greatly inten-

10 million people and kill approximately 55,000.35

Threat to Development

sified climate impacts."36

ronmental refugees from Pacific islands.

ticular populations in northern Canada.

borne encephalitis; impacts on health care.

Increase in heatwave-related deaths; drowning from floods; diar-

rhoeal disease in indigenous communities; potential change in the

geographical range of dengue and malaria; likely increase in envi-

Intensification of malaria and leishmaniasis transmission.

Indigenous populations may be most affected by increases in infec-

Loss of life from frequent flash floods; glacier lake outburst floods;

landslides; hunger and malnutrition; spread of vector-borne dis-

eases into higher elevations; loss of water resources; risk of water-

Increase in heatwave-related deaths; increase in air pollution-

related diseases; spread of vector- and rodent-borne diseases;

increased problems with contamination of both domestic and imported shellfish; increase in allergic disorders; impacts on par-

Small increase in heat-related mortality; changes in phonological

phases and increased risk of allergic disorders; small reduction in

Observed excess deaths from heatwaves; changing ranges in tick-

Key Findings

tious diseases.

borne diseases.

winter mortality.

The International Organization for migration (IOM) defines climate change migrants as persons or groups of persons who, for compelling reasons of sudden or progressive changes in the environment as a result of climate change adversely affect their Climate Change and Security and ensuing migration, will expose many of the weak states to additional pressure to adapt. Weak and fragile states have inadequate capacities to

Venezuela

Afghanistan

Pakistan

China

India

Bangladesh

5

4.9

4.3

2.2

1.4

1.2

1.1

for Development http://www.undp.org/bcpr

Of major flood-affected countries reporting an average of over 200 deaths/year

UNDP has identified Bangladesh to be most vul-

nerable country in the world to tropical cyclones

ource: UNDP (2004), A Global Report: Reducing Disaster Risk: A Challenge

levels of poverty; reliance of many livelihoods on climate sensitive sectors, particularly agriculture and fisheries; and inefficient institutional aspects. Many of the anti-cipated adverse effects of climate change, such as sea level rise, higher temperatures, enhanced monsoon precipitation, and an increase in cyclone intensity, will aggravate the existing stresses that already impede development in Bangladesh, particularly by reducing water and food security and damaging essential infrastructure. These impacts could be extremely detrimental to the economy, the environment, national development, and the people of Bangladesh. However, Box 1: Bangladesh-one of the most climatic vulnerable countries Most vulnerable countries to floods or cyclones (Deaths/100,000 people exposed to floods or cyclones) Floods Tropical Cyclones*

Bangladesh

India

Philippines

Honduras

Vietnam

China

32.1

20.2

8.3

7.3

5.5

2.8

and the sixth most vulnerable country to floods. Bangladesh is frequently cited as one of the most (see box 1) vulnerable countries to climate change because of The human suffering and cost to development is its disadvantageous geographic location; flat and massive to this country and its people. Between lowlying topography; high population density; high 1991 and 2000, 93 major disasters were recorded in Bangladesh, resulting in nearly 200,000 deaths and causing US\$ 5.9 billion in damages with high losses in agriculture and infrastructure. 45 Indeed, the impacts of climate change have added significant stress to our physical and environmental resources, our human ability, and economic activities which ultimately threaten the conditions of human security. The impact of climate change on the national security of Bangladesh has clearly been manifested through a report of New York Times, published on August 8, 2009: An exercise last December at the National Defense University, an educational institute that is overseen by the military, explored the potential impact of a destructive flood in Bangladesh that sent hundreds of thousands of refugees streaming intoneighboring

> might not be able to accommodate such huge uprooted people. Again, 2 degree temperature and 45 cm sea level rise would increase 29 percent risks of flooding of country's low laying areas and may cause permanent inundation of 145 km long coastline⁵¹ It has been estimated that land permanently lost to the sea may amount to 3% and 6% of Bangladesh by the 2030s and 2050s respectively. If sea level rise reaches the 1 metre mark by 2100 over 10% of Bangladesh lies below this height. For this reason, Bangladesh has been ranked as the 3rd

> most vulnerable in the world to sea level rise in

terms of the number of people and in the top ten in

terms of percentage of population living in the low

elevation coastal zone. Therefore the threat of the

communities being forced away due to the effects of

climate change is one of the most severe on earth.

Total population: 112 Million

Total land area: 134,000 km²

Currently almost 40 million live in the coastal

areas of Bangladesh but depending on the rate of

population growth, by 2080 when the situation

begins to get more serious it could be between 51-97

million in this vulnerable area. In 2050 assuming a

sea level rise of 27 cm, around 26 million people will

be at a low risk and almost 7 million will be at

medium risk of flooding, of which 58% of these peo-

ple will be from Khulna, Jhalokati, Barisal and

Bagerhat districts. In 2080 assuming a sea level

rise of 62 cm, 17 million, 12 million and 14 million

people are expected to be at low, medium and high

Climate Change and Security

— The pace of evaporation in winter will increase

- Frequency and intensity of tidal surges will

The main obstacle to intensification of crop produc-

Total cultivated

4,25,490

4,20,420

2,57,270

1,98,890

increase ingression of saline water. 62

Today

Figure 9: Impact of sea level rise on Bangladesh⁵²

soil salinity

Description

Non-saline with

very slightly saline

Very slightly saline

with slightly saline

Slightly saline

saline

with moderately

Moderately saline

with stronglysaline

1.5 m - Impact

Total population affected: 17 Million (15%)

Total land area affected: 22,000 km2 (16%)

17 percent of country's land area i.e. 22135 to 26562

square kilometers, which will make 20 million people

environmental refugee and a country like Bangladesh

Climate Change and Security 11

Natural Disasters Bangladesh experiences frequent natural disasters, which cause loss of life, damage to infrastructure and economic assets, and adversely impacts on lives and livelihoods, especially of poor people. Among the various forms of natural disasters, flood is the most frequent one. Indeed, most part of the country Box 2: Serious floods in the last 25 years

1984 flood Inundated over 50,000sq. km, estimeted damage USS 378 million Inundated over 50,000sq. km, estimeted damage US\$ 1 billion, 1987 flood 2,055 deaths 1988 flood Inundated 61% of the country estimated damage US\$1.2 biliion, More than 45 million homeless, between 2,000-6, 500 deaths Inundated nearly 100,000sq.km rendered 30 million people homeless, damaged 500, 000 homes, heavy loss to infrastructure, estimated damage US\$ 2.8 billion, 1,100 deaths 1998 flood 2004 flood Inundated 38%, damaged US\$ 6.6 bollion, affected nearly 3.8 million people. Estimated damaged over 52 billion, 700 deaths Inundated 32,000sg. km, over 85,000 houses destroyed and almost 2007 flood 1 million damaged, approximately 1.2 million acres of crops destroyed or partially damaged, estimated damage over 51 billion,

Plan, Disaster Management Bureau, Dhaka.

lies in the delta of three of the largest rivers in the

world—the Brahmaputra, the Ganges and the

Meghna. The topography of the country is mostly

low and flat. Two-thirds of the country is less than

5 metres above sea level and is susceptible to river

and rainwater flooding and, in lower lying coastal

areas, to tidal flooding during storms. 47 In an average

Sources: Government of Bangladesh (2005) National Adoptation Programe of Action of, Ministry of

Environment and Forests, Dhaka and Government of Bangladesh (2007) Consolidated

Damaged and Loss Assessment, Lesson Learnt from the Flood 2007 and Future Action

year, approximately one quarter of the country is inundated. However, once in every four to five years, there is a severe flood that may cover over 60% of the country and cause loss of life and substantial damage to infrastructure, housing, agriculture and production.48 In addition to flood tropical cyclone is also very common to the people of the country. On an average, in every three years, a severe tropical cyclone hits Bangladesh. 12 ISSUE BRIEF

risk respectively, of being permanently flooded by

around 33 million of their land by 2050 and up to 43

million of their land by 2080 (Mohal & Hossain,

2007) and this is only taking into account the direct

effect of sea level flooding. If salinity, river gradient

reduction, drainage congestion, erosion and other

indirect effects of sea level rise are taken into

account the almost the entire 51-97 million expect-

ed to be living in the coastal zone by 2080, may

Table 4: Impacts of the rise of sea level on the basic needs of the

Rise in sea level would flood agricultural lowlands and

deltas in parts of Bangladesh leading to decrease in food

production. Only salinity intrusion due to sea level rise

Sea level rise will increase poverty. This may affect the

buying capacity of necessary clothing particularly of the

will reduce 0.2 million metric tons of rice production

have to eventually leave their homes.⁵⁴

people of Bangladesh⁵⁵

Impacts

Indeed, Sea level rise could potentially force

the sea.⁵³

Basic Needs

Food

Clothing

these areas, monga (unemploy-ment leading to seasonal hunger) is often a problem, especially in the months leading up to the November-December rice harvest. If the crop totally fails because of draught, the situation for poor people can become critical. Drought most commonly affects the north-western region, which generally has lower rainfall than the rest of the country. Loss of Agricultural Productivity: A Threat to Food Security With over 35% of people suffering from malnourishment, the threat of increased hunger from reduction in agricultural production suggests the inclusion of agriculture as one of the major vulnerabilities facing the country. There are some

major natural hazards. Although erosion does not

cause loss of lives, but it cause huge economic loss;

makes people asset and rootless. The World

Disaster Report 2001 published by IFRCS, reveals

that in Bangladesh annually 1 million people dis-

placed and 9 thousand heaters of land inundated by

regular natural phenomenon along the belts of out

reach coastal islands like Bhola, Sandwip, Hatia,

Kubdia, which has been turned to massive in the

recent years. The major causes of erosion are

— The Ganges Brahamputra

Meghna (GBM) river system car-

ries immense volume of water silt.

During the monsoon, GBM system

carries about 1.7 billion tons of

silts per year causing severe tur-

bulence the rivers. This results in

gradual undercutting of river-

— During high tide, 30868^m sea

water flows upward through the

cannels of Kutubdia, Sandwip and

Hatia. Again these channels carry

down the upstream fresh waters

from 38,896^m coastal and midland

areas of Bangladesh. The

immense pressure of the down-

wards flows, strong tidal circulation etc. results unprece-dented

By river bank erosion, Hatiya

has reduced from 1000 sq. km to

only 21 sq km over 350 years and

Swandip has lost 180 sq km in the

erosion of coastal habitats.⁵⁶

banks leading to erosion.

observed as:

Since long years, erosion has been becoming a

river erosion.

people from the low-income groups In Bangladesh, 29846 sq. km. area of land will be lost Housing and 14.8 million people will be landless by sea level rise (IPCC, 2001a), even with losses of their dwellings. Extension of the rise of sea level in the coastal areas Health brings increased salinity. Hence, it also increases the risk of cholera. It will accelerate flood intensity facilitating transmission of diarrheal diseases. Education Sea level rise will cause destruction of infrastructures including educational institutes. It may also lead to frequent human migration. This situation is more likely to cause dropout at primary, secondary and tertiary levels. However, sea level rise will affect food and agrilast 100 years. Such erosion adversely affect on the cultural production by increasing, intensity of salinity intrusion in the dry season and the depth of flooding in the wet season from tidal fluctuation. Salinity intrusion will decrease agricultural production by degrading soils and reducing availability of fresh water. Furthermore, seal level rise may increase thr risk of health hazards by spreading communicable diseases (such as diarrhea) due to lack of pure drinking water. In this way sea level rise can become a threat to food and other securities that are determining factors for good living conditions.

ecosystem, navigation, planned agriculture, development and drainage system. It has also affect on inland navigational route as of shifting and migration of channels.⁵⁷ During July to September 2004, a research work on river bank erosion has been conducted in *Bhola* district, which reveals the followings; — 3332 families lost their houses for river erosion — Among the homeless families 48.23% families took shelter beside the embankment, 39.89% took shelter on the river bank and, only 3.48% families had their own land to shift their houses — 21 schools were affected, 7 were abolished com-Territorial loss due to river erosion and sea level pletely and 14 were under constant risk of being rise is an acute national problem and one of the eroded. There is no available resources

lence in the region.⁶⁷

rently expected and coastal polders are not tion in the coastal areas is seasonally high content strengthened and/or new ones built, six to eight of salts in the root zone of the soil. The salts enter million people could be displaced by 2050.64 Indeed, inland through rivers and channels, especially during Bangladesh is particularly vulnerable to the impacts Table 5: Salinity affected areas in the coastal and of climate change and is one of the rare countries in offshore regions of Bangladesh⁶ which natural hazards are the main cause of migra-Saline tion. There are several factors which push people to migrate from one place to another. These include: 1,15,370 • The principal factor that encourages people to (27%)leave their homes in the countryside is the fre-3,09,190 quent recurrence of natural disasters, which undermine agricultural development and cause (73%)food crisis. Not only do environmental hazards 2,40,220 have negative impact on agricultural produc-(93%)tion, but, they also cause important internal migration flows, in the most cases pushing peo-1,98,890 ple in rural areas to move to the urban centres. (100%)• Bangladesh's vulnerability is mainly due to the the later part of the dry (winter) season, when the mix of high population density and low-lying downstream flow of fresh water becomes very low. land. Some estimates predict that by 2050 During this period, the salinity of the river water Bangladesh will have about 15 million environincreases. The salts enter the soil by flooding with mental refugees⁶⁵ saline river water or by seepage from the rivers, • One of the major global impacts of climate and the salts become concentrated in the surface

Territorial Loss

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the magnitude of migration caused by environ-men-

tal influences. Increased river bank erosion, sea

level rise and saline water intrusion in the coastal

areas are likely to displace hundreds of people. It is

estimated that if sea level rise is higher than cur-

change will be sea level rise. It is a slow but

steady and irreversible process which makes it

particularly hard to adapt to. Hence migration

seems to be the only adequate response for larg-

er number of the population. The UNDP

(2007:100) predicts that 11 percent of the popu-

lation of the country will be directly threatened

• Riverbank erosion is another significant factor

which causes migration of the large number of

people. It has been revealed from a study that

between 1982 and 1992, 730,000people dis-

Many of the displaced move inland, which lead to

instability as the resettled population competes for

already scarce resources with the older inhabitants.

Others seek to migrate abroad, which also has the

potentiality to heighten political tension not only in

South Asia but in Europe and Southeast Asia as

well. Indeed, consequences of climate change due to

floods, cyclones etc will create increasing ecological

or environmental refugees in the country, forming

'ecological marginalization'. Barnett (2003) states

that 5.5 million people living on the Ganges delta in

Bangladesh who are likely to be forced to relocate

inland. A rise above one metre, which could be

reached in this century, means Bangladesh could

lose 15 percent to 18 percent of its land area, turn-

ing 30 million people into "environmental refugees"

Vulnerability to Ecosystems

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by 2050.72

by a one meter sea level rise.

placed due to riverbank erosion.⁶⁶

will generate political tension as they traverse the region's many of the contested borders and territories, such as those between China, India, and Pakistan. The combination of deteriorating socioeconomic conditions, rise of radical Islamic political groups, and dire environmental insecurity brought on by climate change can lead to a volatile mix with severe regional and potentially global consequences.68 Risk to Health Security Climate change affects human health both directly and indirectly. People are exposed directly to changing weather patterns (temperature, preci-pitation, sea-level rise and more frequent extreme events) and indirectly through changes in the quality of water, air and food, and changes in ecosystems, agriculture, industry, human settlements and the economy. These direct and indirect exposures can cause death, disability and suffering. Table 6: Incidence of some of the major climate-sensitive

diseases occurring during the last few decades

Total cases

per period

48 302 636

23 697 833

 $1\ 018\ 671$

201 881

19 830

mental degradation;

including floods and cyclone;

Period

1988-2005

1988-1996

1974-2004

1988-1996

1999-2005

Initiate a mass awareness programme to sensi-

tize the public about the impacts of environ-

• Enhancing resilience of urban infrastructure

and industries to impacts of climate change

Average

annual cases

2842273

 $2\ 623\ 092$

33 956

22 431

3305

Diseases

Diarhoea

Malaria

Dengue

Skin disease

Mental disorders

with a 45 cm rise in sea level may seek to move

inland within Bangladesh, but a significant number

may seek to move to neighbouring India and

Pakistan and it should be remembered that previ-

ous migration of this kind has been a factor in vio-

shows the problem more seriously. It says that

about 40 million people of Bangladesh out of 144

million will become environmental refugees due to

1-m sea level rise. Robert Kaplan highlighted that

different environmental problems including sea

level rise will prompt mass migration, and that in

turn, might incite group conflicts. There exists a

long term conflict between Bangladesh and India,

regarding the distribution of water of the Ganges,

influx of refugees and other issues. The victims of

the rise of sea level naturally become environ-men-

tal refugees in India and this may lead to further

political tensions. Indeed, Bangladeshi migrants

A study by the Earth Policy Institute (2004)

Climate change and adaptation information dissemination to vulnerable community for emer-One of the likely adverse impacts of climate change gency preparedness measures and awareness is the loss of the Sundarbans which are the coastal raising on enhanced climatic disasters; man-groves that straddle the coasts of western • Focus should be given on the military response Bangladesh and neighboring India. The Sundarbans to climate security. Hence, military needs to were formed by the deposition of materials from the assess the impact of natural calamities and Ganges, Brahma-putra, and Meghna rivers. If the evaluate their capacity to respond to such crisis. Sundarbans are lost, the habitat for several valu-In this backdrop, the words of Major General able species would also be lost. A 45 cm sea level Muniruzzaman, ndc,psc,(Retd) can be cited: rise would inundate 75% of the Sundarbans, and 67 "Climate change induced impacts will cm sea level rise could inundate all of the system. pose a serious threat to national and Extrapolating from this information, Smith et al. international security. The military will (1998) calculated that a 25 cm sea level rise would need to prepare, train and be ready to face this threat."74

Mainstreaming adaptation to climate change

into policies and programmes in different sec-

tors (focusing on disaster management, water,

Reduction of climate change hazards through

coastal afforestation with community participation;

Development of eco-specific adaptive knowledge

(including indigenous knowledge) on adaptation

to climate variability to enhance adaptive

• Adopt a regional approach to address climate

agriculture, health and industry).;

capacity for future climate change;

change and manage migration.

tives might be fruitful:

vater and make it unsuitable for irrigation.	
Such concentration of salinity causes unfavo	r-
able environment and hydrological situation that	at
restrict the normal crop production throughout th	ıе
vear. However, the impacts of salinity can be depic	t-
ed as follows:	
• Decreases availability/productivity of agricutural land;	ıl-
• Increased food insecurity as naturally-growin species disappear;	ng
• Serious scarcity of safe drinking water;	

Loss of biodiversity, e.g. decrease in tree species

Creates socioeconomic problems, generally

Forced migration provoked by environmental

changes is not a new phenomenon; it is rather a

and freshwater fish;

women will be more vulnerable

Climate- induced Migration

layers through evaporation. The saline river water

may also cause an increase in salinity of the ground

logic consequence of interaction between people and nature. Hence climate change prospects increase Climate Change and Security Climate change and its variability have emerged as a serious challenge to development in general and poverty reduction in particular. Over the last three decades since 1973 over 0.17 million hectares (20.4%) of new land has been salt affected. 70 As per IPCC, average precipitation in Bangladesh is projected to increase in the June-August period by up

to 12.5 percent in the 2020s and 20 percent in the

2050s.⁷¹ This trend of climate change will in turn

affect the food security and agricultural production

from the perspective of temperature variation lead-

ing to change in crop sensitive evapo-transpiration,

soil moisture and change in hydrological regime as

well as salinity intrusion. Besides, climate change

is expected to lead to increases in the potential

transmission of many infectious diseases.

Decreased availability of potable water will be

15

responsible for increased illness and death cases. The impacts of such extreme events on human welfare could be significant. Because, such factors could lead to increased child mortality, reduced maternal health and undermine the nutritional health needed by individuals to attain healthy life for sustained livelihood. Furthermore the cumulative factors will lead to retarding the rate of national economic growth. A recent World Bank Study revealed the fact that about four percent of GDP is eroded by environmental degradation in Bangladesh. Further changes would push the people now living in coastal, flood plains and dry areas

to become climate refugees, vulnerable to extreme

poverty and hunger. However, climate change also

presents serious threat to the infrastructure of the

country. Indeed, the diversity and range of infra-

structures that may be vulnerable to climate

change is enormous. It is making roads, water sup-

plies, sewer systems and buildings more vulnerable

and thereby place human health and safety at risk

water is also causing higher sea levels to push Climate Change and Security on the regional impacts of climate change on water availability. ii. Rural development should be strengthened and reoriented. In view of the anticipated drop in agricultural yields, development cooperation should focus to a greater extent on the development of rural regions. iii. The reform of world agricultural markets should be pursued vigorously in order to

At this juncture of history, it needs to be recognized that environmental crisis has a more pervasive and more political character than any other crisis. For this reason environmental challenges should be placed at the core of security considerations in a rapidly changing world. However, to address the environmental challenges effectively, action should

tioned below:

National Level

and security;

result in a 40% mangrove loss.73

Recommendations and Conclusion

be taken both at the national and international

level. The framework of such action has been men-

• Increase more budgetary allocation for disaster

Pursue appropriate institutional and legal

• Take a consultative approach to the development

• Training on disaster preparedness involving

local institutions/local government;

of national and local policy on climate change

preparedness and rehabilitation activities;

measures Construction of flood shelter, and information and assistance centre to cope with enhanced recurrent floods in major floodplains; Capacity building for integrating climate change in planning, designing of infrastructure, conflict management and landwater zoning for water management institutions;

18 ISSUE BRIEF disasters it causes. Indeed, the unique challenge of climate change requires a unique response which is itself an opportunity for integrating a fragmented international humani-tarian and development system. That endeavour should not only enable us to better combat climate change, but also to reap benefits that will ring true for wide ranging humanitarian challenges of today and tomorrow. — Obayedul Hoque Patwary obayed@bipss.org.bd

International Level It has been appeared from different study that the developing countries will be most vulnerable to the effects of climate change. But such countries lack the means, the know-how and the capacity to effectively deal with this problem. For this reason, it has been argued by different quarters that an international initiative is urgently necessary to tackle this

wide-ranging problem. Hence, the following initia-

• To ensure the constructive participation of the

major stakeholders in the process of decision

making, a multilateral global order should be

formed instead of the current unilateral order.

• With the rise of environmentally induced con-

flicts and the associated security risks, it has

Interviews 1. Major General Muniruzzaman, ndc,psc,(Rtd), President, Bangladesh Institute of Peace and Security Studies(BIPSS) 2. Dr. Mahmud Ali, Senior Editorial Advisor-Asia-Pacific at the BBC World Service, London 3. Rtn. Dr. Dalem Ch. Barman, Professor and Founder Chair, Department of Peace and

Conflict Studies, University of Dhaka.

of people. Immigrants or even simply visitors from a country in which there has been a significant disease outbreak may not be welcomed and could be subject to quarantine restrictions. If the policies that underlie such practices are perceived as discriminatory or motivated by factors other than legitimate health concerns, that would severely damage political relations. Threat to Development been argued that the United Nation and its various organs should play an active role in managing the ensuing problems. Hence, UN should be reformed accordingly. • At the international level, a consensus must be reached on quantifying the ultimate objective of the United Nations Framework Convention on Climate Change (UNFCC) as set out in its Article II. To this end, it is necessary to adapt, as an international standard, of a global temperature guard rail limiting the rise in near-surface air temperature to a maximum of 20 C relative to the pre-industrial value. • For the second commitment period of the Kyoto Protocol, the industrialized countries should adopt ambitious goals of a 30% effective reduction in greenhouse gas emissions by 2020 against the 1990 baseline. · Preventing the natural carbon stocks of terres-

trial ecosystems should be a key goal of future

climate protection policy alongside the reduc-

tion of greenhouse gas emissions from the use of

• In development cooperation, path dependencies

of emission-intensive technologies should be

avoided, and high priority should be granted to

the promotion of sustainable energy systems in

order to overcome energy poverty. To this end,

climate protection must be integrated as a cross-

cutting theme into poverty reduction strategies

• The G8+5 forum should be utilized for the devel-

opment of joint targets for the promotion of cli-

mate-compatible technologies and products.

This group, comprising the world's leading

industrial nations and newly industrializing

countries, represents the heavyweights in the

global political arena and accounts for around

two-thirds of global greenhouse gas emissions.

• Climate change will hit developing countries

fossil fuels.

from the outset.

Melting of the Himalayan Glaciers: A Growing Danger The impact of global warming will hit Bangladesh hard. Soaring global temperatures are increasing glacial melt in the Himalayan ranges, swelling the rivers that flow down from the mountains and across the Bangladeshi floodplain, the largest in the world, far beyond their capacity. The expanding volume of

generate opportunities for market access and production incentives in the developing countries. iv. Development cooperation should develop and implement cross-sectoral strategies for the prevention of disaster risks to a greater extent, focussing especially on emergency planning, adaptation of land-use planning, establishment of clear decision-making structures at an early stage, and the inclusion of disaster prevention in education programmes. Early warning systems should also be embedded in development programmes. Disaster prevention should be taken into

account from the outset in the preparation

of Poverty Reduction Strategy Papers and

in the major poverty reduction programmes.

Global information and early warning system

must be expanded. Indeed both the gradual

changes caused by climate change and the nat-

ural disasters which are expected to occur with

increasing frequency could destabilize the affected regions, and in extreme cases constitute a major risk factor for national and international security. Global information and early warning systems can therefore do much to mitigate these adverse effects and make a major contribution to conflict and crisis prevention. On the one Finally, climate change needs to be seen as an opportunity. The scale of the problem at hand, and the urgency with which we must tackle it, is precisely the opportunity to galvanize calls for reform

Climate Change and Security 19 Notes

hand, these systems should provide timely information and warning in advance of extreme events and crises. On the other hand, the system must provide processed data on expected regional climate impacts, especially for developing countries which lack adequate capacities of their own to model and evaluate these data.

especially hard. However, most developing countries lack the skills and capacities to implement effective adaptation measures. Hence, international cooperation should be provided in the following areas: i. To adapt water resource management to the impacts of climate change, international cooperation on the provision of inforand innovation. We need to question the capacity of mation should be promoted. Inter-national cooperation is vital to facilitate developing the entire system with which we plan to respond to countries access to current scientific data climate change, and the slow and abrupt

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²⁹ http:// www.searo.who.int/Link Files/Regional_Health_Forum_Volume (accessed on 16th August, 2009) 12_No_1_Climate_change_and_its_impact ³⁰ http://www.eird.org/publications/humanimpactreport.pdf (accessed on 11th August, 2009) ³¹ http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4-syr.pdf (accessed on 14th August, 2009) ³² http://www.eird.org/publications/humanimpactreport.pdf (accessed on 11th August, 2009) ³³ Ibid

³⁷ http://www.eird.org/publications/humanimpactreport.pdf (accessed on 11th August, 2009)

³⁸ Nils Peter Gleditch, et al, op.cit, p.10 ³⁹ Ibid ⁴⁰ Ibid 41 www.c40tokyo.jp/en/pdf/session5/di_mallick.pdf (accessed on 17th August, 2009) ⁴² Ashok Swain, 'The Environmental Trap: The Ganges River Diversion, Bangladeshi Migration and Conflicts in India' (Department of Peace and Conflict research, Uppasala University, Sweden, 1996) p.20 ⁴³ Ibid,p.24 ⁴⁴ German Advisory Council on Global Change, op.cit, p.170

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⁵⁴ Ibid Environment and Development, Vol.14, No.2, December 2007 ⁵⁶ Shamsuddoha et al, op.cit, p.21-22 ⁵⁷ Ibid, p.22 ⁵⁸ Ibid, p.22-23 ⁵⁹ Ibid

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