

Mainstreaming Climate Change Adaptation in Agriculture and Water Sectors:

Current Status, Issues and Challenges in the Asia Region

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Presentation outline

- ▶ Climate change impacts
- ▶ Vulnerability of AP region
- ▶ Brief update on what is going on
- ▶ Way forward

The review presented here broadly represents the background paper circulated

In IPCC Words

“Warming of the climate system is **unequivocal**, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level”

Image source: IPCC, 2007, AR 4

Impact: Global temperatures

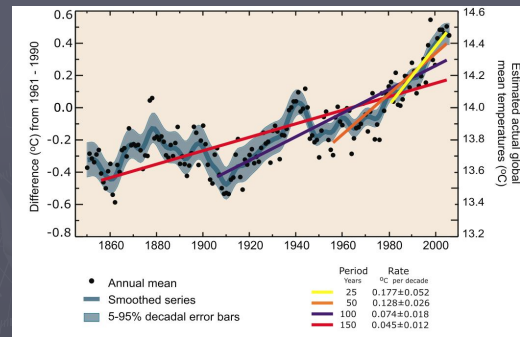


Image source: IPCC, 2007, AR 4

Impact: Sea level rise

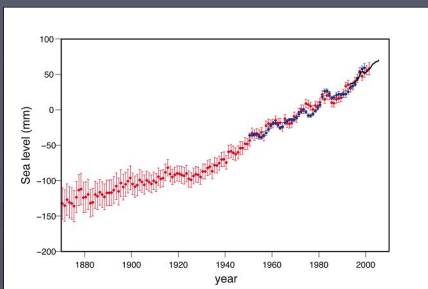
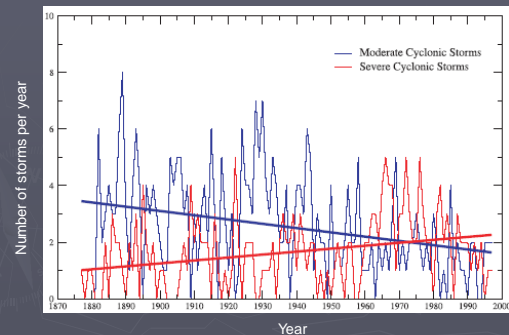


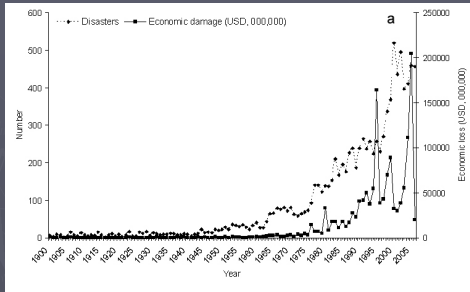
Image source: IPCC, 2007, AR 4

Impact: Natural disasters

Observed cyclonic storms in Indian ocean



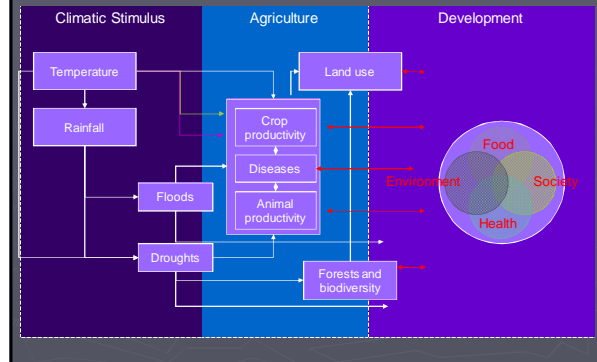
Impact: Global Trend of Hydro-met Disasters*



*Includes droughts, floods, cyclones, tornadoes

Data source: EM-DAT, 2007

The Impact Pathway of CC

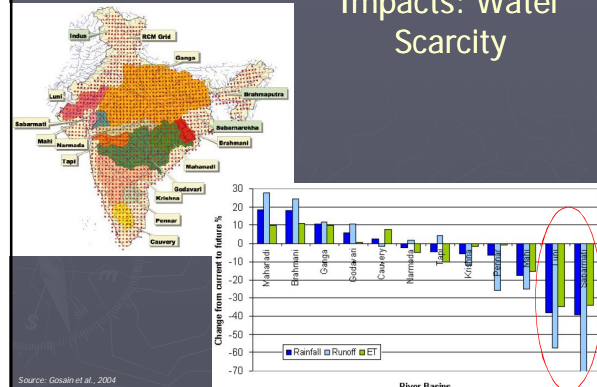


Some projected impacts on agriculture and water sectors in AP Region

- ▶ **Crop yields** could increase up to 20% in East and South-East Asia while they could decrease up to 30% in Central and South Asia by the mid-21st century. Along with population growth, the risk of hunger is projected to remain very high in several developing countries.
- ▶ **Pressure on natural resources** and the environment associated with rapid urbanization, industrialization, and economic development.
- ▶ **Glacier melt** in the Himalayas is projected to increase followed by decreased river flows as the glaciers recede.
- ▶ **Freshwater availability** in Central, South, East and South-East Asia, particularly in large river basins, is projected to decrease which, along with population growth and increasing demand arising from higher standards of living, could adversely affect more than a billion people by the 2050s.
- ▶ Coastal areas, especially heavily-populated mega delta regions in South, East and South-East Asia, will be at greatest risk due to **increased flooding** from the sea and, in some mega deltas, flooding from the rivers.

Source: IPCC, 2007

Impacts: Water Scarcity



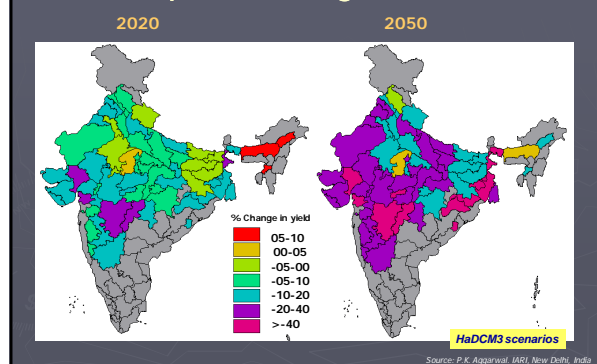
Source: Gosain et al., 2004

Impacts: Water Scarcity

- ▶ **China:** The Haihe-Luanhe River basin will face water scarcity, followed by Huaihe River basin and Yellow River basin. Northern arid provinces are most important.¹
- ▶ **Mekong:** Upper Mekong (Yunnan Province of China), Korat Plateau and Southern Lowland will experience further reduction in rainfall and runoff + water demand due to agriculture and population growth.²

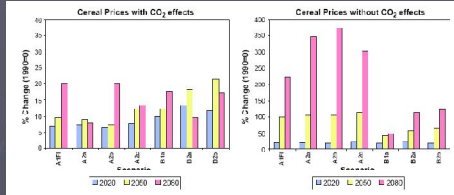
Source: 1. China Nat. CC Prog., People's Republic of China, 2007.
2. Chivorn, S. Reg Conf on Digital GMS, 2003

Impacts on Agriculture



HaDCM3 scenarios
Source: P.K. Aggarwal, IARI, New Delhi, India

Impacts on Food Prices



Changes in global cereal prices under seven SRES scenarios with and without CO2 effects, relative to the reference scenario (no climate change).

Source: M.L. Parry et al., 2004. Global Environmental Change 14:53-67

Vulnerability: High dependence on agriculture

Region	Economically active population in agriculture (%)
World	44
Latin America and Caribbean	19
E & N Africa	33
Sub-Saharan Africa	62
Developed market economies	3
Countries in transition	15

Table source: FAO, State of food & agriculture 2003-04

Vulnerability: Rural Poverty in Asia

Country/Year	Distribution of Poor	
	Rural	Urban
Southeast Asia		
Indonesia, 1990		16.6
Laos, 1992/93		12.2
Malaysia, 1987		14.0
Thailand, 1992		15.3
Viet Nam, 1992/93		10.9
East Asia		
China, 1990		1.1
Philippines, 1995		57.0
Southern Asia		
Bangladesh, 1995/96		42.2
India, 1994		13.8
Pakistan, 1995/96		6.0
Poland, 1990/91		25.0
Central Asia		
Kazakhstan, 1996		43.0
Kyrgyzstan, 1996		40.2
Other		
Upper Middle Income, 1996		5.8
Average	80%	22%

Table source: Assessment of rural poverty in Asia and the Pacific. IFAD, 2002

Vulnerability: Water Scarcity

- The drought-prone countries in this region are Afghanistan, Iran, Myanmar, Pakistan, Nepal, India, China, Sri Lanka and parts of Bangladesh, Philippines, Thailand, Australia and the Pacific islands of Fiji, Vanuatu and Samoa.
- The majority of the estimated **500 million rural poor in the Asia-Pacific region** are subsistence farmers occupying mainly rain-fed land.

Source: ESCAP, 2004. State of the Environment

Vulnerability: Poor Progress in MDGs

Goals and targets	Africa		Asia			
	Northern	Sub-Saharan	Eastern	South-Eastern	Eastern	Western
GOAL 1 Eradicate extreme poverty and hunger						
Reduce extreme poverty by half	low poverty	very high hunger	moderate poverty	moderate poverty	very high poverty	low poverty
Reduce hunger by half	very low hunger	very high hunger	moderate hunger	moderate hunger	high hunger	moderate hunger
GOAL 2 Achieve universal primary education						
Universal primary schooling	high enrolment	low enrolment	high enrolment	high enrolment	high enrolment	moderate enrolment
GOAL 3 Promote gender equality and empower women						
Equal split of unpaid work in primary school	close to parity	almost close to parity	close to parity	close to parity	close to parity	almost close to parity
Women's share of paid employment	low share	moderate share	high share	moderate share	low share	low share
Women's equal representation in national parliaments	very low representation	low representation	moderate representation	low representation	high representation	very low representation
GOAL 4 Reduce child mortality						
Reduce mortality of under-five year olds by two thirds	moderate mortality	moderate mortality	high mortality	moderate mortality	high mortality	moderate mortality
Reduce infant mortality	high coverage	low coverage	moderate coverage	moderate coverage	low coverage	moderate coverage

Legend:

- Target already met or very close to being met.
- Target is expected to be met by 2015 if prevailing trends persist, or the problem that this target is designed to address is not a serious concern in the region.
- Target is not expected to be met by 2015, if prevailing trends persist.
- No progress, or a deterioration or reversal.
- Insufficient data.

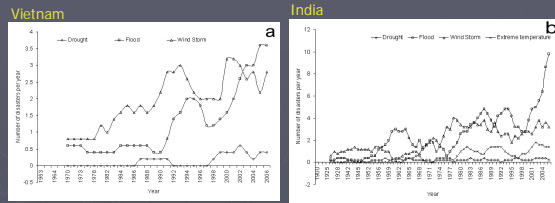
Image source: UN Millennium Development Goals: 2006 progress chart

MDGs cont...

Goals and targets	Africa		Asia			
	Northern	Sub-Saharan	Eastern	South-Eastern	Southern	Western
GOAL 5 Improve maternal health						
Reduce maternal mortality by three quarters*	moderate mortality	very high mortality	low mortality	high mortality	very high mortality	moderate mortality
GOAL 6 Combat HIV/AIDS, malaria and other diseases						
Half and reverse spread of HIV/AIDS	—	very high prevalence	low prevalence	moderate prevalence	moderate prevalence	—
Half and reverse spread of malaria**	low risk	high risk	moderate risk	extreme risk	extreme risk	low risk
Half and reverse spread of tuberculosis	low mortality	high mortality	moderate mortality	moderate mortality	moderate mortality	low mortality
GOAL 7 Ensure environmental sustainability						
Reverse loss of forests**	low forest cover	medium forest cover	high forest cover	high forest cover	medium forest cover	low forest cover
Reduce population without improved drinking water	high coverage	low coverage	moderate coverage	moderate coverage	moderate coverage	high coverage
Reduce population without sanitation	moderate coverage	very low coverage	very low coverage	low coverage	very low coverage	moderate coverage
Improve the lives of slum dwellers	moderate progress	very high progress of slum dwellers	high progress of slum dwellers	moderate progress of slum dwellers	very high progress of slum dwellers	high progress of slum dwellers
GOAL 8 Develop a global partnership for development						
Public expenditure	very high public expenditure	moderate public expenditure	low public expenditure	moderate public expenditure	low public expenditure	high public expenditure
Internet users	moderate access	low access	moderate access	moderate access	low access	moderate access

Image source: UN Millennium Development Goals: 2006 progress chart

Hydro-Met Disaster Vulnerability

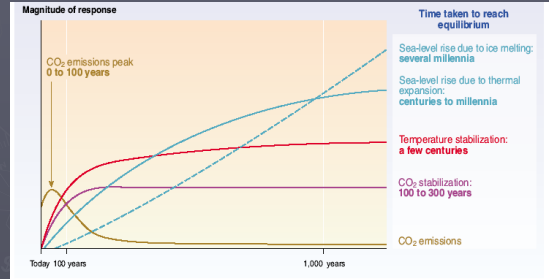


Data source: EM-DAT, 2007

- "The vulnerabilities of people due to the developmental path chosen is a major cause of concern, while the role of climate change cannot be ruled out behind the increasing disasters"
- The Asia - Pacific region accounted for 91% of the world's total deaths and 49% of the world's total damage due to natural disasters in the last century.

Munich-Re, 2006

Hence, Adaptation is Important



Source: IPCC, 2007

What have we been Doing? A Brief Update

Agriculture

- ▶ Some of the countries have already initiated vulnerability assessments with respect to climate change.
- ▶ These vulnerability assessments consisted of identifying and analyzing the impact of climate change and variability on natural eco-systems, socio-economic systems, and human health.
- ▶ Some assessments also considered the institutional and financial capacities of the local communities, assessing the spontaneous and planned adaptation measures already taken up, and developing technical, institutional and financial strategies to reduce vulnerabilities.

Agriculture...

- ▶ Major adaptation initiatives being taken up by the countries in Asia Pacific region could broadly be grouped into the following
 - **Development of crop varieties** that are tolerant to perceived threats that includes droughts, pests and diseases (Australia, India, Indonesia, Malaysia, Vietnam)
 - **Expanding area under irrigation** and efforts for better water management including watershed management practices (Australia, Bangladesh, China, India, Indonesia, Malaysia, Russia, Vietnam)
 - **Improving weather forecasts** and linking with farm decision making (Australia and India)
 - **Drought monitoring systems** are being put in place though do not completely cover the entire country or are in inception stage (China, India, Vietnam, Australia)
 - **Investment in rural infrastructure** that promotes access to markets that in turn enhances the resilience of rural communities which is more relevant for the developing countries in the region (India, China, Sri Lanka)

Source: From different sources

Water Scarcity

Country	Significant initiatives
Bangladesh	<ul style="list-style-type: none"> • National level comprehensive disaster management initiative that encompasses drought as a theme which in turn brings together various stakeholders • Promotion of groundwater use in Barind region • Development of appropriate land and crop management practices to reduce the drought risk
China	<ul style="list-style-type: none"> • Drought monitoring using ground based observatories and remote sensing • Drought risk zoning classification in place • Massive plantations being planned and implemented to stabilize the desertification process
India	<ul style="list-style-type: none"> • National crop weather watch group that monitors drought during monsoon season • Integrated watershed development projects being taken up in drought prone areas • Desert development program (DDP) has been implemented in areas prone to desertification
Indonesia	<ul style="list-style-type: none"> • Integrated water resource management in Citarum river basin, climate field schools, SRI
Vietnam	<ul style="list-style-type: none"> • Laws and decrees exist that provides for drought and water management • Peoples participation in water resource management • Development of water resource monitoring network • International cooperation in water resource management • Establishment of Mekong River Commission
Australia	<ul style="list-style-type: none"> • Drought relief payment system put in place for the affected farmers • National water initiative by Australian Water Fund • Water proofing projects, water strategies at state level, improving water use efficiency in various water-dependent sectors, emphasis on water recycling, water conservation measures are in place

Source: From different sources

Other Vulnerability Reduction Initiatives

Country	Land and rural development initiatives
Bangladesh	<ul style="list-style-type: none"> • Livestock enterprise development • Microfinance through self help groups
China	<ul style="list-style-type: none"> • Legal changes that would give farmers long-term security on the land (to provide tenure security)
India	<ul style="list-style-type: none"> • Secure drinking water supply • Wage employment, employment assurance, food for work, rural housing, social security programs, land reforms etc • Watershed development programs such as Drought Prone Areas Program (DPAP) and Desert Development Program (DDP)
Indonesia	<ul style="list-style-type: none"> • Food security enhancement program
Vietnam	<ul style="list-style-type: none"> • Agricultural diversification • Strengthening the agriculture extension programs • Ongoing efforts to improve access to rural water supply and sanitation
Sri Lanka	<ul style="list-style-type: none"> • Significant investment in natural resource management

Two Approaches to Climate Decision Making

- ▶ Decision making based on the past climate
 - Assumes general development programs would suffice to take care of climate change
 - Most followed ideology
 - Many national communications generally list developmental programs in the place of adaptation initiatives

Two Approaches to Climate Decision Making...

- ▶ Decisions those are valid for the future, based on future climate forecasts
 - Less information
 - No dependable climate forecasts
 - ▶ Time scales (near and far)
 - ▶ Spatial scale (AR4: ~110 sqkm, AR3: 180 sqkm; FAR: 500sqkm)
 - Less understanding on the climate system
 - ▶ Complex ocean and atmospheric interaction
 - ▶ Solar and lunar influence

Way Forward

Way forward

- ▶ **Integrated river basin management** should be given more thrust than they are being given at the moment.
- ▶ **Demand side management** of natural resources is another issue needs more consideration.
- ▶ A prudent **water sharing mechanism** between various water using sectors is an absolute necessity for the countries in the region (complete water balance).
- ▶ There is a clear linkage between coping capacity and land tenure arrangement. Countries in the region enhance the process of streamlining **land tenure arrangements**.

Way forward

- ▶ There is a need for **enhancing the coordination between various institutions** and governments at the local, national and regional levels.
- ▶ **regional cooperation** could be identified in the areas of drought and desertification monitoring.
- ▶ Relevant **weather and climate forecasts** that help the end-users to take decisions with more confidence by improving the consistency, quality and value of the forecasts.
- ▶ The potential of **resource conserving technologies** such as zero and reduced tillage may be explored in the region as they conserve the soil moisture and reduce the off-farm inputs considerably.

Way forward

- ▶ Enhancing the **capacities of local governments** and communities is important for achieving resilience to climate change.
- ▶ **Community based planning** can enable governments to gain better understanding on the vulnerabilities of the communities.
- ▶ A **shift from ad-hoc measures to planned relief interventions** that aims at creating longer-term livelihood options is an important thing to be considered for better vulnerability reduction.

Way Forward: Some requisites

- ▶ Mainstreaming climate change adaptation concerns in developmental planning
 - Strategic thinking: Short term goals vs longer term problem
 - Validity of current actions in future
 - ▶ Identification of win-win strategies
 - ▶ Act where hints are clear and keep on watch where hints are not clear
 - Reducing the uncertainty: Understanding climate system for dependable climate forecast
 - Climate Vulnerability Impact Assessment of projects and programs on the lines of EIA
- ▶ Developing capacities for decision making under uncertainty: Climate integrated decision making, climate task groups (CTGs)
- ▶ Low carbon agriculture for adaptation

Way Forward: climate regime can help progress adaptation in agriculture and water sectors

- ▶ Identify agriculture and water sectors as priority areas for investment of global adaptation funds
- ▶ New and innovative financing adaptation: Soil carbon sequestration credits can help fund adaptation
- ▶ Facilitate agro-technology transfer from haves to have-nots

Thank You!

"Today's problem cannot be solved if we still think the way we thought when we created them"

-Albert Einstein

Thank You

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Sustainable development: A new development path

- ▶ "Many present development trends leave increasing numbers of people poor and vulnerable, while at the same time degrading the environment. How can such development serve next century's world of twice as many people relying on the same environment? This realization broadened our view of development. We came to see it not in its restricted context of economic growth in developing countries. We came to see that a new development path was required, one that sustained human progress not just in few places for a few years, but for the entire planet into the distant future."

Sustainable development

- ▶ 'Development which meets the needs of the present without compromising the ability of future generations to meet their own needs.'