CHALCHIUHTLICUE

Diosa de los rios, lagos y mares
Goddess of the rivers, lakes and sea
The Dynamics of Water and Growth: Issues and Political Reflections

Chair: Katherine Sierra, Vice President, The World Bank
Presenter: David Grey, Senior Water Advisor, The World Bank
Panelists: H.E. Mohamed El Yazghi; Minister of Land Management, Water and Environment, Government of Morocco
          Jerson Kelman, Director General, National Electric Energy Agency, Brazil
          H.E. Maria Mutagamba, State Minister for Water, Government of Uganda
          Suresh Prabhu, Member of Parliament, Government of India
          Achim Steiner, Director General, World Conservation Union (IUCN)
Moderator: John Briscoe, Country Director for Brazil, The World Bank
Fourth World Water Forum, Mexico City
March 17, 2006

Water for Responsible Growth & Sustainable Development

David Grey & Claudia Sadoff
The World Bank
Outline

1. Water & Growth: Destructive & Productive


4. Summary
Water: both destructive & productive

As a source of destruction, poverty & dispute

As a source of production, growth & cooperation
• Drought
• Flood & inundation
• Landslide
• Desertification
• Contamination
• Epidemic & disease
• Dispute, even conflict

Reuters, Feb. 20, 2006
“Approximately 11 million people are threatened by starvation in Djibouti, Ethiopia, Kenya, Somalia and Tanzania... Rain is unlikely before April”
• Drought
• **Flood & inundation**
• Landslide
• Desertification
• Contamination
• Epidemic & disease
• Dispute, even conflict

UN News Centre, March 9, 2006

“More than 1,000 Bolivian families affected by flooding need immediate food assistance... 23 persons have died.”
Water: a source of destruction & poverty, & dispute

- Drought
- Flood & inundation
- Landslide
- Desertification
- Contamination
- Epidemic & disease
- Dispute, even conflict

BBC, Feb. 17, 2006
Philippines: Guinsaugon landslide
140 bodies recovered, 972 missing
35 metres of mud above school… result of heavy rains
Water: a source of destruction & poverty, & dispute

- Drought
- Flood & inundation
- Landslide
- **Desertification**
- Contamination
- Epidemic & disease
- Dispute, even conflict

2006: International Year of Deserts and Desertification

Each year, desertification & drought cause an estimated $42bn in lost agricultural production
Water: a source of destruction & poverty, & dispute

- Drought
- Flood & inundation
- Landslide
- Desertification
- Contamination
- Epidemic & disease
- Dispute, even conflict

Nov. 13, 2005 - Chemical Spill
Songhua River, China
“Suspended Water Supply to 3.4M .... Benzene levels were 108 times above national safety levels” – China’s EPA
People’s Daily, March 11, 2006
Malawi Cholera Outbreak
"we have cholera outbreaks every year during the rainy season" - Habib Somanje, Preventive Health Services. 46 people have died from the recorded 3,852 cases.

Water: a source of destruction & poverty, & dispute

- Drought
- Flood & inundation
- Landslide
- Desertification
- Contamination
- Epidemic & disease
- Dispute, even conflict
Water: a source of destruction & poverty, & dispute

- Drought
- Flood & inundation
- Landslide
- Desertification
- Contamination
- Epidemic & disease
- Dispute, even conflict

The Daily Monitor, Feb. 7, 2006
“The death toll from the drought was also swelling from an upsurge in fighting between nomadic cattle-herders over scant water & grazing resources ... March could see many more killed” Oxfam, Kenya
Water: a Source of Production & Growth, & Cooperation

- Healthy people
- Healthy ecosystems
- Food production
- Energy production
- Navigation
- Cultural Value
- Cooperation
### Water: a Source of Production & Growth, & Cooperation

- Healthy people
- **Healthy ecosystems**
- Food production
- Energy production
- Navigation
- Cultural Value
- Cooperation

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#### IUCN Est. Value - Luang Marsh, Laos

<table>
<thead>
<tr>
<th>Type of Use/Benefit</th>
<th>Annual Value (US$/yr)</th>
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<tbody>
<tr>
<td>Direct</td>
<td></td>
</tr>
<tr>
<td>Rice cultivation</td>
<td>350,000</td>
</tr>
<tr>
<td>Vegetable gardens</td>
<td>55,000</td>
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<tr>
<td>Aquaculture</td>
<td>180,000</td>
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<tr>
<td>Capture fisheries</td>
<td>1,100,000</td>
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<tr>
<td>Non-fish wetlands</td>
<td>350,000</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>2,035,000</strong></td>
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<tr>
<td>Indirect</td>
<td></td>
</tr>
<tr>
<td>Flood protection</td>
<td>2,800,000</td>
</tr>
<tr>
<td>Wastewater purification</td>
<td>71,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,871,000</strong></td>
</tr>
</tbody>
</table>
• Healthy people
• Healthy ecosystems
• Food production
• Energy production
• Navigation
• Cultural Value
• Cooperation
Water: a source of production & growth, & cooperation

- Healthy people
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- Energy production
- Navigation
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Erie Canal Benefits
New Yorks’ Gift to the Nation!

• Costs for shipping one ton of cargo: Buffalo – New York (1925) down by 95%
• N.Y. became US largest exporter (x4)

Water: a source of production & growth, & cooperation

• Healthy people
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Water: a source of production & growth, & cooperation

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**Buddhism** – Used in Funerals

**Christianity** – The Spirit of God

**Hinduism** - Seven Sacred Rivers

**Islam** - Purification

**Judaism** - Purification

**Shinto** - Waterfalls are Sacred

- Healthy people
- Healthy ecosystems
- Food production
- Energy production
- Navigation
- Cultural Value
- Cooperation

Water: a source of production & growth, & cooperation
Mubarak, Ethiopian PM discuss joint Nile River projects  AFP 17 April 2005

“Egypt's President Hosni Mubarak and Ethiopian Prime Minister Meles Zenawi on Sunday discussed joint projects to allow their respective countries to benefit from the waters of the Nile River”
Outline

1. **Water & Growth**: Destructive & Productive

2. **Water Security and the Minimum Platform**: Water Institutions & Infrastructure

3. **Water & Responsible Growth**: Needs, Values and Perceptions & Alternative Paths

4. **Summary**
‘Water security’: reflects water’s unique dichotomy

- As a source of destruction, poverty & dispute
- As a source of production, health, growth & cooperation

‘Water Security’:
- Acceptable level of risk to society of unpredictable water-related impacts and...
- …reliable availability of an acceptable quantity & quality of water for production, livelihoods & health

Both destructive & productive
What we think we’re seeing……

Water Security & the Minimum Platform

Too little water, too much water, highly variable/unpredictable rainfall are ‘difficult hydrologies’

Achieving water security with ‘difficult hydrology’ is complex & costly

Many poor countries have ‘difficult hydrologies’ & have not achieved water security

Most rich countries have ‘easy hydrologies’ & have achieved water security

Increasingly “difficult hydrology”

Increasing wealth

Increasingly “difficult hydrology”

“Analysis of global data sets reveals a statistically significant relationship between greater rainfall variability & lower per capita GDP.”

Brown & Lall (2006)
‘Water Security’:
Acceptable level of risk to society of unpredictable water-related impacts AND reliable availability of an acceptable quantity & quality of water for production, livelihoods & health

‘Minimum Platform’ of Water Infrastructure & Institutions = Investment needed to achieve ‘Water Security’

Water Security & the Minimum Platform

Investments in water infrastructure & institutions

‘Water Secure’ +

‘Water Insecure’ -

‘Tipping Point’
Water Security & the Minimum Platform

Country 1
“low variability”

Water Secure

Country 2
“high variability”

Water Insecure

deeper hole

greater gains

Water & growth – an “S” Curve

‘Minimum Platform’ of Infrastructure & Institutions needed to achieve ‘Water Security’
Water infrastructure & institutions: the debate

- OPPOSING VIEWS?
  - Key is to invest in small-scale water infrastructure
  - Key is to invest in large-scale water infrastructure
  - Key is to invest in water management

- OR
  - Key is to blend all three, reflecting needs & situation

- OUR VIEW:
  - Fighting poverty needs the full range of investment options, selected & implemented responsibly…
The case of variability & storage

- Achieving water security with high rainfall/runoff variability requires water storage & regulation
- Water storage can be natural (aquifers, lakes, wetlands), small or large
- Water storage can be artificial (aquifer storage & recovery, dams & reservoirs), small or large
- Industrial countries are water secure & have invested in what they need (small/large, natural/artificial)

- **OUR VIEW:**
  - Fighting poverty needs the full range of water storage options, selected & implemented responsibly
Water Security & the Minimum Platform

3 Scenarios

- **Developing economies**: hostage to hydrology
- **Intermediate economies**: hampered by hydrology
- **Industrial economies**: harnessed hydrology

Kenya: destructive impacts of water

10/97–2/98 Flood: infrastructure damage
10/98 – 5/00 Drought: crop loss, livestock, reduced hydro, etc.

Total cost of climate shocks - $4.8 b

Impact as % GDP/annum ~ 16%
Water Security & the Minimum Platform

3 Scenarios
- **Developing economies:** hostage to hydrology
- **Intermediate economies:** hampered by hydrology
- **Industrial economies:** harnessed hydrology

**Impact of historical levels of variability on 2003-2015 growth projections:**
- 38% decline in avg. GDP growth
- 25% increase in poverty
Water Security & the Minimum Platform

3 Scenarios

- **Developing economies**: hostage to hydrology
- **Intermediate economies**: hampered by hydrology
- **Industrial economies**: harnessed hydrology

Highlighting projects to improve water management and make India’s rural economy less dependent on the monsoon rains, he said: These reforms will bring meaning to economic reforms from the point of view of the Indian people."
3 Scenarios

- **Developing economies**: hostage to hydrology
- **Intermediate economies**: hampered by hydrology
- **Industrial economies**: harnessed hydrology

**Japan Case Study**

(Water Supply System (WSS) coverage **UP**
Morbid/mortality **DOWN**

- **Paddy efficiency**: **UP**
- **Hydropower**: MATURE
  - **Thermal**: **UP**

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**Domestic Water Use (million m³/year)**

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<thead>
<tr>
<th>Year</th>
<th>Domestic Water Use</th>
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<tr>
<td>1918</td>
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<tr>
<td>1920</td>
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**Patients and deaths of waterborne infectious diseases**

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<th>Deaths</th>
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<td>1920</td>
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<td>1988</td>
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**Acreage (hectares)**

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<tr>
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<tbody>
<tr>
<td>1918</td>
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<td>14,000,000</td>
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**Yield (tons)**

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<th>Yield</th>
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Water Security & the Minimum Platform

3 Scenarios

- **Developing economies**: hostage to hydrology
- **Intermediate economies**: hampered by hydrology
- **Industrial economies**: harnessed hydrology

Flood control: investment & flood damage / GDP

Pre 1960 typhoon/flood damage ~5-10% GNP

Major flood control investments

Today, damage <<1% GNP
Water Security & the Minimum Platform

Japan case study: the ‘S Curve’
(Japan Water Forum, December 2005)

1868
MIP 1960-1961
21st Century

Flood Control Special Account Act 1960
Water & sanitation investment
Initial hydropower development
Paddy intensification

Flood disasters
Low WSS coverage
Epidemics
Lack of power
Economic shock

WR legal framework
Full WS coverage
Acceptable flood risk
Changing values
Water security
Outline

1. Water & Growth: Destructive & Productive


4. Summary
Values change with water security…

John W Keys, III, Commissioner
US Bureau of Reclamation, Jan.2006

“The Bureau played a major role in the development of the most impressive water management infrastructure in the world, an infrastructure that is vital to bringing water & power to people of the West. We're very proud of these achievements.”

“But these are new times, & we face new challenges…”

“Our mission has evolved from the construction of dams to management & maintenance. As water management has evolved, today, much of our focus is on improving the safety, security, & efficiency of the facilities we already have, as well as meeting environmental obligations.”
Changing values: giving room to the rivers in the Netherlands

Netherlands Government has voted to:
- remove unnatural obstacles where possible
- restore side channels, and
- lower flood plains

Water & Responsible Growth

- lowering of groynes
- deepening low flow channel
- removing hydraulic obstacles
- lowering flood plains

5 - locally setting back dikes
6 - setting back dikes on a large scale
7 - detention reservoir
8 - reduction lateral inflow
Kuznets Curve & adaptive investment

Environmental & Social Costs

High

Low

No investment

Low

Development Benefits

High

Adaptive Investment

Water & Responsible Growth

Public Participation
Good Governance
Flexible Design
Benefit Sharing
New Technology
Etc....

New Technology

Good Governance

Flexible Design

Benefit Sharing

Public Participation
Responsible growth is growth that embraces both environmental sustainability & social development. (Hamilton & Johnson, 2004)

Reaching consensus on balancing investments in water infrastructure & institutions to achieve responsible growth.
1. Water & Growth: Destructive & Productive


4. Summary
Water Security, Minimum Platform, Investment, Responsible Growth....

- **Water security**: reducing destructive, increasing productive impacts of water
- Achieving **water security** essential for growth & development
- **Minimum platform** of infrastructure & institutions to achieve water security
- All industrial countries above **minimum platform** (often low: a reason for early growth)
- Most poorest countries below **minimum platform** (often high: a reason for constrained growth)
- **Major investment** needed for growth in many poor countries
- **Balanced investment** in water infrastructure & institutions
- **Adaptive investment** to minimize social & environmental costs

**Investment** for responsible growth & poverty reduction
The Dynamics of Water and Growth: Issues and Political Reflections

Good water management is good politics

Headline in Times of India:
“Madhya Pradesh: No power, no roads, no votes”
Some questions for our panel..

What are your political reflections on............

1. The link between water & growth/ development/ poverty reduction?

2. The priority investment needs in water infrastructure & water institutions, & the balance between them?

3. The institutional & governance challenges for sound development and operation of water infrastructure?

4. Managing / minimizing/ mitigating the social & environmental costs of water infrastructure development?

5. The major political challenges in ensuring the effective management & development of water resources?
END

• DUPLICATE SLIDES IN CASE ANIMATION DOESN’T WORK…
Needs, Values and Perceptions

“The Bureau played a major role in the development of the most impressive water management infrastructure in the world, an infrastructure that is vital to bringing water & power to people of the West. We're very proud of these achievements. “

“But these are new times, & we face new challenges..

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John W Keys, III, Commissioner
USBR, Jan.2006
Alternative Paths

Environmental & Social Costs

High

Low

Historical Investments

No investment

Water & Responsible Growth

Development Benefits
Alternative Paths

Water & Responsible Growth

Environmental & Social Costs

Low

Development Benefits

High

Low

No investment

Adaptive Investment

Low

High
Alternative Paths

Environmental & Social Costs

Low

No investment

High

Adaptive Investment

Development Benefits

Water & Responsible Growth

Public Participation
Good Governance
Flexible Design
Benefit Sharing
New Technology
Etc....

Low

High