World Water Council
3rd World Water Forum

• P R E S S R E L E A S E •

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Number of Killer Storms & Droughts Increasing Worldwide

(William Cosgrove, Vice-President of the World Water Council, will be available for interviews in London on Thursday, Feb. 27th.)

Economic losses from weather and flood catastrophes have increased ten-fold over the past 50 years, partially the result of rapid climate changes, the World Water Council (WWC) says.

These rapid climate changes are seen in more intense rainy seasons, longer dry seasons, stronger storms, shifts in rainfall and rising sea levels. More disastrous floods and droughts have been the most visible manifestation of these changes.

From 1971 to 1995, floods affected more than 1.5 billion people worldwide, or 100 million people per year, according to experts. This total includes 318,000 killed and more than 81 million left homeless. Major floods that left at least 1,000 people dead and caused $1 billion in damages per episode have been the most destructive.

“Extreme weather records are being broken every year and the resulting hydro-meteorological disasters claim thousands of lives and disrupt national economies,” says William Cosgrove, Vice-President of the World Water Council. “The big problem is that most countries aren't ready to deal adequately with the severe natural disasters that we get now, a situation that will become much worse as storms and droughts become more pervasive. Ignoring the problem is no longer an option.”

According to climate experts, the expected climatic change during the 21st century will further intensify the hydrological cycle – with rainy seasons becoming shorter and more intense in some

regions, while droughts in other areas will grow longer in duration, which could endanger species and crops and lead to drops in food production globally. Evidence of the link between climate change and increasing climate variability is mounting rapidly. For example, scientific research has linked the recent droughts in the USA and Afghanistan to the effects of global warming.

"Devastating floods seem to be getting worse," says Hideaki Oda, Director of the secretariat of the **3rd World Water Forum**. "In 2002, many floods ravaged parts of the world, especially in Asia and Europe. More than 4,200 people in the world died as a result of flooding, and more than 16 million people have been affected by floods in the last year."

The United Nations estimates that by 2025 half the world's population will be living in areas that are at risk from storms and other weather extremes.

"The fact is that the poor are not only the most vulnerable to the impacts of climate variability and change on water resources, but those with the least capacity to cope with such impacts," says Ryutaro Hashimoto, former Prime Minister of Japan and Chairman, National Steering Committee of the **3rd World Water Forum**. "We must assist such countries in adopting 'win-win' actions that address directly the more immediate water management problems while preparing for the consequences of longer term climate changes."

Less developed countries with limited economic diversity and poor infrastructure are usually forced to rely mostly on external relief if a disaster happens, but then their economies need more time to recover. In developed economies, governments, communities and individuals have greater capacities to cope with disasters, the economic losses are to some extent absorbed by a diversified economy, and most assets are insured.

An example of this is the1997-98 El Niño, which caused nearly $2 billion in economic losses in the United States, or 0.03 per cent of its gross domestic product (GDP). Ecuador, on the other hand, suffered lower economic losses, but they represented 11.4 percent of its GDP.

The problems of climate and water will be a prime topic of the upcoming **3rd World Water Forum**, where some 10,000 government officials, representatives of international and non-governmental organizations, industry and water experts will discuss the world water crisis and its solutions. The **Forum**, to be held in Kyoto, Japan, March 16-23 of this year, is expected to be the most important

international water conference ever held. The Forum will be the central highlight of the UN's 2003 International Year of Freshwater and World Water Day, March 22.

"**World Water Actions**, the main report that is being prepared for Kyoto, is the next step towards achieving the objectives of the **Vision** for water global security, adopted in at the previous Forum in 2000," says Dr. Mahmoud Abu-Zeid, Egyptian Minister of Water and Irrigation and President of the World Water Council. "It will provide a clear picture of the on-going worldwide activities that are aiming to improve water resources management. When completed and multiplied, these actions can lead to achievement of the World Water Vision."

These natural disasters stemming from climate variability include:

Floods -- Based on data for the period 1950 to 1998, the number of major flood disasters has grown considerably world-wide from decade to decade -- six cases in the 1950s, seven in the 1960s, eight in the 1970s, 18 in the 1980s, and 26 in the 1990s. The number of significant flood disasters in the 1990s was higher than in the three previous decades combined.

Overall, global precipitation is estimated to have increased by about two percent since 1900, though not on a uniform basis. This disparity in new rainfall caused some places to become wetter and others to get drier, such as North Africa south of the Sahara.

In the most calamitous storm surge, the flood in Bangladesh in April 1991 killed 140,000 people. Two floods in China, one in 1996 and the second in 1998, caused the highest material losses of the decade, of the order of $30 billion and $26.5 billion respectively.

Floods also destroy the hard-won economic advances that many people in the developing world have accomplished, such as the Mozambique floods of 2000, which left nearly one million people homeless, and Hurricane Mitch in Central America.

Comparing the economic impacts of the 2000 flood in Mozambique with the 2002 flood in Central Europe clearly illustrates the disparity in how national economies are impacted by extreme events. The cost of damages reflects the income levels of countries. According officials at the World Bank, the Mozambique flood resulted in a 45 percent drop in GDP in 2000, whereas in Germany, the 2002 flood is estimated to have caused less than a one percent drop in GDP.

"Mozambique had been on the road to economic renewal, one of the first African countries to demonstrate its commitment to institutional reforms and to have its overburdening foreign debt forgiven," says HRH Prince of Orange of the Netherlands, Chairperson of the 2nd World Water Forum. "These floods forced Mozambique to rebuild much of its infrastructure – roads, bridges, electric power distribution, clinics and schools – all essential to social development and economic growth. As the cleaning up and rebuilding began, people began asking the question – what can be done to avoid a recurrence of this disaster, or to limit its impact?"

In an awesome display of power and destruction, Hurricane Mitch hit Central America in 1998 with the most deadly Western Hemisphere hurricane in the last two centuries, since the Great Hurricane of 1780, which killed approximately 22,000 people in the eastern Caribbean.

Hurricane Mitch killed 11,000 people, with thousands of others missing. More than three million people were either homeless or severely affected. In this extremely poor region, estimates of the total damage from the storm surpassed $5 billion. The President of Honduras, Carlos Flores Facusse, claimed the storm destroyed 50 years of progress.

As far as the geographic distribution of the worst floods, the majority occurred in Asian countries. However, few nations of the world are free of flood danger, as demonstrated by the unprecedented floods in 2002 in Central Europe. Even countries located in dry areas, such as Yemen, Egypt and Tunisia, have not been flood-safe. It is counter-intuitive, but in dry areas more people die of floods than from lack of water, as the dryness is a normal state to which humans have adapted, while people are unprepared to deal with flood disasters.

Although water-related extremes strike developed and less developed countries alike, their consequences are largely different. In developed nations, material flood losses are growing, while the number of fatalities decreases, which demonstrates that advanced flood preparedness systems can save lives. The ratio of deaths to material losses in developed countries is a high as one fatality for every $400 million in losses, versus one fatality for just $21,000 in developing countries. –This huge disparity comes about because far more people die in floods in developing countries, while at the same time the value of their property is much less by comparison with that of the developed world. This property lost in the developing world usually represents a lifetime of hard work and savings and is almost never covered by insurance.

For millennia, people have settled in floodplains to till fertile soils, to use flat terrain for settlements, have easy access to water and to use the river for transport. Floods are natural phenomena: they have always occurred and people have tried to benefit from them to whatever extent possible. However, in recent decades humans have become more exposed to the risk of floods.

In addition, the impact of floods has had increasingly detrimental and disruptive effects on human health. In flooded areas, some diseases such as diarrhea, which kills 2.2 million children under the age of five per year, or leptospirosis (a systemic infection that can lead to meningitis and hemorrhagic jaundice) spread more rapidly.

Droughts are becoming more severe and widespread, says the World Water Council. Up to 45 percent of reported deaths from natural disasters between 1992 and 2001 resulted from droughts and famines. The most vulnerable communities are impoverished peoples occupying marginal rural and urban environments.

"Natural climate variability has a direct and fundamental bearing on water resources and its management," says Mr. Cosgrove who is also Chair of the International Steering Committee of the Dialogue on Water and Climate. "Small changes in climate variability can be amplified significantly through the hydrological cycle and have major implications for water resource managers. Data on the West African drought of the 1970s and 80s show that a decrease of 25 percent in precipitation translates into a reduction of water flowing into lakes and rivers by 50 percent."

Many countries in Africa have been suffering from unprecedented droughts that may signal widespread climate change.

In Ghana, the Akosombo Reservoir presents a very clear example of the results of climate variability. The Akosombo Reservoir is a huge lake created in 1966 that at one time supplied 95 percent of Ghana's power needs, as well as some power export to neighboring countries. However, reduced inflows into the lake have resulted in the volume of water in the lake being less than 50 percent of its capacity. Among other factors, this reduction is attributable to climate variability and potentially, from long-term climate change.

“The trend continues downward, which has had a very serious impact on the national economy,” says Daniel Adom, Ph.D., Executive Secretary, Ghana Water Resources Commission. “Ghana no longer produces enough hydro-energy for all of its industrial, agricultural and residential needs, which has made energy overall much more expensive and has also led to some rationing. It has also forced the country to develop other energy resources, such as thermal, which is much more expensive.”

Dr. Adom says that this “has had a severe impact on the local economy – price increases in industry and agriculture has been passed on to the population.”

All of this stems from what is happening to the climate. More than 50 percent of the inflows come from tributary rivers from five countries outside Ghana, including Burkina Faso and Mali that border the fringes of the Sahara Desert, where the reduction in rainfall has been quite significant.

This year, rainfall has been poor in the western Sahel in West Africa. Mauritania has been the hardest hit –the third consecutive year of poor rains in many areas. Some 750,000 people are already affected by food shortages, nearly 30 per cent of the country’s population.

Developed countries do not escape droughts. Australia's worst drought in a century brought serious or severe conditions to more than 70 percent of the country by early 2003, which reached a high of 97 percent in the worst hit state of New South Wales, where the lowest rainfall on record was recorded. The drought, which began in March 2002, has devastated crops and livestock and generated serious bush fires in eastern parts of the country. The drought has pushed Australia’s trade deficit to its highest level in more than two years, as agricultural exports faltered.

A direct consequence of drought is crop loss that can, in turn, cause starvation among humans if alternative food sources are not available. Indirectly, water shortage contributes to the proliferation of diseases, without water for hygiene. If a drought persists, people are often forced to migrate.

The expected changes in climate will alter regional agricultural systems, with consequences for food production. If climate change were calculated, the result would be a huge increase in the number of people at risk of hunger by 2080.

Under the best circumstances developing countries will have to increase their cereal imports over the next 15 years to between 170 million tons and 430 million tons. Climate change will add to this dependence, increasing net cereal imports of developing regions by 10–40 percent.

Sea level rise is a concern in coastal and low-lying areas, including small islands. In addition to coastal flooding, saltwater intrusion into freshwater aquifers presents a threat to water supplies. The average global sea level rise from 1990 to the year 2100 is expected to be 0.48 meters (19 inches), between twice and four times the rate of rise over the 20th century. The main effect on humans will be to confront extreme events such as storm surges.

Areas of greatest danger include:

- Small islands in the Pacific – mainly the Atolls
- Coastal low lying countries like Bangladesh and the Netherlands
- Coastal mega-cities like Tokyo, Lagos, Buenos Aires and New York.

Success Stories

It has been estimated that every dollar spent on protection from natural disasters can save from four to ten dollars in relief.

"The potential rewards are high if water managers prepare in advance for severe storms," Mr. Cosgrove says. "There is growing evidence that precautionary designs, disaster preparedness, mitigation measures and adaptation of lifestyles can have a huge impact on both saving lives and preserving economic assets." Some such examples include:

1. The 1991 cyclone and associated storm surge in Bangladesh claimed 140,000 lives. In the 1990s, the government paid attention to disaster preparedness. The result – the death toll in similar cyclones in 2001 and 2002 dropped to less than 200.
2. In four drought-affected states in India, the building and restoration of rainwater harvesting structures has helped an estimated 20,000 villages to grow crops and maintain domestic water supplies.
3. Community-based early warning systems in Guatemala have combined electronic monitoring devices with specially trained volunteers to reduce the death toll and impacts of flooding events in the Coyolate River basin.

4. When Hurricane Michelle hit Cuba in November 2001, effective disaster planning ensured that 700,000 people were evacuated safely, in regions where previously residents had no advance warning.

"Part of the problem for water managers is that there has been little interchange with the climate community," Mr. Cosgrove says. "Because their designs have been based on historic records and their management on hydrological stations, there has not been a perceived need to seek medium and long-term weather forecasts. In fact, meteorologists are getting better at forecasting extreme events with longer warning times."

The Netherlands: Water experts have learned that experience sharing is an important tool for learning. For example, the Netherlands has for centuries followed a policy of maximum defense against water. Water safety is a top priority for Dutch government and it's implementing agencies, the regional water boards.

Recently, because of increasing variations in climate and precipitation and the increasing threats of sea level rise, the Dutch government adopted a policy that allows water more space and which encourages "living with water," spatially and in terms of infrastructures such as housing. In addition, the importance of sharing the responsibility between government, non-government agencies, the private sector and the public is gaining ground.

Bangladesh: Ainun Nishat, Ph.D., Country Representative of the World Conservation Union (IUCN), chaired a group that is producing a paper on climate and water issues in Bangladesh for the 3rd World Water Forum.

"We found that the main threat from climate variability in Bangladesh is to agriculture," says Dr. Nishat. "We have been observing climate patterns of unusual elements, such as no rainfall in parts of Bangladesh during the usual peak monsoon times, or excessive rainfall in other parts of the country, continuing long after the rain was supposed to stop, all extremely unusual where weather patterns are very consistent."

Dr. Nishat adds that Bangladesh's coastal regions are also experiencing more incidents of weather depressions, which bring on more cyclones and storm surges than normal, forcing fishermen to stay in port and damage their livelihood.

“Climate change is predictable, but you can’t plan for climate variability,” Dr. Nishat says. “Sea levels are also expected to rise over the next 50 years, threatening to put 12 percent of all Bangladesh, our low-lying coastal areas where 20 million people live, under water.”

"A coastal polder system will provide some protection against the sea level rise but there would be drainage congestion inside the protected areas unless appropriate structures are constructed,” Dr. Nishat adds. “Further, intrusion of saline from further inland is also of concern."

A consortium of international organizations, including the **World Water Council** and the **3rd World Water Forum**, formed the Dialogue on Water and Climate (DWC) to bridge the information gap between water managers and the climate community. The specific objectives of the DWC are to initiate a political process on water and climate, collect and transfer knowledge and experiences, identify future measures and raise public awareness.

“In many parts of the world, variability in climate conditions, next to many socio-economic and environmental developments, are already having major impacts and such variability is increasing,” says Prof. Pavel Kabat, Technical director of the DWC. “Both present variability and long-term climate change impacts are most severe in the developing world, and particularly affect the poor in these regions.”

Already, the DWC has initiated 18 local, multi-stakeholder dialogues at the national, regional and basin levels. The local dialogues deal with important questions for water managers such as how to address the consequences of climate change and what kinds of knowledge and actions are needed to resolve water problems.

A synthesis report on DWC activities and a policy makers report are being prepared for presentation at the **3rd World Water Forum**. Sessions on water and climate will highlight the challenges and discuss the actions to cope with the impacts. Other important water and climate issues for discussion at the WWF-3 include forecasting, the importance of storage, risk assessments and risk mitigation, health impacts, hot spots and vulnerability, communication and public awareness.

The challenge for water managers is to address the changes in the hydrological cycles by factoring coping measures into sector development policies, strategies and implementation activities. They

should be based upon sound, science and developed in a participatory manner between stakeholders including government, non-government and the private sector.

An important development in the field of adaptive capacity is the gradual shift by disaster relief agencies such as the Red Cross from a reactive response to disasters towards a pro-active and even preventive approach. They seek to prepare and empower vulnerable communities with tools to better cope with extreme events. These disaster preparedness activities include the introduction of forecasting systems for extreme events.

"The increasing incidence of extreme events provides a convincing argument to continue looking into building partnerships between science, water managers and the disaster preparedness communities, including the development and dissemination of capacity development packages and methodologies." says Mr. Cosgrove. "It is telling that disaster reduction has been recognized since 2000 an issue central to poverty reduction."

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