

Ghana Dams Dialogue Newsletter

Contributing towards well-informed decision-making and sustainable planning and management of dams in Ghana

A quarterly publication of the Ghana Dams Forum

Issue 4 - December, 2009

From the Editorial Desk

This is the first quarterly edition of the newsletter for 2010. So, we would like to wish you all a bright and prosperous new year!!

For a start, here is a brief recap of the key events of 2009. It has been a very dramatic year for the National Coordinating Committee (NCC) and the Secretariat. The third phase of the Ghana Dams Dialogue (GDD) was launched in January, with a NCC meeting to commence activities. Since the core committee has not seen many changes in membership they were off to a flying start. In March, the Action Team of the NCC, with the help of the Queen Mother, and closely coordinating with the Volta River Authority (VRA), averted a demonstration by the Ajena-Pese community. The NCC later participated in a community meeting with the regional minister who promised to take up the community grievances. The NCC also welcomed the Bui Power Authority (BPA) on board, who has since been an active member of the group. The good relationship between the different stakeholders across the Dialogue platform was the basis for successful mediation with one of the communities in the Bui Dam flood area, when they refused to move because they were unsure about the resettlement conditions. This was an example of how the different stakeholders, represented on the GDD Forum and the NCC, could use this platform to discuss critical matters in an amicable way.

The GDD facilitated the first meeting of Dam-Affected Communities (DAC), and there was a breakthrough when the 52 resettlement communities of the Akosombo Dam agreed to join forces with downstream communities of Kpong Dam and their less numerous brothers and sisters in the affected areas of Bui.

The driving theme was "strength in unity." The gathering was very colorful and 185 participants were present representing both the community members and the traditional chiefs.

The GDD also hosted the Hydropower Sustainability Assessment Forum (HSAF), conducting meetings with different groups in an attempt to make the Hydropower Sustainability Assessment Protocol (HSAP) more user-friendly and relevant to developing countries. And in culmination, a successful GDD Forum was held at the end of October in spite of regrets from ministries and members who could not attend because unfortunately it coincided with the cabinet budget meetings!! Read more about this in this issue.....

In spite of repeated attempts, regrettably, the NCC could not achieve their objective of paying a courtesy call on His Excellency the Vice President of Ghana. It would, of course, have been even better if a meeting were orchestrated with both the Vice President and the President himself! So, with the expectation that this will happen in the new year, I would like to welcome 2010 in a spirit of optimism. We hope that the good work of the GDD will result in more sustainable use of Ghana's water resources in the future!

Meda mo ase!

Dr. Liqa Raschid-Sally

Project Leader

Ghana Dams Dialogue Newsletter



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Activities in the Fourth Quarter of the Dialogue Process

The National Coordinating Committee held its 8th Meeting

The 8th meeting of the NCC of the GDD was held on Tuesday, September 29, 2009, at the conference room of the International Water Management Institute (IWMI) in Accra, Ghana. A total of 14 members and observers attended the meeting. After confirmation of the minutes of the previous meeting, members were informed of, and discussed, past and upcoming activities of the dialogue process.

The main agenda for the meeting was to plan the Forum meeting to be held in October and to discuss how the HSAP could be strengthened to be more useful for application in a developing country context. The HSAP is an assessment framework of sustainability for hydropower projects. To gain a thorough understanding of the protocol during the consultation process, especially consultation with the DACs, it was agreed that the

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Action Team would select issues of critical importance from the protocol, to be discussed during the consultation (read more on this in the section, HSAF Consultation Process in Ghana). The meeting also considered the theme for the main Forum and settled on "Addressing Livelihood and Institutional Challenges for Sustainable Dam Development in Ghana". Based on this theme, three topics were retained as follows: Institutional challenges; funding challenges; and coping strategies and alternate livelihood options. Therefore, the Action Team of the NCC was provided with the task of identifying institutions and individuals to deliver the presentations and also finalize the format.

Finally, it was suggested that the Vice President of the Republic of Ghana be invited as the Special Guest of Honor for the 3rd Ghana Dams Forum, and that a courtesy call be paid prior to the event to formally introduce the National Dams Dialogue Process and inform him about the consultation processes on the HSAF.

The National Coordinating Committee meets the Press

The Secretariat and the Action Team of the NCC of the GDD met a number of press houses on October 21, 2009. The purpose of the press briefing was to publicize the 3rd Ghana Dams Forum and Hydropower Sustainability Assessment Forum Consultation in Ghana. Dr. E. O. Bekoe chaired the press briefing and Mr. Richard Twum Koranteng gave the keynote address from the Secretariat.

In the keynote address, Mr. Richard Twum Koranteng noted that the GDD seeks to provide a platform for constructive planning around often contentious issues related to hydropower dams. He said that the Forum would bring together various stakeholders in the development of dams in the country and that to date its proceedings had attracted representatives from government ministries, departments and agencies, research organizations and many others.

Torgbe Adom Drayi II, Chairman of the National Association of the 52 Volta River Authority Resettlement Townships (NAVRART-52), expressed regret that, most often, the government delayed resettling people who were displaced as a result of the construction of the dams. He expressed the determination of the Association to collaborate with the GDD to ensure that the needs of the displaced persons in terms of logistics and compensation were met. Finally, he expressed hope that representatives from the government and other stakeholders would attend the HSAF Consultations and the Forum.



Representatives of Press Houses listening to the Chairperson of the Press Briefing.



Participants of the Third Ghana Dams Forum.

Third Ghana Dams Forum

The 3rd Ghana Dams Forum was centered on the theme "Addressing Livelihood and Institutional Challenges for Sustainable Dam Development in Ghana". The theme was selected at the 8th NCC meeting on the basis of the livelihood challenges raised by various DACs, particularly those impacted by the construction of the Bui dam. The Forum was seen as an opportunity to bring these issues to the government's agenda.

The 3rd Ghana Dams Forum was held at the Centre for African Wetlands, University of Ghana, Legon, Ghana, on October 29, 2009. It was attended by 88 participants, including Forum members, observers and invited guests. The Forum was divided into two sessions.

The opening session, which began with a welcome address from the Secretariat of the GDD and a speech from the representative of the Minister for Women and Children's Affairs, was chaired by the Chief of Krachi, Nana Mprah Besemuna III. The Chairman talked about the complexity and the simplicity associated with the construction of dams. He said that the complexity stems from the fact that dam-related issues are not just confined to the design, construction and operation of these infrastructures; but, they also embrace a range of other socioeconomic choices that impact human well-being. In contrast, their simplicity arises from the fact that behind the array of facts and figures lies a number of basic and easily understood principles that, if adhered and applied to, will go a long way to respond to the controversy surrounding dams and improve decision-making on water and energy resources.

The second session was allotted to presentations and discussions on three issues; 'Institutional Challenges' presented by Dr. Liqa Raschid-Sally of the regional office for West Africa of the International Water Management Institute (IWMI) in Accra, Ghana; 'Funding Challenges and Coping Strategies' presented by Mr. Emmanuel Amekor of the VRA, Accra, Ghana; and 'Alternate Livelihood Options' presented by Dr. Rudith King of the Centre for Settlement Studies, Kwame Nkrumah University of Science and Technology (KNUST), Kumasi, Ghana. The session, which was facilitated by Prof. Chris Gordon of the University of Ghana, allowed participants to discuss thoroughly issues that were raised by the presenters.

For proceedings of the Forum, including presentations, visit the Ghana Dams Dialogue website (ghanadamsdialogue.iwmi.org).

HSAF Consultation Process in Ghana

The Hydropower Sustainability Assessment Protocol (HSAP) was developed by the Hydropower Sustainability Assessment Forum (HSAF) in response to the need for broadly agreed-upon hydropower sustainability assessment tools and standards to replace the disparate approaches currently being used at various local, national and regional levels. The Forum, a cross-sectoral group that has been in existence over a two-year period (from March 2008 to February 2010), has been developing these guidelines on the basis of the existing International Hydropower Association (IHA) Sustainability Assessment Protocol (2006). The first phase of the process ended with the drafting of the HSAP in August 2009. The draft Protocol has been subjected to trials and consultations in different locations between September and November of this year in order to finalize it.

The GDD expressed its interest to host trials and consultations in Ghana with DACs and government ministries, departments and agencies (MDAs). It also proposed to introduce the draft Protocol as one of the topics at the third meeting of the Ghana Dams Forum.

The goal of the consultations was to assist in establishing a broadly endorsed sustainability assessment tool to measure and guide performance in the hydropower sector. They sought to obtain detailed feedback from a diverse group of stakeholders, especially DACs and MDAs on the content and practicability of the draft Protocol. The encounters also served to raise awareness amongst members of the GDD Forum about the protocol to ensure its usefulness and credibility.

Below are the activities that were carried out during the Consultations:

- (i) Consultation with DACs on October 27, 2009, at the conference room of the VRA, Akuse, Ghana. The consultation was attended by 196 participants, including representatives of women's groups and six press houses.
- (ii) Consultation with government ministries, departments and agencies on October 28, 2009, at the conference room of VRA headquarters, Accra, Ghana. The consultation was attended by 27 participants.
- (iii) Consultation with the Ghana Dams Forum on October 30, 2009, was held at the Centre for African Wetlands, University of Ghana, Legon, Ghana. The consultation was attended by 70 participants.

The consultation process sought for clarification on the Protocol and gave the opportunity for members to make contribution.



Participants of HSAF Consultation for Government MDAs.

Different styles were adopted during the three consultations. For the consultation with DACs, for example, the World Café method of consultation was adopted. The World Café allowed participants to discuss issues and exchange experiences from their communities with the other participants. The points were noted and the findings were presented in a plenum by a table host. The consultation with MDAs used ordinary group discussions whilst the consultation with members from the Ghana Dams Forum was done through role-play.

Participants of the consultations with the DACs, in particular, were pleased to have participated in such a discourse, to share their experiences of evacuation as a result of dam construction and to make a contribution to the HSAP, concerning critical issues facing DACs. They were optimistic that their contribution will help improve the situation in subsequent dam development in the country, especially the Bui project.

For proceedings of the consultations, visit the Ghana Dams Dialogue website (ghanadamsdialogue.iwmi.org).

Preparatory Meeting towards Institutional Networking Meeting with IFIs and NFIs

One of the critical issues arising out of the ongoing institutional study, which is in its final phase, is the alienation of the DACs. Thus, the DACs of the Akosombo and Kpong hydropower projects are not properly integrated into the national decentralization plan. Therefore, to design a holistic plan to address the above-mentioned problems, which have led to the under-development of the resettlement townships, it was felt that there was the need to take advantage of the institutional networking component of the Dialogue, with the International Financial Institutions (IFI) and Non-Financial Institutions (NFIs), to sell the idea of building the capacities of not only the DACs but also key decentralized institutions at the various local levels.

In order to properly structure the meeting with the IFIs and NFIs, the Action Team of the NCC of the GDD and Secretariat invited key institutions concerned with this issue (VRA, VRA Resettlement Trust Fund, BPA, Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, and Institute of Local Government Studies) to a preparatory meeting on November 24, 2009 at the conference room of IWMI, Accra, Ghana.

Some of the key issues discussed were the need for a joint proposal in order to attract additional support from other stakeholders including donors; the need for careful and gradual integration of the resettlement townships; and the need for linking up with existing community support initiatives and experts working on capacity building.

Notice Board

Visit ghanadamsdialogue.iwmi.org for all information concerning the group!!!!

Straight Talk with Dr. Benjamin Lamptey



Dr. Benjamin Lamptey

A few words of introduction from you.

My name is Benjamin Lamptey, a Meteorologist/Geoscientist. I am a former employee of the Ghana Meteorological Agency but now I'm a Senior Lecturer at the Regional Maritime University (RMU) in Accra, Ghana. I am also affiliated with the International Water Management Institute (IWMI).

Kindly explain the issue of climate change in the simplest way to a layman.

I will first give the technical definition of climate change. According to the Intergovernmental Panel on Climate Change (IPCC), climate change refers to a statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period (typically decades or longer). The causes of climate change could be natural internal processes or external forcings, or due to persistent anthropogenic changes in the composition of the atmosphere or in land use.

The United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as: "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods."

To the layman: Climate change is a change in the climate that is altering the baseline against which future actions are gauged. Our institutions and infrastructure presume that the past is a reasonable surrogate for the future. For example, during the design of reservoirs, historic rainfall patterns are assumed to provide a good indication of the range of future patterns. A farmer plants knowing that, at times, weather conditions will cause a crop to fail, but with the expectation – based on past climate patterns – that the crop will succeed, in most years.

What has been the role(s) [education, knowledge sharing, research, etc.] of your organization in climate change issues in Ghana?

My organization, the RMU, is currently studying Volta Basin Water Resource Management under present and future climate regimes.

There has been much debate about the changes/variation in the climate. What is your organization's position on global climate change and also climate change in Ghana?

Climate change is real and is already happening.

Hydropower dam construction in Ghana can, I believe, contribute significantly to the changes in the climate, and at the same time be impacted by climate change? What exactly is the contribution, impact or linkage?

(i) Hydropower dam construction results in land use and land cover change (LULC). LULC causes a change in the microclimate of the geographical area where the dam is constructed. But the change can also have an impact in regions remote from the site of change. The dam will make available for evaporation, a larger surface area of water. This can increase the evaporation from the site of change compared to evaporation prior to the construction of the dam; (ii) regions of increased temperatures will experience an increase in evaporation from reservoirs, which could result in reduced water and energy benefits. The dam must have its source from a river. Climate change can change (i.e., either increase or decrease) precipitation and river flows; (iii) Hydroelectric power reservoirs can emit methane or carbon dioxide, both being

greenhouse gases, depending on certain conditions; (iv) dams have the potential to offset changes in hydrological patterns. This can be as storage reservoirs in regions of decreased precipitation or as flood control devices in regions of increased precipitation; and (v) if dams are to live up to expectations in the face of a changing climate, there will be the need for robust hydrologic data coupled with a rigorous risk assessment of how climate change might affect runoff in the future.

How will you interpret climate change and what it means for water availability in our big dams?

Water availability in our dams depend on rainfall and river flows among others. The issue is, knowing how climate will change in the vicinity of the dam (including upstream areas) and how that change is expected to affect the factors that influence water availability in the dams. Note that climate change will have different impacts in different parts of the country.

Have researchers or relevant authorities in Ghana modeled the impacts of climate change, or the variability, on water availability in the existing and proposed dams? Can you elaborate on this?

Some initial modeling work has been done but more work needs to be done. The modeling work used the IS92a scenario. The study may have to be repeated using the Special Report on Emissions Scenarios (SRES). Simulations using at least three climate change scenarios will give a range of possibilities that can be incorporated into decision-making. The three climate change scenarios could be A2 (high emissions), B1 (low emissions) and A1B (business as usual). This will enable us to know what to plan for. It must be stated that the SRES scenarios used by the IPCC for its Fourth Assessment Report have been replaced by Representative Concentration Pathways (RCPs). The RCPs will be used for the IPCC new assessment work (AR5).

The GLOWA Volta project did some rapid assessment of the impact of climate change on the Bui Dam. What were the outcomes?

Two different studies investigated the impact of global climate change on water availability in the Ghanaian part of the Volta River Basin. Various global climate change scenarios agree on the overall increase of seasonal river flow variability due to a change in the rainfall pattern. The projection is for reduced river flows during the dry season and increased river flows during the rainy season. A GLOWA Volta Project (GVP) study focused on the Black Volta subcatchment, which is the main source of inflow for the Bui Reservoir. The simulations for this study were done for the periods 1991-2000 and 2030-2039. This study indicated decreasing rainfall in the month of April, increasing duration of the dry season, increasing unpredictability of the onset of the rainy season, increased and intensification of rainfall at the end of the rainy season, slight decrease of river flow and an increase in flood events.

The second Volta Basin study was conducted by the Water Research Institute (WRI) of Ghana. It was for the 2020 and 2050 time periods. This study predicted a much higher decrease in river flows. Both studies agree that higher temperatures and increased evapotranspiration will further reduce water availability. Although these factors alone have the potential to negatively affect water availability in the Black Volta Basin and operation of the Bui Hydropower Project, additional factors need to be considered. The increase in flood events predicted by the GVP study will increase erosion and speed up siltation of the Bui Dam. This has the potential to seriously affect the life span of the dam. Increased deforestation of the Black Volta Basin should also be taken into account as it can lead to increased erosion as well.

It will really be appropriate if the above studies could be repeated using more recent emission scenarios. That is, the SRES scenarios used by the IPCC for its fourth assessment report (AR4) in 2007 or better still the RCP scenarios that are to be used for the next IPCC assessment report (i.e., AR5). At least three scenarios (A2, B1 and A1B) from the SRES scenarios could be used.

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When dams are built, in the light of climate change and frequency of rainfall events, how fragile or at risk are communities upstream and downstream of dams and what should be the government's responses?

Global climate change will affect the frequency and magnitudes of extreme climatic events. For example, increased storm events may mean higher flood flows affecting downstream populations with potential consequences for dam safety. There will be the need for improved forecasting and monitoring technologies and techniques, a more integrated catchment planning and management process, and consideration of factors such as growth in water and/or power demand among others.

How can communities be sensitized about the impact of climate change?

This can be done through (i) radio programs in their local languages with some local people on the panel, and (ii) dramas involving the local people or through movies. The impact of these programs must be evaluated. For example, a survey could be conducted to assess the awareness and understanding of climate change among people before and after the program.

What can we do as a nation to help reduce the driving forces of climate change?

The issue of climate change must be incorporated into our developmental planning at all levels – national and subnational. There should be formal (starting from primary school) and informal education on the issues of climate change.

Any lessons for developers of the Bui Dam and other impending dams in Ghana?

Dams are built for different purposes that include fish and wildlife pond, flood control and storm water management, hydroelectricity, irrigation, navigation, recreation and water supply. However, in all cases, the developers should not underestimate the climate change issue. Arguably, major lakes on the continent have already been affected by climate change, resulting in the loss of water volume and decline in lake levels. Examples of lakes with decline in water level include Lake Victoria in East Africa, and Lake Chad and Lake Akosombo in Ghana. The developers should consider the recommendations made by the World Commission on Dams (WCD) as a basis for developing policy guidelines for dam development in Africa where a variety of stakeholders can be brought to table when large dams are being considered.

Feature

Institutional study nears its final phase

Earlier in the year, we reported of an institutional analysis that the GDD Secretariat was undertaking in efforts to better understand hydropower-related decision-making and decision makers. The study is nearing its conclusion, and it seems a good moment to take stock of some of the preliminary findings of the analysis.

The institutional analysis focused on the roles of ministries, departments and agencies, as well as the local authorities. In contrast to other stakeholder groups that are represented in GDD, this constellation was felt to be more diverse and, as such, in need of a closer examination. Indeed, the authorities that participated in the study represented various sectors (water, energy, health, environment, agriculture, finance as well as lands and natural resources) at the national, regional and district levels.

The Akosombo and Kpong dams emerged at a time when many of the government entities, that are in place today and are involved in hydropower decision-making, had not been established yet, or did not exist in their current forms. Additionally, today's context is characterized by a decentralized administrative system. This marks a departure from the more centralised nature of the government that existed at the time of the Akosombo and Kpong dams. Although different modes of decentralization were trialled both prior and subsequent to independence, the current structure – involving Regional Coordinating Councils and District Assemblies – did not take root until after the completion of the Kpong dam in late 1980s and early 1990s. Moreover, although the electricity subsector in Ghana remains largely in public hands, private actors may become more prominent in financing and constructing infrastructure, as well as generating, transmitting and distributing electricity. As a result, in Ghana – as elsewhere – there are new bodies and levels of decision-making that must be navigated in order to bring to fruition a hydropower dam project.

Among the issues identified by the institutional analysis were the processes of coordination that might be expected to, and that do, take place between the relevant authorities. According to participants in the study, there are few, if any, structures that bring together the various relevant authorities to deliberate solely questions of hydropower. They do, however, encounter each other regularly through other mechanisms – such as board or committee meetings – that allow for the authorities to keep each other abreast of hydropower developments. Some respondents suggested

that a 'clearing house' might be valuable in making sense of the complex terrain of government bodies, whose remits pertain to hydropower dams; others were less keen to add yet another layer onto an already complex system, and instead advocated strengthening the synergies between the authorities that already exist, and bolstering their capacities to interact.

Another reoccurring theme in discussions with participants in the study was accountability in decision-making. At the crux of the matter appears to be concerns that clear nodes of accountability might be lost in a decision-making environment that has developed a high degree of complexity. Accountability was described as a two-way process. On the one hand, authorities are expected to routinely inform each other and the general public of progress in the hydropower sector, including specific dam projects. Simultaneously, other stakeholders – DACs, civil society and the media – must actively hold authorities to account, not only in their information provision but also in their other responsibilities. According to participants in the study, both delivering and demanding accountability requires that stakeholders have the capacities to fulfill the roles expected of them.

Participants in the study felt that the GDD contributes towards strengthening coordination and accountability in hydropower-related issues. In bringing together various hydropower stakeholders, the Dialogue promotes networking among groups of similar stakeholders in order for them to explore common interests and to align their involvement in decision-making. The Dialogues has also conducted or commissioned research on issues that have been collectively identified as priorities, and in this way, adds to the evidence base for decision-making. In addition, by fostering an atmosphere of constructive and democratic debate and discussion, the GDD has been able to mediate between stakeholders, whose perspectives have been at odds. The root causes of discord are often found in poor information provision, which the Dialogue can partly confront.

As the GDD enters the final year of its third phase, it is in a position to reflect upon its experiences and draw lessons from its accomplishments. Among the issues to be deliberated by members of the Dialogue are the means through which its achievements can be sustained beyond the lifetime of the project.

The study would not have been possible without the openness of the various authorities that participated in the exercise. The GDD Secretariat thanks you for your cooperation.

Pictorial Report of the HSAF Consultation Process in Ghana



Members of the Ghana Dams Forum and the Hydropower Sustainability Assessment Forum facilitating the HSAF Consultation with DACs. From left: Mr. Michael Fink, Program Director, International Hydropower Association, Mr. Israel Phiri, representing the Zambian Government, Togbe Adom Drayi II, Chairman NAVRART-52 and Nene Tetteh Amoako IV, Chief of Natriku.



Nene Tetteh Ableze representing the Manya Krobo Traditional Council giving the opening remarks for the HSAP Consultation.



Participants of the HSAP Consultation with DACs in a discussion.



Mr. Micheal Fink introducing the protocol to participants of the HSAP Consultation with the Government MDAs.



Mr. Isreal Phiri of HSAF explaining the Protocol to participants of the Ghana Dams Forum.



Participants of the HSAP Consultation with the Government MDAs discussing the HSAF Protocol.



Ms. Cathleen Seeger, Policy Advisor for Sustainable Hydropower (NaWa), GTZ, Germany, making a presentation at the HSAF Consultation with the Ghana Dams Forum.



Participants of the HSAP Consultation with the Ghana Dams Forum in a role-play.

Pictorial Report of the Third Ghana Dams Forum



Nana Mprah Besemu III (Krachi Wura) giving the opening remarks for the 3rd Ghana Dams Forum. Seated around him are Ms. Becky Barden (from left), Dr. Liqa Raschid-Sally and Richard Twum-Koranteng of the Ghana Dams Dialogue.



Participant contributing to the discussion during the Forum.



Dr. Liqa Raschid-Sally of IWMI delivering her presentation.



Mr. E. A. Amekor delivering his presentation.



Dr. Rudith King of KNUST delivering her presentation.



Ms. Maija Hirvonen making a contribution during the Forum.



Participant contributing to the discussion during the Forum.



Participant contributing to the discussion during the Forum.

Some Facts and Quotes about Climate Change

For some time now, climate change has become a household term in all corners of the world. Children, adults and the elderly are all beginning to take action to help prevent the adverse effects of this phenomenon. This newsletter captures some of these views

I'm sure there will be a voice yet to be heard from you! Enjoy it!

Varying Scientific Definitions

"Climate change" means a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods (United Nations Framework Convention on Climate Change (UNFCCC)).

Climate change refers to any change in climate over time, whether due to natural variability or as a result of human activity (IPCC Working Group I).

The poorest and least responsible bearing the brunt of the climate challenge

Tragically, it is the poorest and least responsible who are having to bear the brunt of the climate challenge as rising temperatures exacerbate poverty, hunger and vulnerability to disease for billions of people. They need both immediate help to strengthen their climate resilience as well as long-term support to enable them to adapt to changing weather patterns, reduce deforestation, and pursue low-emission, clean energy growth strategies.

(Kofi A. Annan, Former UN Secretary-General, Chairman of the Kofi Annan Foundation and the Africa Progress Panel, President of the Global Humanitarian Forum).

Climate change will reduce our potential for hydroelectric power generation

If this is not immediately addressed, it will affect water supplies to communities and impact negatively on an already dire sanitation situation with its attendant health problems in the country. It would reduce our potential for hydroelectric power generation leading to disruptions in energy use for domestic, social, commercial and industrial purposes,

(H. E. John Mahama in a speech read on his behalf at an international symposium on Sustainable Ecosystems, organized by Valley View University (VVU), in collaboration with the Ecological Engineering Society (Germany), at Dodowa on Monday July 20, 2009).

Climate change affects segments of society, particularly women and children

Madam President, in Ghana the population is experiencing the effects of changing rainfall pattern, which has become more erratic; drought has intensified; floods have become more frequent in unusual places; and the impacts of sea level rise on our coastal towns and villages have become more pronounced. Madam President, our people already live on the frontlines of poverty. This has the adverse impacts of climate change on key sectors of the economy such as human health, agriculture production, water resources, land degradation, fishery production and the forestry sector.

Excellencies, Ladies and Gentlemen, we know the extent to which climate change will affect segments of society; particularly women and children. We should, therefore, ensure that gender-responsive considerations as well as challenges of vulnerable groups are appropriately taken care of within any agreed outcome.

(Statement delivered by H. E. John Evans Atta-Mills, President of the Republic Of Ghana, at the High Level Segment of the United Nations Conference on Climate Change held in Copenhagen, Denmark, On December 17, 2009).

If you don't know how to fix it, please stop breaking it!

I'm only a child and I don't have all the solutions, but I want you to realize, neither do you! You don't know how to fix the holes in the ozone layer, you don't know how to bring the salmon back in the dead streams. You don't know how to bring an animal now extinct and you can't bring back the forest that once grew where there is now a desert. If you don't know how to fix it, please stop breaking it! (Severn Suzuke, representing Environmental Children Organization at the United Nations Conference on Environment and Development held in Rio de Janeiro, Brazil, June 3-14, 1992).

Global climate change demands global action

Ladies and Gentlemen, last year, the western region was one of those which got flooded. The whole nation was worried about this disaster, which we believe is a manifestation of global climate change. On behalf of the government and people of Ghana, let me once again express sympathy to the victims of this tragedy. Global climate change demands global action. But in our respective ways, we can contribute to help stem the menacing tide of the phenomenon, for example, through environmental awareness and protection and by adhering to municipal bylaws including regulations for building and sanitation.

(H. E. President J. A. Kufuor, former President of the Republic of Ghana at the People's Assembly at Sekondi-Takoradi on January 15, 2008).

(Note: All the above facts and quotes are collated from sources as referenced in each quote).

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