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EDITORIAL

Closing the gaps in the science-policy interface

The year 2015 will arguably go down in history as a year of global consensus. The member states of the United Nations agreed to adopt the 17 ambitious Sustainable Development Goals to ensure a better future for all peoples, the Sendai Framework on Disaster Risk Reduction to enhance resilience in the midst of escalating risks, and the Paris Accord to prevent greenhouse gas-induced warming of the planet from reaching catastrophic levels. Under the aegis of these global agreements, it is becoming more and more evident that policy decisions must be based on sound scientific knowledge. Mary Midgley's words appear to be more salient than ever:

> "Most of us have begun to see the party is over. The planet is in deep trouble; we had better concentrate on bailing it out... The discrepancy between image and fact is growing too wide to be tolerated. For general sanity we need all the help we can get from our scientists in reaching a more realistic attitude to the physical world we live in."[1]

R.P. Guimaraes once posed an interesting question, which is relevant in this discussion of decision-making informed by scientific data. He asks: When an issue raised by the scientific community has been effectively incorporated in the general public discourse, are actual policy changes guaranteed? The author came to the grim conclusion that they aren't. He argues that politics remains to be the "missing link" in the science-policy interface.[2] Indeed, this argument can be extended beyond scientific data to include all types of information used by the government in its decision-making. For example, within the discourse on climate change, many believe that we have already reached a saturation point in terms of the science. It is now time to involve other experts such as economists and human rights advocates.

Important decisions will be taken by a handful of people who have been given the responsibility – politicians, we call them, otherwise known as our leaders. It would take extremely tenacious leaders with

[1] Midgley, M. (1992) *Science as Salvation: A Modern Myth and its Meaning.* London & New York: Routledge. 256 pp.
[2] Guimaraes, R.P. (2006) Politics, the missing link in the science-policy interface. *IHDP Newsletter.* 3–4, 8–13.

great foresight and unadulterated care for the well-being of people and the planet to steer us in the right direction by listening to what multiple stakeholders and experts have to say.

UNU Peace and Progress (UPP) is proud to present its third volume containing the voices of graduate students from around the world on various issues of global importance: climate change, migration, health, peace and human security, and sustainable development. These articles provide insights from the leading scholars of tomorrow regarding the multifaceted global threats which are currently emerging. The authors featured in this issue believe that better solutions to global problems exist, and challenge our leaders of today to rethink current governance constructs and find ways to implement necessary changes.

Piscano discusses environmental migration in the context of climate change, and argues the need to revise how the international community defines refugees in order to include those who were environmentally displaced. Lapidez' technical note illustrates how scientists obtain projections for future climate using a case study in the Philippines. His results indicate changing rainfall patterns, and highlight the need for increasing the adaptive capacity of the affected communities. Meanwhile, De Leon identifies implementation gaps in climate change adaptation policy in the Philippines, and provides recommendations on how to address these barriers. On another note, Zekeng discusses possible pathways and partnerships for enhancing health care in Sub-Saharan Africa, emphasizing the need for a high level of sustained commitment from various parties involved, including the government and NGO's. Under the Peace, Security, and Human Rights cluster, Dam provides a retrospective review of the US intervention in Panama, and contends that an approach to rebuild vital institutions in the aftermath of the intervention was lacking. His paper also highlights the importance of the Responsibility to Protect (R2P) doctrine in such situations. All these papers also highlight the need for comprehensive solutions through the involvement of a wide range of stakeholders: the international community, governments, scientists, economists, NGO's, locals, and marginalized groups, among others.

Once again, UPP explores a rich variety of global concerns from the perspective of graduate students. The problems faced by our generation are complex, and our brightest minds can undoubtedly work together and learn from past mistakes in our quest for better solutions. UPP is, in many ways, a microcosm of the voices of young scientists, leaders, and future policymakers. It is hoped that through this microcosm, lessons on what constitute the human experience of peace and progress can be learned. In turn, it is hoped that these lessons prove to be useful in initiating the necessary changes in our journey for a better world.

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Cluster 3: Population and Health
Cluster 4: Global Change and Sustainable Development

Rethinking the Relationship of Migration, Environment, and Peace and Security

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ABSTRACT

This paper explores the changing realities of environmental migration in the light of climate change and severe environmental shifts. In particular, it examines the international policy implications of environmental migration that is expected to touch on issues related to national and human security.

KEYWORDS: *climate change, environment, migration, displacement, disaster*

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Changing Perspectives of the Environment and Migration Nexus

Although environmental migration has been a long-running phenomenon, renewed interest in the topic gained ground in the 1980s, brought about by the heightened focus on environmental degradation and its connection to industrial development during that decade. Wide array of researches attempted to understand the impact of environmental changes to population movements. By 1994, a pattern was noticed by Suhrke, who categorized researches on environmental migration into two contradicting groups: the minimalist view and the maximalist view (Lonergan, 1998).

The minimalist view argues that environmental stresses have very limited impact to human mobility. Scholars supporting this view assert that migration is a complex and multilayered phenomenon that cannot be induced by environmental factors alone. In contrast, the maximalist view claims that environmental stresses have direct impacts to population movements and may even trigger displacement of significant numbers if no preventive measures are instituted. A well-known maximalist, El Hinnawi, coined the term environmental refugees to refer to individuals who "who have been forced to leave their traditional habitat temporarily or permanently, because of a marked environmental disruption (natural and/ or triggered by people) that jeopardized their existence and/or seriously affected the quality of their life" (El-Hinnawi, 1985 p. 4).

Most recent researches on the topic continue to be influenced by the two opposing lenses. However, it was noted by Lonergan (1998) that the perspectives taken on previously by most environmental migration researches are highly influenced by realism and geopolitics. Concerns on the possible increase of refugees were overly stressed that in 1993, the Office of the United Nations High Commissioner for Refugees (UNHCR) identified environmental degradation as one of the root causes of refugee flows (Castles, 2002) - an irony given that environmental factors are not included in the criteria to apply for refugee status, making these potential victims unprotected.

It is relatively recent that environmental and humanitarian aspects of environmental migration are given focus especially in the light of climate change. Although it was as early as 1990 that the Intergovernmental Panel on Climate Change (IPCC) made a claim that massive human migration and displacement will be climate change's most severe impact (Lonergan, 1998), the delay in its translation to clear national and international policy interventions have greatly affected our response to the phenomenon which is becoming more complex than what was assumed.

The affected individuals of environmental migration is referred to by the International Organization on Migration (IOM) as environmentally-induced migrants, which is defined as "persons or groups of persons who, for compelling reasons of sudden or progressive changes in the environment that adversely affect their lives or living conditions, are obliged to leave their habitual homes, or choose to do so, either

temporarily or permanently, and who move whether within their country or abroad" (IOM, 2007, p. 1).The sudden and progressive environmental changes have been previously expanded by Lonergan, who enumerated five broad categories of environmental factors that influence human migration: natural disasters, slow onset changes, industrial accidents, development projects, and conflicts and warfare (Lonergan, 1998).

The distinction between rapid onset and slow onset environmental changes is important as it also creates different mobility patterns. It helps in clarifying the role of migration which is oftentimes fluid and unfixed and more importantly, it helps us make timely and well-executed interventions for the affected individuals and groups of people.

Renaud et al. (2011) differentiated the different forms of migration resulting from rapid onset hazards and slow onset hazards. Rapid onset hazards often result to environmental emergency migrants which can be seen as either a preventive measure of the government to avert casualties or an immediate survival strategy employed by affected individuals themselves. This initial wave of migration branches out into two types of environmental migrants with the recovery of affected communities serving as the crucial factor that distinguishes the two. The first are the individuals and groups who voluntarily leave their communities due to personal decisions despite the recovery of the affected area, who are considered environmentally motivated migrants. The other type are referred to as environmentally forced migrants given that they have no option but to relocate due to the inefficiency of recovery initiatives of the affected community that results to permanent displacement.

Conversely, slow onset hazards have more complex criteria to determine the types of environmentally-induced migrants. Gradual and accelerated deterioration of ecosystems may impact livelihood of communities and affected individuals may choose to leave their area of origin. Renaud et al. asserts, however, that the environmental factor of the decision should be dominant in order to be considered an environmentally-induced migrant. Similar to the rapid onset hazard, the environmentally-induced migrant can further be categorized as environmentally motivated migrant if alternative livelihoods still exists in the affected area. They will be considered environmentally forced migrants if alternative livelihood will take time to be productive, if alternative livelihood is impossible, and if the affected area no longer exists.

Recently, more and more literature (Tacoli 2009, Reuveny 2007, Barnett and Adger 2007, Naude 2008) on environmental migration are focusing on the impacts of slow onset changes particularly that of climate change. Although this shift is very timely and relevant, it is apparent that migration brought about by rapid onset hazards has been neglected. Moreover, discussions on migration and climate change are again becoming heavily geopoliticized with the resurfacing of issues on cross-border migration, asylum seekers and immigration system reforms. The focus on the future implications of

environmental migration on national security slowly veers away from issues that are at present being dealt with by the millions that are displaced by natural disasters and other rapid onset hazards. In consideration, the succeeding analysis of policy implications on environmental migration will focus on both rapid onset hazards and slow onset hazards particularly, climate change.

Existing Policies on Environmental Migration

The different migration patterns and timeline brought about by rapid and slow onset hazards require different policy interventions.

Perhaps, the significant difference between rapid onset and slow onset disasters is how the former immediately triggers displacement which is conceptually different from migration. UNESCO (n.d.) defines displacement as "the forced movement of people from their locality or environment and occupational activities". In contrast, migration refers to "the movement of a person or a group of persons, either across an international border, or within a State" (IOM, n.d.). The element of disempowerment given that relocation is not a choice is the main difference between displaced persons and migrants.

Currently, rapid onset hazards such as natural disasters induce the bulk of environmental migration and displacement. In 2012, the International Displacement Monitoring Centre (IDMC) estimated that 98% of recorded displacement resulted from environmental factors. This percentage translates to around 32.4 million displaced people worldwide (IDMC, 2013). Policy implications of migration and displacement brought about by rapid onset hazards should therefore focus on protecting and empowering immediately displaced persons and other affected individuals while preventing natural hazards to turn into catastrophic disasters.

In practice, these policies fall under the disaster risk reduction and management cycle: prevention, preparedness, response and recovery. Pre-disaster activities usually revolve around preventive measures to reduce human casualties and property damages. In the international level, the Sendai Framework for Disaster Risk Reduction passed in 2015, serves as the guiding framework of action for reducing vulnerability and enhancing resilience in disasters. It enumerates four priority actions for governments to undertake to reduce disaster risks:

- Priority 1: Understanding disaster risk.
- Priority 2: Strengthening disaster risk governance to manage disaster risk.
- Priority 3: Investing in disaster risk reduction for resilience.

- Priority 4: Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction (UNISDR, 2015).

As a preventive measure, migration in the form of encouraged or mandatory evacuation can be a preventive strategy to reduce casualties during an impending disaster, but it is usually during the response and recovery phase where migration and temporary displacement are of common occurrence. Displacement's temporary characteristic has placed emphasis on the need to protect individuals and groups within transitional settlements. In the principles of transitional settlement and reconstruction developed by the United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA), it is stipulated that relocation and resettlement should be avoided and that recovery initiatives should focus on the speedy return of displaced groups to their original communities unless it has been proven that returning would make them more vulnerable to future disasters (UNOCHA, 2008). The organization stresses that displacement can further worsen the plight of displaced individuals by breaking their ties with their accustomed community and their known livelihood.

Within the framework of the United Nations, it is the United Nations Office for Disaster Risk Reduction (UNISDR) that coordinates the disaster risk reduction activities of the UN and other regional organizations. However, it is development and humanitarian agencies and offices of the UN such as the United Nations Office for the Coordination of Humanitarian Affairs and the United Nations Development Programme (UNDP) that assist governments in response and recovery phases of disaster management.

Although there are mechanisms in place and respective UN bodies tasked to assist in varying phases of disaster management, migration in this context continues to be a complex phenomenon that one-size-fits-all procedures of response and recovery cannot address varying concerns of displaced individuals and groups. A key issue UNOCHA has identified is the different forms of transitional settlement which displaced populations opt for that cannot be monitored thoroughly by governments and international organizations.

A great concern seen in the analysis of international policies on environmental migration is the highly compartmentalized approach institutions have on dealing with issues they have been tasked to work on. For instance, disaster risk reduction and management, and internal displacement are tackled distinctively that some provisions of the UN Guiding Principles of Internal Displacement released in 1998 may not apply to environmentally induced migrants. These principles stipulate that human rights and freedoms of displaced individuals should be upheld with national governments accountable for the protection and promotion of their rights. It also underlined that internally displaced persons have the

right to migrate and seek safety in another part of the country, leave the country, seek asylum in another country and be protected against forcible return to their settlement (UNOCHA, 1998). These rights of internally displaced individuals appears to have been written with conflict and traditional security issues in mind that can potentially leave out environmentally displaced individuals and their dislocation context. The same problem is also faced by displaced individuals who cross international borders. Although UNHCR is tasked to assist in issues of dislocation, the nature of displacement is not considered grave enough for receiving States to be obliged to protect the displaced given the limited criteria of obtaining Temporary Protected Status (TPS).

It is fairly recent that the concept of human security the United Nations is championing is being applied to natural disasters. Under this framework, governments that are unable to protect their citizens to security threats to their personhood, may it be environmentally-related, should be held accountable. Hobson et al. (2014) adds that a human security approach will look into how people are not only affected by natural disasters but how they also influence the phenomenon. It also examines the opportunities and resilience gained by people after the catastrophe. A case commonly brought up in relation to this is the Myanmar government's response during Cyclone Nargis' disaster of 2008 which incurred an estimate of 138,000 casualties and caused displacement to thousands more. Myanmar's military government has been accused of blocking aid efforts of other actors and had also persecuted people criticizing the response. It is believed that death tolls could have exceeded a million casualties if deaths within poorly managed transitional settlements are considered (Hobson et al., 2014). In this case, the Myanmar government failed to protect its citizens from natural disasters and further aggravated the situation by censoring news and persecuting citizens speaking up against it.

The problem seen in approaching disaster management from a human security perspective is the way we are conditioned to think about certain issues. Dealing with natural disasters, for instance, would make us focus on preventive mechanisms to avert disasters. The challenge on tackling human rights, however, is the way they are more visible and valued when they are violated. Calls for comprehensive human rights protection will only happen in times of heightened insecurity. A possible way of reconciling this is shifting the focus on internal displacement in the context of natural disasters where human rights concerns are more highlighted. Not only does internal displacement and transitional settlement conditions brought about by environmental factors surface human rights violations, but it also helps us understand how preventive mechanisms for human security and human rights promotion matter and should be prioritized.

Population movements brought about by slow onset environmental changes are also a complex phenomenon and probably have a more complicated positioning in international relations and international law than migration resulting from disasters and other rapid onset environmental hazards. Since the establishment of United Nations, it was never predicted that environmental stresses would in

time disrupt not only processes that shape human well-being but also the functions and even existence of States and consequently, international structures. The current and impending effects of climate change are slowly becoming the priorities of the international community while it also calls for the rethinking of the foundations of international relations and international law.

One of the complex situations climate change may bring about in relation to population movements is statelessness. Sea-level rise is threatening the existence of a growing number of small-island developing states (SIDS) in the Caribbean, Indian Ocean and Pacific Ocean regions. Governments of affected States are not only at the risk of not being able to protect their citizens but they are also facing the problem of losing their statehood given that occupation of a definite territory is one of the criteria for being a state under the Montevideo Convention.

In this scenario, governments are considering two options: to adapt and implement measures to avoid statelessness or to migrate and address needs of stateless individuals and groups (Maas and Carius, 2011).Scholars and politicians argue that migration in this context should be the last resort of affected States and priority should be given to adaptation strategies (Ibid.). UNFCCC elaborated adaptation strategies of SIDS to address human security threats arising from climate change, and they vary from institutional reforms, policy-making and community projects geared toward enhancing people's resilience to environmental changes (UNFCCC, 2001). Water availability and food security are often the primary concerns of governments while they also tackle land zoning and new building codes for the safety of the people.

However, some adaptation measures undertaken by SIDS are experiencing some legality issues with policies instituted by the UN. For instance, development of artificial islands is being seen as a way to maintain the State's statehood and maritime zones. In the case of Maldives that developed an island called Hulhumale, the island not only serves the immediate need of supporting its fishing and tourism industry but it also can be a relocation site for its citizens when other islands are deemed unlivable. However, artificial islands are not considered legal islands and legal form of territory under the Laws of the Sea and cannot comprise defined territory as required to be a State (Gagain, 2009).

In worst case scenarios where migration is necessary, Maas and Carius (2011) expounded three possible approaches to migration by the affected SIDS: the acquisition approach, the treaty approach and the pull-factor approach.

The acquisition approach refers to the buying and renting of new territory from other States. This move can be considered legitimate as there is no existing international law that prevents the reestablishment of a State within another State (Gagain, 2009). An example of this is the initiative of the Kiribati government to purchase 6,000 acres of land in Fiji ensuring food security of its people and to also have

an option when the need to relocate becomes apparent (Kirbati Government, 2011). Conversely, the treaty approach focuses on creating agreements with other countries that can absorb citizens of vulnerable states while also strengthening their governments' sovereign character and international legitimacy given that a defined territory isn't a crucial factor in carrying out government functions. Lastly, the pull-factor approach discusses how concerned governments can build the capacity of their citizens to enable them to migrate to other countries on their own will while reducing prejudice and stigma from receiving countries. For its adaptation strategy, the government of Kiribati launched a migration with dignity campaign with their ongoing initiative focused on setting expatriate communities in other countries such as Australia and New Zealand that can help not only by absorbing future migrants but also by increasing remittances aiding in Kiribati's present development (Ibid.).

Situating environmental migration using the relevance of scope has also become a struggle. Is environmental migration in this context a national issue, and when will it reach the point of requiring global consensus to be addressed? Despite initiatives of individual governments to address their environmental migration concerns, it is evident that another hurdle for them to overcome is the legal inadequacy and gaps of international law in protecting environmentally induced migrants. Diasporas created overseas may encounter discrimination if establishments are not facilitated well. Moreover, existing environmentally-motivated migrants are not given ample protection or priority with the international community seemingly more pre-occupied in discussing possible worst case scenarios that involves upholding individual interests. Apart from this, they are also faced with the possibility of having their maritime zones exploited and conflicts escalating may cause disruption to international peace and security.

Conclusion and Thoughts on Resilience

Environmental migration has become a complex phenomenon that has been suffering from a framing problematique. Are environmental threats slightly or critically affecting human mobility patterns? Is migration a solution or a problem in facing impending environmental concerns brought about by climate change? Is environmental migration a domestic issue, a regional matter, or an international concern?

But perhaps the biggest challenge in situating environmental migration as a multilayered phenomenon is the lack of malleability of our current international structures in adapting to environmental changes. Environmental stresses will take time to be considered as threats to our conventional notions of international peace and security that consequently, affects the trivial manner we respond to it.

The struggle on downplaying (minimalism) or exaggerating (maximalism) the environment's influence to population movements has not exactly captured the complexity of migration as a process. On the one hand, underplaying the relationship of environmental stresses to migration diverts the attention away from the existing plight of the displaced as a result of natural disasters and other rapid onset hazards. On the other hand, highlighting the negative impacts of the environment to mobility with theapocalyptic scenarios maximalists are known to utilize may be counter-productive, especially when reaching consensus on what needs to be done in the international level. Both lenses do not entirely highlight the policy gaps that make environmentally-induced migrants and displaced individuals more vulnerable.

The way we perceive and respond to environmental migration is clearly shaped by prevailing paradigms in international relations that aren't exactly flexible and relevant to changing security contexts. Looking at migration as either the problem or solution does not recognize the fluid role of migration in both rapid and slow onset hazards. Moreover, existing highly compartmentalized "soft laws" relevant to environmental migration do not capture the multilayered process of the phenomenon that is also non-linear. The main challenge is to research, document and learn from current environmental migration and displacement trends to come up with realistic predictions and more relevant policy interventions in both national and international levels.

Conversely, environmental migration should also be tackled in both national and international levels. With the unequal impacts of climate change to various member-states of the United Nations, the international community should laud the efforts of vulnerable states in protecting and promoting the rights of their citizens while having mechanisms in place for worst case scenarios that may be their lived realities in the future. It must also be ensured that their willingness to protect their citizens and maintain their territorial integrity should be complemented by enhancing their capacity to continuously do so. In the international level, institutions should be more vigorous and realistic in their response to environmental migration as a current and escalating global phenomenon while learning from best practices of states and organizations in dealing with it. In particular, rights of environmentally-induced migrants should be defined as early as now and necessary amendments on principles of internal displacement, refugee protection, statehood and Laws of the Seas should be looked into.

Better coordination of international institutions should also be fostered. IOM currently sits outside the UN framework, but it will likely play a crucial role in understanding the role of migration in the context of climate change. More transparent and efficient information exchange and dissemination should be discussed. Other regional and international organizations must also ensure that such circumstances will not be exploited by other states so as to not trigger regional or global conflict.

Resilience is now the new development jargon thrown around in the higher levels of climate change negotiations. One can only wonder how relevant the concept is to those immediately affected by the

effects of climate change, in particular, the environmentally displaced and dislocated, and eventually to the States likely to sink and cease to exist because of environmental changes. In their experience, resilience is not a solution but the only option after going through and surviving series of disasters, destruction and deaths. In worst case scenarios, it is what will dictate their survival. Resilience, or the capacity to bounce back, doesn't necessarily discuss how we obtain such characteristic. Moreover, it doesn't identify the threshold on when it will fail. Although well-intentioned, the discussion on resilience in both national and international levels should probably emphasize what has been neglected in the understanding of displacement and migration: dignity.

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Cluster 4: Global Change and Sustainable Development

Assessment of Changes in the Water Resources Budget and Hydrological Regime of the Pampanga River Basin (Philippines) due to Climate Change

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ABSTRACT

Southeast Asia is already experiencing changes in its climate. Heat waves, droughts, floods, and tropical cyclones in the region have been more intense and frequent, causing extensive damage to properties, assets, and human life. In the Philippines, climate change is manifested by the dramatic increase in the number of extreme floods, rising from just under 20 during 1960—1969 to nearly 120 by 2000—2008. This study aims to contribute to the efforts to strengthen the climate change adaptive capacity of the Philippines by assessing the changes in the water resources budget and hydrological regime of the Pampanga river basin, which is one of the most important river basins in the country. The Coupled Model Intercomparison Project Phase 5 (CMIP5) tool under the Data Integration and Analysis System (DIAS) was used to generate data used in the analyses. The results show that the projected total annual water budget of the Pampanga river basin for the years 2046-2065 is larger than present. This increase will likely be concentrated to occur in the wet season (June-November). The models project a wetter wet season and a moderately drier dry season. Results also show that the number of extreme rainfall events is very likely to increase as well as the number of no-rain days. Adaptive measures and climate change policies can be planned and executed given the results of this study.

KEYWORDS: *Pampanga River Basin, Philippines, Climate Change Projection, Coupled Model Intercomparison Project 5 (CMIP5), Data Integration and Analysis System*

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1.0 INTRODUCTION

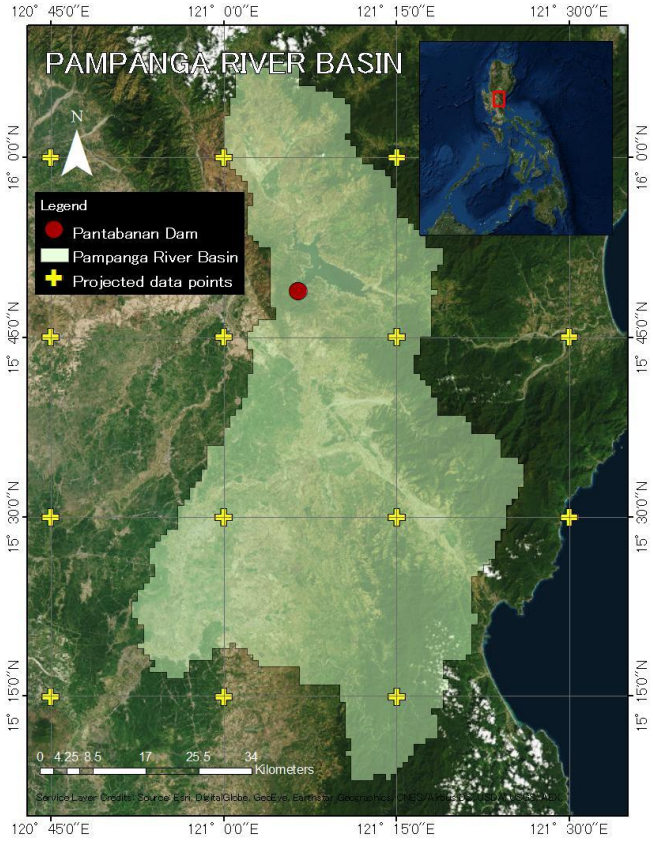

Figure 1. Pampanga River Basin

The study focuses on the Pampanga river basin located in the island of Luzon in the Philippines. The study area is bounded by the region (15°00'N, 120°45'E to 16°15'N, 121°30'E) as shown in Fig. 1. Pampanga river basin is the fourth largest in the Philippines. The study area covers about 3,700 km^2 which includes parts of Pampanga, Bulacan, and Nueva Ecija. The total length of the main river, the Pampanga River, is about 260 kilometers.

Climatology and Topography. On average, 5 tropical cyclones pass through the basin in a span of three years. The dry season lasts from the month of December up to May while June to November is the wet season. The months with the highest amount of rainfall are July, August, and September. The main river channel has a relatively low gradient, particularly at the middle and lower sections. The basin experiences at least one flooding in a year, with some areas remaining submerged during the wet season but relatively dry during dry season [6].

Economic Value. The study area includes one of the most important dams in the Philippines: the Pantabangan dam. This dam is critical to the irrigation water supply of the surrounding agricultural lands. The Pantabangan dam and reservoir located at the northern part of the basin (see Fig. 1) serve to provide irrigation to about 102,000 ha of land in the provinces of Bulacan, Pampanga and Nueva Ecija. It also supplies water to the country's capital, Metro Manila, for domestic and industrial use. The Luzon grid is partly supplied by the hydroelectric power generated by the dam. Pantabangan dam is also used to reduce flooding in the downstream villages [3].

Water Resources Management. The current system of water resources management of the dam relies on the data provided by the Philippine Atmospheric Geophysical and Astronomical Services Administration (PAGASA). The management implements an end-to-end approach which begins with PAGASA providing local climate forecasts by downscaling regional climate forecasts. A hydrological model is then used to forecast seasonal water inflow given the local climate forecasts and other hydrological variables. With this information, the reservoir operators optimize the reservoir yield and make decisions regarding the amount of water to be released for various purposes. The final step is the assessment of the impact which feeds back data to PAGASA to further improve the process.

Climate Change. A changing climate could have drastic effects to the Pampanga river basin and to the country as a whole. Agriculture, particularly rice production, is critical to the Philippines' food security and economy. According to the World Bank, agriculture accounts for 11.3% of Philippines GDP as of 2014 [12]. Rice is also the most important crop in the country because it is a staple food of most Filipinos. Central Luzon is one of the largest producers of rice in the Philippines. This dependence on agriculture makes the region especially vulnerable to the ill effects of climate change. In the recent years, Southeast Asia is already experiencing changes in its climate. A study conducted by the Asian Development Bank notes that heat waves, droughts, floods, and tropical cyclones in the region have been more intense and frequent, causing extensive damage to property, assets, and human life. The number of extreme floods in the Philippines has risen dramatically, rising from just under 20 during 1960—1969 to nearly 120 by 2000—2008 [1]. Climate change projections based on the most pessimistic scenario would result to a decline of 50% of the rice yield potential of the countries in the Southeast Asia region [1].

Research Motivation. This study aims to strengthen the climate change adaptive capacity of the Philippines by assessing the changes in the water resources budget and hydrological regime due to climate change of one of its major river basins, the Pampanga river basin. The results of this research can be used to enhance existing policies for climate change adaptation both in the national and local government units. Specifically, the integrated water management of the Pampanga river basin can be improved with the additional data generated by this research. Downscaled climate change projections for the target area can help improve the flood control and prevention schemes, irrigation management, and water demand management.

2.0 METHODOLOGY

The Coupled Model Intercomparison Project Phase 5 (CMIP5) tool under the Data Integration and Analysis System (DIAS) was used to generate data for this study. Collected climate data for the years

1979-2005 was used as a benchmark for the past and present climate. Selected Global Climate Models (GCM) under CMIP5 were used to project future climate for the years 2046-2065 with RCP8.5 emission scenario, which is the pathway with the highest greenhouse gas emissions [7]. Point analyses were conducted to compare the past and future precipitation data including the annual total rainfall budget, monthly means, and rainfall extremes. Spatial analyses were also conducted to compare the 50-year and 200-year return period intensity rainfall of the past versus the future data. Specific details are discussed in the following sections.

2.1 Data Integration and Analysis System (DIAS)

DIAS was designed to coordinate cutting-edge information for science and technology and various research fields related to the Earth's environment. Its main objective is to function as a data infrastructure that can integrate Earth observation data, numerical model outputs, and socioeconomic data. With this system, new knowledge can be generated towards the goal of solving the Earth's environmental problems and generating socioeconomic benefits. DIAS was launched as part of the Earth Observation and Ocean Exploration System, which is one of five National Key Technologies defined by the Third Basic Program for Science and Technology of Japan [9].

2.2 Coupled Model Intercomparison Project 5 (CMIP5)

CMIP5 is the fifth phase of the Coupled Model Intercomparison Project. CMIP5 provides a set of coordinated climate model experiments from climate modeling groups around the world. CMIP5 can be used to examine climate predictability and explore the ability of models to predict climate on decadal time scales [11]. This functionality of CMIP5 is used in this study to project the future climate in the Pampanga river basin for the years 2046-2065 with RCP8.5 emission scenario. This emission scenario, with the highest greenhouse gas emissions, can be characterized by high population and relatively slow income growth with modest rates of technological change and energy intensity improvements, leading in the long term to high energy demand and greenhouse gas (GHG) emissions in absence of climate change policies [7]. The World Meteorological Organization describes RCP8.5 as rising radiative forcing pathway leading to 8.5 W/m^2 in 2100 [13]. RCP8.5 can be regarded as the most pessimistic scenario for future climate of the target area.

2.2.1 Model Selection

Four GCM's under CMIP5 were selected to be used for the purposes of this study. Initially, the 15 models listed in Table 1 were considered for selection. The models were ranked according to how well they perform for the target area of the Pampanga river basin. This was done by comparing the

model results for the years 1979-2005 to the available actual data. Six meteorological elements were used for the evaluation. These elements are rainfall, air temperature, geopotential height, outgoing longwave radiation, zonal wind, and meridional wind. The correlation coefficient and root-mean-square error (RMSE) for each month and for each variable were used as criteria to rank the models.

Table 1. Table of models considered

Model Name		
ACCESS1.0	BCC-CSM1.1	CESM1(BGC)
CNRM-CM5	CanESM2	FGOALS-g2
GFDL-CM3	GISS-E2-R-CC	HadGEM2-ES
IPSL-CM5A-MR	MIROC-ESM	MIROC5
MPI-ESM-MR	MRI-CGCM3	NorESM1-M

Finally, the 4 GCM's that suited best for the Pampanga river basin were determined. Table 2 lists the final models that are used in this study. The selected models with their ensemble members were used to project precipitation data for the future years 2046-2065. Ensemble members are closely related simulations by a single model. Each member is named as r < N > i < M > p < L >, where N, M and L are integers used to distinguish between different initial conditions, initialization method, and perturbation physics [8].

Table 2. Selected models

Model Name (No. of Ensemble members)	
CNRM-CM5 (1)	CanESM2 (5)
GFDL-CM3 (1)	MPI-ESM-MR (1)

2.2.2 Bias Correction

Monthly precipitation data were computed for several points inside and near the target area. The location of these data points are plotted over the basin map in Fig. 1. The resulting data were corrected for bias using the APHRODITE bias correction tool available with CMIP5. APHRODITE stands for Asian Precipitation Highly-Resolved Observational Data Integration Towards Evaluation of Water Resources. It is a daily precipitation dataset with high-resolution grids for Asia. The data are obtained from a rain gauge observation network in different countries [10]. Bias correction is needed because of the limitations of GCM's. Generally, GCM rainfall output has low extreme heavy rainfall rate, has incorrect distribution of moderate intensity rain, and has small number of no-rain days [2]. The models were bias-corrected so that they would best fit with the past data as given by

APHRODITE. The correction for each model was then applied to its predicted future precipitation. Figures 2 and 3 show examples of bias correction of ranked past extreme rainfall data and past monthly precipitation for the point (15°30'N, 121°15'E).

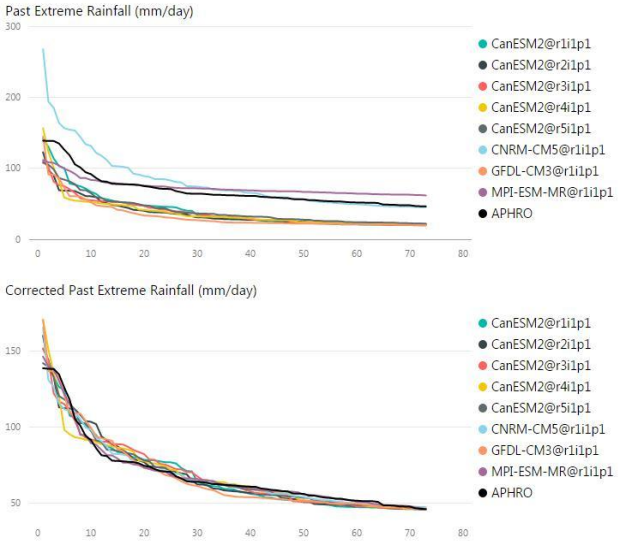

Figure 2. Extreme Rainfall Correction (Past)

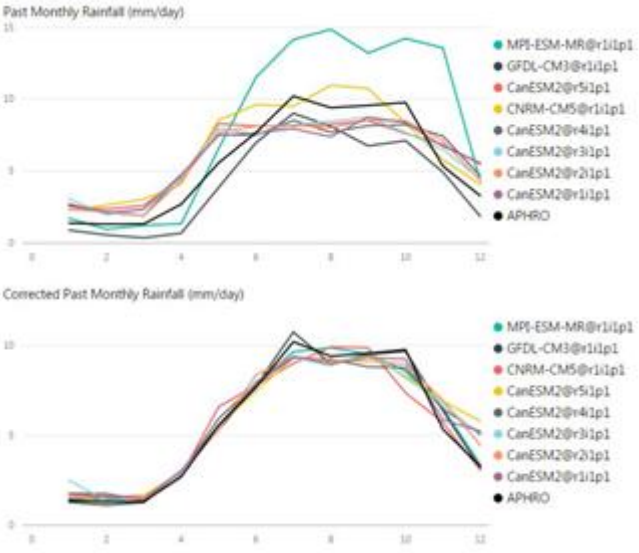

Figure 3. Monthly Rainfall Correction (Past)

2.3 Point Analysis and Spatial Analysis

Analysis was done on 3 point datasets (16°00'N-121°00'E, 15°45'N-121°15'E, 15°30'N-121°15'E) using the bias corrected projected future precipitation. The changes in annual total rainfall budget, monthly rainfall, return period intensities, and number of extreme rainfall and no rainfall days were assessed for each point. Spatial analysis using a GIS tool was also conducted to assess the changes in 50-year and 200-year rainfall intensities. This is done by interpolating precipitation data from all the points. Ordinary Kriging was the method used for interpolating the rainfall data because it has been shown that this method produces lower error compared to other common methods for a mountainous region in a tropical setting [4] such as the Philippines.

3.0 RESULTS AND DISCUSSION

3.1 Point Analysis

The following points were considered for point analysis: (16°00'N-121°00'E, 15°45'N-121°15'E, 15°30'N-121°15'E). These points were chosen as representative of the upstream, mid-portion, and downstream parts of the main river.

3.1.1 Upstream Point: 16°00'N-121°00'E

Figure 4 shows the trends of monthly precipitation as given by the models at the upstream point. Generally, all the models predict an increase in monthly rainfall. The top four models that gave the highest increase in rainfall were chosen and tabulated. Tables 3 shows the change in monthly precipitation from past to future in absolute values and percentages respectively. All the models project that the wet season (June-November) will experience increase in rainfall while the dry season (December-May) will become moderately drier or stay the same. Looking at the total annual change in rainfall at Table 3, the models project an average increase of between 6.5 -15.8 mm/day of rainfall.

Figure 5 shows the rainfall intensities for different return periods for the upstream point. Most models overestimate the past data and there is a disagreement for the future projection. Because of this, no definite conclusion can be derived from this set of data.

Table 4 summarizes the number of no-rain days and number of extreme rain days given by the models for the past and future. Extreme rainfall is defined here as rainfall exceeding 90 mm/day, which is expected to cause serious flooding in low lying areas necessitating immediate evacuation. This is given by the Philippines' weather bureau's (Philippine Atmospheric, Geophysical and Astronomical Services Administration) rainfall warning levels [5]. Table 4 shows that the upstream point will experience an increase in the number of no-rain days, the number of extreme rainfall events will also increase dramatically with 3 models projecting more than double of the past number.

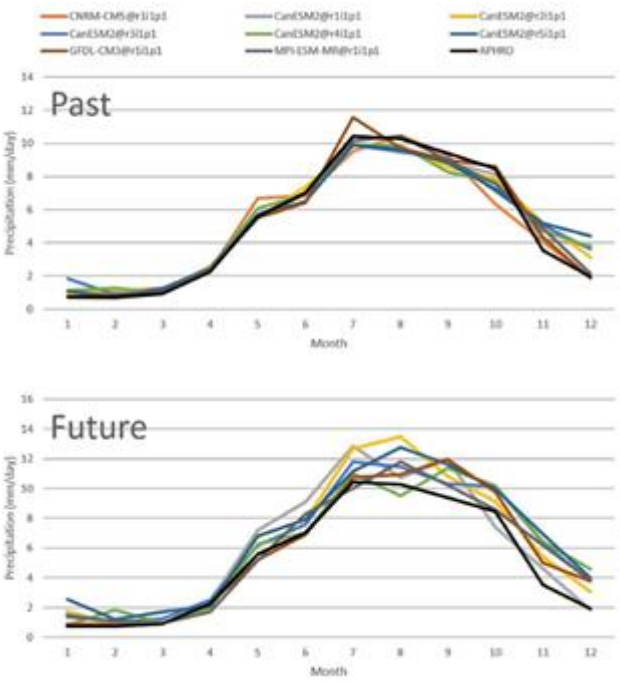

Figure 4. Monthly Rainfall Data for Upstream

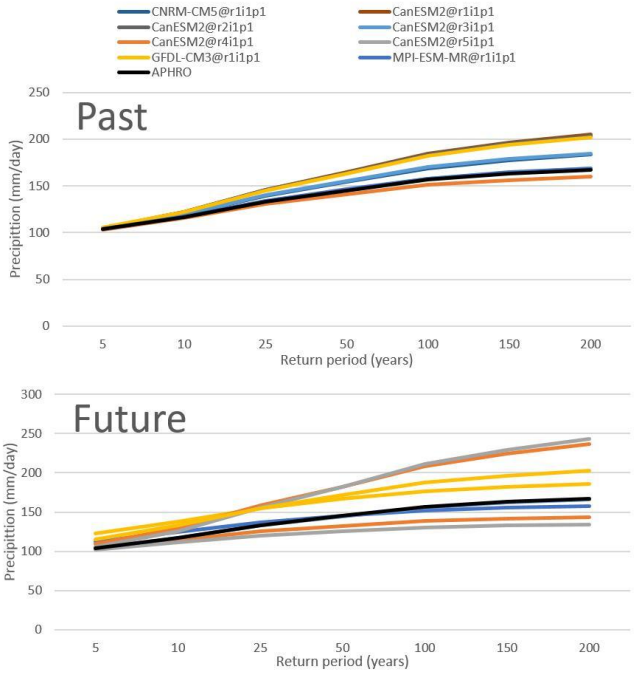

Figure 5. Return Period and Intensities for Upstream

Table 3. Table of change for upstream point: mm/day and percentage

	Model Name							
	CNRM		Can@r1		Can@r4		Can@r5	
Month	mm/day	%	mm/day	%	mm/day	%	mm/day	%
1	0.76	90.05	0.68	62.5	1.43	126.33	0	-16.65
2	-0.17	-16.27	-0.22	-20.02	-0.03	-2.39	0.14	18.62
3	-0.34	-26.77	-0.18	-16.41	0.76	78.92	-0.31	-25.08
4	0.09	3.87	-0.35	-13.64	-0.38	-15.48	-0.21	-8.42
5	0.5	7.47	1.06	18.5	0.72	11.82	-0.49	-8.61
6	2.25	32.85	0.95	13.76	1.01	14.64	0.44	6.79
7	3.32	34.88	2.7	27.05	1.29	13.07	0.85	8.59
8	0.26	2.49	3.91	40.76	2.91	29.52	1.33	13.8
9	2.66	28.65	2.04	23.22	3.33	40.22	3.12	35.22
10	1.07	16.83	0.99	12.15	2.28	29.56	2.49	34.33
11	0.53	12.98	1.25	30	2.23	47.15	-0.2	-3.86
12	-0.02	-1.07	-0.77	-20.02	0.23	6.1	-0.62	-14.08
Total	10.91		12.06		15.78		6.54	

Table 4. Table of 0 or Extreme Rainfall count for upstream point

	Model Name			
P/F	CNRM	Can@r1	Can@r4	Can@r5
P(0)	1104	1144	1122	1148
P(Ext)	11	11	5	10
F(0)	1142	1176	1017	1160
F(Ext)	34	20	25	11

3.1.2 Middle Point: 15°45'N - 121°15'E

Figure 6 shows the trends of monthly precipitation as given by the models at the middle point. Generally, all the models predict an increase in monthly rainfall, same case as the up-stream point. The top four models that gave the highest increase in rainfall were chosen and tabulated. Table 5 shows the change in monthly precipitation from past to future in absolute values and percentages, respectively. Again same with the upstream point, all the models project that the wet season (June-November) will experience increase in rainfall while the dry season (December-May) will become moderately drier or stay the same. Looking at the total annual change in rainfall at Table 5, the models project an average increase of between 6.9-17.1 mm/day of rainfall.

Figure 7 shows the rainfall intensities for different return periods for the middle point. The trends are very similar with the upstream point, Fig. 5. And following the same reasoning, no conclusion can be derived from this set of data.

Table 6 summarizes the number of no-rain days and number of extreme rain days given by the models for the past and future. Table 6 shows that the middle point will also experience an increase in the number of no-rain days, the number of extreme rainfall events will also increase dramatically with 3 models projecting more than double of the past number.

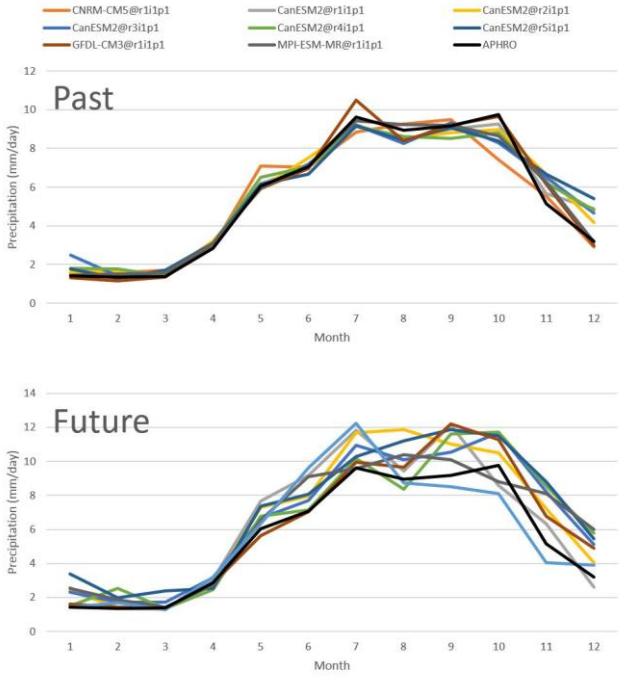

Figure 6. Monthly Rainfall Data for Middle Point

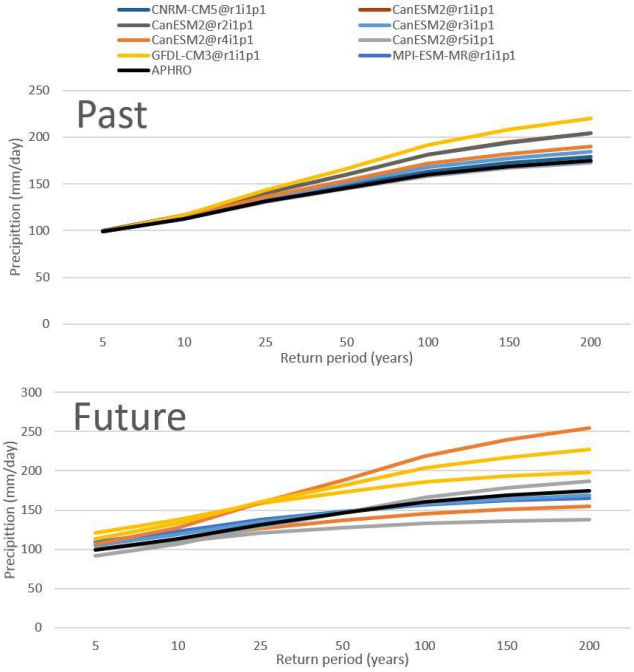

Figure 7. Return Period and Intensities for Middle Point

Table 5. Table of change for middle point: mm/day and percentage

	Model Name							
	Can2@r1		Can@r3		Can@r4		Can@r5	
Month	mm/day	%	mm/day	%	mm/day	%	mm/day	%
1	0.64	36.41	-0.97	-39.07	1.58	87.88	-0.16	-9.1
2	-0.18	-11.22	1.14	81.55	0.22	12.5	0.14	10.84
3	-0.19	-12.36	-0.19	-12.21	0.99	70.56	-0.33	-19.5
4	-0.39	-12.25	-0.57	-18.81	-0.54	-17.55	-0.28	-9.01
5	1.12	18.13	0.76	12.66	0.85	13.03	-0.5	-8.15
6	0.89	12.59	-0.03	-0.42	0.99	14.03	0.37	5.55
7	2.44	26.4	0.99	10.77	1.16	12.7	0.79	8.62
8	3.49	41.67	0.08	0.97	2.6	30.17	1.22	14.48
9	2.02	22.44	2.3	24.68	3.35	39.35	3.1	34.13
10	1.23	13.27	3.44	41.51	2.68	30.39	2.89	34.48
11	1.55	27.33	2.06	31.68	2.6	41.77	0.13	1.95
12	-0.84	-17.16	1.11	23.86	0.65	13.52	-0.51	-9.46
Total	11.78		10.12		17.13		6.86	

Table 6. Table of 0 or Extreme Rainfall count for middle point

	Model Name			
P/F	Can2@r1	Can@r3	Can@r4	Can@r5
P(0)	736	716	739	723
P(Ext)	9	7	5	9
F(0)	788	724	684	735
F(Ext)	20	18	25	10

3.1.3 Downstream Point: 15°30'N - 121°15'E

Figure 8 shows the trends of monthly precipitation as given by the models at the downstream point. The pattern seen in the previous 2 points is seen as well in the downstream point; all the models predict an increase in monthly rainfall. The top four models that gave the highest increase in rainfall were chosen and tabulated. Table 7 shows the change in monthly precipitation from past to future in absolute values and percentages respectively. Similar with the upstream and middle portion points, all the models project that the wet season (June-November) will experience increase in rainfall while the dry season (December-May) will become moderately drier or stay the same. Looking at the total annual change in rainfall at Table 7, the models project an average increase of between 10.3-17.8 mm/day of rainfall.

Figure 9 shows the rainfall intensities for different return periods for the downstream point. The trends are very similar with the upstream point and middle point, Figs. 5 and 7. And following the same reasoning, no conclusion can be derived from this set of data.

Table 8 summarizes the number of no-rain days and number of extreme rain days given by the models for the past and future. According to Table 8, 2 models project increase in the number of no-rain days, while the other 2 project a decrease. Nothing can be concluded from the projected number of no-rain days at the downstream point. However, the number of extreme rainfall events will increase dramatically with 2 models projecting around double of the past number and another one predicting more than double.

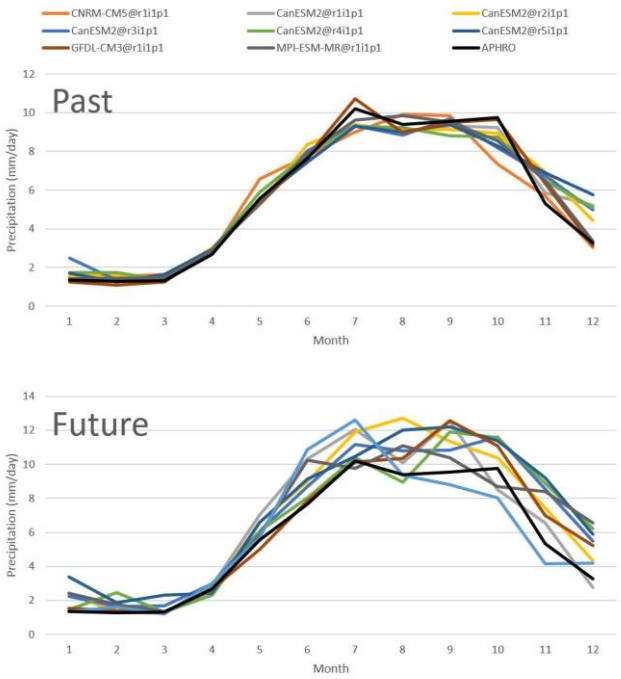

Figure 8. Monthly Rainfall Data for Downstream Point

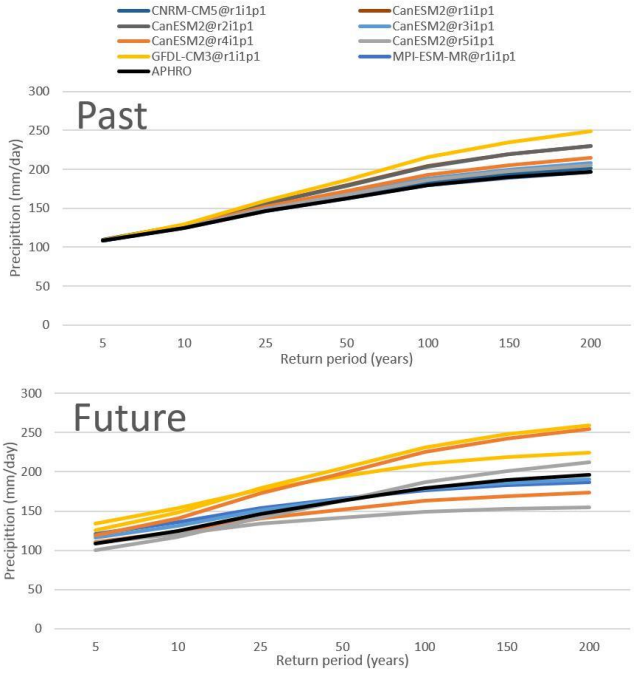

Figure 9. Return Period and Intensities for Downstream Point

Table 7. Table of change for downstream point: mm/day and percentage

	Model Name							
	Can@r1		Can@r3		Can@r4		GFDL	
Month	mm/day	%	mm/day	%	mm/day	%	mm/day	%
1	0.69	40.33	-1.02	-41.25	1.64	93.88	1.18	93.73
2	-0.19	-12.15	1.13	84.01	0.15	8.64	0.67	61.24
3	-0.2	-13.55	-0.19	-12.73	0.98	73.52	0.09	7.24
4	-0.38	-12.62	-0.52	-18.29	-0.46	-15.9	-0.35	-12.05
5	1.06	19.13	0.74	13.82	0.7	11.85	0.62	11.74
6	1.1	13.97	0.01	0.12	1.24	15.73	2.49	32.13
7	2.49	26.5	1.05	11.24	1.16	12.48	-0.98	-9.13
8	3.75	41.82	0.09	1.02	2.8	30.37	2.12	23.62
9	2.03	21.77	2.24	23.16	3.39	38.52	0.91	9.59
10	1.16	12.56	3.4	41.55	2.64	30.16	-0.98	-10.14
11	1.61	27.52	2.13	31.62	2.75	42.55	2.05	32.28
12	-0.87	-16.68	1.25	25.17	0.79	15.49	3.4	108.18
Total	12.25		10.31		17.78		11.22	

Table 8. Table of 0 or Extreme Rainfall count for downstream point

	Model Name			
P/F	Can@r1	Can@r3	Can@r4	GFDL
P(0)	774	731	745	639
P(Ext)	11	13	11	14
F(0)	828	747	689	570
F(Ext)	21	21	31	5

3.2 Spatial Analysis

Figures 5, 7, and 9 prove to be inconclusive to project the rainfall intensities given the return periods. However, it is still worthwhile to look at the extreme scenarios because this could potentially have drastic effects on the river basin. In this section, the past rainfall intensities and change in future intensity of the top 2 models that gave the highest projections are investigated. The 2 models that consistently projected the highest values are MPI-ESM-MR@r1i1p1 and CanESM2@r5i1p1. The results of these models for the 50-year and 200-year return periods are plotted over the river basin to reveal the spatial distributions.

3.2.1 Return Period: 50 years

Figures 10 and 12 show similar distributions of the 50-year return rainfall for the past, with the southeast end of the basin experiencing the most amounts of rainfall and gradually decreasing in the northwest direction. Figures 11 and 13 show the amount of precipitation change for a 50-year return event projected by the models. The models agree that the eastern portion of the basin will experience the biggest increase of about 40-70 mm/day, with the difference being that model CanESM2@r5i1p1 projects the increase to extend higher to the north. The results also show that the same area experiencing the highest amount of rainfall in the present will have the highest increase in the future.

3.2.2 Return Period: 200 years

Figures 14 and 16 also show similar distributions of the 200-year return rainfall for the past, with the southeast end of the basin still experiencing the most amounts of rainfall and gradually decreasing in the northwest direction. Figures 15 and 17 show the amount of precipitation change for a 200-year return event projected by the models. The models also agree that the eastern portion of the basin will experience the biggest increase of about 80-125 mm/day. Model CanESM2@r5i1p1 again projects a bigger area of high increase in rainfall intensity. The results also show that the same area experiencing the highest amount of rainfall in the present will have the highest increase in the future.

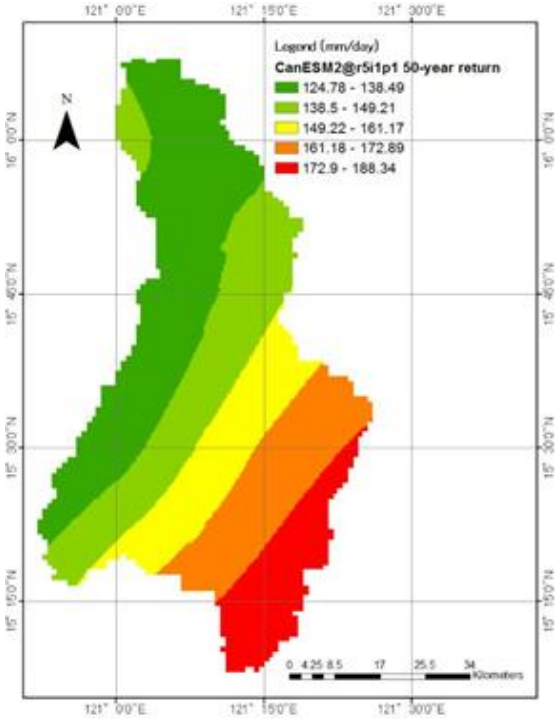

Figure 10. CanESM2@r5i1p1 50-year return period (past)

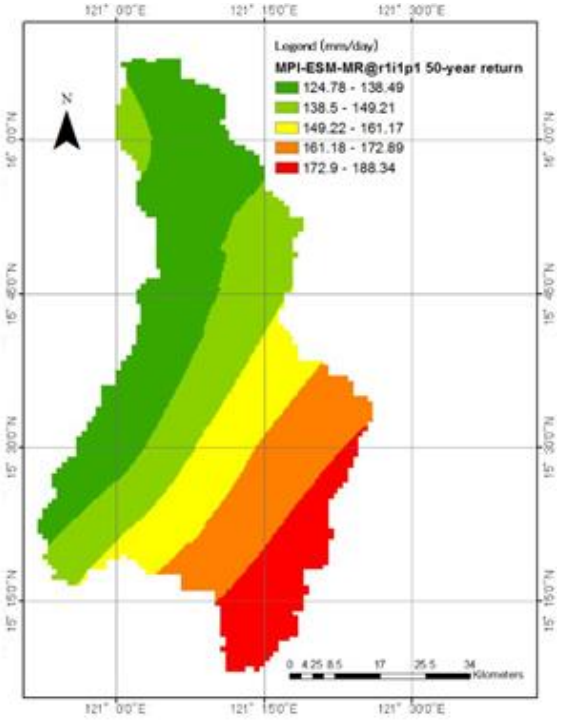

Figure 12. MPI-ESM-MR@r1i1p1 50-year return period (past)

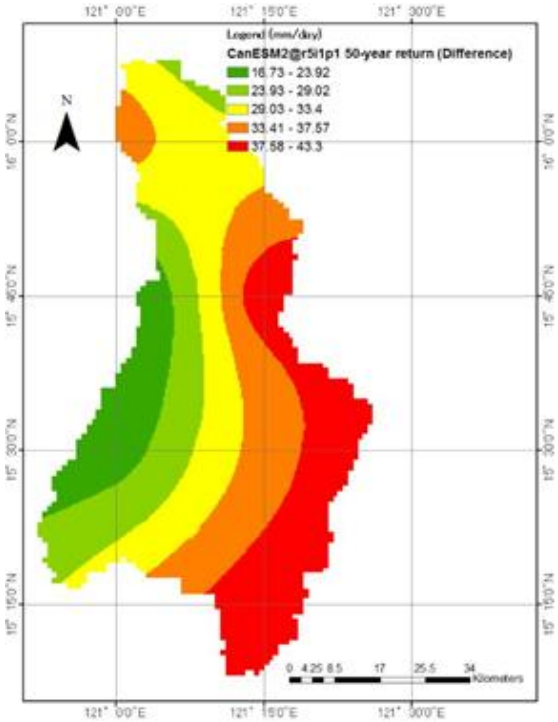

Figure 11. CanESM2@r5i1p1 50-year return period (Difference)

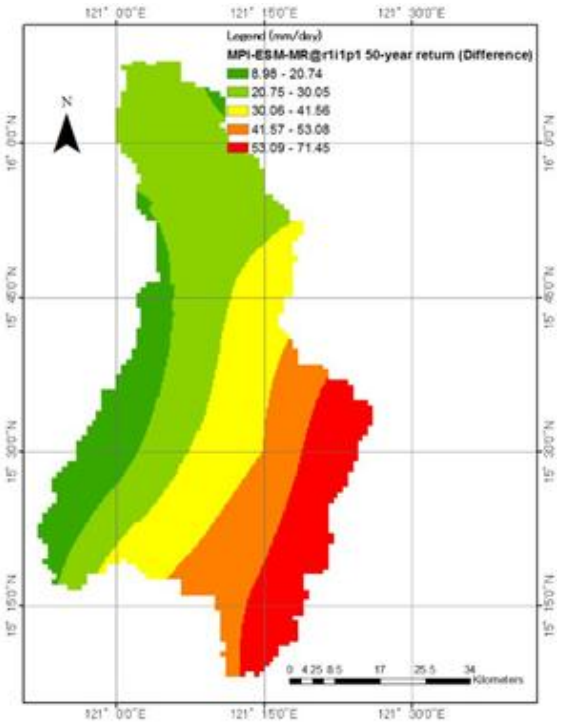

Figure 13. MPI-ESM-MR@r1i1p1 50-year return period (Difference)

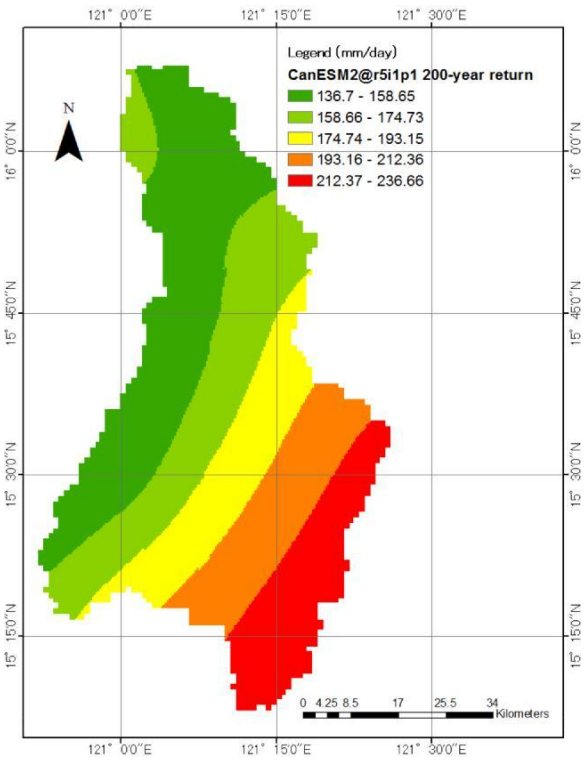

Figure 14. CanESM2@r5i1p1 200-year return period (past)

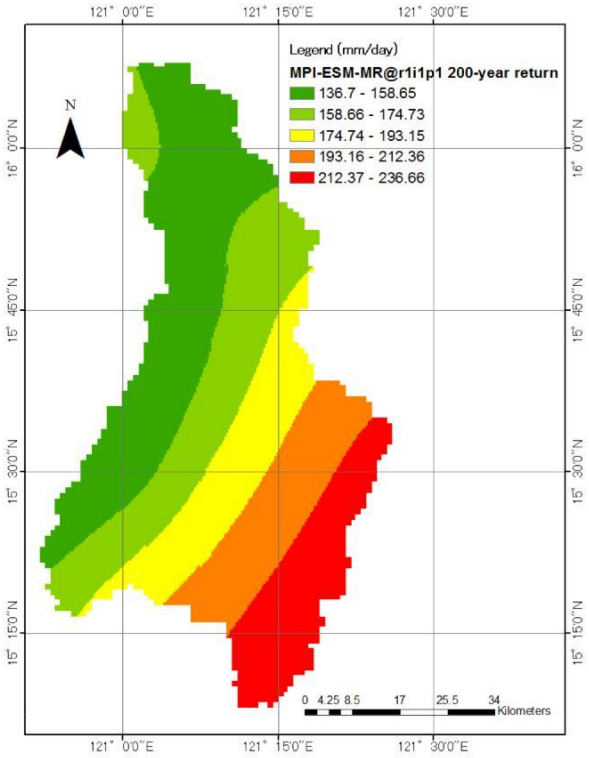

Figure 16. MPI-ESM-MR@r1i1p1 200-year return period (past)

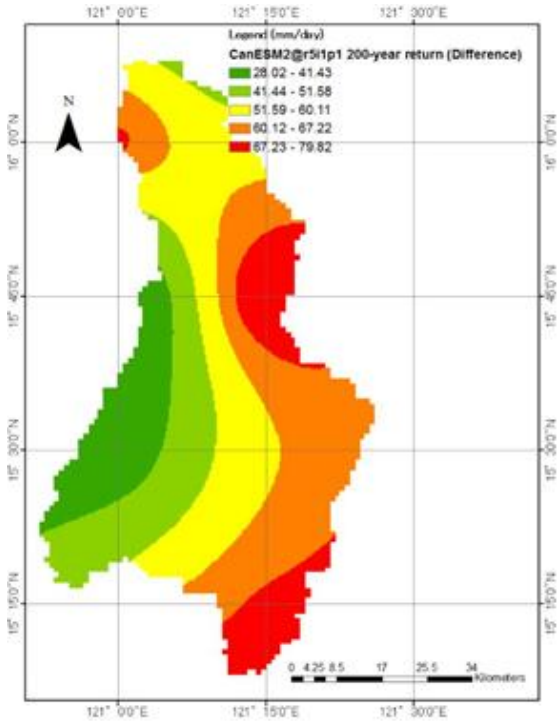

Figure 15. CanESM2@r5i1p1 200-year return period (Difference)

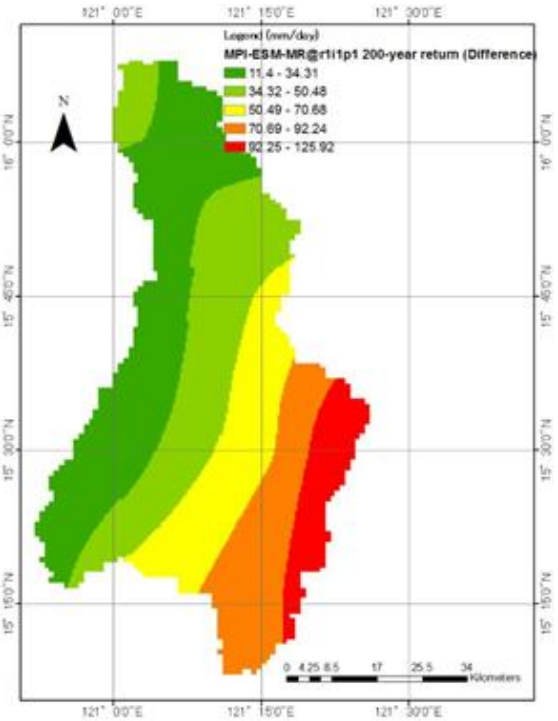

Figure 17. MPI-ESM-MR@r1i1p1 200-year return period (Difference)

4.0 CONCLUSION

The results of the point analysis show that the upstream, middle, and downstream points of the main river of the Pampanga river basin will all experience an increase in their total annual water budget for the years 2046-2065. The average amount of increase will probably be in the range of 6.5-18 mm/day of rainfall. This increase, however, will likely be concentrated to occur in the wet season (June-November). The models generally project a wetter wet season and a moderately drier dry season. Another important result from the models is that they all project that the number of extreme rainfall events is very likely to increase while the number of no-rain days is also expected to increase. These changing trends are critical to various stakeholders such as the agriculture sector, the water resource managers, dam operators, national and local government units, and also the local residents. With this new information, several preparatory actions can be taken such as: improvement of the water resource management to accommodate for the increase in water supply, modification of current agricultural practices to optimize crop yield, and strengthening of disaster response capabilities and resilience of vulnerable people. Although the projection of the future 50-year and 200-year return rainfall is unsuccessful, preparation for the worst case scenario can still be beneficial. The results of the spatial analysis show that in the worst case, the models predict an increase of 40-70 mm/day for the 50-year return rainfall which in the present is at 120-190 mm/day and an increase of 80-125 mm/day for the 200-year return rainfall which in the present is at 140-240 mm/day. These values are well beyond the threshold value of 90 mm/day for serious flooding. Preparations and adaptation measures should be planned and executed as early as now. These results are all based on the projections using the RCP8.5 emission scenario which is the most pessimistic case. Taking measures to prepare for the worst case scenario should also go together with enacting climate change policies to dampen the ill-effects of climate change in our near future.

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Cluster 4: Global Change and Sustainable Development

Barriers in scaled climate change adaptation policy in the Philippines

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ABSTRACT

The Philippines' domestic climate change policies represent a valid attempt at the insertion and coordination of the adaptation paradigm within existing institutional arrangements and legislative structures. However, as with any public policy, the challenge remains in the actualization of the adaptation paradigm in effective and implementable programmes and projects instigating climate-resilient development.

Though Philippine climate change policies and institutions have set in place various legal, financial, and social structures to enable adaptation options, key barriers still prevent the effective addressing of underlying vulnerability issues. It remains to be seen if the current policy system will be effective in reaching climate adaptation goals keeping in mind Philippine development priorities and political realities. The current policy system needs to be updated to reflect the needed changes concerning enhanced capacity development, flexible funding schemes, and other efforts to lessen the implementation gap.

KEYWORDS: *climate change, Philippines, climate policy, adaptation, development, Southeast Asia*

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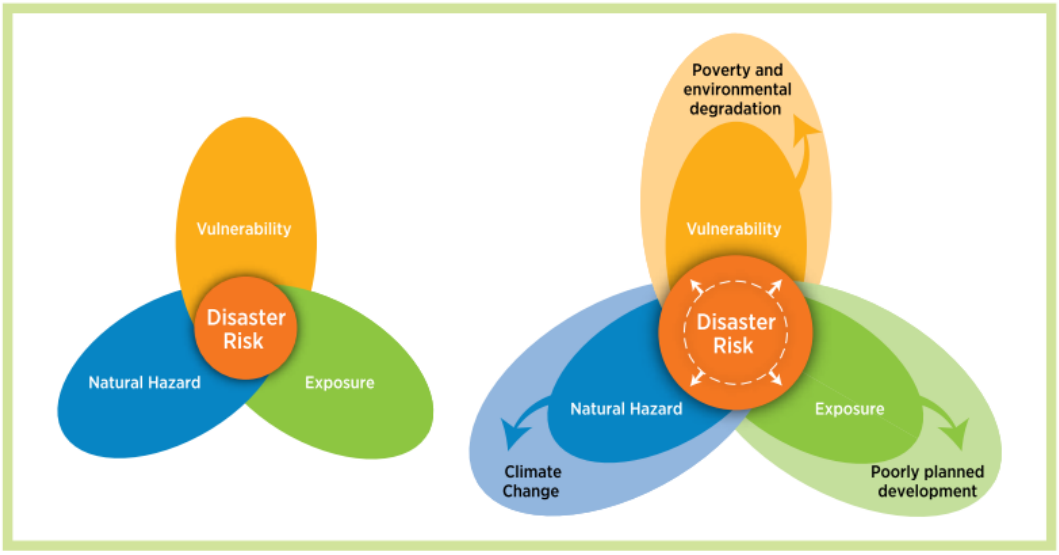
Introduction

Climate change is expected to heighten existing hydro-meteorological hazards by increasing the frequency and/or intensity of extreme events (IPCC 2007; IPCC 2012; IPCC 2013). These extreme events could lead to disasters which can significantly disrupt development objectives by risking lives, threatening livelihoods, and ultimately undermining poverty reduction efforts (IPCC 2012; Schipper & Pelling, 2006).

Developing countries are especially at risk because of several political, socio-economic, and cultural conditions contributing to their high vulnerability (Gitay et al., 2013). Focusing on the Philippines, the country is extremely vulnerable to climate impacts. Along with natural susceptibility to hazards, its rapidly increasing and urbanising population together with inadequately planned development have led to amplified disaster risk (Bankoff and Hillhorst, 2009). The need for adaptation is clear and should be a national priority (Gitay et al., 2013; Prabhakar, Srinivasan, & Shaw, 2009).



Source: Adapted from IPCC 2012.

Figure 1. Relationship between natural hazard, vulnerability, and exposure

Source: Gitay et al., 2013

To combat this, the recently enacted Climate Change Act 2009 provides institutional and legislative arrangements focusing on climate change adaptation (CCA), however, significant challenges still remain despite these policies. This paper aims to discuss some of these barriers to assess the

fundamental institutional and policy changes required to address anticipated climate risks in the Philippines.

Climate Change Adaptation Policy Framework

Adaptation is broadly defined as the adjustment in human arrangements in response to climate stimuli and their impacts (Adger, Arnell, & Tompkins, 2006; ADB 2009; UNFCCC 1992). It is a complementary and parallel response to climate change mitigation as it supports social and economic development using the vulnerability approach (ADB 2009).

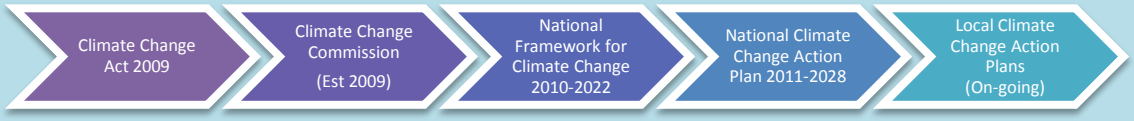
The Conference of Parties has consistently pushed for the adaptation agenda as early as 1992 with the United Nations Convention of Climate Change (UNFCCC) and more recently with the Bali Action Plan 2007, Cancun Adaptation Framework 2010, and the Doha Decision on Losses and Damages 2012, and other important landmarks (Gitay et al., 2013). They have also established funds like the Adaptation Fund, the Global Environment Facility, and the Green Climate Fund, which developing countries can use to finance their adaptation efforts (Fankhauser & Burton, 2011).

The Philippines is signatory to the aforementioned international agreements. The country recognises adaptation action to be linked with poverty reduction and development goals (Lasco et al., 2009). There have been significant efforts in planned adaptation activities resulting in the formal responses stated below (Box 1) (Füssel, 2007).

BOX 1. CLIMATE CHANGE ADAPTATION POLICY IN THE PHILIPPINES

The **Climate Change Act 2009** (GOP 2009) mandates three main formal responses:

- Creation of a climate change organization – the Climate Change Commission;
- Creation of a climate change framework – National Framework for Climate Change; and
- Creation of climate change national and local action plans – National and Local Action Plan/s for Climate Change.



All three responses have been operationalized. The **Climate Change Commission** is the main coordinating body for climate change-related policies and efforts (GOP 2009). They are supported by the **National Framework Strategy on Climate Change 2010-2022 (GOP 2010)**, which guides the development of national and regional (sub-national) planning processes.

In addition, the **National Climate Change Action Plan 2011-2028 (GOP 2011a)** outlines the detailed programs and strategies for adaptation and mitigation for different levels and sectors of government. The Plan created technical working groups to support the seven main priority areas (see Table B1).

In addition, in 2011, the Climate Change Act was amended to include the provision of long-term financing known as the **People's Survival Fund** to support climate change-related programme and project development for local government units and communities (GOP 2011b). As of November 2015, it is currently accepting proposals for 2015 to access its one Billion Philippine Peso fund. (Climate Change Commission 2015).

In October 2015, the Philippines communicated their **Intended Nationally Determined Contribution** to the UNFCCC. The country pledges to reduce its carbon equivalent emissions by 70% by 2030 relative to its BAU scenario of 2000-2030 conditional on international development assistance in terms of financing, technical development and transfer, and capacity building (GOP 2015).

Table B1. Priority Areas of the National Climate Change Action Plan

PRIORITIES	OUTCOMES
1. Food security	The objective of the national strategic priority on food security is to ensure availability, stability, accessibility, and affordability of safe and healthy food amidst climate change.
2. Water sufficiency	In light of climate change, however, a comprehensive review and subsequent restructuring of the entire water sector governance is required. It is important as well to assess the resilience of major water resources and infrastructures, manage supply and demand, manage water quality, and promote conservation.
3. Environmental and ecological stability	Ecosystem resilience and environmental stability during the plan period is focused on achieving one immediate outcome: the protection and rehabilitation of critical ecosystems, and the restoration of ecological services.
4. Human security	The objective of the human security agenda is to reduce the risks of women and men to climate change and disasters.
5. Climate-friendly industries and services	NCCAP prioritizes the creation of green and eco-jobs and sustainable consumption and production. It also focuses on the development of sustainable cities and municipalities.
6. Sustainable energy	NCCAP prioritizes the promotion and expansion of energy efficiency and conservation; the development of sustainable and renewable energy; environmentally sustainable transport; and climate-proofing and rehabilitation of energy systems infrastructures.
7. Knowledge and capacity development	The priorities of the NCCAP on knowledge and capacity development are: • Enhanced knowledge on the science of climate change; • Enhanced capacity for climate change adaptation, mitigation and disaster risk reduction at the local and community level; and • Established gendered climate change knowledge management accessible to all sectors at the national and local levels.

Source: GOP 2011

Key Barriers in Adaptation Policy in the Philippines

Adaptation policy in the Philippines faces several challenges. Working in a narrow framework of donor-driven and formal responses, there are limited mechanisms in place for local governments to source their own means of responsive capacity development and programme implementation. This severely hampers the realization of effective adaptation activities. This section will discuss the wide implementation gap between CCA policy and on-going activities in the Philippines, and it will also talk about the need for intensive capacity development efforts especially at the local level.

A. Strong efforts at localization but limited by the lack of capacity

The prioritization of the adaptation agenda is evident in the Philippines. The Climate Change Commission is headed by the President of the Philippines (GOP 2009), which gives much political clout for the adaptation agenda (IPCC 2012).

As the Philippines has a highly decentralized government, the relationship between the national and local government is crucial (Bankoff & Hillhorst, 2009). Current laws have designed and designated Local Government Units (LGUs) as the front liners and main actors in adaptation efforts (GOP 2009). Indeed, literature supports that localised management may be most effective because it is context-specific. LGUs can determine the cost they are willing to bear for an adaptation benefit. However, without the proper support and capacity development, most adaptation efforts may prove to be unsuccessful due to poor planning and faulty implementation (Dovers & Hezri, 2010; Füssel, 2007).

Government-led adaptation activities should rely on quality hazard, impact, and vulnerability assessments to inform the needed adaptation strategies for their jurisdictions (Hepburn, 2006). However, most LGUs lack the technical capacity to undertake such assessments, as they often do not have in-house expertise on climate change and/or disaster risk. Aside from this, they are also overworked. In addition to their usual government functions that require strict compliance, LGUs are also loaded with CCA-related local planning and activities. It is important to keep in mind that LGUs differ in political and socio-economic conditions and institutions. These can serve to enable or constrain effective adaptation actions (Prabhakar, Srinivasan, & Shaw, 2009).

To illustrate, access to funds and capacity are unequal, rural areas with small populations are disadvantaged. Most funding is centred on major cities due to fund prioritisation based on political, demographic, and economic considerations (Bankoff & Hillhorst, 2009). For example Metro Manila is especially targeted by the national government for development. It also receives large amounts of revenue via tax, and is further supported by foreign aid assistance. With “less important” areas left by the wayside, the Philippines may lose the opportunity to develop climate-resilient cities (Gitay et al., 2013; Hallegate, 2009; IPCC 2012). “Re-developing” climate-resilient cities are significantly more expensive since there is already sunk infrastructure such as transport and water facilities that may have to be relocated, removed, or retrofitted which is significantly more expensive (ADB 2009; Gitay et al., 2013, Hallegate, 2009).

B. Strong legislative arrangements but faulty implementation

Problems remain due to the dependence of the local government on the central government for guidance and finances to enable their desired activities. Most LGUs have very limited funding, time, and technical capacity for CCA-efforts as they compete with their other responsibilities (Bankoff & Hillhorst, 2009). To illustrate, due to limited local engagement, well-meaning national guidelines for local use are often conflicting with local concerns (IPCC 2012). This is exacerbated by short-term, inflexible, donor-driven, and unreliable funding schemes (ADB 2009; Fankhauser & Burton, 2011).

For example, the funds for Typhoon Haiyan have been mismanaged. Funneled through the Department of Social Welfare and Development, a national agency, the 782 million pesos ($18.2 million USD) earmarked for rehabilitation activities have not yet been disbursed. These cannot be released without the proposals of the affected local governments. This guideline was set in place to prevent corruption and to ensure fund availability (Herrera, 2014). These proposals are understandably delayed because the same local governments are overwhelmed, since they are also expected to handle the relief efforts and preventive adaptation efforts aside from tedious project proposal work which can be beyond their expertise.

The current funding structure is clearly inflexible as it commits funds towards a particular project for particular measure to be used for a certain period of time (Birkmann & von Teichman, 2010; Mertz et al., 2009). In addition, aid and other assistance are usually coursed through the national government, the focus on top-down mechanisms is emphasized. This is coupled with the lack of consideration for local political cycles, which can prevent meaningful adaptation action. Because of this, popular tokenistic relief efforts are prioritized instead of more obscure prevention activities. This can limit effective adaptation action due to the mismatch of the actual needs of the locality rather than the perceived generalities as are usually stated in national guidelines (Ford, Berrang-Ford, & Paterson, 2011).

Aside from this, the lack of predictable and sustained funding (10 years or more) has led to stand-alone projects and programmes (ADB 2009; Fankhauser & Burton, 2011; Lasco et al., 2009). The problem with singular endeavours is that it often fails to deliver its main objective – risk reduction (Lasco et al., 2009; Schipper & Pelling, 2006). For instance, in relation to CCA knowledge products, problems remain in making information available, reliable, timely, and appropriate for policy makers, adaptation practitioners, affected local communities, and other stakeholders (Birkmann & von Teichman, 2010). The context-specific implications of these knowledge products are hardly communicated to other relevant departments, government levels, communities, and industries. An example of this would be the downscaling of the A2 emission scenario for the sub-national level.

Funded by the United Nations, changing levels of precipitation and temperature for 2020 and 2050 were modelled on a provincial scale (PAGASA 2011). However, the information remained quantitative and could have been more effectively communicated and linked to policy goals. Subsequent efforts to leverage the results of the data were not in place. For example, the data in relation with farming strategies or water availability were neither evaluated in terms of food and water security nor were they communicated with the relevant departments and livelihood-based communities needing such research (Lasco et al., 2009; Pulhin, Tapia, & Perez, 2010).

In brief, unfortunately, despite relatively progressive policies, the Philippines is still largely limited by political interests and socio-economic realities. The Philippines may have decentralised CCA responsibility across scale, but they have failed to devolve important powers and developed capacities. Large CCA-related funding is still largely allocated by the national government and dependent on international sources (GOP 2009), which can be a slow, cumbersome, and political process. Local sources are often too small or already stretched due to competing priorities. Clearly, fast-tracked resources are needed to respond to the climate problem. The People's Survival Fund hopes to address this problem by simplified project proposals for local governments and communities (CCC 2015).

Way Forward: Need to Change Current Decision-making Processes

As previously illustrated, institutions largely determine policy implementation. In the Philippines like with other developing countries, institutions and policies tend to be largely reactive, fragmented, and rigid, which affects their corresponding CCA efforts. The climate challenge requires more responsive and reflective institutions and more flexible and robust policy structures (Birkmann & von Teichman, 2010; Mertz et al., 2009). This section illustrates some key changes needed to address the barriers discussed regarding CCA policy.

First, CCA efforts will benefit from more flexible means of finance. Climate change related funding should be broadened to include addressing the primary causes of vulnerability. Efforts aimed at development, poverty reduction, disaster, and many others can easily lend themselves towards CCA activities. As mentioned, the People's Survival Fund is an encouraging attempt as it seeks to support local projects with vulnerability considerations focusing on transformative change and no longer stop-gap solutions (CCC 2015). In truth, there is little difference in good development practices and CCA efforts because at both of their cores lies risk reduction and better preparedness to deal with impacts (ADB 2009; Gitay et al., 2013).

Second, it is important to uphold self-reflective measures like review systems. The current CCA policy in the Philippines only mandates the Framework to be reviewed every three years. National and Local Action Plans are not required to undergo review (GOP 2009; GOP 2010; GOP 2011a). Due to the uncertainty of climate change, it is imperative to move away from traditional methods of planned decision-making (Dovers & Hezri, 2010). Reliance on formal responses should be carefully measured as it may be maladaptive. The effectiveness of climate action is differentiated and context-specific because it is particular to each actor, agenda, activity, and timelines (Adger, Neville, & Tompkins, 2006; Hallegate, 2009).

For example, in Metro Manila, the emphasis on formal adaptation infrastructural measures can be problematic (IPCC 2012). In 2012, P352 billion pesos ($8.2 billion USD)-worth flood embankment plan was proposed (Esplanada, 2012). Without corresponding measures in soft adaptation strategies, this can be a maladaptation. The false sense of security can increase exposure for Metro Manila with more people moving into natural flood zones. Though the possibility of failure may be argued as minimal, in case it occurs, the result will be catastrophic (Hallegate, 2009; Moench, 2007).

It is important to remember that organic responses can be just as useful. They can also ensure coupled climate co-benefits. Practical solutions, for example no-regret, reversible, and soft strategies are not limited towards formal responses (Hallegate, 2009). In fact, the motivation for CCA may not even be significant or even present. However, adaptation efforts can rather be a positive externality in an attempt to address economic productivity and development objectives (ADB 2009; Gitay et al., 2013).

Third, there needs to be a more meaningful inclusion of more non-traditional partners such as civil society, universities, and the private sector (Dovers & Hezri, 2010). The effects of climate impacts are dissimilar and regressive as they are differentiated depending on an individual's or group's vulnerability (Gitay et al., 2013). Incorporating different stakeholders is essential in having a well-rounded approach to the climate problem. They diversify coping strategies, which increase the overall resilience of the system (ADB 2009; Dovers & Hezri, 2010).

For example, rural farming communities are, by nature, resilient as they are accustomed to dealing with the climate-dependent industry of agriculture. However, they may be unable to manage sizable and systemic shocks especially since climate change can bring hazards out of the realm of human experience (Dovers & Hezri, 2010; Gitay et al., 2013). LGUs can respond in various ways. Most notably, they can assist farmers with their farming strategies by also involving non-conventional partners such as civil society organisations and state universities who can aid farmers with more modern agricultural research for example in developing drought-resilient crops (Gitay et al., 2013). They can also involve the private sector, which can help by incentivising adaptation efforts through

economic instruments for example microfinance, which can be augmented by international funding as facilitated by the national government (ADB 2009).

Conclusion

Decisions affecting resource allocation are influenced by institutional values, limited by social norms, and constrained by political and economic realities (Dovers & Hezri, 2010). Immature institutions can constrain the availability and effectiveness of adaptation action (Adger, Arnell, & Tompkins, 2006).

The Philippines has clear and progressive institutional and legislative CCA-related arrangements. Further efforts are needed to leverage the strong interest and support of government for CCA activities. Aside from this, the effectiveness of adaptation actions should not only be based on cost-effectiveness but rather also on inclusive equity - how these costs and benefits will be distributed to those most in need (Prabhakar, Srinivasan, & Shaw, 2009) and legitimacy – how the distribution of these costs and benefits will be accepted (Adger, Neville & Tompkins, 2006). It is important to remember that all policy efforts are dependent on political, socio-economic, and cultural realities. The different motivations of value-rich institutions colours their decision-making processes with respect to resource allocation and access to these resources.

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Cluster 3: Population and Health

Healthcare Systems in Sub-Saharan Africa: Focusing on community-based delivery (CBD) of health services and the development of local research institutes

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ABSTRACT

There exists a continuously growing health care gap between Africa and the rest of the world. Sub-Saharan Africa (SSA) accounts for 11% of the world's population and bears 24% of the global disease burden. A total pipeline of up to $25-$30 billion is scheduled to be invested to address the need for healthcare assets such as hospitals, clinics and warehouse distribution in SSA. There have been major strides to alleviate the disease burden on the population of those affected as well as improve patient care. These have been limited to a number of Sub-Saharan African countries and therefore need to be implemented more widely within the region. Most importantly, more efficient strides need to be made towards investing in research institutes within the local community as well as the development of medical devices, products and services. Promoting community-based delivery (CBD) of medication, health services and social work in tandem with the pre-existing healthcare system will go a long way to increasing access to health facilities. The need for revising and implementing policies is for the greater gain of the public. There are high stakes involved including a very high level of commitment from various parties, but this is not insurmountable.

KEYWORDS: *Research institutes, Sub-Saharan Africa (SSA), Community-based delivery (CBD), health services, medication*

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HEALTHCARE SYSTEMS IN SUB-SAHARAN AFRICA

There exists a continuously growing health care gap between Africa and the rest of the world. Sub-Saharan Africa (SSA) accounts for 11% of the world's population and bears 24% of the global disease burden. However, this percentage of the world accounts for less than 1% of the global health expenditure. Over the last decade, as part of a healthcare improvement regime, a significant amount of financial aid worth over $8 billion has been allocated to SSA. The rural inhabitants succumb to and are victims of poor health care facilities, personnel and access to medication.[1,2,3] The most recent and biggest Ebola outbreak in West Africa highlights the loop holes and failures of the healthcare systems in Sub Saharan Africa. While countries like Mali, Nigeria and Senegal successfully contained the disease; other countries like Guinea, Liberia and Sierra Leone relied heavily on foreign help. The eminent need for capacity building and capacity enablement are highlighted alongside the one-sided benefit of international aid for economic development of research collaboration to the donor rather than the recipient.[10]

Despite the financial influx of capital from the international community, only a few countries in Sub-Saharan Africa are able to provide the minimum healthcare as defined by the World Health Organization (WHO) to be within the range of $34-$40 per person[3]. Estimates suggest that over the next decade, a total pipeline of up to $25-$30 billion is scheduled to be invested to address the need for healthcare assets such as hospitals, clinics and warehouse distribution in SSA.[1]

The Joint United Nations Program on HIV/Acquired Immune Deficiency Syndrome (UNAIDS) 2013 report depicts the HIV epidemic in Ghana to be a generalized epidemic with a prevalence of more than 1%. The HIV prevalence in Ghana is not generalized but varies with geographic regions, age and gender. Highest prevalence was recorded within 35-39 year age group with 43% prevalence in males and 57% in females. The following regions; Greater Accra, Western, Volta, Northern, Upper East and Upper West recorded the highest increase of prevalence in 2012. In the Northern region for example, service providers revealed an increase in young (15-30 years) nubile female head porters. The health facilities see a noticeable increase in these ladies with advanced HIV infection and subsequently dying from AIDS related complications.[12]

Having spent a month working with Society for Women Living with AIDS in Africa (SWAA) in partnership with UNAIDS, I had the opportunity to visit 3 socio-economically deprived regions of Ghana. We visited some health facilities in rural areas of WA, Tamale and Bolgatanga all in the Northern region. The healthcare system in Ghana requires the patients to visit the Anti-retroviral Drugs (ARV) Center monthly for their ARV and a GHC5.00 surcharge. A recurring problem highlighted was the lengthy journey times in order to access treatment at the ARV centres in addition to the surcharge. On average, the closest ARV centres in these regions were over 5km away from their residences, which was a financial burden in terms of transport costs. This lack of remote access was identified as a leading cause of the increase in HIV-related morbidity and mortality especially among

the women in the region. In addition to this, there was a lack of HIV testing commodities and a shortage of staff thus longer waiting periods for monitoring of CD4 counts. A lack thereof of viral load testing equipment and reagents as part of quality ARV service delivery was raised. As a result, critical steps must be taken to properly address this malaise.

WHO outlined the key components of a functional health system; they include the following: improving individual's health, defending the population from factors of a threat to national health, protecting against financial consequences of ill health, providing equitable access to people centered care and involving people in the decision-making process affecting their health and healthcare system.4 Access to essential medical products and technologies is essential to a national health system as well as ensuring the health delivery systems are reliable and convenient.

Findings from research conducted by the International Finance Corporation – with help from McKinsey & Co – on the main problems in Africa's healthcare system and possible solutions highlighted 5 imperative solutions, namely[1]:

1- Developing mechanisms for creating and enforcing quality standards for health services and medical product manufacturing and distribution.

2- Including as many of the population in risk pooling programs.

3- Channeling a proportion of public and donor funds through the private sector.

4- Enacting local regulations that are more encouraging of the private health care sector.

5- Improving access to capital, including by increasing the ability of local financial institutions to support private healthcare enterprises.

This short brief and communication focuses on the first point for the various reasons; the medical product manufacturing and distribution has potential to be most profitable in the SSA, albeit not being exploited sufficiently. Across SSA, local pharmacies play a major role in subsidizing the hospitals and clinics' financial income; for example there is a Kenyan outpatient clinic with up to 70% of its profit originating from their pharma department.[1] Nigeria is a prime example whereby monopolies strive with one leading pharmaceutical manufacturer supplies to over 100 outsourced distributors out of a possible 724 medical licensed distributors. This highlights the market domination by a handful of companies and the need for development and diversification, as dependency on one source is risky.

This lays emphasis on the need to improve and innovate medical product manufacturing and distribution of medication as well as healthcare services.

A general concept that eventually coined the term community-based delivery (CBD) has shown success in various countries with different applications. The focus within this context is placed on the healthcare workers deployed by the government or non-governmental organizations (NGO) to deliver services to the community. This has addressed a major shortage of human resources within low and middle-income countries and improved the quality of the healthcare system. The deliveries of insecticide-treated nets in Kenya and preventive malaria treatment in Southern Malawi are a few examples where CBD has been a success. In community-based sites in Kenya, there was an increase in bed net ownership from 21% to 61.1%. In Southern Malawi, preventative malaria treatment coverage increased from 41.5% to 81.9%.[5, 6] The results from this study showed a general increase in effectiveness of this delivery approach.

Innovative technologies and approaches will further effectuate the delivery of healthcare reforms. Bangladesh is reputed for being one of the first few developing countries to implement innovative technologies, policies and approaches towards improving their healthcare system. There has been a surging increase in government partnerships with local NGOs and institutional research to foster the development of innovative technologies, which are beneficial to the specific population. These techniques have seen the development of oral rehydration solutions and designing community-based family planning programs.[8]

South Africa is looked upon as a hub for life sciences innovation in SSA. It finances, encourages and fosters the development of its innovation industry revolving around existing research capabilities. The government funded and fostered the development of telemedicine in Tsilitwa, a suburb in the Eastern Cape of South Africa. The nearest hospital to Tsilitwa is 10 miles away with no connecting roads. South Africa's Center for Scientific and Industrial Research equipped Tsilitwa's health centres with the necessary equipment to allow live feed and communication between the nurses at the clinic and doctors in the hospital. This clinic attends to about 10,000 patients monthly and has no doctors physically present. This demonstrates that technological innovation will go a long way in bolstering the healthcare system across the given population based on the common ills identified. This should thus result in higher attendance rates for patients, speed of patient dispatch by having the appropriate number of doctors on-site. In addition, the positive feedback loop this system creates extends far beyond the creation of the technologies but also education and job opportunities. On a larger scale, by creating a robust healthcare system characterised by sophisticated technology platforms, the population should progressively become self-sustainable with little or no reliance on foreign aid. An estimated $1 billion allocated towards pharmaceutical production1 in SSA has over 70% concentrated in South Africa alone. Nigeria, Ghana and Kenya represent about 20% of this continental fund.

Swipha, located in Nigeria could be used as a case study as a leading generics manufacturer with potential and room for growth. Bio24 is another example in Senegal of a growing diagnostic laboratory with services in high demand to health providers, research centers and the general public. The system offers opportunities to the population for novel approaches and solutions towards local health challenges.

While the evolving technology development increases, there is a vital need for government policies to be instated or reinforced to allow for the translation of the changes to be observed by and among the general public. This creates a strategy for the implications into human resources, pharmaceuticals, and technology infrastructure and service delivery placing relevant guidelines, plans and targets for subsequent implementation. Africa's pharmaceutical industry rose from $4.7 billion in 2003 to $20.8 billion in 2013 and expected to climb to $3.3 trillion by 2020. The cumulative growth is a product of 10 countries (Algeria, Egypt, Kenya, Ivory Coast, Libya, Morocco, Nigeria, South Africa, Sudan and Tunisia) out of the 54.[11] This highlights the need for expansion and creation in the other 44 countries.

Taking into account the estimates projected for the next decade of investment into healthcare systems in Sub-Saharan Africa, creating research institutions for technological development and innovative delivery approaches, as a venture for investment, is absolutely vital. This takes CBD a step further by not only delivering services to the inhabitants but also creating an environment and providing a platform for social education, fostering innovation of technologies, ideas and novel approaches whereby the community at large can contribute to the development of a more sustainable healthcare system and alleviate dependency on foreign aid. The lack of on-going research detracts potential scientists in the diaspora from returning to their country of origin to pursue their careers as there is a feeling of reaching a "final ceiling" with no room for further progression. The lack of incentives further result in brain drain in Sub-Saharan Africa with only 3% of healthcare professionals and experts deployed to rural regions.[1, 8]

The Trade-Related Aspects of Intellectual Property Rights (TRIPS) agreement supported by the Doha declaration reiterated; "it does not prevent members from taking measures to protect public health." UNAIDS executive director, Michel Sidibé stated, "countries should not trade away the public health of their people for other trade gains."9 This places a call on governments of SSA countries to take advantage of this agreement and invest in the local manufacture of essential drugs and encourage CBD. This entails interdisciplinary cooperation between different sectors including policy makers, research scientists, healthcare training personnel and economists directing the flow of funds into each project. There are high stakes involved including very high level of commitment from various parties but this is not insurmountable. It is imperative that local governments in partnership with local NGOs and enthusiastic investors jointly address the issue of community-based delivery services. Investments in essential medical products and technological research and development in local communities

should be encouraged both finically as well as via widespread education as this creates a social village.

Endnotes:

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Cluster 1: Peace, Security, and Human Rights

Legality of the 1989 Panama Invasion and the "Responsibility to Protect" doctrine

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ABSTRACT

The morning of 20 December 1989 marks the first US military intervention that was not related to the Cold War since 1945. This event, codenamed as Operation Just Cause by the Pentagon, is simply remembered as "the invasion" by Panamanians. This unilateral intervention violated international laws, regional agreements and bilateral treaties. This paper explores each of the reasons that then President George H. W. Bush cited to argue the legality of the intervention, and tries to assess the validity of each of them. An overview of the international community's reaction coupled with the aftermath of the invasion sets the scene to explore what role could the Responsibility to Protect (R2P) principle have had if it existed during that period.

KEYWORDS: *Responsibility to Protect, Panama invasion, Intervention*

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I. INTRODUCTION

Most Panamanians will agree the country would not be enjoying today's growth if the political landscape had not changed in the early 90s. Changes triggered by the overthrow of General Manuel Antonio Noriega's dictatorship during the 1980s through an invasion carried out unilaterally by the USA violated international laws, regional agreements and bilateral treaties. On one hand, it is difficult to approve the infrastructure destruction and the thousands of deaths left by the invasion, especially for the surviving families; on the other hand, it is naive to think that the country would have achieved the same prosperity that it is enjoying today without the US intervention to remove the military hegemony over Panamanian politics. The next question to explore, then, is if there could have been a better approach to address the situation— a solution that could have achieved a better balance between diplomacy and some type of international intervention, without the massive destruction and civilian casualties that resulted from a unilateral decision to invade a country.

Furthermore, what would have happened if the United Nations had had the legal arguments to rightfully intervene in Panama through a set of resolutions supported by the international community and had implemented it in a comprehensive way, including a recovery plan to address civil security and judicial warranties? This is in contrast to the exit strategy used by the Bush administration, which considered only the retrieval of the military forces without any plan for the stabilization of the country to deal with the aftermath of the intervention.

II. RELEVANCE OF THE EVENT

The morning of 20th December 1989 marks the first US military intervention that was not related to the Cold War since 1945. It was the first attempt to shift foreign policies to pursue interventions under moral and ideological grounds. These ideals were fostered by the fall of the Berlin Wall one month earlier, a structure that for all its purposes represented the division of the Cold War. Its fall signaled the emergence of the US as the remaining power, with the desire to defend democracy under its own terms. This view of democracy was articulated by US ambassador to the Organization of American States (OAS), Luigi Einaudi. Addressing the OAS delegates within two days of the US military force invasion he warned of "a time when a great principle is spreading across the world like wildfire. That principle, as we all know, is the revolutionary idea that people, not governments, are sovereign."

This point of view, if it becomes widely accepted, can dangerously throw some serious ambiguity in the interpretation of Article 2(1) of the UN Charter where "sovereign equality" is recognized for "all its members". Based on Article 4(1), the members of the UN are defined as "peace-loving states", and not specifically the people. Redefining who actually enjoys the sovereignty status matters because actions can be pursued against one state claiming that Article 2(1) is not being violated if the sovereignty of the majority of the population of such states is not affected. This idea was exercised in the Panamanian invasion, with the US claiming that its decision was widely accepted by the Panamanians.

The invasion of Panama also represented a whole new era of US warfare evolution, where 24,000 troops were mobilized and dozens of targets were destroyed within 24 hours. This was orchestrated through multiple military divisions representing a level of coordination and technology unseen before, including the usage of smart-guided bombs. This intervention provided the template to be followed a year after during the first Gulf War operation codenamed Desert Storm in January 1991. It can be said that Desert Storm implemented the lessons learned in Panama, not only in terms of the high level of coordination and new weaponry usage, but also in terms of the clear guidance followed by the US forces. This became known as the Powell Doctrine, named after Colin Powell, the US Secretary of Defense under President George W. Bush.

Among the questions that the Powell Doctrine requires asking before engaging into a conflict situation, is whether or not the American people support such actions. With the Panama invasion, authorities sought to attain this by bombarding American viewers with live feeds of the invasion, using a tactic of shock-and-awe journalism. This was a stark contrast from past conflicts where most military activities were carried out in secret, or public information was at least delayed for days. The new strategy proved to be an effective tool to secure the popular acceptance, and it eventually became a standard model during Desert Storm.

III. POLITICAL CONTEXT PRIOR THE INVASION

As with most military interventions, the set of events that culminated with the US invasion in Panama was not only the product of Panamanian socio-political turmoil and the "noble" pursuit of the US to ensure democracy throughout the region. It was also induced by pressures on the Bush administration from his constituents clamoring for foreign policy changes, and by the embarrassment for failing to control Noriega, a well-known ally and asset of the US Government. This embarrassment became evident a year before the invasion, when in 1988, the US Senate Subcommittee on Terrorism,

Narcotics and International Operations declared: "The saga of Panama's General Manuel Antonio Noriega represents one of the most serious foreign policy failures for the United States. Throughout the 1970's and the 1980's, Noriega was able to manipulate US policy towards his country, while skillfully accumulating near-absolute power in Panama."

Noriega became a CIA asset even before consolidating his power back in 1983 when he took command of the Panama Defense Forces (PDF), while he was still in the Military School of Chorrillos in Peru. During his first few years as a CIA asset, Noriega was a key ally in the prevention of the spreading of communist regimes across Central America. He even served as an intermediary for financing and arming the "Contras" in Nicaragua, and was still under the CIA payroll until February 1988. Noriega's utility was not only limited to the CIA, but also to the Drug Enforcement Administration (DEA) where he acted as an operative against the drug trafficking in the region. A reason which eventually led to his downfall was when he double-crossed the DEA by also supporting the Medellin Cartel. Noriega facilitated money laundering through the national banking system, thus effectively betraying both sides at the same time.

In the political sphere, there wasn't any resemblance of free democratic elections during Noriega's regime. Presidents were appointed and removed by his will. In 1984, after allowing Presidential elections and upon foreseeing the victory of the opposition party, he stopped the process and declared the victory to Nicolas Ardito Barletta Vallarino. Later on, after providing some comments to the US press that he was going to pursue the gruesome murder of a known adversary of Noriega's regime, Vallarino was forced to step down, appointing the vice president as his replacement. In the May 1989 elections, after the opposition party won the election, Noriega once again nullified the results, calling upon the illegal contribution that the Bush Administration provided for the campaign of the elected president Guillermo Endara.

The moment which marked the end of Noriega's usefulness to US interests was not brought about by the gross violations of human rights in the country, or his complete disregard of the Panamanian political process. It started with the US announcement of drugs as a major threat to American society— a change of policy that occurred while a Federal Court in Florida indicted Noriega under charges of drug trafficking and racketeering in February 1988.

At that point, the US government was more actively seeking the removal of Noriega, by urging a change of command to the Panamanian military officers. This ended up in a failed attempt to overthrow Noriega's regime in October 1989. A set of economic sanctions and asset freezes from the US in the months preceding the invasion resulted to the Panamanian National Assembly declaring a "state of war" with the US on 15 December 1989. A day after, during an incident in Panamanian territory outside the US-controlled zone, a US soldier under civilian clothing was killed in a military

road inspection. The next day, on 17 December 1989, President Bush gave the order to invade Panama. The invasion commenced in the morning of 20 December 1989.

IV. LEGAL REVIEW: US REASONS FOR THE PANAMA INVASION AND INTERNATIONAL LAW

In his 20 December 1989 address regarding the military actions to be taken by the US forces, President George H. W. Bush cited four reasons for the intervention: *"to safeguard the lives of Americans, to defend democracy in Panama, to combat drug trafficking, and to protect the integrity of the Panama Canal treaty."* Reviewing each of these four reasons under International Law, Customary Laws, Regional Agreements and bilateral treaties, serious doubt of the legality of the actions taken by US can be raised.

Furthermore, not only International Laws were broken, but US national Laws as well. During the second day of the Panama Invasion, President Bush sent to the Congress a report justifying the motive of the military intervention in Panama in accordance with the War Powers Resolution enacted in 1973. The third section of the Resolution requires a report to be sent to the Congress within 48 hours of any military intervention; more important than this, however, is the provision under the second section which stipulates that "The President, in every possible instance, shall consult with Congress *before* introducing United States Armed Forces into hostilities or into situations where imminent involvement in hostilities is clearly indicated by the circumstances, and after every such introduction shall consult regularly with the Congress until United States Armed Forces are no longer engaged in hostilities or have been removed from such situations."

It is evident that the President failed to comply with the provision to conduct due consultations with the Congress *before* engaging in an armed conflict. The purpose of the law is not only to ensure that both branches of the government can fully grasp the repercussions of the decisions, but also to prevent any unilateral decision driven by passion rather than rationality from one person who can be influenced by personal feelings and beliefs. Such was the case for the military actions in Laos and Cambodia authorized by President Nixon; the consequences of these unilateral decisions led to the enactment of the War Powers Law.

It is also important to consider this law under the uniqueness of each situation. Setting the requirement of consultation as *"in every possible instance"* implies there is some room for flexibility on this, based mainly on necessity. Such was the case when President Carter sent American commandos without any consultation to release US hostages in Tehran given the time urgency of the situation. But

one can hardly argue that the events developing in Panama required a time-constrained decision to involve the country in an armed conflict. Moreover, it can be argued the decision was greatly influenced by a passionate rationale, considering that the order to invade came within 24 hours of the isolated death of a US serviceman.

A. Safeguard the lives of American

The actions undertaken in 1989 by the US are in clear violation of the provisions under Article 2(4) of the UN Charter where the "threat or use of force" is strictly prohibited, even if we consider the exception under Article 51 where "Nothing in the present Charter shall impair the inherent right of individual or collective self-defense if an armed attack occurs against a Member of the United Nations". First, the incident that resulted to the death of one American serviceman on the night of December 17 cannot be categorized as an armed attack to call upon this exception. Second, preemptive attacks on the fear of possible future incidents are not permitted, assuming that the declaration given by the Panamanian National Assembly of being at a "state of war" represented a credible threat. Considering that the context of the declaration was in response to the sanctions imposed and military maneuvers done by the Bush Administration, it can be presumed that the statement was oriented to refer the status of the relationship between the two governments rather than an actual war declaration. Moreover the Bush administration was never able to provide any evidence of future threats or attacks; neither was it able to justify the fear that the US citizen couldn't be safely protected within the restricted American-controlled Canal Zone.

The invasion also violated regional agreements under the Organizations of American States. Article 21 of the OAS Charter declares that "The territory of a State is inviolable; it may not be the object, even temporarily, of military occupation or of other measures of force taken by another State, directly or indirectly, on any grounds whatever." International Customary Laws were also broken, as the proportionality and efforts to minimize collateral damage were not taken.

The well-known Entebbe Principle was also clearly disregarded. This principle, based on an incident where Israeli nationals were targeted when a French Airline plane was hijacked and forced to land in Uganda, is considered to be a textbook execution on how to protect nationals abroad. During the incident, Israeli forces, without authorization of Uganda's government, assaulted the plane in a rescue operation. In this case, three main concepts can be highlighted. First, there was an *immediate and real threat* in the hostage situation, where the lives of the hostages were being endangered, and time could not be spared for lengthy negotiations. In contrast, there is a lack of evidence that a pacific solution could not have been achieved in the Panama case; this is especially evident considering that prior to the invasion, negotiations were already being conducted with Noriega for him to step down as

General of the PDF. Second, the Ugandan military helped the terrorists by separating Israeli nationals from non-Israeli passengers in an *active act* that can be viewed as *supporting the targeting of Israeli nationals*. Meanwhile in the case of Panama, the "state of war" declaration did not actively target individuals, but rather relationships between nations. Third, the hostage rescue operation performed by the Israeli forces was considered successful since the *proportionality* of the intervention itself ensured minimal casualties as possible while assuring the maximum amount of gains possible; in contrast, the tactic used by the US forces called for a shock-and-awe intervention by sending as much force as possible without concern of the international opinion, without apologizing for doing what was needed get the job done.

B. Defend Democracy

There is no provision either in the UN Charter or the OAS Charter that allows any type of intervention of one state in the affairs of another state regarding their political system. There are, on the other hand, explicit articles that prohibit such interference. Article 2(1) of the UN Charter stipulates the protection of both the "territorial integrity" and the "political independence of any state" from any threat or use of force. Article 19 of the OAS Charter declares that "No State or group of States has the right to intervene, directly or indirectly, for any reason whatever, in the internal or external affairs of any other State. The foregoing principle prohibits not only armed force but also any other form of interference or attempted threat against the personality of the State or against its political, economic, and cultural elements." In 1986, three years before the Panama invasion, the International Court of Justice declared the following regarding the Case Concerning Military and Paramilitary Activities in and against Nicaragua (more popularly known as the Nicaragua v. United States of America case): "The Court cannot contemplate the creation of a new rule opening up a right of intervention by one State against another on the ground that the latter has opted for some particular ideology or political system."

The only provision that could have been called upon to legitimize the US invasion was if the legitimate government of Panama had invited the US forces to enter the country to help with efforts to capture General Noriega. Arguments have been made that the regime of Noriega was an illegitimate one, and the legality of the intervention was to seek the restoration of sovereignty and democracy back to the people of Panama. The gap in this argument lies in the fact that no such request was arranged by the incumbent government at the time, or by Guillermo Endara, whose 'rightful' presidency was illegally nullified eight months earlier. The United States cannot assume that an invitation has been extended to them by the general population, no matter how popular the intervention might seem among the citizens.

Furthermore, when the Bush administration supported the electoral campaign of Guillermo Endara with 10 million USD as a way to change the political command, and sent messages urging a military coup to overthrow General Noriega, the US government arguably already violated the articles earlier mentioned regarding the political sovereignty of Panama even before the invasion. Such message was taken into action on October 3, 1989, when Moises Giroldi, a trusted officer of Noriega, organized a joint attempt with the US army stationed in Panama to capture the General. The plot failed and ultimately resulted in the torture and murder of Giroldi.

C. Combat Drug Trafficking

In a letter sent to the Speaker of the House of Representatives by President Bush in December 21, 1989, he explains that one of the goals of the US invasion in Panama was *"to apprehend Noriega and bring him to trial on the drug-related charges for which he was indicted in 1988."* In 1989, the United States Justice Department considered that there was no violation of US laws if US military apprehended drug traffickers in other states without the consent of such states. However, this does not preclude the fact that such an action is still in violation of International Law in matters of state sovereignty, where a state cannot send forces without the consent of the implied state agents for the capture of a person to be detained somewhere else. Issues such as basic human rights can be called upon, where an individual has the right to be detained under a recognized legal authority and thus have access to recognized legal courts to appeal the charges. Given that the presence itself of the US forces was illegal and unrecognized by any legal authority, the arrest conducted by the DEA agents can be constituted as illegal and in violation of Noriega's human rights.

A similar circumstance can be recalled, in a better-known case which is universally-recognized as a violation of international law: the abduction of Otto Adolf Eichmann, a major architect of the Holocaust, in 1960 by undercover Israeli Mossad intelligence agents. The said agents illegally entered Argentina to bring Eichmann to stand trial in Israel. This series of events resulted in his death sentence in 1962. When confronted by Argentinian objection of the incident, Israel admitted this violation and apologized for the events. But important differences can be drawn from these two events. First, Israeli intervention in Argentina was *limited to a small covert operation* in contrast to the 24,000 troops sent by the US to Panama. Second, the *collateral damage consequence of the operation was basically non-existent* in the former case, compared to the widespread destruction in the latter, produced not only during the US invasion itself, but also from the looting that followed afterwards. Third, it was evident that the Israelis had *no intention to interfere in the political sovereignty* of Argentina, whereas in the case of Panama, President Bush explicitly declared that the political dimension was a key factor in the US intervention.

D. Protect Integrity of the Panama Canal Treaty

Since its conception, the treaty that granted US permanent control of the Panama Canal and its management was opposed by the country and was a constant source of conflict between the two nations. In 1973, the United Nations Security Council met in Panama City to draft a resolution to pave the way for a solution to the disagreement, but it was eventually vetoed by the US. In 1977, President Jimmy Carter seized the opportunity to negotiate the return of the Panama Canal and all the associated assets back to Panamanian control when he recognized that the strategic value of the Canal had diminished in recent years. As a consequence, two new treaties were signed. The Panama Canal Treaty refers to the transfer of assets to Panama by December 31, 1999. The second one, the Treaty Concerning the Permanent Neutrality and Operation of the Panama Canal, provides the legal rights for the US to defend the Canal against an armed attack by an outside power. Under the Reservations a(1), the Treaty states, "the United States of America in the exercise of its rights to assure that the Panama Canal shall remain open, neutral, secure, and accessible… shall not have as its purpose or be interpreted as a right of intervention in the internal affairs of the Republic of Panama or interference with its political independence or sovereign integrity."

Once again, it becomes evident that under the bilateral treaties signed between Panama and the US, there are explicit prohibitions for any type of intervention and political interference against state sovereignty. It is noteworthy to highlight that the last of the four reasons provided by President Bush for the Panama invasion does not claim the exercise of the Treaty itself. Instead, it claims to protect the "integrity" of the Panama Canal Treaty, as if using the same basis of preemptive actions. Once again, we see a line of reasoning which assumed, without solid evidence, that more lives were at risk, or in this case, that somehow the operation of the Panama Canal could have been at risk. Any legal argument that may be invoked to support this preemptive rationale, such as those in the UN Charter, does not apply, since both scenarios of perceived risk require an armed attack to occur to be able to act upon these provisions.

V. AFTERMATH OF THE INVASION

Operation Just Cause, the codename for the Panama Invasion, was considered to be an efficient military operation- executed fast and simple, with the presence of ground troops for only a couple of weeks since their insertion on December 20th, achieving their final objective of capturing General Noriega on January 3rd, and leaving days after. According to Brigadier General John Brown, a

historian at the United States Army Center of Military History, Operation Just Cause was "one of the shortest armed conflicts in American military history." But this 'effective' exit strategy from the tactical military standpoint took a high toll on the human security aspect.

Up until today, the final number of civilian casualties remains unknown. Numbers range from 300 based on early estimates by the Pentagon, and go up to 3,000 based on a report from a delegation of The Commission for the Defense of Human Rights in Central America (CODEHUCA) sent in 1990. A report done by Human Rights Watch in 1991 asserted that "American forces violated the rule of proportionality, which mandates that the risk of harm to impermissible targets be weighed against the military necessity of the objective pursued… Under the Geneva Conventions, attacking forces are under a permanent duty to minimize harm to civilians. We concluded that the command of the invasion forces violated that rule."

Ensuring basic security beyond the military intervention was apparently not contemplated. Looting and crime impunity afflicted Panama City for weeks under the US military watch. Economic losses hit local enterprises, and a group of 60 of those afflicted filed a joint lawsuit in the Federal District Court in New York City against the United States Government in 1991. An aid package promised by the Bush administration of 1 billion USD, out of the 2 billion USD estimated as damages caused by the invasion, had also proven to be ineffective. Most of the fund transfers were either delayed as a political pressure mechanism, or they were directed to pay debts that affected US institutions, making direct contribution to the affected and displaced families only a small fraction. For the first 500 million, only 42 million were disbursable directly for humanitarian aid.

VI. INTERNATIONAL REACTIONS TO THE EVENTS

In December 22, 1989, a draft resolution condemning the US invasion of Panama submitted by Algeria, Colombia, Ethiopia, Nepal, Senegal and Yugoslavia to the Security Council recalling Article 2(4) declared that it "strongly deplores the intervention in Panama by the armed forces of the United States of America, which constitutes a flagrant violation of international law and of the independence, sovereignty and territorial integrity of States" and "demands the immediate cessation of the intervention and the withdrawal from Panama of the armed invasion forces of the United States." The draft resolution was vetoed by France, United Kingdom and US. Seven days later, in December 29, 1989, an almost identical resolution, A/RES/44/240 was passed in the General Assembly instead by 75-20 votes, with 40 abstentions.

On a regional scale, the OAS voted on December 22 by 20-1, with 6 abstentions on a resolution OAS CP/Res. 534 (800/89), where it expressed a "deep(ly) regret [for] the intervention in Panama" and was demanding a "call for the withdrawal of the foreign troops used for the military intervention" advocating for "the right of the Panamanian people to self-determination without outside interference."

Although on both instances the resolutions condemning the US actions were passed, the vote result on the UN General Assembly provides some hints that the actions taken by US, even though not widely accepted, were not hugely deplored either. There was little doubt that the democracy in Panama was in a precarious situation at best, with little room for the international community to act upon. It is probable that the vote result reflected just the conflict between the need to do something versus the legal means to do it.

VII. RESPONSIBILITY TO PROTECT: A RETROSPECTIVE REVIEW

It is clear that under International Laws, including the UN Charter and the OAS Charter, there were no provisions back in 1989 to legally intervene with a military action to remove General Noriega from power. His actions did not demonstrably put international peace and security at risk enough to activate the Security Council to take actions. Furthermore, considering the right of each state to sovereignty, self-determination and political independence, the oppressive regime conducted Noriega, although wrong, seemed to be protected. But would it have been that easy in today's world for regimes like that to live in impunity for so long?

In December 2001, the term *Responsibility to Protect* appeared for the first time in a report of the International Commission on Intervention and State Sovereignty in response to Secretary-General Kofi Annan's question on when the international community needs to intervene for humanitarian reasons. By 2005, at the 60th session of the General Assembly, 191 heads of state unanimously endorsed the resolution supporting the Responsibility to Protect Doctrine. Could this virtually universally-accepted doctrine have provided the legal framework to mobilize actions from the international community to prevent the gross human rights violations that happened in Panama back in the 1980's?

The Resolution (A/RES/60/1, para. 139) adopted by the General Assembly in September 2005 calls upon the enforcement under Chapter VII, "In this context, we are prepared to take collective action, in a timely and decisive manner, through the Security Council, in accordance with the Charter, including Chapter VII, on a case-by-case basis and in cooperation with relevant regional organizations

as appropriate, should peaceful means be inadequate and national authorities are manifestly failing to protect their populations from genocide, war crimes, ethnic cleansing and crimes against humanity." If an individual state were to fail in fulfilling its obligation to protect its citizens, which in the case of Panama was true, such framework would have provided the means for the international community to legally intervene in the internal affairs of that individual state.

The Responsibility to Protect not only provides the enforcement methods, but the justifications to do so. Under the same Resolution (para. 138), "Each individual State has the responsibility to protect its populations from *genocide, war crimes, ethnic cleansing and crimes against humanity*." As defined by the International Criminal Court, crimes against humanity include acts such as "enforced disappearance of persons", "persecution against an identifiable group on political, racial, national, ethnic, cultural, religious or gender grounds" and "other inhumane acts of a similar character intentionally causing great suffering or serious bodily or mental injury". All of these crimes happened in Panama during Noriega's dictatorship. The most prominent case was the murder of Dr. Hugo Spadafora, who publicly denounced Noriega's ties to drug trafficking and other crimes. Days after being captured and tortured by the military, Spadafora's body was found decapitated. Other atrocities include how opposition party's candidates were flogged after winning the election in May of 1989 just before the election results were nullified.

VIII. CONCLUSION

Beyond providing legality to international interventions, the Responsibility to Protect doctrine provides a better assurance that any action taken has a better chance to have a comprehensive approach, better proportionality in scale, higher consensus between relevant parties, and a better scope of prioritizing the protection of civilians at the heart of the intervention.

As reviewed earlier, the US invasion of Panama clearly lacked of a comprehensive approach. Only the military portion of the intervention was planned, with a clear exit strategy of the troops, while there was complete disregard of the economic and social aftermath on human security. In contrast, better support could have been achieved, even if the events were to escalate to a military intervention, based on Resolution 1674 from the Security Council in 2006 which states that the Responsibility to Protect "stresses in this context the need for a comprehensive approach through promoting economic growth, poverty eradication, sustainable development, national reconciliation, good governance, democracy, the rule of law, and respect for, and protection of, human rights, and in this regard, urges the cooperation of Member States and underlines the importance of a coherent, comprehensive and

coordinated approach by the principal organs of the United Nations, cooperating with one another and within their respective mandates."

Twenty five years have passed since the invasion. The fact that the toppling of Noriega's regime has proven to be immensely favorable for Panama's growth cannot be disputed. The fact that the actions taken unilaterally by the US was in violation of international law nevertheless remains true. The lack of internationally accepted doctrines to legally address oppressive dictatorial regimes after the Cold War proved to be an issue that split the nations in half, as reflected in the moderate margin with which the UN resolution condemning the US actions was passed in the General Assembly. We can only speculate that the Responsibility to Protect doctrine, if existed back in the 1980's, could have given a better solution. At the very least, it would have provided the legal framework for the international community to act upon Panama's dire situation at the time.

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