ARANGKADA PHILIPPINES

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Water

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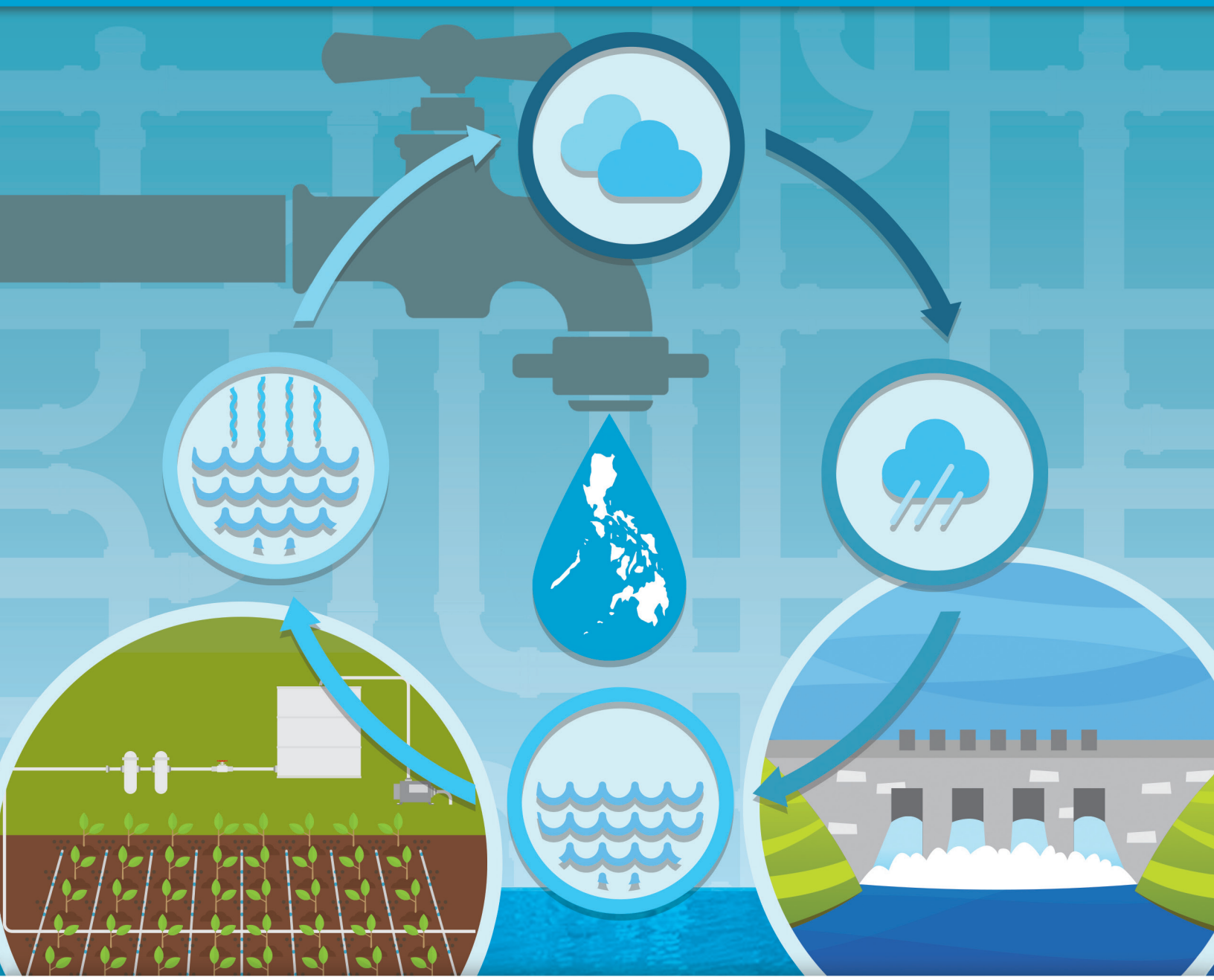

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Ipo Dam • Source: Metropolitan Waterworks and Sewerage System

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A POLICY BRIEF ON THE PHILIPPINE WATER SECTOR

I. INTRODUCTION

The Philippine water sector is much larger and more complex than often portrayed. It has been observed that the national policy debate surrounding water has, over the years, revolved mainly around the municipal water supply and sanitation/sewerage (WSS) sub-sector. This dominant position of the WSS sub-sector in Philippine water policy is easy to explain. It deals with water as a basic necessity of life – globally accepted as a basic human right – and has received legitimacy through its inclusion among the UN's Sustainable Development Goals and the Medium-Term Philippine Development Goals of the country *(see Table 1).*

However, the Water Sector is much larger than the WSS sub-sector. As such, it is important to first broaden the discussion and raise it to a more strategic level that will allow us to appreciate the interconnectedness of the sector as a whole and how issues across that various uses of water (agriculture, industry, household, recreation, transportation, power generation, and environment) are interrelated. This interconnectedness highlights the demand for more integrated solutions rather than the piecemeal fixes we see today.

Table 1: United Nations Principles on Water and Sanitation

Water and Sanitation	
Millennium Development Goals (MDGs) 2000-2015	**Sustainable Development Goals (SDGs) 2015-2030**
MDG No. 7: Ensure environmental sustainability **Targets:** **7.C** Halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation. **Achievements:** • The global MDG target for drinking water has been met five years ahead of schedule. • Since 1990, 2.1 billion people have gained access to improved sanitation, but the world has missed the MDG target. - In 2015, 91% of the global population uses an improved drinking water source, compared to 76% in 1990. - Since 1990, 2.1 billion people have gained access to improved sanitation, and the proportion of people practising open defecation globally has fallen almost by half. • Global rural-urban disparities have decreased, but large gaps remain.	**SDG No. 6: Ensure availability and sustainable management of water and sanitation for all** **Targets:** **6.1** By 2030, achieve universal and equitable access to safe and affordable drinking water for all. **6.2** By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations. **6.3** By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally. **6.4** By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity. **6.5** By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate. **6.6** By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes. **6.A** By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies. **6.B** Support and strengthen the participation of local communities in improving water and sanitation management."

Source: United Nations

In the face of accelerated climate change and the increasing pressure on existing water supplies to support the continuously growing needs of modern society, water security has become a major policy objective both locally and globally. To get to being water secure, much needs to be done in terms of governance, institutional arrangements, and infrastructure – both hard and soft – and this policy paper seeks to be able to extract fundamental issues besetting the sector today in hope of offering clear, actionable, and measurable interventions that will get the country moving towards water security for generations to come.

To this end, this policy brief shall provide a general situationer and analysis of the current state of the water sector in the country today, drawing upon a mixture of secondary desktop research and inputs gathered from a roundtable discussion organized by The *Arangkada* Philippines Project. From this context, the hope is to be able to lay down a list of policy recommendations, which the government can pursue over the short-, medium-, and long-term to ensure the country is moving towards increased water security.

II. THE STATE OF WATER RESOURCES IN THE COUNTRY

Water has a predefined physics, which governs its natural existence on our planet.

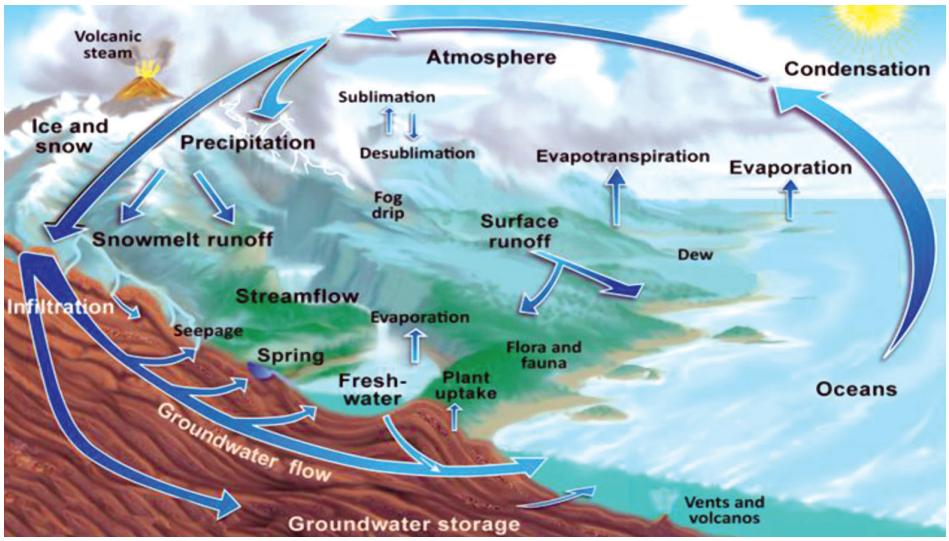
The water cycle neatly summarizes this physics: water when heated is turned into a gaseous state through evaporation; when cooled, it is turned into a liquid state via condensation; when cooled further, it turns into a solid state through freezing. It is water in its liquid state that human society requires for its daily existence *(see Figure 1)*.

Since time immemorial, man has striven to manage and utilize the water resources which surround him to sustain him biologically, socially, and economically. But the reality is that water, particularly fresh water, is a scarce resource, comprising only 2.75% of the world's total water resources. (The rest is in our planet's oceans and seas.)

Of this 2.75%, 2.05% is frozen in glaciers with the remaining 0.70% in groundwater (0.68%) and surface water (0.02%). It is this 0.70%, which supplies the various needs of human society. (NB: Non-naturally occurring freshwater, however, is slowly being made available through the adoption of new technologies such as desalination, which turns sea water into fresh water through a process known as reverse-osmosis).

It is because of this scarcity that water, or its lack, has triggered wars between peoples and nations. Water recognizes no human-made or political boundaries and its improper management can lead – especially in these extreme climatic times – to either undersupply or oversupply.

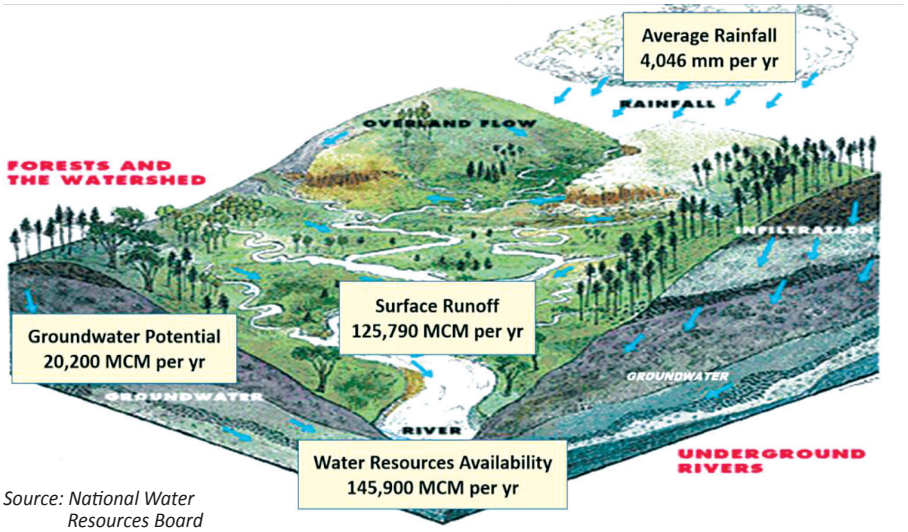
Figure 1: Water Cycle



Source: Wikipedia

These conditions are further aggravated by the inequitable distribution of water across geographical boundaries (e.g. North America has access to 15% of the world's total renewable fresh water supply, but only 8% of the world's population vs. China has 21% of the world's population, but only 7% of the renewable freshwater supply).

Figure 2: Water Resources Availability in the Philippines

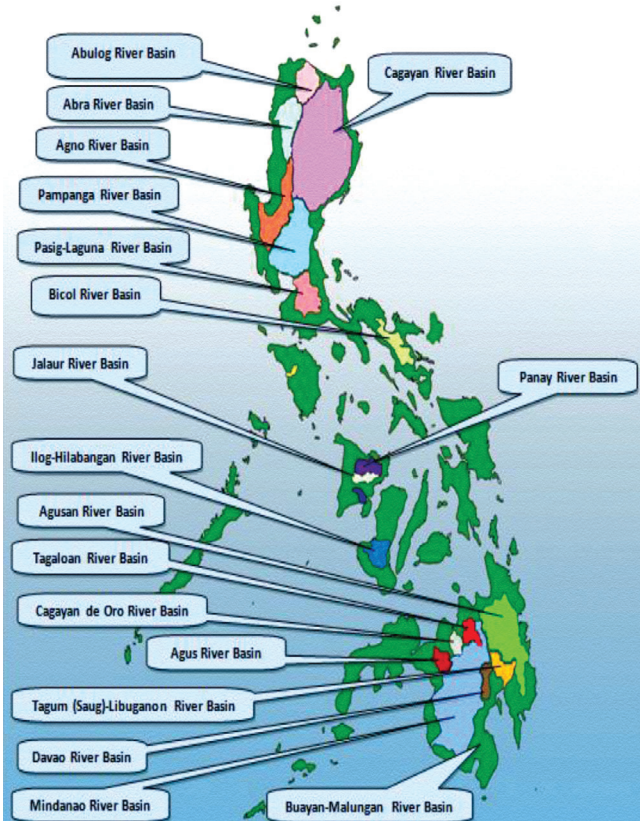


Source: National Water Resources Board

And this disparity is aggravated in today's world of rapid climate change. According to a 2015 McKinsey report, global water demand will exceed viable resources by 40% by 2030. Governments and industry around the world have taken notice and recognize this trend, as shown in the more recent results of the annual World Economic Forum Survey on Top Global Risks. "Water supply crisis" since 2012 has been a consistent Top 5 global risk concern in terms of impact to society and business. In the context of climate change, which is ranked in the Top 5 global risk list in terms of likelihood, the shared perception is clear: water resources are threatened in a world of climate change and the impact of not addressing the issue can lead to drastic consequences for the human race.

In the Philippines, total renewable freshwater available is about 146 billion cubic meters (BCM) per year. Of this amount, about 86% is in the form of surface run-off (126 BCM/year) and the remainder is below the ground (20 BCM/year). Average rainfall is about 4,000 mm per year *(see Figure 2)*. The bulk of these water resources are distributed among the country's 421 river basins, 18 of which are defined as "major" – defined as river basins with a floor area of over 1,400 square kilometers *(see Figure 3)*.

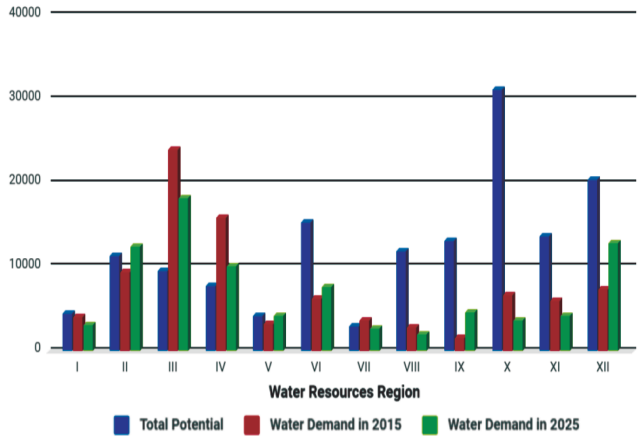
Figure 3: River Basins in the Philippines



Source: National Water Resources Board

However, some regions are more blessed than others. For example, Water Resource Region 10 – Northern Mindanao – has about 31 million cubic meters (MCM) vs. Region 7 – Central Visayas – with only a little under 3 MCM *(see Figure 4 and Table 2).*

Figure 4: Total Resource Potential, Philippines, 2015



Source: National Water Resources Board

Table 2: Water Resources Availability, Philippines, by Region, 2017

Region	Surface Runoff	Deep Well	Springs
I-Ilocos Region	2	235	14
II-Cagayan Valley	--	114	5
III-Central Luzon	9	885	6
IV-Southern Tagalog	10	1122	73
V-Bicol Region	11	154	81
VI-Western Visayas	8	263	34
VII-Central Visayas	37	200	39
VIII-Eastern Visayas	12	65	29
IX-Zamboanga Peninsula	1	53	20
X-Northern Mindanao	10	113	29
XI-Davao Region	--	180	10
XII-Soccsksargen	5	129	12
ARMM	2	12	10
CAR	--	72	4
CARAGA	14	47	36
Total	**121**	**3644**	**402**

Note: This excludes areas serviced by Maynilad and Manila Waters
Source: Local Water Utilities Administration

The water-availability-per-capita situation in the Philippines paints a clearer picture of the country's water security issue. Based on 2000 data from the World Bank, the country's water availability per capita stood at 1,907m3/year. If one were to use 2018's population of 107M against the fixed renewable fresh water supply of 146 BCM, per capita availability stands at 1,553 m3/year, less or more when the availability disparities between the country's water resource regions are taken into account.

This means the country already falls below the international "water stress" threshold of 1,700m3/year and is fast approaching the "water scarcity" threshold of 1,000 m3/year *(see Table 3)*.

Table 3: Water Production and Consumption, Philippines, 2017

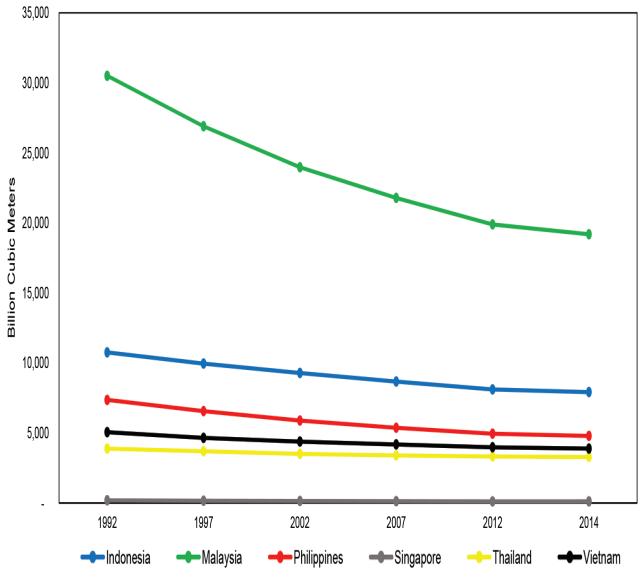
Region	Monthly Production	Average Monthly Consumption		
		Residential	Government	Commercial
I-Ilocos Region	6,139,794	19	68	23
II-Cagayan Valley	2,653,548	22	38	25
III-Central Luzon	18,821,658	18	591	31
IV-Southern Tagalog	20,170,657	20	71	27
V-Bicol Region	4,833,586	18	103	39
VI-Western Visayas	7,340,447	19	122	36
VII-Central Visayas	9,855,164	24	161	76
VIII-Eastern Visayas	3,257,868	20	64	26
IX-Zamboanga Peninsula	4,432,405	20	105	33
X-Northern Mindanao	7,338,840	19	111	37
XI-Davao Region	11,595,716	23	227	61
XII-Soccsksargen	4,184,252	20	54	30
ARMM	1,042,442	20	23	20
CAR	1,754,010	19	20	19
CARAGA	1,431,153	15	42	24
Total	**203,563,286**	**20.5**	**242.0**	**35.5**

Notes: (1) This excludes areas serviced by Maynilad and Manila Waters;
(2) Average monthly consumption indicates that of a single connection unit
(3) Averages are computed using the number of connections as weights
Source: Local Water Utilities Administration

Based on National Water Resources Board (NWRB) data, hydropower is the largest user of water, but its use is non-consumptive in nature. The largest consumers of water are irrigation, followed by industry and municipal use. About 81 BCM is consumed by these three sectors. However, this does not include all other water uses, which do not have water permits issued by NWRB. Unauthorized water use is difficult to estimate, but many believe it is quite a substantial amount *(see Figure 5)*.

While each LGU in the country sees water resources within its political boundaries as its own, the resource itself does not recognize the same jurisdiction. If one places the country's political regions beside the country's Water Resource Regions (which are based on natural/river basin/hydrological boundaries) the boundaries do not

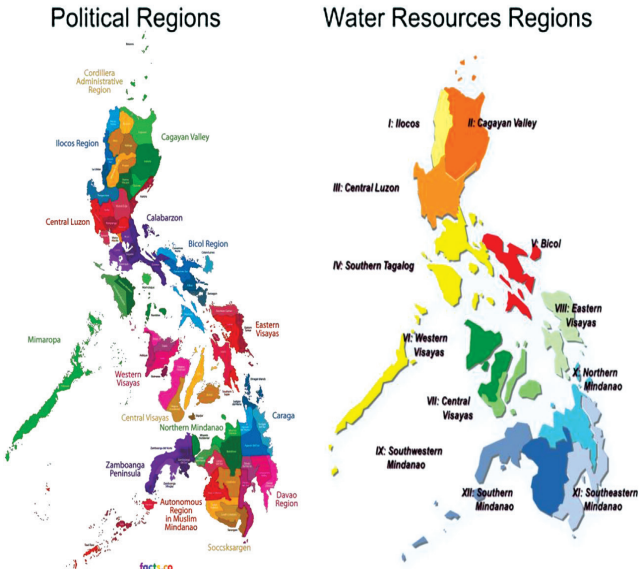
Figure 5: Per Capita Internal Freshwater Resources Availability, ASEAN-6, 1992-2014



Source: Food and Agriculture Organization, AQUASTAT data

match *(see Figure 6)*. This is precisely why water cannot be managed as a political resource driven by local, self-interested motivations.

Figure 6: Political vs. Hydrological Boundaries in the Philippines



Source: National Water Resources Board

Based on projections from a JICA study, four of the country's 12 Water Resource Regions – Water Resource Regions 2, 3, 4, and 7 – will experience water deficits. Indeed, the Philippine water sector must find a way to manage its water resources most efficiently and sustainably to avoid a worsening situation in future years.

The narrative and figures above highlight a major issue of the country's water resources that is, rising demand for water when supplies are limited or shrinking, leading to water scarcity. This imbalance is caused by a variety of factors:

- **Population growth and economic development.** Renewable water resources are constant while population growth continues. The negative correlation between population growth and per capita water availability is evidenced in the graph. The "water stress" threshold of 1,700m3/year was breached in 2007 when the figure dropped to 1,650 m3/year and saw a further drop in 2010 to 1,553 m3/year.
- **Climate change.** The country has been experiencing the El Niño phenomenon more frequently and intensely. These drier dry seasons have the potential to cause severe droughts. The average number of people affected by such disasters – based on historical data – stands at over 900,000 for every drought in the country.
- **Groundwater over-abstraction.** Groundwater over-abstraction is well-known to cause a multitude of problems such as groundwater contamination, land subsidence, and subsurface thermal anomalies. The country is feeling these effects already, particularly groundwater contamination, as evidenced by a study conducted in 2003 which showed that 58% of the country's groundwater is contaminated with E. Coli. Though compared with major Asian cities, land subsidence has not occurred as drastically in Manila (perhaps because of LGU regulations prohibiting groundwater extraction), the situation is likely worse outside Metro Manila given

over-reliance of water service providers on groundwater.

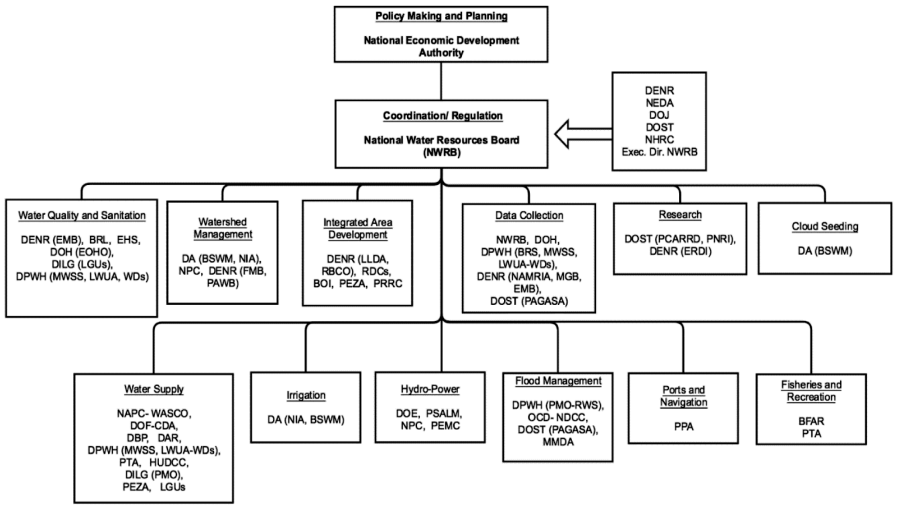
- **Pollution.** Pollution of the country's water resources is already well-known. It is estimated that the cost of this pollution is in the range of PhP 67 billion/year. 48% of the country's water pollution is attributable to domestic waste, followed by agriculture at 37%, and industry at 15%. Polluted water resources translates not only into limited water available for use, but also expensive treatment and other negative externalities such as environmental degradation and enhanced risks to human health.
- **Forest denudation.** The country's 70% forest cover in 1900, has dwindled to a mere 18% in 1999. These figures are surely much lower today. Forests serve as natural water storage (i.e. watersheds) as well as flood management tools (i.e. natural catchments). The drawdown of the country's forest cover limits the country's ability to better manage the use and consequences of water.
- **Institutional/legal water resource management framework.** Over 30 agencies are tasked to manage and oversee various aspects of the country's water resources. These institutional overlaps have caused the multiple agencies to work only on their respective areas of concern. This unintegrated water resource management has led to the country's inability of managing its water in a way that satisfies all of society needs. *(see Figure 7).*

All these factors cause the undersupply of water, which leads to instances of water scarcity, particularly during the dry season.

The flipside of the country's water resources issues is when there is an oversupply of water, there are devastating floods. These are caused by the following variables:

- **Climate change.** Similar to what was mentioned earlier on the El Niño phenomenon, but opposite in effect, the country has been experiencing more frequent La Niña phenomena. This leads to wetter wet seasons causing massive destruction to infrastructure and lives due to floods and winds. The historical data suggests that each flood affects approximately 100,000 individuals, while each storm affects about 500,000, on average.
- **Forest denudation.** As already mentioned, the country's watersheds are threatened due to the illegal logging activities throughout the country. Their denudation leads to large volumes of water run off during the monsoon season. Without the trees, the soil cannot absorb such a large volume of water. This water ends up flowing downstream towards communities, causing massive flooding, ultimately leading to loss of life and property.

Figure 7: Agencies Involved in the Philippine Water Sector



Source: National Economic and Development Authority, The Philippine Water Supply Sector Roadmap

- **Institutional/legal water resource management framework:** The ideal framework for managing a country's water resources is through integrated water resource management or IWRM. None of the three pillars – Enabling Environment, Management Resources, and Institutional Roles – have been established in the country. This has led to disintegrated water resource management, which is partially to blame for the increasing frequency of floods during the rainy season. To begin reversing this situation, it is necessary that the enabling environment for IWRM is first established after which the other two pillars can follow.

These three factors cause the oversupply of water during rainy seasons, ultimately leading to massive floods which affect the lives and property of millions every year.

Thus, at the level of water resource management across various uses, there are both demand and supply driven issues. At the core of the issues is the lack of coordination, accountability, vision, and leadership in the sector. In a word, what lacks is proper management within the sector. Water is a single resource with multiple uses. Key, therefore, is managing the resource from a systemic and holistic perspective, rather than today's fragmented, myopic manner. The current fragmented approach of water resource management in the country is one clear area where reforms must be taken if the country is to move towards water security.

III. MAKING THE CASE FOR WATER SECURITY

In its 2016 Asian Water Development Outlook, the Asian Development Bank (ADB) references two common definitions of "water security":

1. *"The reliable availability of an acceptable quantity and quality of water for production, livelihoods and health, coupled with an acceptable level of risk to society of unpredictable water-related impacts."*
2. *"The capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socioeconomic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability."*

In operationalizing this definition, ADB defined water security along five measurable key dimensions as follows:

1. **Household Water Security** – level of ability to satisfy household water and sanitation needs in all communities
2. **Economic Water Security** – level of ability to support productive economies in agriculture, industry, and energy
3. **Urban Water Security** – level of ability to develop vibrant, livable cities, and towns
4. **Environmental Water Security** – level of ability to restore healthy rivers and ecosystems
5. **Resilience to Water-Related Disasters** – level of ability to build resilient communities that can adapt to change

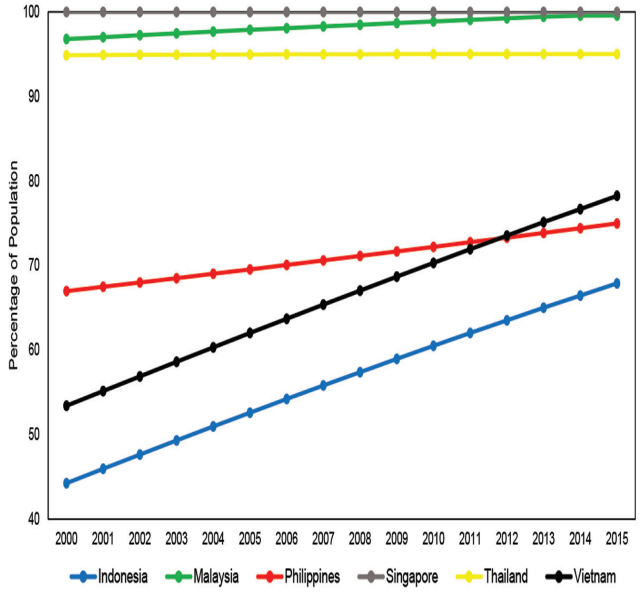
In this study, the Philippines ranked 33rd out of 48 countries, scoring poorly across all key dimensions. On a scale of 1-5, where 5 represents the highest level of water security, the Philippines only garnered a rating of 2. Parsing the data, much of the water insecurity seems to be driven by the available data, which paints a sorry state of the water sector, particularly in the area of municipal water supply.

In the hierarchy of priority allocations of water, social allocation is recognized globally as the foundation upon which all other uses of water

come second. Recognition of this principle that the social allocation should be at the base of any water allocation system has been echoed by the United Nations when, in 2010, its General Assembly adopted UN Resolution No. 64/292, which acknowledged access to water and sanitation services as a basic human right. The same body, however, recognizes that water should also be treated as an economic good since its treatment and distribution do not come free.

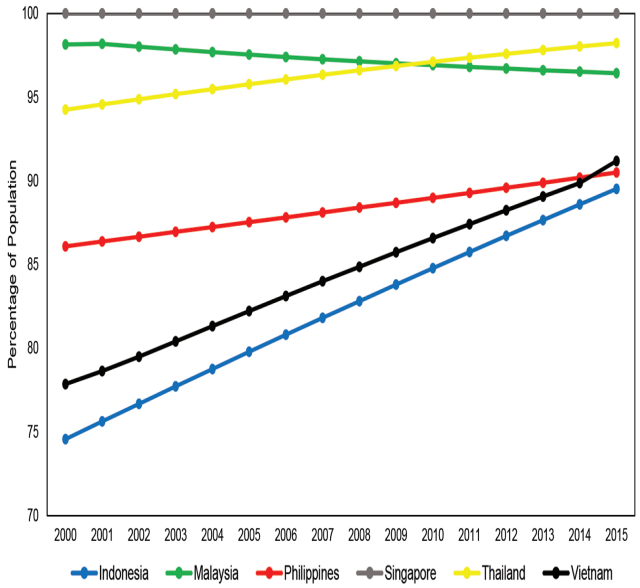
In the National Economic and Development Authority (NEDA) Philippine Development Plan (PDP) 2017-2022, it was pointed out that, while the 2015 Millenium Development Goals (MDG) target for safe water was met, access to sanitary toilet facilities was missed. Nevertheless, as of the end of 2015, there were still 1.2 million households with no access to safe water and 1.8 million households with no access to sanitary toilet facilities *(Figure 8 and Figure 9)*.

Figure 8: Access to Basic Drinking Water Services, ASEAN-6, 2000-2015



Source: World Health Organization/United Nations Children's Fund Joint Monitoring Programme for Water Supply, Sanitation, and Hygiene

Figure 9: Access to Basic Sanitation Services, ASEAN-6, 2000-2015



Source: World Health Organization/United Nations Children's Fund Joint Monitoring Programme for Water Supply, Sanitation, and Hygiene

The same report recognizes that there are serious gaps in water services in the country. A significant cause of this problem is the fragmented governance structure of the water resources sector (hydropower, irrigation, drainage, water supply, sanitation, etc.). While the NWRB Board was created in 1974 to serve as the apex body of the 30 plus agencies in the water sector *(see Figure 7)*, it has failed to fulfil this vital role. As a result, there is a lack of overall planning, programming, and policy formulation based on sound data.

In addition, there is also no government agency with the overall responsibility to address the water supply and sanitation conditions of the country. 14.5% of the country's 22.7 million families still have no access to safe water supply. Of those with access to water, only half enjoy household connections. For sanitation, while only 5.9% of households did not have access to basic sanitary toilet facilities, their wastewater is largely untreated. Only 4.4% of households nationwide are served by sewerage systems.

Water and sanitation coverage across the country differ by region as well. Certain geographies have achieved higher coverage than others along both fronts, but the discrepancy is particularly sharp between ARMM and the rest of the country.

A closer look paints a sorry picture. We have already seen how poorly funded municipal water is, especially in the gap between what is needed versus what is actually spent. Some fast facts:

- PhP 2-5 billion actual investments in municipal/domestic water supply
- <$1 per capital average annual investment in municipal/domestic water supply
- PhP 31-32 billion annual investments needed to meet water-related Sustainable Development Goals (SDGs) by 2030

On the operational side, coverage remains weak with just over half of the country's total population with access to water services, per 2010 Global Water Intelligence figures. Efficiencies in the sector remain weak as well with more than half of the water pumped into the country's existing water systems lost to leaks and pilferage. Furthermore, labor productivity and water availability remain far below what should be acceptable to the public. More fast facts:

- Only 44.1% of the population have access to Level III access and 11.2% with Level II access
- 32.4% have Level I access with as much as 12.3% of the population having no access to safe water at all
- 47.6M population served
- Average of 5 health workers in Barangay health stations
- 55% non-revenue water
- 24 hours of water availability

Some other glaring facts about the municipal/ domestic water supply situation in the country:

- 6-8% of the population still do not have access to improved sanitation facilities
- Most septic tanks installed are bottomless pits, as opposed to the recommended structure of a septic tank
- Open defecation is still practiced by 8.3M people
- Only 7% sewerage coverage throughout the country
- High contribution of domestic waste to the country's water pollution due to weak sanitation coverage

The sad state of affairs, especially in the areas of household, economic, and urban water security are often attributed to the following root causes:

- **Institutional fragmentation and a plethora of water service providers.** Over 30 government agencies are involved in the water supply and sanitation sector, while estimates point to over 6,000 water service providers across the country. **On resource allocation**, competing users vie for a share of allocations from common sources while locations where water is abundant are unwilling to share their abundance with adjacent water scarce areas. **On planning and infrastructure**, the different players within the sector have their own roadmaps and do not integrate or coordinate plans with other sector players in the vicinity. The conflicting, uncoordinated mandates and interests of these agencies and service providers makes it difficult for the sub-sector to move towards the goal of universal access to water and wastewater services.
- **A lack of proper regulation**. There is no single regulatory framework for the sector. Though certain jurisdictions have more developed regulatory frameworks (i.e. Metropolitan Waterworks and Sewerage System (MWSS) and Water Districts), generally, regulation in the sector is weak and underdeveloped.

A proper regulatory framework should be established to govern all water service providers throughout the country in order to bring about the outcomes desired from the operation of the said providers.

- **Politicization of the sector**. The sector is highly politicized, especially at the local level. Oftentimes, local water utilities favor consumer interests (i.e. application of very low tariffs with services concentrated in densely populated areas only) to secure political support for local incumbents. At other times, such utilities do the exact opposite (i.e. application of excessively high tariffs) serving as cash cows for the utility's top management and their "padrinos" in the local government. The effects of both approaches are the same: low coverage and unsustainable operations. These market misbe-haviors are due to the fact that the distribution and network sectors are natural monopoly markets. Theoretically, proper regulation should be able to resolve these market abuses, but in the Philippine context, regulatory regimes often suffer from "capture" and weak regulatory capability. Additionally, due to the 3-year terms of LGU executives, new administrations often appoint new heads to the local water service providers (LGU water utilities or water districts) threatening the continuity of programs and projects of the previous heads.
- **A lack of reliable sector data**. Each service providers track performance and data in accordance to its own specific needs. Many times this data is not filtered up to the national planners or, if it is submitted, such data is not in a format that can allow easy consolidation. Because of the absence of reliable data from the field, it has been difficult to get the real score on the situation of the sector. Without understanding current realities, it becomes almost impossible to develop the policies and interventions needed to achieve universal access in water and sanitation.
- **Unsustainable use of the country's water sources**. The country's water resources are limited and unevenly distributed throughout the country. Over-dependence on groundwater has led to the whittling down of aquifer levels, especially in more densely-populated urban areas. Pollution and forest denudation has also affected the quality and availability of raw water. Without an integrated perspective on water resource management, which ensures sustainable utilization and distribution of the resource from ridge to reef, supplies for the sector will remain under stress.
- **Neglect of sanitation**. Because of its "public good" character, sanitation often takes the back seat to domestic/industrial water supply. People are willing to pay for the latter because of the direct benefits they receive. However, sanitation offers indirect benefits in the form of a healthier and cleaner environment. There is a need to divert much needed investments into sanitation programs across the country, whether it be funded via public, donor, or private funds through innovative PPP models.

The challenges of the sector are numerous and multi-faceted. Diverse players and interests are involved in this ecosystem, making it very difficult to bring order and direction to the sub-sector. Similar to the larger water sector in general, the municipal/domestic sector seems to be wanting in a proper governance and management framework that would allow for better coordination and leadership. Such a framework may require structural reforms to reconfigure the current landscape of the broader water sector to lessen the number of players involved and allow for better oversight of those that would remain under the new structure.

Magat Dam • Source: National Irrigation Administration

IV. MAJOR WATER SECTOR REFORM INITIATIVES

Various quarters in Philippine society have recognized the need for reforms in the water sector. Numerous proposals have been developed and pushed over the years, but the last major reform the sector has experienced is the passage of the National Water Crisis Act in 1995, which paved the way for the entry of the private sector in the operation of Metro Manila's water and wastewater system. Since then, no major reform in the sector has been implemented.

In more recent years, various policy proposals have focused on the following:

- Improving the management of water resources and governance of the water sector
- Strengthening economic regulation in the water sector
- Expanding water and wastewater coverage

A brief discussion on the various policy proposals and initiatives under each of these reform areas is in order.

A. IMPROVING THE MANAGEMENT OF WATER RESOURCES AND GOVERNANCE OF THE WATER SECTOR

It has long been recognized that governance in the water sector is fragmented and uncoordinated. The lack of leadership, accountability, and strategic direction are often cited as the core issues behind the country's poor state of water resources. The last administration under President Aquino recognized this and, as early as 2011, issued EO 62, which created the Inter-Agency Committee on the Water Sector (IACWS), headed by the appointed "Water Czar," DPWH Secretary Rogelio L. Singson. The IACWS was tasked *"to design and recommend to the President a water sector master plan which will effectively address all the issues and concerns of the water sector. The Committee shall likewise recommend to the President the appropriate organizational structure of all concerned agencies for the effective implementation of the water sector master plan."*

In accordance with its mandate, the IACWS – in partnership with the World Bank – commissioned a study to understand the current institutional arrangements within the water sector and to propose a new governance framework. The main recommendations of the study were:

1. Establishment of a National Water Resources Management Board (NWRMB), which is a strengthened NWRB with more financial resources and backed by a larger plantilla (certain water resource-related government offices, such as Department of Public Works and Highways (DPWH)-Bureau of Design, DPWH-Bureau of Research and Standards, DPWH-Project Management Offices (PMO)-Major Flood Control Projects, DPWH-PMO-Small Water Impounding Management, Department of Environment and Natural Resources (DENR)-Mines and Geosciences Bureau, and DENR-Regional Basin Control Office (RBCO), would be consolidated under NWRB) to carry out its envisioned functions under the 1976 Water Code;

2. Consolidation of DPWH's oversight over agencies involved in municipal water supply and wastewater services (i.e. MWSS and Local Water Utilities Administration (LWUA)); and
3. Introduction of new consultative bodies (i.e. Inter-Agency and Multi-Stakeholder Panel) to serve as platforms for policy coordination and alignment among the various stakeholders in the Water Sector.

The outputs of the study have already undergone numerous stakeholder dialogues and a proposed executive order (including IRRs) was submitted to the Office of the President as early as October 2012. Unfortunately, the order was never signed.

Another equally important initiative at the executive level, but less visible to the general public, is amendment of the 1976 Water Code. The NWRB is taking the lead in consolidating proposed amendments. Most proposed amendments are envisioned to institutionalize the institutional changes proposed under the NWRMB proposal. However, other amendments are being introduced to modernize the outdated law and align it with successive water-related laws (such as the Local Government Code, the Clean Water Act, the Climate Change Act, and the Disaster Risk Reduction Management Act). As of this writing, status of this effort is unknown.

With regard to master planning for the water sector, another significant initiative is currently being pursued by the DENR-RBCO. Under the previous PDP, RBCO had been tasked to complete the master plans for the 18 major river basins in the country. This would include an investment roadmap for the development of water-related infrastructure within each of the 18 river basins. Given that RBCO is supposed to be subsumed under the proposed NWRMB, these master plans would serve as strong starting points for identifying and pursuing key water infrastructure throughout the country. It may also ignite renewed calls for LGUs to recognize that water knows no political boundaries and, thus, a rethinking of LGU power over water resources and development is in order, laying the seeds for eventual legislation redefining the role of LGUs insofar as the water sector is concerned.

It is also worth highlighting that the Executive Branch had established institutions to enhance coordination among the various players in the Water Sector. The first is the NEDA-Committee on Infrastructure (INFRACOM) Sub-Committee on Water Resources, which serves as a recommendatory body to the NEDA-INFRACOM on proposed water policies, projects, and programs and is composed of water-related government agencies and civil society representatives. The second is the Philippine Development Forum Sub-Working Group on Water Supply and Sanitation, which serves as a platform for government agencies, multilateral/bilateral donor agencies, private sector, academe, and civil society to coordinate on the various programs and projects being pursued in the WSS Sub-Sector by all organizations represented. Though these institutions meet frequently, they serve merely as coordinative bodies rather than policymaking ones.

Under the current Duterte Administration, water remains a key area of priority. Under the current PDP, priority strategies for the water sector include the following:

- Pursue institutional reforms such as streamlining processes in involved agencies to encourage and guide investments in water supply, sewerage, and sanitation.
- Formulate an irrigation master plan to set the direction for irrigation development and a framework for capital and operations and maintenance financing of irrigation projects.
- Continue flood management initiatives.
- Create an apex body that will: a) address the fragmented structure of water resources and b) formulate master plans that will foster coordinated efforts in the country.

- Reverse the loss of forest cover by continuing to rehabilitate degraded forestlands, including critical watersheds and strengthening protection of remaining natural forests.

Other current initiatives include:

- The Philippine Water Summit. A National Steering Committee has been established with the blessing of the President to organize a Philippine Water Summit, which intends to set a platform for President Duterte to deliver his policy pronouncements and direction for the water sector. The Steering Committee is composed of top officials from the Executive (Cabinet Secretary, Department of Agriculture, DENR, Department of Interior and Local Government, DPWH, and NEDA), Legislative, and private sector, supported by the University of the Philippines – Los Baños as research/ academic partner. In preparation of the summit, stakeholder dialogues were held across the country in an effort to consolidate inputs to the country's water policy across seven sectors – agriculture, domestic, economics, environment, governance, resilience, and urban. From these various consultations, research papers were developed forming a seven-book series, which presents the issues faced under each sector as well as proposed solutions to the issues identified. These books have been presented to NEDA and will serve as the basis of dialogue during the Philippine Water Summit to be presided by President Duterte, where he is expected to adopt the seven recommendations of the Philippine Water Summit Secretariat as follows:
- Presidential priority bill creating a policy making, high level, coordinating apex body to oversee the entire water resources sector;
- Creation of a separate economic regulatory agency to lead water supply and sanitation initiatives;
- Adoption of Integrated Water Resource Management (IWRM) operationalized through the creation and strengthening of River Basin Organizations (RBO) as a matter of national policy;
- Improve the Building Code to mandate efficient public and private buildings;
- Employ Return on Investment method to decide how to spend irrigation funds (i.e. repair vs. new; small vs. large);
- Consolidation of all water-related data with the Philippines Statistics Authority;
- Increase the water budget to improve access for water and sanitation and utilitize cost effective technologies; and
- Support DENR program to reforest 1 million hectares with accompanying livelihood activities and restore 300,000 hectares of mangroves.
- Inclusion of the Creation of a Department of Water among LEDAC Priorities. The President has included water sector reform through the creation of a Department of Water or an apex body among the list of legislative priorities of his Administration. Though little advancement has been seen in Congress, its inclusion in the list of priority bills provides hope that necessary legislation will begin to move forward, if not in the 17th Congress then in the next.

On the legislative front, numerous bills have been filed supporting the IWRM/RBO concept, the establishment of a Department of Water, the amendments of the Water Code, and the introduction of an independent regulator for the water sector. No bill has yet been identified as the Administration's preferred one. Thus Congress will have to play the role of preparing a consolidated version through the conduct of public hearings. Little priority has been given to these bills under the current Congress.

The list below summarizes all water sector reform-related bills currently pending in both houses of Congress: *(see Table 4)*.

Table 4. Status of Water Sector Reform Legislation in the 17th Congress

Senate/ House Bill No.	Senate/House Bill Title	Author	Status
Senate			
SB 245	An Act Promoting Integrated Water Resource Management in the Use of the Country's Water Resources through the Rationalization of Service Areas, Provision of Incentives for Infrastructure Development or Clean and Efficient Technologies, and Reorganization of the National Water Resources Board, Amending for the Purpose Certain Laws and for Other Purposes	Legarda, Loren B.	Pending in Public Services Committee
SB 933	An Act Rationalizing the Economic Regulation of Water Utilities, Creating the Water Regulatory Commission and for Other Purposes	Recto, Ralph G.	Pending in Public Services Committee
SB 1217	An Act Rationalizing the Economic Regulation of Water Utilities, Creating the Water Regulatory Commission and for Other Purposes	Poe, Grace L.	Pending in Public Services Committee
House of Representatives			
HB 221	An Act Creating the National Water Resources Management Authority and Appropriating Funds Therefor	Villarica, Linabelle Ruth R.	Pending in Government Enterprises and Privatization Committee
HB 517	An Act Rationalizing the Economic Regulation of Water Utilities, Creating the Water Regulatory Commission and for Other Purposes	Herrera-Dy, Bernadette C.	Pending in Government Enterprises and Privatization Committee
HB 2075	An Act Rationalizing the Economic Regulation of Water Utilities, Creating the Water Regulatory Commission and for Other Purposes	Ramirez-Sato, Josephine	Pending in Government Enterprises and Privatization Committee
HB 2457	An Act Rationalizing the Resource Management of the Water Sector, Creating the Department of Water, Sewage, and Sanitation, and for Other Purposes	Yap, Arthur C.	Pending in Government Reorganization Committee
HB 4995	An Act Creating the Department of Water Resources and Services and Appropriating Funds Therefor	Suansing, Estrellita B.	Under Government Reorganization Committee TWG Deliberation
HB 5776	An Act Rationalizing the Financial Regulation of Water Utilities, Creating the Water Regulatory Commission and for Other Purposes	Rodriguez, Maximo Jr. B.	Pending in Public Works and Highways Committee
HB 6404	An Act Rationalizing the Economic Regulation of Water Utilities, Creating the Water Regulatory Commission and for Other Purposes	Yap, Arthur C.	Pending in Government Enterprises and Privatization Committee
HB 6505	An Act Instituting A New Water Code, Amending for the Purpose PD No. 1067 Otherwise Known as The Water Code of The Philippines and for Other Purposes	Antonio, Michelle M.	Pending in Natural Resources Committee
HB 6828	An Act Mandating Each City or Municipality to Create a River Development Authority for the Preservation, Protection and Development of All Rivers, River Systems and Natural Waterways Within its Jurisdiction, Defining its Powers and Functions and Appropriating Funds Therefor	Rodriguez, Maximo Jr. B.	Pending in Local Government Committee
HB 8068	An Act Creating The Department of Water, Irrigation, Sewage and Sanitation Resource Management, Defining its Powers and Functions, Appropriating Funds Therefor, and for Other Purposes	Macapagal-Arroyo, Gloria	Pending in Government Enterprises and Privatization Committee

Note: As of August 15, 2018
Source: Senate of the Philippines, House of Representatives of the Philippines

A glimpse at the status of these bills in both Houses suggests that they are not moving at a pace that will enable passage into law during the 17th Congress.

The momentum for reform of the water sector's governance and management structures looks to be waning. Despite water being among the LEDAC priority list, political will so far appears to be lacking to move needed legislation along, taking a back seat to other priority legislative agenda items such as the Comprehensive Tax Reform Program, Constitutional amendments, and impeachment proceedings. For sectoral reform to begin, political backing from the top is required. The Philippine Water Summit, in this regard, may be the very impetus required for Congress to begin acting on the legislative agenda for the water sector.

B. STRENGTHENING ECONOMIC REGULATION IN THE SECTOR

The failure to expand service coverage in the sector is often attributed to the fragmented regulation of the sector. Over 6,000 water service providers exist within the country. Different regulatory regimes exist for the different categories of service providers.

The fragmentation creates a hodgepodge of varying standards, tariff setting methodologies, and uncoordinated planning and decision-making.

Such underdeveloped and disorganized regulation of the water sector yields sub-optimal outcomes. For example, the short time horizon considered when setting rates for water districts forces such utilities to turn down long-term, more strategic infrastructure projects despite the compelling business case because current tariff-setting methodologies would not allow for recovery of expenditures longer than five years. Another example is that because of a lack of regulatory targets, oftentimes regulation is more input-focused than output/outcome focused. It is no wonder the desired goal of universal coverage is never achieved.

During the 15th Congress, the effort for establishing a Water Regulatory Commission (WRC) reached a peak, having been included among the Administration's top priority bills. The WRC envisioned being what the Energy Regulatory Commission is to the energy sector – the premier regulator of all WSS operators in the country. It was believed that regulatory reform would pave the way for improved water and wastewater services throughout the country. WRC bills have been refiled in succeeding Congresses, but no action has been taken by the committees assigned to move these measures forward. Key donor agencies, which have funded studies to support this WRC initiative, include the World Bank and USAID.

The WRC is created to undertake the following:

- Achieve universal access to improved water and sanitation services for the entire country through an effective economic regulatory system that can compel expansion and improvement of service;
- Encourage private sector participation in the development of water and sanitation services;
- Protect the interests of consumers; and
- Address the conflicts of interest inherent in the current regulatory agencies.

To achieve these objectives, the WRC will have the following powers:

- Grant or revoke Certificates of Public Convenience for all water utilities, including LGU-run utilities;
- Consolidate the economic regulatory powers of LWUA, MWSS, NWRB, Philippine Economic Zone Authority, Tourism Infrastructure and Enterprise Zone Authority, and other agencies regulating water utilities into one agency; and

- Require and regulate sewerage and sanitation systems.

However, actions speak louder than words. Though legislated regulatory reform may have taken a back seat, the executive, through its instrumentalities, seem to be pushing the agenda along through its actions.

On the wastewater front, most regulatory initiatives have come in the form of enhanced compliance and monitoring as well as prescribed environmental standards. The Clean Water Act of 2004 can be said to be the instigator of these initiatives. The wastewater advocacy gained traction with the Supreme Court's passage of the Continuing Mandamus for the Clean-Up of Manila Bay in 2008. A Committee was formed at the Supreme Court to monitor the compliance of all agencies that have a stake in the clean-up of the bay, including MWSS and its concessionaires. The Manila Bay Coordinating Office, housed at the DENR, serves as the Committee's secretariat. The Laguna Lake Development Authority, on the other hand, has been on a limitedly successful crusade against polluters of Laguna Lake, while DENR is constantly evaluating its effluent standards to ensure protection of the country's natural waters. Though the initiatives seem few and scattered, it is quite obvious that wastewater – especially in the case of Metro Manila and its environs – is the next big issue facing the sector.

In terms of regulatory reform and development of the sector, it is difficult to say whether major reforms can be expected anytime soon. However, reforms to strengthen regulation in the sector are necessary and must be properly crafted to ensure that the sector's goal of universal access is achieved.

C. EXPANDING WATER AND WASTEWATER COVERAGE

Though strengthened regulation of the sector is seen as a key element to expanding coverage in the country in a sustainable manner, various projects and programs are already being implemented, which are engaged in providing the necessary funds to make this a reality. Some

Ambuklao Dam • Source: Province of Benguet

noteworthy projects/programs are:

- **Sagana at Ligtas na Tubig Para sa Lahat (Salintubig)**. This multi-billion peso National Government program aims to expand water and sanitation coverage among the 455 waterless communities throughout the country, while reducing the incidence of water-borne and sanitation-related diseases.
- **Water District Sector Development Program (WDSDP)**. Worth US$ 60 million and funded by the ADB, WDSDP aims to expand coverage and improve health conditions in identified localities served by water districts.
- **A Unified Framework for WSS Sector Financing.** Development of this framework was funded by the World Bank. It is envisaged to provide a way to ensure the optimal use of available funds (donor, private, and public) in the sub-sector, diverting the different categories of funds to where they are needed and have the most impact in terms of expanding WSS coverage. It is also meant to avoid fund duplication, as often occurs.
- **National Sewerage and Sanitation Management Program (NSSMP)**. The goal of the NSSMP is to improve water quality and protect public health in urban areas of the Philippines by 2020. The objectives are to enhance the ability of local implementers to build and operate wastewater treatment systems for urban centers and promote the behavior change and supporting environment needed for systems to be effective and sustainable. The main strategy is to facilitate a bottom-up, demand-driven project development process by providing national government support/subsidies and incentives.
- **The Philippines Water Supply and Sanitation Master Plan.** NEDA has commissioned a team of consultants to undertake development of a unified master plan for the water supply and sanitation sector. The plan is to serve as the roadmap to achieve the country's long-term targets of universal access by 2025 for water supply and 2028 for sanitation. The plan will incorporate:
  - Strategies, policy reforms, priority programs, and projects over the short-, medium-, and long-term to achieve access targets
  - Inputs from previous roadmaps (e.g. National Sewerage and Septage Management Program, Water Supply Roadmap) and programs (e.g. Eco-efficient Water Infrastructure Program, Unified Financing Framework Program)
  - Capacity-building programs to ensure the various government agencies involved will be able to carry out the strategies and programs to be laid down in the plan

What is promising with such developments is that interventions are currently being adopted to reach the goal of universal access to water and sewerage/sanitation. Nevertheless, it is also quite obvious to see that the efforts are scattered and remain uncoordinated. Indeed, these efforts may be more effective if operating under a single master plan for the WSS sub-sector, which lays down clear accountabilities, funding sources, monitoring regimes, and implementing arrangements.

As is clear from the discussion above, the water sector is not wanting in the number of initiatives and reform efforts. A good number of them, in fact, are laudable programs. However, it is clear little headway is actually being made on the ground in terms of enhancing national water security. This is likely due to the lack of clear leadership in the sector and the current fragmented approach to governance in the sector. An honest-to-goodness effort to reform institutional arrangements in the sector is necessary and the needed first step towards a broad reform effort, which is sustainable and able to deliver improved water security in the country.

Pulangi Irrigation • Source: Inquirer.net

V. *ARANGKADA* RECOMMENDATIONS TOWARDS ACHIEVING NATIONAL WATER SECURITY

Based on the roundtable discussion (RTD) conducted by the *Arangkada* Philippines Project (TAPP) in January 2018, a list of policy recommendations meant to improve the state of the water sector and work toward national water security has been developed. These recommendations represent the inputs of 12 government agencies, 11 private sector companies, 5 development agencies, and 11 business associations and have their bases in the various topics and issues raised in the previous sections of this paper. The recommendations have been categorized into three prescribed strategic goals, namely:

- To improve governance and management of water resources;
- To improve water quality and coverage; and
- To expand wastewater treatment coverage.

A. IMPROVING THE GOVERNANCE AND MANAGEMENT OF WATER RESOURCES

At a most fundamental level, the current weak state of water in the country is attributable to fragmented governance and management. Thus, TAPP's first key recommendation is:

1. **Speedy Enactment of a Law to Harmonize and Streamline Governance in the Water Sector**

All stakeholders were in agreement that water sector reform can only begin in earnest with a restructuring of the current water sector in terms of governance and institutional arrangements. It is recommended that the President publicly announces the prioritization of water sector reform policy and give strict timelines as to when said legislation should be enacted.

In terms of substance, any water sector reform law should (1) adopt IWRM and RBO principles, (2) establish an apex body to coordinate the entire effort and fulfill the policy function for the sector, and (3) establish a clear regulatory regime that will move the sector closer to achieving its universal access targets.

Other specific policy recommendations, which emerged from the TAPP roundtable, are:

a. The country's water rights regime needs rethinking in terms of both principles to follow and processes involved. The "first come, first served" granting of water rights must give way to the principle of IWRM, which grants water rights based on strategic plans set by RBOs. Also, periods for posting and protest should be shortened for speedier processing of permits. Finally, all unutilized water permits for one year or longer ought to be

automatically cancelled to give way to other productive uses of the resource.

b. With climate change an accepted reality, water plans must incorporate climate change-resilient design. This includes construction of disaster-resilient water infrastructure as well as redundant infrastructure to cope with extreme weather events. Eco-efficient water infrastructure should also be incorporated into master plans to be developed under a reformed water sector.

c. In the context of the proposed federalism, consideration should also be given to the hydrological landscape of the country. As much as possible, political boundaries should take into account hydrological ones to ease the process of water resource management in administrative sub-divisions of the country.

d. Sector data is severely lacking and remains unstandardized. Under a reformed sector, a system for data gathering is necessary to ensure evidenced-based policy decisions and infrastructure plans.

No reform effort can succeed without appropriate leadership and focus. Thus, the TAPP's second key recommendation to get the reform initiative moving is:

2. **Appointment of a Water Czar by the President**

In the absence of clear leadership in the sector, it would serve the Executive well to appoint a Water Czar who will shepherd various reform efforts prior to the passage of a Water Sector Reform Law. The Water Czar should be at the cabinet level, have the full blessing of the President, provided resources to carry out his/her duties, and 100% devoted to the water sector reform effort. Without this strong interim leadership, there is a good chance any reform effort for the sector will falter. The Water Czar can be announced during the planned Philippine Water Summit to ensure action is taken immediately after the event.

B. IMPROVING WATER QUALITY AND COVERAGE

A central theme of water governance around the world is the ability of the governing framework to ensure every individual's right to access to water. The current thrust towards universal access to water in the country is hampered mainly by two key factors: regulation (or the absence of it) and financial resources. Insofar as regulation is concerned, the TAPP recommends the following:

1. **Passage of Water Regulatory Commission Bill**

The WRC proposal has been tabled in Congress for over two decades. It proposes establishing an independent regulator to govern water service provision throughout the country. The said regulator should adopt performance-based regulation geared towards universal coverage and minimal service quality standards (i.e. water quality, pressure, service availability, non-revenue water, etc.) equally applicable to both private and public service providers. The said regulator should also ensure sustainable yet affordable tariffs – i.e. tariffs which reflect the true cost of service delivery to ensure water delivery systems are maintained and expanded over generations, rather than per political cycle.

Under a WRC regime, a framework for private sector participation should be established for two reasons: (1) the private sector is capable and willing to participate in the sector, as shown by the recent proliferation of PPP arrangements among water districts and LGUs, and (2) private sector involvement, where viable, frees up

public finances to focus on more targeted areas, which are not commercially viable. To encourage private sector participation in the water sector, there will be a need for stable policy and regulatory regimes, especially where tariff-setting is concerned. Changing of rules in mid-stream for political or populist reasons must be avoided.

One interesting proposal, which surfaced during the TAPP RTD, is the passage of something similar to the Electric Power Industry Reform Act of 2001 for the energy sector. This may very well be a good starting point for both the Executive and Legislative Branches to begin crafting a similar sector reform bill for water. As this bill is developed, sector stakeholders should be consulted to ensure buy-in for when the new law is implemented.

The WRC can either proceed within the context of the larger water sector reform under the TAPP's first recommendation, or be pursued in parallel to it, especially if the proposed sectoral reform is expected to take longer than a single Congress to complete.

Proceeding to the next factor constraining universal access to water, TAPP recommends the following:

2. **Finalize and Implement the Unified Financing Framework for the Water Supply and Sanitation Framework**

On financing for the sector, a mixture of national government funding, official development assistance, and private sector investment can all co-exist. What is required is a financing framework to determine where these different sorts of funding should be applied based on a set of pre-determined criteria. For example, private sector funding can be allocated for those areas which are commercially viable, ODA funding to supplement large infrastructure water projects to reduce cost for paying users, and national government funding to cover the cost of infrastructure in far-flung areas. That having been said, there is a need for the NEDA-driven Unified Financing Framework for the Water Supply and Sanitation Sector to be finalized and implemented immediately.

C. EXPANDING WASTEWATER TREATMENT COVERAGE

The country's water resources will only be sustainable if the entire water cycle is addressed. Without dealing with the quality of water post-use, water resources are threatened. To this end, TAPP recommends:

Casecnan Irrigation and Hydroelectric Plant • Source: Knight Piesold' ConsultingSystem

1. **Strict Implementation of the Country's Major Wastewater-related Laws and Programs**

Major laws and programs governing wastewater management include the Clean Water Act, the Supreme Court Mandamus on the Clean-up of Manila Bay, and the National Sewerage and Septage Management Program. The laws mentioned need to be enforced in order to reverse the heavy pollution in the country's water bodies. The recent actions taken in Boracay serve as a good example of how delayed enforcement winds up requiring drastic intervention, such as the temporary closure of the country's top tourist destination. This also requires appropriate levels of funding to concerned government agencies (DENR, DPWH, and LGUs) for these laws to be implemented. A review and harmonization of these laws and programs may be in order to ensure real action is taken to address the sustainability of the country's water resources. Not doing so threatens the country's long-term water security.

Wastewater infrastructure is an expensive endeavor. Considering this, it may be necessary for the government to consider a long-term financing plan to bankroll the needed assets for an effective wastewater management system across the country. To expect end-users to finance such infrastructure could lead to very expensive tariff rates, not to mention the fact that, unlike water, the public may be less willing to pay via tariffs for a public benefit, which is not perceived to provide a private good. It may thus be worth considering to include wastewater infrastructure projects in the Duterte Administration's Build, Build, Build Program, financed either by ODA or national budget appropriations.

To also address the high-cost of wastewater infrastructure, a rethinking of the technology to be deployed is in order. Convention wastewater treatment facilities are heavy and expensive, while new emerging technologies are being developed and deployed, promising effective results at much cheaper costs. Thus, TAPP recommends:

2. **Encouragement of Innovation and Technology Adoption to Expand Access and Improve Water and Wastewater Services**

Both the public sector and private sector have various initiatives to develop and introduce new technologies in the water sector, many with applications for wastewater management. What lacks is awareness of such innovations and technologies. Platforms should be established for these new technologies and innovations to be exposed to the larger water sector ecosystem for the benefit of both technology adopters and technology inventors alike. Such feedback platforms allow for constant improvement in available local technologies to support overall improvements in coverage and service delivery.

Bustos Dam • Source: National Irrigation Administration

VI. CONCLUSION

Though certainly not an exhaustive list, TAPP believes that this list of recommendations provides very clear, actionable items, which the current Administration can undertake within its term and take the country closer to realizing its dream of water security. The path towards water security will surely last beyond 2022, but these actions, if taken today, can yield long-term impacts for our future society. We thus put them forth and commit to push for their adoption and implementation.

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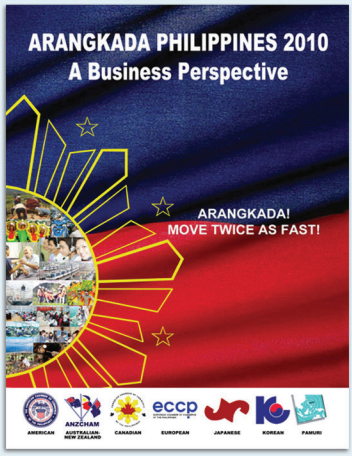

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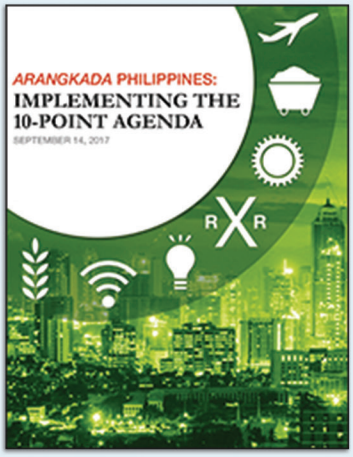

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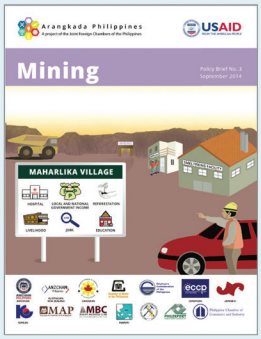

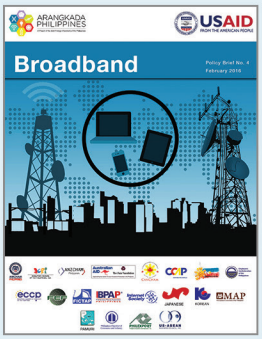

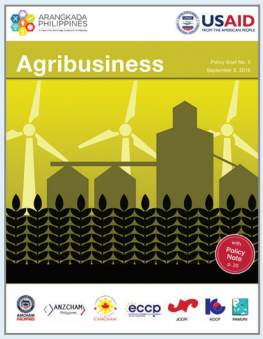

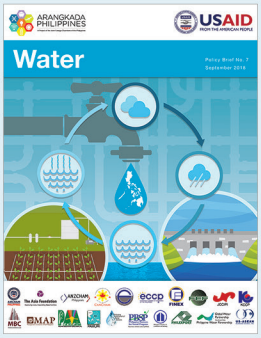

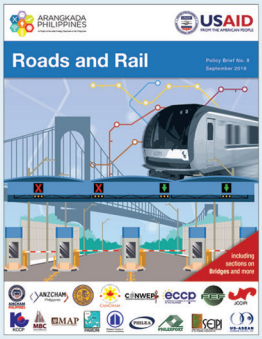

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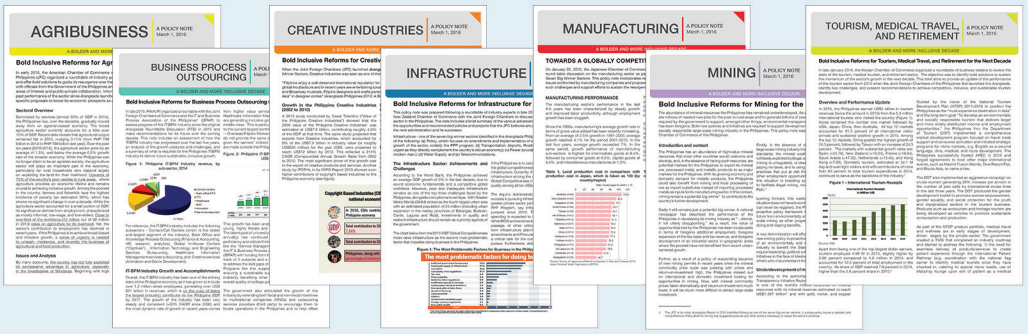

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