Global Issues in Water Policy 8

Agnes C. Rola
Juan M. Pulhin
Rosalie Arcala Hall *Editors*

Water Policy in the Philippines

Issues, Initiatives, and Prospects

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Global Issues in Water Policy

Volume 8

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Foreword

Water advocates had warned of an impending water crisis in the Philippines. The projections for 2025 show that in a high-economic-growth scenario, the water balance is predicted to be negative for some regions in the Philippines. The reason behind the crisis could either be because of increased water demand arising from economic growth and population rise or because of decreased water supply associated with watershed degradation and climate change.

Notwithstanding, the Philippine freshwater ecosystems also face severe problems because of pollution. Economic activities have considerably increased the effluents being discharged to water bodies. Domestic sewage has contributed about 52% of the pollution load, while industries account for the remaining 48%, according to recent data. Other causes of water pollution include improper and inefficient operation of landfills and lack of public cooperation on the proper disposal of sewage and solid wastes.

This book is a timely reference for water policy decision-makers. The analysis and recommendations contained in this publication to ensure water security can turn the tide for both declining and degraded water resources.

As the last chapter prescribes, "there is a need to implement policies and corresponding policy instruments in an integrated manner instead of the usual piecemeal approach." As deemed by the authors, the policy implementation requires putting investments into human and institutional capacities as well as on modern technologies. These investments, from the government point of view, are necessary for the water sector's improved planning, proper and efficient implementation of water programs, and sustained management and development of water resources in the country.

Roy A. Cimatu
DENR Secretary

Preface

Rapid population growth and urbanization were observed to cause increasing competition in the use of water, the supply of which is also becoming scarce due to widespread water pollution and degradation of watersheds. According to a 2007 Asian Development Bank report, some Asian countries will face a water crisis in the future due to inadequate or inappropriate water governance mechanisms. Cases all over the world, the Philippines included, have shown that water governance is a very complex process. Decisions about policies, laws, institutional structure, incentives, and capacity development are made by a multilayer of decision-makers: national, regional, local, and even ethnic authorities. Water conflicts have also been observed especially at the local level.

To address this issue, a group of University of the Philippines faculty members conducted a research program that aimed to understand the current status of water governance. Funded by the University of the Philippines during the years 2012 to 2016, the study characterized water governance in urban, urbanizing, and rural areas of the country; conducted an actor-based assessment of water governance at the watershed level; and developed a platform for adaptive collaborative water governance in three sites differentiated by level of urbanization and ease of access to water.

The writing of this book was motivated by the aspiration to share the results of this 4-year study. The original proposal for the book chapters focused on the water policy supporting the water dynamics within the watershed and national levels. While water governance at the watershed level has been observed to be improved by the program, national-level water governance reforms will not be that easy.

This book aims to contribute to the national water governance reforms through incisive analysis of present water policies. Using perspectives from the biophysical and social sciences, this volume maps and examines the current state of the water sector in the Philippines in terms of demand, supply, and uses; legal, institutional, and policy arrangements; sector performance (domestic, industrial, agriculture and

fisheries, environment, and multiple-use sectors); initiatives for water supply sustainability and improved water demand management; and prospects to achieve water security. With increasing population, urbanization, land use conversion, and the threats associated with climate change, water policy and its implementation must improve.

Los Baños, Philippines Agnes C. Rola

Acknowledgment

This book reflects the authors' passion to contribute to the improvement of the Philippine water policy environment. All of the authors have in one way or another been engaged with the water sector as researcher, consultant, and administrator. Each has his/her own thinking, stock knowledge, and practical experience about what ails the sector, and thus, the actual writing of the manuscript was not a difficult exercise. We therefore thank the various authors who gave their time and expertise freely to come up with this volume.

The University of the Philippines (UP) through the Emerging Interdisciplinary Research Program (EIDR) funded most of the research work in this volume. We acknowledge with gratitude the unconditional support of then UP President Alfredo E. Pascual and Vice President for Academic Affairs, Dr. Gisela P. Concepcion, in making this volume a reality.

This volume also benefitted from the contribution of UP colleagues, Dr. Guillermo Q. Tabios lll and Dr. Rex Victor O. Cruz, who wrote two chapters each, and our non-UP colleagues, Dr. Arlene B. Inocencio, Dr. Rafael D. Guerrero lll, and Mr. Antonio "Tony" R. de Vera, whose chapter contributions made the story more complete.

To Professor Ariel Dinar of the School of Public Policy, University of California, Riverside, and the editorial board of the Issues in Water Resources Policy series of Springer, our heartfelt thanks for the encouragement and for the confidence that we can come through with this publication.

Finally, we thank the Springer Nature publication and its staff, particularly Mr. Joseph Daniel, for guiding the editors in the publication process.

The Editors

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Chapter 1
Water Resources in the Philippines: Overview and Framework of Analysis

Agnes C. Rola, Juan M. Pulhin, and Rosalie Arcala Hall

Abstract This chapter provides the context, setting and framework of water policy analysis for this volume. It gives an introduction to the state of water resources in the Philippines, supply and demand situation and the extent of pollution of water bodies. It presents the framework of analysis that guided the discussion in the book. The framework showcases the water supply sustainability issues vis a vis the growing demand and the needed policy support to make this happen. Factors identified to drive water scarcity are the increasing population and urbanization, weak institutional arrangements in the water sector, lack of policy instruments and weak implementation of environmental policies and laws. The last part outlines the organization of the book.

Keywords Water resources • Water policy framework • Policy instruments • Water institutions • Philippines

1.1 Introduction

Water scarcity in the Philippines does not seem to be a pressing concern because of the perception of too much water, the country being an archipelago. It is composed of an estimated 7107 islands, with a land area of 299,764 km^2 (115,831 mi^2). Its length measures 1850 km, starting from the point near the southern tip of Taiwan and ending close to northern Borneo. Its breadth is about 965 km. The Philippine

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coastline adds up to 17,500 km. The 11 largest islands contain 94% of the total land area. The largest of these islands is Luzon (about 105,000 km^2 or 40,541 mi^2). The next largest island is Mindanao (95,000 km^2 or 36,680 mi^2). The archipelago is around 800 km (500 mi) from the Asian mainland and is located between Taiwan and Borneo. Three prominent bodies of water surround the archipelago: the Pacific Ocean in the east, the South China Sea in the west and north, and Celebes Sea in the south (PIA 2012).

The Philippines is divided into three island groups: Luzon, Visayas, and Mindanao. The current (2016) population of the Philippines is estimated at 102,638,895, equivalent to 1.37% of the total world population. It ranks number 12 in the list of countries by population (Worldometer 2016). The economy of the Philippines is the 33rd largest in the world (IMF 2016) and is one of the largest economies in ASEAN. The Philippines is also regarded as one of the emerging markets. Based on 2009 official statistics (NSCB 2009), overall poverty incidence in the country increased slightly, reaching 26.5% of the population in 2009, up from 26.4% in 2006 and 24.9% in 2000. Importantly, income disparity between the country's urban and rural populations continued to widen over the period, as urban poverty incidence declined faster than did rural poverty. Results of the 2008 Annual Poverty Indicator Survey (PSA 2008) showed a significantly lower poverty incidence in urban areas than in rural areas (19.7% vs 42.5%). As in other developing countries in the region, urban areas in the Philippines are seen to be offering better employment opportunities and higher incomes than rural areas.

As to form of government, it is a presidential, representative, and democratic republic, meaning that the president of the Philippines is both head of state and head of government within a pluriform multiparty system. The government has three interdependent branches: legislative, executive, and judicial (Philippine Government Official Gazette 2016a). The country has a decentralized form of governance, where power and authority from a central institution have been transferred to lower or local levels. Currently, local government units number 80 provinces, 143 cities, 1491 municipalities, and 42,028 villages/barangays (Dorotan n.d.). Each of these is headed by a local executive.

Per capita water availability in the country has been declining over the years brought about, on one hand, by increased water demand arising from economic and population growth, and, on the other, by decreasing water supply associated with degradation of watersheds (Rola and Francisco 2004) and low surface runoff during dry months in some areas (see, for instance, Peñaranda et al. 2015). In terms of spatial differences across the country, projections for 2025 show that, in a high-economic growth scenario, water balance is predicted to be negative for some regions in the Philippines due to rising water demand in the metropolis such as in Metro Manila (JICA/NWRB 1998).

The Philippine freshwater ecosystem faces severe problems of pollution and rising costs of potable water supply (DENR EMB, 2008). The increase in population and economic activities has considerably increased the effluents being discharged to these water bodies. Other sources of water pollution are inefficient and improper operation of landfills or incinerators and inadequate public cooperation on the

proper disposal of sewage and solid wastes. Toxic red tide outbreaks occur regularly, and their frequency is also increasing through time.

The World Resources Institute (WRI) predicted that the Philippines will experience a "high" degree of water shortage in the year 2040 (WRI 2015 as cited in Almaden 2014). It ranked 57th out of 167 countries that are most likely to be water stressed by 2040. The sector that will bear the brunt of water shortage by that year is agriculture, a major component of the country's economy. The study likewise predicted the degree of water shortage for three specific sectors: industrial, domestic, and agricultural. For the Philippines, the predicted degree of water stress for agriculture is the highest among the three. Water stress for the industrial sector and domestic use was graded "medium to high," whereas overall water stress projection for the country is "high," specifically for regions such as Mindanao, which could experience more extreme cases of water shortage than the national average.

The impending water shortage is an outcome of weak governance. This weakness is further revealed through destruction of tropical rainforests and catchment areas, water pollution, excessive extraction of groundwater, general water misuse, and poor resource management. It must be known that the Philippines has a multitude of laws and policies as governance instruments, but structural constraints in water policy in the Philippines persist.

Water as a policy area in the Philippines exhibits the kind of multilayered complexity and fragmentation (Hall et al. 2015). Multiple institutions with hierarchical areas of coverage, varying mandates (regulatory and customary), and sectoral representations inhabit its universe. Participants include state agencies and non-state actors (NGOs and civil society), including the private sector, but their ability to influence outcomes is highly uneven (Malayang 2004). The power of each actor is, in turn, determined by its mandate, resources, and public recognition of its legitimacy. There are more than 30 agencies (national, catchment-based, private, and local) managing the water resources of the Philippines.

Coordination among these agencies is not observed (Rola et al. 2015, 2016). Some national agencies have no field presence in many localities. There are some catchment-based formations, but these are mostly loose and informal. There is no nationally legislated funding scheme for water resource management. As such, there is a national policy, but plural governance schemes at the local level exist, many of which have customary bases. In addition, local water managers have a poor understanding of the formal laws (Hall et al. 2015).

1.2 State of Water Resources in the Philippines

The Philippines is an archipelagic country with an average annual rainfall of 2500 mm. It is endowed with vast water resources (Fig. 1.1) consisting of marine (bays), inland waters (rivers and lakes), and groundwater with a total area of 2,257,499 km^2. These resources are vital for the welfare of its people and the country's economic development. Groundwater reservoirs have an estimated storage

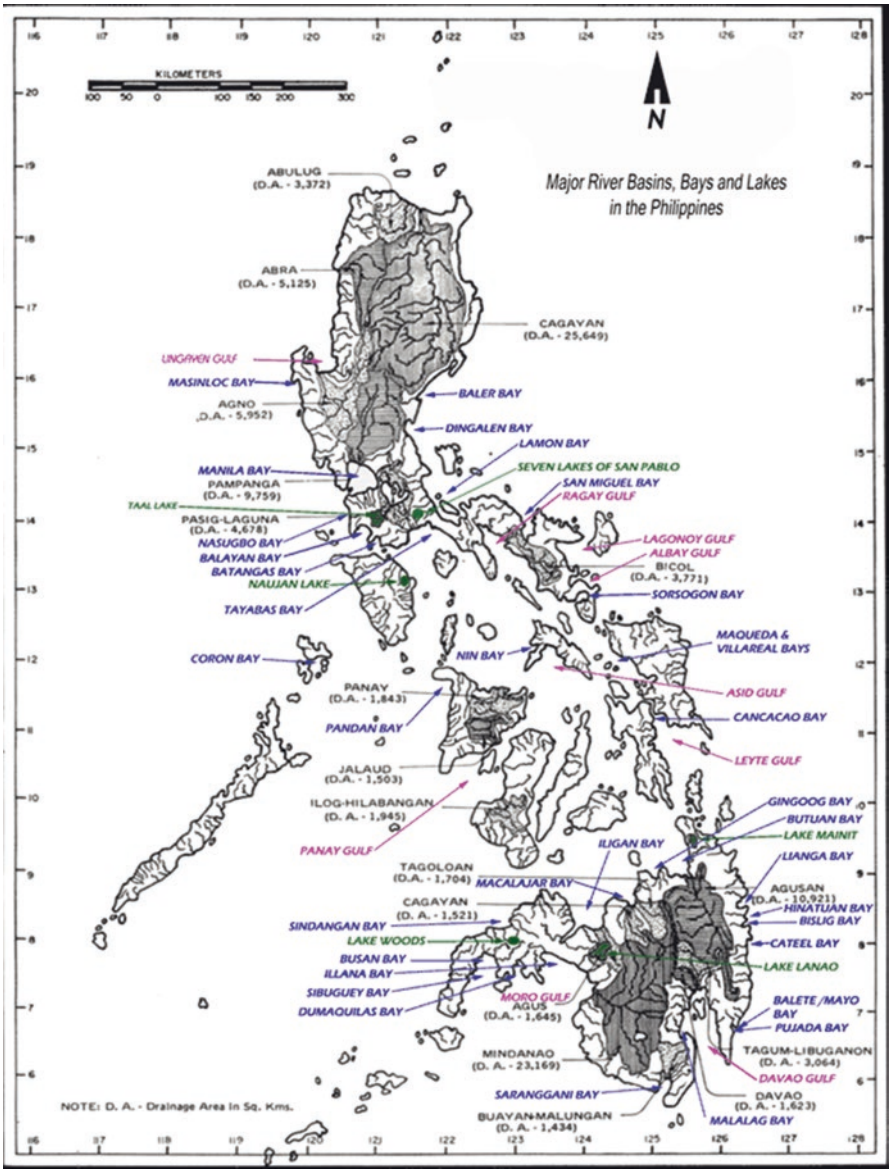

Fig. 1.1 Major rivers, dams, bays, and lakes in the Philippines (Source: WEPA n.d.)

capacity of 251,100 million m^3 and a dependable supply of 126,000 million m^3 per year (DENR 2016).

The country's surface water use is largely devoted to agriculture, with irrigation, livestock, and fisheries representing 86% of total water use. Industry and domestic sectors both comprise the rest of the total. On the other hand, groundwater is distrib-

uted according to these uses: 63% for domestic consumption, 17% for industry, 13% for agriculture, 1% for power generation, and 6% for other sectors (Gamolo 2008).

1.2.1 Water Supply and Demand

Global projection states that, for 2025, only 10% of total renewable water shall have been withdrawn. Yet, there are spatial variations in water supply conditions. In the Asia-Pacific region, only a small portion of renewable water sources can be tapped, even if, statistically, per capita annual use of 400 m^3 is only 12% of the 3360 m^3 per capita renewable water resources in the area (Webster and Le-Huu 2003). This pattern was also noted in the Philippines, where annual water use accounts for only 12% of available supply (FAO 2002). Viewed in isolation, this figure tends to suggest that the need to manage water use and conserve water resources in the region and in the Philippines, in particular, is not a pressing concern. Several facts, however, quickly dispel this notion (Rola and Francisco 2004).

First, per capita water availability has been declining over the years (Webster and Le-Huu 2003). This situation is brought about, on one hand, by increased water demand arising from economic and population growth, and, on the other, by decreased water supply associated with degradation of forest watersheds in the country. Second, the data on aggregate availability are illusory in that they indicate *average* supply per capita per year, without regard to the distribution of available supply. True availability is contingent on time, place, quality, and cost. The Philippines, like all other Asian developing countries, has regions and times of year in which water for specific uses is scarce (Fig. 1.2).

1.2.2 Trends in Water Supply and Demand

Available data also show that water demand is increasing and water supply is dwindling. This can be seen by analyzing trends of surface and groundwater supply and demand. Water demand, while considered stable, is actually increasing in terms of per capita use (NSCB 2004; Bagares et al. 2012).

1.2.3 Trends in Water Use, by Sector

As a proxy for water use, data on water permits issued and the corresponding volume of water allocated were examined for the periods 2006–2010 and 2011–2014 (see Chap. 2). There was an increase in total water permits issued and in the volume of water allocated. In terms of sectoral water use, irrigation remained to be a major

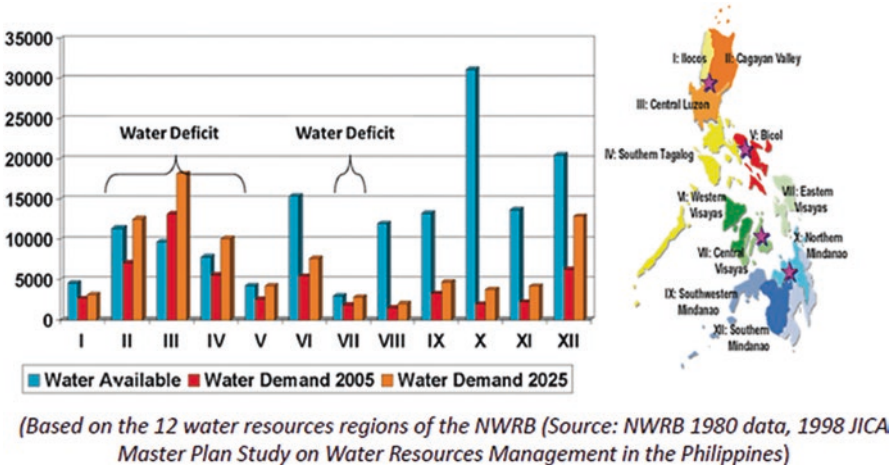

Fig. 1.2 Projected supply and demand of water ('000 m^3) in various regions (2005–2025) (Source: JICA/NWRB 1998)

water use, followed by municipal or domestic water use. Industrial water use was also becoming prominent. Future conflicts are expected, brought about by competition between domestic water use and irrigation, the latter being tied to the major goal of food security.

1.2.4 Extent of Water Pollution

Of the 688 classified water bodies in the country, only about 27% have potable water. Many of the major rivers and lakes are heavily polluted. Of the 40 water bodies monitored as sources of drinking water supply, only 28% satisfied the criterion established for total suspended solids, signifying the effects of sand and gravel-quarrying activities and runoff sediments from denuded forest and agricultural land (DENR-EMB 2014). Domestic sewage has contributed about 52% of the pollution load, while industries account for the remaining 48% (NSCB 2006). On the other hand, pollution of groundwater occurs when contaminants coming from domestic wastewater, agricultural runoffs, and industrial effluents reach the aquifer or water table in the form of leachates (Ancheta et al. 2003). Of these, domestic wastewater is the main cause of bacterial contamination to groundwater supply. Water-borne diseases such as diarrhea, cholera, dysentery, hepatitis A, and others can be caused by the presence of coliform bacteria in drinking water.

Saline water intrusion has likewise emerged as a problem in some areas, reducing the availability of groundwater supply. This is caused by overexploitation or excessive withdrawal of groundwater. As salt water enters the water table, water availability for domestic usage, including drinking and agricultural usage, is

reduced. This poor water quality (see also Chap. 5) plus the dwindling water supply due to environmental degradation (Chap. 9) and climate change can result in water scarcity looming in the horizon.

1.3 Factors Affecting Water Scarcity: A Framework of Analysis

The Philippines faces water shortage due to a variety of factors: population increase and urbanization constitute the direct drivers of change, and then there is weak water governance characterized by fragmented and multiple institutional arrangements within the water sector, lack of effective policy instruments, and weak enforcement of environmental protection policies.

1.3.1 Population Growth and Rapid Urbanization as Drivers of Water Demand

The population of the Philippines when it was first surveyed in 1903 was 7.6 million people. In merely two decades, the national population grew from 60 million in 1990 to 92 million by 2010.

In addition, as early as 1980, urbanization (proportion of urban population to total population) reached 37.2%; by 1990, it was 48.6%. In 2000, urban areas were home to 48.1% of the country's 76.5 million inhabitants. By 2010, those areas accounted for 45.3% of a total population of 92 million. While annual population growth rate has declined over a 25-year period, urban growth rate remains higher than national average due to high birth rates, in-migration, and, to some extent, the reclassification of local government units (LGUs).

Rapid increase in population and creeping urbanization gave rise to conflicting demands for water for domestic, agricultural, and industrial purposes (see also Chap. 2). Trends show that overall access of the population to water supply services and sanitation facilities has declined, along with the ability of water service providers to expand their services. Both the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) had reported a decline in overall access to improved water services in the Philippines, from 87% in 1990 to 85% by 2002 (Almaden 2014).

For households without formal access to safe water, the alternatives are self-provision (e.g., private wells, fetching from river/spring systems) or availing of services of informal providers such as small-scale independent providers, entrepreneurs with water tankers, or neighborhood water vendors (Hall et al.2015).

1.3.2 Weak Institutional Arrangements Within the Water Sector

Water decisions in the country are made and implemented under multilayered and fragmented institutional arrangements and policy complements (see Chap. 3). The Water Code of the Philippines (PD 1067) is the overarching law that governs water access, allocation, and use. However, there are at least eight legal frameworks that govern the water sector in the Philippines; in some instances, there are conflicting provisions (Philippine Government Official Gazette 2016a, b, c) that make matters worse.

Water governance is also a mandate of multiple water institutions that were a result of the creation of offices corresponding to new laws but without the old systems being abolished. There are 30 agencies (national and LGU-based) managing the water resources of the Philippines (Tabios and Villaluna 2012). Their regulatory mandates cover water quality and quantity, water resource and water services. Institutional concerns as expected are also varied: water sanitation and quality, watershed management, integrated area development, data collection, flood management, irrigation, hydropower, water supply, research and cloud seeding. While not all are present at every locality, the sheer number of potential actors and the assumed plurality of mandates (no mandate is deemed a priority over the others) make for serious political inertia in terms of getting the job done. As a consequence of fragmented and overlapping functions, there is no central planning body for water; no available integrated water data bases for decision support; and there are known conflicts in the enforcement of the various water-related laws (Hall et al. 2015).

In terms of planning for water use, there are also no observed vertical and horizontal linkages among the water-related institutions (Rola et al. 2016). The weak institutional arrangements result in high costs of coordination (Elazegui 2004), politically contingent, and selective application of formal rules at the local level, and inherent tensions between formalization and traditional/customary norms in water provisioning.

Within particular water sectors, institutional concerns are also an issue. For the domestic water sector, the water districts and municipal-government-administered water works play a key role in supply, distribution, and management at the local level (see Chap. 4). Historically, these water institutions have paid less attention to sanitation and focused more on water provisioning. The patterns of water use in the domestic household sector also follow the country's demographic distribution where urban and town centers are favored infrastructure-wise over rural and urbanizing areas. Urbanizing areas suffer from competing uses between households and small-scale industries and the attendant pollution arising from unregulated wastewater-dumping activities. Especially in the urban centers, private companies are now also becoming popular service providers.

With regard to industrial water use, the Philippine Environmental Management Bureau (EMB) regulates the toxic emissions into water bodies. The Laguna Lake

Development Authority (LLDA) regulates the water quality of the Laguna Lake, where industrial agencies abound within its perimeter. Water is a driver for industry both from the perspective of securing stable supply sources as well as from the standpoint of enhancing operating efficiency (see Chap. 5). It is also increasingly recognized by businesses as fundamental to the health of its customers, workers, and communities. In 2010, based on the NWRB reports, industrial users represented the second largest user of water, with agriculture still the sector with the highest water use. Fifteen percent of wastewater generated is attributable to industries.

In irrigation, currently, there are three government entities concerned with irrigation governance: the National Irrigation Administration (NIA), the Bureau of Soils and Water Management (BSWM) under the Department of Agriculture (DA), and the local governments. NIA constructs and manages the large reservoirs/dams. The DA-BSWM is charged with the promotion of small-scale irrigation projects. It provides supplemental irrigation, incidental functions such as flood control structure, and other economic uses like those for fishery and livestock production. With devolution of powers to local governments, LGUs were also given the mandate to construct communal irrigation systems and to build inter-barangay irrigation infrastructure. This multiplicity of institutions hinders the preparation of an integrated irrigation plan (see also Chap. 6).

For the aquaculture sector, the Bureau of Fisheries and Aquatic Resources (BFAR) under the DA is responsible for the development, conservation, management, protection, and utilization of fisheries resources, with regional offices throughout the country. The Local Government Code of 1991 and the Fisheries Code transferred government supervision and licensing of all types of aquaculture to the LGUs. The only licensing function left with BFAR as far as aquaculture is concerned is the granting of fishpond lease agreements for public land (see Chap. 7).

Another government body, the Fisheries and Aquatic Resources Management Councils (FARMC) were created at national level and coastal municipalities to advise the national government and LGUs on fisheries policy and planning. In addition, the government has been increasingly engaging non-government organizations and people's organizations on fisheries co-management. The participation of the business sector in the development and management of the aquaculture industry has not yet been institutionalized or strengthened.

1.3.3 Lack of Effective Policy Instruments

The government has attempted to establish market-based mechanisms founded on a socially conscious system of water tariffs. Practices in water allocation across multiuse are concentrated through public and user-based allocation systems and equity still is the dominant driving force in drawing the country's water policy. This has been justified on account of the public good characteristics of water resources, the large investment required in water infrastructure, and the need to provide for the basic requirements of people in water-scarce regions. While efforts to price water

more appropriately to reflect its marginal opportunity cost are already being considered, initiative on its implementation has not been achieved (Almaden 2014).

For domestic water tariff, there are as many forms of pricing as the typology of domestic water suppliers (Rola et al. 2016). This ranges from full-cost pricing by the water district to free water by the community-based systems. The latter is the more dominant form of water service delivery in the country. Self-provisioning is very common, where again water is free. This non-uniformity of water tariffs raises issues of equity in water access and inefficiency in the system.

For industrial users, payment of user fees by virtue of the 'polluters pay' principle is also being implemented in some water bodies; however, water pollution still exists (see also Chap. 5). The utilization of these fees by the regulatory agencies has to be established.

For irrigation, only the farmers served by the NIA pay for the irrigation facility maintenance, called the irrigation service fees (ISF) to cover operation and maintenance expenditures. This fee is used primarily to finance the continuous operation of the irrigation systems (IS). Rates are based on the IS development scheme (run-off-the-river, reservoir, and pump), crops planted, and season. Farmers whose irrigation facility is constructed by the BSWM do not pay any fee. Farmers whose irrigation system was established communally have to pay for the capital outlay and for maintenance of the systems.

As discussed, water-pricing policy is vague in the Philippines. Seemingly, water is not treated as a commodity. Several subsidy schemes reflect the Philippine policy that water is a social good and should be accessible to all as a human right. The policy is payment for the delivery and other maintenance services. Until this day, there is no definite bulk water price as it is deemed that water is abundant and free at the level of source. Increasingly, water transfers, competition for multiple uses (see also Chap. 8), and payments for environmental services are emerging issues as water scarcity becomes real.

1.3.4 Weak Enforcement of Environmental Protection Policies

In the natural resource and environment sector, two earlier laws issued during the Martial Law years provided a sound legal basis for the conservation of water resources. In forestry, the Revised Forestry Code of the Philippines (1975) adopted policies on multiple uses of forest lands and their protection, development, and rehabilitation to ensure the continuity of their productive condition, including water resources (Philippine Government Official Gazette 2016a, b, c). Another presidential decree provided the legal definitions of a watershed and watershed reservation, with the latter "established to protect or improve the conditions of the water yield thereof or reduce sedimentation." Likewise, it provided for the definition of a "critical watershed" and accorded protected status to these areas by prohibiting commercial logging and grazing operations therein. To date, there are 146 proclaimed watershed forest reserves covering a total area of 2,675,687 ha, which constitute

about 16.94% of the country's total classified forest land of 15,805,325 ha (FMB 2014).

In spite of these two landmark laws, the state of the Philippine watersheds and water resources has continued to deteriorate through time (see also Chap. 9). Forest cover loss in many watersheds in the country has been severe (Cruz et al. 2010). The ratio of forest cover to irrigated and irrigable lands is generally quite low, and this could have serious implications on soil erosion and the availability and quality of water for irrigation. More recent environmental policies and programs impinge on the water quantity and quality. However, these policies and programs do not explicitly link these environmental initiatives with the water outcomes. The institutional arrangements and mechanisms to promote synergy among the various water-related agencies and overall efficiency in the water sector remains a challenge (see Chap. 10).

1.4 Organization of the Book

Using perspectives from the biophysical and social sciences, this book maps and examines the current state of the water sector in the Philippines in terms of demand, supply and uses; legal, institutional, and policy arrangements; and sector performance (domestic, industrial, agriculture and fisheries, environment and multiple-use sectors). It also analyzes the initiatives for water supply sustainability and improved water demand management as well as the ways forward to achieve water security.

The book is divided into three parts with a total of 12 chapters. The first part (Chaps. 1, 2 and 3) will set the context of the Philippine water sector. The second part (Chaps. 4, 5, 6, 7, 8 and 9) is an assessment of water sector performance. Sectors include domestic, agriculture, aquaculture, industry/commercial, environmental protection, and the multiple uses of water. In this part of the book, each chapter will discuss the state of the sector and the current policy environment, then highlight the problems; assess the sector from the policy/governance lens in terms of different indicators such as efficiency, effectiveness, equity, sufficiency, social profitability, transparency, accountability, and participation, whenever appropriate; and finally ends with a set of policy recommendations for sector improvement. The last part of the book (Chaps. 10 and 11) discusses current and future initiatives for water supply security and demand management, respectively. The last chapter (Chap. 12) maps out the ways forward for a more responsive and integrative water policy in the country.

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