

# 水與永續發展：台灣的政策與立法

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水是地球的重要資源，關係人類的可持續發展。但是，不少現象均顯示出水的危機普遍存在。例如，全球約十億人得不到安全的飲水，過度使用及污染水資源危害生物多樣性，地下水缺乏令農作物減少，與水有關的疾病和缺乏衛生導致人類死亡的主因。水資源安全與複雜的地緣政治密切相關，其內容涉及水質保護、水資源分配、水資源開發、水域環境保護、水資源管理和區域發展等方面，也成為國家對外關係和區域和平穩定重要的一環。

臺灣面積36000平方公里，其中2/3為南北綿互的山脈，河川發源呈東西走向，流短坡陡。平均年雨量2500毫米，然而降雨型態在空間及時間的分布極不均勻，豐、枯水期相當懸殊。年平均降雨量950億噸，平均蒸散量21%，年平均逕流量74%，其餘為地下水入滲量。在逕流量701億噸中，71%直接入海，剩餘154億噸為地面水實際利用，另外加上地下水36億噸，合計用水量約181億噸，其中20%為生活用水，9%工業用水，71%農業用水。整體水資源利用率約為年平均降雨量之19%，而在181億噸中有24%（44億噸）係靠96座大小水庫壩體調節而來。然而，水資源利用不能單憑水庫蓄水，台灣必須重新調整水資源的經營管理方式，以順應氣候變遷造成的水的危機，因此，水資源政策較以往更形重要。

台灣水資源政策的演進，分為三階段，關注的面向越來越廣。初期的〈水利基本政策〉（1986~2000年）以防洪、水資源利用及減低旱澇災害為主要目標，並因應產業快速發展、都市化和河川污染等問題的解決。1996年所訂之〈現階段水資源政策綱領〉開始納入生態保育及地層下陷防治等，水資源利用策略從積極開發調整為以區域水資源調度。1990-2000年間，環保意識抬頭，故於2003年召開「全國水利會議」，並於2006年訂定〈新世紀水資源政策綱領〉，積極納入民眾參與機制，並將加強水資源多元化經營管理，以及營造水岸環境及水文化等重要策略。嗣後，鑑於氣候變遷衝擊日趨明顯，經濟部水利署以2030年為目標年，研議〈新紀元水利施政綱要計畫〉（2003-2022年），以強化源頭管理、跨域協調、多元策略，以及促進公民參與，優化水環境，營造水文化為政策主張，以追求與水保育和經濟發展共生的願景。

在具體防災計畫方面，台灣曾二度制定特別條例。2006年行政院通過「水患治理特別條例」，以特別預算編列1160億進行「易淹水地區水患治理計畫」；2014年再公布施行之《流域綜合治理特別條例》，分6年編列660億元特別預算，期望以國土規劃、綜合治水、立體防洪及流域治理等多面向及宏觀思維，持續協助地方政府進行水患治理工作，但兩法成效如何，常久以來仍受質疑。

在立法方面，《水利法》制定於1942年，是我國歷史悠久和最重要的水的法律，歷經多次修訂。有鑒於近年全球氣候異常，面對超過保護基準之極端降雨事件，工程手段已無法完全避免災害產生；又土地高度開發與都市化區域日趨擴

大，逕流增加、洪災現象更甚以往。在政府財政有限下，推動「逕流分擔」與「出流管制」措施有其必要，並透過非工程避災措施以減輕淹水災害。因此，2018年6月，《水利法》增訂了第七章之一〈逕流分擔與出流管制〉，本章代表了台灣強化水安全的最新思維。例如，其第83-2條特別規定：「為因應氣候變遷及確保既有防洪設施功效，中央主管機關得視淹水潛勢、都市發展程度及重大建設，公告特定河川流域或區域排水集水區域為逕流分擔實施範圍，主管機關應於一定期限內擬訂逕流分擔計畫，報中央主管機關核定公告後實施。」第83-7條復規定：「辦理土地開發利用達一定規模以上，致增加逕流量者，義務人應提出出流管制計畫書向目的事業主管機關申請，由目的事業主管機關轉送該土地所在地之直轄市、縣（市）主管機關核定。」

除了仿效其他國家或地區，倡議「海綿城市」的建立外，台灣水利署自2010年起推動水患「自主防災社區」，配合政府的輔導，進行日常演練與災害應變，並評鑑特優之社區，作為「種子社區」，除強化自主性防災的工作外，也協助政府在當地進行區域聯合防汛、輔導鄰近社區及防汛推廣工作。此外，台灣於2019年初，舉辦「水文化資產」國際會議，呼籲將水的永續性，視為生活與文化的一環，共同關切全球水的共同利益。

## **Water and Sustainable Development: Taiwan's Policy and Legislation**

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Water is an important resource of the earth and is related to the sustainable development of mankind. However, many phenomena have shown that water crisis is widespread. For example, about one billion people around the world do not have access to safe drinking water, excessive use and pollution of water resources endanger biodiversity, groundwater shortages reduce crops, water-related diseases and the lack of hygiene lead to the cause of human death. Water security is closely related to complex geopolitics. Its content involves water quality protection, water resources allocation, water resources development, water environment protection, water resources management and regional development. Therefore, the issue has also become an important part of national foreign relations and regional peace and stability.

Taiwan covers an area of 36,000 square kilometers, of which 2/3 are mountains. The origin of the river is east-west, and the average annual rainfall is 2,500 mm. However, the distribution of rainfall patterns in space and time is extremely uneven, and the dry season is quite disparate. The annual average rainfall is 95 billion tons, the average evapotranspiration is 21%, the annual average runoff is 74%, and the rest is the amount of groundwater. Among the 70.1 billion tons of runoff, 71% went directly into the sea, and the remaining 15.4 billion tons were actually used for surface water. In addition, groundwater was 3.6 billion tons, and the total water consumption was about 18.1 billion tons, of which 20% was domestic water and 9% industrial water, 71% agricultural water. The overall water resource utilization is about 19% of the average annual rainfall, while 24% (4.4 billion tons) of the 18.1 billion tons are regulated by the dam of 96 large and small reservoirs. However, the use of water resources cannot be based solely on reservoirs. Taiwan must reorient its water management practices to meet the water crisis caused by climate change. Therefore, water resources policies become more and more important than ever.

The evolution of Taiwan's water resources policy is divided into three phases, and the focus of attention is becoming wider and wider. The initial "Water Basic Policy" (1986~2000) focused on flood control, water use, drought and flood reduction,

and responded to the rapid development of the industry, urbanization and river pollution. In 1996, the water policy began to be integrated into ecological conservation and subsidence prevention, and the water resources utilization strategy was switched from active water development to regional water management. In 1990-2000, accompanying with the rise of environmental awareness, the "National Water Conservancy Conference" was held in 2003, and the "New Century Water Resources Policy Guidelines" was promulgated in 2006, including several new topics, such as the public participation mechanism, and strengthening the diversification of water resources. It also created important strategies of waterfront environment and water culture. Afterwards, in view of the increasingly obvious impact of climate change, the Water Resources Agency of Ministry of Economic Affairs has targeted 2030 as a target year for the "New Age Water Conservancy Program" (2003- 2022) to strengthen water source management, cross boundary coordination, multiple strategies, and promote citizen participation. The program also aims to optimize the water environment, to create a water culture, and to set up a comprehensive water control system for the basin. It is hoped to achieve the vision for the coexistence between economic development and water conservancy.

In terms of specific disaster prevention plans, Taiwan has enacted special regulations for twice. In 2006, the Executive Yuan passed the "Special Act for Flood Management" to set out a special budget of 116 billion for "water flood control projects in flood-prone areas". Following that, the "Special Statute for the Comprehensive Management of River Basins" was passed in 2014 and put aside a special budget of NT\$66 billion in six years. It is expected to continue to assist local governments in flood control work with multi-faceted and macro-visions, such as land planning, comprehensive water control, three-dimensional flood control and watershed management. However, the performance of these two laws have long been the focus of controversy.

Regarding the legislation, the "Water Act" was enacted in 1942 and is a long-standing and most important water law in Taiwan. It has been revised several times over the past several decades. In view of the extreme events of climate anomalies in recent years, engineering methods have been unable to completely avoid disasters. The flooding is even more unprecedented with expansion of urban areas and the runoff is increasing. Under the government's limited financial resources, it is necessary to promote the "runoff allocation" and "outflow control" measures, and to mitigate flooding through non-engineering disaster prevention approaches. Therefore, in June 2018, the Water Law added the seventh chapter 7-1, "Runoff Allocation and Outflow Control". This chapter represents the latest thinking on strengthening water

security in Taiwan. For instance, Article 83-2 specifically states: "To respond to climate change and ensure the effect of existing flood control facilities, the central authority-in-charge may make a public announcement of implementation scope of the specific river basins, or catchment areas of regional drainage for runoff allocation, depending on the flooding potential, the degree of urban development and major constructions. The authority-in-charge shall draw up a runoff allocation plan within the given deadline and report to the central authority-in-charge for approval and public announcement before implementation." Article 83-7 also regulates: "When runoff increases due to the land development and utilization at a certain scale or above, the obligator shall apply to the central authority-in-charge of relevant industry with the outflow control plan presented. Then, the central authority-in-charge of relevant industry will forward the application to the municipal or city (county) authority-in-charge, which the land is under the jurisdiction of for approval."

In addition to emulating the establishment of the "Sponge City" in other countries or regions, Taiwan's Water Resources Agency has promoted the "independent disaster prevention community" system since 2010, cooperated with the government's counseling, and conducted daily drills and disaster responses. The community evaluated as excellence will be designated as a "seed community" to assist the government in regional joint flood prevention, counseling neighboring communities and related flood prevention works. In May 2019, Taiwan will host an international conference on "Water as Heritage". It is hoped that the sustainability of water will be a part of life and culture, and will share the concern for mutual benefits of global water.