

# A Review on Challenges, Opportunities and Outlook of Water Sector Privatization for Sustainability and Water Scarcity Management

Jeet Chand<sup>1,\*</sup>, Farjana Akhter<sup>2</sup>, Shiva Kumar Jha<sup>3</sup>

<sup>1</sup>Government of Nepal, Prime Minister Agriculture Modernization Project, Khumaltar, Lalitpur, Nepal

<sup>2</sup>Government of People's Republic of Bangladesh, Public Works Department, Joypurhat, Bangladesh

<sup>3</sup>Nepal Agricultural Research Council: National Agricultural Engineering Research Centre, Khumaltar, Lalitpur, Nepal

## Email address:

jeetchand06@yahoo.com (Jeet Chand), chajb003@mymail.unisa.edu.au (Jeet Chand), farjanasony01@gmail.com (Farjana Akhter), jhashiva25@yahoo.com (Shiva Kumar Jha)

\*Corresponding author

## To cite this article:

Jeet Chand, Farjana Akhter, Shiva Kumar Jha. A Review on Challenges, Opportunities and Outlook of Water Sector Privatization for Sustainability and Water Scarcity Management. *American Journal of Water Science and Engineering*. Vol. 9, No. 2, 2023, pp. 41-49. doi: 10.11648/j.ajwse.20230902.13

**Received:** April 13, 2023; **Accepted:** May 2, 2023; **Published:** May 10, 2023

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**Abstract:** The sustainable use and management of freshwater resources is on the center of developmental debate and becoming a global challenge. The overall aim of this study is to document published literature in the field of water privatization, critically review them and to draw a conclusion about how private sector participation can contribute in the initiative of sustainability for freshwater. To accomplish the specific goal of this paper, review articles, research papers, mini-articles, book and reports of authorized organizations published from last 25 years were reviewed. Comparative advantages, problems, challenges and opportunities of private and public sector management in water resources were thoroughly analyzed. Based on those reviews, this study found that there is a mixed legacy in water privatization throughout the world which needs to be strongly regulated to fulfill the basic requirements of consumers in one side and for sustainable management of scarce freshwater resources in another side. Meanwhile, after careful analysis of various water delivery systems and case-studies managed by different agencies around the world, this paper postulates the public-private-partnership as an appropriate form of privatization in water which not only helps to increase the project efficiency but also improves the service delivery to end-users.

**Keywords:** Private Sector Participation, Public-Private-Partnership, Remunicipalization, Water Economics, Water Privatization, Water Supply

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## 1. Introduction

In the article [1] Thales of Miletus, a Greek philosopher in nearly three millennia ago had acclaimed that “best of everything is water”. The recognition of water as a basic human requirement was first made at UN conference 1977 convened in Mar del Plata, Argentina and was sealed by Resolution Act 64/292 of UN General Assembly in 2010 [2]. However, the Dublin Conference 1992 affirmed that: “Water has economic value in all its competing uses and must be recognized as an economic good” [3]. With no doubt, water is one of the most essential and fundamental natural

resources upon which the functioning of natural ecosystem, human life and economy is based on the research [4, 5]. In the bucket of world's total water volume, a mere 3 percent is freshwater, and approximately 1 percent of that is economically and technically available for use [6]. The population throughout the world has tripled over the past 70 years and the water use has increased six-times because of increased irrigated agricultural area and industrial development [7]. Population projection and subsequent water requirements for agriculture, power, industry, environment and daily consumption indicate that availability of freshwater resources for different end-uses will be a complicated and challenging issues in coming decades [8]. The articles [9, 10]

show that about 2.70 billion people are facing water scarcity by 2025 and currently more than one billion is struggling to find enough water to meet their basic needs. About 250 million cases of water-related diseases are reported every year with four to five percent deaths [11]. Water quality deterioration is one of the major problems, aggravated by climate change and municipal/industrial activities throughout the world [12]. The World Water Council's Vision 2025 assumes that around USD three thousand billion needs to be invested over a 25-year period to provide universal access to water and sewerage services and it anticipates that national/international private companies will contribute 70 percent of this investment [13].

Although freshwater is a renewable resource, supply of freshwater is decreasing and water requirement already exceeds supply in many parts of the world because of growing number of competitors and subsequent demand. The general assembly of UN in 2010 had recognized water supply and sanitation (WATSAN) services as the human rights and declared that all people in the world should have access to quality water and sanitation by 2030 [14]. Unplanned rapid urbanization is expected to increase perennial water shortage by almost 1 billion in developing countries alone by 2050 [15]. In a vicious circle, due to Covid-19, the most vulnerable groups are now suffering even more from lack of clean water making them more vulnerable to the pandemic [15]. Simple hand washing with soap can fight the spread of the coronavirus, but it appears to be a luxury that the majority on the planet cannot afford. This highlights the need and scope to manage freshwater as a finite, precious and scarce resources and rationalize its use in terms of efficiency, efficacy and access [16].

It is said that earth contains enough water for living being but there is water insufficiency, primarily due to mismanagement, bureaucratic inertia and a limited investment in both physical infrastructure and human resources development [17]. To fulfil water requirements of living beings as a fundamental right, socio-political issues such as accountability, reasonable price, and transparency should be considered along with issues of environmental protection and conservation [18]. The debate regarding pricing of water heightened after the 1992 Dublin Water Conference and World Water Vision described water as an economic good. However, the concept containing water as an economic commodity still remains controversial. Basically, there are two main opposing arguments, first category recommends that the government should control water resources for its development and management while another advocate privatization as the solution for the challenges related to water sector. In these uncertain conditions, the question of who is best placed to manage water is crucial [19].

## 2. Water Privatization

The overview above indicates that the community across the globe is facing challenges in water sector and the

magnitude of the problem will be increased until an effective implementation of holistic approach. The annual renewable water resources throughout the world amount to nearly 50,000 km<sup>3</sup> and currently about 70 percent of the annual available freshwater is being used in different sectors [7]. One important point to be noted is the rate of water use should be maintained at a lower than the renewable rate of water resources. In the article [20] it has recommended that a combination of innovative approaches including technological advances, managerial techniques and arrangement of additional financial resources can collectively tackle the challenges related to water. One of the major problems in water sector throughout the world is repair, maintenance and modernization of the old infrastructures (including leakages reduction, replacement and expansion of existing networks) which needs huge financial investment for sustainable and equitable tariffs, and efficient revenue collection [18]. In this context, private sector participation (PSP) is one of the approaches to help achieving UN targets in SDGs because PSP is often perceived as a way to tap new economic sources for improvement, modernization and expansion of services or networks [21].

A clear scientific need of water management in the context of scarcity and competition by treating water as an economic good was the starting point of privatization which slowly shifted towards market-based water governance [21]. The term 'privatization' is frequently defined as ownership change or management handover from government to the private party and is considered as the accumulation of property to exclude others from use [11]. Water privatization has been lately initiated compared to other sectors including telecommunication, energy and transportation [22]. The previous research reported that the wave of water privatization was started in the early 1990s from Latin America [23]. Romans were the first to consider drinking water from economic view point to secure water resources for their future generation [24]. The finding of article [25] shows that the water privatization thrust in developing world increased rapidly due to active involvement of the donors including World Bank and International Monetary Fund. It is claimed that in accordance with the dominant neoliberal ideology in the EU, water privatization was promoted as a way to relieve state debts and spending by privatizing public water utilities and, most important, for generating profit to companies [15]. Water privatization contains many forms including engineering construction work to management contracts, leasing, and public-private partnership (PPP) model [15].

In the past, the provision of WATSAN was seen primarily as the responsibility of government only, however, this view has changed since the 1980s, and increasingly so in 1990s and 2000s, there has been a growing trend towards privatization of many aspects of water [20, 25]. Underpinning this has been a shift away from seeing water as a public good that is essential for life, to a more market-oriented approach where the state, although still responsible for maintaining universal access to water services, uses

market forces to meet this aim [13].

There have always been debates on water privatization soon after its initiation [4, 26]. Impact studies (e.g. [27- 30]) undertaken throughout the world about privatization in water resources services indicted mixed outcomes regarding prices, investments in infrastructure and service quality. The customer viewpoint in the study [31] has reported that the water privatization looked much less successful compared to other utilities (especially gas, electricity and telecommunications) and advocated that water sector has made very little progress towards market liberalization because hardly any consumers have a choice of supplier. The opponents of PSP in water always argue that the quality of the service (both physical and operational) deteriorates under a regime of privatization because the strategy of private company remains in the center of benefit and cost recovery [26]. The study in the article [32] has concluded the asymmetric information, asset specificity and renegotiations as problematic factors of PSP in water sector. In addition, the article [33] reported that reputation and credibility are difficult issues under water privatization because if a company withdraws from a contract, this might damage its reputation and diminish its prospects for future PSP contracts.

In advanced countries, PSP is often seen as a means of improving the existing services of government with expectation that privatization will bring modernization, partly through the introduction of additional capital and partly by good human resources development and management [20, 34]. Hence, people in the developed world agree that despite the challenges induced from economic crises, PSP for water services has becoming an increasingly attractive proposition in the sound footing of integrated water resources management. The proponents who support PSP argue that private sector can add extra value in quality services using the principle of competitive market and also can improve service coverage by bringing more investment and new technology [35]. In the contrary are those who claim that water should not go in the basket of privatization because it is an essence of life and access to safe and enough water is human rights. Thus, it can be claimed that water privatization is one of the most controversial and emotional developmental debates.

### **2.1. Water Privatisation and Associated Advantages**

The article [7] points some key contributors responsible to the increased freshwater withdrawal including unsustainable and lack of scientific management (leakage, waste etc.), and the free use concept-treating water could not be an economic good. In addition, the association recommends a holistic review in the freshwater management including control on access and use, conservation, protection from pollution and prevention of waste. There are many theories and principles regarding whether water could be treated commercially or not. If we go deeper, neoliberal theory particularly advocates PSP considering water as an economic good and hence privatization would result improved project efficiency and better quality output to end-users [36, 37]. Apart from the

increased profit and resources use optimization from privatization, other major factors for PSP in water sector include budget limitation and poor performance of governmental water organizations along with donor conditionality in favour of private sector. Privatization has capacity to allow capital to be raised independently without going to the public sector, and there is a reduced chance of politicisation in decision-making process, all of which cumulatively improve the performance, transparency and overall quality of water projects [26]. Efficiency of water related projects can be enhanced both technically and economically in three tiers: global water use efficiency, water allocation efficiency and local water application efficiency where privatisation can play significant role in all selected levels [38].

Many case studies throughout the world reveal how PSP positively contributed in efficiency, economy and service delivery to consumers. For example, experiences of the England, Wales and Germany since 1990s indicate that PSP in water services can reduce capital expenditure by 30 percent and service provision cost by 20 percent because of robust management [13]. Similarly, the article [32] advocate the superiority of PSP in extension of water services by taking an example in the Manila Philippines that utility charges reduced by 65 percent after private sector entry in WATSAN. Moreover, the performance of the United Utility (a private company) in terms of finance and service delivery was better in Manila (the 24-hr water delivery increased from 22 to 80 percent in between 1997 to 2001) and hence connected 50000 low-income households in pipe network by 2004. The article [39] claim that private firms are more efficient because they operate following the principle of perfect competitive markets where the least efficient will forced to go out of business automatically. In the 2008 emergency situation of fire in the Western Pennsylvania of US, there was a severe problem of water access and quality issues. However, the AQUA (an essential utility company) accepted the order of Pennsylvania Public Utility Commission and solved the problem 17 months before of the deadline by investing USD 7.3 million for the construction of a new water treatment plant and replacement of 4000m old water mains [40]. In Kenya, PSP increased the average water consumption per capita per day which attributed to quality and service improvements under privatization.

The privatization process in water sector, which was primarily originated in the early days as a tool for economic change in the region of Latin American slowly led to the significant concern that tariff adjustments create important implications to the end-users [41]. Several surveys indicated that the users (even if they are pro-poor) are willing to pay utility bills up to 10 percent of their net-income in the case of safe water and better services reliability [42]. Majority of the published literatures also agree that people generally have willingness to pay charges for water services if guarantee in availability and quality is ensured. By taking these examples it can be critically said that private companies use and manage water for commercial and social benefits, promote

efficient utilization and they have strength of financial resources and hence can be suggested that problems of good quality water availability and easy excess to water could be minimized if the resource is properly treated as an economic good. The reviewed literatures also indicated that PSP in water sector (particularly WATSAN) has two strengths: mobilizing existing assets to optimize their efficiency and developing new assets so that they provide a satisfactory level of performance at the lowest price. Unless water is treated as an increasingly scarce natural resource and priced to reflect its value, significant part will be wasted which is the current bitter reality.

In summary, countries are observed to be adopting PSP in water sector for attempting to improve the quality of the water services supply, to expand the networking, to improve efficiency in operations and proper maintenance and to secure financial resources for investment as well as to incorporate new technologies. As such, privatization is observed as a tool to reduce the burden on public budgets while improving the customer service.

Table 1 indicates a brief summary how PSP in water sector is distributed around the world and investment commitment to run the projects from 1984 to 2010. Table 1 is based on [2] which shows that the major attraction of private sector in WATSAN was in East Asia and Pacific, followed by Latin America and Caribbean. However, to judge the success and failure of PSP for sustainability of freshwater resources, these projects should be carefully reviewed. Some notable successful and failure water privatization case studies are listed in the article [2]. Municipalities of Finland, Bucharest in Romania and the city of Macau in China come under successful PSP projects whereas Cochabamba in Argentina, Hamilton in Canada and Dar es Salaam in Tanzania were the failed projects. The main reasons behind the success and failure in privatization of such a scarce and important resources could be: corruption, lack of capital, insufficient technical know-how of bureaucracy, insufficiency (network expansion in water supply), neoliberal policies (promoting competition), external pressure from donors/bilateral organizations, high water tariff, non-implementation of the agreement, lack of transparency and water quality deterioration.

**Table 1.** Synopsis of PSP projects and investment commitments worldwide (1984 - 2010).

Region	No of PSP Projects	Investment Commitments (USD million)
Europe & Central Asia	44	3781
Middle East & North Africa	22	3772
Sub-Saharan Africa	28	266
East Asia & Pacific	406	29816
Latin America & Caribbean	224	24751
South Asia	13	354

## 2.2. Water Privatization and Possible Challenges

PSP in WATSAN sector increased sharply from 1990 to 1997, thereafter it is in the declining trend [2]. Indeed, the 1990s saw a wave of privatization, initiated from public

sector and multilateral donors including development banks. However, in countries like Uruguay and South Africa, this wave of PSP in water sector created devastating consequences of extreme price hikes which resulted disconnecting access to water for poor and pro-poor [43]. In contrast, private corporations earned huge profits in highly developed cities including Paris and Atlanta, whilst failing to invest in infrastructure and simultaneously increasing the water bill to consumers. Activists also criticize that international commercial parties/firms and corporations generally problematize the increased tariffs by raising the utility bill above the limit of pro-poor, while profits have been taken to own country. India witnessed the violation of agreement in PSP who indulged in price fixing and amplified prices and it was the poor who faced network disconnections and were often forced to drink contaminated water [17]. WATSAN is becoming a thriving industry considering water as an 'asset class' dominated by few multinationals including Suez and Veolia [19]. Nevertheless, the trend of PSP in water sector has been in the direction of failure worldwide, resulting remunicipalization for water service delivery [2].

Privatization of water supply continues to be a subject of intense debate, particularly as to its effects on the urban poor and the arguments for and against often reflect the intellectual divide between socialist ideals and neo-liberal pragmatism with key issues on access, quality and price [42]. Privatization has been hailed as the solution to WATSAN problems in many parts of the world but studies reveal that this solution has created more problems than it has solved because privatization privatized profits only in the absence of transparency and accountability. In their study, [4] concluded that the privatization of water has been found to cause degradation of natural systems and social exclusion. The European Citizens' Initiative 'Right2Water' made a Europe-wide movement in 2013 and collected around two million signatures against PSP [15]. In recent years, it is common to see protests in TV and newspaper against water sector privatization across major cities of Europe including Berlin, Madrid and Barcelona. The water charge had risen by 21 percent between 2003 and 2011 in Berlin, and the concession contract between the city of Berlin and two multinationals (RWE and Veolia) was kept secret [44]. Privatization remains controversial in UK also where water bill increased over 40 percent above inflation since 1989 [19]. Although it is claimed that private sector invests huge money, however, majority of PSP cases depends on public funds. For example, Public Services International Research Unit reports that private firms received above 500 million euros from the European Bank for water development projects from 1991-2012 [19].

The study [17] has reported some negative consequences of water privatization throughout the world as: "In Australia, in 1998, the water in Sydney, was contaminated with high levels of giardia and cryptosporidium shortly after its water was overtaken by Suez Lyonnaise des Eaux. Water rates in England increased by 450 percent while company profits soared by 692 percent. CEO salaries for the private

corporations behind the water supply increased by an astonishing 708 percent. After privatization, water fees in France rose by 150 percent while the water quality declined". Studies have also shown that private companies have hidden strategy to invest in low-risk countries (middle to high-income) rather than there where WATSAN need is more. For example, there was above 50 percent private sector investment in middle-income countries like China compared to 18 percent in poor nations [19].

Water affordability is a widespread and growing problem in the U.S., especially for low-income communities and this is not just a problem of aging infrastructure and poverty; private ownership contributed significantly to higher water bills and lower affordability [45]. After careful analysis of rates charged by the 500 largest community water systems collectively serving about 140 million people in 48 states in the US, [46] concluded that private ownership had the largest impact on annual water bills, averaged \$144 higher in privately owned systems compared to government charge. In their research study, Barbosa and Brusca [47] also found that privately owned utilities in Brazil charge higher prices, even when utilities are under local and regional regulatory agencies' price mechanisms. However, the research [48] found no difference between public and private utilities in Italy. One study found that privately owned utilities in Germany charged higher prices and this was explained by higher investment [49], but [50] found that it is not investment but rather profit seeking which drives higher prices among private operators.

The problems associated with PSP in water can be explained in different perspectives, this article identified the following major problems.

### 2.2.1. Water Quality Issues

Quality of water is defined by certain physical, chemical and biological characteristics and differs based on end-uses whether that is for drinking or agriculture or industry. Literatures have shown that one of the greatest challenges after granting PSP access in water infrastructures is threat to environmental and public health standards as there is a higher chance that private companies compromise these issues in the pursuit of their profit. For example, occurrence of Giardia and Cryptosporidium at Sydney Water in July 1998 and similar Cryptosporidium incident in Milwaukee, USA in 1993 causing illness in more than 400,000 people and 50 deaths [17]. Global experience in water privatization projects demonstrates that the argument of superiority over public is too generalized to guarantee high quality water services in the longer run because institutional frameworks are important for reliable and sustainable service provision [20]. The research study as explained in the finding of Greg and Margaret [39] along with the study [22] identified water sector privatization as a limiting factor in the implementation of laws and regulations to protect quality of scarcest and most vulnerable freshwater resources.

### 2.2.2. Water Access Issue

The critics argue that the poor, due to their inability to pay

or the fringe location of their communities are excluded from the privatized service [42]. It is said that private companies are reluctant to extend pipe networking to pro-poor settlements. There is always a risk that rural communities have less priority getting WATSAN services, particularly given that when the water industry has come to be dominated by a relatively few multinational companies [13]. The public/private conflict has been explored by the article [39] who observed that when private sector enters, there is a profit-seeking dynamic which might and often does conflict with the public objectives of a safe and reliable water supply.

### 2.2.3. Water Pricing Issue

In their study, the research [11] considered PSP in water as the main contributory factor for the low-income people not being able to afford water bills and therefore being cut off from service and finally resorting to contaminated water, resulting in deaths from water-borne diseases. It was noted that the transaction costs (the costs incurred in searching for the right transaction partner, monitoring performance and in intervening in case of contractual failure) in water privatization can make up a considerable share of the overall costs and hence even if the bidding amount is lower, the costs of monitoring the contract usually outweigh the savings which ultimately affects in water pricing. After PSP, regulatory costs for the government increases and many complexities occur in contracting and monitoring commercial firms [51].

### 2.2.4. Sustainability Issue

Majority of reviewed literatures recommends that it is always better to look the issues of water privatization from the eyes of user's participation as many scholars accept that these issues are overlooked in privatization because sustainable development always gets the least priority in profit-oriented business unless bound by strong rules and regulations. The private corporations claim that PSP leads to higher investments in construction and improved service delivery, but water activists, however, criticize privatization process and argue that it adversely affects environmental sustainability [51].

Based on these issues of demerits related to PSP in water, Table 2 is prepared [2]. Table 2 indicates that the majority of the remunicipalization cases were reported in France and USA. According to Koumpli and Kanakoudis [2], Paris is a good example of remunicipalization in water services after nearly 25 years' private management. Literatures reviewed pointed the main reasons behind remunicipalization are but not limited to: privatization failure, non-renewable contracts, unprofitable procedures for new contracts, lack of interest in investment and political reasons. In between 15 years (2000 to 2015), around 235 PSP cases were terminated by city or national government to bring water back under public control that resulted 100 million people across 37 countries benefitting from water as a public good, rather than a private commodity [15, 43]. It shows that despite being declared water as an economic good, its implementation in ground reality is subjected to politics and socio-political changes.

**Table 2.** A synopsis of remunicipalization in WATSAN sector from 2000 – 2015.

Country	No of Cases	Country	No of Cases
France	94	USA	58
Argentina	8	Germany	9
Spain	14	Hungary	4
Italy	4	South Africa	3
Russia	1	India	1
Bolivia	2	Malaysia	2
High-income countries	184	Low & middle-income countries	
Total	235		

However, there is always the room for question that what will be the remaining option when the government fails in effective utilization and distribution of water to its people.

### 2.3. Public Private Partnership

The PPP concept in the water sector was initiated mainly from the French historical model of public service delegation and has been practiced in the water sector for three decades. PPP is one of the popular and successful forms of privatization throughout the world in water sector [23]. A PPP arrangement is, by definition, a contract between government and a private service provider. Currently, PPP provides water to 5 percent of the world's population, and private financing in WATSAN accounts for somewhat less than 10 percent of the sector's total investment [2]. The finding of the research [52] demarcated three major bases about why state gives importance to PPP in water sector: a) budget limitation in government, b) Better efficiency and performance of private parties in the same cost, and c) Higher risk management capacity of private compared to public sector. With no doubt, developing and least-developed countries throughout the world including Nepal, Bangladesh, India, Thailand and many more are giving high priority to PPP in their sectorial policy of water (irrigation, hydropower, drinking water and sanitation and environment protection).

In the context of mobilizing finance, implement investment programs, and improve performance of service delivery, PPP is worth considered as one way of bringing efficient management skills and fresh funds and relieving government from financial and administrative burdens. Effective application of PPP not only increases system efficiency, water productivity and service quality but also improves fiscal benefits to both counterparts [25]. PPP contract generally includes service contract, management contract, lease contract or concession contract and each has different general characteristics, responsibility and risk factors [13]. Majority of the literatures point performance-based service contract as the best option in PPP model. In performance-based service contract, a private company is selected to implement a designed project, paid for services and an incentive is provided to address specific problems more systematically and efficiently. However, concessions (joint venture/ concession of 20-30 years) are generally less effective in improving efficiency compared to service

contract [2].

## 3. Water Privatization and Regulations

Global institutions are using their funding programs in individual countries and regions to promote their agenda of developing a perfect competition market and the World Bank in particular, has been active in facilitating the commercialization of public water utilities and developing of regulatory frameworks [53]. Multilateral institutions, development banks, politicians and international aid agencies need to create the right conditions to encourage the capital flows from private sector to rational use of precise sources [54]. As privatization demands a huge investment, great deal of financial commitment will not take place unless adequate investment conditions exist, and undoubtedly, these require suitable policies and programs for PSP [22].

Rules and regulations for water supply include managerial options, the actors and financial arrangement for development, operation and maintenance of the system, and also the legal system for its sustainable operation where government policies and plans provide the institutional framework for water management. The article [11] examined the effects of PSP in water by focusing on how water pricing and allocation policy affected specific principle of sustainability, particularly the implications for the urban poor and concluded that it would be possible to provide water both equitably and in an environmentally sustainable manner if comprehensive water pricing policy is documented. After describing the deep-rooted problems with ability to pay, the CEO of SAUR-International claimed that without major financial support in terms of soft loans and subsidies, private companies won't be able to deliver services effectively, particularly in poor communities [55].

Institutional and pricing reforms have increased the efficiency of water use and investment in water infrastructure and water utilities in Australia [56]. They recommended the necessity of many intense debate and empirical work to identify the feasibility of further pricing reforms, such as the introduction of scarcity pricing and to identify mechanisms for creating markets for bulk water supply. Similarly, the article [39] traced the re-regulation of water industry following privatization, and concluded that there is a need for regulatory mechanisms (institutions) that adjudicate "between economic and social equity, and between economic efficiency and environmental protection". Literatures also indicate that there is always the necessity of some of the novel rules/regulations including national competition policy, trade practices act, water industry competition act etc. for third party access in water sector so that their roles and responsibilities for securing public and environmental health are fixed along with security of their large investments. In England, water sector has a strong regulatory framework to protect consumers and public health so that private companies cannot disconnect domestic consumers (even for non-payment of bills), and low tariffs for vulnerable consumers. Thus, it can be emphasized that strong government regulation in price and quality services is required

for the healthy entrance of private sector, especially given that the cost of water tends to bear disproportionately on poorer citizens, with disastrous consequences for human health if water becomes unaffordable. Literatures also show that whilst there exists no universally applicable regulatory model, effective regulation relies on effective regulatory institutions and strong public administration to enforce these regulations.

## 4. Conclusion

By viewing different literatures, it is no surprise that the range of prospective and issues covered on water privatization sector throughout the world failed to present a clear-cut picture either for or against the privatization in one of the most essential basic needs of living beings. Rather, a complex and difficult situation was identified with respect to PSP, the implementation of privatization and its relative advantages, problems and challenges. Partly, this might be attributable to the monopoly nature of WATSAN, so that the privatization of these services makes water sector more complex and problematic compared to other industries. However, the private sector is essential for improving the service delivery to end-users and in this regards PPP model can play a significant role in water industry for securing blue revolution and if its negative externalities carefully considered. PSP in PPP model showed two direct benefits: first is better efficiency and service coverage compared to public sector only, and the second is fiscal arrangement. The least-developed to developing countries (poor category) always struggle to raise huge investment for large engineering projects, but ceding water privatization can minimize that financial burden of state. However, after PSP in water, there should not be the condition like “risk socialization for profit privatization” to the consumers because case studies have demonstrated that corporations extract benefits while relying on the government to shoulder financial risk. In summary, we author agree with the conclusion of the article [39] that “if privatization has to achieve socially desirable objectives, water conservation and scarcity management, there needs to be significant public control in the water utility, ideally in the form of specific mandatory targets”.

## Author Contributions

Conceptualization: J. C., F. A. & S. J.; First Draft: JC; Draft Review: F. A. & S. J.; Final Version: J. C. & F. A.

## Consent for Publication

All authors have read and agreed to the published version of the manuscript.

## Conflict of Interest

We declare that there is no conflict of interest in this research.

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