



Indonesia's Water Supply Regulatory Framework: Between Commercialisation and Public Service?

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ABSTRACT: Due to financial and operational problems faced by local Indonesian water supply companies (*Perusahaan Daerah Air Minum* – PDAMs), people depend for their domestic water on many private providers, who use groundwater as their source. Within this context, this article interrogates the current water supply regulatory framework and its implications. Indonesia is at the crossroads of treating water supply as a public service or commercialising it through market or market proxy mechanisms. Through content analysis and a literature study on the impacts of such regulations in the past, this article shows that Indonesia's regulatory framework lends itself to the commercialisation option. Some findings on the current regulations and their impacts indicate that awarding commercial water rights has the potential to marginalise traditional users as well as create administrative problems; adopting the full cost recovery concept has made PDAMs reluctant to expand their services, especially to the poor; inviting the private sector to manage water supply is surely not in the best interests of the provision of public services; assigning an Indonesian National Standard (SNI) has resulted in bottled water becoming the most reliable drinking water; and allowing groundwater extraction to take place without sufficient regulation and law enforcement has resulted in excessive extraction at a detriment to the environment.

KEYWORDS: Water supply, regulation, commercialisation, public service, Indonesia

INTRODUCTION

Indonesia is the fourth richest country in the world in terms of its total actual renewable water resources, after Brazil, Russia and Canada, and with its 13,381 m³/year/inhabitant it is the fifth ranked per capita after Canada, Columbia, Brazil and Russia (FAO, 2003). Unfortunately, though, this water is not evenly distributed (see table 1). Since 2003, Java, Bali and Nusa Tenggara have experienced water deficits during the dry season, and by 2020 it is predicted that this deficit will have grown significantly higher (Sutardi, 2003). In the dry season of 2003, water availability in Java/Bali and Nusa Tenggara measured 25.3 and 4.2 billion m³, whilst demand was 38.4 and 4.3 billion m³. By 2020, demand will reach 44.1 and 4.7 billion m³. Rapid population growth, urban development and industrialisation in most cities, especially in Java and Bali, have put pressure on the increasing water deficit of these two islands, particularly on domestic water supply provision.

Even though Indonesia is one of the richest countries in the world in terms of water, average domestic water consumption in 1990 was only 34.2 litres/person/day¹ (Gleick et al., 2002). According to data from *Badan Perencanaan Pembangunan Nasional* – the National Planning Agency (Bappenas) (2007) – in 2006 30.8 per cent of households in urban areas had access to a piped water supply, 9 per cent in rural areas and an average of 18.4 per cent across the country.

¹ According to Gleick (1998), the minimum quantity to meet basic human needs is 50 litres/person/day.

Table 1. Indonesian water balance in the 2003 and 2020 dry season (in billion m³).

Island	Availability	Demand in 2003	Projected demand in 2020	Balance
Sumatera	96.2	11.6	13.3	Surplus
Java & Bali	25.3	38.4	44.1	Deficit
Kalimantan	167.0	2.9	3.5	Surplus
Nusa Tenggara	4.2	4.3	4.7	Deficit
Sulawesi	14.4	9.0	9.7	Surplus
Maluku	12.4	0.1	0.2	Surplus
Papua	163.6	0.1	0.2	Surplus

Source: Sutardi (2003)

The obligation to deliver piped water supply services is on PDAMs, the history of which in Indonesia began during the colonial period. For example, PDAM Semarang City was established in 1911, PDAM Salatiga in 1921 and PDAM Solo in 1929. Following Indonesian independence in 1945, PDAMs became part of local public works offices and, in the 1960s, local government companies.² The involvement of central government in PDAM management began in the 1970s. The development of PDAMs, in particular their infrastructure, became part of an effort to generate and/or support economic growth, which is a typical stage in the development and organisation of urban water supply systems in most parts of the world (Hassan, 1998). In 1987, through Government Act No. 14/1987, the central government handed over some of its public works businesses to local government, including water supply. However, the involvement of central government in PDAMs' management is still evident after that period.

The management of PDAMs is quite complex, as many government institutions are responsible for their operation (Hakim, 2000). The Department of Public Works is responsible for the technical matters of infrastructure and raw water management, managerial aspects are the responsibility of the Department of Home Affairs, whilst financial matters are under the jurisdiction of the Department of Finance. The Department of Health is responsible for setting the requirements for drinking water quality, whilst the ownership of PDAMs lies with city, municipal or provincial governments.

Since the issuance of the Law No. 22/1999 on local government,³ officially effective from 1 January 2001, the role of city, municipal or provincial governments⁴ as the owners of PDAMs in PDAM management has been greater than that previously undertaken by of central government departments, because pressure has been applied to PDAMs to generate local income. Local government officers, members of local parliaments and PDAM managers think that it is an obligation of PDAMs to generate local income for cities or municipalities, regardless of whether their financial situation is profitable or

² In 1962, the Government of Indonesia issued Law No. 5/1962 on local government companies. In response to this Law, PDAM Semarang for example became a local water supply company in 1965, PDAM Salatiga in 1969 and PDAM Solo in 1974. These positions as local government companies have put PDAMs in a difficult situation, as they now differ from state-owned companies in that state-owned companies are divided into two categories: those that function as a public utility (*Perusahaan Umum*) and those as a limited company (*Persero*), with one of the tasks being to make a profit. Local government companies have both functions: providing public services and also making a profit to generate local government income. Most local governments do not want to allocate their local budgets to the expansion of PDAM services. To cope with this problem the draft to supersede this law has been in preparation since 2003, but as at August 2010 it is yet to be issued.

³ A well-known regional autonomy law.

⁴ Only two PDAMs are owned by provincial governments: PDAM Tirta Nadi Medan and PDAM Jaya Jakarta.

not (Hadipuro, 2003a). According to local government law,⁵ if a city or municipality cannot be self-financed, it will be merged into a neighbouring city or municipality, which is why financial self-sufficiency is very important for these entities. Income sourced from PDAMs⁶ is one means of achieving financial self-sufficiency.

The trend of making PDAMs a source of local income complicates how they offer their range of services. According to an analysis of data from Perpamsi (*Persatuan Perusahaan Air Minum di Seluruh Indonesia* – the Association of Local Water Supply Companies in Indonesia, 1998 and 2000) and *Departemen Pekerjaan Umum* (the Department of Public Works, 2005), most PDAMs faced many operational and financial problems. During the seven years covering the above studies, from 1998 to 2005, the major problem was foreign loans, which after the financial crisis in 1998⁷ trapped a large number of PDAMs in very difficult situations. For example, 128 out of 319 PDAMs across Indonesia had foreign debts, 35 of which experienced an increase in their total debt in 2005 compared to 1998. Foreign loans did not necessarily improve performance. Of the 128 PDAMs, only 22 PDAMs increased their coverage, nine increased the ratio of utilised capacity to installed capacity and 52 decreased their levels of 'unaccounted for water'. Nevertheless, 125 PDAMs increased their tariffs.

An assessment made by Development Alternatives Inc (DAI) (2005) shows a similar situation. Out of 22 PDAMs surveyed, the best coverage was achieved by PDAM Tanah Datar, with 81 per cent of the total population covered. However, its financial performance – for example the ratio of its current assets (Rp. 1,423.5 million) and its current liabilities (Rp. 4,310.3 million) – was very poor. The ratio shows that if something untoward happens the PDAM will not be able to pay its short-term obligations. The worst PDAM surveyed, in terms of coverage, was PDAM Malang District, with only 10 per cent of the total population covered. Twelve PDAMs out of 20 had current liabilities larger than current assets. With these financial asset conditions, service expansion was, and still is, a difficult prospect. Water supply services are revolving within a vicious circle, which means that people cannot rely on PDAMs. Figure 1 shows the recent piped water supply services, by province, in Indonesia in 2009. Most of the service coverages cover below 30 per cent of the total population.

Nowadays, those who can afford it tend to rely on bottled or refilled bottled water for drinking purposes. The bottled water business in Indonesia started in 1973, when the first bottled water company, Aqua, went into business. From 1973 to 1978, Aqua faced a few ups and downs, but it was in 1978 that the company began to grow, finding success due to the ability to reach the high potential low-class market, particularly the market segment that could not be reached by public water supply companies. Following this, the dependency of people on bottled water has steadily increased, as shown by data on the growth of bottled water companies from Aspadin, the industry sector's association, in table 2.

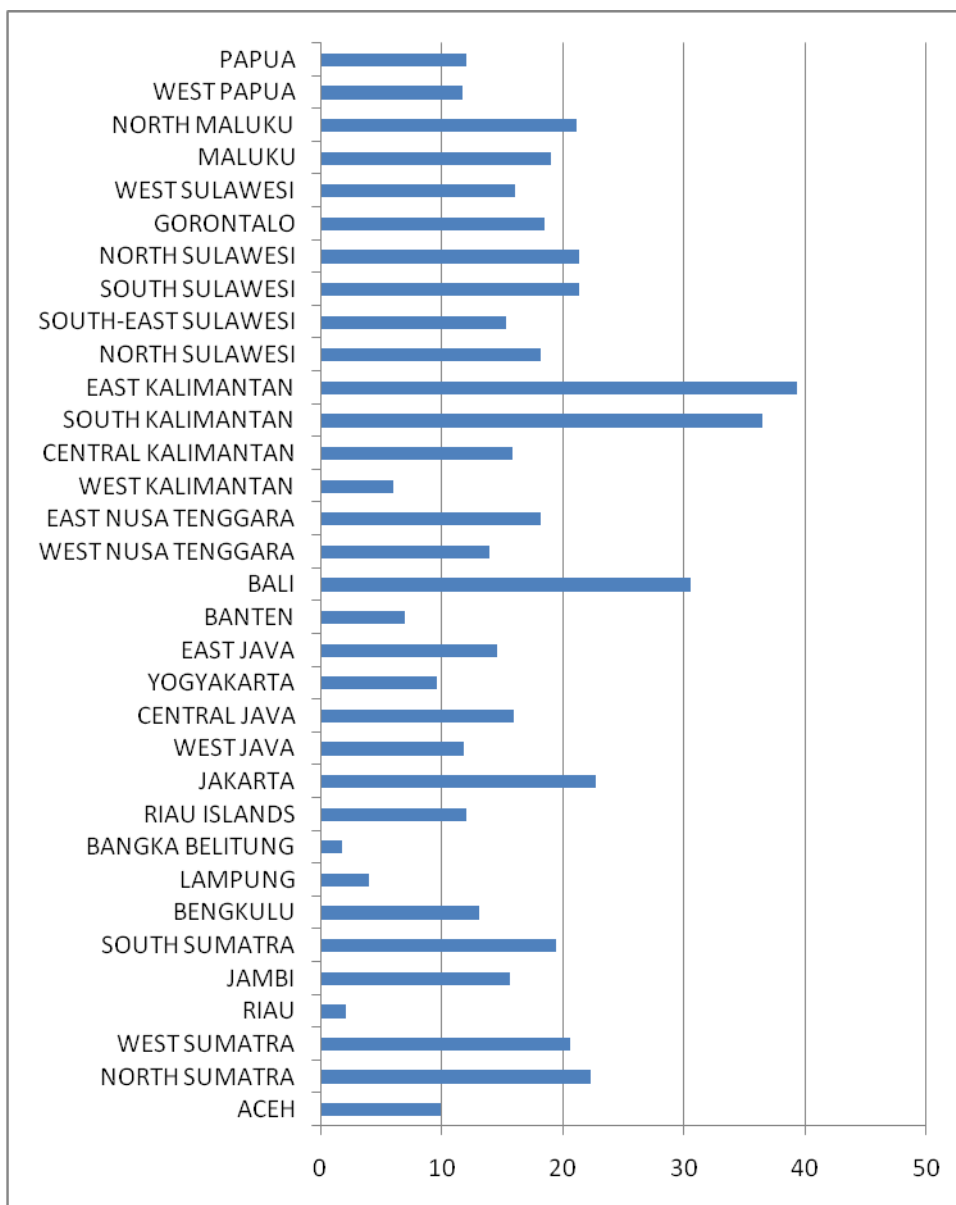
In 2000, 17.2 per cent of the total population were served by a piped water supply (Perpamsi, 2000), and by 2004 the number had only increased to 17.96 per cent (Medium-Term Development Plan 2004-2009). Across four years the average yearly growth rate of piped water was thus only 1.1 per cent, whilst the average yearly growth rate in the production of bottled water in the 2000-2004 period amounted to about 25 per cent.

⁵ Law No. 22/1999 was superseded by Law No. 32/2004, but there was no change in the articles and clauses related to the requirements mentioned above. See Article 6 of Law No. 32/2004.

⁶ In 2009, the Minister of Home Affairs issued letter No. 690/477/SJ mentioning that PDAMs whose service coverage was under 80 per cent of the total population served were free from the obligation to contribute to local government income; all the profits generated by these PDAMs should be reinvested to expand their service coverage. However, at the time of writing this article there is no research to evaluate the effectiveness of this letter, i.e. research assessing whether PDAMs and local governments comply with this letter or not.

⁷ The financial crisis in 1998 resulted in a decrease in the Indonesian rupiah value exchange to USD, whereas some PDAMs' foreign loans were in USD.

Figure 1. Piped water supply service by province in 2009.



Source: *Survei Sosial Ekonomi Nasional Badan Pusat Statistik – National Social Economic Survey of the National Statistics Bureau (Badan Pusat Statistik – National Statistics Bureau, 2009)*

The data above does not include refilled bottled water kiosks, which have sprung up like mushrooms in all corners of almost every city in Indonesia since 2002. Usually, these kiosks are found in areas where people face difficulties in obtaining fresh water. People purchase water from water kiosks by bringing in their own refillable bottles of 20 litre capacity.⁸ The price for the same quantity of refilled bottled water, about 20 litres, is only 30 per cent of that of non-refillable bottled water. In addition to bottled and refilled bottled water, small-scale water supply providers, water peddlers and self-provision methods using groundwater or shallow wells have also become common in the effort to fill the gaps in PDAM coverage (Hadipuro and Indriyanti, 2009).

⁸ Referred to as a *galon* in Indonesia.

Table 2. Growth of the Bottled Water Industry in Indonesia (1990-2004).

Year	Number of companies	Production capacity (1,000,000 litre)	Rate of growth from the preceding year (per cent)	Number of Aspadin members
1990	5	399		-
1991	125	637	60	13
1992	132	1,321	107	36
1993	140	1,590	20	45
1994	165	1,832	15	45
1995	184	2,055	12	51
1996	184	2,215	8	51
1997	184	2,500	13	62
1998	184	2,000	- 20	62
1999	184	2,400	20	62
2000	184	3,700	54	71
2001	246	5,400	46	71
2002	350	7,100	31	71
2003	413	8,100	14	108
2004	413	9,100	12	141

Source: the Indonesian Bottled Water Business Association (Aspadin)

Note: in 1998, Indonesia experienced a severe financial crisis

Efforts to improve PDAMs' performance through private sector participation began in Jakarta in 1993, when Thames Water Overseas Limited and Suez Lyonnaise des Eaux started to get involved in water supply delivery. Even today, private sector participation remains controversial in regards to whether this involvement is beneficial to the people or not.

Within the context outlined above, the purpose of this article is to interrogate the current Indonesian regulatory water supply framework and its consequences for the water supply sector in Indonesia. The case of Central Java Province, Indonesia will be used to give a substantive example of the impacts of water regulations on people's livelihoods. Firstly, the current water supply regulatory framework and its background are presented. This is followed by a review of the literature on relevant case studies of events in other countries, as well as Indonesia, to show the probable impacts of the current Indonesian regulatory framework. Logical consequences of the current regulatory framework to water supply in Indonesia are then presented, and finally conclusions and recommendations are given.

CURRENT WATER SUPPLY REGULATORY FRAMEWORK

Urban water supply in a specific area is influenced directly or indirectly by policies issued by the government, a business entity or its association, civil society and even by multilateral agencies such as the World Bank.⁹ Whether public water supply companies will prioritise coverage expansion or the generation of profits for local income, and whether or not these two objectives can be combined, will depend on the policies that regulate public water supply companies. Hall and Lobina (2006), for example, write "The existence of public water supplies depends on a political commitment to deliver clean water for all". The roles of the private sector in Indonesia, in the form of the growth of bottled

⁹ A description of the controversies surrounding the World Bank's influence on country policy can be found in Thomas (2004). A good example of the World Bank's role in a certain country's water sector can be seen from one of the World Bank's documents, *The World Bank Lending Instruments Resources for Development Impact*. It states "Adaptable Program Loans are used when sustained changes in institutions, organisations or behaviour are keys to successfully implementing a program. They can be used to support a phased program of sector restructuring, or systemic reform in the power, water, and health sector" (World Bank, 2001).

water and refilled bottled water businesses, and in participation in PDAM management such as in Jakarta, are influenced directly or indirectly by government regulations and the role of its business associations.

Urban water supply is a highly regulated business in Indonesia; a multitude of regulations on urban water supply are issued by different governmental institutions at different levels. An inventory of relevant policies will be presented, after which qualitative content analysis¹⁰ will be carried out to determine the potential impacts of these policies on people's livelihoods. The inventory will be produced by first identifying changes in policies at a national level. The referral order of the policies in Indonesia places the Constitution at the top, followed by laws as the legal products of executive (the government) and legislative (parliament) presidential, ministerial, provincial, and city legal products. If there is no change in the policies at national level, they will be analysed at the lowest level, which can be at city, province or ministerial level, or regulations on a certain water supply provider. To identify the relevant water policies, interviews with government officers, water supply providers and their business associations, as well as secondary data gathering, were undertaken.

At the national level, there was a change in Indonesia's water law in 2004. However, the regulations surrounding implementation (Government Acts, Ministerial Decrees and Provincial- and City-level Acts) to make this law fully and officially effective are still in process. In Indonesia, to be officially effective a law should have implementing regulations that elaborate on the details of the articles or the clauses of the law. Some implementing regulations issued for Law No 7/2004 are Government Act No. 16/2005 on the development of the water supply system, the Ministry of Public Works Decree No. 438/KPTS/M/2006 and No. 432/KPTS/M/2007 on the establishment process of the National Water Board, and the Ministry of Home Affairs Decree No. 23/2006 on guidelines for PDAM tariff setting. At the time this paper was written, the process for issuing a Government Act on water rights was still ongoing.

Because there is a time lag in the issuance of all implementing regulations for the new water law, some implementing regulations mentioned in this paper are actually based on the old water law. Some are not even based on water law. For example, Presidential Decree No. 96/2000 about private sector participation in urban water supply delivery is based on the foreign direct investment law. Again, because of timeframe, an inventory of implementing regulations will be undertaken by identifying policies at the lowest level.

Law No. 7/2004 on water resources

In 2004, the Government of Indonesia issued a new law on water resources, which acted as a starting point for ideological change in managing water supply in the country. What makes Law No. 7/2004 on Water Resources different from the superseded Law No. 11/1974 is that the new law gives more room to the private sector through Article 9 on commercial water rights and Article 40 clause 3 on participation in water supply delivery. According to the old law, water supply should be in public hands, or at least managed by an institution based on a cooperative spirit.

Private sector involvement is also mentioned in Government Act No. 16/2005 on the development of the water supply system, specifically in Article 1 clause 9. Article 60 of the Act states that profit is included in the calculation of the water supply tariff; water has become a profit-making commodity.¹¹ The Ministry of Home Affairs Decree No. 23/2006 Article 20 clause 3 states explicitly that, even though a PDAM is still in public hands, the tariff should guarantee that the PDAM can achieve full cost recovery.

¹⁰ Qualitative content analysis involves extracting information from a large quantity of textual material that is relevant for the researcher (Verschuren and Doorewaard, 2005).

¹¹ As an economic good, users can be signalled regarding the value of water through a variety of incentives, including price. Pricing is aimed at signalling the opportunity cost associated with the use of water (Tiwari and Dinar, n.d.). Treating water as an economic good is an official policy of the World Bank (World Bank, 1993). Commoditisation means turning a free good into a commercial good, which then can be sold and bought at market price (Baillat, 2005).

The same decree also stipulates the normal rate of return as 10 per cent of the productive asset (Article 5 clause 4).

Law No. 7/2004 and Government Act No. 16/2005 provide a more solid legal standing on the role of the private sector than Presidential Decree No. 96/2000 (superseded by Presidential Decree No. 118/2000 on the possibility for foreign investors to own 95 per cent shares of water supply companies), because these presidential decrees refer to foreign direct investment law (Law No. 1/1967, which was superseded by Law No. 11/1970) rather than water law. As mentioned above, water law No. 11/1974 does not mention the possibility of a profit-motivated private sector to deliver water supply services in Indonesia.

Since the 1980s, the Government of Indonesia has been inclined to follow World Bank policy. From 1983 to 2003, 27 water project loans were financed by the World Bank, amounting to US\$2,921.75 million (Hadipuro, 2003b). The World Bank can exert its influence on the Indonesian water sector through conditions attached to its loans.

The involvement of the private sector in urban water provision and water commoditisation are two World Bank principles that have been adopted in the new Indonesian water law through the conditionality of the Water Sector Adjustment Loan from the World Bank to the Indonesian Government. To disburse the third tranche of the loan,¹² which amounts to US\$150 million, the Government of Indonesia must meet the following requirement: "Adoption of a national water resources policy and related implementation plan, acceptable to the Bank" (World Bank, 1999). A more elaborative explanation about the policy acceptable to the Bank can be found in Objective 1 of the Water Resources and Irrigation Reform Program Policy Matrix Implementation Plan (see the letter from Boediono as the Minister of Development Planning/the Head of the National Planning Agency on 23 April 1999 number 2565/MK4/1999 to James D. Wolfensohn as the president of the World Bank). The conditionality of the loan is that the Government of Indonesia should revise the water law and its implementing regulations. The national water resource policy acceptable to the World Bank is based on the fourth Dublin principle (World Bank, 1993), which states that water has an economic value in all its competing uses and should be recognised as an economic good.¹³

Given the provisions in Law No. 7/2004 and Government Act No. 16/2005, the role of the profit motivated private sector will grow larger in the future. Furthermore, with Ministry of Home Affairs Decree No. 23/2006, PDAMs, although still in public hands, could be a source for profit making.

From this point, the discussion will now be directed toward the lowest level policies for each urban water supply provision: PDAM, bottled water company, refilled bottled water kiosks and Central Java Province groundwater extraction policies related to groundwater well provision. Except for self-provision, for which regulation is non-existent, the relevant policies are discussed for each provider separately.

Relevant regulations on PDAMs

The goals to achieve full cost recovery and make a profit, as stipulated by the Ministry of Home Affairs Decree No. 23/2006, are behind many PDAMs increasing their tariff. Even if a PDAM cannot contribute a great deal to local income, it should still, at the very least, not be a liability for local budgets. Increasing the tariff is the easiest way to achieve the goals of full cost recovery and profit generation. Consequently, the expansion of the coverage, especially to the poor who pay a subsidised tariff, is not the first priority for a PDAM, a city or a municipal government.

¹² Because of the opposition to this law, there were a number of delays in fulfilling this condition. According a World Bank staff member in Indonesia, the disbursement was delayed three times, following which the World Bank eventually cancelled it. Nevertheless, the law itself is still deeply influenced by the World Bank's principles.

¹³ The Dublin Statements and Principles are the products of the International Conference on Water and the Environment: Development Issues for the 21st Century in Dublin, Ireland, January 1992. This fourth point is also quoted in the World Bank Policy Paper (World Bank, 2003). The complete statements and principles are available at www.gwpforum.org.

According to one PDAM Solo officer, maintaining existing subscribers is more profitable than expanding services to new customers, based on his hypothesis that if the service is available 24 hours a day, then the consumption of the existing subscribers will increase. An increase in consumption means they will need to pay the higher rate of the block tariff, which will in turn create profit for the PDAM. If the PDAM expands its coverage, then many subscribers will be paying the first block, which is a subsidised tariff (see table 3). This provides no additional profit and may actually result in a net loss to the PDAM.

The Ministry of Home Affairs Decree No. 2/1998 and the Ministry of Home Affairs Instruction No. 8/1998 on the guidelines of drinking water tariff calculation (superseded by the Ministry of Home Affairs Decree No. 23/2006) are not fully effective in increasing the coverage to the poor, because of the strategy of PDAMs to maintain their coverage for existing subscribers. Potentially, these regulations could play a great role in making PDAMs serve the poor through cross-subsidy mechanisms, but it is apparent that presently they do not do so practically. According to these regulations, subscribers who belong to group 3 pay a full cost tariff, which includes profit for PDAMs. Group 2 subscribers pay a full cost tariff, but only for consumption that exceeds 10 m³ per month; below this they pay a break-even tariff. Group 1 subscribers pay a subsidised tariff for consumption below 10 m³ and the break-even tariff for consumption over 10 m³. Table 3 shows the tariff setting according to the decree.

Table 3. The tariff for each PDAM subscriber group.

Consumer classification	Minimum daily basic need consumption of 10 m ³ /month	>10 m ³ /month
Group 1	Subsidised tariff	Break-even tariff
Group 2	Break-even tariff	Full-cost tariff
Group 3	Full-cost tariff	Full-cost tariff
Special group	Based on agreement	Based on agreement

Source: Ministry of Home Affairs Decree No. 23 of 2006 Article 9 and 10.

Nowadays, PDAM tariffs are set by local governments and do not necessarily follow the decrees mentioned above. For example, the PDAM Semarang City tariff was legalised through the Semarang City Mayor Decree No. 17/2009.

The Ministry of Home Affairs Decree No. 47/1999 on guidelines for evaluating the performances of PDAMs is also losing power because of the regional autonomy law. This decree is attempting to push PDAMs to improve their financial, operational and administrative performance. If the decree from the Ministry of Home Affairs No. 47/1999, which deals with the performance evaluation of PDAMs, functions effectively, PDAMs may have strong motivation to increase service coverage. Service coverage is one of operational aspects evaluated.

Regular tests on the quality of PDAM water are carried out, but unfortunately these results have never been made available to the public. Even if the test shows that PDAM water meets all the requirements regulated under the Ministry of Health Decree, most subscribers still do not dare drink directly from the tap; they usually boil PDAM water before they drink it. Some PDAMs attempt to make the water drinkable directly from the tap in some limited coverage areas under the *Pelayanan Air Minum Prima* (the best quality drinking water service) program, but at the time of writing this article no such reports had been made regarding the results of this system. *Pelayanan Air Minum Prima* will certainly challenge the bottled water business, especially it will appeal to people who buy bottled water for convenience reasons, such as those who do not want to boil their water before drinking.

Relevant regulations for the bottled water industry

The bottled water industry is regulated under Ministry of Industry and Trade Decree No. 705/MPP/Kep/11/2003. According to this decree, a number of requirements are in place to ensure the quality of bottled water products:

1. Indonesian National Standard No. 01-3553-1996 is used as the standard for product quality. To check whether a certain bottled water company meets the standard, the company should be inspected by an accredited institution at least once a year.
2. Products should also meet the requirements specified in Ministry of Health Decree No. 907/MENKES/SK/VII/2002 on inspections for drinking water quality. To meet the requirements, bottled water producers must conduct a periodical test: once a week for e-coli bacteria, once every three months for chemical and physical components and a radioactivity analysis once every four years.
3. To ensure that the product is safe for human consumption, the producer must ask for an MD (domestic food) number from the Medicine and Food Watch Office or ML (foreign food) when the product is imported from other countries.
4. All the materials used should be of food grade.

An interview with one of the officers of the Indonesian Bottled Water Business Association (Aspadin) revealed that the ministerial decree was prepared by the association, and was supposed to be a barrier to entry in to the water supply business, especially for refilled bottled water suppliers. According to this informant, the bankruptcy of the biggest bottled water company in Bangkok – as a direct result of competition from refilled bottled water kiosks – inspired the association to propose this decree. Through the decree, the association was trying to differentiate bottled water from refilled bottled water.

Relevant regulations on refilled bottled water kiosks

The regulation governing refilled bottled water kiosks was issued by the Ministry of Industry and Trade in 2004 through Decree No. 651/MPP/Kep/10/2004 regarding the technical requirements for water kiosks and their position in the water trade. According to this decree, refilled bottled water kiosks belong to the category of small-scale industry. The requirements for producing drinking water are mostly the same as the requirements for bottled water companies; however, certain differences are:

1. There is no Indonesian National Standard on drinking water for refilled bottled water kiosks.
2. The regulation for drinking water quality assurance is the same as for bottled water (refilled bottled water kiosks should also meet the requirement for drinking water quality according to Ministry of Health Decree No. 907/MENKES/SK/VII/2002), but the requisite periodical tests are less stringent – once a month for e-coli bacteria and twice a year for chemical and physical tests.
3. The inspection of water quality lies within provincial and city jurisdiction. Since the budget needed to inspect all water kiosks is quite substantial, and given the size of provincial and city budgets, inspections are usually carried out once a year using a sampling method (i.e. not all refilled bottled water kiosks are inspected). (See the survey report prepared by the Central Java Health Office in 2003 and 2004).
4. If, for bottled water companies, the test for drinking water quality should be reported once a year, the requirement for refilled bottled water kiosks is once every six months.

5. Refilled bottled water kiosks are prohibited from using 20-litre bottles or cans with the brand of other companies printed on them. They are also prohibited from keeping an inventory of water in bottles or cans that are ready for sale. Water kiosks should only fill customers' bottles or cans at the time at which they bring the receptacles to buy water. Nevertheless, all the machines and processes needed to produce drinking water are the same as those required for bottled water.

Often, there is an association for refilled bottled water kiosk businesses in each area. In Semarang, for example, there is a business association known as Aspami. These small-scales business associations are not necessarily members of the two national business associations, namely Apdamindo and Aspada. According Apdamindo staff in Jakarta, the head office of Aspada is in Surabaya, while Apdamindo's is in Jakarta. There is no relationship between these two national associations, and their role is weak in terms of the issuance of regulations.

Relevant regulations on water supply provision using groundwater wells

Two regulations relate to water provision using groundwater wells, both of which were issued by the Central Java Province.¹⁴ The first is the Central Java Provincial Act No. 6/2002 on groundwater extraction and the second is the Central Java Provincial Act No. 7/2002 on groundwater extraction tax.

According to Article 2 of the Central Java Provincial Act No. 6/2002 on groundwater extraction, it is not necessary for those who use groundwater for drinking and domestic usage at a consumption of less than 100 m³ per month, or less than a two-inch diameter pipe for their groundwater wells, to ask for a groundwater extraction permit. Furthermore, according to Article 4 of the Central Java Provincial Act No. 7/2002 on groundwater extraction tax, groundwater extraction for domestic purposes is not subject to groundwater extraction tax.

All commercial groundwater well providers, for example at *Kelurahan* (sub-district) Tanjung Mas in Semarang who are selling water to the local neighbourhood do not have groundwater extraction permits, even though the water extracted exceeds 100 m³ per month. Without the permit, tax and water meter, excessive groundwater extraction cannot be avoided. As a result, the sustainability of groundwater management is in question (Hadipuro and Indriyanti, 2009).

THE REGULATORY FRAMEWORK'S PROBABLE IMPACTS

Indonesia is now at a crossroads as to whether the state maintains control of water supply management or relinquishes its management to a commercialised regime. In a public water supply administration it is the duty of government to ensure that its citizens have access to water supply – at any cost. Commercialisation refers to a reworking of management institutions (rules, norms and customs), and entails the introduction of markets as allocation mechanisms (Bakker, 2003a) or the utilisation of market proxies in the management of water supply. In such a case, the state still runs the services but uses private sector criteria such as efficiency and competitiveness. The problem faced by Indonesian water supply management can be seen in the regulatory framework. Some of the regulations can be categorised as leading to the utilisation of market proxies such as cost recovery, or the involvement of the private sector in managing water supply.

This section aims to document the impacts of similar approaches in other countries that have implemented the same regulations or policies, as well as past cases in Indonesia. The intention is to

¹⁴ The authority to regulate groundwater lies with the Central Java Province Mining Office. In 2008, the Government of Indonesia issued Government Act No. 43 on groundwater. According to this Act, a permit to extract groundwater is issued by the regent or the mayor of the area where the extraction occurs. However, many cities or municipalities are not ready to accept the transfer of authority from provincial government. The consequence of the transfer is that, for Semarang for example, a new Act on groundwater extraction and the tax that will be levied should be issued by Semarang City local government.

identify anticipated similar impacts in Indonesia's future and hopefully take steps to avoid their occurrence.

Water right regime

One of the countries with the most far-reaching water rights reform is Chile. According to Toledo (1996, cited in Davis, 2004), the indigenous Mapuche only held 2 per cent of the total water rights in three areas of the study in Chile. In one of these areas, the rights they held only allowed irrigation of 4 per cent of the total irrigated area. Administrating and socialising water rights, especially for marginalised people who have traditionally used the water, is a challenge for a country when implementing a water rights system (Davis, 2004).

Private sector participation

Inviting the private sector in to water supply delivery does not necessarily improve access for the poor. According to one of the books published by the ADB, private concessionaries are not particularly eager to connect the poor because they do not buy much water, cannot pay for connection fees upfront and often lack the security of land tenure (McIntosh, 2003), which could cause significant long-term issues in Indonesia at the expense of service provision for the poor.

In some cases, private operators tend to 'cherry pick' (Castro, 2004; Swyngedouw, 2003) areas that they believe will produce profits, and then leave other areas to public companies. For example, the private partner of PDAM Semarang Municipality, PT Sarana Tirta Ungaran, prefers to supply water for industries in the Semarang municipality, which require less in terms of quality but pay a higher tariff. This kind of partnership affects the financial capacity of the PDAM to implement the cross-subsidy mechanism, because the PDAM has to share any profit with the private partner. Another example demonstrating how much profit a private company can obtain is in the case of the proposal from a consortium involving an Indonesian company, PT Karyadeka Griya Semesta, and a Dutch water supply company, Waterleiding Maatschappij Noord-West-Brabant (WNWB), to provide water supply services to the people and industries of West Semarang. West Semarang is an area of huge prospective economic growth, since a large number of industries currently use groundwater as their water supply and there are many affluent housing developments. According to the feasibility study of the project, sponsored by Senter, an operating agency of the Dutch Ministry of Economic Affairs, and undertaken by a consultant named Witteveen+Bos, the break-even point would be reached in 10 years. To reach this point in such a short time is amazing, as generally around two-thirds of the costs are capital costs for infrastructure (Marques, 2008). Usually, it takes a longer to reach the break-even point, which is the reason why for such a partnership the concession period is typically about 25 years.

Private sector participation in urban water supply also requires a good mechanism to control the tariffs charged by private providers. Water supply services operate under a natural monopoly characterised by high, long-lasting and sunken capital for developing infrastructures and building water treatment plants (Marques, 2008). Under a monopoly, there is a tendency for private operators to set the price high so that they produce a larger profit. Furthermore, water can be classified as an inelastic good, especially as it meets essential needs (Nauges and Thomas, 2000, cited in Marques, 2008). In this way, there may be no choice for the subscribers but to accept the price set by the providers. Government legislation and regulation are needed to resolve these problems. Unfortunately, it is not easy to set a tariff that can balance the interest of the private sector to maximise profit alongside the interests of the people that need the service. All regulations and mechanisms used by Ofwat in England and Wales, for example, limit the profit of water supply companies to the normal rate of return, namely 7 per cent (before financing and corporate taxes). However, the water industry's actual rates of return have not dropped below 9 per cent since privatisation (Miller-Bakewell, 1998, cited in Bakker, 2003b; Loftus and McDonald, 2001).

The current experience of privatisation has largely failed to resolve the balance between public and private interests, despite the financial regulatory regime within which it operates (Buller, 1996). Regulation for setting the tariffs for services delivered by private operators is a big problem, especially in a developing country such as Indonesia which has poor law enforcement. Moreover, a pseudo competition mechanism such as that implemented in England and Wales to control private sector profit is quite impossible to implement in Indonesia. As earlier mentioned, local governments tend to dominate the management of PDAMs and ignore regulations issued by central government, including the regulation controlling a PDAM's profit. This is particularly understandable when one considers that big PDAM profit means a big contribution to local government income.

Groundwater extraction

The limited coverage of public water supply companies is a business opportunity for small-scale water supply providers, almost all of which, and all Indonesian PDAM alternatives, prefer to use groundwater as their source. Foster (2001) notes that due to its relatively low cost and generally high quality, groundwater has often been the preferred source for reliable public water supplies, and is also widely exploited for private domestic and industrial uses. It is quite impossible, especially for small-scale water supply providers, to build a water treatment plant to convert surface water into safe drinking water in light of the huge investment needed.

The water supply case study of the Tanjung Mas sub-district in Semarang shows exactly this phenomenon. Groundwater is exploited widely for private and industrial uses (Hadipuro and Indriyanti, 2009), although impacts on the environment include land subsidence, water table drop and sea water intrusion. There are 16 communities (*Rukun Warga*)¹⁵ in this sub-district and always at least one groundwater well in each community, from which water is sold to the neighbourhood. Table 4 shows the number of groundwater wells in each community at Tanjung Mas, excluding groundwater wells owned by industries. This table shows the important role of small-scale water supply providers in the absence of public water supply company services.

Table 4. Water supply providers using groundwater wells in the Tanjung Mas sub-district in Semarang in 2006.

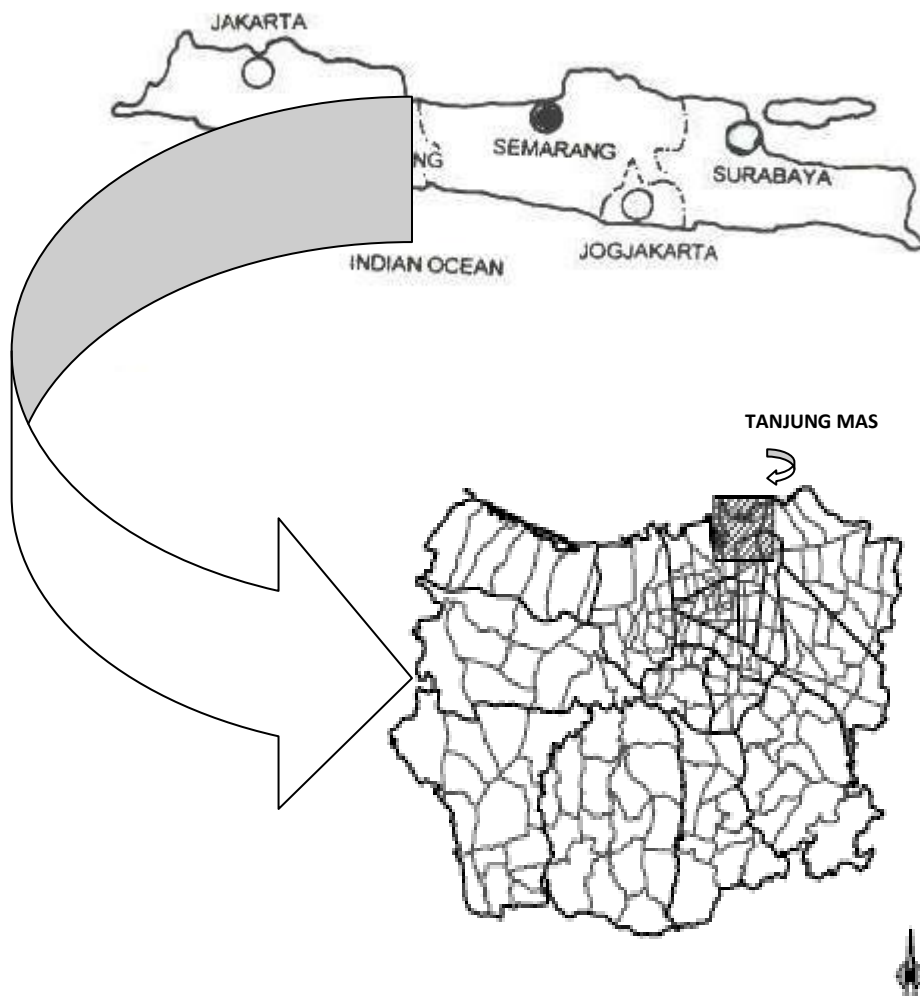
Community	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI
Nb. of small-scale providers	2	2	2	3	1	1	1	1	3	2	0	4	3	10	6	4

Source: Hadipuro and Indriyanti, 2009.

Note: a small-scale water supply provider can, on average, offer services to about 100 households. Each household consumes an average of 16 m³ of water per month.

¹⁵ There are 16 *kecamatan* (districts) and 117 *kelurahan* (sub-districts) in Semarang. In Indonesia a city or municipality is divided into districts, which are then divided further into sub-districts. Each sub-district is divided into *Rukun Warga* (RW or communities), which is subsequently divided into *Rukun Tetangga* (RT or neighbourhood associations).

Figure 2. Semarang and Tanjung Mas location.



In many situations in the world, including in some major cities in Indonesia, groundwater is a common property resource, which often leads to a race to pumpage by the owners of the land overlying the aquifers. In Bandung, for example, 0.2 million m³ of good quality groundwater per day in 2001 was extracted for various industrial purposes (Soetrisno, 2002, cited in Hendrayana, 2002), while in Jakarta and Semarang the daily average rates in 2008 were 60,000 m³ and 20,000 m³, respectively (Amrta Institute and Tifa Foundation, 2009). Users try to extract as much groundwater as possible in order to capture the benefits for themselves before the resource is exhausted, the result of which is a negative externality because the depletion and degradation caused by the excessive pumpage of groundwater will affect all continuous aquifer systems that can extend across multiple geographic, administrative and political regions. Legislation and regulation from the government or other public or private bodies are therefore urgently needed to solve these problems (Burke and Moench, 2000; Palma, 2003).

Excessive pumpage clearly has a severe and detrimental effect upon groundwater reservoirs; water tables drop, significantly altering groundwater flow directions. Moreover, where excessive pumpage exists, saline seawater tends to intrude in to the fresh water inland reservoirs, a phenomenon which can make salinisation almost irreversible (Hoekstra, 1998), and can cause hydraulic cones of depression. Groundwater flows inward towards these depressions, where chemical and biological parameters have accumulated and concentrated, leading to deterioration in groundwater quality and a danger to public health (Collins and Melloul, 2001). As a consequence of excessive pumpage, some major cities in

Indonesia, such as Jakarta and Semarang, are experiencing water table drop. In most parts of Jakarta, for example, current water table levels are more than 20 metres below sea water level. In addition, northern parts of Semarang are now categorised as being in danger due to groundwater extraction. An area is categorised as critical for groundwater extraction if the water table is more than 20 metres below sea water level. Unlike surface water systems, much of the depletion and degradation of groundwater systems is irreversible – and therefore far more critical.

The poorer the coverage of the public water supply company, the greater the necessity to regulate groundwater extraction, because people will be highly dependent on groundwater sources to replace the absence of public water supply (Hadipuro and Indriyanti, 2009). Unfortunately, regulations in Semarang from the Central Java Province on groundwater extraction and groundwater extraction tax do not cover extraction by small-scale water supply providers. The consequence of excessive groundwater extraction is that Semarang is currently experiencing land subsidence. According to a study by Partners voor Water (2008), Semarang is progressively subsiding below sea water level at a rate of 9 cm/year.

THE LOGICAL CONSEQUENCES: WAYS FORWARD

There is potentially a problem in the implementation of water rights in Indonesia because the government differentiates between those for commercial purposes (*hak guna usaha*) and those for daily subsistence (*hak guna pakai*). According to the law, it is not necessary (for water rights) for daily subsistence holders to ask for permits from the government (see Article 8 clause 1 Law No. 7/2004). For commercial purpose water rights, the government will issue permits (see Article 9 clause 1 Law No. 7/2004). Nonetheless, problems will arise in the future whenever there is conflict between these two kinds of holders, as one officially has a permit whilst the other does not. The question is how to solve these conflicts and who will benefit from this situation.

On the one hand, to participate in water supply delivery in Indonesia's private sector, interests have been guaranteed. One such guarantee is that commercial water rights will ensure companies' access to raw water. On the other hand, the private sector might be reluctant to be involved in piped water supply if the Ministry of Home Affairs Decree No. 23/2006 about the maximum 10 per cent¹⁶ profit becomes effective. Since the water supply business is characterised by high, long-lasting and sunken capital, the 10 per cent maximum profit ceiling implies a longer period in which to reach a break-even point, which increases the size of the risk. If the private sector is still interested in water supply, companies will look for alternatives to directly delivering water, such as management contracts or managing water treatment plants whose water is sold to PDAMs, as the maximum 10 per cent profit limit is not sufficient for them to cover their investment. If they are still willing to deliver the service, they will keep their investment as low as possible and finance this through loans, which might result in a higher cost of production because of the associated interests. Higher cost of production will therefore result in higher tariffs charged to subscribers.

If private companies do become involved in piped water, there should be a mechanism that can balance the interests of these private companies and those of the people, to create a reliable and fair water supply service. From the description of the model used in England and Wales, achieving this is not an easy task for the Government of Indonesia – at any level.

If PDAMs remain in public hands, the 10 per cent profit level might encourage local governments to use them to generate local income. Even without such regulation, when a certain PDAM experiences losses, it does not necessarily mean that it does not have to contribute to local income or other local

¹⁶ In Jakarta, for example, according to the cooperation agreement, the Internal Rate of Return of Thames Pam Jaya (now Aetra) and Palyja (a subsidiary company of Suez Lyonnaise des Eaux), as PDAM Jaya partners, is 22 per cent.

government interests.¹⁷ The consequence is that PDAMs will not increase their coverage, especially to the poor. The same decree mentioning that PDAMs should achieve full cost recovery, and that the total costs for a household should not exceed 4 per cent of its income, will only strengthen their reluctance to cover the poor.

The result is, firstly, the poor have to depend on more expensive sources. Second, people who have no piped water connection, including industries, will exploit groundwater to meet their demands. Consequently, pressure on the environment, principally in the water deficit islands of Java, Bali (which are also Indonesia's economic growth centres) and Nusa Tenggara, will be higher and therefore threaten groundwater sustainability in these areas.

This pressure will not only come from small-scale water supply providers, such as in the Tanjung Mas sub-district mentioned earlier, but also from bottled water companies and refilled bottled water kiosks, since all of them use groundwater as their source. Lifestyles, the convenience of not needing to boil water and the real demand for good quality drinking water will enable bottled and refilled bottled water businesses to grow significantly.

Government regulations, for example issuing an SNI for bottled water, have influenced people to believe bottled water is the safest source of drinking water. However, there have been no reports published about the results of the bottled water laboratory tests. Such one-sided information will influence people's preferences, which in turn could affect livelihoods. People, including the poor, will spend more money for a supply of water that they think is safer and healthier, even though the facts might state otherwise.

CONCLUSIONS AND RECOMMENDATIONS

Based on the discussion above are some findings on the current regulations and their impacts, or potential impacts. First, awarding commercial water rights has the potential to marginalise traditional users, as well as create administrative problems such as those found in the case study in Chile. Another problem is that whenever there is conflict between water right holders for commercial purposes and for daily purposes, a commercial water right holder officially has a permit, whilst a daily purpose water right holder does not. Most daily purpose right holders belong to the group of traditional users. The questions of how to solve these conflicts and who will benefit from this situation are not well regulated.

Second, the commercialisation of water coupled with the trend to force PDAMs not only to adopt a full cost recovery concept, but also to contribute to the local income of the city or the municipality, will challenge the livelihoods of people, especially the poor. With its tariff structure, the expansion of coverage to the poor will result in no additional profit and may actually cause a net loss to the PDAM because of poor returns on the subsidised tariff.

Third, inviting the private sector to manage water supply is surely not in the best interests of the provision of public services, as profit motivated private concessionaries are not too eager to connect the poor because they do not buy much water, cannot pay for connection fees up front and often lack the security of land tenure. They also tend to 'cherry pick', i.e. only deliver services to areas which bring profit. In sum, providing universal access, which is the overall aim of public services, is not the first priority of the private sector.

Fourth, assigning an SNI, coupled with the fact that the results of regular tests on the quality of PDAM water have never been made available to the public, has resulted in bottled water becoming the most reliable drinking water. The growth of bottled water production proves that the SNI strategy has benefited the bottled water industry.

¹⁷ Although PDAM Semarang City has many financial problems, the Mayor of Semarang City acknowledged: "Once I borrowed Rp. 1000 million from the PDAM to support Semarang City Football Club". Semarang City Football Club was managed by the Mayor's son. Available at www.kompas.com/kompas-cetak/0205/27/jateng/saya26.htm (accessed 28 April 2003)

Fifth, the lack of regulations on all water supply providers for ensuring water conservation will harm the sustainability of groundwater management in the long term. The tendency of small-scale water supply providers to extract groundwater in larger quantities cannot currently be avoided, as there is no need to request a permit or pay tax, even though they sell their service to the neighbourhood. The issue of making water accessible to everyone is worsened due to the many serious problems faced by PDAMs such as debt burden and the pressure to generate local income.

A reform of the regulations for water supply delivery is a must, especially regarding:

1. How to make a PDAM a public company that favours public interest, so that it does not act as a private company with profit as a motive but instead as a source for the generation of local income.
2. How to enforce that all groundwater extractors are responsible for water conservation.
3. How to ensure that the regulations on drinking water quality are truly met by all providers, without favouring bottled water companies.

It is not too late for the Government of Indonesia to change its regulations at all levels to cope with the problems outlined in this paper.

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