WATER CRISIS IN KLANG VALLEY, SELANGOR

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1 Introduction

As our time on Earth seem endless, natural resources have voiced out its critical state of depletion. Technology requires more power which leads to more use of resources. Water is also important for food production, sanitation and general hygiene of the environment (Siwar and Ahmed, 2013). The Asian Development Bank (2013) states that 60% of Asia households live without safe, piped water supply. This report will scrutinize the issue of water crisis in Klang Valley, Malaysia. Water crisis in this report is when the severity of water drought started causing many problems to its community and lack of good quality, clean water become an issue. Although solutions may have been implemented to help reduce water crisis, the problem may still be unsolvable which is why, the effectiveness of solution must also be figured out, not just the solutions.

1.1 Determinant of water crisis in Klang Valley

Using the elements of water security by Bizikova et al (2013), Klang Valley's water state is investigated to determine if the community is having a legitimate water crisis. For that, water security has to be proven violated. Water security is put as reliable access of sufficient water and adequate quality for basic human needs, small-scale livelihoods and local ecosystem services, coupled with a well-managed risk of water-related disasters (WaterAid, 2012). The elements are such:

1. Water Access - The community in Klang Valley has difficulty reaching clean water to use. This problem surfaced especially in recent times during water rationing. Some of the community got sick from walking too far to reach water tanks with heavy pails that are stationed at wee hours in the night (The Star, 2014).
2. Water safety - Although most waters are treated, reports have shown extremely high chemical levels like in Bandar Sunway. Drinking water in that township is sourced from Selangor River that contain Pb in range of 0.1–50 lg/L (Department of Environment, 2014).
3. Water affordability - This concerns more rural areas where poverty is severe. Water prices have been very debatable but the minimum currently, for domestic use is at RM6.00 which may be a problem for some but not all (Syabas, n.d.).

In summary, there are enough negative feedbacks from this framework to know that Klang Valley's crisis is not at a preliminary stage.

2 How it happens

2.1 Unplanned development

Reaching its 2020 vision to become a developed country, Malaysia's urbanisation occurs in the cities like Klang Valley due to the better job opportunities offered. A well-planned urbanisation is an important factor towards national development. In fact, unplanned and irregular urbanisation will serve as an impediment and threat towards success of the sustainability of urban development (World Economic Forum, 2015). In Klang Valley, urbanisation has led to overpopulation which influences changes in hydrological processes (Mak, 2014).

Between 1991 and 2000, the population in Klang Valley has grown from 3.2 million to 5.1 million and today, it is home to 7.2 million people in Malaysia. Moreover, this urban area accounts for roughly a quarter of Malaysia's total population (Saleh Mohammed, 2014). High population density in the Klang Valley means mounting demand and competition for water in domestic, industrial, and municipal uses (Tey, 2012). However, the existing social amenities and infrastructures are not developed and maintained well to adapt its growing number. Needless to say, it is unable to support growing demands. Furthermore, urbanisation brings with it many alterations of nature including site transformations, such as river channel diversions which changes functions of local ecosystems (Mohamad Suhaily Yusri Che Ngah and Zainudin Othman, 2011). The increased pressure on finite water resources coupled with the uncertain future water availability will subsequently lead to water scarcity (Population Action International, 2012).

2.2 Weather

Sectors	2010	2020	2030	2040	2050	2010	2020	2030	2040	2050
	Water Demand MCM per year					Water Demand mm rainfall per year				
Potable Water Demand	1,474	1,787	1,960	2,181	2,364	175.5	212.8	233.5	259.8	281.6
Irrigated Paddy	720	655	555	516	482	85.8	78.0	66.1	61.5	57.4
Non-Paddy Crops	36.0	37.0	39.0	43.0	48.0	4.3	4.4	4.6	5.1	5.7
Livestock	8.6	11.3	14.9	20.2	27.9	1.0	1.3	1.8	2.4	3.3
Total consumptive water demand	***2,238***	***2,490***	***2,569***	***2,760***	***2,922***	***266.6***	***296.6***	***306.0***	***328.7***	***348.0***
Fisheries	159.2	194.1	236.6	288.4	351.5	19.0	23.1	28.2	34.3	41.9
Total demand	**2,397**	**2,684**	**2,806**	**3,048**	**3,274**	**285.5**	**319.7**	**334.2**	**363.1**	**389.9**

Figure 1: Total water demand in all sectors in Selangor projected from 2010 to 2015

Year	Runoff	Estimate % available (15%)	Total consumptive water demand	Deficit
2010	760	114	266.6	(152.6)
2020	760	114	296.6	(182.6)
2030	760	114	306.0	(192.0)
2040	760	114	328.7	(214.7)
2050	760	114	348.0	(234.0)

Figure 2: Total Water Availability in Selangor (mm rainfall per year) projected from 2010 to 2015

Figure 1 and 2 are extracted from National Water Resources Study (2000-2050) by the Ministry of Natural Resources and Environment (2011). As depicted by Figure 2, Selangor is facing the deficit of water and the state's surface water resource is insufficient to meet its requirement. The deficit will be worsened when still insufficient rain fall get collected in the water dams. Currently, Malaysia is affected by the heatwave brought by the El-Nino phenomenon which causes intensely hot and dry weather (Fox, 2016). It is evidenced by the fact that water crisis hit Selangor the hardest in 2014 whereby the water level in the Sungai Selangor dam which supplies 60% of the water for Klang Valley, has fallen to a critical level. As shown by the red line in Figure 3 extracted from The Malaysian Water Association (2014), the state has implemented water rationing as an emergency plan to tackle the water crisis.

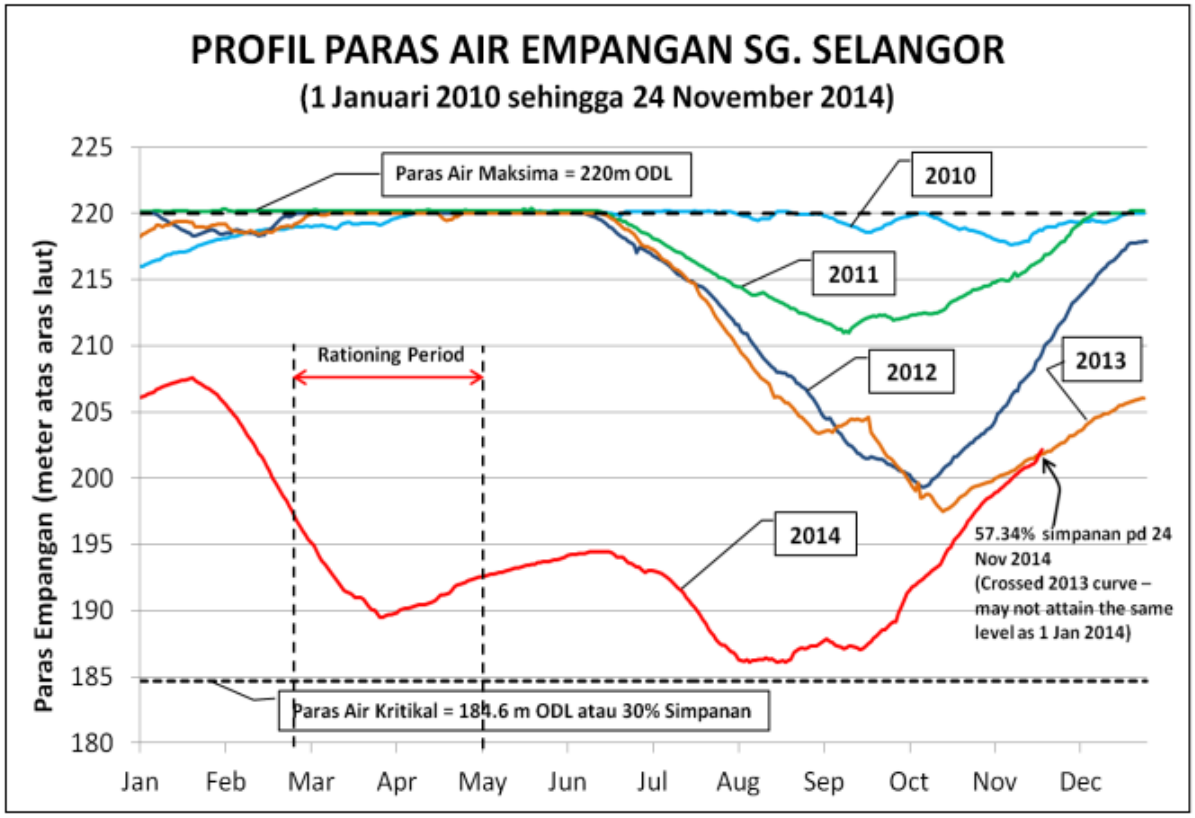

Figure 3: Profile of water level for Sungai Selangor Dam from 1 January 2010 to 24 November 2014

2.3 Unsustainable water consumption pattern

Malaysians, on average, use more than 200 litres of water a day and only 30% of the usage is for actual consumption, while our neighbouring countries such as the Singaporeans and Thais consume 154 and 90 litres of water a day respectively (Fomca Nur Imani Abdullah, 2015). The underlying cause could lie with the lack of awareness of the people on the issue of water scarcity. The relevant authorities such as Suruhanjaya Pendidikan Air Negara and SYABAS have develop water saving tips which are on webpages but these messages were not channelled efficiently to the public. Consequently, the perception about water being renewable and abundant is embedded in their mind, leading to excessive, uncontrolled water usage.

3 What was done

3.1 Water Tariff

Water tariff has long been used in many countries as a policy instrument to manage water consumption. In Malaysia, tiered water rates are imposed and different water rates are charged in different states because water resources are controlled by each state government. Below are the water rates charged in Selangor:

Usage	RM /m^3	Minimum payment (RM/m^3)
Domestic		
0-20m^3	0.57	6.00
21-35m^3	1.03	
35m^3 and above	2.00	
Commercial		
0-35m^3	2.07	36.00
35m^3 and above	2.28	

(SYABAS, 2016)

The average consumption per day of Malaysians in 2014 was 212 litres in which it has increased by 2 litres as compared to 2013. It is reported that Malaysia has the highest water consumption rate in Southeast Asia (Malaysiakini, 2015) albeit the domestic water tariff in Malaysia being one of the lowest (Ching, 2012). This shows that the water consumption rate is inversely proportionate with the water tariffs.

To keep the water tariffs low, the state government provides subsidy to the water concessionaires. In Selangor, the cost for the first 20 cubic meter of water is borne by the state government. However, the policy of subsidizing the water tariffs contradicts with the concept of using pricing mechanism to promote the efficient use of water. In fact, the people have taken this subsidy for granted that the water is plentiful and easy to obtain (Ching, 2012). Furthermore, charging people by usage will lead the people to think that they have the rights to use water as much they would like to since they are able to afford for it (Barford and Everitt, 2012). This denotes that water tariffs does not work in a way as intended but in fact, it has worsen the case of water crisis because people treat water as a commodity instead of a scarce resource. Consequently, the water tariffs structure implemented in Klang Valley does not tackle the underlying reason behind this water crisis which is the low level of awareness and apathetic attitude among Malaysians (The Malaysian Times, 2014).

3.2 Cloud seeding

Cloud seeding is a technique of inducing rain from cloud that is commonly used to manipulate the weather, especially during drought season (Weatheronline, n.d.). The Malaysia government has been carrying out cloud seeding in water catchment areas as water reserve levels has plunged continuously during the drought season back in 2014 (Faizal Nor Izham, 2014). Cloud seeding enables the formation of raindrop in the drought areas that are suffering from water scarcity to ease the impact of the rough climate (NLCATP, 2015). Theoretically, cloud seeding is able to overcome water crisis as it is able to provide water whenever it is needed. But there are many factors needed to be taken into consideration during the implementation of cloud seeding.

Being constantly expose to silver iodide (the primary chemical compound used for cloud seeding) can lead to negative health impacts on human. Some examples are running nose, skin rash, headache, loss of weight and general depression (CNN, 2010). However, the concentration of the silver iodide used in cloud seeding is in an acceptable safety level that will not cause harm. Environmental studies in silver iodide usage in cloud seeding started way back in the 1960s and until today, there is no indication of negative human and environmental impact (Weather Modification, 2009). Even though temporary exposure to silver iodide may be potentially harmless, the cumulative and long-term effects remain unclear and may potentially bring harm to the environment and people.

Besides, the cost of cloud seeding operation is also astronomical. Each attempt will cost between RM30,000 to RM40,000 (Straight Times, 2015). Yet, there is no guarantee that every cloud seeding attempt will be fruitful. There is a success rate of between 57% and 65% in the cloud seeding operation in Malaysia since 1974 (The Star, 2014). Hence, it may not be economical for overreliance in cloud seeding for rain to overcome water crisis. Cloud seeding is also exposed to serious accidents. Although it has yet to happen in Malaysia, one such accident occurred during the Cumulus Project, carried out by the British Royal Air Force and Western scientist in the 1950s. It lead to one of the worst flash floods ever to occur in Britain, claiming 35 innocent lives and destroying buildings (Vidal and Weinstein, 2001).

All in all, cloud seeding only provides temporary relief and does not serve as a permanent solution to water crisis. Indeed cloud seeding is able to provide water to address

the desperate needs of the people, but the aforementioned roots that cause water crisis are not addressed. Hence, it should not be the sole and easy option that the government is relying to obtain water but instead, address the real reasons that are causing water crisis.

3.3 Water rationing

This method cuts water usage for domestic use in certain intervals. According to Beh (2004), there are three options for water rationing depending on the severity of the water shortage crisis. They are:

(1) every day on an interval of eight hours;

(2) alternate days for 12 hours;

(3) every third day for 16 hours.

By limiting the use of water by people, water can then be conserved enough for everyone to provide for their basic needs. Facts show that the water output has an overall decrease to 1,700 million litres per day compared to the normal rate of 2,700 million litres per day over at Klang Valley (The Rakyat Post, 2014). Despite the positive cut in water usage there is neglect to include the social cost while this solution is carried out. True, there are much more people getting a share of water, despite it reducing more and more. But the inconvenience that it proposes to not get water in certain hours of the day should be accounted for. It may be a short term solution, but to provide water as a basic right of a citizen, water rationing cannot be considered a viable solution.

4 Conclusion

The causes and solutions of the Klang Valley water crisis may seem like another awareness pullup. This is a classic tale of Tragedy of the Commons where water seems and feels so abundant, never-ending. It is generic to consider aforementioned solutions in managing a water crisis. Some may also argue controlled development or to just ‘use less’, but really, would that help? Amidst the solutions given here, none will actually impact on solving water crisis because humans are ignorant. The underlying factor that still proceeds to be absent is lack of awareness which could be boiled down to education.

With no real conscience of how critical the situation is, the overall people of Klang Valley will still remain ignorant to the fact that water, is not abundant. Education will help to minimise the crisis by first, informing the public how bad the situation really is. When the

media is misused to fool the public, they are ‘educated’ into thinking that water is recyclable. Hence, they are spoilt but in fact, by collectively reducing consumption, said water can be provided for other drier rural areas without proper plumbing.

Furthermore, education helps the younger generation to act proactively rather than being too late. It is not entirely late to put an end to water crisis. By proper education, the future generation of the country can come up with proper development plans that coincide with assuring, sustainable water resources for everyone. In fact, education will fix the flaws that current solutions have.

Most importantly, education creates a civic awareness in individuals and removes ignorance. It is not only our moral duty to guard resources for ourselves but for others. Klang Valley is an urban area but not everyone has equal access to water. Social equality can be achieved with more civic minds among Malaysians, young or old.