

# Political Intervention in Water Supply Management Companies in Kedah, Malaysia

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**Abstracts:** Disruption of the supply of treated clean water is a phenomenon that occurs all over the world. The increase in population, the growth of urbanization, the opening of agricultural areas and the current economic needs cause the demand for clean water supply to increase but the resources that can be supplied are limited. In addition, other side factors such as natural disasters, raw water resources, technical aspects, human weaknesses and political elements also make the management of clean water supply treated to consumers unmanageable and effective. Hence, the study aims to justify political intervention in water supply management in the state of Kedah with a focus on politicking in Syarikat Air Darul Aman (SADA). Four methods are used to obtain appropriate data and information involving library studies, document analysis, face-to-face interviews with SADA senior management and politicians in Kedah using semi-structural questions and participating in the nature of the researchers who have held the position of CEO of SADA. The results of the analysis showed that; naturally as a result of SADA's organizational structure, close ties between politicians and top management, abuse of power by the CEO, poor company delivery system, public perception of society causing influence and political interference in organizations such as SADA are seen to occur. At the end of the study, a conceptual and model framework to enable SADA to become a professional and consumer service-oriented corporate entity by marginalizing political influence was developed for future reference and implementation purposes.

**Keywords:** Political Intervention, Professionalism, SADA, Water Supply Management.

## 1. INTRODUCTION

Water supply management in 14 states in Malaysia including the Federal Territory, Labuan and Putrajaya is handled by companies established by each state government. In such a case, the inclinations of a company operating cannot be separated from the influence and intervention of political elements. In terms of its original structure, the company established is in accordance with the Companies Act 1965 and has its own autonomous powers. Elements of influence and political intervention for example are seen as dominant in the management of water supply companies in every state in Malaysia for two reasons. First, the water supply company is wholly owned and subject to the control of the state government with the chairman of the company headed by the Menteri Besar. Second, all regulations, policies and important decisions relating to travel, company expansion, operating capital, appointment of top management personnel and business plans are subject to the full supervision of politicians.

In nature, the water supply companies established in each state in the context of the Federation of Malaysia are not spared the symptoms of political intervention and influence. His thrust creates a constant dilemma. The dilemma in question touches on the functioning of the company whether to be and move as a full-fledged business entity. In other words, it is able to move independently with a business plan oriented to maximise profit, minimize costs and provide professional and effective services to consumers.

Therefore, the research on the natural scenario and situation faced by most of the water supply management companies in the country including in the state of Kedah wanted to focus on the situation faced by the water supply company in the state of Kedah, Syarikat Air Darul Aman or SADA. The specific situation in the context of the study is the description of political influence and intervention that occurs inside and outside SADA. The symptoms that occur cause the professionalism of the company's management and supply services to consumers in the face of issues and problems. So much so that the company itself is often entangled with various unpleasant images.

The main purpose of this study is to provide information and understanding of the political influence that occurs in the management of water supply in the state of Kedah and specifically in SADA. To enable the study to have a

clearer focus, three specific objectives were also highlighted the identifying factors of political interference in the management of water supply in the state of Kedah, the describing the elements of political intervention that occur in SADA and the analysing the impact of political intervention on SADA management and the impact on users.

## **2. METHODOLOGY**

The design of the study used is a qualitative method of discussion. The type of study is a single case study, which is to examine the SADA entity. Specifically in the context of this study, the face-to-face interview used semi-structured questions of 14 senior SADA officers, 3 Kedah State Assemblymen, 3 former Kedah State Assemblymen, one Member of Parliament in Kedah and one former Chairman of SADA. In addition, three years' experience as CEO at SADA (2016-2019) is leveraged to enable more data by engagement to participate in the insights events.

Field note notes are used for this purpose. In addition, the analysis of documents including minutes of meetings, important memos of the company, official government reports are also consulted. To add on, library studies involve writing in scientific books, articles, journals and previous scientific trainings related to water supply management in Malaysia. With the variety of methods used helps researchers so that more extensive, robust and triangulation of data sources are carried out.

## **3. DISCUSSIONS AND FINDINGS**

### **3.1. Project Distribution and Implementation**

Since the initial establishment of Syarikat Air Darul Aman (SADA) in January 2010, among the distribution of projects that had to be inherited and incurred by SADA were concession awards to two major companies namely AIU and Air Works for operational work at 10 Water Treatment Plants (LRA). The second aspect that shows the influence and political interference that is hidden is the overpayment that SADA must pay to the concessionaire for a fee that does not reflect the actual revenue collection by SADA. The one-sided agreement exists because of political direction and pressure from the party and government leaders on the management of SADA and previously on the Public Works Department (JKR) of the water division and the Kedah State Water Supply Department (JBA) in the matter of payment for project work. For example, at a water treatment plant in Langkawi operated by Air Works Sdn Bhd (company nickname), while the Bukit Pinang and Pelubang plants are managed by AIU.

In addition, the project offers for small, medium and large contractors to be involved in supplying or providing the necessary support services also demonstrates the existence of political interference in the matter of distribution. In this regard, since SADA was established in January 2010, all small and medium-sized projects for all supply, procurement and repair services are typically under the jurisdiction and control of the Chief Executive Officer. In this case, among the obvious examples of the use of absolute power by the Chief Executive Officer of SADA in deciding the distribution of projects through the dominance of its control can be scrutinized in the delivery of clean water using tanker trucks when the state of Kedah was experiencing a supply crisis due to low pressure, failure to deliver supplies through the piping system method around 2011, 2012 and 2013. For the record, SADA had to pay RM6-8 million to the contractors of the truck suppliers involved between the years (SADA Finance Department, 2019). Similarly, for maintenance projects, repair of plumbing systems, construction of new tank and pump houses worth hundreds of thousands, previously the bulk of the project implementation distribution was only enjoyed among certain companies through the close relationship of the owners of the company with the Chairman of SADA or with the previous Chief Executive Officer.

For instance, a project value of between RM20,000 and RM200,000 is detected only a few companies that have received priority project work through direct negotiations or selected tenders as a result of the close relationship between the contractor and the top management of SADA in addition to the company's expertise. Table 1 below among others pleases.

**Table 1.** List of Contractors for Small and Medium Projects under the Direct Supervision of the Chief Executive Officer of SADA.

REGION	PROJECT AREA	WORK SCOPE	CONTRACTOR	PROJECT COST (RM)
Kedah Utara	1.Padang Garam, Kuala Kedah.	Build a new pump house and install water pipes.	M.E.T MOTION (ALOR SETAR), SDN.BHD.	73, 557.00
	2. Kg Pida 4 dan 5, Jerlun.	Build a pump house and replace old water pipes from AC pipes to poly pipes.	M.E.T MOTION (ALOR SETAR), SDN. BHD,	140,000.00
Kedah Timur	Kampung Hujung Bandar, Sik.	Build a pump house and maintenance and electrical work of the pump house.	HYDROVISION SDN. BHD	93, 670.00
			HYDROVISION SDN. BHD,	237,685.00

Source: (SADA Annual Report, 2018; 39).

There is another justification that can be displayed for how the close relationship between the owner of the company and the state political leadership allows the company to be involved in acquiring the project from SADA. In this regard, the string of project awards for 2019 can be described; As a result of the project to review and improve Non-Revenue Water (NRW), as a result of the good relationship between the Chairman of SADA and a company from Selangor, was established a subsidiary that only has a paid-up capital of RM2 known as Darul Aman Pipewater Sdn Bhd for this purpose. The actions displayed imply that the practice of the Chairman of SADA shows that there are conflicting of interests.

This is due to the fact that the research and measures proposed by the consulting companies involved are not able to reduce the NRW that occurs in the distribution and supply system. On the other hand, the NRW rate remained at 49% for 2018 and 2019 higher than the previous year (Sinar Harian, 21 November 2019 and NRW SADA Department Report, 2019). For 2016, 2017 and 2018 through the initiative and dispersal of technical systems conducted internally by the NRW Department at SADA, it can reduce NRW to a level of between 43 to 45 % (Technical Report and Efforts to Reduce NRW, SADA, 2019).

There are also other issues that indicate abuse of power and political interference in the distribution of contracts for the conduct of internal courses for staff both at the executive and non-executive levels. Among the programmes in question are short-term courses for the improvement of organizational culture and internal courses for executives and officers at SADA. Several Senior Managers of SADA (SMSEs) who reviewed their views on this course expressed the following assessment. ESQ's sfat course seems a money-making course very much. It is not clear what to achieve, and based on experience, many courses have been passed, but the courses that are participated are now just like coercion. Second, when assessed as having nothing to do with the scope of our job at SADA, and it seems that it is just a course that benefits the course operator. More surprisingly, the course operators are outsiders who don't understand the culture of SADA, the consumer environment in Kedah and the main needs that SADA should meet. This is very disappointing for us among the officers.

The same view was also expressed by SMEs 9, 10 and 11 who formulated the recurring course as organised, which is said to be insignificant with the technical requirements of a utility company such as SADA. They stated that it seems clear that the company under the new CEO and the control of the water supply EXCO from PH implemented a program not because of the benefits of the program and its suitability with the company's business plan, but rather the effort to distribute the opportunity for payment of the program to a consulting company owned by their friend. And we are also very concerned about the widespread participation of politicians in SADA management lately such as involvement in new recruitment meetings and interviews, staff promotion and determination of eligible staff with those who do not qualify for annual bonuses. This is not only disappointing but blatantly in violation of the Companies Act, immoral and never done by the previous government. This action seems to be that the company is

tied hands and feet and only follows the lead of the government and the politicians in power in the current government.

The explanations and descriptions provided by SME 1 and SME 2 are also supported by SMEs 4 and SME 7. They explain among other things; for a technical company that holds the business of utility which is a field of need that is directly related to the consumer, the company's orientation should be directed to improve the plumbing system, technical, mechanical equipment in the plant and the maintenance services that are agile and effective. Examining the explanations presented by SMEs 1, 2, 4 and 7 found that the elements of intervention and political influence are rampant in determining the internal governance of SADA.

### **3.2. SADA Internal Politics Influence and Project Distribution**

Apart from issues related to project awards involving crony companies, good partners and so on, political influence and internally conflicting interests regarding the distribution of projects involving the dominance of top management power in Syarikat Air Darul Aman (SADA) also took place. There are several examples of projects given involving incorrect management procedures that were reprimanded in the Auditor General's Report 2018.

For example, the award for carrying out geo-coding meter work for a period of two years from June 1, 2015 to May 31, 2017. The work was given to Koperasi SADA or KOSADA by management. There was a lot of misconduct and management that did not follow the rules based on the Auditor General's Report 2018. Among the misconduct that exists in relation to this project are the following:

1. The Chairman of the Board of Directors of KOSADA has family ties with the Chairman of the SADA Tender Committee. The description of this matter is as follows; Datuk Azman Dahari as Chairman of the SADA Tender Committee is a *bisan* to the Chairman of the Board of Directors of KOSADA.

2. The SADA officer who is given the credentials to monitor and verify the project is the Deputy Chairman of the Board of Directors of KOSADA. The son of the Chairman of the SADA Tender Committee is a SADA officer who is a commissioned SADA officer and serves as the Deputy Chairman of the Board of Directors of KOSADA. Thus, the conflict of interest occurs when the award, approval, commissioning, and payment of the project work is carried out.

3. The officer responsible for preparing the agreement documents and terms of work conditions and payment for the project is a member of the Board of Directors of KOSADA and at the same time was also a witness during the project agreement between SADA and KOSADA. In this regard, there is once again a conflict of interest and internal malpractice as the officer holds two positions in two different entities that are in a business relationship, namely as Legal Adviser of SADA and a member of the KOSADA Board of Directors. This means that the individual recommends the legal terms and draft agreement on behalf of SADA, and the individual is the one who reviews and then signs and confirms any transaction agreement on behalf of KOSADA.

4. The biggest misdemeanour that appears to be the intervention and influence of the power directive in this project is the full payment approved by the Chief Executive Officer of SADA even though the work on all these projects has not been fully completed.

5. A total of 110,571 accounts from a total of 565, 820 user accounts have yet to be updated with coordinated data converted to Geographic Information System (GIS) data. In addition, the GIS data matching and updating process with the Consumer Information Billing System (CIBS) database for 565, 820 user accounts was not completed (Auditor General's Report, 2018).

The explanations and evidence presented show that the issue of political interference and the influence of power within SADA has occurred until its top management can determine the distribution and awarding of projects either to external parties and subordinates within SADA itself. In fact, there is also a result of internal actions among SADA's top management who leverage the power of management. Those who are given the responsibility of being the mainstay at SADA are seen to have improperly carried out actions, violated the rules, governance of the company and leveraged power with authority.

### **3.3. Political Intervention in Appointment of Position**

The scope of intervention and political influence in SADA is also manifested by the government and stakeholders at any given time through the appointment of positions in SADA. As previously explained, SADA was founded as a corporation or company from January 2010, the year when the state of Kedah was governed by the Pakatan Rakyat government which won the 2008 general election, led by Parti Islam Se Malaysia (PAS) together with a coalition of the People's Justice Party (PKR) and the Democratic Aaction Party (DAP). When SADA was established in its early stages as a business entity, a portion of the workforce was absorbed from JBA (Kedah), while the appointed top management personnel had to obtain confirmation and approval from Yang Amat Berhormat Menteri Besar Kedah as the Chairman of SADA.

Due to the early establishment of SADA, the Pakatan Rakyat government led by PAS led the leadership of the Kedah government, so the manpower and top management taken could be said to have a relationship with the then state government leadership. There are also efforts to defuse political tensions and the disparity of certain political strategies when it comes to the appointment of top staff. For example, by appointing the Chief Executive Officer of SADA at the beginning of its establishment (2010) even though the appointee is a member of UMNO and has contested the position of Head and Deputy Head of UMNO Pendang Division for two consecutive terms.

However, in his capacity as the Deputy President of the Kedah State Administrative Officers Association (KCS), the then Menteri Besar of Kedah from PAS made strategic arrangements especially in terms of political and business interests by appointing Dato Azam Dahari (not his real name) as the first Chief Executive Officer of SADA (2010-2016). The situation shows as if the policy of PAS and the image of Islam that it brought at that time was to guarantee justice for all regardless of the party's affiliation and ideology according to partisanship. On the other hand, the appointment seems to emphasize the achievement of merit. Third, the appointment was also intended to take the hearts of state administration officials or Kedah Civil Service (KCS) who are influential in creating harmony in the state administration for the purpose of building political stability.

### **3.4. Political Influence and Intervention Effects of SADA Structure**

Naturally, due to the organisational structure of SADA, the Menteri Besar of Kedah as the Chairman of the company is eligible to appoint several Special Officers to be placed in SADA. The appointment process was carried out by all Menteri Besar from the time of the late Ustaz Azizan (2008-2013), Mukhriz Mahathir (2013-2016), Ahmad Bashah (2016-2018), Mukhriz Mahathir (2018 to May 2020) and Sanusi Md Noor (20 May 2020 to date).

The issue is, only in the era of Ahmad Bashah, Special Officers were appointed to perform permanent duties and functions in SADA, while in the era of other Menteri Besars Special, Officers were appointed to serve in the course of political work for the Menteri Besar but salaries were paid by SADA for a decent fee. When the appointment of a Special Officer is done the implication is that there are two. First, whether the officer has the skills and can contribute back to SADA's operations commensurate with the lucrative salary paid by SADA or simply to be an officer but at the same time perform work outside the scope of SADA.

Similarly, the impact of SADA's existing organisational structure provides and enables the Chairman of SADA who the Menteri Besar of Kedah is also to appoint six SADA Board Members (ALP) from among outsiders. In addition to automatic appointments based on administrative positions such as State Secretary, State Financial Officer, and Chief Executive Officer of SADA. During the PR period (2008-2013) in the Kedah state government, six ALPs were appointed from outside comprising politicians who had interests with component parties in PR. In the meantime, in the BN era especially during the era of Ahmad Bashah as SADA Chairman, the number of six was balanced between politicians, experts in various fields and former state officials.

By comparison, during Pakatan Harapan's time in the Kedah state government, all six members of the Board of Directors (ALP) were politicians representing the interests of PKR, Parti Peribumi Bersatu Malaysia (Bersatu), AMANAH and DAP. There is a contractor who often gets projects and contracts from SADA are also appointed. Therefore, there can be no denying that there is a link between the organisational structure, the natural situation and the jurisdiction inherent in SADA through the role of the Chairman and the Board of Directors (political

appointments) which is also the cause of the influence and political interference in the management of SADA. All of these are driven and result in the close relationship between politicians and SADA's top management, as well as the management staff in SADA itself.

### **3.5. Command and Control**

This section's discussion focuses on the influence and political interference on the day-to-day operations of SADA involving specific directives or controls issued by politicians to officials at SADA. For this purpose, the findings from interviews of 14 senior managers in twelve departments in SADA provided an accurate and comprehensive picture of the description in question. Based on the insights and findings of interviews conducted on SME1, SME2, SME3, SME4, and SME5, all the informants made some conclusions.

Among the formulations highlighted are that political intervention and direction usually occur in SADA in three main areas, namely when it comes to the decision-making process on contract and procurement work, the job appointment process and legislation. In this regard, SMEs 3 and SME 4 among others insist, Often when tendering an infra project or procurement related to the control of a project under SADA, we will be contacted by certain politicians including from the Chairman of SADA himself to give full consideration to the tender offer submitted by the company in relation to their own interests. Quite a directive is meeting and inconvenient for us, because when a project is made on an open tender basis then a thorough assessment should be carried out based on the financial capabilities and abilities of the company to perform the work, not due to the personal relationship of the owner of the company with a particular political person. In this case when the technical committee wants to decide then it poses a dilemma and a problem and ultimately a less competent company is offered the effect of patronage from politicians.

Politicians in Kedah often make SADA a place and a hole for instant projects. It's more unfortunate they didn't use the channel properly. Any opportunity to be taken is almost entirely using the influence of the Chairman of SADA and the Menteri Besar. This puts us in a dilemma and difficult situation because the companies brought by political leaders are mostly unsuccessful in the work related to plants, piping systems and so on. Political direction and intervention often occur in their day-to-day tasks through requests and requests from political leaders. However, most of it involves helping to secure project work, appointment to staff and assistance in addressing water issues in certain areas. According to SME7, SME8, SME9 and SME13, political directives and interventions are considered when there is an order, memo or need to carry out a result of instructions coming from the office of the Menteri Besar or through his representatives and political parties. In terms of priorities to be implemented, SME8 and SME9 outline: Usually if an instruction comes from the Menteri Besar himself then it is considered important as the Menteri Besar is also the Chairman of SADA. Often the instructions from the Menteri Besar are directed through the Chief Executive Officer and it is easy to implement as it has received the consent and direction of the top leadership of SADA itself. Similarly, if the instructions coming from the Water Supply Exco are also considered as a top directive that should be given high attention. The issue is that if the instructions come from a regular Assemblyman, then we need to refer specifically to the instructions for further action from the Chief Executive Officer. In this regard, there are two important themes regarding the direction and political intervention that occur in the day-to-day operations of SADA based on the perception of the officers on duty at SADA. The theme covers as follows. Directions and interventions either generally or directly in the matter of project procurement, work appointment process and legislation. Formal instruction and intervention from the office of the Menteri Besar, his representative or from the ruling political party in relation to the need for an action.

### **4. CONCLUSION**

Directions and interventions appear to be significant when there is a close relationship, relative affinity or close acquaintance between politicians and duty officers at SADA. However, to confirm whether the political direction and intervention was followed and implemented is less clear, as SADA is an entity subject to the company's deed directives, procedures and procedures. What's more, any political directives and interventions that exist are not necessarily implemented by the officers as the process for the success of the directive has to go through various filters and procedures until the final stage of obtaining approval from the top management of SADA, the Chief Executive Officer.

Thus, there can be an in-depth analysis and analysis that this form of influence and political intervention exists significantly at the top management level, as the Chief Executive Officer often receives direct instructions or requests from the heads of political parties, state assemblymen, MPs, even from SADA Chairman himself who is the Menteri Besar of Kedah. Perspectives that need to be acknowledged by the researchers because during his three years as the Chief Executive Officer at SADA various confidential, official instruction requests involving finance, instructions on issuing CSR expenses and project distribution, staffing and others received by the researchers in the form of memos, instructions through telephone calls, text whats app, email and so on. The difference is that at the middle and lower levels the aspects of influence and political intervention can still be minimized due to the availability of work restrictions and reference acts, company manners and limits on the source of power which are a deterrent from continuing to implement or enforce the instructions or political interventions received.

## REFERENCES

- [1] Abdullah, M. F. (2017). Sejarah Perkembangan Bekalan Air Domestik Di Negeri Kedah Sehingga Tahun 1957. *SEJARAH: Journal of the Department of History*, 26(2 (December)).
- [2] Abdullah, M. O. H. D., & Noor, M. (2018). KERJASAMA KEDAH DAN PERLIS DALAM PEMBANGUNAN SISTEM BEKALAN AIR DOMESTIK DI NEGERI PERLIS, 1969-1978. *Jebat: Malaysian Journal of History, Politics & Strategy*, 45(1).
- [3] Abllah, F. N. (1994). Bekalan air, pembetulan dan pengairan. Penerbit Universiti Sains Malaysia bagi pihak Pusat Pengajian Perumahan, Bangunan dan Perancangan.
- [4] AIR, K. K. B. P. S., & DI, B. (2005). Kajian awal kualiti air Sungai Kilim, Langkawi: Kajian kes bagi pengurusan sumber air bersepadu di sebuah pulau, Malaysia. *Malaysian Journal of Analytical Sciences*, Vol. 9, No. 3 (2005), 9(3), 396-405.
- [5] *Kedah*. (2019). Laporan Jawatankuasa Kira-Kira Wang Negeri Kedah. Alor Setar, Majlis Dewan Undangan Negeri Kedah.
- [6] Kerkvliet, J., & Nowell, C. (2000). Tools for recreation management in parks: the case of the greater Yellowstone's blue-ribbon fishery. *Ecological Economics*, 34(1), 89-100.
- [7] Kraas, F., & Sterly, H. (2009). Land use change in megacities and challenges for water management. *Proceedings of Megacities–Interactions Between Land Use and Water Management–Mitteilungen zur Ingenieurgeologie und Hydrogeologie*, 99.
- [8] Lai, C. H., Chan, N. W., & Roy, R. (2017). Understanding public perception of and participation in non-revenue water management in Malaysia to support urban water policy. *Water*, 9(1), 26.
- [9] Leach, M., Newell, P., Scoones, I., & Mehta, L. (1999). Exploring understandings of institutions and uncertainty: new directions in natural resource management.
- [10] Lerner, D. N. (2002). Identifying and quantifying urban recharge: a review. *Hydrogeology journal*, 10, 143-152.
- [11] Li, C., Qiu, J., Froliking, S., Xiao, X., Salas, W., Moore III, B., ... & Sass, R. (2002). Reduced methane emissions from large-scale changes in water management of China's rice paddies during 1980–2000. *Geophysical Research Letters*, 29(20), 33-1.
- [12] Li, H., Tang, Y., Wang, Z., Shi, Z., Wu, S., Song, D., ... & Mazza, A. (2018). A review of water flooding issues in the proton exchange membrane fuel cell. *Journal of Power Sources*, 178(1), 103-117.
- [13] Lin, Y., Yan, L., & Wang, Y. M. (2019). Performance evaluation and investment analysis for container port sustainable development in china: An inverse DEA approach. *Sustainability*, 11(17), 4617.
- [14] Magsi, H., & Atif, S. (2012). Water management, impacts and conflicts: Case of indus water distribution in Sindh, Pakistan. *International Journal of Rural Studies*.
- [15] Majizat, A., Ahmad, B., Noordin, N., & Sharip, Z. (2016). Adopting an integrated catchment-based management approach for Putrajaya Lake and Wetlands. *International Journal of Water*, 10(4), 343-358.
- [16] Makropoulos, C. K., Natsis, K., Liu, S., Mittas, K., & Butler, D. (2008). Decision support for sustainable option selection in integrated urban water management. *Environmental modelling & software*, 23(12), 1448-1460.
- [17] Malaysia. (2019). Laporan Ketua Audit Negara. Kuala Lumpur, Percetakan Nasional Berhad.
- [18] Masalah paip tak selesai. (4 Julai 2017). [http:// www.sinarharian.com.my](http://www.sinarharian.com.my). //www.sinarharian.com.my/edisi/utara/masalah-paip-tak-selesai- Diakses pada 26 November 2018.
- [19] Meerah, T. S. M., Halim, L., & Nadeson, T. (2010). Environmental citizenship: What level of knowledge, attitude, skill and participation the students own?. *Procedia-Social and Behavioral Sciences*, 2(2), 5715-5719.
- [20] Mendoza, G. A., & Martins, H. (2006). Multi-criteria decision analysis in natural resource management: A critical review of methods and new modelling paradigms. *Forest ecology and management*, 230(1-3), 1-22.
- [21] Miles, M. P., & Covin, J. G. (2000). Environmental marketing: A source of reputational, competitive, and financial advantage. *Journal of business ethics*, 23, 299-311.
- [22] Mollinga, P. P. (2008). Water, politics and development: Framing a political sociology of water resources management. *Water alternatives*, 1(1), 7.
- [23] Mostert, E., Pahl-Wostl, C., Rees, Y., Searle, B., Tàbara, D., & Tippett, J. (2007). Social learning in European river-basin management: barriers and fostering mechanisms from 10 river basins. *Ecology and society*, 12(1).
- [24] Mote, P. W. (2003). Trends in snow water equivalent in the Pacific Northwest and their climatic causes. *Geophysical Research Letters*, 30(12).
- [25] Mumme, S. P., & Moore, S. T. (1990). Agency autonomy in transboundary resource management: the United States section of the international boundary and water commission, United States and Mexico. *Natural Resources Journal*, 661-684.

- [26] Murphy, E; Dingwall, R (2003). *Qualitative methods and health policy research* (1<sup>st</sup> edition). Routledge
- [27] Musloff, A., Leschik, S., Möder, M., Strauch, G., Reinstorf, F., & Schirmer, M. (2009). Temporal and spatial patterns of micropollutants in urban receiving waters. *Environmental pollution*, 157(11), 3069-3077.
- [28] Nazemi, A., & Madani, K. (2018). Urban water security: Emerging discussion and remaining challenges. *Sustainable Cities and Society*, 41, 925-928.
- [29] Pahl-Wostl, C. (2002). Towards sustainability in the water sector—The importance of human actors and processes of social learning. *Aquatic sciences*, 64, 394-411.
- [30] Pahl-Wostl, C. (2007). Transitions towards adaptive management of water facing climate and global change. *Water resources management*, 21, 49-62.
- [31] Pahl-Wostl, C. (2009). A conceptual framework for analysing adaptive capacity and multi-level learning processes in resource governance regimes. *Global environmental change*, 19(3), 354-365.
- [32] Pahl-Wostl, C., & Hare, M. (2004). Processes of social learning in integrated resources management. *Journal of community & applied social psychology*, 14(3), 193-206.
- [33] Pahl-Wostl, C., Mostert, E., & Tàbara, D. (2008). The growing importance of social learning in water resources management and sustainability science. *Ecology and society*, 13(1).
- [34] Poeter, E. P., & Hill, M. C. (1997). Inverse models: A necessary next step in ground-water modeling. *Groundwater*, 35(2), 250-260.
- [35] Price, W., & Smith, E. D. (2006). Waste tire recycling: environmental benefits and commercial challenges. *International Journal of Environmental Technology and Management*, 6(3-4), 362-374.
- [36] Putra, D. P. E., & Baier, K. (2009). The effect of uncontrolled urbanization in regard to the availability of groundwater demonstrated with the example of the Indonesian million City Yogyakarta. *Cybergeo: European Journal of Geography*, 31(469), 1-11.
- [37] Ralph, N., Birks, M., & Chapman, Y. (2014). Contextual positioning: Using documents as extant data in grounded theory research. *Sage Open*, 4(3), 2158244014552425.
- [38] Raunkjær, K., Hvitved-Jacobsen, T., & Nielsen, P. H. (1994). Measurement of pools of protein, carbohydrate and lipid in domestic wastewater. *Water research*, 28(2), 251-262.
- [39] Rogers, P., De Silva, R., & Bhatia, R. (2002). Water is an economic good: How to use prices to promote equity, efficiency, and sustainability. *Water policy*, 4(1), 1-17.
- [40] Rowland, M. (2005). A framework for resolving the transboundary water allocation conflict conundrum. *Groundwater*, 43(5), 700-705.
- [41] Rusteberg, B., Tamimi, A., Abu Sadah, M., Walter, F., Schmidt, S., Samhan, S., ... & Sauter, M. (2018, April). Comparison of alternative water development and planning options towards sustainable IWRM implementation in the Lower Jordan Valley based on indicator assessment. In EGU General Assembly Conference Abstracts (p. 18172).
- [42] SADA. (2016). Ringkasan Laporan Berhubung Aduan Pengguna Musim Perayaan. Alor Setar: Jabatan ICT Syarikat Air Darul Aman Sdn. Bhd.
- [43] SADA. (2018). Mesyuarat Kawal Selia SADA, Bil 1, 2018. Alor Setar, Syarikat Air Darul Aman.
- [44] SADA. (2018). Water Supply Improvement Works (2018-2021). Alor Setar, Syarikat Air Darul Aman.
- [45] SADA. (2019). Laporan Tahunan Jabatan Korporat SADA, 2019. Alor Setar, Syarikat Air Darulaman Sdn. Bhd.
- [46] SADA. (2019). Laporan Tahunan Jabatan Pengguna SADA. Alor Setar, Syarikat Air Darulaman Sdn. Bhd.
- [47] SADA. (2019). Laporan Tahunan Jabatan Sumber Manusia SADA. Alor Setar, Syarikat Air Darul Aman Sdn. Bhd.
- [48] SADA. (2019). Laporan Tinjauan Tahap Kepuasan dan Persepsi Pengguna Terhadap
- [49] SADA. Kerja lapangan bagi penyiapan tesis Ijazah Doktor Falsafah, Politik dalam Pengurusan Bekalan Air di Negeri Kedah.
- [50] Sakke, N., Ithnin, H., & Ngah, M. S. Y. C. (2014). Pengaruh Air Tidak Berhasil (NRW) ke Atas Kemapanan Bekalan Air di Selangor, Malaysia: Influence of Non-Revenue Water (NRW) on the Sustainability of Water Supply in Selangor, Malaysia. *Perspektif Jurnal Sains Sosial dan Kemanusiaan*, 6(2), 66-81.
- [51] Salazar, M. R., Hook, J. E., y Garcia, A. G., Paz, J. O., Chaves, B., & Hoogenboom, G. (2012). Estimating irrigation water use for maize in the Southeastern USA: A modeling approach. *Agricultural Water Management*, 107, 104-111.
- [52] Sato, T., Qadir, M., Yamamoto, S., Endo, T., & Zahoor, A. (2013). Global, regional, and country level need for data on wastewater generation, treatment, and use. *Agricultural Water Management*, 130, 1-13.
- [53] Sebesvari, Z., Rodrigues, S., & Renaud, F. (2017). Mainstreaming ecosystem-based climate change adaptation into integrated water resources management in the Mekong region. *Regional Environmental Change*, 17, 1907-1920.
- [54] Sol, J., Beers, P. J., & Wals, A. E. (2013). Social learning in regional innovation networks: trust, commitment and reframing as emergent properties of interaction. *Journal of cleaner production*, 49, 35-43.
- [55] Suratman, S., Awang, M. O. H. A. M. A. D., Ling, L. A., & Tahir, N. M. (2009). Kajian indeks kualiti air di lembangan Sungai Paka, Terengganu. *Sains Malaysiana*, 38(2), 125-131.
- [56] Swart, R., Robinson, J., & Cohen, S. (2003). Climate change and sustainable development: expanding the options. *Climate policy*, 3(sup1), S19-S40.
- [57] Teclé, A. (1992). Selecting a multicriterion decision making technique for watershed resources management 1. *JAWRA Journal of the American Water Resources Association*, 28(1), 129-140.
- [58] Tong, S. T., & Chen, W. (2002). Modeling the relationship between land use and surface water quality. *Journal of environmental management*, 66(4), 377-393.
- [59] Toor, G. S., Harmel, R. D., Haggard, B. E., & Schmidt, G. (2008). Evaluation of regression methodology with low-frequency water quality sampling to estimate constituent loads for ephemeral watersheds in Texas. *Journal of Environmental Quality*, 37(5), 1847-1854.
- [60] Trochim, W. M., & Donnelly, J. P. (2000). *Research methods knowledge base* (Vol. 2). Macmillan Publishing Company, New York: Atomic Dog Pub.



- [61] Udías, A., Efremov, R., Galbiati, L., & Cañamón, I. (2014). Simulation and multicriteria optimization modeling approach for regional water restoration management. *Annals of Operations Research*, 219, 123-140.
- [62] Walmsley, N., & Pearce, G. (2010). Towards sustainable water resources management: bringing the Strategic Approach up-to-date. *Irrigation and drainage systems*, 24, 191-203.
- [63] Weintraub, A., Romero, C., Bjørndal, T., & Lane, D. E. (2001). Operational research models and the management of renewable natural resources: a review.
- [64] Welty, C. (2009). The urban water budget. *The water environment of cities*, 17-28.
- [65] Weng, Q. (2001). Modeling urban growth effects on surface runoff with the integration of remote sensing and GIS. *Environmental management*, 28, 737-748.
- [66] Weng, Q., & Yang, S. (2003). An approach to evaluation of sustainability for Guangzhou's urban ecosystem. *The International Journal of Sustainable Development & World Ecology*, 10(1), 69-81.
- [67] Wester, P., Rap, E. R., & Vargas-Velázquez, S. (2009). The hydraulic mission and the Mexican hydrocracy: Regulating and reforming the flows of water and power. *Water Alternatives*, 2(3), 395-415.
- [68] White, K. D., Vaddey, S. V., Hamlet, A. F., Cohen, S., Neilsen, D., & Taylor, W. (2006). Integrating climate impacts in water resource planning and management. In *Current Practices in Cold Regions Engineering* (pp. 1-11).
- [69] White, K. D., Vaddey, S. V., Hamlet, A. F., Cohen, S., Neilsen, D., & Taylor, W. (2006). Integrating climate impacts in water resource planning and management. In *Current Practices in Cold Regions Engineering* (pp. 1-11).
- [70] Wong, T. H., & Brown, R. R. (2009). The water sensitive city: principles for practice. *Water science and technology*, 60(3), 673-682.
- [71] World Health Organization, WHO/UNICEF Joint water supply, & sanitation monitoring programme. (2015). *Progress on sanitation and drinking water: 2015 update and MDG assessment*. World Health Organization.
- [72] Yonarnan, M. (2018). Technical Knowledge and Politics of Decision Making in Water Management: A Case Study of Water Allocation in Chonburi, Unpublished Manuscript, Chulalongkorn University, Thailand.
- [73] Zeitoun, M., Eid-Sabbagh, K., Talhami, M., & Dajani, M. (2013). Hydro-hegemony in the Upper Jordan waterscape: control and use of the flows. *Water Alternatives*, 6(1), 86.
- [74] Zhao, Q., Bai, J., Huang, L., Gu, B., Lu, Q., & Gao, Z. (2016). A review of methodologies and success indicators for coastal wetland restoration. *Journal 2*, 60, 442-452.

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