

## CHAPTER EIGHT

### CONCLUSION

This chapter provides the summary of findings and implications of study based on results analysed in Chapters 4, 5 and 6. Recommendations for further research will also be made at the end of this chapter.

#### 8.1 Summary of Findings

The supply of water in Selangor Darul Ehsan has always been able to meet the demand for water except during the water crisis in 1998. It would appear that the water crisis experienced in 1998 is not caused solely by the shortage of rain but also by other management problems. The non revenue water in Selangor is high, reducing the amount of water available for sale. Water tariff has not been reviewed to substantiate the high cost in maintaining the distribution system. The lack of revenue inhibits the maintenance and expansion programmes.

#### 8.2 Recommendations

##### 8.2.1 Use of alternative water sources:

###### a) Groundwater

Groundwater is basically water that occurs beneath the surface of the earth. Groundwater provides readily fresh water. Malaysia is believed to be endowed with 62,719 billion square metres of groundwater resources (The Star - 5 May 1998). However the utilisation of groundwater in Malaysia is very limited (Mohd. Ali Hasan, 1996 p.146). JICA (1982) noted that groundwater amounted to only 2% of the total water used in Malaysia.

The recognition of groundwater as an alternative of water source was given a

facelift during the recent water crisis. It helped to ease acute shortage of water during the recent water crisis. Areas with underground water potential were located. Some of these areas are located at Wangsa Maju and Olak Lempit in Kuala Langat. This underground water would help to reduce the load of the Sg. Semenyih treatment plant (The Star - 25 Aug 1988, p.6). Underground water is found to be suitable for industrial purposes such as for cleaning toilet and air -conditioning use (The Star - 3 Sept 1998, p.8). During the water crisis, factories were allowed to use groundwater for free (The Star - 3 Sept 1998).

The use of groundwater as an alternative should be encouraged. The use of groundwater should be used even when there is normal water supply. This is to relieve the strain on JBA to keep increasing water production to meet new demand.

It would be appropriate to suggest that the rural areas be encouraged to use groundwater since the cost of capital in providing water to these areas is high. If they use groundwater which need only handpumps and wells with reticulation systems , may reduce the cost of supply. Therefore, the lower the cost of supply , the higher is the probability of cost recovery.

Since groundwater is yet to be extensively developed in Selangor Darul Ehsan, overdevelopment is unlikely to be a threat in the short term, however, it is highly advisable for Selangor Darul Ehsan to implement groundwater protection and data collection and monitoring programmes so that when there is a need to develop fully groundwater resources, such groundwater would be readily available at hand. Therefore, the cost of expensive and time consuming and technically demanding remediation works could be avoided.

The sustainable development and the use of groundwater resources must take into account both the quality and quantity and the interconnection between groundwater and surface water. Appropriate charges should be levied to prevent indiscriminate exploitation of this resource. Indiscriminate exploitation of groundwater would bring about adverse effects such as water

shortages due to contamination ,reduced base flows in rivers, declining water level in lakes, loss of wetlands and a reduction in soil moisture; structural damage and coastal flooding occurs where land subsidence is severe, building and infrastructure can be damaged, and low lying areas may experience increased flooding; damaged ecosystems because of the interplay between groundwater and surface water can be devastated by groundwater problems where nutrient enriched groundwater discharging into lakes and reservoirs reduce algae blooms and other symptoms of eutrophication ; and the depletion of a major aquifer can also lead to the permanent loss of agricultural and industry productivity. Hence, in the long run the risks are almost never worth the short term benefits of mistreating groundwater (UNESCO 1992).

#### **b) Recycled Water**

Water is a scarce resource. Since substantial amounts of water are made unfit for use by the addition of relatively small amounts of pollutants, reuse of wastewater is another method by which existing water supplies can be augmented. Used water for certain processes can be rechannelled to other process especially in factories (The Star - 1 September 1998). This does not only help to conserve water but also reduce the operation cost of factory as the amount of water used is reduced substantially.

#### **c) Rain Water**

It is time that rainwater be captured and used for washing or flushing the toilet to reduce the demand on treated water. Toilet flushing uses up to 41 per cent of daily water use in residential buildings. An average persons uses the toilet seven times a day , flushing away 10 to 12 litres each time. This adds up to a total of 70 litres per person per day. An ordinary terrace house roof can drain 1,800 litres of rainwater in just half an hour of downpour (New Straits Times, 19 October, 1998). The houses need only to be fitted with gutters. This method should also be encouraged in factories as an alternative to treated water. The

gutters are joined and channelled into a special storage with water pump. This method has been proved feasible in Kalimantan Barat, Indonesia where there is no water supplies. The outlets rely only on rainwater.

### **8.2.2 Institutional Reforms**

The JBAS should be proactive in carrying out some institutional reforms if it is serious in its pursuit to improve its water management resources. In order to achieve self financing, there should be institutional reforms where JBAS should be organised as Water Board and Water Authority and not as government department. It should be decentralised and be given financial autonomy. Penang and Sarawak Water Boards have proved this to be vital and have been performing extremely well by recording high profits. Experience in other countries indicates that making water supply agencies more commercially -oriented improves efficiency of water services. In China, reforms that bestowed a greater degree of financial autonomy on provincial water management agencies resulted in water being priced closer to its actual cost, increased conservation, and made the service more reliable (Asian Development Bank, p.247).

New internal organisation such as Personnel Services, Legal and Property Services, Public Relations and General Administration should be considered. The setting up of Legal and Property Services is important in view of the high amount of uncollected bills which is the main source of funds.

The collection rate should be improved to provide funds for management of water resources. The staff efficiency should be increased. Difficulties in levying charges and collecting payments are related to weak institutional systems and failure to meet users' perceived needs. For this reason, the role of Public relations should be considered seriously.

Public relations has a vital role to play in promoting water services, both at the individual water authority level, and also at the national and international

stage. Good public relation may help to contain public discontent and build a sustained commitment to environmental stewardship which comes from a well informed public, thus can enhance the value of the service they are providing for.

### **8.2.3 Financing Infrastructure Supply**

Given the centrality of water supply for economic and social well being , it is not surprising that its is given priority in the Seventh Malaysia plan and the NEAC (National Economic Action Council) Plan. But its financing provides a challenge and a major stumbling block in the improvement of water supply services.

Financing raises the challenge of protecting the public interest: where the development is financed directly by public funds, it is necessary to avoid government failure which is linked to corruption, monopoly and rent capture. Government can privatise but ensure that there is competition. Monopoly should be avoided and to ensure that the risk is shared between the promoters and the State.

### **8.2.4 Pricing and Management**

It was noted in an earlier chapter that efficient management of scarce resources requires that users be charged prices which reflect the costs at the margin of supplying the good or services; it is also the essence of the "polluter pays" principle.

The water rates should also be revised upwards since the operating costs and maintenance costs went up. Raising the tariff may be politically unpopular but underpricing has serious adverse consequences. Underpricing created a vicious circle: low tariffs reduced revenues, which forced water supply agencies to skimp on maintenance. The reduced expenditure on maintenance

caused leakages and meter underregistration to worsen, which reduced the revenue even more (G.Sivalingam, 1995 p.14). In order to raise the tariff the user or public need to be made aware of the benefits of health awareness through improved water supplies.

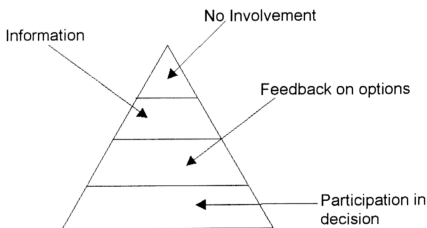
### 8.2.5 Community Involvement

It should be recognised that water can no longer be regarded as the silent and invisible services. The industry needs to be seen and heard.

Local communities can be placed in the front line of efforts to save scarce resources like water and we should not overlook the potential for local initiatives to make a difference. The involvement of community in the planning, building and operation of water supply facilities often yields a strengthening of community organizations and managerial capabilities that can be transferred to other types of activities.

The current "no Involvement" should gradually evolved to "participation in decision" as shown by Figure 8.1.

**Figure 8.1 Community Involvement**



Source: Challenges for the Urban Infrastructure in the EU, 1998

### **8.2.6 Holistic Management**

Concerted efforts are needed by government, water supply authority and consumers to protect the water resources. Integrated management by the various authorities concerning water resource should be encouraged to avoid duplication of duties and delay of any major plans for improvement and protection of water resources and the catchment areas.

### **8.2.7 Conservation**

Very little consideration is now given to methods of meeting present needs with less water. Techniques which use less water in the home and industry could result in substantial savings of water and should be encouraged.

### **8.2.8 Enforcement**

It is heartening to see that the state governments have made a pledge not to carry out any development projects in designated catchment areas (SUN, 30 June 1998, p.2). It is hoped that they would enforce the law against any lawbreakers.

### **8.2.9 Control of NRW**

NRW should be monitored and reduced. The reduction of losses in volume through reduction in NRW can obviously defer capital expenditure on new treatment facilities. But if the cost of reducing the leakage is high there may be greater benefits to improve on other aspects of NRW. The areas to improve are management of the distribution system, reduce illegal usage, improve billing and collection systems and improve meter maintenance.

Singapore, which has to rely on Malaysia for water, does not experience any water supply shortages when several of the states in Malaysia were hit by water shortages. Since it is in the same geographical location and has limited catchment area, it is commendable to look into the management of water in the Republic. The NRW rate is low (15%). This could be due to the efficient management where repair of leakages is given top priority.

#### **8.2.10 Control of Arrears**

The fundamental requirement for addressing this issue is accurate data on consumers. Are the bills being sent to the right destination with the correct billing? Are the meters functioning well? Is the meter reader doing his job? Are the bills being issued regularly?

Computerised cross checking of billing and collection information is vital in accurate and focussed control of arrears. Customer classification needs regular updating to identify changes from domestic to commercial use.

If the arrears and NRW can be reduced, then sustainability of the water authority could be achieved without increasing the tariff substantially as a means to recover the costs. This would be a win-win situation to all involved in the water industry.

Water resources management is shifting. The development of new supplies should not be the major function of management. Wastewater treatment should become an important aspect of management along with wise allocation of existing water supplies among competing uses.

Unilateral efforts by individual states to solve water problems will only yield limited success. Water at the surface is related to underground water and water in one basin is related to the water in another basin through the action of the hydrologic cycle. Research work by individual states may also lack the



scientific and technical know-how to solve the very complex water problems of the present and the future. Pooling of interest and knowledge offers a more likelihood of success. Water knows no boundaries and can only be fully studied on an integrated basis.

Water demand does not have to be inflexible. Efforts to modify demands to make them equal supply are viable alternatives to efforts to increase supply. The encouragement of water conservation technology should be goal of any water policy that is developed. The possibility of meeting present and future water needs by adjusting our levels of water may be among the most realistic of our solutions to water resources problems.

Expansion of water supplies is not the answer as the current supply is always higher than the demand. It involves substantial cost and becomes a long term liability to the authority that manages it. The non revenue water should be resolved as soon as possible. Similarly the control on arrears should be closely monitored. Procrastination on these matters should not be allowed. There is ample water for all of us; the part that is missing is ample competence to manage the resource provided. Attitude must change and a new philosophy of recycling, conservation and minimisation must be embraced.

Due to the unique qualities of the water industry, there is an overriding concern to provide what is considered an essential social utility as well as to protect lower income consumers. However, an appropriate water tariff is important to signal to the consumers of its scarcity and thus moving towards a trend of conservation and ensuring water is not wasted.

### **8.3 Suggestion for Additional Research**

As stated earlier, the project is not free of flaws and due to the complexity of the issues surrounding the water industry, it is hope that in future more research related to this industry would be carried out.

Survey on willingness to pay by consumers could be conducted. The proper LRMC could be obtained with complete costs consideration to gather a clearer picture of the cost and water tariff imposed.

#### **8.4 Implications of this Study**

The author hopes that the research would be useful to those who are interested to know about the water supplies condition in the Selangor Darul Ehsan.

It is the desire of the author that the public would be more aware that water is indeed a scarce resource and should not be wasted. Measures towards the conservation and minimisation on this resource would be embraced.

The author hopes that the data and information contained in this project could be utilised for other research where it could serve as a quick reference. Similar studies on other states in the country could be carried out to derive a more accurate demand and supply of water in the country so that a high competence in management of water industry could be achieved.