



WATER, ENVIRONMENT AND MANAGEMENT

Water supply in isolated areas of Malaysia

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ABSTRACT

It is the aim of the Government to provide standard water supply schemes for every community in the nation. However, for certain cases, the scheme could not be provided due to some technical problems such as too far from the main pipe line that make low water head, or financial problems that the users or communities would not be able to have such kinds of costly piping system. In this paper, five typical case examples of different locations in West Malaysia are presented. The appropriate technology that the community adopted in order to have adequate water supply is discussed. The water quality and appropriate treatment process are also given.

INTRODUCTION

In line with the policy of providing safe and adequate water supply for domestic and industrial uses, various programmes were implemented in Malaysia. Under the Fifth Malaysia Plan, 2,467 million ringgit (US\$1.00 = 2.45 ringgit) was expended for water supply development which included source development works, upgrading of existing treatment plants, rehabilitation of distribution systems, and reticulation systems development, while an allocation for such development during the Sixth Malaysia Plan period (6MP) will be 2,855 million ringgit [Malaysia, 1991].

At present, there are 54 dams in operation with a total live capacity of 12 bcm. Of these, 11 were developed for hydropower while the remaining dams were for water supply, irrigation and flood mitigation. There are more than 400 water treatment plants with capacity more than 6,000 million litres per day and coverage of about 14 million people which is almost 80 percent of the Malaysia population. Table 1 summarizes the quantity of treated water (in million litres per day) which was supplied to the people as consumers (in million of population) during the 5MP and 6MP [Low, 1990].

It is expected at the end of the 6MP, about 20 percent of the population in rural areas will not have piped water supply. With regard to state distribution, it varies between states, where Johor will be 22 percent, while Selangor will be only six percent, as shown in Table 2. This is due to the scattered nature and remoteness of the villages or areas from water sources.

Since development programmes are still in progress whether in urban or rural areas, it is believed that the development works such as logging and forest cutting down for land use alteration may affect water resources. Therefore, a study was carried out in typical rural villages, namely Kampung Sungai Pencala, Kampung Sungai Rumput, Kampung Tanjung Jawa of Selangor State; Kampung Bukit Cantik and Kampung Rahmat of Johor State.

STUDY AREA

A brief summary of the villages studied, is tabulated in Table 3, while Table 4 shows typical qualities of water samples, taken from various sources such as wells and streams which are used for domestic purposes by the villagers. The analysis was done by following the standard method [American Public Health Association, American Water Work Association & Water Pollution Control Federation, 1975].

DISCUSSION

Groundwater and stream water are the two common sources of water, besides rainwater. However, the wells used are not properly constructed. The concrete perimeters of the wells are precast. When they are sunk into the wells, no lining outside these perimeter are provided and the ground surface around the wells is bare. It makes the water easily contaminated. The ground surface should be concreted, 1.0 metre around the wells [International Reference Centre for Community Water Supply and Sanitation, 1981]

Table 1. Water Treatment Supply and Coverage in the States of Malaysia under the Fifth and Sixth Malaysia Plan

State	1985		1990		1995	
	Supp. (MLD)	Cove. (Mil)	Supp. (MLD)	Cove. (Mil)	Supp. (MLD)	Cove. (Mil)
Johor	431	1.37	529	1.75	1063	2.13
Kedah	237	0.77	374	0.90	752	1.07
Kelantan	104	0.42	116	0.65	233	0.91
Melaka	114	0.42	137	0.58	178	0.66
N.Sembilan	182	0.50	230	0.67	405	0.81
Pahang	201	0.73	369	0.83	542	1.01
Perak	468	1.55	564	1.94	730	2.34
Perlis	24	0.09	43	0.15	69	0.18
P.Pinang	343	0.98	452	1.15	577	1.33
Sabah	188	0.67	363	0.97	488	1.58
Sarawak	183	0.69	282	1.05	433	1.56
Selangor	1000	2.61	1406	3.06	2475	3.65
Terengganu	71	0.39	114	0.57	230	0.71
Malaysia	3546	11.23	4979	13.28	8175	17.93

Source: Modified [Low, 1990] and the Sixth Malaysia Plan

Table 2. Rural Population without Standard Water Supply in the States of Malaysia during the Fifth and Sixth Malaysia Plan

State	1985		1990		1995	
	Pop. (Mil.)	%	Pop. (Mil.)	%	Pop. (Mil.)	%
Johor	0.442	39	0.329	33	0.241	22
Kedah	0.429	42	0.295	31	0.242	23
Kelantan	0.506	70	0.398	60	0.356	49
Melaka	0.068	18	0.009	02	0.010	02
N.Sembilan	0.099	25	0.045	11	0.018	04
Pahang	0.262	35	0.219	30	0.169	21
Perak	0.363	28	0.313	23	0.265	17
Perlis	0.075	50	0.041	25	0.031	17
P.Pinang	0.073	15	0.018	04	0.010	02
Sabah	0.623	62	0.535	48	0.262	20
Sarawak	0.841	67	0.636	53	0.353	26
Selangor	0.268	27	0.116	15	0.051	06
Terengganu	0.203	60	0.122	46	0.103	35
Malaysia	4.277	43	3.186	33	1.888	18

Source: Modified [Low, 1990] and the Sixth Malaysia Plan

Table 3. Some Informations of the Villages Studied

Facts	Sg.Pench	Sg.Rumpu	Tg.Jawa	Bt.Canti	Kg.Rahma
Location	K.Lumpur	Petaling	S.Bernam	Masai	S.Gading
Distance from main road [Km]	3.0	5.0	10.0	15.0	8.0
Distance from nearest town [Km }	20	20	25	30	25
Number of houses	30	200	40	30	85
Villagers	200	1350	200	150	400
Schools	yes	yes	yes	yes	no
Electric power	national supply	individu	national supply	individu	individu
Accessible road	public	private	public	private	private
Environment	villages	estates	estates	estates	estates
Water resources	well stream	well stream	well rain	well	well rain stream
Water intake	pump gravity	pump gravity	manually	diesel pump	manually
Water Storage (tanks)	elevated ground	elevated ground	elevated ground	elevated ground	ground
Tank type	concrete fibre- glass	concrete fibre- glass	concrete fibre- glass	concrete fibre- glass	concrete
Distribution pipes (20 - 30 mm diameter)	pvc	pvc	pvc	pvc	pvc
Water treatment	settling boiling	settling boiling	settling boiling	settling boiling	settling boiling

Table 4. Typical Water Quality of Samples taken from Wells and Streams

Parameters	Sg.Pench	Sg.Rumpu	Tg.Jawa	Bt.Canti	Kg.Rahma
pH	6.0-7.5	5.2-6.6	6 - 7	8 - 8.5	6.5 - 8
Turbidity (NTU)	5 - 30	2 - 10	10 - 20	10 - 22	5 - 9
Dissolve Oxygen(mg/L)	5 - 7.7	1.5-4.5	4.5	3.7-4.5	6.5 -7.5
Hardness(mg/L CaCO ₃)	-	6-10	900	100	2 - 60
Mg (mg/L)	-	5 - 9	-	32-42	3.5 -87
Ca (mg/L)	-	0.4-6.5	-	28-61	2.4 -58
Fe (mg/L)	-	0 - 0.4	2.8	-	0.1 -1.4
Odour	no	no	smelly	no	no
Colour	no	no	slightly brown	no	no
Taste	no	no	slightly sour	no	no

The piping system is also not orderly. Most of the pipes are laid on the ground. It is suggested that these pipes should be buried underground to a depth of at least 150 mm, and bedded in sand or soil. It might be better, if the community have a zonal distribution system with standard elevated tanks, but they may not be able to construct due to its cost and technical works [Fauzi and Fadil, 1986]. Concrete tank on the ground is the most common because the material for constructing such tank is easily available locally. Furthermore, some villagers use recycled steel drums for their water storage.

By the experiences of the villagers, they do not face much problems using the water, except Tanjung Jawa where its well water is slightly smell and sour, especially during dry session. Generally the quality is acceptable according to the WHO Criteria. For the cases of Kampung Rahmat and Tanjung Jawa, they use rain water for oral intake, drinking and food processing. Boiling is the most practical for disinfection.

A simple aeration process such as tray tower or fountain, might be suitable to be adopted in order to add oxygen, remove undesirable odour or convert undesirable substances (such as iron) to a more manageable form, so that improve the water quality [Peavy, Rowe and Tchobanoglous, 1986]. It is a double function for water tanks, as a storage and settling tanks which reduce turbidity [Fadil and Fauzi, 1985].

Hopely it will provide guidelines for improving water supply in remote areas in Malaysia, even if there will be no piped water supply for ever.

ACKNOWLEDGEMENTS

I would like to acknowledge my students, Ayob Ab Karim, Yusof Ahmad, Jamil Shaari, Johan Sohaili, Rajali Ahmad, Bak Peng Kuan, Othman Idris, Mohd Fauzi Sulaiman, Rohimi bin Mat, Ramli bin Ab Ghani, Nor Azam Buyanidan Mohd Yusof bin Haji Halos (final year undergraduate civil engineering 1985 - 1990) for conducting the research works upon which this paper is based. Our thanks are also due to the villagers for their help and cooperation and Universiti Teknologi Malaysia for supporting me throughout the entire project and in making it possible to present this paper.

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