WATER SUPPLY IN JAPAN

JAPAN WATER SUPPLY DATA REPORT 2008
APRIL 2006－MARCH 2007

Executive Director's Message

This Report is published every year by Japan Water Works Association, and presented data from Water Utilities in Japan. The data is mostly from FY 1970 to FY 2006.

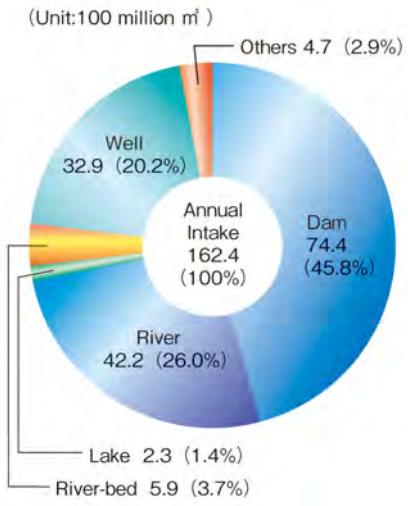
I am pleased to present my third report as the director general of JWWA and greatly appreciate the supreme endeavor that the publication of this Report has been making a great contribution toward international exchange of information.

御園喜彦

Yoshihiko MISONO
Executive Director

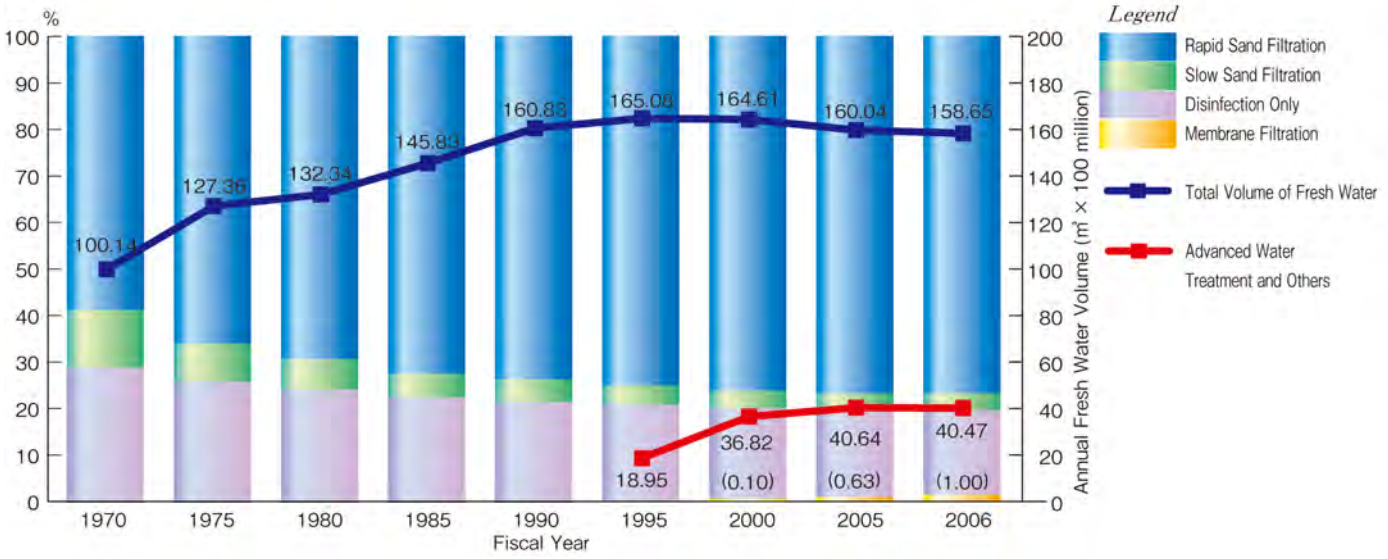
1.Water Resources & Treated Water Volume

The raw water of water supply in Japan is occupied about 72.0 % from rivers and dams and the total annual volume is about 16.24 billion m^3.



■ Water Sources of Public Water Supplies and Bulk Water Supplies (as of March, 2007)

Presently, chlorination is made obligatory for disinfection of water under all circumstances for introduction of the above treatment methods. Recently the advanced water treatment systems by ozone-GAC treatment including membrane filtration are also introduced for water treatment system in Japan. The advanced water treatment system can completely eliminate musty odors and THMs substances which can not be removed by conventional treatment system.

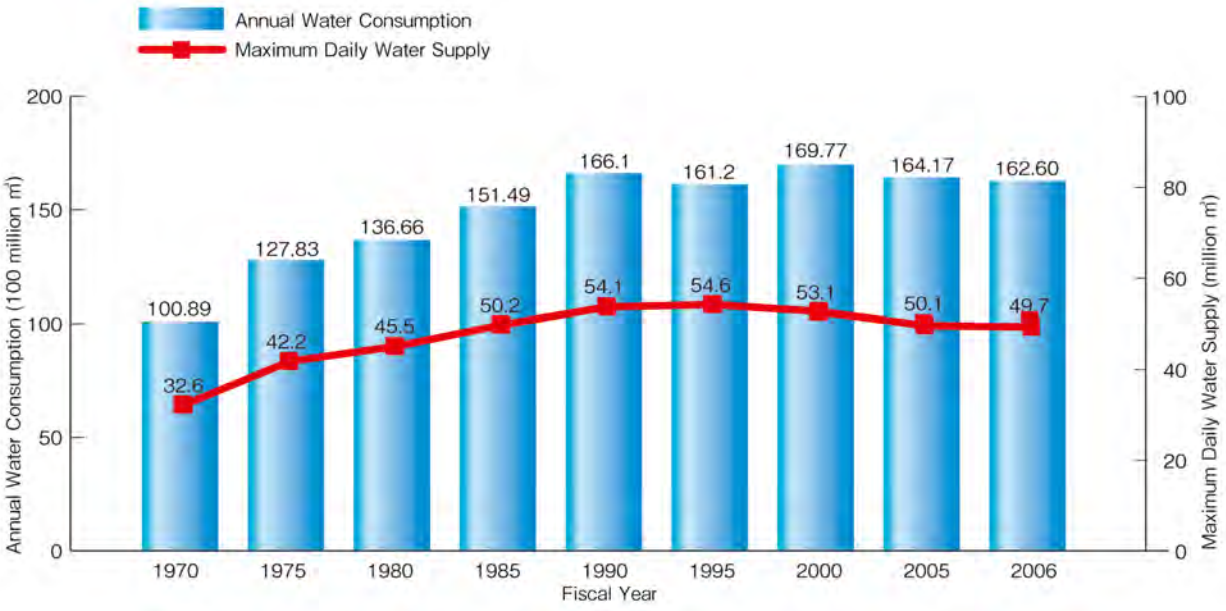


■ Annual Fresh Water Volume by Water Treatment Systems (Large Public Water Supply + Bulk Water Supply)

2.Water Supply Status of Japan

At the end of the fiscal 2006 (March 31, 2007: hereinafter just "in FY 2006"), there are 17,041waterworks in Japan. According to Waterworks law, "Waterworks" is defined as "water supply systems which are designed to supply more than 100 people with potable water through equipments such as pipes." Public waterworks which are designed to supply water less than 50,000 people occupy 97.5% of total waterworks in Japan, and out of them, 93.7 % are serving a population of less than 5,000. The majority of water supplies in Japan today are "small-scaled".

Water supply utilities had been increasing their facility capacity to cope with water demand that keeps increasing, but in these years, the consumption of water is decreasing due to saving and efficient using of water.



■ Trend of Annual Water Consumption and Maximum Daily Water Supply

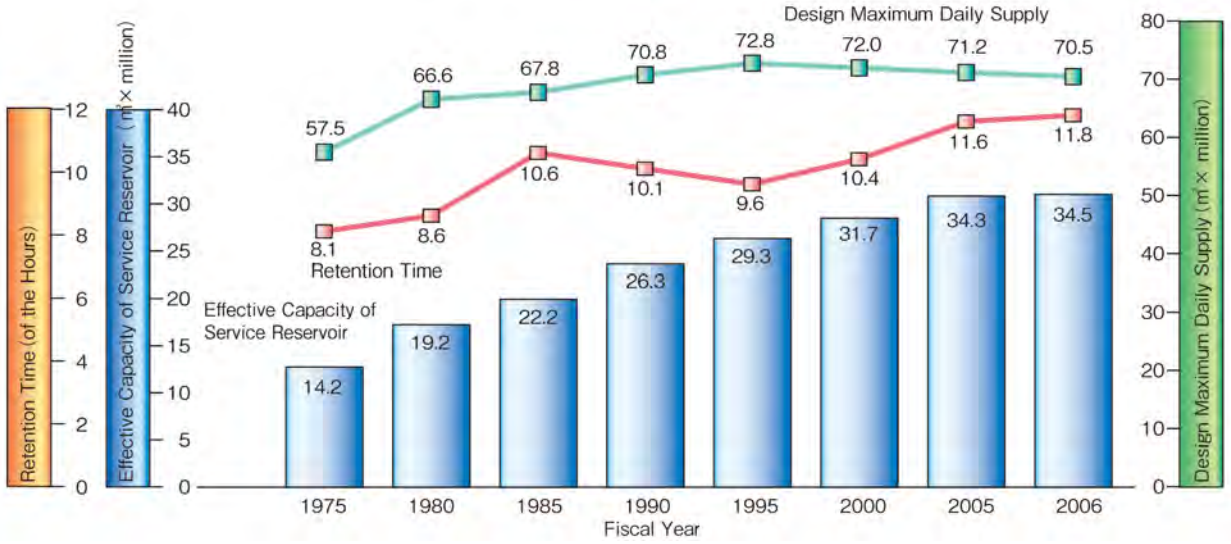
Served Population (1,000 person)		Number of Supplies	Population Served (1,000 person)	Volume of WaterSupplied in annual (100 million m³/year)	Daily Demand per Capita (ℓ)		
					Maximum	Average	Capacity of Facility
Public Water Supply	More than 1,000	14	3,744	48.3	403	353	575
	Less than 500 ~1,000	10	702	9.0	399	352	565
	〃 250 ~ 500	57	1,977	25.3	406	351	544
	〃 100 ~ 250	134	1,999	25.8	407	353	542
	〃 50 ~ 100	206	1,420	18.8	427	362	588
	〃 30 ~ 50	215	821	11.1	451	371	623
	〃 20 ~ 30	166	404	5.3	446	360	612
	〃 10 ~ 20	328	474	6.7	493	388	657
	〃 5 ~ 10	333	243	3.5	524	393	710
	〃 5	100	34	0.7	813	560	1,187
	Under Construction	9	0.6	—	496	398	—
	Total	1,572	11,818	154.0	419	358	578
Small Public Water Supply		7,630	562	7.8	491	372	—
Private Water Supply		7,737	56	0.4	—	—	—
Total		17,041	12,436	162.6	—	—	—

● Number of Waterworks in FY2006

3.Qualitative Upgrading of Water Supply Facilities

The activities of industry and our daily routine are carrying on the premise that stable water will always supply to us. Therefore, the water utilities are forwarded positive actions, such as plural distribution systems, reconstruction of aged facilities and anti-earthquake.

The total effective capacity of service reservoirs owned by water supplies is increasing year by year, from 14.2 million in FY 1975 to 34.5 million cubic meters in FY 2006. Also, retention time of service reservoirs [(effective capacity of service reservoir / design maximum daily supply) × 24 hours] increased from 8.1 hours in FY 1975 to 11.8 hours in FY 2006.



■ Effective Capacity, Retention Time and Maximum Daily Supply

The total length of water mains in overall Japan stood at 180,768 km in FY 1970, which grew to 603,310 km in FY 2006, namely, 3.34 times. As such, great efforts were made to do such expansion works. As the projects of replacing of aging water mains progress, but the length of the cast iron and asbestos cement water mains are decreasing.

Type \ Fiscal Year	1970	1975	1980	1985	1990	1995	2000	2005	2006
Ductile Iron Pipe (Seismic Type ※)	–	–	76.85	148.56	179.13	240.45 (6.65)	289.10 (19.67)	327.38 (29.77)	328.65 (32.83)
Steel Pipe	–	–	13.78	16.08	16.28	18.25	19.34	19.26	19.20
Hard-type PVC Pipe	–	–	83.65	118.81	132.15	155.42	174.35	189.23	191.57
Cast-iron Pipe	–	–	64.50	51.30	46.99	33.25	29.79	25.90	29.95
Asbestos Cement Pipe	–	–	86.87	77.26	67.73	47.51	26.79	14.72	12.87
Others	–	–	14.59	12.53	13.44	11.45	14.76	20.19	21.07
Total	180.78	262.18	340.24	424.54	455.72	506.33	554.13	596.68	603.31

● Length of Pipelines by its Type (unit : 1,000 km) (Length of Pipelines are included for Bulk Water Supplies.)
※No data for the FY pre-1995.

4.Supply of Drinking Water with Clean and Safe

Ministry of Health, Labour and Welfare in Japan is established the drinking water quality standards of 51 items to keep up the supply of drinking water with clean and safe. To respond to the standards, all the water utilities have fully introduced the works of improvement of water treatment facilities as well as introduction of necessity operation management. On the other hand, the water quality laboratory of water utilities is periodically conducting in order to measure for water quality whether tap water meets the standards perfectly by these measures or not.

No	Item	Standard Value
1	Common Bacteria	100 per 1 ml
2	E. coli	Not to be detected
3	Cadmium	0.01 mg/L
4	Mercury	0.0005 mg/L
5	Selenium	0.01 mg/L
6	Lead	0.01 mg/L
7	Arsenic	0.01 mg/L
8	Chromium (VI)	0.05 mg/L
9	Cyanide ion and Cyanogens chloride	0.01mg/L as Cyanide
10	Nitrate and Nitrite	10mg/L as Nitrogen
11	Fluoide	0.8 mg/L
12	Boron	1.0 mg/L
13	Carbon Tetrachloride	0.002 mg/L
14	1,4-dioxane	0.05 mg/L
15	1,1-Dichloroethylene	0.02 mg/L
16	cis-1,2-Dichloroethylene	0.04 mg/L
17	Dichloromethane	0.02 mg/L
18	Tetrachloroethylene	0.01 mg/L
19	Trichloroethylene	0.03 mg/L
20	Benzene	0.01 mg/L
21	chloric acid	0.6mg/L
22	Chloroacetic acid	0.02mg/L
23	Chloroform	0.06mg/L
24	Dichloroacetic acid	0.04mg/L
25	Dibromochloromethane	0.1mg/L
26	Bromate	0.01mg/L

No	Item	Standard Value
27	Total Trihalomethanes (Total of Chloroform, Dibromochloromethane, Bromodichloromethane and Bromoform)	0.1 mg/L
28	Trichloroacetic Acid	0.02 mg/L
29	Bromodichloromethane	0.03 mg/L
30	Bromoform	0.09 mg/L
31	Formaldehyde	0.08 mg/L
32	Zinc	1.0 mg/L
33	Aluminium	0.2 mg/L
34	Iron	0.3 mg/L
35	Copper	1.0 mg/L
36	Sodium	200 mg/L
37	Manganese	0.05 mg/L
38	Chloride	200 mg/L
39	Calcium, Magnesium (Hardness)	300 mg/L
40	Total residue	500 mg/L
41	Anionic surface active agent	0.2 mg/L
42	Geosmin	0.00001 mg/L
43	2-Methylisobolneol	0.00001 mg/L
44	Nonionic surface active agent	0.02 mg/L
45	Phenols	0.005mg/L in terms of Phenol
46	Organic substances (Total Organic Carbon)	5 mg/L
47	pH Value	5.8-8.6
48	Taste	Not abnormal
49	Odor	Not abnormal
50	Color	5 degree
51	Turbidity	2 degree

■ Water Quality Standards of Drinking Water

In case of exceeding concentration of the standards, it is necessary to clarify the causative factors and take measures against prevention. In regard to prevention measures, the modification of operation management of the treatment plant is in the case a good solution or construction and improvement of facilities for water purification plant are also another ways. Water utilities are continuously required constant efforts to clear 100 per cent for drinking water standards to supply clear and safe tap water.

○ Water Quality Management

To secure for the safety of tap water over future, it is very important to make managerial decisions for its water quality. Therefore, according to water examination of items of the water quality standard, the guideline was established 27 items of the target of water quality management as the items to have to take into consideration for managerial decisions and water utilities are carrying a proper monitoring as well as the items of water quality standards, if it is necessary. In regard to water examination of items of the target of water quality management, the pesticides that citizens are gazing with deep interest and anxiety are also including as the items of monitoring and the pesticides consisting of 102 items that may be detected from raw water of water supply. In addition, in pesticides analysis, the water quality standards are also requiring to monitor appropriately in line with usage of pesticides of region.

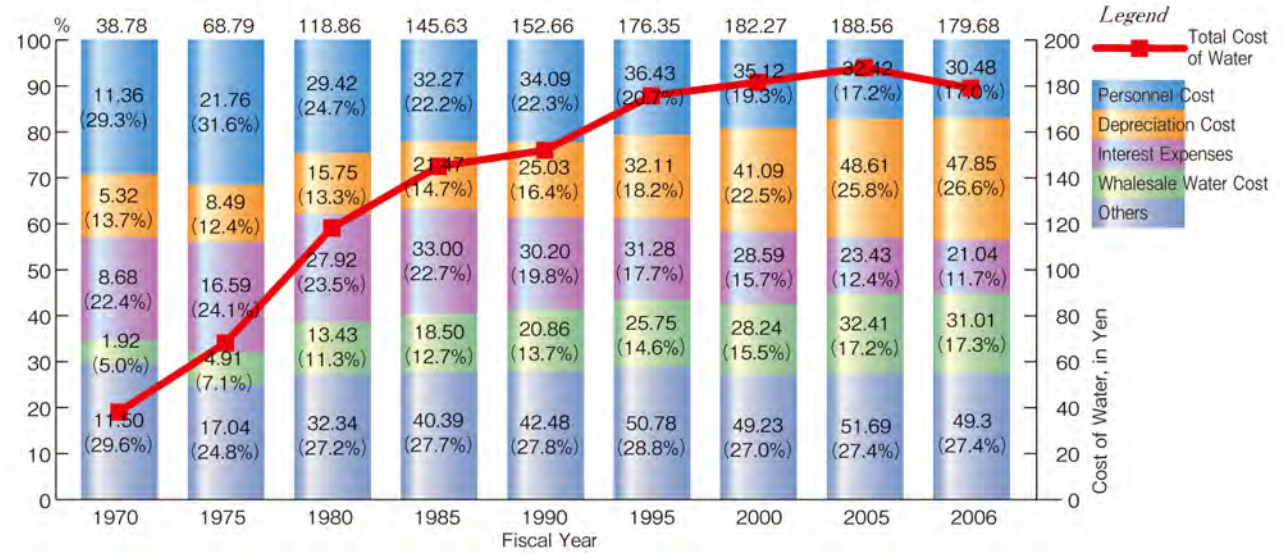
○ Revision of Drinking Water Quality Standards and Improvement of the Facilities of Water Supply

Drinking water quality standards of water supply is always renewing by introducing of the latest scientific approach, such as toxicity information, etc. Water works facilities are strongly requested to match the new drinking water quality standards to supply good quality and safe tap water even in future ages.

5.Cost of Water : Capital Cost Plus Operation Cost

Among cost of water, depreciation costs and interest expenses (capital cost) hold about 38 %. Especially, in case of bulk water supplies, the cost is brought up to some 58 %.

Production cost of water per cubic meter is increasing year by year for the ratio of cost, such as depreciation and wholesale water, in spite of its decreasing of staff cost and interest paid. This real reason is to be rehabilitated for the old water supply facilities as well as to build the water reservoir as water resources at a great distance, resulting in secure of safe water quality and stable water quantity.



■ Trend and Composition of Cost of water per cubic meter

Construction and improvement cost of water supply reached 996.2 billion Yen for public water supplies. This figure is 4.3 times larger than that of FY 1970, namely 227.7 billion Yen. Especially, the cost for improvement of facilities has risen over 14 times, from 40.6 billion Yen in FY 1970, to 580.9 billion Yen in FY 2006.

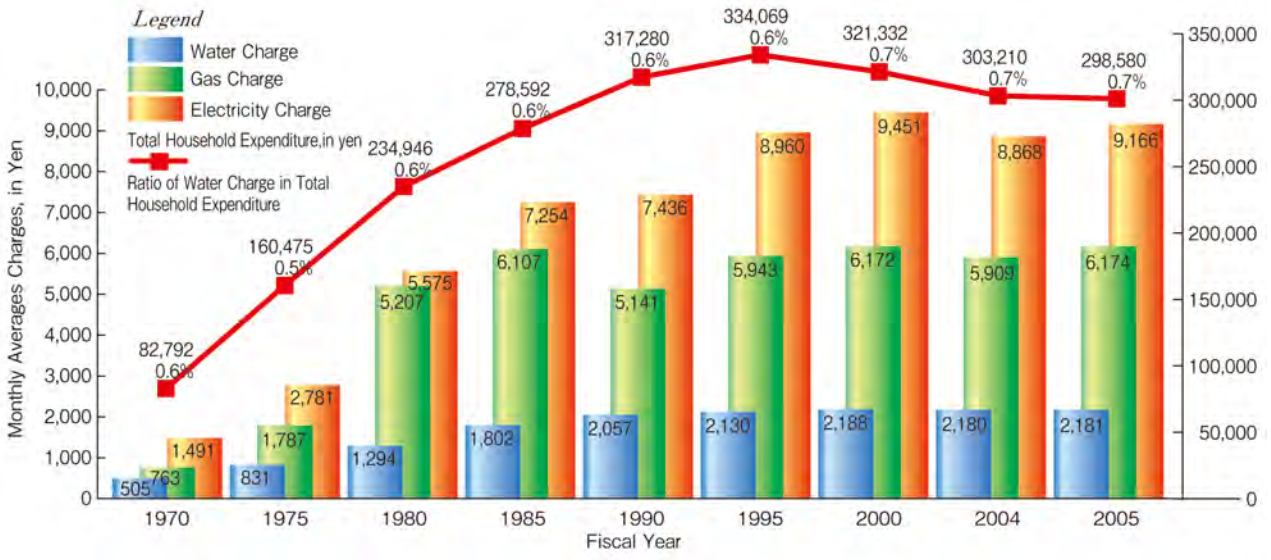
Item \ Fiscal Year	1970	1975	1980	1985	1990	1995	2000	2005	2006
New & Expansion Works	1,871	6,388	6,847	6,096	5,886	7,863	6,576	5,176	4,153
Improvement Works	406	1,154	2,216	3,209	5,810	8,644	7,635	6,263	5,809
Redemption Cost on Revenue Bond	565	876	1,237	2,812	2,827	4,195	5,021	7,710	7,534
Redemption Cost on Long-term Loan	15	52	71	83	90	97	106	63	68
Others	66	166	304	232	514	590	517	696	766
Total	2,923	8,636	10,675	12,432	15,127	21,389	19,855	19,908	18,330

● Trend of Capital Expenditure (unit : 100million yen)

6.Water Charges

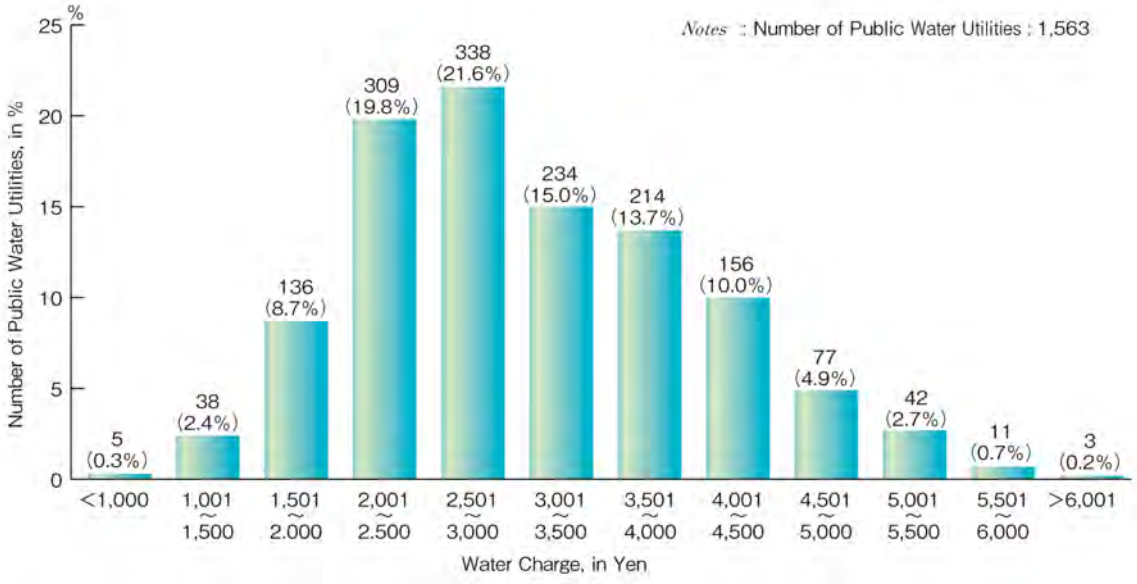
Most of water supply utilities in Japan are established by prefecture or municipality, which are operated on a self-paying basis. The water charge is set by each water supply utility. The water charge for an average household expense occupies about 0.7 per cent (2,181／month) of its disposable income.

Monthly average charge of Water supply is increase gradually. But, the water charge ratio to the average household expense of the nation is from 0.5 to 0.7 per cent.



■ Trend if Total Household Expenditure and Water Charge in Monthly Average for the cities with Population over 50,000

Basically, water supplies are deemed to be self-supporting, so they should meet the costs of construction and operation of their facilities by the water charge collected from the customers. The charge is different by the region, because there is some differences on condition and distance of water resource, construction year, its scale, staff cost, maintenance cost, etc.



■ Number of Water Supplies and Water Charge for Domestic Usage of 20 m^3／month for a Family Living in a House Consuming (as of April 1, 2007)

Future Water supply service

Water works is an indispensable lifeline for the people. But there are still some issues such as anti-seismic measures, replacement of old facilities, etc. Looking to future water supply, it is important to improve these issues steadily by enhancing of information disclosure aimed at ensuring user understanding and participation.

■ *"Water Vision" and "Regional Water Vision"*

Ministry of Health, Labour and Welfare has released "Water Vision" on June 2004, which mentioned Desirable Future Directions, Long-term Policy and related measures of water works. On the other hands, water supply utilities are going to formulate "Regional Water Vision", which sets their own target and measures by concerning about current status and future prospects.

It is necessary for achievement to the goals to acquire participation from all persons concerned which include users.

Water Vision (June 2004)
Desirable Goals of Water Supply at middle of this century

Regional Water Vision
Desirable Goals of each water supply utility

Figure: Desirable Future Directions of Water Supply, Long-term Policy Goals and Related Policy Measures Shown in "Water Vision"

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