

## Q&A

**51Q1:** I live in a city of India. I am thinking of using rainwater because the water supply is insufficient. I heard that rainwater has been used in Japanese big cities. Please let me know a good example of using rainwater. (Ms. N.S, India)

**A:** Rainwater is an accessible water resource that can be used, and it also has the effect of controlling runoff (inundation and flood prevention) by storing rainwater. It is necessary to further promote the use of rainwater as one of the methods for effective use of water resources. (Quotes from "Let's start using rainwater!" published by Fukuoka Prefecture Government) Mr. Hiroto Oda, who contributed to the water shortage countermeasures at the Fukuoka City Waterworks Bureau, answered on the use of rainwater in Fukuoka City. (Yamamoto)

### 1. Use of Rainwater in Fukuoka City

#### 1) Background

Fukuoka City experienced an unprecedented drought in 1978. As a result of the abnormal drought, the 287-day water supply restriction reminded citizens and governments of the value of water and the harshness of water conditions. Based on the lessons learned from this drought, Fukuoka City established "the Outline of Measures for Economical Water Use in Fukuoka City" in 1979. And for stable water supply, water source development and efficient water operation management have been strengthened. In addition, we have promoted the development of water-saving city (1, effective use of water, 2, water-saving measures). As one of the effective uses of water, we have been promoting and spreading non-portable water supply system<sup>\*1</sup> through water cycle and reuse of treated sewage water (including complementary rainwater utilization) for large buildings, etc. However, considering the unstable rainfall situation and the increasing population, it was necessary to further promote water-saving city development. Therefore, we reviewed the guideline and enforced the "Fukuoka City Water Saving Promotion Ordinance" for the first time in Japan in 2003. We are working on all measures for "effective and rational use of water with the understanding and cooperation of the citizens about "use water wisely" and "water resources are limited"

2) Outline of rainwater use in Fukuoka City The aforementioned "Fukuoka City Water Saving Promotion Ordinance" obliges the installation of "non-portable water supply system" in the target buildings with a total water saving areas<sup>\*2</sup> of 5,000 m<sup>2</sup> or more.

As of the end of 2017, rainwater and groundwater are used as non-portable water supply system in combination with reclaimed wastewater in Fukuoka City. There are 323 individual circulation type facilities and 443 wide area circulation type facilities, and the latter receives part or all of reclaimed wastewater from the "Fukuoka City Reclaimed Water Project".

Facilities that use rainwater in Fukuoka City are schools, corporate / commercial buildings (Canal City

Hakata, etc.), civic centers, hospitals, baseball stadium (Fukuoka PayPay Dome), station buildings, etc. There are 51 public facilities, 113 private facilities and total 164 facilities. The total capacity of water storage tank is 42,071m<sup>3</sup>.

In addition, Fukuoka City has a subsidy system for the installation of rainwater storage tank in each house in order to use rainwater effectively and control outflow.

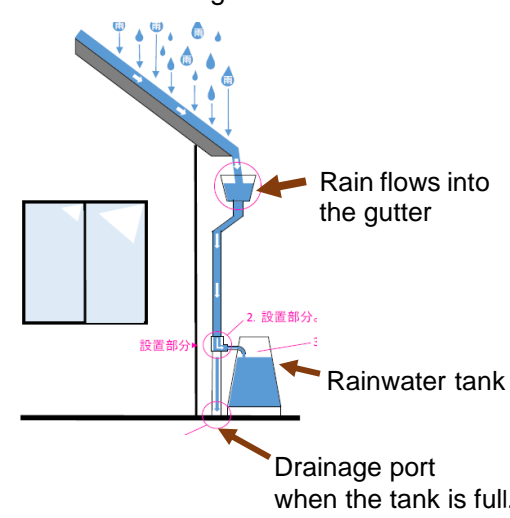
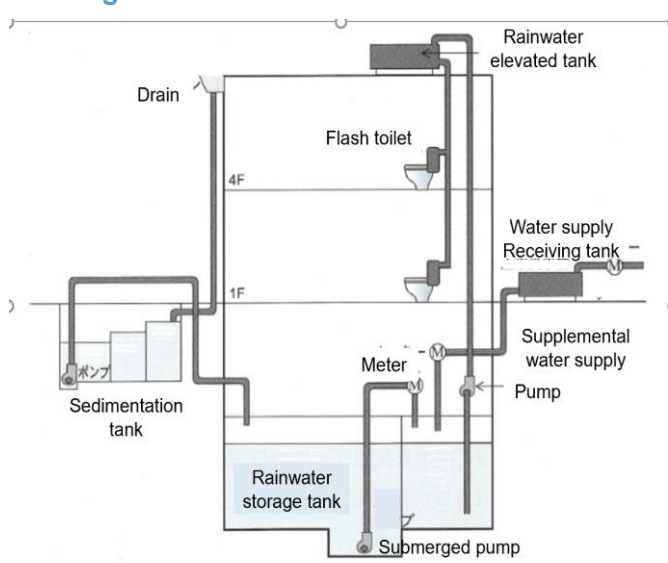
(Answerer: Mr. Hiroto Oda, former staff of Fukuoka City Waterworks Bureau)

**Notes**

- \*1 Non-portable water supply system: A facility that supplies reclaimed wastewater and/or rainwater for flushing toilets other than beverages, watering parks and plants, cleaning buildings, etc., and is supplied with lower water quality than water supply.
- \*2 Water-saving areas: excluding apartment houses, dormitories, warehouses, parking lots, etc.

**2. Examples of rainwater use in Fukuoka City (References provided by Mr. Oda)**

Fukuoka Prefecture Government has published a booklet collecting the cases of rainwater use called "Let's start using rainwater". The followings are extracted from it.

<p><b>○ Image of using rainwater in household.</b></p> <p>Mainly used for watering</p>  <p>Rain flows into the gutter</p> <p>Rainwater tank</p> <p>Drainage port when the tank is full.</p>	<p><b>○ Image of facility using rainwater in the building</b></p>  <p>Drain</p> <p>Rainwater elevated tank</p> <p>Flash toilet</p> <p>4F</p> <p>1F</p> <p>Water supply Receiving tank</p> <p>Supplemental water supply</p> <p>Meter</p> <p>Pump</p> <p>Sedimentation tank</p> <p>Rainwater storage tank</p> <p>Submerged pump</p> <p>* In order to prevent cross-connection with other pipes, pipes for non-portable-water should be taken necessary measures to be distinguished from pipes for other purposes such as water supply pipes.</p>
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### ○ Fukuoka PayPay Dome



A multi-purpose dome that can be used for various events such as concerts and exhibitions in addition to baseball. A single event can have 40,000 to 50,000 people.

Opening: April 1993

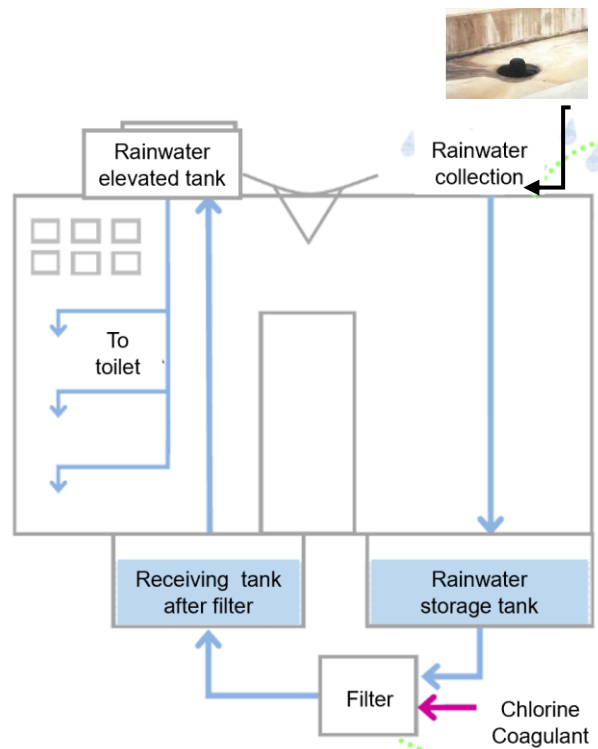
Water collection area (dome roof):  
32,000 m<sup>2</sup>.

Rainwater storage tank  
(underground) :2,900 m<sup>3</sup>

Rainwater usage (flush water for toilet  
and planting): 30,000 m<sup>3</sup> /year.

### ○ Clover Plaza (Kasuga City)

A complex facility in Fukuoka Prefecture that has many functions such as a multipurpose hall, training rooms, and a fitness room. Rainwater that has fallen on the roof is stored in an underground storage tank, and after treatment, it is once pumped up to the rooftop rainwater elevated tank, and from there it is used as flush water for toilets on each floor by gravity.



Opening: November 1996

Water collection area: 6,900m<sup>2</sup>

Storage tank: 400m<sup>3</sup>

Rainwater usage :  
3,000m<sup>3</sup>/year



Filter

### 3. Drinking water use of rainwater in Japan

The use of rainwater is increasing in Japan. But most of them are used for flushing toilets (equivalent to about 25% of household water usage) and watering to garden, for reducing the use of tap water and save money.

However, the number of condominiums installed a purification equipment for drinking water is increasing for preparing water suspension in the disasters such as typhoons and earthquakes which occurred frequently in recent years. Rainwater is used for toilet and watering with a simple treatment in normal times, and in an emergency, it is used for drinking water for residents using purification equipment.

Generally, rainwater has good quality, but at the beginning of the rain fall, it contains a lot of impurities such as dust, dirt, and etc. in the air and on the water collecting surface (roof, rooftop floor). It is better to store rainwater except for the rain at the beginning of rain.

The problem with rainwater is that there is a difference in rainfall depending on the season. In some countries, there are two seasons, the dry season and rainy season in a year. Dry season has no rain, in some case, it does not rain for half of the year. In addition, the amount of rainfall changes from year to year, and the change has become remarkable especially in recent years because of the effects of global warming. Such instability of water intake can be said to be the big weak point as a water source for domestic water. Therefore, in the case of Japan, because there are several other water sources, it can be said that direct use of rainwater is only used as a supplemental water source so far.

(WaQuAC-Net Office, Keiko Yamamoto)