Challenge 4 Challenge of Minimizing and Optimizing Water Usage

Fundamental Approach According to forecasts, the world's population will grow to 9.1 billion by 2050, water demand will increase 55 percent from current levels, and 40 percent of the world's population is therefore expected to suffer water shortages*.

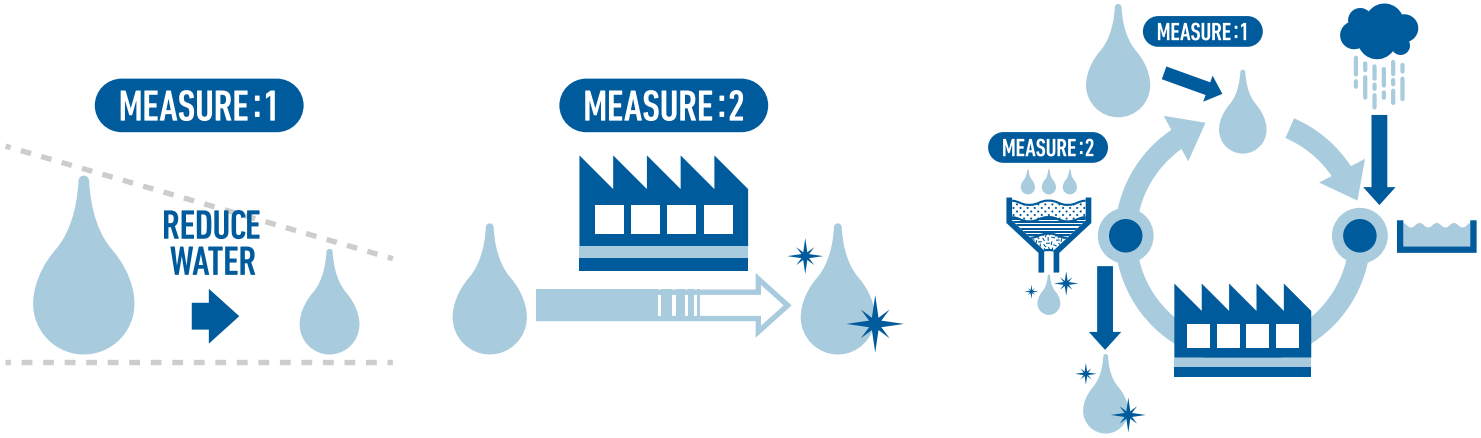
Water problems such as increases in water stress in conjunction with rising populations and stricter regulations in response to deterioration of water quality in rivers and other water sources are important issues from the perspective of risks in corporate activities.

Water is used in painting and other car manufacturing processes. This makes it imperative to reduce the impact on the water environment, to whatever degree possible.

There are significant differences in the characteristics of the water environment depending on the region, but we have two main strategies: thoroughly reduce the amount of water used and comprehensively purify water and return it to the environment. Toyota has implemented various initiatives such as collecting rainwater to reduce industrial water usage, cutting water usage in production processes, recycling wastewater to reduce amounts withdrawn from water sources, and returning high-quality water to local environments.

In the future, we will undertake measures that have a positive impact on local water environments, taking into consideration the local requests and water issues.

* According to Toyota data



Measures Undertaken in Accordance with the Toyota Water Environment Policy

Although water-related issues and measures differ depending on the region, Toyota established the Toyota Water Environment Policy and takes action in order to achieve the goals of our water environment Challenge on a global level.

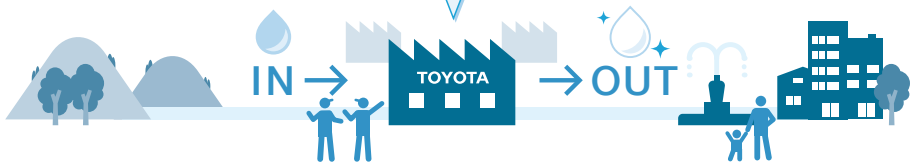
Under the Toyota Water Environment Policy, we are assessing our impact on water environments and working to minimize those impacts from two perspectives: the input side, where we are taking thorough measures to reduce water usage, and the output side, where we are taking comprehensive measures to purify water.

We take action from three directions—the pursuit of environmental technologies, community-rooted operations, and cooperation with society—and strive to be the region's leading plant linked to regional prosperity.

Toyota Water Environment Policy

Striving to consider the importance of water sustainability, Toyota will aim for realizing prosperous societies that will share a sound water environment to the future.

Become No. 1 regional plant leading to the prosperity of entire societies



Thoroughly reduce the amount of water usage

Minimize the impact on regional water resources by minimizing water withdrawal and utilizing rainwater

Clean thoroughly and return

Have a net positive impact on the environment by returning clean water in the local water environment

Reduce Water Usage in Production Activities

To reduce water usage in our production activities, we have been working to introduce innovative technologies alongside planned upgrades to our production lines, and to conduct daily measures to reduce water usage.

In FY2018, Toyota Motor Corporation (TMC) took measures in painting pretreatment processes, which use large amounts of water, such as implementing recycling of water discharge in chemical coating processes and optimizing washing nozzles in electrodeposition coating processes to raise the efficiency of use within processes. As a result, total water usage was 10.3 million m^3 (down 3.2 percent year on year). Water usage per unit produced was 4.0 m^3 (down 7.6 percent year on year).

Globally, Toyota is steadily implementing measures to reduce water usage according to the actual water environment in each country and region. However total water usage rose to 32.9 million m^3 (up 0.4 percent year on year) because of increased washing in pretreatment processing due to quality measures implemented in conjunction with model redesigns and process changes. Water usage per unit produced was 3.1 m^3, up 1.2 percent year on year.

Moving ahead, we will continue striving to minimize impacts on the water environment through the promotion of water-saving and water recycling.

Trends in Total Water Usage and Usage per Unit Produced at TMC

Third-Party Assurance

FY	2014	2015	2016	2017	**2018**
Total water usage (million m^3)	11.6	11.5	10.9	10.7	**10.3**
Water usage per unit produced (m^3/unit)	4.9	4.9	4.7	4.3	**4.0**

- Scope of coverage: Production and non-production divisions (excluding employee benefit facilities)
- Water usage per unit produced indicates the amount of water consumed per unit produced at vehicle assembly plants

Trends in Global Total Water Usage and Usage per Unit Produced

Third-Party Assurance

FY	2014	2015	2016	2017	**2018**
Total water usage (million m^3)					
Japan (TMC)	5.3	5.2	4.9	4.7	**4.5**
Japan (consolidated EMS and its subsidiaries)	12.1	11.9	11.3	12.6	**13.1**
North America	5.0	5.3	5.0	6.0	**5.7**
China	2.6	2.5	2.5	2.6	**2.7**
Europe	1.4	1.2	1.1	1.4	**1.6**
Asia (excluding Japan), Australia, Middle East, South Africa, Latin America	4.8	4.9	4.5	5.5	**5.3**
Total	31.2	31.0	29.3	32.8	**32.9**
Water usage per unit produced (m^3/unit)	3.1	3.0	2.9	3.1	**3.1**

- Scope of coverage: Vehicle assembly plants of TMC and consolidated subsidiaries and other companies in Japan and overseas, a total of 37 companies
- Errors in FY2017 data were corrected

Toyota's Water Environment Challenge: Connecting with Society

Thoroughly Reduce the Amount of Water Usage (Policy 1)

Evaluate Impact on the Water Environment Through Dialogue with Local Affiliates

Based on evaluations of the impact of water usage volume on the water environment, we set four plants (see p. 37) in three regions as challenge-focused plants and are taking action. Some regions have few water resources but in fact water is stably supplied, and therefore, the impact evaluation and local understanding were not in agreement in those regions. Discussions regarding these regions had been conducted over the course of six months, taking into consideration issues that have arisen and potential future impacts from climate change and other factors of concern.
In addition, we collected more detailed regional water-related information and continuously updated impact evaluations to reach mutual understandings. This led to enhanced awareness of our efforts to reduce water usage and invigorate activities.

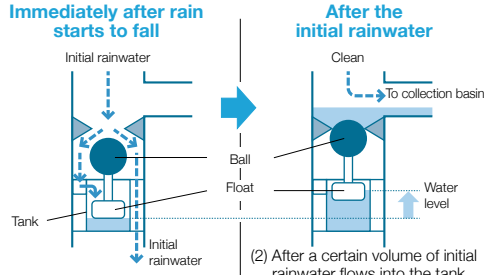
■ Case study 1: *Karakuri** used to develop initial rainwater separation system (Japan)

Using rainwater is an effective means of reducing the amount of industrial water used in production processes, but reuse as industrial water requires filtering and other purification and treatment, giving rise to issues regarding the treatment costs. The initial rainwater in particular washes contamination off buildings and needs to be treated. To address this issue, *karakuri* was used to develop a device that can separate the initial rainwater, which contains large amounts of contaminants.

Verification tests began in December 2016. They confirmed the quality of the recovered water and the maintainability and durability of the device. From now on, the initial rainfall that descends onto the roof of a plant, etc., will be separated in order to reuse clean rainwater, which will lead to a reduction in the amount of water used at plants.

* *Karakuri* refers to mechanisms that do not use electricity or other energy sources

Initial Rainwater Separation Technology

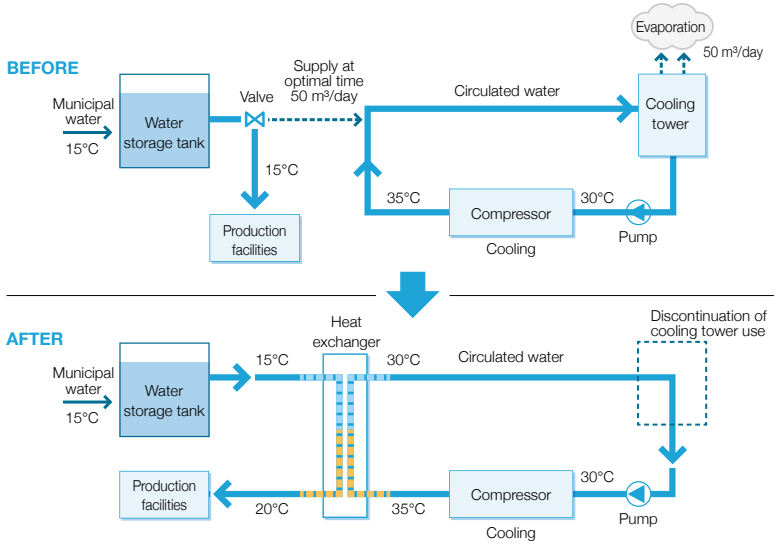


(1) The initial rainwater flows down and a portion starts to collect in a tank.

(2) After a certain volume of initial rainwater flows into the tank, the float rises, and a ball floats and stops the water, and the rainwater flows to the collection tank.

■ Case study 2: Reducing water usage by eliminating water cooling towers (Turkey)

At TMMT, an affiliate in Turkey, *kaizen* activities are reducing water usage.
Until now, the temperature of the water circulated in order to cool the compressor that makes compressed air was cooled by means of a cooling tower. However, it was necessary to supply approximately 50 m^3 in additional water each day to cooling towers that evaporate water in order to lower the temperature.
Now, using low-temperature municipal water (15°C), we have introduced a new cooling system that lowers the temperature of circulated water through a heat exchanger.
This *kaizen* made it possible to discontinue the use of cooling towers and supply water became unnecessary, so water usage was reduced by 0.06 m^3 per unit produced, and annual water usage is down 16,500 m^3.



Clean Water Thoroughly and Return (Policy 2)

Priority Regions for Water Quality Selected

Not only do we comply strictly with laws and regulations regarding the water discharge quality, we are working to maintain and control water quality including setting voluntary control standards that are even more stringent than laws and regulations.

In FY2018, we positioned 22 “water-quality” challenge-focused plants in three regions where water discharge is released into rivers for implementing measures intended to achieve the Challenge goals, taking into consideration the local impacts of Toyota’s water discharge. We will strive to reinforce water quality control even further by surveying water quality in the surrounding areas of the target plants and confirming the impact attributable to our water discharge.

Challenge-focused Regions

Water quality: Asia, North America, Europe
(Water volume: Asia, North America, Southern Africa)

Four Approaches to Water Purification

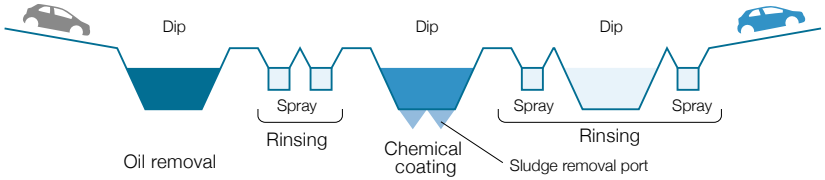
We take measures from four approaches in order to return clean water to rivers and other public waters.

A. Reduction of substances of concern

Chemical coating is performed as a vehicle body undercoat treatment. Until now, Toyota has developed technologies such as chemical coating agents compatible with bodies containing aluminum and steel as well as a nickel- and phosphorous-free treatment agent that reduces environmental impact.

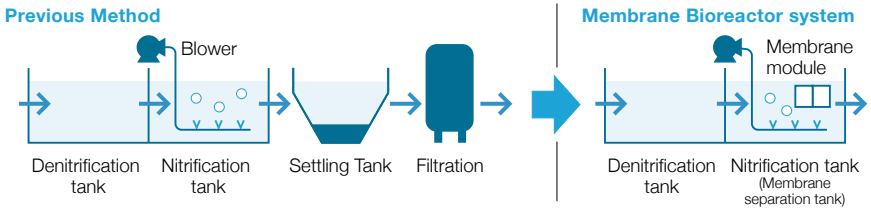
By switching to processes that do not include materials that place a burden on the environment such as nickel, the impact on water quality has been reduced. It was first introduced in 2013 in conjunction with the retooling of production lines and was introduced in 2017 at the Tahara Plant, which produces the Land Cruiser and the Lexus LS, GS, and IS.

Automobile Painting Pre-treatment Process



B. Proper treatment of wastewater

A Membrane Bioreactor system, an advanced treatment technology, was introduced to the wastewater treatment facilities at the Meiko Center and Kamigo Center. This treatment technology employs a membrane to separate sludge, reducing the release of sludge more than before and achieving stable treatment water quality.




Wastewater treatment facilities


Membrane module


Before treatment


After treatment

C. Water quality control

At wastewater treatment facilities, monitoring equipment continuously monitors the quality of treated water discharge and checks for any equipment abnormalities, and personnel conduct daily inspections. Workers conduct onsite inspections on a daily basis, checking color (oil films, turbidity), odor (oil contamination), sound (equipment operating status) etc.

In addition, to ensure that there are no contaminants with pollutants due to accidents and so on in rainwater, which is normally clean and does not go through a water discharge treatment facility, water quality, analysis is periodically performed.

D. Prevention of leaks

We take measures to prevent leaks of contaminated water from plant sites even in the event of an accident including (1) creating ditches at plant entrances to prevent leaks, (2) installing pipes above ground so they can be examined for leaks, and (3) building dikes around oil and chemical tanks.