V Preserving the Water Environment

1. Transition of the Amount of Water Consumption and Water Consumption per Unit of Production

1) FY2012-FY2015

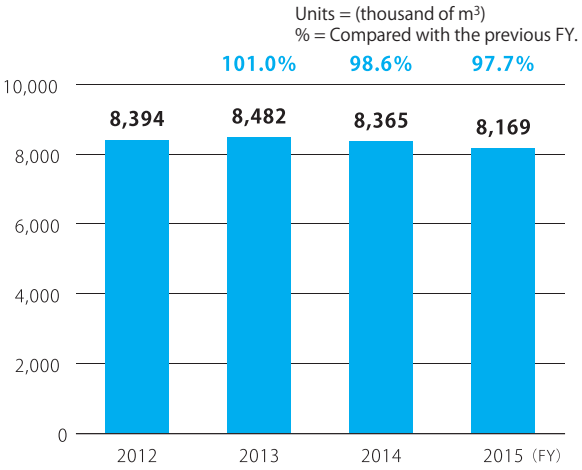
<Refer "Reduce Water Consumption" in Corporate Citizenship Report, detailed (web) edition>

At the manufacturing sectors (plants) of the Kikkoman Group, the amounts of water consumption for manufacturing are measured to control the water consumption and water consumption per unit of production. In addition, the Group is making efforts for efficient reduction of water consumption by reviewing the current manufacturing processes and adopting efficient water consumption measures.

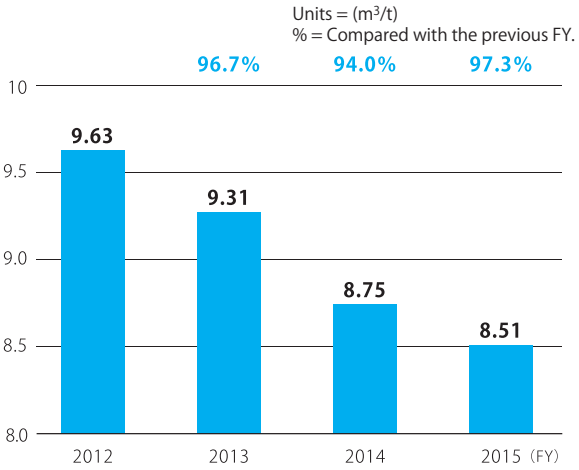
The target companies: 11 domestic manufacturing companies (Kikkoman Food Products Co., Hokkaido Kikkoman Co., Nagareyama Kikkoman Co., Ltd., Heisei Foods Co., Edogawa Foods Co., Saitama Kikkoman Co., Nippon Del Monte Corp., Manns Wine Co., Ltd., Foodchemifa Co., Ltd., Kikkoman Soyfoods Co. and Takara Shoyu Co., Ltd.), and 3 major overseas manufacturing companies (KFI, KSP, KFE)

In FY2015, the water consumption was reduced by 2.3% from the level of the previous fiscal year. A reduction of 2.7% in water consumption per unit of production from the previous fiscal year was also achieved.

● Transition of water consumption (Domestic and major overseas manufacturing companies)



● Transition of water consumption per unit of production (Domestic and major overseas manufacturing companies)



2) FY2016-FY2018

【FY2016】

<Reported in FY2017>

The Kikkoman Group set forth a new objective to reduce water consumption in the Medium-term Environmental Preservation Goals FY2016-2018, and began activities to reduce water consumption.

【Objective in the Medium-term Environmental Preservation Goals FY2016-2018】

(1) To keep the water consumption per unit of production at the domestic and major overseas manufacturing with the level of the previous fiscal year or below.

*The targets were changed from "domestic and major overseas manufacturing companies" to "domestic and major overseas manufacturing divisions (plants)".

The target divisions: 19 plants of domestic manufacturing companies (Kikkoman Food Products Co. (Noda Factory, Takasago Factory), Hokkaido Kikkoman Co., Nagareyama Kikkoman Co., Ltd., Heisei Foods Co.(Main Plant, Nakanodai Plant and Nishinippon Plant), Edogawa Foods Co., Saitama Kikkoman Co., Nippon Del Monte Corp. (Gunma Plant and Nagano Plant), Manns Wine Co., Ltd. (Katsunuma Winery and Komoro Winery), Kikkoman Biochemifa Co. (Edogawa Plant and Kamogawa Plant), Kikkoman Soyfoods

Co. (Saitama Plant, Gifu Plant and Ibaraki Plant) and Takara Shoyu Co., Ltd. (Choshi Plant)) and 4 factories of major overseas manufacturing companies (Wisconsin and California Plants of Kikkoman Foods, Inc. (KFI), Plant of Kikkoman (S) Pte. Ltd. (KSP) and Plant of Kikkoman Foods Europe B.V. (KFE))

*Change in calculating water consumption per unit of production
The weights of containers and packaging had been included in the amounts of production (tons) until FY2015. From FY2016, the weights of containers and packaging were excluded. With this, the relations between production activities and water consumption became clear, and efficiency in water consumption was enhanced.

The water consumption per unit of production at Kikkoman Group domestic and major overseas manufacturing divisions in FY2016 was 8.22m³/t, which was decreased by 9.0% as compared with FY2015 (9.03m³/t), calculated with the new definition, by reviewing the current manufacturing processes and adopting new measures and the objective was achieved.

【FY2017】

<Reported in FY2019>

The water consumption per unit of production at Kikkoman Group domestic and major overseas manufacturing divisions in FY2017 was 8.24m³/t, which was increased by 0.2% as compared with FY2016 (8.22m³/t). We could not achieve the objective.

【FY2018】

<Reported in FY2019>

The water consumption per unit of production at Kikkoman Group domestic and major overseas manufacturing divisions in FY2018 was 8.00m³/t, which was decreased by 2.9% as compared with FY2017 (8.24m³/t). The objective was achieved in these divisions.
*Heisei Foods Co. merged Edogawa Foods Co. and changed its name to Kikkoman Foodtech Co. on April 1, 2017.
The target divisions: 19 plants of domestic manufacturing companies (Kikkoman Food Products Co. (Noda Factory and Takasago Factory), Hokkaido Kikkoman Co., Nagareyama Kikkoman Co., Ltd., Kikkoman Foodtech Co. (Main Plant, Nakanodai Plant, Edogawa Plant and Nishinippon Plant), Saitama Kikkoman Co., Nippon Del Monte Corp. (Gunma Plant and Nagano Plant), Manns Wine Co., Ltd. (Katsunuma Winery and Komoro Winery), Kikkoman Biochemifa Co. (Edogawa Plant and Kamogawa Plant), Kikkoman Soyfoods Co. (Saitama Plant, Gifu Plant and Ibaraki Plant) and Takara Shoyu Co., Ltd. (Choshi Plant)) and 4 plants of major overseas manufacturing companies (Wisconsin and California Plants of Kikkoman Foods, Inc. (KFI), Plant of Kikkoman (S) Pte. Ltd. (KSP) and Plant of Kikkoman Foods Europe B.V. (KFE))

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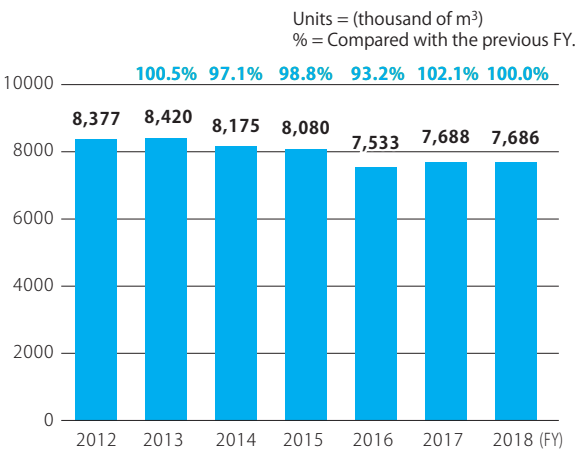

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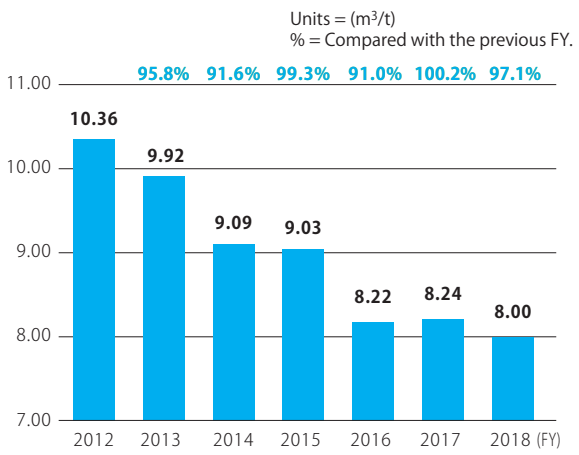

2. Approaches Taken by Plants

<Reported in FY2017>

Hokkaido Kikkoman Co. (Chitose city, Hokkaido) has fully reused the clean water used for cooling in the manufacturing process of soy sauce and other products to cleanse equipment and others in the plant as a means to reduce water consumption per unit of production.

● Wines for cooking and food processing: 1.8L PET Bottles (left) and 10L Bag-in-Box (BIB) (right)

Katsunuma Winery of Manns Wine Co., Ltd. (Koshu city, Yamanashi prefecture) stopped using centrifugal separation to remove any dregs (yeast and tartar) remaining after brewing wine. This resulted in controlling the deterioration of wine through oxidation and at the same time in reducing water consumption (appx. 3,000kl) for centrifugal separation as well as CO_2 emissions (appx. 10t-CO_2) by ending electricity consumption for separation.

<Reported in FY2019>

● Brewery equipment
(Katsunuma Winery, Manns Wine Co.,Ltd.)

● Wine filling equipment
(Katsunuma Winery, Manns Wine Co., Ltd.)

In FY2017, Katsunuma Winery of Manns Wine Co., Ltd. succeeded in reducing water consumption (appx. 57m^3) by improving the method of cleaning wine filling equipment. Gunma Plant of Nippon Del Monte Corp. succeeded in reducing water consumption (appx. 2,500m^3) by improving the method of cleaning the containers for shipping ketchup. As a result, the amount of fuel (heavy fuel oil A) used to heat the wash water was reduced.

● Wastewater treatment facility
(Edogawa Plant, Kikkoman Biochemifa Co.)

● Sludge dewatering equipment
(Edogawa Plant, Kikkoman Biochemifa Co.)

The Edogawa Plant of Kikkoman Biochemifa Co. pays full attention to preserve the water environment by processing wastewater discharged from its plant in the wastewater treatment facility. Because the quality of the processed water became very high, the Edogawa Plant began using the water for washing sludge dewatering equipment in FY2017. The water consumption of the plant was reduced by appx. 850m^3 per year.

3. Approaches to Preserve the Water Environment

<Reported in FY2017>

Being fully aware of the importance of preserving the water environment, the Kikkoman Group has established new water quality standards that are more stringent than the current legal standards to apply to the water discharged from manufacturing activities such as Biochemical oxygen demand (BOD). Through reviewing the manufacturing processes and equipment being used, and applying efficient measures, the Group makes efforts to preserve the water environment of manufacturing sectors (factories and plants) and their vicinities.
The Kikkoman Group set forth a goal in the Medium-term Environmental Preservation Goals FY2016-2018, to improve the quality of water discharged and began activities in FY2016 to achieve the goal.

【Objective in the Medium-term Environmental Preservation Goals FY2016-2018】
(1) To reduce wastewater BOD to less than 10mg/L, or COD to less than 8mg/L at domestic river discharge areas.

【FY2016】
In FY2016, among 14 domestic manufacturing divisions (plants) in the Kikkoman Group, 10 plants which discharge wastewater to river discharge areas after treating the water at their wastewater treatment facilities, their purifying capabilities were upgraded. In total, 8 plants succeeded in lowering BOD to 10mg/L or COD to 8mg/L. In the 2 plants which failed to achieve the objective, the quality of discharged water was lower than the legal standards (restriction values).

【FY2017】
<Reported in FY2019>

In total, 8 plants succeeded in lowering BOD to 10mg/L or COD to 8mg/L. In the other 2 plants which failed to achieve the objective, the quality of discharged water was lower than the legal standards (restriction values).

【FY2018】

<Reported in FY2019>

In total, 9 plants succeeded in lowering BOD to 10mg/L or COD to 8mg/L. In another plant which failed to achieve the objective, the quality of discharged water was lower than the legal standards (restriction values).

The wastewater treatment facility in the Second Production Department of Noda Factory of Kikkoman Food Products Co. improved its wastewater processing by installing an ozone reactor in October 2013 to further purify the treated water before discharging into the river.

● Ozone Generator (Second Production Department, Noda Factory, Kikkoman Food Products Co.)

● Ozone wastewater treatment equipment (Second Production Department, Noda Factory, Kikkoman Food Products Co.)

In March 2015, a pressure floatation separation apparatus was installed at the First Production Department of Noda Factory of Kikkoman Food Products Co.
Since soy sauce is manufactured in the First Production Department, the wastewater from the manufacturing process contains oil from soybeans causing a great burden on the wastewater treatment facility. By reducing the inflow of oil to the wastewater treatment facility through the pressure floatation separation apparatus, the load on the treatment facility was lightened. At the same time, the aeration blower of the wastewater treatment facility was renovated to promote energy-saving in wastewater treatment.

4. Supporting Activities to Mitigate Water Stress

<Reported in FY2017>

The Kikkoman Group has manufacturing bases in regions where water stress* has become a significant social issue, such as the US, the Netherlands and Singapore. At these manufacturing bases, we support water environment preservation activities that are conducted by local governments and NGOs in order to contribute to solving issues.
*Water stress: Situation when water demand exceeds the amount of water available at certain periods of time or when use of water is limited as a result of water quality.

For example, KSP in Singapore supports the Kingfisher Lake construction project, and KFE in the Netherlands supports the water quality improvement project of Zuidlaadermeer Lake in Groningen state. (refer VIII. Preserving Natural Environment).

5. Dialogues with Suppliers

<Reported in FY2017>

In North America where water stress is observed, the Kikkoman Group procures great amounts of soybeans and wheat, the raw materials for soy sauce, and the Kikkoman Group has dialogues with the big suppliers on the protection and improvement of the water environment.

6. Participation in the CEO Water Mandate

<Reported in FY2017>

The Kikkoman Group signed the CEO Water Mandate, an initiative under the United Nations Global Compact.
This CEO Water Mandate is a framework for signatory corporations to work together to promote efforts to reduce climate risk and to solve various issues, aimed at alleviating problems in sustainable water use caused by climate change.
The Kikkoman Group will put the Group's environmental philosophy into practice through being involved in the initiatives working to preserve water resources indispensable for the earth and reflecting that involvement to our corporate activities.