

# The Most Polluted River in Japan: Ayasegawa River ~Campaign Breaking the Worst One~

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## Abstract

Ayasegawa River was the most polluted river in Japan. Fig.1 shows “the ranking of the polluted river in Japan” which is disclosed by Japan Government every year. It shows that Ayasegawa River records 19 times continuously, total 25 times the worst from 1972. How ashamed result is it! Government and the local gave up the improvement, and they recognized the status. But we realized that they did the best for the improvement of the river very hard when we started the research in our campaign. For example, government and prefecture have planed distribution plans 10 years ago and have constructed the direct purification plant. NPOs have also done the grassroots actions individually to change the river to a clean and clear one. We, Water forum which connects Tokyo Bay to Arakawa, Tonegawa and Tamagawa River, had no information about Ayasegawa River at that time. We knew the river recorded the worst polluted river in Japan, but we believed the responsibility in the government and the local. Saitama prefecture raised the big campaign, “Breaking the most polluted river in Japan: Ayasegawa River” in 2005. Our NPO also agreed to the campaign. We campaigned with the basin NPO together widely. This report is the review of the big campaign.

Keywords: the largest improvement river in Japan

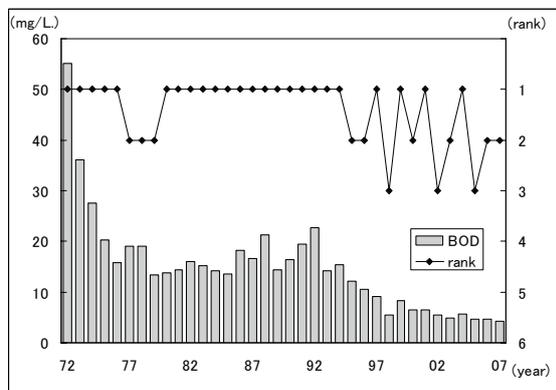


Figure 1. The ranking of the polluted river in Japan.

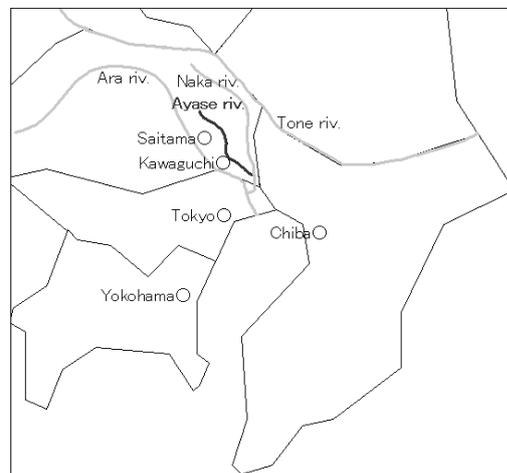


Figure 2. The map of the Tokyo metropolitan area in Japan.

## Overview of Ayasegawa River

### Location

Fig.2 shows the Tokyo metropolitan area in Japan. Tokyo Bay is located on the south, and Tonegawa River and Arakawa River are located on the east, on the west, respectively. Ayasegawa River is located in the middle. The river originates independently. The upper side of the river is used as agricultural irrigation canal. The middle and downstream are used as agricultural and storm drainage systems. The river is main role to accept the domestic

wastewater in the recent years. It accepts the domestic wastewater and drainage, and reaches the Tokyo bay through Arakawa River. The area of the river basin is 178 km<sup>2</sup>, the population of the basin is 1.25 million, and the length is about 47 km.

### Features

The flood control project of rivers began 400 years ago in modern Japan. Ayasegawa River had abundant water supply, and was the booming shipping and fishing industries before because it connected Tonegawa and Arakawa rivers. Rice farming was the most important in the modern Japan's agriculture, so people ensured that water was the highest priority. Ayasegawa River was used for the agricultural irrigation and drainage systems. The river was loved and developed by basin. However, with an increase in the population of capital Tokyo, has also increased the population around Ayasegawa River. Fig.3 shows the change of the population. The rapid increase in population has changed the condition of Ayasegawa River. Naturally, the river has received wastewater from houses and factories. The receipt of the wastewater has brought the river to the most polluted river.

### Cause of the most polluted river in Japan

Whenever people live, people must be the release of wastewater from houses and factories. River pollution is inevitable. In the case of Ayasegawa River, is it the same reason? As described in Fig.4, the wastewater from houses, from industries, and agricultures are almost 73%, 18%, and 5%, respectively. About three quarters of wastewater come from houses. Classified the wastewater from houses in detail, we can find that it consists 40% from kitchens, 30% of toilets, 20% from bathrooms, and 10% from close washers.

### Activities required

We recognized that the biggest factor of the river pollution came from the wastewater from houses through our research. We are convinced that the around Ayasegawa River had to realize the fact, recognize their own responsibility, and take measures.

### Objective of our campaign

Our campaign is very simple. It is an activity of the domestic wastewater by residents. Improvement of manner for draining the domestic wastewater is expected obviously. People must drain the wastewater when they live. The worst thing is to drain the wastewater without treatment. We call it, "Tarenagashi" in Japanese. How is your family? Can you permit that the polluted water is drained without any treatment? No one can clean up. As you recognize, you have to use the water after some treatment. Water is circulating around the world, and into the space. Our campaign, "Campaign breaking the most polluted river in Japan", means a domestic wastewater measures and improvement of manner for draining the domestic wastewater. In other word, it is consciousness by the residents. This is our mission and duty.

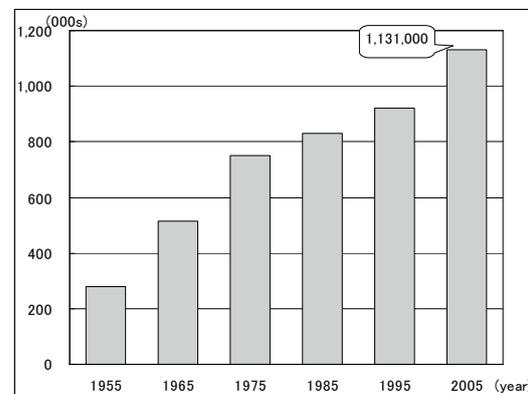


Figure 3. Population growth around the basin for 50 years.

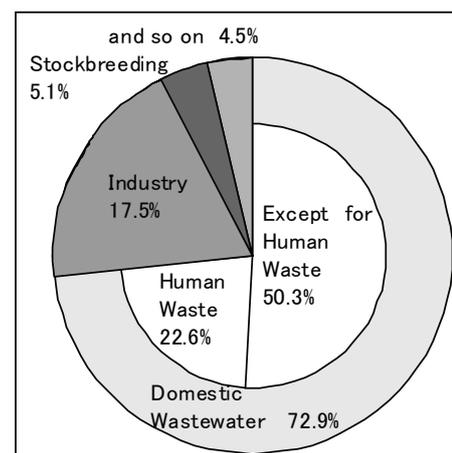


Figure 4. Factors of BOD in Ayasegawa

## **Activities of our campaign**

The following is our various activities breaking the most polluted river in Japan.

### ***Activities by government and prefecture***

#### 1) Removal of the polluted sediments

Large amount of polluted sediments deposits in river. The rivers which have ability of self control system, for example, with large amount of Dissolved Oxygen (DO) can decompose the sediments, but in the rivers in urban areas the sediments deposit. The deposited sediments must be removed by a mechanical way like mobile cranes.

#### 2) Purification plant

Water from the river is sent to the plant directly, and returned after purification. 2 plants by the Government and 8 plants by the prefecture exist through the Ayasegawa River.

#### 3) Securing water

Main industry in this area is farming, so the required water volume of the river theoretically reduces to 0 in winter. To compensate it, some amount of water is supplied. Now the government decides 1.8m<sup>3</sup>/s of water supply to Ayasegawa River. The prefecture decides 0.5m<sup>3</sup>/s of water supply. In the near future, the amount will be increased.

### ***Drainage measures and treatment of effluents***

Drainage measures in Japan are introduced here. As I mentioned before, 73% of the reason was the domestic wastewater. The following is the drainage measures in Japan. It consists of 75% of public swage treatment, 10% of *Johkaso* treatment which is on site treatment, and 15% of non-treatment. According to the government instruction, the public swage treatment is done by the prefectures. Large scale of treatment plants is constructed in urban areas, the drainage pipes are connected with the public pipes, and the wastewater is collected. Most treatment plants are adopted activated sludge process. *Johkaso* treatment is mainly used in the suburbs, and every house has a small plants. Ability of treatment is improved to 6~10 mg/L of BOD. Additional and advanced investment for the treatment causes the availability of use for factory and farming.

### ***Activities of NPO***

Basic part of the campaign was done by NPO. And main purpose was improvement of manner for draining the domestic wastewater and of consciousness by the residents. The following is some examples of our activities.

#### 1) Clean up campaign

We call it "Gomihiroi" in Japanese. It is held all over Japan. Some groups are doing their action every day, every week, every month and once a year. Wastes must be divided into 4 types in Japan. The waste is divided by the type to be re-used and recycled. The divided wastes which the NPO gathered are packed and sent each other by the government. Children can attend this campaign with observation of nature. They can observe changes of the plants and the bird watching. They also can analyze the quality of water through the campaign. We sometimes prepare a short game in it.

#### 2) Research of water quality in the river

It is very important to analyze the water quality of the river and assess the environment. Scientific data is acceptable for any people. It is also important to compare with the past such as 1 year, 5 years and 10 years ago. Each NPO can adopt the research methods and items like COD, NH<sub>4</sub>, PO<sub>4</sub>, NO<sub>2</sub> and NO<sub>3</sub>. But it is difficult to analyze BOD, so we ask for analyzing it to the professional organization if necessary. We also can analyze transparency, flow rate of the stream, temperature, smell and color of the water. Our analysis technique is not so specialized, but it is

very meaningful to measure as a perspective of the residents frequently. Finally we discuss the measures with the government together using the collected data.

### 3) Education about the environment

The education system is studied in primary schools and junior high schools. Japanese schools have some curriculum of social issues, and students of each grade study various levels of the social issues. NPO can support the lessons regarding the environment, river and water. The students can study by the documents and pictures of our activities in their classroom. They sometimes can experience analysis of water quality. They discuss the reason for pollution of the river each other and the better way to recover the river.

They sometimes have open-air lessons. The lessons take more 2 hours. We take the students to the river, and they smell, observe the color of water, clean around the river and watch many plants, fish and birds. They realize the dirty and polluted river by themselves.

The students usually talk to their family at home about the lessons they learned. Their family talks to their neighbors and friends. The information is spread automatically. We are looking forward to seeing the reports or essays written by the students.

### ***Activity using check sheet***

We also start an action using a check sheet not to pollute the river. The residents check their lifestyles by 10 items. The items are the following.

1. Use any filters at the drainage area of kitchens and baths.
2. Not to cook the excess amount of meals, and not to throw leftovers into the drain of kitchen.
3. Manage to consume all the vegetable oil for fryer, and adsorb on the papers or waste cloths.
4. Wash the dishes with oily food using acrylic wash sponge.
5. Use the washing water of rice to feed for plants and the others.
6. Wash cloths as much as you can, and use adequate amount of detergents.
7. Use the soap which is good for the environment in laundry, car wash and so on.
8. Drain to the public treatment system, or maintain and clean up the *Johkaso* regularly.
9. Clean up the river and drain paths and attend the clean up campaign voluntary.
10. Attend the seminars regarding any environment issues.

It may be difficult to agree with some items for people outside Japan. But these are very useful items and familiar in Japan. Few people can do the right actions against all items from the beginning, but it is a useful action to realize by them. This action has not been done by only NPO. Cooperation with city administration is necessary. The action needs huge effort because we ask for any assistance of many city organizations. Action once is not effective very well, so it should be repeated 3 times and 5 times. People experienced the check sheet 3 times can success more than 80 %. Therefore continuous action is the most important.

### ***Nonuse of detergent***

An Acryl wash sponge is enough to wash dishes without detergent. We distributed the wash sponges to the basin residents. It is a handmaid sponge by NPO members. The detergent is one of the main reasons for deterioration of water quality. Do not use it as possible. Use of the acryl wash sponge is effective.

### ***Recommendation of tidy (garbage in the kitchen sink)***

It is important not to throw out the solid waste from kitchen as possible. We also distributed a tidy. The solid waste can be removed from the domestic wastewater by the tidy. These continuous and steady actions were base of our campaign.

### ***Collaboration with the government***

NPO's actions are only inside the community even if we do the best. On the other hand, the government's action also has various limitations. The most important thing is that NPO and the government realize by themselves what we can do or not, and collaborate together. The residents trust and cooperate with the collaboration after ripening relations. But it is difficult to have a good relation from the beginning. This is the result of continuous efforts.

### **Effect of our campaign**

#### ***Collaboration among NPOs, the government and the private companies***

Each NPO has been campaigned separately for a long time. They had a limitation of their action area and action issues. We also have known that Ayasegawa River was the most polluted river in Japan, but NPOs did not any collaboration and cooperation. Saitama prefecture asked for the policy of the campaign to NPOs in 2006. Only 5 NPOs attend the campaign at first. After that each NPO cooperated together, asked for other NPOs to join. Now more than 40 parties attend. Clean up campaign is sometimes done by one NPO, and sometimes by many NPOs. Non NGO members such as the government and residents become to attend frequently. This change means the progress of our campaign. Our NPO is also encouraged.

The system of governmental administration is not so simple. Ayasegawa River is not so long river (64 km), and the downstream 10 km is administrated by capital Tokyo, the upstream 40 km is administrated by Saitama Prefecture, and the middle 15 km is administrated by the national government. It has 60 branch rivers. Each river is administrated by 13 cities. No controlled systems between these organizations existed, so the actions are decided individually, and the government noticed that this situation was worse, but less effort for improvement was tried. Recently the improvement among the governments is progressing, and collaboration with the residents is also tried.

Collaboration with the private companies is also progressing. They release large amount of effluent and some chemical compounds. In 2007, 40 companies support economically. The basin companies also hope to have a good relationship with the basin residents, and to make the river clean. They cooperate with NPOs and educate in their office. We, NPO, visit the companies, tell them to thank and report our campaign. This causes a good relation and collaboration.

Clean up campaign is one of the most familiar activities for the NPO. The action is introduced above. This action did not go well without collaboration with the government and NPO, but most case goes well. The volume of the waste is gradually decreasing. The people who throw away the waste is decreasing, because the active NPO becomes to increase. Clean up campaign is quite simple. Clean up campaign means that picking up the waste thrown by others, so people feel bad. But the mind of picking up the waste, not throwing away the waste and willing to clear a river is the same as the mind of loving the water. And this is the origin of heartwarming communication.

Campaign of cooperation with school becomes more active. The campaign is held from 50 to 100 times a year around Ayasegawa River. Many NPOs support each other depending on the issues and themes.

Collaboration among NPO, the government and the private companies is really progressing. The residents do not believe and cooperate without the collaboration. We convinced that the campaign becomes powerful, and becomes to have fruitful results, because the collaboration is going well, and the residents believe and feel how the collaboration runs.

Media becomes to cooperate. Sometimes a newspaper reports our activity. NHK (National broadcast) often broadcasts from last year. The media which broadcasts by many images is very effective. The program titled as, "Ayasegawa River; the most improved quality of water in Japan", broadcast through the country on 18th July 2008.

Fig.5 shows the comparison of water quality between the past 20 years and 2007 fiscal year.

Promotion of many challenges by the governmental organization and continuous, daily campaigns by NPOs are leading to the successful results.

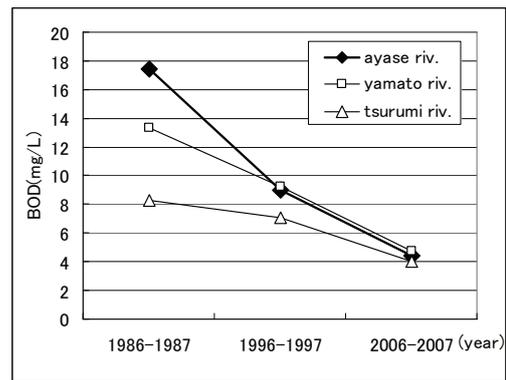


Figure 5. Improvement of BOD among worst 3 rivers in Japan.

### Conclusion

We were surprised that Ayasegawa River got status of the most polluted river in Japan. It lasted for 15 years and 19 times. We appreciate and thank that the government made a decision of starting "Campaign breaking the most polluted river in Japan". The greatest finding in the campaign is that the drainage treatment of domestic wastewater occupied 79 % in the wastewater would be the most effective. Besides, we decided that main activity in the campaign should be an improvement for manner of domestic wastewater. We convinced that the decision is right.

The residents attending the campaign really recognized useful. As a result, Ayasegawa River jumped up from the worst position and got an honor of the largest improvement river in Japan (against 10 years ago, 20 years ago).

Progress in collaboration among the government, the prefecture, cities and NPOs will be a great driving force around the issue.

Saitama prefecture decides that they really try to improve a maintenance level of Johkaso. It is a wonderful decision. The decision leads the residents to cooperate.

We had a confidence our activity because our responsible campaign gave a great result. Finally, tightening network of the residents and formation of the manner are also another effect.

What we have been pursuing for 15 years is that Ayasegawa River becomes the cleanest and clearest river in Japan. The aim has been fulfilling as expected.

### Acknowledgment

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