

Review of Outputs of Past ODA Projects for China by External Evaluator

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The observations and impressions obtained through the experience of conducting ex-post evaluations in China as an external evaluator in the past can be summarized as follows.

(1) Contributions of Japanese ODA Loans as basic funds

There has been a substantial need for implementation and funding for environmental management and measures, improvement of television broadcasting, as well as higher education and training such as universities. However, necessary funding and improvement were not sufficiently carried out due to reasons such as the lack of financial leeway that forced these projects to be in a lower priority as well as insufficient experience and knowhow in China. Japanese ODA Loans were actively provided to these sectors and projects where improvement was delayed. Representative projects include the Municipal Solid Waste Treatment Project implemented in Anhui and Hunan Provinces, the Higher Education Project implemented in 23 provinces, cities and autonomous regions, and the Television and Radio Infrastructure Improvement Project implemented in Liaoning Province and six other provinces and autonomous regions.

During the ex-post evaluation of these projects, we heard many opinions from project-related people, expressing that “At the time when the Japanese ODA Loan was decided, we did not have enough money to work on these projects. We really appreciate that we could proceed in earnest with the ODA Loan.” At the same time, these projects were relatively financially favorable at the time of the ex-post evaluation. Factors contributing to this situation include: (1) improvements that proceeded using China’s own funds based on the outputs of the Japanese ODA Loan projects, and (2) a business profit base was consolidated utilizing the basic infrastructure developed through the Japanese ODA Loan. This result suggests that Japanese ODA Loan, which contributed to these factors, played an important role as essential basic funds to support these projects.

(2) Regional development based on the outputs of Japanese ODA Loan projects

The impact of the Japanese ODA Loan for China was not limited to the target organizations mentioned above. Instead, mainly in the sector of environmental management, its impact could be found in a broader region which was not directly covered by the Japanese ODA Loan for China.

In the Municipal Solid Waste Treatment Project and the Jilin City Comprehensive Environment Improvement Project, final waste disposal sites, collection and transport facilities, heat supply for heating and sewer network construction were initially implemented in only a single region within the province/city. Although the necessity of these projects had been pointed out, their progress was delayed because output could not be guaranteed. However, having seen the satisfactory results brought about by the advanced development carried out with the Japanese ODA Loans, improvement is now progressing rapidly in other parts of the province/city with Chinese domestic funds. As a result, these issues were improved in a wider area. (In view of the outputs of the Jilin City Comprehensive Environment Improvement Project, similar projects are being carried out in

other cities in the province with financial assistance from other donors.) It is considered that because the Japanese ODA Loan for China has broadly and specifically demonstrated the necessity and outputs of these projects, it has encouraged improvements in a wider area including regions not covered by the projects.

(3) Effects of support combining funds and soft components in Japanese ODA Loan projects

Especially for the Japanese ODA Loan for China in the latter half, considering that China has a certain level of financial capacity and that experience in Japan is supposed to be useful, instead of mere financial cooperation, training in Japan was actively provided. Representative projects include the Municipal Solid Waste Treatment Project implemented in Anhui and Hunan Provinces and the Jilin City Comprehensive Environment Improvement Project and the Higher Education Project implemented in 23 provinces, cities and autonomous regions.

In particular, for project-related people in the environmental management sector, since China did not have enough experience and that the future of the project and the roles of concerned persons were unclear, training in Japan was highly evaluated as extremely important in learning advanced cases and reconfirming the meaning of the project. Many cases of actually employing the training results could also be found. Training participants from the Municipal Solid Waste Treatment Project mentioned that “Understanding the current state of Japanese household solid waste management, as well as clearing up the long-term vision for solid waste management and administration and what issues need to be addressed going forward to achieve this vision have made it possible for us to develop business with confidence and with the future in mind. As a specific example, securing land to construct sanitary landfills for household solid waste had not always been recognized as a big problem in China. However, upon hearing that ‘urbanization will make it difficult to secure the land needed to construct sanitary landfills’, after returning to China, we promoted the incineration of household solid waste ahead of Chinese policies. As a result, a waste-to-energy plant was completed in 2013 by BOT, the earliest endeavor among medium-sized cities in Anhui Province. We are planning a project in the future to tackle the conversion of food waste into fertilizer/feed.” Another participant said, “Having learned the Japanese practice of not distinguishing rural areas from urban areas for solid waste management, along with the project, we implemented solid waste control measures in rural areas, formulated a treatment plan for all towns in the province, developed an administrative system and constructed related facilities.” There were also many examples that JICA partners who were inspired by Japan’s environmental education started building environmental education facilities and giving environmental lectures for schools while using examples of methods and teaching materials from Japan. As for the Higher Education Project, we see many cases where university faculty and staff concluded exchange agreements between universities after their training in Japanese universities, bringing research and educational exchanges between Japanese and Chinese universities and students.

In this way, giving support by combining funding and soft components in the Japanese ODA Loan for China is considered to have an important meaning in enhancing the outputs of the projects.

Responsible ex-post evaluation projects in China

| | Project name | Sector | Project type | Start fiscal year | Evaluation type | Evaluation fiscal year | Rating |
|----|---|---|-------------------------------|-------------------|--------------------|------------------------|--------|
| 1 | Liaoning Television and Radio Infrastructure Improvement Project | Broadcasting | Japanese ODA Loan | 2001 | Ex-post evaluation | 2010 | A |
| 2 | Project for Surveillance and Control of Vaccine-Preventable Diseases | Health / Health care | Technical cooperation project | 2006 | Ex-post evaluation | 2014 | B |
| 3 | Inland Higher Education Project (Regional Vitalization, Market Economy Reform Support, and Environmental Conservation) (Guangxi Zhuang Autonomous Region) (Jiangxi Province) (Hubei Province) (Shanxi Province) | Higher education | Japanese ODA Loan | 2003, 2004 | Ex-post evaluation | 2015 | A |
| 4 | Hebei Higher Education Project(Hebei Province) | Higher education | Japanese ODA Loan | 2006 | Ex-post evaluation | 2016 | A |
| 5 | Shanxi Xilongchi Pumped Storage Power Station Project | Electrical power | Japanese ODA Loan | 2002 | Ex-post evaluation | 2016 | B |
| 6 | Hunan Municipal Solid Waste Treatment Project | Urban sanitation | Japanese ODA Loan | 2007 | Ex-post evaluation | 2017 | B |
| 7 | Anhui Municipal Solid Waste Treatment Project | Urban sanitation | Japanese ODA Loan | 2007 | Ex-post evaluation | 2017 | B |
| 8 | Guizhou Province Environment Improvement and Education Project | Environmental issue / Higher education / Basic healthcare | Japanese ODA Loan | 2006 | Ex-post evaluation | 2017 | B |
| 9 | Higher Education Project(Liaoning Province) | Higher education | Japanese ODA Loan | 2006 | Ex-post evaluation | 2017 | B |
| 10 | Higher Education Project(Hainan Province) | Higher education | Japanese ODA Loan | 2006 | Ex-post evaluation | 2018 | B |
| 11 | Jilin Province Jilin City Comprehensive Environment Improvement Project | Environmental issue / Sewerage | Japanese ODA Loan | 2006 | Ex-post evaluation | 2018 | A |

Review of Outputs of ODA Projects for China

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1. Summary

- (1) As an evaluator, I conducted ex-post evaluations for a total of 22 loan assistance projects. Many of them were environmental measures and afforestation projects.
- (2) Given the urgency of taking environmental measures in the rapid growth period of China, although there were problems in the process of project formation, ODA to China in the late 1990s were still significant. In the equilibrium growth period, ODA was appreciated for its contribution as seed money beyond the scale of the projects.
- (3) Towards the end of ODA to China, amidst China's rapid development, there is a stronger impression that the effect of ODA has transformed from an explicit effect brought by ODA itself to a more indirect ripple effect in the overall development projects in China.
- (4) It seems to me that the significance of the outputs of ODA projects in developing countries like China cannot be measured merely by the concept of projects evaluation based on existing DAC standards.

2. Writer: Kenji Momota, President of IC Net Limited

3. Writer's evaluation of ODA to China thus far

I have been engaged in ex-post evaluation of Japanese ODA loan projects as an external evaluator contracted by JICA for many years. Especially in the last 10 years or so, I have had many opportunities to be working on ex-post evaluation in China. I evaluated a total of 22 projects launched from the late 1990s to around 2007, of which 13 projects were about environmental measures such as water supply, sewerage, and air pollution control, three were afforestation projects (some duplicated), and seven other projects concerning health and roads. I was also in charge of work such as supporting the preparation of project completion reports, and I have experience working in 14 provinces in China.

Speaking of the regions, I worked in the three provinces in Northeast China (Heilongjiang, Jilin, and Liaoning) and coastal cities such as Suzhou in Jiangsu Province from the late 1990s to the early 2000s. Since the late 2000s, I have been engaged in projects mainly in inland areas and cooperation projects in provincial cities. I was mostly in charge of environmental measures projects, as well as water environment (water supply, sewerage, and flood control) and atmospheric environment (heat supply system) improvement projects, following changes in the support policies and priority regions based on the country assistance plan at that time.

Environmental improvement projects took many forms from the late 1990s to the early 2000s, including comprehensive support of water supply and sewerage infrastructure in large cities and the so-called sub-projects, which are programs of small-scale projects for state-owned enterprises and factories. Regarding the overall trend, as China's domestic policies and systems were being

developed, sub-project-type support as in the late 1990s has gradually decreased, while cases of utilizing the Japanese ODA Loans to support small- to medium-sized provincial cities and to cover part of the development projects for large cities have increased.

The distribution of rating results is generally good, with 11 cases of A (highly satisfactory), five cases of B (satisfactory), and one case of C (partially satisfactory).

I would like to look back at the ODA projects for China based on my experiences thus far and summarize my comments as follows. While I was writing this review, I took a holistic view from my past experience, including transition over time from the late 1990s to the late 2000s and transition along with changes in the form of financial assistance and region, and chose those points that are particularly impressive as topics. For this reason, my observations are somewhat subjective and may not be in line with the facts. In addition, compared to the usual quantitative analysis reports, the structure and contents of this review may be less coherent. I appreciate your understanding.

4. Review

(1) Transition and background of project structure and form - "Turning from rapid growth to equilibrium growth"

Many ODA loan projects to China were sub-project-type supports consisting of multiple cities and projects. The structures and contents of environmental measures projects varied a lot in particular. Some of the projects that I was involved in had changed significantly from their original plans. The background and changes to these projects varied greatly depending on when the projects were implemented. They can be broadly divided into projects implemented in China's development period in the late 1990s to the early 2000s, and projects implemented in the mid-2000s to the final stage of ODA to China. This is equivalent to the period of the 9th to 11th Five-Year Plans (1996 to 2010) in China's national development plan.

① ODA in the rapid growth period - "Difficulties in project formation during periods of radical change"

Because of the severity and urgency of environmental problems in China in the late 1990s, ODA at that time had different contents and structures, and was more or less an emergency aid to deal with immediate crisis. An example is the Jilin Song Liao River Basin Environmental Improvement Project (loan agreement (L/A) in 1998). This project consisted of nine sub-projects including wastewater treatment and improvement of city sewerage system for key factories such as paper factories and ferroalloy factories. These sub-projects did not seem to have been selected in the usual ODA logical framework in a planned manner. Instead, it seems to me that they were implemented as a quick-fix to handle severe pollution and urgent problems. Meanwhile, China's environmental measures have been undergoing changes even faster than the urgency. Reform of state-owned enterprises, industrial restructuring, and environmental policies were quite advanced in China at that time. Because of their influences, ODA sub-projects had to be frequently canceled or replaced. There was a case in which the

factory itself was designated as a source of heavy pollution right after a wastewater treatment system had been built. The factory was ordered to shut down, and the state-owned enterprise itself could not survive. Due to the large number of sub-projects and the scale of many of the individual projects being small, some of them succeeded while others failed. Of course, sub-projects that did not produce an effect received low rating in ex-post evaluations. I did have a debate with local project-related people when I gave a C rating to the Jilin project. Some of them, in particular, argued that it was against their will to be evaluated that strictly only by mechanical standards for what they had worked so hard for during that period of radical change.

At that time, I insisted on the objectivity of ODA evaluations, and was determined to face the results. Since then, however, I have been in charge of many projects evaluations and I myself gained some experiences in corporate management and project operation. Looking back at the changes in the environment over the past dozen years or so, now I have a slightly different impression. Since the 1960s, Japan has experienced a cycle from high economic growth to the emergence of pollution problems. In China, this cycle occurred simultaneously in a much shorter period of time. Amidst such rapid changes in national and provincial development and environmental policies, there was no choice but to take various actions at the same time. If you ask me whether I could have made a sustainable plan considering the mid- to long-term development policies in that environment, my answer is probably not. However, the major pollution sources that existed at that time could not be neglected. Even if a project's mid- to long-term sustainability was unclear, people had no choice but to carry it through. In such a major upheaval, it may be necessary to proceed with projects with some flexibilities and risks. In that sense, when I look back at the history of China's major environmental policy changes, I believe that some aspects of the projects were unavoidable. For example, promptness of support is one of the perspectives in evaluating urgent support projects. However, when we evaluate the significance and role of projects in the transition stage under drastic changes in national policies and industrial structure, some aspects may need to be considered besides the five DAC evaluation criteria currently adopted. Some sub-project-type ODAs at that time were allowed to be replaced flexibly according to the progress of the project without fixing the details of individual projects at the time of signing a loan agreement. Now I began to think that, given the severity of environmental pollution and the urgency of actions, it is reasonable to have adopted such a flexible project plan. Even if the yield of the sub-projects was somewhat low, prioritizing the proposition of vigorously pushing forward measures against pollution is still meaningful from the cause of ODA of supporting mid- to long-term nation-building.



Suzhou City after water quality improvement



Sewage treatment plant in Nanyang City of Henan Province

② ODA in the equilibrium growth period - “Contributions as seed money”

On the other hand, I feel that the environment for project formation of ODA since the mid-2000s has become much more stable, partly because environmental policies were tightened to some extent. In most cases, there was a well-established development plan in each region for projects to be formulated upon. Under the ownership of the government, more development plans were implemented with ODA clearly incorporated, and activities could be carried out in a more planned manner. In the final stage of ODA to China, most projects were formed as part of the overall development plan, making it a lot more difficult to evaluate ODA as individual projects.

Looking back at projects implemented from around 2004 and 2005, mid- to long-term project plans that foresaw the tightening and drastic changes in environmental policies were formulated from the very beginning of the planning, and ODA was utilized as part of the process. For example, consider the sewage treatment plant built through ODA in the Guangxi Zhuang Autonomous Region Yulin City Environment Improvement Project (L/A in 2007). An upgrade had been planned for this treatment plant from the beginning in anticipation of tighter water quality regulations by China afterward. Taking into consideration its design specifications, ODA was adopted as the first phase of the project. This project style is more consistent with the mid- to long-term regional development plan. Further, in this project, it was originally planned to improve sewer pipe facilities with ODA, but due to concerns about the duration of procurement time, it was changed to procure with domestic fund, and the ODA fund was used for another purpose. As a result, the distinction between ODA and each city’s infrastructure improvement project became ambiguous, and it was to some extent difficult to accurately assess the status and outputs of ODA as a single project using the existing operations evaluation framework.

Around this time, as an evaluator, I started to become aware of the meaning and sustainable contributions of ODA to China over the mid- to long-term might not be accurately assessed within the existing evaluation framework that targets the project itself. Therefore, I shifted my focus during field surveys to a more mid- to long-term development perspective, such as how an ODA project is positioned in the development plan of the target city, and how it contributes

to sustainable infrastructure development afterward. Specifically, my interviews focused more on perspectives such as how infrastructures developed by ODA projects have been modified and improved thereafter to adapt to China's environmental policies, or conversely, how the infrastructure development has affected the environmental policies and regulations in each region, and how the experience gained from operation and management of these infrastructures has contributed to improve the capabilities and technology development of the implementing agency.

During my investigation of the Baotou Atmospheric Environment Improvement Project (L/A in 2005), I have heard that the implementing agency was tendering a bid for the procurement of gas supply equipment for Central Asia based on its experience and know-how gained through the ODA project. Like this case, I believe that the efforts of ODA are not limited to the effects on individual projects, but are having sustainable impacts in various forms. By this time, the technical level of water supply and sewerage enterprises even in inland local cities has caught up with that of developed countries. Exchange of opinions with engineers also took place at a higher level such as discussing advanced processing methods and more sophisticated ideas for improving cost efficiency. Even the inland local companies started to compete on the international stage. I strongly felt from their burning desire for development that China is no longer a country that needs to receive support.

The two impressions mentioned above are quite different, but in fact the two projects were started only seven years apart. Though the situation in Japan at that time was different, the fact that such a mature implementation environment could be consolidated for development projects in such a short time of not more than 10 years in China does show a marked contrast to Japan's "lost 20 years" in the same period. Furthermore, in the past few years, there has been an increase in interest in the projects evaluation itself in on-site discussions. There are also more public projects in China that are operated by the private sector. It shows me that their abilities of improving planning and development have further advanced.

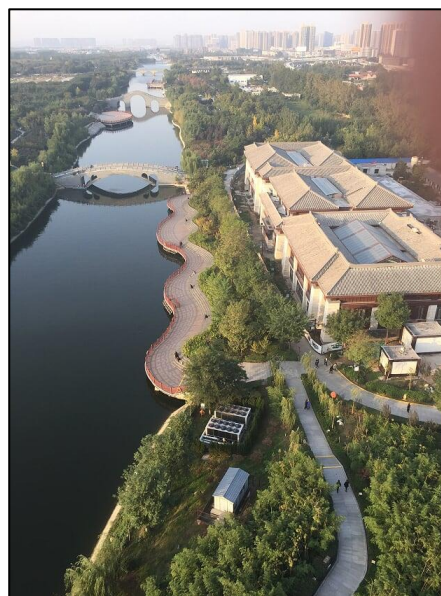
Amidst such rapid development, it is hard to verify exactly how ODA has contributed. In my discussions with the project-related people at the time, however, I often heard their gratitude for the ODA funding that had made it easier for them to raise funds from the government and other sources, and that the role of so-called seed money was greater than the actual amount of funding. I think this was not just about funding. It was also the appearance of the evaluation of secondary effects such as the recognition and trust brought by the ODA projects and the effects of transfer of technology through training in Japan.

Let's take the Shaanxi Water Environment Improvement Project (Xi'an City) in 2005 as an example of the impact brought about by training in Japan, which was conducted as part of ODA. In this project, drainage canals were constructed in the city. On top of that, a Public Relations Center was built near the canal as an educational facility to display information about the importance of the flood control project and as a learning corner for children. Local

project-related people expressed that these kinds of educational programs reflect what they learned during their training in Japan as part of ODA.



Water quality after treatment (treatment plant in Nanyang City of Henan Province)



Waterway improvement project in Xi'an City

This kind of knowledge and technology transfer-type support has produced a ripple effect in addition to ODA projects. It also triggered incorporation of new mechanisms into the mid- to long-term development plans. As I will mention below, ODA in these days is less directly recognized by beneficiaries. Instead, because it is incorporated into mid- to long-term urban development, you could say that it continues to contribute beyond the scale of the project to which ODA was invested.

(2) Changes in beneficiaries - "As a part of normal life"

Next, I will summarize what I felt from my exchanges with local residents who enjoy the benefits of the projects. The most noticeable change that I felt in my recent evaluations is that beneficiaries' interest and awareness of the development of core infrastructure, rather than ODA projects, are very low. This is not a negative thing. In China these days, even houses in local cities have faucets. People can get water whenever they twist the faucet. Flush toilets could also be commonly found. As was in the Jilin Province project mentioned above, in the late 1990s, the environmental policies and regulations in China were still weak. There were not a few cases where harmful substances such as heavy metals were discharged from pollution source factories untreated. Even developed coastal cities like Suzhou at that time had daily problems such as water pollution due to eutrophication, which was a social problem even recognized by beneficiaries. That was why the effects brought about by the ODA projects were remarkable. There was no more runoff from factories, the water quality of the river improved dramatically, and the odors and health hazards that residents had felt were also notably reduced.



Interview with beneficiaries in Yining City (2015)



Participants from Yining City attending training in Japan (2015)

However, amidst the full-scale economic development and the tightening of environmental policies in China in the late 2000s, infrastructure development using local financial funds also progressed rapidly. For this reason, to the general public, not only ODA, but also basic infrastructures such as water supply, sewerage and heat supply have become a matter of course. When I asked about the impacts and benefits of a specific infrastructure in interviews with beneficiaries, most of their responses were like “Why do you ask such a common thing?” As regional development including ODA progressed, people became less aware of the development projects. Of course, this does not impair the significance of the projects. Just like us living in Japan, we seldom think of water supply and sewerage in our lives. I believe it proves that the country has developed and matured, and it is also true that ODA plays a part in that. In addition, when it becomes so common to have infrastructures equivalent to those of developed countries, the awareness of people in urban areas will further change. An example is the increase in awareness of saving water. In my recent visit for the Ningxia Hui Autonomous Region Water Environmental Improvement Project (L/A in 2007), I found more efforts were put on soft components to raise awareness, such as developing and selling water-saving machines, holding water conservation campaigns, and giving enlightenment education to children.

(3) Conclusion

To conclude, when I look back, what I feel the most is the rapid development of China’s national power. I have been working in China almost every year for the past dozen years or so. Year by year, even from small aspects such as arranging a car for evaluation and the infrastructure procurement environment, I could feel that the environment in China is completely different from other developing countries where I usually work. In that sense, I think it is natural to end ODA projects for China. In today’s world, many regions and countries are developing at the same speed. I believe that the experience of ODA to China will be a valuable hint when we think about how ODA should be utilized effectively to support mid- to long-term development in an environment with rapid development and changes in development policies and situations like China.

Reference: List of ex-post evaluation projects

| Project type | Rating | Start fiscal year | Evaluation type | Evaluation fiscal year | Country | Sector | Project name |
|-------------------|---------|-------------------|--------------------|------------------------|---------|---|---|
| Japanese ODA Loan | B | 1996 | Ex-post evaluation | 2010 | China | Environmental issue | Lanzhou Environmental Improvement Project |
| Japanese ODA Loan | C | 1998 | Ex-post evaluation | 2009 | China | Environmental issue | Jilin Song Liao River Basin Environmental Improvement Project |
| Japanese ODA Loan | B | 1998 | Ex-post evaluation | 2009 | China | Environmental issue | Heilongjiang Songhua River Basin Environmental Improvement Project |
| Japanese ODA Loan | A | 1999 | Ex-post evaluation | 2010 | China | Environmental issue | Suzhou Water Environmental Improvement Project |
| Japanese ODA Loan | A | 2000 | Ex-post evaluation | 2012 | China | Environmental issue | Shenyang Environment Improvement Project: Phase 2 |
| Japanese ODA Loan | A | 2000 | Ex-post evaluation | 2009 | China | Roads | Heilongjiang Heihe-Bei'an Road Construction Project |
| Japanese ODA Loan | A | 2002 | Ex-post evaluation | 2015 | China | Forestry / Forest preservation | Inner Mongolia Afforestation and Vegetation Cover Project |
| Japanese ODA Loan | B | 2002 | Ex-post evaluation | 2014 | China | Sewerage | Nanning Environmental Improvement Project |
| Japanese ODA Loan | A | 2003 | Ex-post evaluation | 2012 | China | Health / Health care | Public Health Project (Liaoning Province) |
| Japanese ODA Loan | A | 2003 | Ex-post evaluation | 2012 | China | Health / Health care | Public Health Project (Heilongjiang Province) |
| Japanese ODA Loan | A | 2003 | Ex-post evaluation | 2012 | China | Health / Health care | Public Health Project (Jilin Province) |
| Japanese ODA Loan | B | 2004 | Ex-post evaluation | 2015 | China | Environment issue, water supply, sewerage | Xinjiang Yining City Environmental Renovation Project |
| Japanese ODA Loan | A | 2004 | Ex-post evaluation | 2014 | China | Environment issue, forestry / forest preservation | Eco-environmental Construction and General Treatment Project of the Yangtze Upper Reaches in Sichuan Province |
| Japanese ODA Loan | A | 2005 | Ex-post evaluation | 2016 | China | Sewerage | Shaanxi Water Environment Improvement Project (Xi'an City) |
| Japanese ODA Loan | A | 2005 | Ex-post evaluation | 2016 | China | Gas / Oil | Baotou Atmospheric Environment Improvement Project |
| Japanese ODA Loan | A | 2006 | Ex-post evaluation | 2017 | China | Water supply, sewerage | Sichuan Water Environmental Improvement Project |
| Japanese ODA Loan | Ongoing | 2007 | Ex-post evaluation | 2018 | China | Water supply, sewerage | Guangxi Zhuang Autonomous Region Yulin City Environment Improvement Project |
| Japanese ODA Loan | Ongoing | 2007 | Ex-post evaluation | 2018 | China | Water supply, sewerage | Ningxia Hui Autonomous Region Water Environmental Improvement Project |
| Japanese ODA Loan | B | 2007 | Ex-post evaluation | 2017 | China | Environment issue, sewerage, gas / oil | Henan Province Nanyang City Comprehensive Environment Improvement Project |

The Roles Played by ODA Projects for China in China's Environmental Management and Future Japan-China Environmental Cooperation

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I worked with the State Environmental Protection Administration (SEPA (currently the Ministry of Environmental Protection)) in China (the counterpart organization) from 2003 to 2006 as a JICA long-term expert with the aim of enhancing the cooperation between Japanese ODA Loans and other Japanese environmental cooperation. As one of the important tasks, I conducted mid-term reviews to verify the expected effects of the Environmental ODA Loan projects (Japanese ODA Loan projects aimed at environmental measures) being implemented at that time. I visited over 15 project sites throughout China, and through exchanging opinions with the counterpart organization, I was able to realize the roles played by the Environmental ODA Loan and its issues. The results of the mid-term reviews are applied in the "Survey Regarding Evaluation on Contribution of Environmental ODA Loan to China - Assistance for Environmental Improvement in China (Air and Water)" (a survey contracted by JBIC (Japan Bank for International Cooperation) in 2005).

Below, I would like to look back on the impacts of the Environmental ODA Loans committed from the 1990s to the early 2000s on China's environmental policies and systems with reference to the above survey report. I would also like to have an overview of the trends in China's environmental policies and systems since 2007 when approval of new Japanese ODA Loans to China finished, and then give my personal opinions on new areas in future Japan-China environmental cooperation.

1. Impacts of Environmental ODA Loans on China's environmental policies and systems

First of all, let's have an overall picture of the Environmental ODA Loans to China. There are a total of 81 Environmental ODA Loan projects from 1988 to 2004, and the amount of Japanese ODA Loans provided reached 822.8 billion yen. Some of these projects consist of multiple sub-projects, totaling nearly 300 sub-projects. I would like to summarize the outline of Environmental ODA Loans in line with China's Five-Year Development Plans.

[Environmental ODA Loan projects during China's 7th to 8th Five-Year Plans (1985 to 1995)]

Environmental projects were mainly about water supply improvement and other urban environmental infrastructures. There were 14 sub-projects of water supply improvement, which accounted for about 70% of the commitment amounts of Environmental ODA Loan projects.

[Environmental ODA Loan projects during China's 9th Five-Year Plan (1996 to 2000)]

There are a variety of environmental projects including industrial pollution control, sewerage improvement, water supply improvement, regional gas and heat supply, and conservation of the ecological environment. These projects account for about 45% of all Japanese ODA Loans provided during this period (approximately 1 trillion yen). In addition, the total project costs of the Environmental ODA Loan projects are RMB26.4 billion, which account for about 5% of the total environment investment of RMB450 billion under the 9th Five-Year Plan. Further, the planned

amount of foreign funds in this Five-Year Plan is US \$4 billion, of which the Environmental ODA Loans account for US \$1.3 billion, or about 30%.

[Environmental ODA Loan projects during China's 10th Five-Year Plan (2001 to 2005)]

Environmental projects continued to focus on urban environmental infrastructure improvement, desertification prevention, and conservation of the ecological environment of the Yangtze River basin. The 10th Five-Year Plan has set out a goal to increase the domestic wastewater treatment rate in urban areas to 45%. Under this background, both the number of sewerage improvement projects and the commitment amounts in Environmental ODA Loans increased from the previous Five-Year Plan. In terms of commitment amounts, the ratio of regional gas and heat supply also increased significantly from 8.0% to 22.0%. Industrial pollution control, on the other hand, greatly decreased. The total project costs of the Environmental ODA Loans committed during the 10th Five-Year Plan (commitment amounts from 2001 to 2004) are RMB25.4 billion, which account for about 4% of the total environment investment of RMB650 billion under this Five-Year Plan.

So, how did these Environmental ODA Loans affect China's environmental policies and systems? This point is addressed in the next chapter, by extracting and reorganizing the parts of the survey report "Survey Regarding Evaluation on Contribution of Environmental ODA Loan to China - Assistance for Environmental Improvement in China (Air and Water)" which I introduced earlier, based on my experiences through site visits and exchange of opinions with the counterparts at that time.

(1) The effectiveness in formulation of national environmental plan

The Environmental ODA Loan provided during China's National 9th Five-Year Plan on Environmental Protection (hereinafter referred to as the "Environmental 9.5 Plan") has given necessary investment funds to implement the Plan timely and effectively. The Environmental ODA Loan (the 4th Environmental ODA Loan) provided during that period exceeded 450 billion yen. The important point that I want to emphasize is that the governments of both countries have been discussing Environmental ODA Loans from the formulation stage of the Environmental 9.5 Plan.

The Japanese government strongly requested to the Chinese government that the 4th Japanese ODA Loan measures should put priority on environmental protection and development of inland areas. This has drastically changed the policy on the use of foreign government funds of the Chinese government, which placed emphasis on economic infrastructures at that time. In response to this request, the Chinese government started discussions with the Japanese government on the 4th Japanese ODA Loan in 1993, about two years before the Environmental 9.5 Plan was officially approved. During this process, the SEPA discussed closely with the State Planning Commission in China based on the Environmental 9.5 Plan. Then the State Planning Commission informally informed the Japanese government of their candidate projects, including environmental projects, for the 4th Japanese ODA Loan. Afterward, the Japanese government dispatched a preliminary survey team, and at the end of 1994, the terms and conditions were decided. It was decided to provide 580 billion yen for 40 projects, including 15 environmental projects (nine for air and water pollution measures, six for water supply), for the first three years of the 4th Japanese ODA Loan.

These Environmental ODA Loans mainly targeted areas designated by the Chinese government as having a high priority for addressing pollution. For example, with regard to air pollution control, nine provinces and two municipalities in the southwest and southern regions were designated as priority areas of acid rain pollution. Chongqing, Changsha, and Liuzhou in particular, were regions with frequent acid rain. In light of this, 109 projects for addressing acid rain were listed, of which 67 projects planned to

use foreign funds. In addition, 23 cities were selected as priority for air pollution control, including Shenyang, Dalian, and Guiyang, which had been suffering from pollution caused by soot, dust and sulfur dioxide for years. A total of 219 air pollution control projects were listed, and 136 of these projects were planned to use foreign funds. Among these projects, the Environmental ODA Loans were provided to support improvement of Chongqing, Guiyang, Liuzhou, and other cities designated as priority areas of acid rain pollution, as well as Shenyang, Benxi, Lanzhou, and other cities designated as priority for air pollution control.

(2) The effectiveness in local government's ability to manage environmental projects

The Environmental ODA Loan is considered to have enhanced the abilities of Chinese local governments to plan, implement, and manage environmental projects, and played a useful role in facilitating the implementation of these projects. At that time, the "Environmental Protection Target Responsibility System"¹ and the "Quantitative Examination System for Comprehensive Urban Environment Improvement"² were introduced in provinces and municipalities with heavily polluted cities and areas, showing that they were aware of the need for addressing environmental issues. In reality, however, many local governments prioritized more economic growth in their regions than environmental protection. In view of this, the SEPA reflected plans that focus on pollution control in the Environmental 9.5 Plan, and guided local governments to incorporate environmental conservation into their economic and social development plans.

In September 1995, the State Planning Commission and the SEPA convened the provincial governments, the planning committees from cities under separate state planning (cities delegated with more authorities than an ordinary city), and the Environmental Protection Bureau, and held the National Working Conference on Environmental Protection. It was concluded in this conference that, (1) local governments' plans shall be in line with the central government's 9th Five-Year Plan, (2) local governments' 9th Five-Year Plan on Environmental Protection shall include not only environmental protection goals and indicators, but also environmental improvement projects and funds, and (3) the plan for environmental improvement projects and funds shall be incorporated into the annual budget plan in addition to the Five-Year Plan. In addition, the roles of each party were proposed as the principle of financing for environmental investment; enterprises secure funds by themselves through reinforcement of the polluter-pays principle, local governments secure funds for the construction of urban environmental infrastructures, and the central government provides support through financing from domestic banks and the use of foreign capital. Furthermore, it was also made clear that in principle, local governments and enterprises shall be responsible for project implementation. The central government's responsibility is limited to providing indirect support.

The 4th Environmental ODA Loan has provided funds to the local governments, especially the municipal governments of cities designated as priority polluted areas, through the central government

¹ A system in which the governor, mayor, and/or magistrate stipulate specific environmental protection goals within their term of office, and sign a document stating that they will be responsible for achieving those goals. They receive rewards and punishments according to their performance in achieving the goals.

² The Quantitative Examination System for Comprehensive Urban Environment Improvement introduces an index for quantitatively judging the environmental quality of cities. This system consists of five sectors: air, water quality, noise, solid waste utilization and treatment, and urban greening. The environmental quality of cities is scored using a total of 21 quantitative criteria. This system also serves as a criterion for examining whether the responsibilities prescribed in the Environmental Protection Target Responsibility System have been fulfilled. There are two types of examinations under this system. One is the national examination, in which the state directly examines 37 cities throughout China, whereas the other one is the provincial examination conducted by the provincial governments on focus cities within their jurisdiction. At present, the provincial examination covers 230 cities nationwide.

(SEPA) for the implementation of environmental projects. Thereby, many local governments followed the progress management methods demanded by the Japanese ODA Loans when implementing the funded environmental projects. On average, the Japanese ODA Loan covered about 40% of the total project costs. The rest of the money had to be raised by the local governments of each project from their own budgets or financing from a bank. In that sense, Japanese ODA Loan can be said to have contributed to indirectly improve the local governments' ability to raise money. Environmental ODA Loan projects have been implemented in all provinces and autonomous regions except Qinghai, Hainan and the Tibet Autonomous Region, involving over 100 cities.

(3) The effectiveness in introduction of clean technologies

Environmental ODA Loan projects were not only about supporting technologies for treating pollutants emitted from factories, but also cleaner production technologies that suppress emissions of pollutants in the production process with energy-saving/resource-saving technologies, and technologies that enable the collection and reuse of valuable resources contained in waste. Information on available cleaner production technologies was provided to enterprises at the project formulation stage to encourage them to adopt those technologies. This allowed companies to recover the costs of environmental investment and even gain profit.

Centered on the steel industry, Benxi, Liaoning Province, is a heavy industrial city that produces abundant iron ore and coal. It has suffered from severe air pollution so seriously that the city was called "the city invisible to satellites". In 1989, the municipality established the Benxi Seven-Year Plan for Environmental Improvement, and implemented environmental improvement measures using financial funds from the local government. However, most of the funds were provided for investment in companies' pollutant treatment technologies, and because the sources of emission were not sufficiently monitored, the pollution control equipment being installed was often stopped. In view of this situation, in the Benxi 9th Five-Year Plan on Environmental Protection formulated in 1995, the municipal government set the annual average sulfur dioxide concentration, sulfur dioxide emissions and emission reductions for 2000. At the same time, it also decided on about 70 environmental investments, with a total project cost of about 30 billion yen, to meet the requirements. Of which, the Environmental ODA Loans supported 25% of all projects, which was about 50% in terms of money amount. This figure included the support provided to state-owned enterprises for investment in cleaner production technologies that require changing the production process, and technologies that enable the collection and reuse of valuable resources contained in waste. According to what I heard locally, an engineer from a company involved in the cleaner production project under the Japanese ODA Loan was qualified as a cleaner production consultant after leaving the company and diagnosed other companies.

On the other hand, there are also cases in which the introduction of these technologies was affected by changes in economy and other conditions. For example, market competition began to intensify with the progress of market economy and reform of state enterprises in China. The state-owned enterprises, which had been carefully protected by the local government, delayed their management reform and were unable to keep up with the sudden changes in the external environment. As a result, although environmentally-sound technologies had been introduced, the factories themselves could not survive and had no choice but to stop production. For another example, the liquefied propane gas (LPG) supply project was implemented to replace coal used in residential areas and restaurants. The concentrations of sulfur oxides and total suspended particulate matters have steadily declined since the project started. However, from the end of 2004, the cost of LPG supply rose as crude oil prices soared. Pipelines were also constructed for the natural gas developed in western China. When supply of natural gas began in July 2005, LPG lost its competitiveness and its supply was forced to stop.

(4) The effectiveness in environmental systems and standards

In the process of implementing Environmental ODA Loan projects, we can see some cases where the ODA Loan has also contributed to building institutional systems by local governments, which were indispensable for achieving sustainable development. Such as cleaner production I mentioned above, the central government recognized its effectiveness and enacted the Cleaner Production Promotion Law in 2001. Furthermore, many urban environmental infrastructures such as regional heat and gas supply and sewerages were constructed under the Environment ODA Loans. As knowledge on their construction, maintenance, and operation was accumulated and disseminated, some of the knowledge were institutionalized. For your information, I conducted mid-term review on six concentrated heat supply projects, 10 city gas projects, and 32 sewerage projects (the number of sub-projects).

For example, as sewerage projects increased, the Chinese government began to recognize the need to establish a sewage treatment fee collection system. Many local governments introduced such system based on the polluter-pays principle. Since the sewage treatment fee was determined based on the volume of water used measured by water meters, water companies collected sewage treatment fees along with the water fees. However, prior to 2003, the fees collected had not been directly used for sewerage operation and maintenance. Instead, they had been first put into the municipal governments' finances and then provided by the Municipal Finance Bureaus to sewerage departments according to their financing needs. Nevertheless, the Municipal Finance Bureaus had not always allocated sufficient funds for the maintenance and operation of sewerages. Some sewage treatment plants had been forced to stop operation due to a lack of budget. Under the sewage treatment fee collection system in 2003, however, a sewerage usage fee was collected as the sewage treatment fee. The sewage treatment fees collected by the water corporations were almost automatically allocated to the sewage treatment facilities without being included in the financial income of the municipalities. This has enabled the sewage treatment facilities to secure a stable source of revenue from the sewage treatment fees.

Besides, standards for the design and construction of sewage treatment plants, as well as operation technologies and accounting management were gradually introduced. Guidelines for selecting sewage treatment technologies for sewage treatment plants were also developed. Knowledge on the criteria for selecting sewerage technologies was accumulated as many sewage treatment plants were being constructed through the Japanese ODA Loan projects. For example, in areas with a high proportion of industrial wastewater, an anaerobic-aerobic treatment system or an anaerobic-anoxic-aerobic treatment system that can respond to changes in the amount and concentration of wastewater should be selected. In the region of North China there is in a severe water shortage, and sewerage treatment should be designed assuming the use of reclaimed wastewater. In areas where more money can be invested, one should consider the digestion treatment of sludge, and the recovery and use of methane gas generated in the process to generate power. It has also been emphasized that sewer pipes should be constructed at the same time or before the construction of a sewage treatment plant in order to be able to fully exert the effects of the treatment plant. Even though sewage treatment plants were built with the Japanese ODA Loans or financial funds from the central government, in many cases, local governments had to raise funds by themselves to construct the sewer pipes. However, local governments tended to be slow in procuring funds, thus causing the construction of sewer pipes to be delayed, and as a result, the amount of sewage flowing into the sewage treatment plant sometimes fell below the treatment capacity. That was why sewer pipes should be constructed first.

(5) The effectiveness in environmental cooperation between cities in Japan and China

Environmental ODA Loans have had an effect in promoting and strengthening technical cooperation and exchanges between China and Japan at the city level. For example, in the Environment Model City Projects and the Beijing Sewage Treatment Plant Construction Project, which were supported by the Japanese ODA Loans, technical cooperation and exchanges took place between cities in Japan and China. The Dalian Environment Model City Project is a project that started from the environmental technical cooperation initiatives between Dalian and Kitakyushu City. It was originally the Dalian Environment Model District Plan that Kitakyushu proposed to the Dalian authority while conducting surveys on cleaner production for representative companies in Dalian and holding seminars for engineers from enterprises. This led to the formulation of a master plan by the Japan International Cooperation Agency (JICA), thus allowing subsequent Environment Model City Projects to be implemented through the Environmental ODA Loans based on this master plan. Environmental cooperation at the private and citizen levels were further enhanced in the process of implementing the Environment Model City Projects.

The Chongqing Environment Model City Project played a role in complementing the technical cooperation between local governments regarding advanced natural gas utilization that Osaka City had been moving ahead with. Before constructing natural gas tanks and pipelines in Chongqing under the Environmental ODA Loan project, Chongqing and Osaka conducted joint researches on various technologies, including gas supply technologies for automatic supply systems, combustion technologies for industrial fields such as boilers and furnaces, and detection technologies for gas leakage. Based on this experience, in the construction of a natural gas supply facility in Henan Province supported by the Environmental ODA Loan, Osaka strove to promote technical cooperation and exchanges between cities, such as providing technical assistance to cities in Henan Province to improve air pollution.

In the Beijing Sewage Treatment Plant Construction Project, the Gaobeidian sewage treatment plant, which boasts a treatment capacity of 500,000 m³/day, was constructed with the Environmental ODA Loan. At that time, however, China had little experience in planning, constructing, and operating such a large-scale sewage treatment plant. In view of this, the Bureau of Sewerage of Tokyo, a friendship city of Beijing, accepted trainees for training on water treatment and management techniques, as well as on how to start up a new sewage treatment plant. The sewage treatment plant was constructed and operated smoothly, in the end. Moreover, many of the trainees are now executives in the Beijing Water Authority. Currently, the Gaobeidian sewage treatment plant has enhanced its treatment capacity to 1 million m³/day. As a representative and the largest sewage treatment plant in China, it does not only accept a great number of visitors from China and abroad, but has also established a new training facility inside the plant.

2. Recent trends in China's environmental policies and institutional framework, and JICA's technical cooperation

Provision of new Japanese ODA Loans ended in 2007. However, the Environmental ODA Loan projects have continued to be implemented, operated, and managed since then. Although these projects have contributed in part to improving the environment in China, the environmental issues in China are becoming more diversified and complex nowadays, reflecting economic and social conditions. Below, I would like to take air pollution as an example to give an overview of the recent status of environmental issues in China and the changes in policies and institutional framework for tackling these issues. Then, I will touch on how JICA's technical cooperation has been involved and contributed in the process.

(1) Strengthening of policies and institutional framework for addressing air pollution in China

Let's have a look at the air pollution situation in China in 2016 with the latest data. The achievement status of air pollution emission standards in 338 cities in China is as follows: sulfur dioxide 97.0%, nitrogen dioxide 88.1%, carbon monoxide 97.0%, total particulate matter (PM10) 41.7%, and fine particulate matter (PM2.5) 28.1%. The emission standard achievement rate of sulfur dioxide and nitrogen dioxide, which are the causes of acid rain and were prioritized under the Environmental ODA Loan, reach a high of about 90%. On the other hand, the standard achievement rate of PM10 and PM2.5 is rather low. However, when we look at the PM2.5 of 74 cities that has been measured since 2013, it can be observed that the achievement rate of emission standards has been improving steadily year by year from 2013 to 2016 (4.1% -> 12.2% -> 16.2% -> 18.9%). PM (particulate matter) is a substance formed when particulates generated from industrial smoke, car exhaust gas, dust storms, forest fires, etc. chemically react with gaseous substances in the atmosphere, and to which heavy metals such as arsenic and cadmium adhere. Its mechanism of formation is complex and it has a serious impact on health.

The State Council of China formulated the Air Pollution Prevention and Control Action Plan in 2013 with the aim of improving air quality over the medium to long term. This Action Plan set 2017 as the target year, by which PM10 in prefectures and cities at or above the prefectural level nationwide should be reduced by 10% from 2012, while PM2.5 in Beijing, Tianjin and Hebei areas should be reduced by 25% from 2012. Specific measures include improving coal boilers (stopping the construction of small boilers, switching from coal to gas, etc.), improving the quality of gasoline and other fuel oil, scrapping old vehicles, curbing the total coal consumption (lowering the percentage of coal to not more than 65% of the total energy consumption, banning the construction of new coal-fired power plants other than for cogeneration, etc.), and accelerating the introduction of clean energy (13% renewable energy and 50 million kilowatts of nuclear power generation capacity in 2017, etc.). The Action Plan also includes improvement of environment for achieving these targets, such as technologies and R&D, energy and industrial restructuring, strengthening of regulations and supervision, clarification of corporate social responsibility, and public participation.

On January 1, 2015, the amended Environmental Protection Law (hereinafter referred to as the amended Environmental Law) entered into force in China. The former Environmental Protection Law, which had been promulgated in December 1989, was amended for the first time in 25 years and was completely revised. The background underlying the amendment of the Environmental Law was the complexity and seriousness of environmental pollution, as symbolized by PM2.5, and the increase in environmental awareness among citizens. New perspectives are included in the amended Environmental Law. First, the amended Environmental Law called for ever stricter penalties for polluters of the environment, because law enforcement under the existing environmental laws and regulations had become routine and loose. People were not punished even if they did something illegal. It also specified the responsibilities of the regulatory parties at the same time, which had not been included in the former law. Second, the amended law clarified the subject of public interest lawsuits in environmental pollution cases, which had been ambiguous under the former law and the Civil Procedure Law. It also institutionalized disclosure of environmental information by governments and enterprises.

Regulations have also been tightened in implementing the amended Environmental Law. The basic idea is to limit the role of the government to institutional framework, supervision and auditing, and to incorporate incentives and toughened penalties to encourage enterprises to address environmental issues autonomously. For example, in the past, ex-ante regulations were applied in which the government's environmental departments check and approve applications received from enterprises. After the amendment, enterprises are required to prepare applications in accordance to guidelines. This has made

it easier to obtain approval, yet on the other hand, a new sample investigation is conducted after the approval, and severe penalties are imposed for violations. In addition, from the viewpoint of promoting highly transparent administrative execution and mutual monitoring, the information of the Pollutant Discharge Permit is publicly disclosed on the Internet (the National Administration Information Platform) after the application is approved. The information includes discharge substances, concentrations, and total annual discharge amount. The industries covered include petroleum refining, coke, steelmaking, papermaking, and chemicals.

The former law adopted a sewage charging system in which local governments' Environmental Protection Bureaus collected sewage charges from enterprises. Under the amended law, enterprises are required to file this charge as local tax and the local tax authorities collect it. Tax payments are calculated by multiplying the pollution equivalent value by the applicable tax amount. As an incentive, tax payments are reduced if emissions fall below the emission standard (e.g. 50% reduction if emissions are less than 50% of the standard). On the other hand, in the case of a violation such as underclaim, a fine of up to five times the amount underclaimed is imposed (the fine was up to three times under the former law).

Environmental auditing methods were also strengthened. A central environmental audit system was introduced in response to criticism that it would not be able to handle collusion between the government and enterprises by the traditional audits conducted by local governments. In the new audit system, not only enterprises but also local governments are subject to audits based on reports from the public. In the two years from 2016 to 2017, all provinces (30 provinces) were audited, and the number of punishments was about 24,000 cases, with about 15,000 people being punished. There were about 120,000 cases of accusations during this period, of which 20% was punished.

It is also interesting to note that a CO₂ emissions trading system that makes use of the market economy has been introduced. It is a part of the measures for the Paris Agreement to combat global warming. Since controlling CO₂ emissions involves many measures related to fossil fuel combustion, it eventually leads to air pollution abatement measures. In 2013, markets for trading CO₂ emissions were launched in eight provinces and cities including Beijing, Shanghai, and Chongqing, and pilot runs started. Enterprises selected by each local government were assigned with a total emissions allowance, and they were obligated to purchase allowance for the excess emissions from the emissions trading market. It is reported that from 2013 to 2016, a cumulative total of approximately 370 million tons of CO₂ emissions, about 100 billion yen, has been traded by more than 3,000 companies (including 70 Japanese companies). From the result of this trial run, it was decided to roll out this system nationwide from 2017. It covered 1,700 electricity enterprises in the first stage, and will gradually expand to other industries, including petrochemical, steel, non-ferrous metal, and chemical in the future.

(2) Contributions of JICA technical cooperation

JICA technical cooperation projects are also considered to contribute to formulation and implementation of the Chinese government's air pollution abatement-related laws mentioned above. I would like to give some examples. As I mentioned earlier, the Air Pollution Prevention and Control Action Plan announced in September 2013 includes improvement of pollution control, such as technologies and R&D, energy and industrial restructuring, strengthening of regulations and supervision, clarification of corporate social responsibility, and public participation, which are required for implementing the specific measures. Some of these contents are related to the outputs obtained through the cooperation in the implementation of the JICA projects. Some related articles can be picked up from JICA China Office News (Oct. and Nov. 2013 (combined issue)). The following table summarizes them.

| Main contents of the “Air Pollution Prevention and Control Action Plan” | JICA technical cooperation projects and their outputs which can be considered to be related to the “Air Prevention and Control Action Plan” |
|--|---|
| Study on correlation between air pollution and health (Action Plan (Article 8)) | In the “Training Project for Promoting the Institutional Building on Compensation for Health Damage by Environment Pollution”, JICA shared with China Japan’s experience of severe pollution-related diseases and how it had established a compensation system for victims of pollution-related diseases after numerous court battles. |
| Circular production through recycling by companies, development of circular industrial parks (Action Plan (Article 10)) | In the “Promotion of Circular Economy Project”, JICA formulated a maintenance plan and guidelines for zero emissions in industrial zones (industrial parks) through mutual recycling of waste between factories. |
| Strengthening of nitrogen oxide management (total emission control system) (Action Plan (Article 17)) | Through the “Project for Total Emission Control of Nitrogen Oxide in Atmosphere”, based on the know-how of how Japan controls total emissions, JICA identified technical issues as well as policy and institutional issues required for reducing emissions, and disseminated practical control technologies and methods. |
| Strengthening of environmental supervision and management (Action Plan (Article 23)) | In the “Promotion of Circular Economy Project”, taking Japan’s corporate environment supervisor system as a model, JICA introduced it to China. It also held seminars for dissemination of the system for more than 7,000 people, including local environmental government officials and concerned persons from enterprises. |
| Public participation (Action Plan (Article 35)) | JICA is building a “Japan-China Environmental Information Plaza” (tentative name) in the Sino-Japan Friendship Center for Environmental Protection as a national-level environmental education base. It also provides training for environmental volunteers and develops educational materials. In the “Project on Capacity Building on Climate Change and Public Participation”, JICA is giving training with the aim of improving citizens’ environmental awareness. |

Let me give one more example. JICA cooperated in preparation for the amended Environmental Protection Law, which was revised in January 2015 for the first time in 25 years. With the cooperation of the Ministry of the Environment of Japan, JICA conducted training in Japan from April 1 to 11, 2013, before the Standing Committee of the National People’s Congress (NPC), the legislative body of China, held the second meeting to deliberate on the law amendment. Eleven members from the Administrative Law Office of the NPC Legislative Affairs Commission and the Ministry of Environmental Protection who were involved in the amendment of the Environmental Protection Law attended the training. During this training, lecturers from various stakeholders engaged in environmental issues in Japan were invited, and through site visits, trainees got required information on the comprehensive system and operation status of Japanese environment-related laws. They also actively exchanged opinions. With regard to the Environmental Law, an outline of Japan’s Basic Act on the Environment, the philosophy of environmental rights, the impact of lawsuits on environmental policies, settlement of environmental pollution disputes, and the relationship between local governments and companies were introduced. As for pollution lawsuits, in addition to a lecture given by the Pollution Control and Environmental Protection Committee of the Osaka Bar Association, the Aozora Foundation (NPO) also shared its experience of air pollution lawsuits in the Nishiyodogawa area from the perspective of local residents. Many participants from China expressed, “I’d like to apply what I learnt from the background of local governments and companies’ voluntary efforts in environmental protection, the active participation of citizens, and the government’s incentive policies for enterprises, in order to strengthen the environmental protection measures in China in particular.” (JICA China Office News, April 2013 issue)

Furthermore, after the amendment of the Environmental Protection Law, JICA invited its counterparts to Japan to the Country-Focused Training for China in 2015. The counterpart of the Project for Administrative Litigation Law and Administration-related Law was invited to the Air Pollution Law course, and the counterpart of the Project for Capacity Development of Planning for Pollution Control of O3 and PM2.5 in Atmosphere was invited to the Air Pollution Control course respectively to share their useful knowledge in the implementation of the amended law.

(3) Trends in the air pollution situation in China

As we have seen, the Chinese government has made continuous efforts and adopted new initiatives to improve the environment since the 1990s and 2000s when the Environmental ODA Loans were provided. Now, here is a question. Have the outputs actually led to improvements in environmental quality? Here, I will examine air pollution by having a look at the changes in the emissions of sulfur dioxide, one of the air pollutants. The data of sulfur dioxide has been published by the SEPA in the “Report on the State of the Environment in China” every year since the 1990s. The changes in sulfur dioxide emissions in China in the past are shown in the following table (bar graph). (The figures for 1995, 1996, and after 2015 are not included in the graph, because, instead of the volume of emissions, they were published as standard achievement rate or other indicators in the “Report on the State of the Environment in China”.)

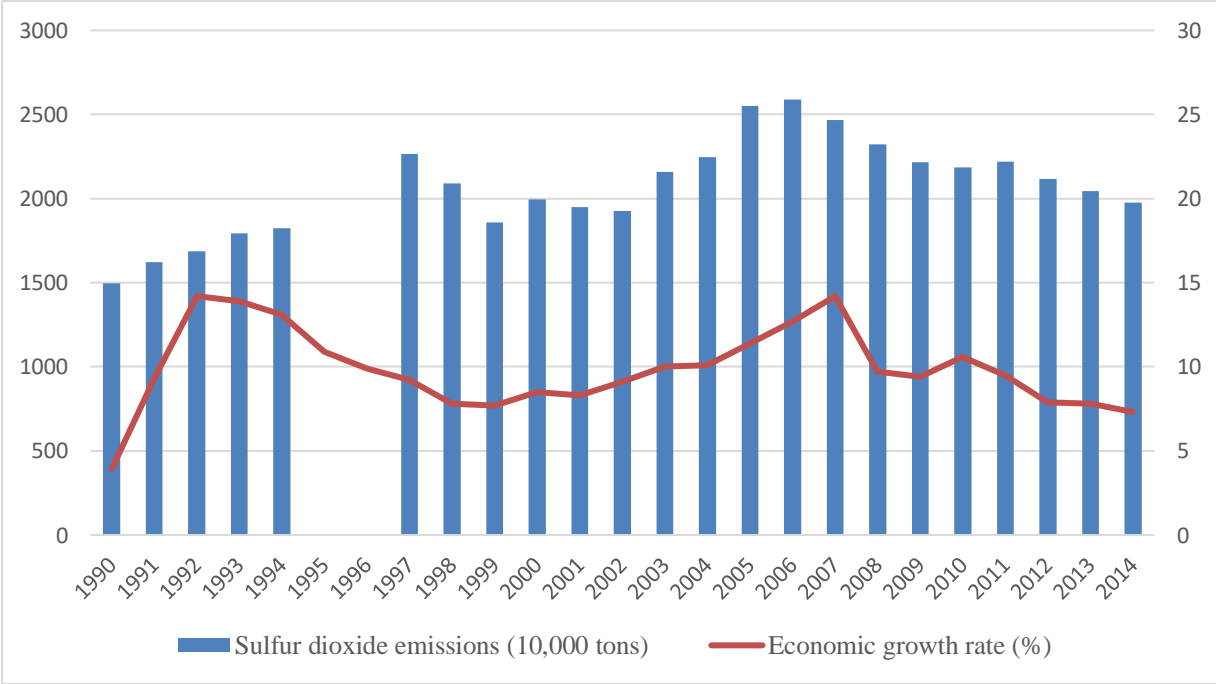


Table - Changes in sulfur dioxide emissions and economic growth rates in China (The left scale shows sulfur dioxide emissions and the right scale shows annual economic growth rates. Sulfur dioxide emissions are based on the “Report on the State of the Environment in China”, and economic growth rates are based on World Bank data.)

These figures indicate that sulfur dioxide emissions have been increasing since 1990. It showed a decline around 2000, but started to increase again, reaching a maximum in 2006, and declined every year since then. On average, total sulfur dioxide emissions increased by about 30% between 1990 and 2014. It is hard to know the outcomes of the environmental measures taken by the Chinese government from the changes in sulfur dioxide emissions. What we should note here, however, is that the Chinese economy has substantially grown about thirtyfold (US \$0.37 trillion -> US \$10.5 trillion; World Bank GNP data) between 1990 and 2014.

As another viewpoint, I would like to compare sulfur dioxide emissions with the annual economic growth rates during the same period. The annual economic growth rates are shown by the line graph in the above table. This graph shows that economic growth rates and sulfur dioxide emissions have been changing similarly since 1998. For example, looking at 2011 to 2014, sulfur dioxide emissions dropped by an average of 12.3% from 22.18 million tons to 19.75 million tons, while economic growth rates also declined from 9.5% to 7.3%. In any case, sulfur dioxide emissions have been on the decrease since peaking in 2006, but it is not clear from this data alone how much this is due to the outcome of environmental measures. The above table is based on data up to 2014. Since 2015, the Chinese government has drastically amended the Environmental Law and has begun to considerably strengthen its regulatory system. We look forward to further analysis from 2015 onward.

3. Future Japan-China environmental cooperation; promotion of green finance

The strengthening of environmental regulations by the Chinese government can have an impact on business activities such as adding costs. However, from the macro perspective, the higher need for environmental measures will create opportunities for environmental businesses. In addition, economic incentives for pollution control by the Chinese government and emissions trading using market mechanisms also stimulate environmental businesses.

It is said that there are two kinds of companies that engage in environmental businesses: companies that “sell the environment” and companies that “sell with the environment”. A company that “sells the environment” is a company that rolls out environmental businesses such as environmental engineering and environmental solutions among companies. They cover different sectors, including energy-saving, resource-saving, and pollution control measures for water, air, waste, and soil. The Circular Economy Promotion Law was enforced in China in 2009, and in 2011, the Regulations on the Administration of the Recovery and Disposal of Waste Electrical and Electronic Products, the Chinese version of the Act on Recycling of Specified Kinds of Home Appliances, was introduced. In response to this move, a company that engages in waste treatment and resource recycling has started a home appliance recycling business using a system similar to that in Japan, and is also working on rolling out a business to handle contaminated soil. On the other hand, a company that “sells with the environment” is a company that primarily engages in businesses between companies and consumers, and offers eco-friendly products and services. Their products not only need to be superior, but should also be a brand trusted by consumers. For example, a Japanese printer manufacturer has set up one of its worldwide toner cartridge recycling bases in China. They completed an international recycling system by giving clients an eco-friendly image while having clients continue to use the company’s inks and toners.

From the perspective of cooperation between Japan and China in the environmental field, we can see that the government sector took the lead from the 1990s through the 2000s when the Environmental ODA Loans were utilized. Since then, companies and business sectors have been assuming a leading role. Amidst such drastic changes, which field should we focus on in order to promote further environmental cooperation between Japan and China? I would like to propose “green finance” through which environmental businesses in both countries can be further enhanced.

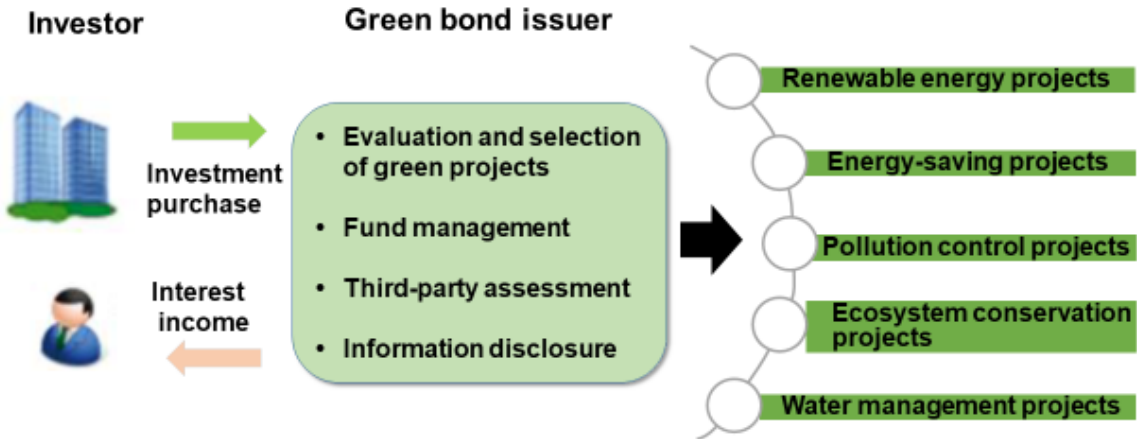
The Sustainable Development Goals (SDGs) and the Paris Agreement to combat climate change agreed on in 2015 have led to a growing international recognition of the need to promote activities such as renewable energy and energy-saving, resource efficiency and circular economy, nature and ecosystem conservation, and climate change adaptation (measures against floods, droughts, etc.), as well as the

importance of expanding green finance where private funds, in particular, are expected to be mobilized for these activities.

At the G20 Summit hosted in China (Hangzhou) in July 2016, the Chinese government launched an international Green Finance Study Group (GFSG) and addressed expansion of green finance in the G20 joint statement. China has a strategic policy of using green finance to solve serious environmental problems in the country, which is in line with the intention of developed countries to expand green finance for low carbon. Green finance in China has in fact made significant progress. For example, in August 2016, seven ministries and the Central Bank jointly issued the “Guidelines for Establishing the Green Financial System in China” with the aim of supporting policy incentives such as grants or subsidies in loans and guarantees for expanding green finance.

Let us take a look at green bond, a specific financial instrument of green finance, as an example. Green bond raises funds from the capital market necessary for the implementation of environmental (green) projects such as renewable energy, pollution control, and waste management by issuing bonds. These bonds can be issued by companies, banks, local governments, or even the central government. One of the features of the green bond is information disclosure on the green projects to be financed, such as project outline, funding amount and environmental benefits. China issued approximately US \$30 billion (3.24 trillion yen) of green bonds in 2018, second only to the United States’ amount of about US \$34 billion. The amount of green bonds issued in the world in that year was approximately US \$170 billion, of which China accounted for 18%. Over the past few years, China has boosted its international presence with its large green bond issuance. In comparison, Japan seems a little behind. The Ministry of the Environment issued the Green Bond Issuance Guidelines in 2017, and established technical and financial supporting schemes to expand the green bond market in Japan. Since then, the amount of green bonds issued in Japan has rapidly increased. In 2018, about 540 billion yen of green bonds were issued by companies (electricity, electric railways, ships, real estates, construction, retails, etc.), banks and leasing companies, and local governments. In parallel with green bonds, the Ministry of the Environment is planning to develop a system to expand loans and credits to mobilize funds to green projects.

Green Bond Scheme



In this way, there is a clear rising trend of green finance in both Japan and China, and the need for the formation and implementation of the underlying green projects is also high. Companies of Japan and China are making their business in each other's countries. For example, more than 30,000 Japanese companies operated in China as of 2016. Greening activities such as environmental improvement and low-carbon activities have been increasing in recent years. Green finance systems and markets to financially support these activities are also growing. Accordingly, it is expected that more and more Japan-China joint ventures will issue green bonds in the financial markets in each other's country, and that more and more Japanese and Chinese investors will purchase the green bonds.

On the other hand, the finance system needs to be further improved in order to expand green finance. For example, the issue of the definition of "green". In China, clean coal is included as a green project, but it is basically not recognized as green in international market. In Japan, switching fuel from oil to gas can be considered as green, but it is controversial internationally. Both countries need to coordinate the definition of "green", taking into consideration the discussions in the international financial market. In addition, information disclosure on environmental projects and their benefits is also an issue. There is an opinion that information disclosure by companies in China is not always sufficient. For green investors and financial institutions, however, information disclosure is essential for making investment decisions. Furthermore, incentives to develop green projects are required. China has introduced a financial support package like the "Guidelines for Establishing the Green Financial System in China", but Japan does not have such a comprehensive framework. Therefore, there must be areas where Japan and China can cooperate while sharing their experiences on these issues.

As the environmental businesses in Japan and China continue to grow, there are opportunities for both governments to cooperate in developing a framework for enhancing green finance while taking advantage of the common ground of SDGs and Paris Agreement. I believe it will become a promising area for future Japan-China environmental cooperation.

[References]

Graduate School of Economics, Kyoto University, "Survey Regarding Evaluation on Contribution of Environmental ODA Loan to China - Assistance for Environmental Improvement in China (Air and Water)" (November 2005)

Ministry of the Environment, "Recent Situation of Air Pollution in China" (2017)

Embassy of Japan in China, "Air Pollution in China" (October 2017)

Kentaro Hara, Manager of Economic Information and Machinery-Environment Industry Division, JETRO Shanghai Office, "Current Situation of Environmental Issues in China" (June 2018)

Japan International Cooperation Agency, "JICA China Office News" (FY2013 - FY2017)

Meguri Aoyama, Researcher (former) of the Keio Institute of East Asian Studies, "Environmental Issues and Environmental Business in China" (2015)

Ministry of the Environment, "The Green Bond Issuance Promotion Platform" (accessed December 3, 2019)

G20 Green Finance Study Group, “G20 Green Finance Synthesis Report” (July 2016)

Wang Yao, Director General of the International Institute of Green Finance, Central University of Finance and Economics, Beijing, “China’s green finance strategy: much achieved, further to go” (October 2018)

Climate Bonds Initiative, “China Green Bond Market 2018” (February 2019)

EU Technical Expert Group on Sustainable Finance, “Report on EU green bond standard” (June 2019)