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Water-supply Management in Japanese Shrinking Society¹

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¹ This paper is based on the research paper reported to the AAPA conference on November 15, 2023 and revised as of April 2024.

Abstract

1. This paper's object is water-supply management in the changing society. The research question is 'How the municipalities (water suppliers) should respond to the social changes (depopulation) in Japan for sustainable public services?'
2. Method is the analysis of the quantitative data and the case studies of some local governments.
3. Municipalities are basically in charge of the water supply in Japan and the population decline, resulting in fewer individual water users, has a fundamental impact on long-term management. This declining demand has reduced the income from water charges, profoundly impacting the waterworks business. In addition, municipalities face financial crises, with outstanding local loans amounting to approximately 182 trillion yen (1.2 trillion euros); the need to combat the pandemic in order to support the economic life of the people has led to large debts. Therefore, restoration of fiscal health of local governments is an urgent issue.
4. In those situations the municipality as water supplier has to solve the issues on their own. Municipalities must address three major problems in water management: (a) small-scale businesses, (b) organizational inefficiency and (c) aging facilities. The two main options for these challenges are *wide-area management* and *public-private partnerships* (PPP).
5. The first of these involves the effective use of a wide-area management. Several municipalities have established associations. However, recently, a new model has been implemented; '*unified wide-area waterworks management*' involves an association composed of a prefecture and all municipalities in its jurisdiction. This allows for the most exhaustive and unified control of services throughout the area. The authorities in Kagawa and Hiroshima, which have advanced wide-area waterworks, have several noteworthy characteristics as follows:
 - (A) A combination of unified wide-area waterworks management and timely revision of charges would ensure the sustainable development of the waterworks business.
 - (B) Water supply authorities can manage assets and liabilities in a well-balanced manner by focusing on expenditure on investments for wide-area waterworks management.
 - (C) Water supply authorities have consolidated water purification plants to reduce depreciation expenses, which has helped reduce water supply costs.
 - (D) Unified wide-area waterworks management has had certain positive effects, including (a) reductions in the unit price of the water supply, (b) correction of regional disparities in the unit price, (c) optimization of facilities, and (d) reinforcement of organizational systems.
6. The second option is PPPs. The Water Act was amended in 2014 and the concession model was introduced. However, almost all municipalities have yet to introduce this model. Local governments have been cautious about introducing this system. Therefore, a system that addresses citizens' concerns is required. Local government should take into account foreign experiences including remunicipalisation.
7. Current Japanese water supply management is characterized by uncertainty, fragility, and unpredictability. In those situations, the conceptual changes are expected to deal with such difficult factors. The keys for the sustainable management are the idea of 'super-wide' and 'reversible trial of privatization'. Japanese local governments should make flexible strategies.

Keywords: water-supply management, polycrisis, declining population, financial deterioration, developed collaboration, PPP, diversified collaboration, large-scale collaboration, enter-prefecture-area-syndicat, remunicipalization.

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Introduction

Currently the poly-crisis has become a major issue in public administration; the crises are various cases such as pandemics, wars, natural disasters, and financial crisis. In this context, depopulation and government financial deterioration are the most typical crises in Japan. This paper focuses on water supply management by Japanese local governments and tries to consider the management in those crises. From this point of view, this paper's object is water-supply management in the changing society and the research question of this paper is as follows:

'How the municipalities (water suppliers) should respond to the social changes, the depopulation in Japan for sustainable public services?' This paper tries to consider this challenge which Japanese local governments are currently facing.

I. Method

The research object of this paper is the management of water supply business. The research method is the consideration based on data analysis and comparative study. This paper focuses on depopulation and financial crises. Therefore, the population trend and financial management data are principal data. The main source are Japanese local enterprise year books published by the Ministry of Internal Affairs and Communication ('MIC' hereinafter), the Cabinet office reports and such.

To analyze the effects of risks, the author uses the data as follows:

- A. Trend of Depopulation; OECD.Stat. and the data produced by MIC.
- B. Trend of Finance; the data from the web pages of the Ministry of Finance of Japan in 2023.
- C. Comparative analyses; *"The Governance of Water services in Europe"*, EurEau, 2007.
- D. Financial situation of Japanese water enterprises; *"Local public enterprise yearbook (2014–2021)"*, MIC.

II. Result

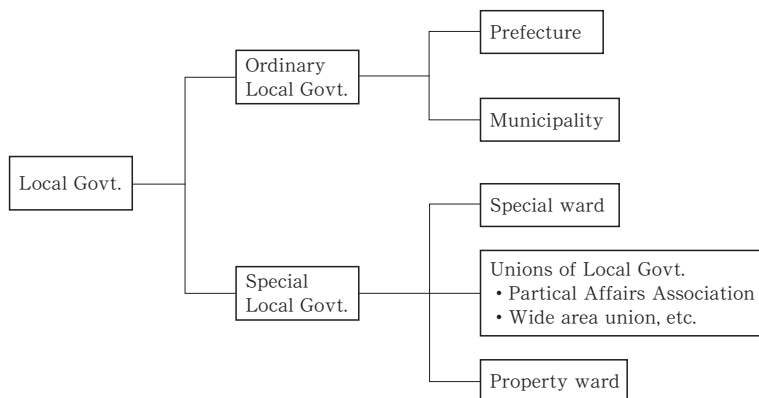
2.1. Outline of Japanese Local Governments

The current situation has been brought about by the basic structure of Japanese local administration and the surrounding circumstances. Therefore, this section provides an overview of the local government system in Japan.

2.1.1. Framework of Japanese Local Governments

In Japan, a local government is a juridical body under Art. 2, Local Autonomy Law ('LAL' hereinafter). There are two major categories admitted as local governments: ordinary local governments and special local governments. (Figure 2-1)

Figure 2-1 Classification of local governments

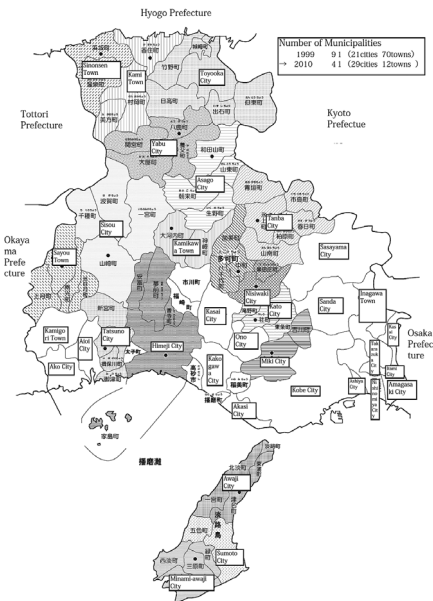


The figure is created by the author.

Ordinary local governments have general and normal characteristics in their organization, affairs, powers and such. Their existence is universal, and they therefore can be said to be typical local governments. They are local governments which are subject to the constitutional guarantee on local autonomy, and the wider unit, prefecture and the basic unit, municipality fall into this category. Under the current local autonomy system, there is a dual structure, that is to say, the entire country of Japan is divided into prefectures, and respective prefectures are divided into municipalities. The sample of prefecture and municipalities are shown in Figure 2-2; Hyogo prefecture is divided into forty-one municipalities since 2010².

2 The number of municipalities decreased from 91 in 1999 to 41 in 2010 due to the Heisei merger movement.

Figure 2-2 Sample; Prefecture and Municipalities



The figure is created by the author.

The number of the ordinary local government as of 1st March in 2024 is shown in Figure 2-3.

Figure 2-3 Ordinary local governments

Kind of Local Government			Number (1st Apr., 2024)
Prefecture	To	Tokyo	1
	Do	Hokkaido	1
	Fu	Kyoto, Osaka	2
	Ken	All others	43
	Total		47
Municipality	City	Designated City	20
		Core city	62
		(Remaining) Special City(*)	23
		Other city	687
	Town		743
	Village		189
	Total		1,724

※Until March 2015, population requirement for “Core cities” was 300,000 or over, and at that time, there was another category of “Special cities” with a population of 200,000 or over. The lower limit of the Core Cities was pulled down in March 2015. Those cities designated as “Special cities” by that time may retain the special status with the delegated functions.

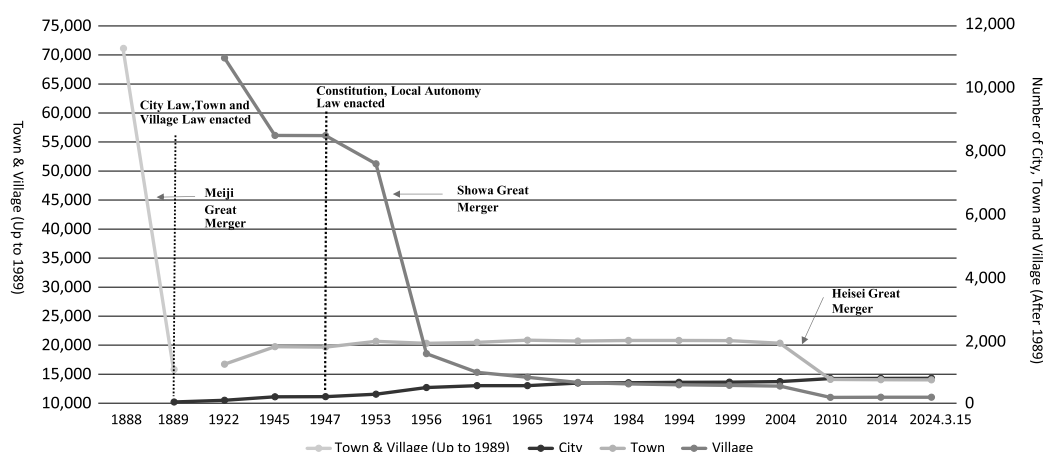
The average population size of prefecture is 2,651.7 thousand as of February 1st, 2023 and that of municipality is 72.3 thousand. The average area size of prefecture is 8,041.9 km² and that of municipality is 219.2 km². (Figure 2-4)

Figure 2-4 Size of local public entity (1st Feb. 2023)

Items	Average Size		Number of units
	Population (thousand)	Area (km ²)	
Prefecture	2,651.7	8,041.9	47
Minicipality	72.3	219.2	1,724
Total	124,631	377,971	—

The figure is created by the author based on the data from MIC (2023).

One of the features of Japan is that municipalities have experienced three times merger movements since the end of nineteenth century. (Figure 2-5)

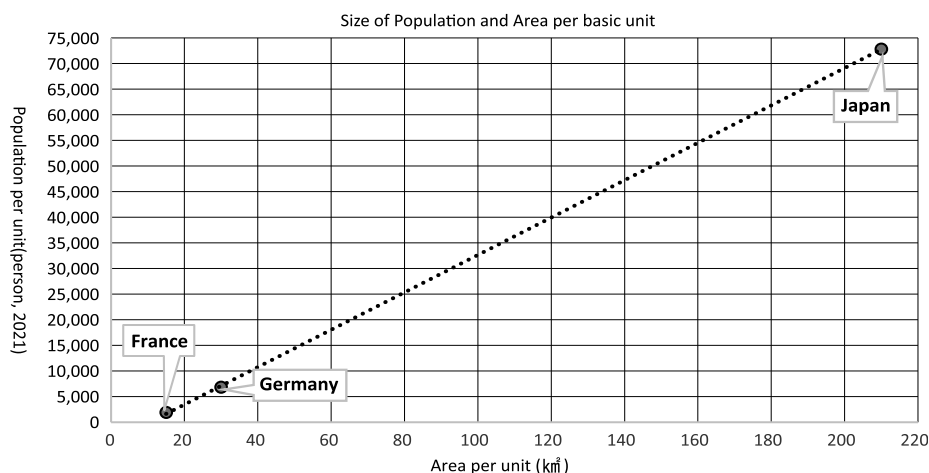
Figure 2-5 Change of number of Municipalities

At first, Meiji First, the Meiji Era Great Merger (1888–1889) took place, focusing on the consolidation of small towns and villages, because it was necessary to establish a basic local government structure for tax collection and school education (especially the operation of elementary schools) as a basis for the construction of a modern nation. Second, the Showa Great Merger (1946–1947) was carried out to strengthen the financial base of municipalities and to establish a basic local government structure for school education (especially junior high school operations). Third, in 1999, the Heisei Great Merger (1999–2011) was implemented due to the need to promote decentralization and to meet the financial demands of social welfare, etc.

The history of the municipal system thus far shows that the roles required of local governments and their size as administrative entities are closely related.

As a result, the average sizes of population and area are considerably larger than those of European continental countries such as France and Germany. Area and population are almost proportional; three countries are on the same approximation line. This suggests that the merger movement in Japanese case impacts today's sizes of area and population of a municipality. (Figure 2-6)

Figure 2-6 Comparison Size of local government (2021)



The figure is created by the author based on the data from OECD Stat (2021).

2.1.2. Affairs of Municipality

Japanese local autonomy system does not adopt the restrictive enumerating principle for the power of local government, but the comprehensive authorizing principle.

By LAL, prefectures as the wide-area local governments, are defined roles for comprehending municipalities and dealing with wide-area affairs, communication and coordination relating to municipalities and supplementary affairs for municipalities. On the other hand, municipalities as the basic local governments, are defined roles for dealing with affairs excluding those dealt with by prefectures. This is considered to specify the 'principle of priority on municipalities'.

The affairs dealt with by municipalities are as follows:

- A. Affairs relating to ensuring the safety and health of residents (e.g., *water supply*, sewage, garbage disposal, fire service)
- B. Affairs relating to residents' life (e.g., residents' registration, family register, residence indication)
- C. Affairs relating to the welfare of residents (e.g., nursing insurance, national health insurance, public assistance)
- D. Affairs relating to the urban development plan (e.g., urban design, city parks, municipality roads)
- E. Affairs relating to the establishment and management of various facilities (e.g., elementary and junior high schools, libraries, daycare facilities, public halls, citizens' halls)

As mentioned above, municipalities are in charge of affairs relating to ensuring the safety and health of residents and the water supply service is a typical business among them.

2.1.3. Water Supply Management

Waterworks Act ('the Act' hereinafter) was promulgated and came into effect in 1957; the Ministry of Health, Labour and Welfare ('MHLW' hereinafter) is in charge of the Act. The purpose of the Act is to supply clean, ample, and inexpensive water. Through water supply, the Act shall contribute to the improvement of public health and living environment.

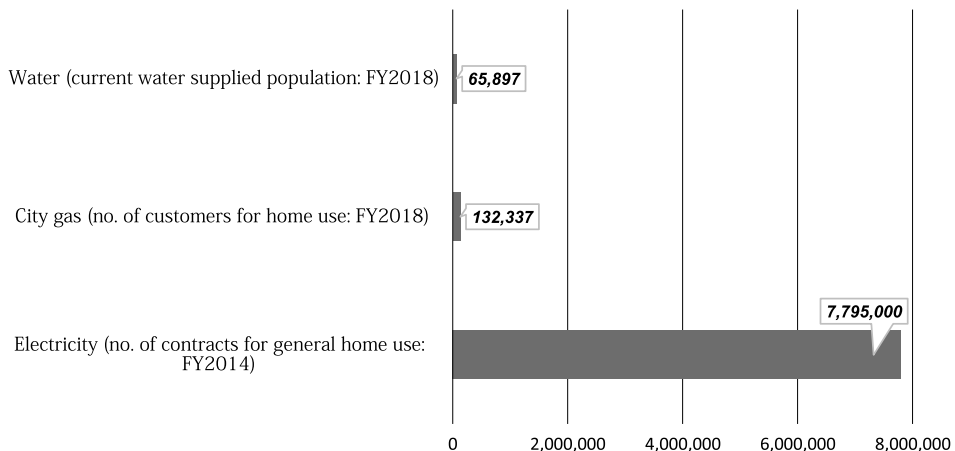
Article 3 of the Act includes activities related to distribution of water which is suitable for drinking of the person by pipes and facilities. The ministries in charge of water define the standards for quality of service. Municipalities are responsible for guaranteeing the application of these norms and for insuring the quality of service. Municipalities must examine water, make records and save them for five years.

Water management affairs are supervised by the national government ('national government' hereinafter) but are free to decide on the management models. The basic model is the direct public management system; local government chooses to handle water services (personnel, infrastructures, etc.) and directly collects compensation from users. Local government may also choose the delegated private management system; it is called 'concession'. Local government retains ownership of facilities but signs PPP contract with the private operator that carries out water service.

2.1.4. Feature of water supply as the internal utilities

The significant feature of Japanese water supply business is the fact that the number of users per operator is the extremely small scale when it is compared with the other infrastructure businesses such as electricity and gas in Japan. The number of users per operator is 7,795,000 for electricity, 132,000 for city gas; on the other hand the number of water supply is 65,000. (Figure 2-7)

Figure 2-7 The number of users of infrastructures



This figure was created by the author based on the data from MIC (2018).

This is one of the consequences of Article 6.2 of the Act stating that the water supply business should be operated by municipalities in principle. The small-scale management base also causes financial instability and disparities in charges, presenting structural challenges that the water supply business needs to confront and deal with constantly.

2.1.5. Comparison with the other countries

The comparison of water management framework among five countries is shown in Figure 2-8; four European countries (France, UK, Italy, Germany) and Japan.

First, the common features among those countries are two points as follows;

A1. The public engagement plays an important role; the basic local government such as

Figure 2-8 Comparison; Water Supply Management Framework

Item	France	United Kingdom	Italy	Germany	Japan
Drinking water network length per capita (m)	15.0	6.45	5.8	6.94	6.30
Average price (€/m ³)	3.92	3.54	1.5	—	1.10
Average residential consumption (l/cap/d)	143	139	245	122	298
Management models	Municipalities are legally responsible for water supply, waste water services and customer service. They are supervised by the state but are free to decide on one of the following management models	Water services are organised under the direct private management model in England and Wales, with the latter operated on a not-for-profit basis.	In Italy there are different managing systems for water services.	In total, there were approximately 6,065 drinking water supply enterprises and utilities in 2010. These are mainly small ancillary municipal utilities and owner-operated municipal utilities.	Municipalities are legally responsible for water supply, waste water services. They are supervised by the state but are free to decide on one of the following management models
	<ul style="list-style-type: none"> The direct public management system (régie). Municipalities choose to handle water services (personnel, infrastructures, etc.) and directly collect compensation from users. 		About half of the population are served through the delegated public management model. PPPs (Public Private Partnerships) cover 36% and concessions cover 5% of the population.	Direct public management: Only a small number of drinking water utilities (less than 50) are organised as ancillary municipal utilities. The share is even lower for water output. As regards waste water, the majority are owner-operated municipal utilities	<ul style="list-style-type: none"> The direct public management system (régie). Municipalities choose to handle water services (personnel, infrastructures, etc.) and directly collect compensation from users.
	<ul style="list-style-type: none"> Municipalities may also choose delegated public management, by adopting a public structure or company such as a société publique locale to manage water services. 	In Northern Ireland and Scotland, services are organised according to the delegated public management model.	Water services are directly provided by municipalities (direct public management) to the remaining share of the population	Delegated public management: Delegated management is carried out mainly through special purpose associations which account for almost 64% of drinking water utilities (about 3,880 companies). These companies account for almost 40% of water output. Special purpose and water associations are also common in waste water service provision.	<ul style="list-style-type: none"> Municipalities may also choose delegated public management through PFI Law procedure.
	<ul style="list-style-type: none"> The delegated private management system (gestion d'éliguee). Municipalities retain ownership of facilities but sign Public Private Partnership (PPP) contracts with private operators that carry out water services. 			Delegated private management: The share of drinking water companies managed through delegated private management was to 35% in 2012 (about 2,120 companies described as AG or GmbH). These are mainly companies with private participation. The share increases to 60% when looking at water output.	<ul style="list-style-type: none"> The delegated private management system (concession). Municipalities retain ownership of facilities but sign Public Private Partnership (PPP) contracts with private operators that carry out water services. Only a few local governments have adopted this model.
Water services core activities	Article L2224-7 of the General Local Authorities Code (Code général des collectivités territoriales) includes under 'water services' all activities related to the protection of the abstraction area, treatment, transportation and storage, and distribution of drinking water as well as the collection, transportation, treatment and discharge of waste water	In the UK, water services include	Water services include: drinking water supply, sewage (including urban drainage and rain separated sewage management) and waste water treatment (sludge included).	Water services supply drinking water and, in some parts of Germany, also take care of waste water treatment.	Article 3 of the Water Law includes activities related to distribution of water which is suitable for drinking of the person by pipes and facilities.
		<ul style="list-style-type: none"> the provision of public water supplies-including abstraction, treatment and distribution networks the provision of waste water services, including waste water collection and treatment, and sludge management. 	The definition of water services also includes all the operations needed to run them such as new connections and water meter management.	When water supply is provided under private law, it is often part of the company also responsible for municipal services such as energy supply or public transport.	
		Water policy is devolved within the UK, and different arrangements apply in England, Northern Ireland, Scotland and Wales.			
Quality of service	The municipality is accountable for the service level, including the monitoring of customer complaints (subject to a national performance indicator) and ways to answer to them.	Customers are entitled to guaranteed minimum standards of service, as laid down by the governments.	Both the national regulator (ARERA) and the local regulators (EGA) define the quality of service.	As part of self-governance rules, municipalities decide on the implementation and organisation of water supply and waste water disposal.	The municipality is accountable for the service level.
	The ministries in charge of water define the standards for quality, continuity of service and resource preservation.	If a company fails to meet any of these standards of service then it is required to make a specified payment to the affected customer.	With the resolution 655/2015/R/ldr, ARERA now approves the service quality for regulating the quality of the Integrated Water Service contracts, i.e. of each of the individual services (RQSIL).	Local statutes determine that each citizen and commercial company is obliged to connect to and utilise the public drinking water supply and sewers of the local government or responsible special purpose association.	The ministries in charge of water define the standards for quality of service.
	Municipalities are responsible for guaranteeing the application of these norms and for insuring the quality of service		This follows a complex process of consultation involving management company associations and consumer associations.	Exceptions might occur outside municipalities in rural areas.	Municipalities are responsible for guaranteeing the application of these norms and for insuring the quality of service
	They have to report yearly on these topics, which are also subjected to national performance indicators.	In England and Wales, Ofwat monitors the scheme and recommends changes; the Utility Regulator and the Water Industry Commission carry out similar roles in Scotland and Northern Ireland.	The measure defines minimum contract levels and quality objectives of the Integrated Water Service, through the identification of significant indicators for maximum times and minimum quality standards, uniform at national level, for the services. It also determines methods for recording, reporting and verifying data on services provided by operators upon the user's request.	Binding regulations ensure that no residential buildings may be constructed without a proper drinking water supply.	Municipalities must examine water of a fixed period and the temporariness. Municipalities make records and save them for five years.
	In addition, the delegated private partner (if any) must publish a report on actions taken analysing the quality of service.		In case of failure to meet specific quality standards in individual services, the authority introduced automatic compensations to be paid to users, and a penalty mechanism for failing to meet general quality standards for all services.	<ul style="list-style-type: none"> Home owners have to respect technical standards of their house water supply installation. 	When the private operator violates this law or rule, the Minister can demand that municipality should do the corrective action.

The figure is created by the author based on "The governance of water services in Europe", EurEau, 2007.

municipality is playing the central role in the management in four countries excluding UK³.

A2. Each country has been adopting the PPP mechanism selectively.

Japan differs from other countries in the following two points. The feature of Japanese system is traditionally direct management is the main format.

Second, Japan differs from other countries in the following two points.

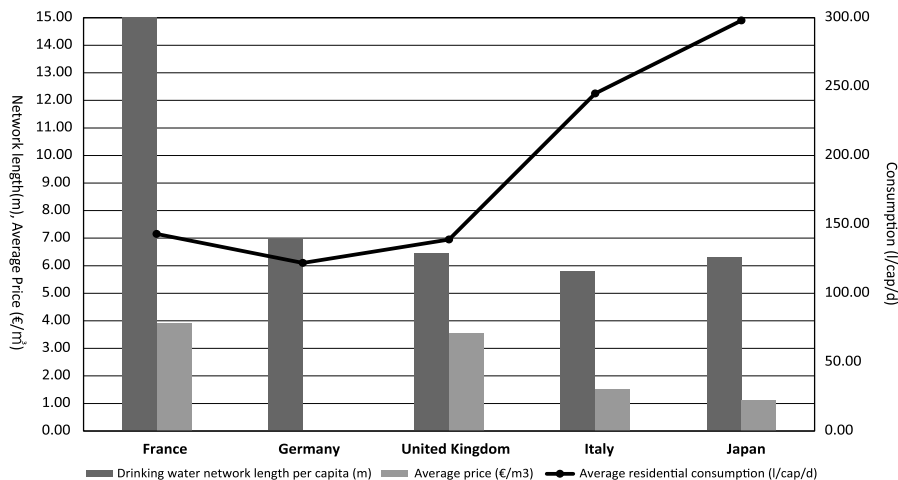
B1. Municipalities have actively used outsourcing; water meter reading, water quality testing, maintenance and management of facilities and equipment and such. However, the time when PPP was introduced as a legal system is new; it was introduced by the revision of Water Law in 2018.

B2. Traditionally direct public service has been preferred among municipalities; only one local government started PPP project in the year of 2022.

Next, the features of countries in the standpoint of the primary indexes of water management are as follows:

- A. In terms of drinking water network length per capita, France has remarkably advanced; 15.00 m per capita. Germany (6.94), UK (6.45) and Japan (6.30) are around a half of it.
- B. In terms of average price, France (3.92 €/m³) and UK (3.54) are relatively higher. Italy (1.50) and Japan (1.10) are less than a half level.
- C. In terms of average residential consumption, Japan and Italy are larger than that of the other countries. (Figure 2-9)

Figure 2-9 Comparison; Water Supply Service (2010-2018)



The figure is created by the author, based on "The governance of water services in Europe", EurEau, 2007 and "Local Enterprise Yearbook (2020)".

In conclusion, there is a trend that the countries with historically larger size of investment and advanced water network⁴ have higher level of price. And the lower price countries have

3 In UK water services are organized under the direct private management model in England and Wales, with the latter operated on a not-for-profit basis. On the other hand, services are organized according to the delegated public management model, in Northern Ireland and Scotland. Therefore, public engagement plays an important role overall.

4 The creation of water networks in Europe was first initiated in England during the late 18th century and the waterworks expanded in the first quarter of the 19th century. The expansion of water networks was promoted in Germany by English engineers from the second quarter of the 19th century. On the other

higher average consumption. The quality and the cost of water supply business is affected by natural conditions, citizen's lifestyle, citizen's preference and such. Even supposing that it is true, it cannot be denied that Japanese water management has pursuing lower cost service under the condition that Japanese people are sensitive to the price of public services.

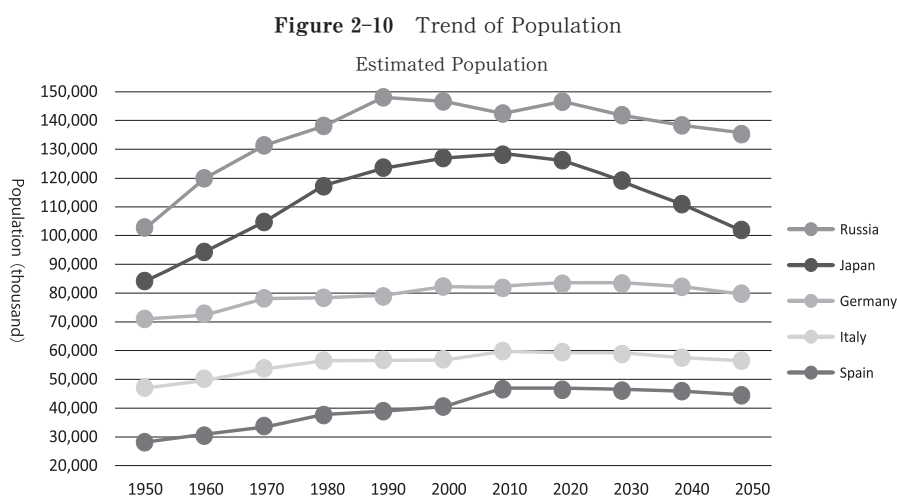
2.2. Issues

This paper focuses on two issues of Japanese water management. The first is the current population decline; it resulted in fewer individual water users, and has given a fundamental impact on long-term management. The second is that municipalities face financial crises, with outstanding local loans.

2.2.1. Declining population

The Japanese society is currently facing a significant phenomenon: a shrinking society. The population of Japan was on a consistent upward trend through the first post-war baby boom in the 1940's and the second baby boom in the 1970's.

However, it has been declining sharply after peaking at 128 million in 2008. According to the Population Projections for Japan by the National Institute of Population and Social Security Research, the medium fertility variant projection assuming the total fertility rate is approximately 1.35, indicating that the Japanese population will fall below 100 million in 2050. Several European countries are also experiencing population declines; Russia, Germany, Italy, and Spain and such. But Japan's population is declining faster than those countries. (Figure 2-10)



The figure is created by the author based on the data from OECD.Stat. (2023).

2.2.2. Financial Deterioration

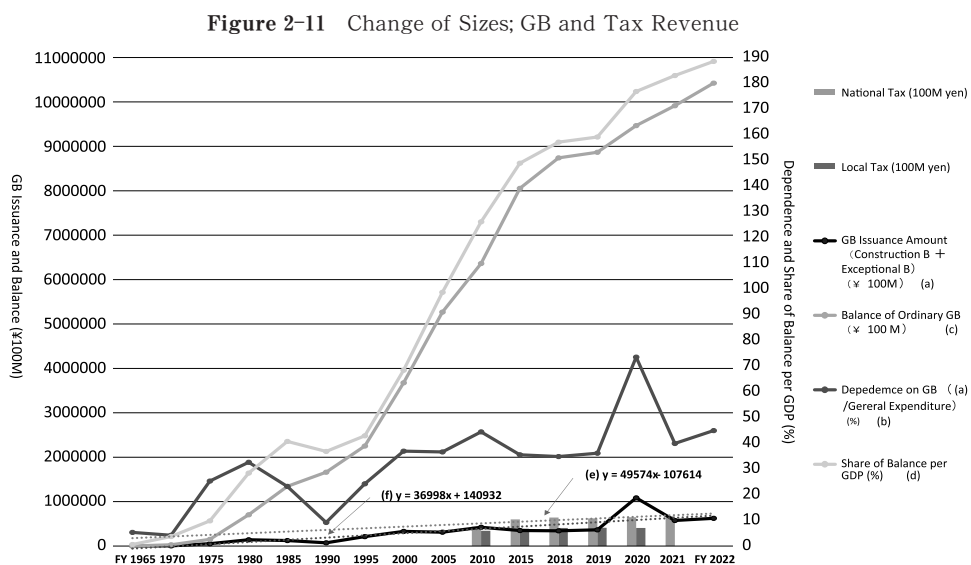
An overview of Japan's economic situation since the 1960s is as follows:

A. After the end of World War II Japanese economy recovered with high speed from 1950's to 1970's; this period was called the high-growth period. At the end of the 1980's, Japan's economy

hand, Japanese water supply business started at the end of 19th century: 1887. Waterworks spread rapidly from the 1950s to the 1960s; water supply coverage rate of 30% in 1950 reached 90% in 1975.

continued favorable conditions, with stable wholesale prices and a low unemployment rate. However, excessive funds flowed into the stock markets and caused abnormal increases in capital asset values.

- B. At the beginning of 1990, stock prices plummeted, and land prices sharply declined; it is called the start of major economic recession (collapse of the bubble economy). In 1998 and 1999, the government injected public money into the banking sector to stabilize the financial system and the economy began to make a moderate recovery in 1999.
- C. However this was only a temporary phenomenon because recovery was too dependent on foreign demand and information technologies. Japan's exports to Asia dropped due to excess inventory and production facilities. Japanese economy again entered into an economic downturn in 2001 with the global decline in IT demand. On the economic recovery phase starting at the beginning of 2002, and shifted generally with a bullish tone up until mid-2007.
- D. The bankruptcy of the major American securities firm Lehman Brothers in 2008 led to a serious financial crisis globally. Japan was also affected by the yen's rise and the sudden economic contraction in the U.S.A. and other countries. Declining exports contributed to a large drop in production and a sharp rise in unemployment.
- E. Subsequently, the Japanese economy recovered with foreign demand and economic measures in 2009. However, the Great East Japan Earthquake took place in 2011, and the nuclear power plant accident caused by it weakened the economic recovery. In 2013 the government set forth its 'three-arrows' strategy⁵; 'aggressive monetary policy', 'flexible fiscal policy'⁶ and 'growth strategy that promotes private investment' in order to achieve an early end to deflation. Under such approaches, the employment and income environment improved and attained a moderate recovery.
- F. In 2020 the COVID-19 pandemic directly affected the financial situation. Urgent expenditure for the countermeasures against Pandemic rapidly increased.



The figure is created by the author based on the data of Ministry of Finance (2023).

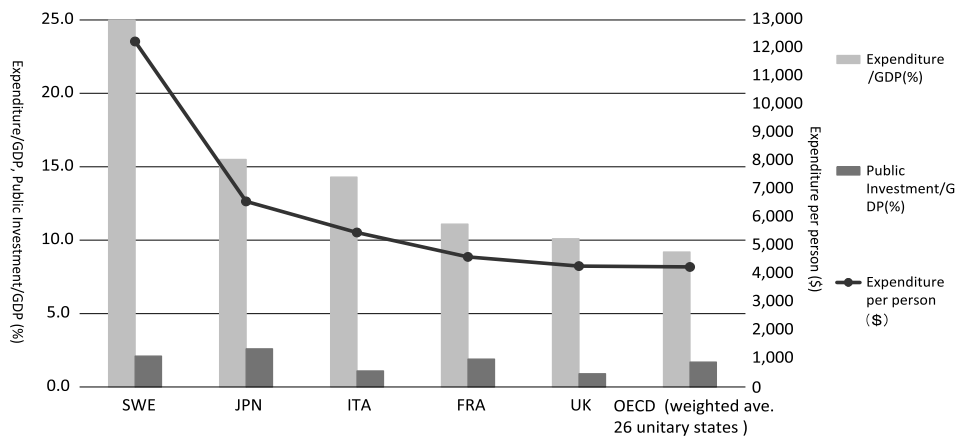
5 This policy is named after the prime minister Shinzo Abe, and is called "Abenomics".

6 An emergency economic stimulus package with a scale of approximately 10 trillion yen was developed.

Against the backdrop of these economic conditions the national government had to make use of the government bond ('GB' hereinafter) as the financial resource. The share of the dependence on GB ((b) in the Figure 2-11) increased from 1990's. In addition, the size of GB expanded especially from 2020 ((a) in the Figure) because the temporary spending remarkably increased due to pandemic measures. As a result the balance of ordinary GB ((c) in the Figure) and the share of Balance per GDP ((d) in the Figure) went abruptly up.

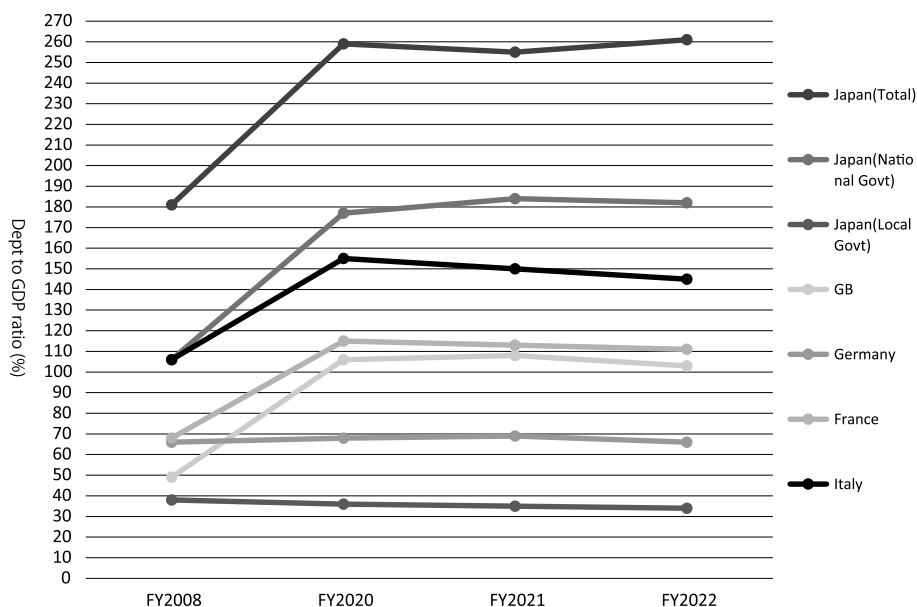
The revenue of national tax and local tax continue gradual increase even after 2019 which is the Pandemic period. The approximate line of the national tax revenue ((e); $y = 49,574x - 107,614$) shows higher slope than that of GB ((f); $y = 36,998x + 140,932$). This is a good sign; the financial situation will gradually improve. However, the ratio of dependence is still extremely

Figure 2-12 Comparison; Size of local government Expenditure (2016)



The figure is created by the author based on the data from OECD. Stat. (2023).

Figure 2-13 Change of Debt to GDP ratio (%)



The figure is created by the author based on the data from ministry of Finance (2023).

high since 2020. Therefore, how to quickly normalize financial management is still an exceedingly significant issue for the national government and local governments.

Next it is necessary to keep in mind the relationship between national finance and local governments finance. In Japan the size of the local expenditure is considerably larger; the local expenditure per GDP, the local public investment per GDP and the local expenditure per person of Japan are higher than the average sizes of OECD countries. (Figure 2-12)

Consequently, not only the debt ratio of Japanese national government but also that of Japanese local government is quite high compared to other countries; the latter alone accounts for more than thirty percent. (Figure 2-13) This fact shows that the fiscal consolidation is the urgent issue for local government.

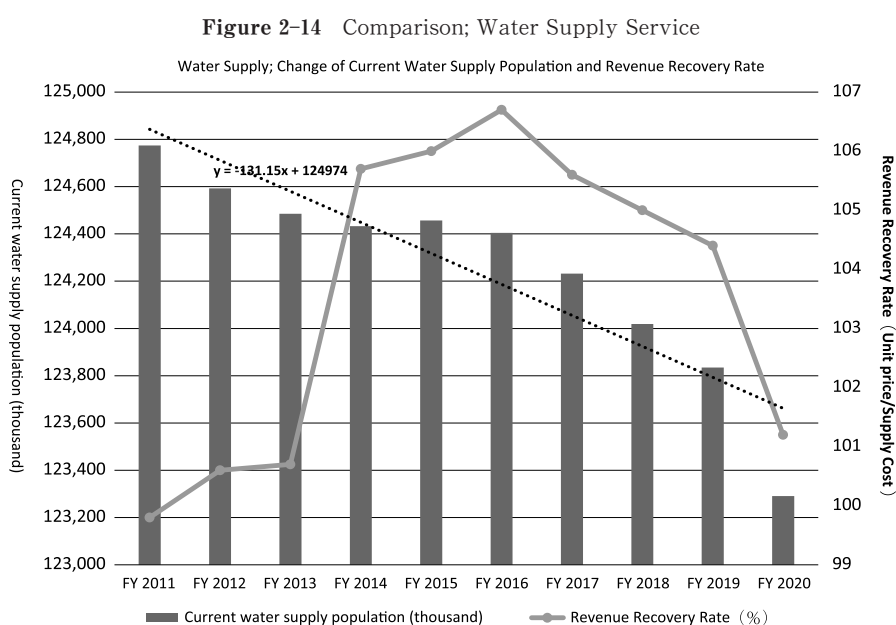
2.3. Impacts by the declining population and the local financial deterioration

In this section, how the two risks effected the water supply management is overviewed.

2.3.1. Declining population

In Japan municipality is basically in charge of water supply. Population decline which means fewer individual water users has a fundamental impact on water supply management in the long term. Although the curve of Japan's declining water-supplied-population has a little moderate gradient than that of the decline in the overall population, it shows a tendency to keep declining. This decline has pushed down income from water charges, having a profound impact on the waterworks business.

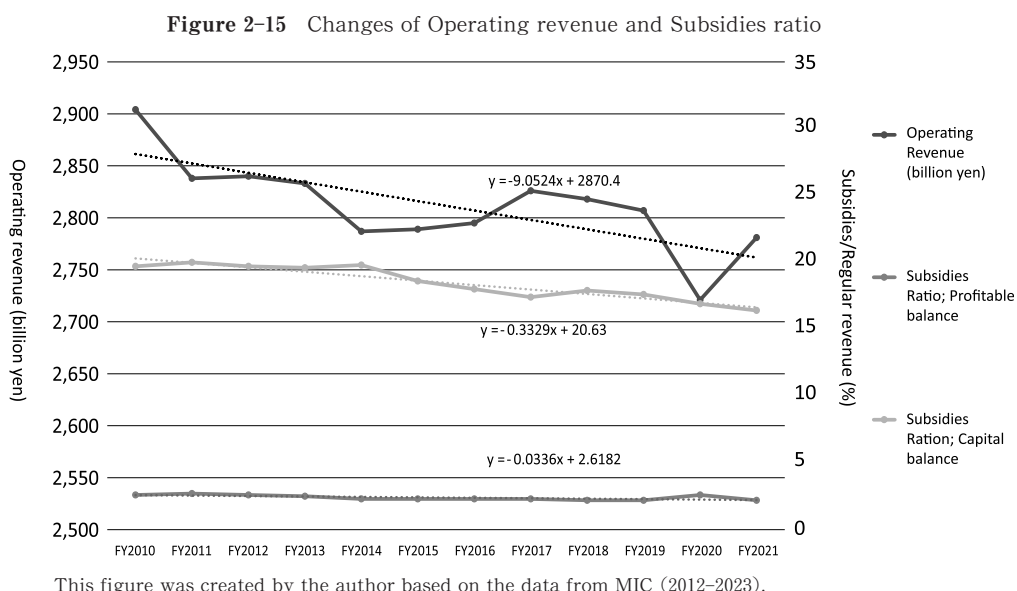
In accordance with the depopulation, the current water supply population has been consistently decreasing since 2011; the Approximate line formula is $Y = -131.15X + 124,974$. Under this situation, the revenue recovery rate has been fluctuating and recently decreasing; the revenue has not grown because of depopulation. This decline has pushed down income from water charges, having a profound impact on the waterworks business. (Figure 2-14)



The figure is created by the author based on the data from MIC (2021).

2.3.2. Financial Deterioration

Water accounting is operated based on the self-supporting accounting principle; expenditure is basically covered by revenue from water charges. However, declining individual water users has brought about decreasing the operating revenue of water management of all Japan; the Approximate line formula is $Y = -9.052X + 2870.4$. (Figure 2-15)



Under that situation the general account of the municipality pays subsidies or disburses the loan to the water account in order to balance the water account; those funds are collectively referred to as withdrawal money. On the other hand, currently the general accounts of municipalities are in difficult financial situations; they owe a large amount of debts as shown in Figure 2-13 above. As a result, both of profitable balance subsidies ratio and capital balance subsidies ratio is not increasing but decreasing; the Approximate line formula of the former is $Y = -0.3329X + 20.63$ and that of the latter is $Y = -0.0336X + 2.6182$. This suggests that the decrease of water charge revenue is not fully compensated by the general accounts. These facts suggest that the general accounts of municipalities currently cannot afford to support the water accounts. In this circumstance Japanese local governments are faced with the urgent demand of establishing fundamentally effective water services.

2.4. Collaboration

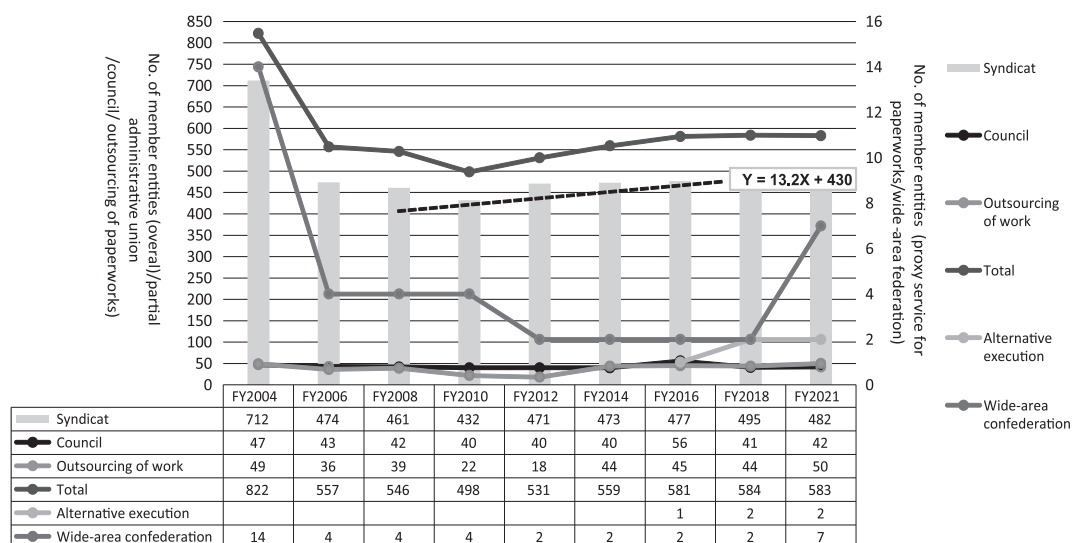
2.4.1. Background

Under the current situations it becomes difficult to increase operating income because of decreasing water users and to receive financial support from the general account because of the accumulating debts. At the same time municipalities have been facing the traditional three problems in water management: (a) small-scale businesses, (b) organizational inefficiency and (c) aging facilities.

What are the reforms for the fundamentally effective water services to meet these challenges? Two directions are currently recognized; developed collaboration and PPP (scrutinizing and effectively utilizing PPP).

This section provides an overview of the present status of wide-area waterworks collaboration. There are various methodologies currently used for collaboration, including setting up syndicat and alternative execution of administrative procedures. As water supply operators, some municipalities find it difficult to provide adequate services on their own due to their small scale of business, shortage of financial resources, lack of technology, or for other reasons. They have used common treatment systems under the Local Autonomy Law, including a syndicat (a type of partial administrative union) and a wide-area confederation authority (a type of wide-area confederation). (Figure 2-16)

Figure 2-16 Changes of the number of water-supply inter-municipal collaboration



This figure was created by the author based on the data from MIC (2022).

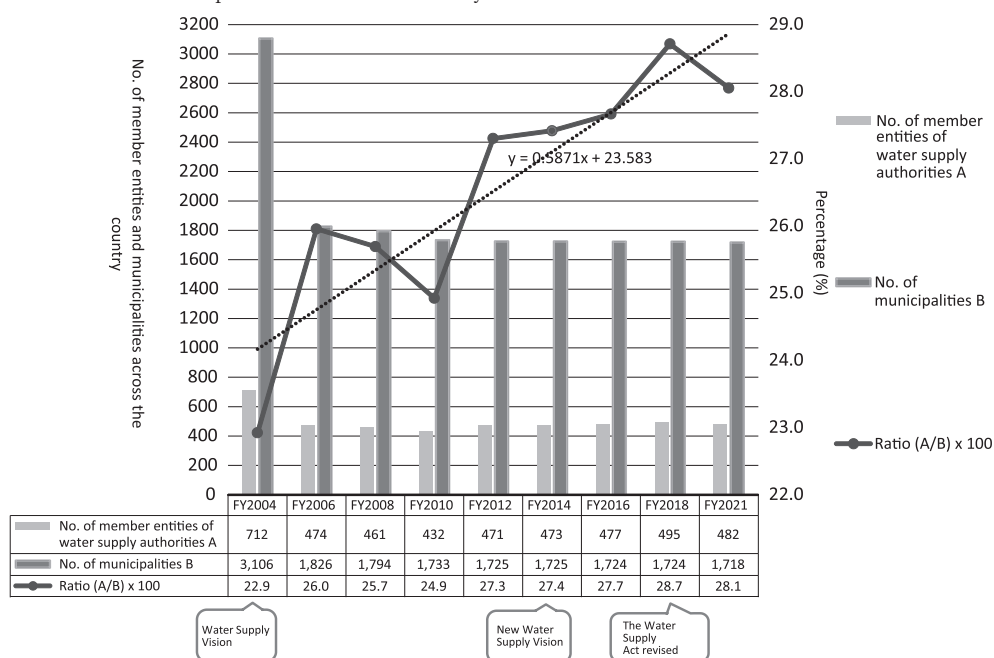
These number of collaboration systems diminished in number during the period of municipal mergers from 1999 to 2010. However, the number of entities using collaboration systems has resurged since 2010. Among other options for collaboration, the number of entities participating in syndicates has steadily increased; the approximate line showing the growth rate had a gradient of 13.2 for the period from fiscal 2010 to 2018). Entrustment of administrative work increased from 18 cases in fiscal year 2012 to 44 in fiscal year 2014, and has been expanding at a similar pace. Concrete examples include 24 cities under Tokyo entrusting the administrative work of small, private water supply systems to Tokyo, and Hiroshima prefecture entrusting the management and operation of facilities it owns to Kure and other cities. In 2016, there was one case of execution by substitute, which was institutionalized in fiscal year 2012, and it increased to two in fiscal year 2018, and there is likelihood of local governments utilizing the method in the future (see IV 2 described later).

This reveals the increasing importance of the role played by collaboration in water supply service, where the number of municipalities sustaining their water supply utilities through regional collaboration has been maintained amidst decline in the number of municipalities following the Heisei-era mergers.

Next, against the backdrop of the Heisei-era municipal mergers (from 1999 to 2010), the total number of member entities of syndicat decreased to 432 (fiscal year 2010) from 712 (fiscal

year 2004) because the total number of municipalities decreased. However, the number of entities participating in syndicat had shown consistent growth since 2010. Consequently the proportion of entities to municipalities across the country also continued to increase from fiscal 2010 to 2021, with the (approximate) line showing the growth rate climbing with a gradient of 0.5871. (Figure 2-17)

Figure 2-17 Change in the number of member entities of water supply authorities and municipalities across the country



This figure was created by the author based on the data by MIC (2022).

These situations show that collaboration among local governments have been progressing since 2010's. The developed collaboration is classified into two types; the diversified collaboration and the large-scale collaboration.

2.4.2. Diversified Collaboration

The first trend is diversified collaboration. Regarding consolidation of water supply utilities overall, the New Water Supply Vision had put forward a concept called “*new consolidation*” which calls for wide-ranging measures led not only by simple service integration but also by collaboration between various operating divisions (tariff collection, maintenance, water quality management, training program, etc.). In this way, the promotion of wide-ranging collaborations were planned and implemented. (Figure 2-18)

Specifically, in consolidation, service integration⁷ and management integration⁸ are considered as the most promising means⁹ to deliver effective strengthening of the management foundation such as reducing water supply unit cost and securing specialist workforce through

⁷ Denotes integration of management entity and water supply implementing entity into a single entity.

⁸ Denotes retaining multiple implementing entities of the water supply service, while integrating the management entities.

⁹ See Yamakoshi, *op. cit.*, p. 81.

Figure 2-18 Types of Collaboration of Water Supply Management

Type of Collaboration	Type		Examples		Number set up (FY2018)	Local Autonomy Act (relevant legal basis)	
			Concerned Authorities, etc.	Starting fiscal year			
Syndicat	Service integration (integrate management entity and water supply service)	Entire-Prefecture-Area-Syndicat	Kagawa Water Supply Authority	FY 2018	—	Article 284	
			Hiroshima Water Supply Authority	FY 2022			
		Horizontal integration (integration with multiple water supply services)	Iwate Chubu Water Supply Authority (2 cities, 1 town)	FY 2014	98		
			East Gunma Water Supply Authority (2 cities, 5 towns)	FY 2016			
			Chichibu Joint Administration Bloc Association (1 city, 4 towns)	FY 2016			
			Kagawa Water Supply Authority (integrated water supply services of the prefecture, 8 cities, 8 towns)	FY 2018			
			Nakasorachi Water Supply Authority (3 cities, 1 town)	FY 2006			
			Awaji Water Supply Authority (3 cities)	FY 2010			
	Management integration (integration of management entities. Water supply services continue to exist)		Osaka Water Supply Authority (The Authority manages the water supply services of Shinjonawate-shi, Taishi-cho, and Chihaya Akasaka-mura.)	FY 2019			
Execution by substitute	Execution by substitute by prefecture		Nagano prefecture carries out the design and work management of water supply services for Tenryu-mura.	FY 2016	2	Article 252-16-2	
Central city subsumption type		Kitakyushu city carries out the water supply, tariff collection, facility construction and renovation, etc. for Munakata District Administrative Association.	FY 2016				
Other methods	Permanent independent zone formation agreement		Started water supply services as part of services of the Chichibu Joint Administration Bloc Association utilizing the agreement.	Study period: FY2009–FY2016	—		
	Sharing facilities	Joint set up and usage of water supply facility. Connection, etc. during emergency notification period	Arao-shi (Kumamoto prefecture) and Omuta-shi (Fukuoka prefecture) jointly constructed a purification plant.	FY 2012			
	Cooperation in management	Establishment of third sector	Hiroshima prefecture established Mizu Mirai Hiroshima Corporation (a third-sector entity) . The company carries out the work as specified manager of prefectural water supply facilities and management of municipal water supply facilities.	FY 2012			
			Sharing of systems	Through Kita Ou Water Supply Association, the concerned Authorities considering sharing the systems for tariff, accounting, pipe information, and other works of Hachinohe Water Supply Authority.			
		Virtual association	Through Kita Ou Water Supply Association, (virtual association), considering sharing the systems for tariff, accounting, pipe information, and other works.	FY 2014			
		Joint entrustment (centrally and jointly entrust water quality inspection, facility management etc.)	Water source quality inspection, etc. of five operators in Kanagawa prefecture (Kanagawa prefecture, Yokohama, Kawasaki, and Yokosuka cities, and Kanagawa Water Supply Authority) carried out centrally by Wide-area Water Quality Management Center (the said Authority).	FY 2015			
		Joint ordering	Kasumigaura-shi and Ami-machi (Ibaraki prefecture) jointly ordered service entrustment of water supply tariff payment.	FY 2015			

This figure was created by the author.

integration and reorganization of water supply facilities and centralized management of human and financial resources. Also, even in regions where services and management integration is difficult due to geographical factors, it is possible to expect reduction in upgrading and maintenance costs through sharing of facilities¹⁰. Further, collaboration in management¹¹ can be expected to deliver streamlining of administrative work. The new consolidation is looking at effective utilization of such methods based on a broader vision.

Concrete examples of recent collaboration initiatives are listed in the chart below, and the key points to note are as follows:

- A. Large-scale collaboration, which is represented by EPAS; all the municipalities in one prefecture take part in one syndicat in pursuit of the full-fledged wide-area administration under the initiative of the prefecture. The establishments of Kagawa Water Supply Authority (“Kagawa Authority” hereinafter) in 2018 and that of Hiroshima Water Supply Authority (“Hiroshima Authority” hereinafter) in 2022 are the leading cases.
- B. Service integration, which is made up of horizontal and vertical integrations, and management integration are full-fledged consolidation methods in the sense that it establishes a permanent organization following the change in juridical person (new establishment, integration) called administrative association (Association). Against a background with such features, after the completion of the Heisei-era mergers of municipalities in March 2010, from around 2006, when there was a break, to after fiscal year 2014, the number of member entities of Water Supply Enterprise Associations continued to increase (see earlier Figure 2–17), and more Water Supply Enterprise Associations are being established as part of the new form of consolidation wherein since fiscal year 2015 the share of Water Supply Enterprise Associations in water supply services has been showing a rising trend.
- C. Typical examples of horizontal integration in service integration are the East Gunma Water Supply Enterprise Association, Chichibu Regional Administration Zone Association¹², and Kagawa Wide-area Water Supply Enterprise Association¹³.
- D. The impact from the vertical integration of bulk water supply utilities and local water supply utilities is considered to be significant due to the reduction in expenses by securing stable water sources, facility downsizing through flexible water flow, and as reserve funds become unnecessary for bulk water supply utilities. Typical examples of that are the Nakasorachi Wide-area Water Supply Enterprise Association, Awaji Water Supply Enterprise Association, and Midland Iwate Water Supply Enterprise Association¹⁴.

10 Denotes shared installation or shared usage, etc. of part of the water supply facilities.

11 Denotes sharing of system for tariff, accounting, pipe information, etc., joint entrustment, joint ordering, etc. and such intangible operations and contract activities, in addition to sharing method using the third sector or virtual association as the receiver.

12 Concluded a permanent independent zone formation agreement in 2009 to set up Chichibu Regional Administration Zone Association, carrying out joint processing of services such as garbage processing, fire services, etc. The water supply services were added in 2016, which carried out integration and reorganization of facilities (reduced purification plant to 26 from 41, etc.), reducing time and monetary expenses.

13 A case of service integration of prefecture, eight cities, and eight towns (first prefecture-wide integration in the country) to ensure stable supply by unifying water source.

14 The Midland Iwate Water Supply Enterprise Association was established in 2014, focusing on downsizing, and by 2018 reduced the number of purifying plants to 29 from 34 and water intake facilities to 32 from 36, saving approx. 7.6 billion yen. See pp. 36 to 38 of Junji Hashimoto's *Suido mineika de mizu*

- E. In management integration, while the managing entities are consolidated, the water supply services (accounting, tariff system, etc.) coexist even after the integration. A typical example is the Osaka Water Supply Enterprise Association. This Association started operations in 2011, and in 2017 it was integrated with three other Associations (Shinjonawate-shi, Taishi-cho, and Chihaya Akasaka Mura), but accounting continue to be carried out separately.
- F. Execution by substitute was a system introduced in the partial revision to the Local Autonomy Act of 2014, and as existing examples there are two types based on their nature. The first one is the execution by substitute by prefecture, where a prefecture takes on the municipalities' administrative work, as in the case of Nagano prefecture. In particular, in under populated municipalities, solving issues such as the decrease in tariff revenue following population decline, upgrade of aging facilities, and shortage of water supply technicians had been difficult, and the prefectural government carries it out from the perspective of regional contribution. Second is the central city subsumption type, where municipalities, under a horizontal relationship, take on the administrative work of surrounding municipalities (as in the case of Kitakyushu).
- G. Other methods include the permanent independent zone formation agreement (e.g. Chichibu Regional Administration Zone Association), virtual associations (e.g. Northern Ouu District Water Supply Council¹⁵), establishment of third-sector entities (e.g. Hiroshima prefecture), etc., which have realized new consolidation utilizing existing local government systems.
- H. As seen in sharing of facilities and cooperation in management, there are examples where the concept of joint processing is interpreted flexibly to handle consolidation. Sharing of facilities focuses on the infrastructure aspects and ensures reduction in construction and maintenance costs of facilities (e.g. Arao-shi and Omuta-shi¹⁶).

Those cases show that the diversification of collaboration of water supply management is progressing remarkably. The characteristics of each operator (municipality) are completely different; size of number of users, geographical conditions, amount of facilities and such. Therefore, the current situation is a manifestation of the need for ingenuity of local governments when the water business situation becomes difficult; local governments are expected to choose the best collaboration.

2.4.3. Large-scale Collaboration

The second trend is the large-scale collaboration as represented by the enter-prefecture-area-syndicat. Especially Enter-Prefecture-Area-Syndicat ("EPAS" hereinafter) which all the municipalities in one prefecture take part in allows for the most thorough control of organizations. As examples of this concept, let us overview Kagawa Authority and Hiroshima Authority.

ha donarunoka" (What will happen to water with privatization of water supply) by Iwanami Shoten, Publishers, 2019.

15 Northern Ouu District Water Supply Council was established as a virtual association in 2008, and initially was engaged in activities such as study sessions, etc. centered on information exchange, but concluded an agreement in 2015 and started four sharing initiatives (shared operation of facilities, shared management of water source data, bulk order of facility management, and sharing of water purification system).

16 The cities together ordered the design, construction, and maintenance management of the purification plant and achieved cost reduction of approx. 700 million yen through shared installation and approx. 1.2 billion through DBO method.

A. The case of the Kagawa Authority

Kagawa Authority is a water supply authority comprised of the prefecture and eight cities and eight towns within the prefecture, excluding Naoshima Town. It built the first unified wide-area waterworks management system in Japan and oversees water supply businesses for general and industrial uses.

Water supply businesses in the prefecture have faced a pile of problems, including declining water supply revenue resulting from a declining population, aged waterworks facilities, responses to a massive earthquake that is predicted to occur in the near future, and succession of technology among water supply service personnel. To resolve these problems, the prefectural authority devised measures to consolidate water supply businesses within the prefecture and thereby eliminate or integrate facilities, improve operational efficiency, and cut down expenses in order to reinforce the operational foundation. In November 2017, Kagawa Authority was founded with the permission of the Minister for Internal Affairs and Communications and started the operation in April 2018.

B. The case of the Hiroshima Authority

Hiroshima Prefecture's water supply business is expected to worsen rapidly in the future due to a fall in water supply revenue stemming from a declining population, a potential increase in upgrading expenses for aged facilities, and other factors. Some cities and towns might even become unable to maintain themselves. Therefore, the prefecture considered measures to reinforce the foundation of the water supply business through wide-area cooperation beyond the municipal boundary.

In April 2021, the Preparatory Council for the Foundation of Hiroshima Authority started reviews and preparations toward integration of water supply businesses under the Master Agreement on the Integration of Water Supply Businesses in Hiroshima Prefecture. As a result, 14 cities and towns and the prefecture integrated their respective tap water businesses (1), water supply businesses for city water (2), and water supply businesses for industrial use on April 1, 2023. As the management body, they set up the Hiroshima Authority in fiscal 2022 as a wide-area confederation authority.

Figure 2-19

Kagawa Authority		Hiroshima Authority			
Member Entities	Prefecture, 16 Municipalities	Member Entities	Prefecture, 21 Municipalities		
Purification plant	71 plants were reduced to 38 through consolidation and abolishment	Purification plant	Fiscal year	Number	Capacity
Authority office	17 authority offices were integrated into five control centers.		2020	166	592 Km³/day
			2032	77	387 Km³/day
			2062	70	313 Km³/day
		Pipeline	2020	7,441 km	
			2032	7,633 km	
2062	7,645 km				

This figure was created by the author based on the data from both prefectures (2022).

EPAS has obtained certain positive effects, including (a) optimization of facilities (b) reduction in the unit price of water supply, (c) correction of regional disparities in the unit price and (d) reinforcement of organizational and control systems. Focusing on (a) optimization of facilities, the purification plant is reduced to 38 from 71 in Kagawa Authority and reduced to 70 from 166 in Hiroshima Authority. Since they are large organizations, it takes time to build consensus for slimming facilities. However, these results of reforms show that the remarkably big slimming can be achieved in large-scale collaboration. (Figure 2-19)

2.5. PPP

As mentioned above, in many countries including Japan, the basic model of water management is the direct public management system. But local government may also choose the delegated private management system; it retains ownership of facilities but signs PPP contract with the private operator that carries out water service.

The extent of making use of private companies for water supply management depends on each country's policy. The author summarizes the description in Bel (2020) as follows:

"In Europe, during the 19th century, the intervention of private companies in the management of local public services, especially in those of water supply, was not as great as in the United States... More generally, the creation of water networks in Europe was first initiated in England during the late 18th century. Expansion of waterworks in the first quarter of the 19th century was characterized by the important role played by private firms, although public management was also increasing. After the passing of the Public Health Law, in 1848, public ownership quickly expanded and gained hegemony, making municipalization in England something of a precursory policy.

The expansion of water networks was promoted in Germany by English engineers from the second quarter of the 19th century, but in this case the public sector had absolute hegemony in ownership and management of networks, with some exceptions, most notably Berlin, where a private concession was awarded in 1856.

In France, private companies played a highly relevant role from the early stages of the development of waterworks, and, as in other countries, the concession model generated much criticism and acrimony from the middle of the 19th century. However, municipalization was not the most frequent response. Christelle Pezon (1999, 2010, 2012) shows that the concession model was replaced with lease and management contracts, in which large investments were made by the public sector. By the end of the 19th century, however, many new water systems in France had been created by local governments and were managed in-house."

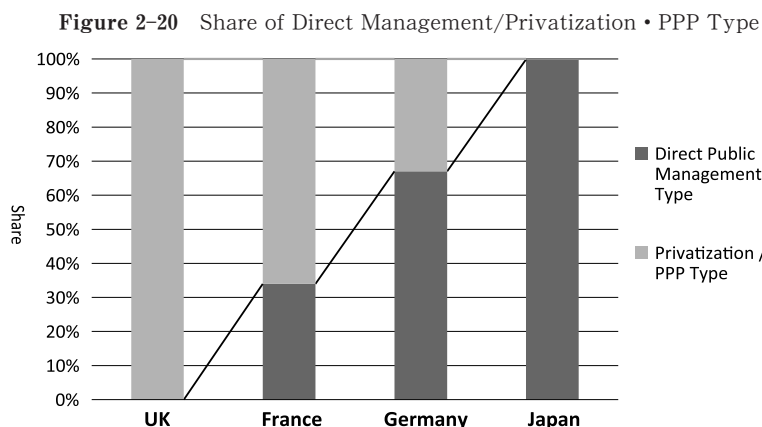
Based on those backgrounds, the current shares of direct public management and privatization including PPP in countries are as follows:

In UK (England and Wales) the water management was privatized. About seventy percent of units in France and thirty percent in Germany are making use of PPP model¹⁷. In Japan very few local governments¹⁸ make use of PPP. (Figure 2-20)

In Japan the basic model is the direct public management system; local government chooses to handle water services directly. Local government may also choose the delegated

17 Source; Data of Cabinet Office in 2013. In 2010, remunicipalization was implemented in France and Germany; Paris and Berlin. Currently the direct public model and PPP model coexist in both countries.

18 Miyagi Prefecture started PPP project as a water supplier in 2022.



The figure is created by the author based on the data of Cabinet Office (2013).

private management system since the revision of the Act in 2018. But why are PPPs so underused? MHLW set up a study group and the representatives involved in the water business gave opinions as shown in Figure 2-21.

Figure 2-21 Reasons why PPP has not been utilized in Japan

(A)	Few business operators entrusted with business
(B)	Local govts. are not able to have a good dialogue with business operators.
(C)	Overly cost-focused when PPP is considered. Local govt. need to propose the attractive contracts for private companies; setting a minimum price limit, lengthening the consignment period, eliminating risks for private companies and such.
(D)	In Japan, it is necessary to promote the large-scale collaboration and PPP at the same time. However, the former has not progressed sufficiently.
(E)	Small local govts. lacking technical capabilities and human resources need to develop the conventional outsourcing.

This figure was created by the author.

Based on those discussions the reasons are thought to be as follows:

- A. There is a gap between the expected capacity of the private business operator and the current capacity of private business operator.
- B. There has not been enough consensus about the public support and involvement for the development of PPP business between the private business operators and local governments.
- C. Japanese citizens are very sensitive to water tariff level. Therefore, there is a sense of caution that PPP may trigger an increase in water tariffs.
- D. There have been few cases where the large private companies with shareholders entered in the markets of outsourcing businesses of local governments. Therefore, there is a sense of caution that the user's burden may flow out to the shareholder's profit.

In connection with D above, we also need to pay attention to the discussion of *remunicipalization* of water business. Several countries experienced the difficult clash between

maintaining the quality of business operators and the distribution of water business profits to shareholders; it is still now globally hot issue.

McDonald (2018) describes this policy as follows;

“Remunicipalization is one of the most important changes in water services in a generation. After more than three decades of privatization (including public-private partnerships and outsourcing), cities around the world are taking water services back under public management and ownership, with major implications for how water and sanitation may be owned, financed and operated in the future. Over the past 15 years there have been at least 267 cases of water remunicipalization in 37 countries, affecting more than 100 million people. The pace of remunicipalization appears to be growing, and there is an expanding international movement in favour of publicly-managed water.”

McDonald (2018) also points out as follows; “If remunicipalization is set to grow in the coming years due to growing dissatisfaction with private sector water delivery it is important that there be more theoretical clarity and stronger empirical evidence of what is actually taking place. For those working within the progressive remunicipalization movement it is critical to have a better sense of the *internal tensions* that might create *dissent* while at the same time *collectively dealing with* the threat of commercialized forms of public water.”

Lindholst (2019) also points out as follows;

“To enable public entrepreneurship, municipalities must nurture *capacities* and a *willingness to search for and invest in innovative solutions* under conditions of substantial uncertainty about institutional conditions and feasible technologies from a long-term perspective.”

In this way, several viewpoints have been suggested by previous studies. The author agrees with the point that the local governments are required internal tensions, capacities and willingness to search the potential and threat of commercialized forms of public water.

On this point Japan has not yet entered the realm of full-scale PPP utilization and discussion of remunicipalization.

What can be said objectively is that Japanese local government should keep an eye on world trends, and ascertain the capabilities of the operators.

III. Discussion

The research question of this paper is ‘How the municipalities (water suppliers) should respond to the social changes (depopulation) in Japan for sustainable public services?’ In thinking this question, the feature of Japanese system should be considered. What are the characteristics of Japanese water supply management? Municipality is in charge of water supply service. Japanese municipality’s average sizes of population and area are considerably larger than those of European continental countries such as France and Germany. However the water supply service per operator has the small number of users when compared with electricity, gas, and other infrastructure supply services in Japan. (Figure 2-7 above) Therefore, the small-scale management base causes financial instability and disparities in charges.

Next, what kind of impacts have done the declining population and local financial deterioration have on water supply management? Population decline which means fewer individual water users has a fundamental impact on water supply management in the long term. The continuous decline of number of users has pushed down income from water charges, having

a profound impact on the waterworks business. Under this situation, the revenue recovery rate has been fluctuating and recently decreasing; the revenue has not grown and the demand has decreased because of depopulation. (Figure 2-14 above)

On the other hand, Water accounting is operated based on the self-supporting accounting principle. And declining individual water users has brought about decreasing the operating revenue of water management of all Japan. Under that situation the general account of the municipality pays subsidies or disburses the loan to the water account in order to balance the water account. In addition, currently the general accounts of municipalities become severe financial situations; they owe a large amount of debts as shown in Figure 2-13 above. As a result, both of profitable balance subsidies ratio and capital balance subsidies ratio is not increasing but decreasing. This suggests that the decrease of water charge revenue is not fully compensated by the general accounts. The general accounts of municipalities currently cannot afford to support the water accounts. (Figure 2-15 above) This fact shows that Japanese local governments are faced with the urgent demand of establishing fundamentally effective water services.

In those situations the municipality as water supplier has to solve the issues on their own. Municipalities must address three major problems in water management: (a) small-scale businesses, (b) organizational inefficiency and (c) aging facilities.

The impacts above by the declining population and local financial deterioration finally converge on demand of establishing effective public service. The solution options for it are the developed collaboration and scrutinizing and effectively utilizing PPP.

The first option, collaboration has become diversified as shown in Figure 2-18 above. Recently, a new model has been implemented; '*unified wide-area waterworks management*' involves an association composed of a prefecture and all municipalities in its jurisdiction. This allows for the most exhaustive and unified control of services throughout the area. The authorities in Kagawa and Hiroshima, which have advanced wide-area waterworks, have several noteworthy characteristics as follows:

- (A) A combination of unified wide-area waterworks management and timely revision of charges would ensure the sustainable development of the waterworks business.
- (B) Water supply authorities can manage assets and liabilities in a well-balanced manner by focusing on expenditure on investments for wide-area waterworks management.
- (C) Water supply authorities have consolidated water purification plants to reduce depreciation expenses, which has helped reduce water supply costs.
- (D) Unified wide-area waterworks management has had certain positive effects, including (a) reductions in the unit price of the water supply, (b) correction of regional disparities in the unit price, (c) optimization of facilities, and (d) reinforcement of organizational systems.

In terms of scrutinizing and effectively utilizing PPP, Japanese legal framework prepared PPP (concession) in 2018 but the actual use has been extremely rare up to now. In PPP project, local government has to take into account many considerations; citizen's financial burden (level of charge), public sentiment, competence of local businesses, private operator's required capacity, private operator's earnings for sustainability, appropriateness of interests of shareholders and such. In this way the local governments are required internal tensions, capacity and willingness to search the potential and threat of commercialized forms of public water. On this point Japan has not yet entered the realm of full-scale PPP utilization and discussion of remunicipalization. Japanese local government should keep an eye on world trends, and ascertain the capabilities of the operators.

VI. Conclusion

The research question of this paper is ‘How the municipalities (water suppliers) should respond to the social changes (depopulation) in Japan for sustainable public services?’

Based on the discussion above, municipalities should respond to their management crises through the concepts of securing *stability* and *flexibility* of water-supply management. The concrete methods are the options of *developed collaboration* and *PPP*.

Developed collaboration is classified into two types. The first trend is diversified collaboration. Regarding consolidation of water supply utilities overall, the New Water Supply Vision had put forward a concept called “new consolidation” which calls for wide-ranging measures led not only by simple service integration but also by collaboration between various operating divisions (tariff collection, maintenance, water quality management, training program, etc.). In this way, the promotion of wide-ranging collaborations were planned and implemented.

The second trend is large-scale collaboration, which is represented by the enter-prefecture-area-syndicat. All the municipalities in one prefecture take part in one syndicat in pursuit of the full-fledged wide-area administration under the initiative of the prefecture. The establishments of the syndicat of Kagawa prefecture in 2018 and that of Hirosima prefecture are the leading cases. Since they are large organizations, it takes time to build consensus for slimming. However, the results of reforms show that the remarkably big slimming can be achieved in large-scale collaboration. In conclusion developed collaborations are showing progress and they are responding to the demand of establishing effective public service.

This model can be praised for its *stability*: stable financial base, user size and secured water supply through unification of rights. The bottleneck of this model is the requirement of the agreement from many constituent organizations: all the municipalities in one prefecture. It is unclear whether this initiative will become widespread. But it can be a promising model for the future if the key municipality such as a capital city in a prefecture recognizes that the framework is meaningful.

The second option is PPP. The merit of this method is flexibility. The private partner can make a flexible strategy for pricing and investment. However, the right balance among three elements is essential for PPP; charge, investment and private partner’s commercial merit. As examples from other countries show, the conflict among these elements sometimes occur, and it lead to remunicipalization in some cases such as France and Germany. The Japanese Water Act was amended in 2014 and the concession model was introduced but local governments have been cautious about introducing this system. Therefore, very few local governments have introduced this model. Considering these experiences, enhancing citizen participation in policy-making processes of PPP is thought to be required. Especially Japanese citizens are generally very sensitive for the level of water charge, and how to take a transparent and timely process for making consensus is essential for developing PPP in Japan. And reversible trial of privatization which means that the municipality can try PPP and can return to public management easily if a problem occurs is desirable.

Current Japanese water supply management is characterized by uncertainty, fragility, and unpredictability. To deal with such difficult factors, two points are required. The first is the changes of concepts. As EPAS cases show, the thorough wide area administration is required for establishing full-fledged effective public service. The second is science attitude of administration

;the water supply business is expected to be managed more scientifically and more systematically than ever in poly-crisis. As Lindholst (2019) above points out, municipalities must nurture capacities and a willingness to search for and invest in innovative solutions. It is necessary to proceed with administration scientifically because the local governments are surrounded uncertainty in modern society with poly-crisis.

It should provide both of appropriate water charge and good quality service (updated equipment) to citizens through the accurate grasp of demand and planned capital investment because the sustainability of the water management is needed as an extremely important value in Japanese shrinking society.

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Examining Japan's Modern Terrorism History in the Context of the Global Terrorism Trend:

An Analysis Based on
the Four Waves Frameworkⁱ

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Abstract

This study utilizes David C. Rapoport's Four Waves framework to explore Japan's modern terrorism history, aiming to understand its global alignment and distinctive characteristics. Two key research questions guide the inquiry: How does Japan's contemporary terrorism landscape align with the Four Waves framework, and what are the distinctive characteristics of terrorism within Japan? The analysis is based on statistical data from Japan's National Police Agency. Findings indicate the following: Firstly, Japan's terrorism landscape shares similarities with Rapoport's framework, primarily aligning with the new left wave. Nevertheless, notable deviations exist, particularly concerning incidents related to far-right extremism. Secondly, these deviations stem from Japan's unique political, social, and geographical factors, including pivotal historical events such as the Meiji Restoration in 1868 and post-World War II reconstruction. Acknowledging limitations, such as unavailable statistical data for pre- and during-war situations, the study offers academic novelty by comprehensively examining Japan's modern terrorism history. It fills a gap in the existing literature by analyzing terrorism in Japan through the Four Waves framework and objective data. By situating Japanese terrorism research within global discourse, this study aids in understanding contemporary security challenges, particularly amidst evolving security collaborations between Japan and advanced Western nations.

Keywords: Terrorism, Counterterrorism, Japan, History, Four Waves, David C. Rapoport

Introduction

The primary objective of this study is to examine Japan's modern terrorism history through the lens of David C. Rapoport's Four Waves analytical framework. The research seeks to address two main research questions: Firstly, how does Japan's contemporary terrorism landscape since the late 19th century align with the Four Waves framework? And secondly, what distinctive characteristics delineate terrorism within Japan?

Rapoport's seminal work in 2004 delineated four distinct waves of terrorism spanning from the latter part of the 19th century to the present day. These waves include the anarchist wave (1880s–1920s), the anticolonial wave (1920s–1960s), the new left wave (1960s–1990s), and the religious wave (1980s–present).¹ Rapoport acknowledged the persistence of nationalism across historical epochs, albeit with evolving manifestations.² He also recognized that certain terrorist groups transcend specific periods.³ Although there is a certain fluidity in the demarcation between these waves and the overlapping traits across successive eras, Rapoport's framework serves as a valuable tool for delineating historical shifts in terrorism, particularly within developed Western nations.

Significance of the Study and Previous Literature

The significance of this study lies in its implications for global terrorism studies. Japan's status as a member of the Group of Seven (G7) and its geographical location in East Asia, which is different from the West, underscores the importance of understanding its unique terrorism

landscape. Furthermore, since Japan hosts the second largest contingent of U.S. military personnel overseas after Germany, Japan's security dynamics are closely intertwined with global security concerns.

Despite some academic research on terrorism in Japan, particularly notable is Kobayashi's 2020 study, the historical perspective remains largely unexplored, with minimal examination of frameworks such as the Four Waves model. Consequently, historical terrorism research in Japan remains somewhat distinct from global terrorism research. This study aims to address this gap by scrutinizing the applicability of the Four Waves framework to Japan, employing objective quantitative data where feasible. Such efforts are crucial for contextualizing Japan's terrorism landscape within the broader global discourse, thereby fostering a nuanced understanding of the interplay between Japanese and global terrorism dynamics.

Methodology

Methodologically, this study utilizes qualitative analysis of prewar and wartime terrorist incidents due to the scarcity of reliable statistical data prior to 1945. For the postwar period, quantitative analysis is employed, drawing from data in the annual reports of the Japan's National Police Agency (JNPA). The reliability of these statistics is evaluated based on the clarity of terrorism definitions and the objectivity of case selection. Despite potential imperfections and discrepancies, this study assumes that the JNPA statistics offer valuable insights into broader trends in Japan's terrorism landscape.

Structure of the Study

The study's structure adheres to the Four Waves framework, encompassing: (1) the anarchist wave (1880s–1920s), (2) the anticolonial wave (1920s–1960s), (3) the new left wave (1960s–1990s), and (4) the religious wave (1980s–present). The fifth section presents a more comprehensive analysis of the characteristics of the all waves. Additionally, a brief examination of potential future trends in Japan's terrorism landscape is included. The concluding section offers responses to the research questions posited at the study's outset.

Definition of Terrorism

Regarding the definition of terrorism, Article 12, Paragraph 2 of Japan's Law for the Protection of Specified Secrets defines terrorism as "activities to kill or injure people or to destroy critical facilities or other objects based on political or other principles in order to coerce the state or others to make such demands or to cause anxiety or fear in society." This study uses this definition for discussion. While there's no universally accepted definition, academia generally agrees on the core elements of terrorism, including a political motive, instilling fear for political ends, and the use of unlawful violence or its threat.⁴ The aforementioned Japanese legal definition is not significantly at odds with this academic consensus.

This study uses the term "far-right" or "right-wing" with considerable frequency. There is no consensus among scholars on the definitions of these terms, which may vary depending on the political, cultural, and historical context of each country.⁵ The study posits that the essential

elements of the far-right or right-wing in Japan are xenophobia (especially toward other Asians), anti-government sentiment, and a conservative emperor-centric ideology. In contrast, in Western historical and cultural contexts, the primary elements of the far-right or right-wing are typically regarded as white supremacism, anti-establishment sentiment, and conservative Christianity.⁶

1. The Anarchist Wave: 1880s–1920s

1.1 *The Global Trend*

David C. Rapoport's Four Waves framework designates the period from the 1880s to the 1920s as the anarchist wave. Anarchist ideology finds its roots in the public discontent that emerged in late 19th-century Russia under the imperial regime. This sentiment evolved into a more refined ideology through the works of influential thinkers like Mikhail Bakunin and Peter Kropotkin, spreading not only in Russia but also across Western Europe and North America.⁷

1.2 *The Situation in Japan*

Preceding this era, Japan experienced the Meiji Restoration in 1868, a transformative political event that replaced the feudal lord system under the Tokugawa Shogunate with a centralized sovereign state centered on the emperor. This radical modernization facilitated Japan's transition from a feudal to a capitalist society, fundamentally reshaping its political and social landscape. Before and after this transformation, Japan witnessed significant political upheaval, giving rise to various terrorist incidents. Notable among these were:

- (1) The Sakurada Palace Gate Incident (March 1860): This event, predating the Meiji Restoration, underscored the deep societal divide between proponents of opening Japan to foreign influence and advocates of national seclusion. The victim, Naosuke Ii, Chief Minister of the Tokugawa Shogunate, was assassinated by samurai warriors aligned with the isolationist faction. This incident marked the outset of anti-government terrorist activities rooted in far-right extremism in modern Japan.
- (2) The Kioizaka Incident (May 1878): This incident, which occurred in the aftermath of the Meiji Restoration, reflected the societal upheaval and class conflicts of the era. The assassination of Toshimichi Okubo, Minister of Home Affairs under the newly established Meiji Emperor Administration, was carried out by disgruntled former samurai warriors who had lost their status due to the Restoration's reforms. At the time, Japan was undergoing a significant transformation in social dynamics, accompanied by an increase in the number of individuals who were dissatisfied with the prevailing circumstances. This incident exemplified anti-government terrorism driven by these disaffected elements.
- (3) The Great Treason Incident (May 1910): This incident involved an assassination attempt on the Meiji Emperor orchestrated by socialist and anarchist elements, including Shusui Koutoku, a prominent Japanese anarchist influenced by Russian anarchist Peter Kropotkin. From a global anarchist movement perspective, this incident aligns closely with Rapoport's characterization of the anarchist wave.

While the third incident aligns with anarchism and demonstrates Japan's connection to the global anarchist wave of the period, it is crucial to note that the first two incidents are not anarchist in nature. Instead, they stem from far-right extremism, reflective of Japan's unique socio-political divisions, particularly influenced by the Meiji Restoration.

2. The Anticolonial Wave: 1920s–1960s

2.1 *The Global Trend*

In David C. Rapoport's Four Waves framework, the period spanning the 1920s to the 1960s is commonly delineated as the anticolonial wave. This wave emerged in the aftermath of World War I and II, coinciding with the decline of Western colonial influence over overseas territories. Concurrently, movements advocating for anticolonialism, national self-determination, and nationalism gained traction in colonized regions worldwide.⁸

2.2 *The Situation in Japan*

Japan's annexation of Korea in August 1910 and subsequent rule over the peninsula until September 1945 sparked significant resistance movements, particularly within Korea. A notable example is the "March 1 Independence Movement," a mass protest against Japanese colonial rule. In this context, instances of terrorism or attempted terrorism occurred both within Japan, on the Korean Peninsula, and in other foreign territories. These acts were perpetrated by anticolonial activists targeting Japanese imperial figures, government officials, and other entities associated with Japanese colonialism. However, with Japan's loss of its colonies following World War II, instances of anticolonial terrorism within Japan notably declined.

One notable case that predates the defined period of the global anticolonial wave is the assassination of Hirobumi Ito, a prominent Japanese statesman and former Prime Minister, in October 1909. Ahn Joong-keun, a Korean independence nationalist, carried out this assassination at Harbin Station in China. While occurring earlier, the nature of this incident aligns with the context of the anticolonial wave. Other attempts include incidents targeting former Korean Crown Prince Yi Un in April 1920⁹ and Showa Emperor in January 1932 by Lee Bong-Chang, a Korean independence activist. It is important to note that from the perspective of colonized territories, these acts are often viewed as struggles for freedom rather than acts of terrorism or crimes.

In addition to anticolonial movements, the 1920s and 1930s witnessed significant terrorist attacks within Japan against government and business leaders perpetuated by the Japanese. These attacks stemmed from an anti-establishment ideology influenced by far-right extremism. The backdrop of these incidents includes social grievances related to economic recession, political distrust, and other societal conditions unrelated to anticolonialism. Notable instances of far-right extremist terrorism during this period include the assassination of Prime Minister Takashi Hara in November 1921, the shooting of Prime Minister Osachi Hamaguchi in November 1930, and the "Blood League" Incident targeting several senior business leaders in February–March 1932.¹⁰

3. The New Left Wave: 1960s–1990s

3.1 *The Global Trend*

Rapoport's Four Waves framework designates the period from the 1960s to the 1990s as the era of the new left wave. This epoch witnessed the global ascendancy of socialist and communist ideologies, set against the backdrop of the Cold War rivalry between the United States and the Soviet blocs. Influential events such as the Vietnam War (1955–1975) and the Cuban Revolution (1953–1959) contributed to the proliferation of leftist ideals worldwide.¹¹

3.2 *The Situation in Japan*

These global trends reverberated in Japan, where the 1950s to the 1970s saw the emergence of several violent extremist organizations espousing far-left ideology. Prominent among these groups were the Japan Revolutionary Communist League (JRCL) and its various factions, including the JRCL–National Committee, the JRCL (Revolutionary Marxist faction), the Communist League, and the United Red Army. Grounded in Marxist principles, particularly Trotskyism, these organizations harbored staunch anti-government, anti-American, and anti-imperial sentiments.¹²

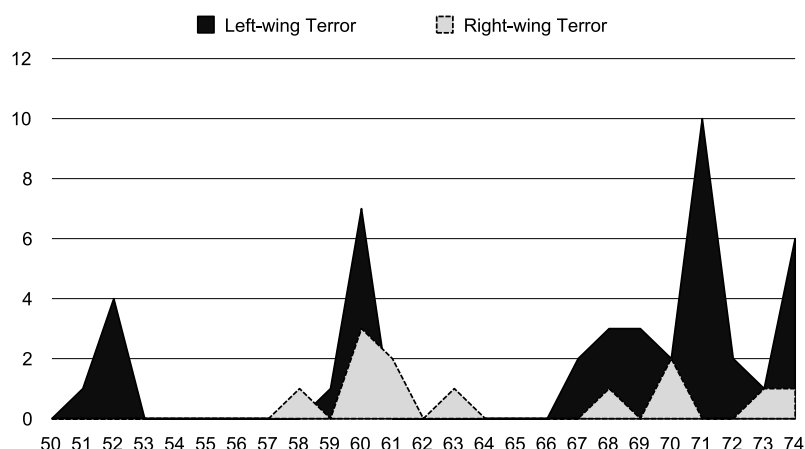
The revision (1960) and subsequent extension (1970) of the Japan–U.S. Security Treaty became focal points of contention, exacerbating political polarization in Japanese society. These socio-political dynamics catalyzed a surge in violent activities perpetrated by far-left extremist groups. Figures 1 and 2 illustrate the prevalence of far-left-related terrorist incidents during this period based on JNPA statistics. Tables 1 and 2 provide examples of major far-left extremism-related terrorist incidents during this era, highlighting the active engagement of these groups in terrorist activities both inside and outside Japan.

Far-left extremist attacks typically targeted government institutions, political parties, law enforcement agencies, the imperial family, U.S. military installations, and major corporations, occasionally involving assassination attempts against key figures. Notably, these groups employed high-risk tactics, including the use of Molotov cocktails, explosives, and even small missiles. Furthermore, some far-left extremist factions expanded their operations beyond Japan's borders (Table 2). The Japanese Red Army (JRA), an offshoot of the United Red Army, orchestrated hijackings of international flights and carried out terrorist attacks on Japanese diplomatic missions abroad. Some JRA members even relocated to the Middle East, collaborating with Palestinian terrorist organizations to execute attacks in Israel.

The global decline of the new left wave in the 1990s, concurrent with the collapse of the Soviet Union (1991) and the dissolution of the Cold War paradigm,¹³ mirrored a similar trajectory in Japan.¹⁴ During this period, the activities of far-left extremist groups gradually waned, with terrorism associated with far-left extremism becoming increasingly sporadic. As evidenced by JNPA data, serious incidents related to far-left extremism that captured public attention became exceedingly rare in subsequent years (Figures 1 & 2 and Table 1 and 2).

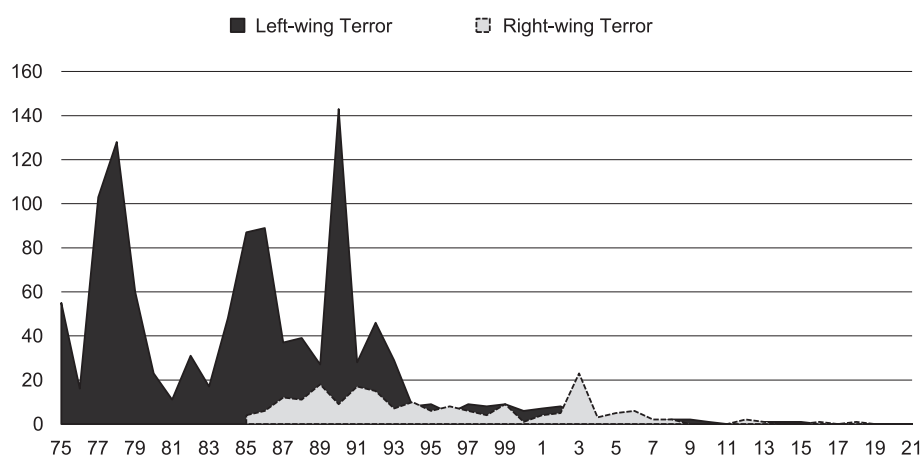
It's noteworthy that, according to the data presented in Figures 1 and 2, instances of terrorist activity related to far-right extremism also occurred during this period of the new left wave, albeit to a lesser extent than those related to far-left extremism. A significant proportion

Figure 1 The number of major terror incidents in Japan between 1950 and 1974 related to left or right-wing ideologies



* Source: The author prepared the figure based on data from the official JNPA website: <https://www.npa.go.jp/publications/booklet/index.html> (accessed June 1, 2024).

Figure 2 The number of terror incidents in Japan between 1975 and 2021 related to left or right-wing ideologies



* The data about incidents associated with the right-wing between 1975 and 1984 is unavailable.

* Source: The author prepared the figure based on data from the official JNPA website: <https://www.npa.go.jp/publications/booklet/index.html> (accessed June 1, 2024).

of these incidents stemmed from social sentiments opposing far-left extremism movements, which gained momentum during this period. Nevertheless, serious incidents targeting prominent politicians, large corporations, and media organizations did occur. Illustrative examples include (1) the assault on Prime Minister Nobusuke Kishi in July 1960, (2) the murder of Socialist Party Chairman Inajiro Asanuma in October 1960, (3) the attack on the headquarters of Japan Business Federation in March 1977, (4) the attempted murder of Hitoshi Motojima, Nagasaki City Mayor, in January 1990, (5) the attempted murder of ruling Liberal Democratic Party Secretary-General Makoto Kanemaru in March 1992, and (6) the hostage-taking incident at the Tokyo headquarters of the Asahi Shimbun newspaper in April 1994.

Table 1 Major terrorist incidents related to far-left extremism in Japan during the New Left Wave period

Year/Month	Incident
1971/12	Bombing of the Tokyo Metropolitan Police Secretary-General's Residence
1971/12	Bombing of Tokyo Metropolitan Police Oiwake Police Box
1974/08	Bombing of Mitsubishi Heavy Industries Corporation Building
1978/09	Attack on the New Tokyo International Airport Control Tower
1984/09	Arson Attack on the Liberal Democratic Party Headquarters
1990/11	Bombing of the Shinjuku Police Station Officers' Residence

* Source: The author prepared the figure based on data from the official JNPA website: <https://www.npa.go.jp/publications/booklet/index.html> (accessed June 1, 2024).

Table 2 Major terrorist incidents perpetrated by the Japanese Red Army (JRA) outside Japan during the New Left Wave period

Year/Month	Incident
1970/03	Hijacking of Japan Airlines "Yodo-go" **
1972/05	Shooting at Tel Aviv airport
1973/07	Hijacking of a Japan Airlines flight in Dubai
1974/09	Attack on French Embassy in The Hague
1975/08	Attacks on U.S. and Swedish embassies in Kuala Lumpur
1977/09	Hijacking of a Japan Airlines flight in Dhaka
1986/05	Bombing of the Japanese Embassy in Jakarta
1986/06	Bombing of U.S. and British embassies in Rome
1988/04	Bombing of the U.S. military installation in Naples

* Source: The author prepared the figure based on data from the official JNPA website: <https://www.npa.go.jp/publications/booklet/index.html> (accessed June 1, 2024).

** It can be stated that the "Yogo-go" incident was not perpetrated by members of the JRA. Nevertheless, the perpetrators of this hijacking were originally affiliated with the same group that JRA members were from.

4. The Religious Wave: 1990s–Present

4.1 Global Trend

In Rapoport's Four Waves framework, the period following the 1980s is generally considered to be the religious wave period. This wave may have been triggered by the Islamic Revolution in Iran in 1979 and the start of the Soviet invasion of Afghanistan in the same year. In particular, the latter event is believed to have encouraged Islamic extremist actors to converge on Afghanistan and provided the basis for the subsequent formation of al-Qaeda and ISIS.¹⁵ In the aftermath of the 9/11 attacks in 2001, the U.S. military invasion of Afghanistan in October 2001, and the commencement of the war in Iraq in March 2003, there was a discernible increase in terrorism related to Islamic extremism, particularly in the Middle East, North Africa, South Asia, and sub-Saharan Africa.

In Western developed countries, although the number of incidents is smaller than in the Middle East and South Asia, there have been several high-profile incidents related to Islamic

extremism after the 9/11 attacks. The following incidents are illustrative of this phenomenon: (1) The Madrid train bombings in Spain (March 2004, approximately 190 fatalities); (2) The London subway bombings in the United Kingdom (July 2005, approximately ten fatalities); and (3) The Paris attacks in France (November 2015, approximately 130 fatalities).

It should be noted that although the primary actor in the religious wave is terrorism related to Islamic extremism, the religion in question is not necessarily limited to Islam alone.¹⁶

4.2 The Situation in Japan

4.2.1 Islamic Extremism-related Terrorism

The religious wave has developed somewhat differently in Japan from the global situation described above. It is true that Islamic extremism has had a certain degree of influence on the terrorist situation in Japan. It is nevertheless important to note that, according to the JNPA records, only the following three incidents of Islamic extremism-related terrorism have been confirmed to have occurred in Japan during this period.

- (1) The simultaneous bombings in Chiyoda Ward in March 1988 (No fatality): A timed explosive device detonated in front of a building in Chiyoda-ward, Tokyo, resulting in damage to the Saudi Arabian Airlines office located in the building. Concurrently, a timed explosive device detonated in proximity to the Israeli Embassy, situated in the same ward.¹⁷
- (2) The murder of a Japanese translator of "Satanic Verses" in July 1991 (One fatality): In a tragic incident on the campus of Tsukuba University in Tsukuba City, Ibaraki Prefecture, a faculty member of the university, who served as the Japanese translator of the novel *The Satanic Verses* (written by Salman Rushdie), was fatally injured by a knife attack. The novel was the subject of criticism for its blasphemous content against Islam.¹⁸
- (3) An explosion in a Philippine airplane in December 1994 (One fatality): An explosive device planted under a seat detonated over Okinawa Prefecture on a Philippine Airlines flight en route from Manila to Narita via Cebu, resulting in the death of a Japanese passenger. The incident is believed to have been a test of al-Qaeda's plan to attack the United States using an aircraft (the so-called Bojinka Plot).¹⁹

When compared to the situation in developed countries in North America and Western Europe, both the number of cases and the number of casualties in Japan are significantly lower. In addition, instances of Japanese nationals and Japanese interests being involved in terrorism related to Islamic extremism have occurred on occasion outside Japan, primarily in the Middle East and Africa (Table 3). The majority of these incidents, with a few exceptions, do not appear to be directed at Japanese nationals or Japanese interests.²⁰

Table 3 Major incidents of terrorism related to Islamic extremism outside Japan in which Japanese nationals or Japanese interests were affected

Year/Month	Incident
1997/11	Attack on tourists in Luxor, Egypt (1 Japanese fatality)
2001/09	9/11 incident in the United States (24 Japanese fatalities)
2002/10	Bombings in Bali, Indonesia (2 Japanese fatalities) Local Islamic extremists detonated a vehicle-borne improvised explosive device in downtown Bali, Indonesia. The blast resulted in the deaths of 202 individuals, including numerous foreign nationals (including two Japanese nationals) who were patrons at a nearby nightclub.
2004/10	Killing of a Japanese hostage in Iraq (1 Japanese fatality) A local armed group in Iraq, believed to be Islamic extremists, demanded the withdrawal of Japanese Self-Defense Forces from Iraq and killed a Japanese traveler as a hostage.
2008/11	Mumbai attacks in India (1 Japanese fatality) In Mumbai, India, an armed group believed to be Islamic extremists launched a coordinated attack on multiple targets, including a hotel, a restaurant, and a train station. The attack resulted in the deaths of 174 individuals, including 34 foreign nationals, one of whom was a Japanese national.
2013/01	Attack on a gas plant in Algeria (10 Japanese fatalities) In In Amenas, Algeria, local Islamic extremists attacked a gas plant and detained employees of the plant, including Japanese nationals. The Algerian military was able to take control of the situation within a few days, but 40 people, including 10 Japanese nationals, were killed.
2015/01-02	Killing of Japanese nationals in Syria (2 Japanese fatalities) ISIS disseminated footage of two Japanese nationals, purportedly held captive in Syria, and demanded a ransom of \$200 million. Subsequently, videos of the killings of the two Japanese nationals were made available on the Internet.
2016/07	Attack on a restaurant in Dhaka, Bangladesh (7 Japanese fatalities) In Dhaka city, a local armed group affiliated with ISIS attacked a restaurant that was a popular venue for foreign diners and detained patrons. The attack was suppressed by security forces, resulting in the deaths of 20 individuals, including seven Japanese nationals.

* Source: The author prepared the figure based on data from the official PSIA website: https://www.moj.go.jp/psia/ITH/topics/Japanese_suffer.html (accessed June 1, 2024).

4.2.2 Other Religious Terrorism

It is worth noting that the religion in question during the religious wave period is not necessarily limited to Islam alone. In the early 1990s, Japan experienced a series of serious terrorist attacks related to religious ideologies other than Islamic extremism. These attacks were perpetrated by Aum Shinrikyo, a religious cult related to Buddhism and unrelated to Islamic extremism. Notable terrorist incidents perpetrated by this cult include the Matsumoto Sarin Gas Attack Incident in June 1994 and the Tokyo Subway Sarin Gas Attack Incident in March 1995.²¹ The former incident resulted in eight deaths and approximately 140 injuries, while the latter resulted in 13 deaths and over 5,800 injuries.

Of particular interest to Western terrorism researchers and counter-terrorism practitioners was the Tokyo Subway Sarin Gas Attack, which attracted attention for the following reasons.²² (1) It is a rare example of non-Islamic religious terrorism in an era of the religious wave, in which

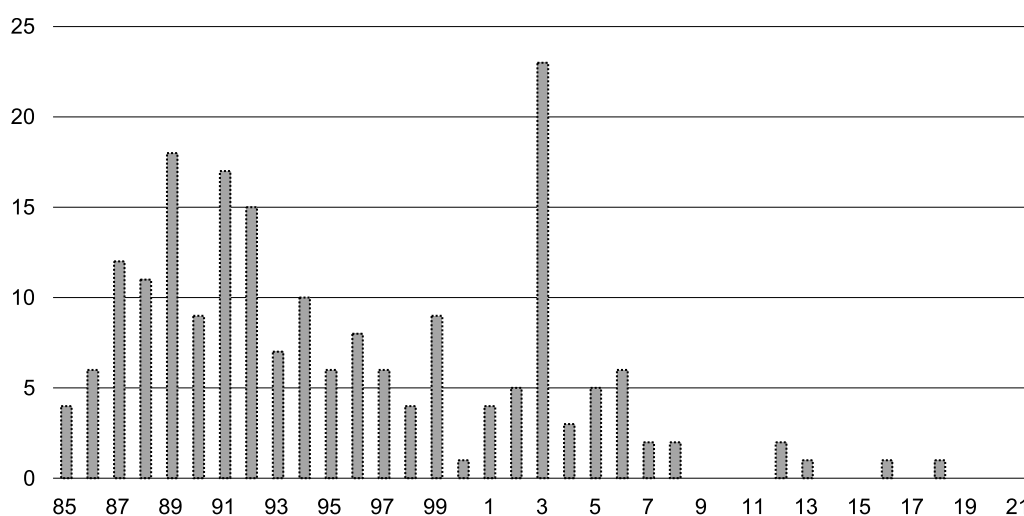
Islamic extremist-related terrorism is the dominant form of terrorism. (2) This is a rare case of organized terrorism that occurred in the center of a large city in a developed country and in which a chemical substance (i.e., sarin gas) was used.²³ (3) Many of the members of Aum Shinrikyo, including the perpetrators of this incident, were highly educated and of high social standing, including medical doctors and lawyers. This situation of Aum Shinrikyo provides strong counterevidence against the (false) perception that the root cause of terrorism is poverty and low levels of education.²⁴

It is noteworthy that, according to JNPA statistics, there have been no confirmed cases of terrorism by similar religious groups, including Aum Shinrikyo, since the Tokyo Subway Sarin Gas Attack in March 1995.²⁵ This situation is somewhat surprising, despite the fact that Japan's slowing economic growth and widening economic disparities in society (both of which are believed to contribute to the growth of social discontent that fosters the soil for terrorism) have continued to grow since then. Although the cause is not necessarily clear, one possible hypothesis is that the Japanese government, based on the lessons learned from the Tokyo Subway Sarin Gas incident, has strengthened its measures against such religious cults. This may have contributed to this situation.

4.2.3 Far-right Extremism-related Terrorism

According to data from the JNPA, there has been a decline in the number of incidents of far-right extremist terrorism during this period of religious unrest, at least in terms of statistics (Figure 3). Furthermore, incidents that have attracted significant public attention have also been limited. Nevertheless, it is conceivable that the character of far-right extremism in Japan has undergone a gradual transformation since the 2010s. While the majority of postwar far-right extremism-related terrorism in Japan was anti-government, anti-establishment, and anti-leftist in nature, from the 2010s onward, discrimination and xenophobia against foreigners and the physically challenged have become more prominent. While there is no objective statistical data to support

Figure 3 The number of terror incidents in Japan between 1985 and 2021 related to right-wing ideologies.



*Source: The author prepared the figure based on data from the official JNPA website: <https://www.npa.go.jp/publications/booklet/index.html> (accessed June 1, 2024).

this assertion, the following events may be considered circumstantial evidence of a change in the situation. First, the JNPA publishes an annual report on the security situation each year. The 2014 report identified a potential increase in xenophobia in the future for the first time.²⁶ Secondly, in 2016, the Japanese Diet enacted the country's inaugural Hate Speech Act. Thirdly, in June of the same year, a near-clash occurred in the city of Kawasaki near Tokyo between a group espousing hate speech against Koreans and an opposing group that sought to counter the hate speech. Although no tangible damage was incurred, the incident bears resemblance to the events surrounding the "Unite the Right" rally in Charlottesville, Virginia, the United States, in August 2017. In response to this incident, the Kawasaki City Council enacted Japan's first municipal-level ordinance in December 2019, which imposes penalties for hate speech that is related to xenophobia.

5. Discussion

Building upon the preceding discussions, this section presents a more comprehensive analysis of the characteristics of the Four Waves in Japan and the underlying reasons for their occurrence. It then offers responses to the research questions initially set forth at the beginning of this study.

5.1 *The Evaluation of the Each Wave in Japan*

During the period of the anarchist wave, although Japan experienced elements of anarchism-related terrorism, it was not a predominant feature. The majority of terrorist attacks that occurred during this period were driven by far-right extremism, which manifested in various forms, including xenophobia and anti-government sentiments. These sentiments were shaped significantly by Japan's unique socio-political conditions of the time, which were influenced by the Meiji Restoration in 1868.

Historical records indicate that the anticolonial wave had some manifestations in Japan until the end of World War II, owing to Japan's colonial endeavors abroad during the early 20th century. However, with Japan's loss of its colonies following World War II, instances of anticolonial terrorism within Japan dwindled significantly. It is evident that the framework of the anticolonial wave does not align well with the post-war circumstances of Japan. Furthermore, it is notable that, particularly during the 1920s and 1930s, there were several instances of terrorism motivated by far-right extremism that were not related to anticolonialism. These incidents can be attributed to Japan's unique social and political situation at the time, including economic recession and political disunity.

Within Rapoport's Four Waves framework of global terrorism, the new left wave appears to align more closely with the Japanese context than the preceding waves. Possible contributing factors include Japan's geographical proximity to communist and socialist powers such as the Soviet Union and the People's Republic of China, which fostered a receptive social climate to their influence. Moreover, the postwar period in Japan was marked by a pervasive anti-war sentiment following the defeat in the war. This was compounded by the nation's reliance on the United States for national security, which created conditions conducive to the fusion and radicalization of anti-war, anti-American, and socialist ideologies. It is also noteworthy that terrorist incidents motivated by far-right extremism continued to occur during this period, which were unrelated to

leftism. Many of these incidents were seen as a reaction to the upsurge in leftism.

The characteristics of the period of the religious wave in Japan appear more complex. Firstly, during the period of religious wave activity, there has been a notable absence of terrorism related to Islamic extremism in Japan, in comparison to developed Western countries. A summary of the factors that may explain this situation is as follows:²⁷ Japan is geographically distant from major Islamic extremist conflict zones in the Middle East and South Asia compared to developed Western countries. Moreover, as an island nation, Japan has relatively robust border security, making it challenging for those involved in Islamic extremist organizations to gain access to Japan from the Middle East or South Asia. Furthermore, the Islamic population in Japan is relatively small, estimated to be approximately 0.15% of the total population.²⁸ Consequently, the issue of so-called “loan offenders” among second or third-generation immigrants, which has become a significant concern in developed Western countries, is unlikely to emerge in Japan at this time.

Secondly, in the early 1990s, Japan experienced a series of non-Islamic extremist religious terrorist attacks perpetrated by the Aum Shinrikyo cult. This is also a relatively uncommon occurrence in comparison to other Western industrialized countries. The rationale behind the sudden emergence of this cult remains unclear. Furthermore, since the Tokyo Subway Sarin Gas Attack of March 1995, there have been no other terrorist attacks of this kind. Apart from the possibility that counterterrorism measures may have been strengthened by the authorities in the wake of the incident, the rationale behind this phenomenon remains unclear.

5.2 *Future Prospects: The Possibility of the Fifth Wave*

There is a debate over whether a “fifth wave,” or a far-right wave, has been initiated, especially in developed Western countries, following the recent escalation of terrorism related to far-right extremism.²⁹ It would be beneficial to assess whether such a debate applies to Japan as well. During the period of the religious wave, terrorism that is related to far-right extremism in Japan declined in comparison to the previous wave of attacks. Consequently, the assertion that the “fifth wave,” or the advent of a wave of far-right extremism as observed in some developed Western countries, would not be applicable to Japan, at least, is supported by the evidence.

Nevertheless, the nature of far-right extremism in Japan has been undergoing a transformation since the 2010s, with a shift towards discriminatory and exclusionary attitudes towards foreigners and individuals with disabilities. This situation may be analogous to that observed in more recent Western industrialized countries. As of 2023, the ratio of foreign residents to the total population in Japan was approximately 2.5%, which is lower than in developed Western countries.³⁰ Consequently, it is unlikely that the situation in Japan will become as severe as in the United States or Germany in the near future. Nevertheless, the inflow of foreign personnel into Japan is likely to persist, given the ongoing immigration policy of the Japanese government. Consequently, it is imperative that the security authorities exercise caution and vigilance in monitoring the situation. An official document of a Japanese intelligence organization also points this out.³¹

5.3 *Findings*

In light of the preceding analysis, the responses to the two research questions for this study, as

set forth at the beginning, are as follows.

Firstly, the contemporary terrorism scenario in Japan since the late 19th century exhibits elements reminiscent of Rapoport's Four Waves, albeit with certain nuances. Among these waves, the new left wave appears to find the closest resonance with the Japanese context. While the other historical periods demonstrate typical characteristics ascribed by Rapoport, they also manifest deviations from his framework, notably evidenced in terrorist incidents related to far-right extremism.

Secondly, the deviations from the Four Waves framework in Japan appear to be the result of unique political, social, and geographical factors specific to the country. These include pivotal events such as the Meiji Restoration in 1868 and the nation's post-World War II reconstruction, as well as Japan's geographical isolation and the relatively limited Muslim population within its borders. It is notable that far-right extremist terrorism has persisted across historical epochs in Japan. However, the emergence of a distinct fifth wave appears improbable, at least within the Japanese context.

Conclusion

The primary objective of this study is to examine Japan's modern terrorism history through the lens of David C. Rapoport's Four Waves analytical framework. The research seeks to address two main research questions: Firstly, how does Japan's contemporary terrorism landscape since the late 19th century align with the Four Waves framework? And secondly, what distinctive characteristics delineate terrorism within Japan?

Based primarily on statistical data provided by the JNPA, the findings pertaining to these inquiries are as follows: Firstly, Japan's terrorism landscape shares similarities with Rapoport's framework, primarily aligning with the new left wave. Nevertheless, notable deviations exist, particularly concerning terrorist incidents related to far-right extremism. Secondly, these deviations stem from Japan's unique political, social, and geographical factors, including pivotal historical events such as the Meiji Restoration and post-World War II reconstruction.

This study acknowledges its limitations. While striving for objectivity, reliance on postwar statistical data from the JNPA constrains the examination of this period, with a lack of available data on prewar and wartime cases.

Notwithstanding these limitations, this study bears academic novelty and significance. Prior investigations into terrorism in Japan have predominantly focused on specific historical periods, leaving a dearth of comprehensive scholarly inquiry spanning the entire modern era since the late 19th century, particularly through the lens of the Four Waves framework. This study marks the pioneering endeavor to scrutinize Japan's modern terrorism history utilizing objective statistical data. By harnessing the widely recognized Four Waves, entrenched in the academic discourse on terrorism in developed Western nations, this study contributes to situating Japanese terrorism research within the broader context of global terrorism studies. As security collaborations between Japan and advanced Western countries, notably the United States, continue to evolve, such scholarly endeavors hold both academic and practical significance.

Notes

- 1 Rapoport, 2004, pp. 47–50.
- 2 Rapoport, 2004, p. 47; Forest, 2019, pp. 41–42.
- 3 Rapoport, 2004, p. 48.
- 4 Bakker, 2015, pp. 38–42; Hoffman, 2017, pp. 43–44; Martin, 2019, pp. 7–8.
- 5 Auger, 2020, p. 89.
- 6 Forest, 2019, pp. 202–207; Freilich, Chermak, Gruenewald, Parkin, & Klein, 2018, pp. 38–51.
- 7 Forest, 2019, p. 29.
- 8 Bakker, 2015, p. 52; Forest, 2019, pp. 30–31.
- 9 Anticolonialism activists targeted Crown Prince Yi Un because of his planned marriage to one of the Japanese imperial princesses.
- 10 In addition, the “15th of May” incident in 1932 and the “26th of February” incident in 1936 were attempted coups by military personnel, which do not meet the criteria for terrorism as defined in this study. However, these coup attempts share a common ideological background with the aforementioned terrorist incidents, led by mid-level army officers influenced by anti-government far-right extremism.
- 11 Rapoport, 2004, p. 56; Bakker, 2015, p. 53; Forest, 2019, p. 33.
- 12 The JNPA website: <https://www.npa.go.jp/bureau/security/kyokusa.pdf> (accessed June 1, 2024).
- 13 Forest, 2019, pp. 177–179.
- 14 National Police Agency of Japan, 2004, p.19.
- 15 Rapoport, 2004, pp. 61–62; Bakker, 2015, p. 58; Forest, 2019, pp. 37–39.
- 16 Forest, 2019, p. 208.
- 17 National Public Safety Committee and the National Police Agency, 2019, p. 28.
- 18 National Public Safety Committee and the National Police Agency, 2019, p. 29.
- 19 National Public Safety Committee and the National Police Agency, 2019, p. 29.
- 20 Kobayashi, 2020, pp. 225–227.
- 21 The Tokyo Subway Sarin Gas Attack occurred at approximately 8:00 a.m. on March 20, 1995, within five train cars of three subway lines (Hibiya Line, Chiyoda Line, and Marunouchi Line) en route to Kasumigaseki Station, situated in the center of Tokyo. It is noteworthy that Kasumigaseki Station was the location of the central government's primary ministries and agencies, and that the timing of the attack coincided with the commute of numerous government officials and business persons from major corporations utilizing the subway. In the trains, five senior members of the Aum Shinrikyo, under the direction of Shoko Asahara, the leader of the cult, stabbed a plastic bag containing sarin gas with a pointed umbrella and vaporized the sarin gas in five subway cars on three lines. Their objective was to spray sarin gas in order to kill an indefinitely large number of passengers. Each of the five perpetrators was carrying a separate bag in a different carriage. Consequently, thirteen passengers succumbed to sarin gas poisoning, while more than 5,800 others also exhibited symptoms of sarin poisoning (The Public Security Intelligence Agency of Japan official website: <https://www.moj.go.jp/psia/20140331.aum.top.html> (accessed June 1, 2024)).
- 22 On October 8, 1997, the U.S. Secretary of State designated Aum Shinrikyo as a Foreign Terrorist Organization (FTO) under the Immigration and Nationality Act. This designation remained in effect until its removal on May 20, 2022 (The United States State Department official website: <https://www.state.gov/foreign-terrorist-organizations/> (accessed June 1, 2024)).
- 23 Rapoport, 2004, p. 67.
- 24 National Police Agency of Japan, 2004, p. 50.

- 25 Following the Tokyo Subway Sarin Gas Attack in March 1995, the founder, Chizuo Matsumoto (also known as Shoko Asahara), and numerous other Aum Shinrikyo leaders and members were apprehended. Consequently, no further terrorist attacks by the cult have been substantiated since 1995. Asahara was executed in July 2018. It is important to note that the cult has undergone name changes and splits, yet it continues to exert a certain level of influence and activity within Japanese society. In January 2000, the Public Security Examination Commission issued a disposition placing the cult under observation by the Director of the Public Security Intelligence Agency (PSIA) in accordance with the Law on the Regulation of Associations (Act on the Control of Organizations Which Have Committed Acts of Indiscriminate Mass Murder). This disposition has been renewed several times and is still in force. As of February 2024, the PSIA estimates the strength of Aum Shinrikyo's successor groups as follows: (i) The number of members is approximately 1,650. (ii) The group has 30 facilities throughout Japan. (iii) The group's assets are approximately 17 million (PSA's official website: <https://www.moj.go.jp/psia/20140331.aum.top.html> (accessed June 1, 2024)).
- 26 National Public Safety Committee and the National Police Agency, 2014, p. 183.
- 27 Kobayashi, 2020, p. 222.
- 28 A 2019 study by Tanada indicates that, as of 2017, the percentages of the Muslim population to the total population in the G7 countries (excluding Japan) were as follows: The United Kingdom has a Muslim population of 4.4% (2.91 million), Germany has 4.3% (3.53 million), France has 4.3% (2.79 million), Canada has 3.2% (1.17 million), Italy has 2.0% (1.19 million), and the United States has 1.6% (5.19 million). Conversely, as of June 2018, the estimated Muslim population in Japan was approximately 200,000 (of which approximately 157,000 were foreign Muslims and 43,000 were Japanese Muslims). This equates to approximately 0.15% of the total population (Tanada, 2019, pp. 253–262).
- 29 Auger, 2020; Byman, 2023; Hart, 2023.
- 30 The Organization for Economic Cooperation and Development (OECD) has identified the following ratios of foreign population to total population in the G7 countries (from highest to lowest): Germany: 13.1% (2019), UK: 9.8% (2018), Italy: 8.7% (2019), France: 7.3% (2019), US: 6.9% (2017), Canada: 6.6% (2016), Japan: 2.2% (2019). While data for Japan is not available for comparison, the foreign-born population as a percentage of the total population for the other countries is as follows (from highest to lowest): Canada: 21.0% (2017), Germany: 16.1% (2019), United Kingdom: 13.7% (2018), United States: 13.6% (2019), France: 12.8% (2019), Italy: 10.4% (2019) (Organization for Economic Cooperation and Development, 2024a; 2024b).
- 31 National Police Agency of Japan, 2013, p. 22.

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