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Development and application of local SDG indicators:

The case of local governments in Japan

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Abstract

Since the Sustainable Development Goals (SDGs) were launched in 2015, there has been growing attention on how countries and municipalities can localize the SDGs within their respective contexts. Accordingly, scholars have investigated theoretical frameworks to operationalize SDG localization. However, few studies have explored ways of developing and applying local SDG indicators within local government administrations. Therefore, this research aims to investigate how local governments can develop and apply a localized indicator framework by reviewing cases of local governments in Japan. Through a quantitative analysis of the indicators created by Japan's local governments—as presented in the SDG Future City plans—as well as interviews with officers from local governments, the research identifies clear characteristics of local indicators. These include a tendency for local governments to disproportionately focus on specific SDG goals and targets, often using subjective measures and developing their own local indicators for specific goals and targets. The research suggests that these imbalances are due to the voluntary selection process by which local governments prioritize their own goals, targets, and indicators. In addition, a lack of appropriate indicators for some targets is another potential reason for the imbalance in the selected targets. Based on these findings, the research culminates in an agenda that central and local governments should consider when developing and applying local SDG indicators. This agenda is expected to serve as a reference for other countries.

Keywords: Sustainable Development Goals (SDGs), Localization of SDGs, Local SDG indicators, Japan, Local government

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1. Introduction

1.1 SDGs and their localization

The 2030 Agenda for Sustainable Development, comprising 17 Sustainable Development Goals (SDGs), was adopted at the General Assembly of the United Nations in 2015 (United Nations 2015). To achieve sustainable development, it is critical not only to promote national governments' efforts but also the actions of local governments (Ortiz-Moya and Reggiani 2023). Following the launch of the 2030 Agenda, regional and subnational levels (i.e., local governments) have been regarded as important actors in achieving the SDGs. The Agenda stipulates in paragraph 21 that "Regional and subregional frameworks can facilitate the effective translation of sustainable development policies into concrete action at the national level" (United Nations 2015, 7). Indeed, local governments play critical roles in the implementation of the SDGs because more than 65 percent of the sustainable development objectives are related to local communities in the regions and sub-regions of many countries (Guarini, Mori, and Zuffada 2022). However, the localization of the SDGs at the regional and subnational levels faces challenges, as it requires the development of decision-making systems, financing systems, and localized indicators to monitor progress (Smith et al. 2018; Tan et al. 2019; Ortiz-Moya and Reggiani 2023).

While the importance of local governments in implementing the SDGs has long been recognized, the UN has not granted local governments any enhanced status, nor has it established how the localization of the SDGs should be realized in concrete terms (Perry et al. 2021; Krantz and Gustafsson 2023). Under these circumstances, voluntary local reviews (VLRs) have recently been regarded as a possible tool for promoting SDG localization by encouraging local governments to translate the SDGs into local contexts (Ortiz-Moya and Reggiani 2023). VLRs are localized reports that follow voluntary national reviews (VNRs) on national progress of the SDGs, submitted annually to the High-Level Political Forum (HLPF) on Sustainable Development since 2016 (Allen et al. 2020). By the end of 2023, 315 VLRs had been published by local governments worldwide, especially municipal governments in Europe (Stamos et al. 2024). However, despite the issue of several guidelines for preparing VLRs, they still do not have official status. Moreover, there are still issues regarding how local governments should conduct VLRs—especially in terms of operationalizing the integration between the VNRs and VLRs (Narang Suri, Miraglia, and Ferrannini 2021; Ortiz-Moya and Reggiani 2023).

To address this issue, a growing body of research has emerged on how to realize SDG localization (Rimba, Sato, and Endo Forthcoming). Most of this research has focused on exploring how the concepts could be applied in practice (Krantz and Gustafsson 2021). They have tended to focus on governance and management aspects within local governments, such as leadership and stakeholder participation, in order to operationalize the SDGs at the local level (e.g., Krellenberg

et al. 2019; Valencia et al. 2019; Krantz and Gustafsson 2021). However, local SDG indicators have seldom been the focus of research, especially regarding their development by local governments—even though the importance of local indicators has frequently been emphasized in the context of SDG localization (Perry et al. 2021; Okitasari et al. 2019). The lack of research on local SDG indicators as a reference for local governments may have made it difficult for them to develop their own local indicators. Therefore, practical research on how local governments can develop local indicators based on real-world cases is required.

1.2 SDG localization and local indicators in Japan

Japan's approach to SDG localization—including the development of local indicators—may be described as unique, and it potentially provides a valuable reference point for other national and local governments worldwide. Japan is one of the few countries that has successfully incorporated the SDGs into society by combining public awareness, corporate engagement, and government policy (Sato and Endo 2025). Japan's approach is distinctive in that the Japanese government has promoted SDG localization at both the national and local levels by connecting the SDGs with the revitalization of regional societies and economies. Specifically, the Japanese government has promoted regional revitalization strategies to address issues caused by population decline and dwindling regional economies in aging rural communities through SDG localization (Masuda et al. 2021; Sato and Endo 2025). One of the most noticeable activities is the "SDGs Future City" (SFC) initiative, established in 2018 by the Cabinet Office and the Headquarters for Overcoming Population Decline and Vitalizing Local Economy, which selects local governments with high potential for realizing the SDGs and encourages them to develop relevant policies involving multiple stakeholders (Masuda et al. 2022). As of the end of March 2024, 182 local governments in Japan had been selected as SFCs that promote SDG localization (Cabinet Office of Japan 2024).

All the SFCs have set and disclosed their own prioritized goals and targets aligned with the SDGs, with specific strategies designed to realize them and original indicators to monitor their progress. Considering the fact that only 315 local governments around the world have included local indicators in their VLRs, Japan's progress in this area is remarkable (Stamos et al. 2024). In Japan, only eight local governments have officially published VLRs so far. However, 182 local governments across the country have established local SDG indicators to assess progress toward their own prioritized goals and targets (as of the end of March 2024). This factor distinguishes Japan from other countries in its knowledge and experience of local indicators, in line with the SDG creation.

In addition, the national government and some local governments have sought to develop a comprehensive set of local SDG indicators to measure the overall progress of the SDGs at the

local level, although the process is still ongoing. In 2018, the Cabinet Office of Japan presented a "list of local indicators of SDGs and the regional revitalization" as a reference for local governments, in collaboration with Japanese research institutes and researchers, and revised it in 2022 (Cabinet Office of Japan 2022; Kawakubo and Murakami 2020). At the local level, Shimokawa Town and Kitakyushu City—both designated as SFCs and publishers of VLRs—have developed their own sets of local SDG indicators and associated data collection mechanisms (Masuda et al. 2021). In addition, some local governments have begun piloting the use of local SDG indicator sets to measure the overall progress of the SDGs in local contexts (e.g., Toyota City and Kanazawa City).

1.3 Research objective and research question

Considering the above background, this research aims to investigate how local governments should develop local SDG indicators. To do so, this research draws on the cases of local governments in Japan that have created their own indicators for their analysis. In concrete terms, this research aims to answer the following questions: (1) What are the characteristics of local indicators for SDGs developed by Japan's local governments? (2) Why do these local indicators incorporate such characteristics? (3) What is the agenda for the future development of local SDG indicators?

This research is significant in that it provides new knowledge and insights related to local SDG indicators. As noted above, this is an aspect that has so far received little attention due to the scarcity of real-world implementation. By drawing from actual cases of Japan's local governments, this research is expected to serve as a reference for practitioners and scholars in exploring local SDG indicators and advancing SDG localization through their development and use.

2. Research method

This research employs both quantitative and qualitative analysis. First, the research quantitatively analyzes the trends in indicators for prioritized goals and targets, as set out in the local governments' SFC plans. A total of 182 local government SFC plans, published up until the end of March 2024, were analyzed. This research utilizes the most recent version of each plan at the time of data collection (December 19, 2024) for analysis. The indicators set out in the SFC plans comprise one or more key performance indicators (KPIs), each corresponding to one or more targets/goals. Accordingly, this research quantitatively analyzes the trends of the indicators used, focused targets, and goals, as well as the relationships between them.

In addition to the quantitative analysis, this research conducts semi-structured interviews with staff members from 11 local governments, including town, city, and prefectural governments, that

published SFC plans (see Table 1 for the list of interviews). The interviews focused on the following points, with additional relevant information also collected. Key questions related to (1) the approach to SDG localization and development of the local indicators; (2) the methods used to select indicators, as well as data collection and application; (3) the methods used for the selection of prioritized targets and goals; (4) the use of subjective indicators; and (5) the use of original indicators developed to assess specific issues and policies of local governments. Through the interviews, the research investigates why the local indicators reflect the characteristics identified in the quantitative analysis.

［Table 1］

3. Results

In this section, the results of the data analysis and interviews are presented under the following four categories: features of local indicators, prioritization of SDG targets and goals, use of subjective indicators, and use of original indicators specific to certain issues and policies of local governments.

3.1 Features of the local indicators

The indicators set out in the SFC local government plans have four specific features. The first feature is that local governments tend to use fewer indicators than those used in the global SDG framework; local governments tend to use fewer than ten indicators to measure between 10 and 25 targets (see Table 2), while the global SDG framework includes 248 indicators for 169 targets. This difference reflects the fact that the indicators set out in the SFC plans are specifically designed for prioritized targets and goals.

The second feature is that there is a noticeable difference in the number of targets linked to each indicator when comparing SFC plans with the global SDG framework. The average number of targets corresponding to one indicator set out in the SFC plans is larger than 1—i.e., 2.41 (3,150 targets out of 1,308 indicators). In contrast, the average number of targets per global SDG indicator is less than 1—i.e., 0.73 (169 targets out of 231 indicators, excluding duplicated indicators). The indicators specified in the SFC plans often include one or more KPIs, which could lower the average number of targets per indicator. However, even when treating individual KPIs as sub-indicators within the SFC plan, the average remains larger than 1—i.e., 1.80 (3,150 targets out of 1,752 indicators). This means that a single indicator adopted by Japanese local governments tends to correspond, on average, to more than one target, whereas most global SDG indicators are linked to only one target.

[Table 2]

This feature can be better understood by examining the number of targets corresponding to one indicator and the number of KPIs under each indicator (see Table 3). Indeed, 57% of the indicators specified in the SFC plans correspond to more than one target (with 40% linked to two or three targets), while 43% correspond to a single target. For instance, Nagoya City uses three indicators—each composed of two sub-indicators—to measure six, four, and six targets, respectively (see Table 4). Notably, as many as 90.7% of local governments (165 out of 182) have at least one indicator linked to multiple targets. Across all local government SFC plans, Kagoshima City links its indicators with the highest number of targets (three indicators for 57 targets). This trend suggests that the global SDG indicators could be streamlined by adopting indicators that are common across many targets, though this requires further scientific verification.

[Table 3]
[Table 4]

The third feature is regarding components of the indicators. 80% (1,050 out of 1,308) have a single KPI, while the remainder contain more than one KPI. Moreover, 63.7% of local governments selected as SFCs (116 out of 182) use at least one indicator with multiple KPIs, despite being free to adopt any indicator framework under the SFC plan. Among these, Ueda City specified the highest number of KPIs—23 in total—for three indicators (each corresponding to one target). The maximum number of KPIs used per target (i.e., 11 KPIs in one of Ueda City's indicators) is much larger than that of the global SDG indicators (i.e., five indicators are the maximum for one target). In addition, there is no obvious similarity in the number of indicators or KPIs corresponding to a specific target between the indicators/KPIs set out in the SFC plan and the global SDG indicators. For example, Target 3.9 has three indicators in the global SDG indicator framework, while the target has just one indicator (KPI) in any SFC plans. On the other hand, some local governments have established several KPIs for Target 4.7 (e.g., Shizuoka City has set out three KPIs), whereas only one indicator is defined in the global SDG indicator framework.

The fourth feature of the indicators set out in SFC plans is that some indicators have been adapted from global indicators to measure progress toward global targets of the SDGs using locally available data. For instance, the indicator for "the number of newly installed renewable energy power generation facilities" and "the number of renewable energy electricity contracts" seems suitable for measuring Target 7.2 (Increasing the share of renewable energy). Similarly, "the number of public-private partnership projects through comprehensive partnership agreements and

others" seems to be an acceptable indicator for evaluating Target 17.17 (Encouraging and promoting effective public, public-private and civil society partnerships). This demonstrates that current global SDG indicators can be replaced with local indicators to measure progress using locally available data.

Through the interviews, we found that the approaches employed by Japanese local governments to developing indicators could, to some extent, explain the above features of the indicators in the SFC plans. First, local governments often rely on existing local indicators to measure progress toward achieving the SDGs. This is because developing new indicators can entail significant labor to collect data, leading to resistance from departments within the local government. There is also a risk that knowledge of the data sources and collection methods may be lost due to personnel transfers. In addition, continuous data collection is necessary if new data is required for the indicators. However, it is not easy to obtain data at a high frequency. Therefore, it may be difficult to develop new indicators solely for the SDG plans, and this is the consensus among the local governments interviewed. On the other hand, there are the following benefits of using existing indicators: 1) it is easy for the staff to update the necessary data, because each department in charge follows the indicators as regular work; 2) the staff can spend their time considering policies and measures rather than data collection; 3) similar indicators are often used in higher-level plans, which maintains the consistency of local government policies between such plans and the plan on SDGs.

Second, the indicators are selected not only by the department in charge within local governments but also by internal and external stakeholders. Indicators for local governments are typically formulated through coordination between the department in charge (i.e., the coordinating department) and related departments that propose the indicators. This means that the selection of indicators may depend on the intentions of the relevant departments and discussions between them. Both the coordinating department and the related departments tend to prefer smaller numbers of indicators because compiling and analyzing data becomes difficult if there are too many indicators, though some governments prefer having higher numbers of indicators to accurately grasp progress toward the SDGs. In addition, stakeholders outside local governments, such as academic scholars and consultants, may become involved, in which case, local governments may try to develop more comprehensive SDG indicator frameworks. In such cases, a similar issue arises. During the process, a local government may face conflicts between consultants who want to increase the number of indicators and government officials seeking to reduce the number of indicators. Overall, the selection of indicators may depend on the intentions of the relevant stakeholders and the discussions between them.

Third, local governments tend to prioritize specific goals and select indicators related to these goals. They then determine the targets linked with these indicators. To do so, local governments generally consider the linkages among the targets through indicators. A staff member from a local government explained that it had selected multiple targets that correspond to indicators (i.e., there are few indicators that have a one-to-one correspondence with targets), because it considered that multiple outcomes generally appear together, resulting from a single input (action). An example of this kind of linkage is that in disaster prevention—by developing and operating evacuation shelters with women and the elderly in mind—it is possible to address not only the issue of disaster prevention but also the issue of alleviating inequality. In the words of a local government official, the linkage would mean that "the cause of stiff shoulders does not lie in the shoulders (multiple factors are intertwined)". Currently, only a few local governments do not link the indicators with multiple targets, which implies that these linkages can be regarded as an important concept by local governments.

The approach of these Japanese local governments—where they first choose existing indicators managed by relevant stakeholders and then determine the targets related to those indicators—helps explain the nature of their indicators, which often have several KPIs and are linked to more than one target. The use of existing indicators provided by divisions can increase KPIs for certain areas in some local governments. This is because the relevant local government divisions may recommend multiple indicators for the projects they are eager to promote. On the other hand, the local governments' emphasis on the linkages may explain the higher number of targets linked with indicators in the SFC plans.

3.2 Prioritization of targets and goals of the SDGs

The targets and goals selected for the SFC plans by local governments reflect a clear trend in prioritization. An analysis of the average number of local governments that have selected targets linked to each goal (Figure 1) shows clear differences in local governments' priorities among the goals. In particular, local governments tend to prioritize Goal 7 (G7; hereafter abbreviated in this way) (Affordable and clean energy), G8 (Decent work and economic growth), G9 (Industry, innovation and infrastructure), G11 (Sustainable cities and communities), and G13 (Climate action). Conversely, they tend to pay less attention to G1 (No poverty), G2 (Zero hunger), G5 (Gender equality), G6 (Clean water and sanitation), G10 (Reduced inequality), G14 (Life below water), and G16 (Peace, justice and strong institutions). Analysis of the percentage of local governments that have selected each target (Figure 2) also shows that the priorities of local governments are distributed unevenly across the targets and goals.

This unbalanced prioritization by local governments is noteworthy. Although some goals do not

need to be prioritized—especially given Japan's current development situation and the relatively high level of progress already achieved—a lack of focus on other key goals remains. In particular, there is slow progress on goals such as G5 (Gender equality) and G14 (Life below water), according to the SDG Report 2024 (Sachs et al. 2024) (see Figure 3 for progress toward the SDGs by Japan). On the other hand, G9 (Industry, innovation and infrastructure) remains a focus despite substantial progress already being made. This pattern suggests that a bottom-up approach, in which each local government decides its own priorities, may be inefficient for Japan as a whole to achieve the SDGs. In order to strategically implement the SDGs, the central government may need to establish some top-down policies to guide progress in achieving each of the priorities.

Perspectives gathered through the interviews offer insights into how local governments prioritize the goals and help explain, to some extent, why this unbalanced prioritization occurs. To localize the SDGs, local governments typically utilize one of the following two methods of selecting priority goals and targets: 1) a method for setting priority goals through comparative analysis with other countries and municipalities and 2) a method for setting goals based on the municipality's existing priority policies. The first method—known as the comparison method—can be seen in the approach adopted by Kitakyushu City, which used the "OECD web-tool for measuring cities' and regions' distance to the SDGs" to compare the progress of the SDGs among the cities and identify both advanced and lagging goals (OECD 2021). Toyota City used the "SDG achievement indicators at the local level," developed by the United Nations Centre for Regional Development (UNCRD) research group on SDG monitoring for local governments, to compare its progress with that of other municipalities in Japan (Toyota City 2022). As for the second method — prioritization according to existing policies—Toyama City, for instance, promotes the concept of a sustainable, value-added city through a compact city strategy, placing utmost importance on urban development and management (Toyama City 2021).

Both methods have their benefits and drawbacks. Comparative method makes it easy to establish the objective position of the local governments and is useful for considering necessary measures. On the other hand, some local governments are reluctant to make comparisons because the results may have a negative impact on their image. In addition, the comparison process can be very laborious in cases where a large number of indicators are used for comparison analysis. Local governments that have used multiple indicators for comparative analysis reported that the data collection and comparison process was cumbersome, time-consuming, and difficult.

As for the second method (i.e., prioritization according to existing policies), one advantage is that it allows the SDGs to be localized, making them a "personal concern". The SDGs are a comprehensive concept and are far removed from the daily lives of citizens, so it is important to

make people feel that the SDGs are sufficiently familiar to them through symbolic and familiar things (policies). In addition, local governments can promote and advertise valuable policies and measures by placing them at the center of the SDGs. On the other hand, some residents may believe that issues directly related to their daily lives, such as sorting garbage and conserving electricity, make the SDGs feel more familiar to them.

Either approach can lead to biased prioritization among the SDGs. In the comparative method, most municipalities compare themselves with other municipalities in Japan, so issues where progress is lagging behind in Japan as a whole may be overlooked. For example, if one municipality is more advanced on gender issues than others, it may decide that it does not need to address gender issues, even though Japan as a whole is lagging behind other countries. With the approach that places existing policies at the center of the SDGs, some issues that local governments have not traditionally addressed may not be sufficiently considered, potentially leading to biased goal-setting that only addresses certain issues.

To overcome the issue of unbalanced prioritization, local governments emphasize the importance of using SDG linkages. The interviewees believe that prioritizing specific issues (goals) can have an impact on other goals, as they are interrelated. Moreover, they explained that Japanese local governments have traditionally considered sustainability in their administrations; therefore, every policy is linked to some goal, and goals other than the priority goals should also be addressed. Overall, based on information from local governments, it is understood that all the SDGs are being addressed, even though some are prioritized over others.

[Figure 1]
[Figure 2]
[Figure 3]

3.3 Use of subjective indicators

Through our analysis of the indicators set out in the SFC plans by local governments, we found that subjective indicators are widely used by local governments. A subjective indicator is defined as an indicator that incorporates a subjective component, such as personal perceptions and evaluations of criteria, such as satisfaction and trust (Rammstedt 2009). Upon reviewing SFC plans, we can easily identify various subjective indicators. These include, for instance, the "Percentage of residents who want to continue raising their children in this area" (Shizuoka City), "Percentage of citizens who feel their human rights are respected" (Saitama City), and "Citizen satisfaction with the rich natural environment, including the sea, mountains, and rivers" (Wakayama City).

Based on our analysis, 17.6% of the indicators (230 out of 1,308 indicators) can be categorized as subjective indicators, and 57.1% of the SFC local governments (104 out of 182 local governments) use subjective indicators to measure at least one target. For example, Kamakura City applies subjective indicators for all three of the indicators it has set. Another example is Gifu City, which uses both subjective and non-subjective (objective) indicators—six subjective and three objective indicators are used. This implies that subjective indicators are widely used by local governments to measure progress toward the SDGs, whereas the global SDG indicators are mostly objective indicators. However, it should be noted that some local governments do not use subjective indicators. For instance, Hokkaido, which employed a relatively large number of indicators (18 indicators), does not use any subjective indicators. This may suggest that some local governments are willing to apply subjective indicators while others are not.

Information on the share of subjective indicators for each target (Figure 4) also provides interesting insights. It is clear that subjective indicators tend to be used for specific goals (e.g., G3, G4, G11, and G16) and targets (e.g., Targets 1.b, 6.2, and 17.7). The share of subjective indicators is not high for the targets selected by more than 15% of the 182 SFC municipalities, apart from some specific goals (e.g., G4 and G11) and targets (e.g., Target 10.2).

Information from the interviews provides insights into why local governments use subjective indicators, especially for certain goals and targets. These reasons can be broadly divided into two categories: 1) cases where subjective indicators were used as a substitute because there was no suitable alternative objective indicator, and 2) cases where subjective indicators were used intentionally to measure residents' feelings and satisfaction. On the other hand, some local governments intentionally avoided using subjective indicators as much as possible. The reason for this is that while subjective indicators are considered useful for considering how to reflect the voices of citizens in policies, their results can fluctuate significantly depending on the region, timing, and circumstances in which surveys are conducted (e.g., after disasters or during the COVID-19 pandemic). Another problem is that it can be difficult to set appropriate target values for indicators.

On the other hand, there are local governments that have consciously developed mixed indicator frameworks that combine subjective and objective indicators, recognizing the benefits of both, as seen in the SFC plans of some local governments. Some interviewees noted that there are aspects that are well-suited to the use of subjective indicators, primarily social aspects, while others are not, generally those in the economic and environmental areas. Indeed, of the subjective indicators used in the 182 SFC plans, 64.0% are classified as social aspects, while 18.4%, 11.1%, and 6.5%

are classified as economic, environmental, and partnership aspects, respectively.[1] In the environmental field, there was a lot of trial and error involved in the process of developing subjective indicators such as environmental comfort. Ultimately, many of these indicators were omitted. This explains the situation in which subjective indicators are used more for specific goals and targets, primarily related to social issues such as health and education.

In addition, it should be remembered that indicators for local governments are primarily formulated through coordination between the coordinating department and relevant departments that have proposed the indicators, as explained in the previous sub-section. Moreover, there is communication and discussion between the local governments and the central government agency responsible for the SFC initiative. These administrative procedures may affect the use of subjective indicators by reflecting the central government's views.

[Figure 4]

3.4 Use of original indicators specific to certain issues and policies of local governments

In addition to subjective indicators, we found that some original indicators—specific to certain local government issues and policies (hereafter referred to as "original indicators")—are widely used by local governments. For instance, Kasukabe City uses "Number of users of the elderly safety watch program"[2] as an indicator directly related to a local program for measuring some aspects of progress related to G2 (zero hunger), G3 (good health and well-being), and G17 (partnerships). Aichi prefecture applies "Number of companies declaring their intention to promote women's participation in the workforce" for measuring Target 5.1 (Abolition of discrimination against women). Fujinomiya city uses "Number of households relocating to vacant houses in the areas promoting the incoming migration and settlement" for Target 11.1 and 11.4, which are related to sustainable cities and communities.

Based on our analysis, 25.5% of indicators (334 out of 1308 indicators) can be categorized as original indicators, and 69.2% of local governments (126 out of 182 SFC local governments) use at least one original indicator. This share is larger than that of the use of subjective indicators. It should also be noted that in addition to the original indicators, indicators specific to Japan's

[1] The classification of sustainability areas here is based on the SDG wedding cake model defined by the Stockholm Resilience Centre (Folke et al. 2016). The classification is as follows: economic sustainability (G8, G9, G10, G12); social sustainability (G1, G2, G3, G4, G5, G7, G11, G16); environmental sustainability (G6, G13, G14, G15); and partnerships for the goals (G17).

[2] For elderly people living alone or in households consisting of only elderly people, the program staff make regular phone calls or visits to check the conditions of their living, including their health and nutritional status.

context or nationwide projects are also used (e.g., "Number of children on waiting lists for daycare centers at the start of the fiscal year" (Kyoto City), "Proportion of the population in the residence attraction area[3] to the total city population" (Tsukuba City), and "Number of participants in disaster prevention projects in collaboration with the town planning council" (Toda City)). Of the indicators (112 out of 1308 indicators), 8.6% can be categorized as indicators specific to Japan's contexts or Japan's nationwide projects, and 44.0% of local governments (80 out of 182 SFC local governments) used them. Therefore, it can be said that Japanese local governments, intentionally or not, translate 34.1% of global SDG indicators (446 out of 1308 indicators) to their own contexts by using the original indicators or indicators specific to Japan's contexts or nationwide projects.

The proportion of original indicators used for each target is shown in Figure 5. It is evident that some goals and targets have a higher share of original indicators (e.g., G9, G15, Target 1.4, and Target 17.16). On the other hand, the share of original indicators is not high for the most popular targets among municipalities (those selected by more than 15% of SFC municipalities), except for Target 11.4. This suggests that general indicators (i.e., all indicators excluding original indicators or indicators specific to Japan's contexts or nationwide projects) tend to be developed for prioritized goals and targets in Japan due to their importance.

The results from the interviews explain why the original indicators are applied to specific goals and targets. There are two possible reasons for local governments to use indicators specific to them: 1) cases where local governments used them as a substitute for general indicators, and 2) cases where local governments used them to focus on their own circumstances and policies. There are advantages to the use of both original indicators and general indicators. The advantage of using original indicators is that they allow evaluation of initiatives that are unique to the local government, while the advantage of using general indicators is that they are easy for citizens to understand and make it easier to compare and evaluate with other cities.

Some local governments propose measuring progress toward the SDGs by using both original indicators and general indicators, taking into account the advantages of each type. They consider it better to use original indicators and reserve general indicators for measuring specific issues and larger issues, respectively. On the other hand, establishing general indicators for some goals may be challenging. A local government interviewee explained that, in cases where local government official statistics are not available, data linked to specific local government projects may be used as indicators. This supports the hypothesis that general indicators tend to be developed for

[3] The term "Residence attraction area" refers to a selected area that aims to maintain and improve life services and communities by maintaining population density amid a declining population. Within the area, various measures are taken to attract residents, such as the development of public transportation and improvements to the living environment.

prioritized goals and targets in Japan due to their importance.

On the other hand, one drawback of using indicators specific to local governments is that these indicators may diverge from the SDG global indicators and may not measure the originally intended targets of the SDGs due to their specific nature. However, many local governments appear to regard this divergence as unavoidable. A local government employee explained that it is not realistic to set indicators that measure all the items listed in a particular target. Since it is common for either the SDG global indicators or the localized indicators to diverge from the SDG targets, the realistic approach may be to define an ideal image (i.e., a local target) for each local government and adopt indicators that align with it. Overall, local governments do not hesitate to use the original indicators, accepting divergences between the indicators and the original targets, especially for certain goals and targets.

Another important factor that may explain why the original indicators are applied to specific goals and targets is that the use of original indicators largely depends on discussions among stakeholders. Indicators for local governments are primarily formulated through partnerships between the coordinating departments and the relevant departments proposing the indicators. Hence, the selection of indicators may be affected by the intentions of the relevant stakeholders.

[Figure 5]

4. Discussion

The above results offer valuable insights into the development of the local SDG indicator framework. First, the results indicate a disproportionate focus on specific goals and targets of the SDGs among local governments in Japan. Local governments consider that even less-emphasized goals and targets are addressed because there are linkages or synergies between the goals and targets, with some research demonstrating these linkages (e.g., Kroll, Warchold, and Pradhan 2019; Anderson et al. 2022; Asadikia, Rajabifard, and Kalantari 2021). If this is true, the unbalanced nature of the SDGs and their targets may not be a major problem. However, interlinkages between the goals through the same indicators under the SFC plans in Japan (Figure 6) show that strong linkages are observed only for the target pairs within the same goals and those between certain goals (e.g., between G7 and G13 and between G12 and G13), which implies that we need to be careful in making assumptions about linkages. If there are limited linkages between the goals and targets, the central government may need to provide appropriate guidance for local governments to support more balanced indicator settings for nationally prioritized goals and targets.

Second, the results show that there are trends in the types of indicators used under the SFC plans in Japan (i.e., subjective indicators and original indicators). Local governments often utilize these types of indicators for goals and targets when appropriate general indicators are unavailable, applying them to assess local situations or residents' perceptions within the context of their local governments. This situation appears to result from the local governments' process of selecting prioritized goals, targets, and their indicators. Local governments identify prioritized goals and find useful indicators related to the goals; they then identify targets linked with the indicators. Therefore, the selected targets could eventually depend on the availability of the indicators. Hence, in cases where local governments seek to promote particular targets but appropriate general indicators are unavailable, they develop their own original indicators. Considering that subjective indicators and original indicators are used for targets selected by only a limited number of local governments, these types of indicators may serve as useful references for considering indicators for niche targets.

Third, the results raise an issue of divergence between the applied indicators and the original SDG targets. As many interviewees suggest, it can be challenging to establish indicators that accurately measure the original targets in the SDGs. This reflects a fundamental issue in measuring the SDGs at the global level. The indicator framework of the SDGs was developed with the aim of limiting the number of indicators (i.e., one indicator for each target), although many more indicators would be necessary to adequately measure the principal aspects of the targets (MacFeely 2020; Kim 2023). This creates the problem that the indicators do not necessarily reflect the original targets, suggesting a need to add more indicators to capture critical aspects of the targets (Kim 2023). Interestingly, similar discussions have emerged at the local level. It is essential for central governments to establish a clear policy on how to balance the minimization of the number of targets with the minimization of the divergence between the indicators and the targets under the framework for the local SDG indicators.

Fourth, the results highlight the importance of an easy-to-use indicator framework. Based on the interviews, the number of indicators could also influence the way local governments use these indicators in their administrations. Many local governments emphasized the importance of adopting a simple indicator framework for measuring the SDGs in their own local context to reduce the burden on staff and enhance the quality of their administrations. Some local governments, however, acknowledged the usefulness of the inclusive framework with many indicators for awareness-raising purposes. Given this situation, it is essential for central governments to develop a local SDG indicator framework with simple core indicators that local governments can adopt. In addition to these core indicators, local governments are recommended to develop their own indicators or "custom indicators" to measure their own priorities in policies

and measures, as Sato (2025) suggests.

In addition, the results offer insights into the application of the local SDG indicator framework, particularly how local governments can use the results of the indicators to enhance their administrations. All the local governments periodically update the indicators. However, based on the interviews, there was little concrete evidence that local governments use the results to improve their administrations, beyond simply measuring the progress of the SDGs. Rather, local governments often use the indicators for awareness-raising purposes. To effectively localize the SDGs, an overall policy framework is needed to achieve the SDGs, where indicators inform local governments about the effectiveness of policies and the need for course corrections. In addition, the effects of local SDG indicators on the progress of the SDGs at the local level should be examined carefully, a goal that should inform future research work.

[Figure 6]

5. Conclusion

This research aimed to investigate how local governments develop and apply the SDG local indicator framework, using the case of local governments in Japan. Through the analysis of the indicators created by Japan's local governments and presented in their SFC plans and interviews with the local government staff, the research found the following answers for the three research questions: (1) What are the characteristics of local indicators for SDGs developed by Japan's local governments? (2) Why do these local indicators incorporate such characteristics? (3) What is the agenda for the future development of the local SDG indicators?

First, the research revealed a disproportionate focus on the goals and targets of the SDGs among local governments. Moreover, there are trends of local governments using subjective indicators and original indicators for specific goals and targets under the SFC plans in Japan. Regarding the factors leading to these characteristics, the research suggests that they are due to the voluntary selection process of local governments' priorities in goals, targets, and indicators, which lacks clear guidance. The research also suggested that local governments had no choice but to use subjective indicators and original indicators for some goals and targets, and the lack of appropriate indicators for some targets caused the imbalance in the selected targets.

Based on these findings, this research provides key insights into setting the future agenda for developing and applying local SDG indicators for central and local governments. First, governments may consider how to achieve a well-balanced focus on the goals and targets of the SDGs. One possible approach is for the central government to establish a clear policy identifying

the prioritized goals and targets that local governments should pursue. In this approach, it is important for the central government to work closely with local governments rather than making decisions in a top-down manner, and to strike a balance between local-specific issues and universal national issues. It is also important for governments to develop dedicated indicators for the targets they seek to prioritize. Second, the research identified another agenda item: how local governments can effectively use local SDG indicators within their administrations. In this regard, a key role for governments would be to develop a simple SDG local indicator framework with core indicators, under which local governments can add their own custom indicators. Lastly, the research suggested that an overall policy framework is needed to effectively localize the SDGs, where indicators can be used to inform local governments about the effectiveness of policies and the need for course corrections.

Table 1: List of interviews

Name of local government	Date of interview	Interview style
Hokkaido Prefecture	Feb 7, 2025	Online
Kanazawa City (Ishikawa Prefecture)	Jan 30, 2025	Online
Kitakyushu City (Fukuoka Prefecture)	Jan 29, 2025	Online
Osaka Prefecture	Feb 10, 2025	Online
Sakai City (Osaka Prefecture)	Feb 13, 2025	Online
Sapporo City (Hokkaido Prefecture)	Feb 9, 2025	E-mail
Shiga Prefecture	Feb 3, 2025	Online
Shimokawa Town (Hokkaido Prefecture)	Feb 17, 2025	Online
Toshima City (Tokyo Prefecture)	Jan 22, 2025	Online
Toyama City (Toyama Prefecture)	Feb 7, 2025	In-person and E-mail
Toyota City (Aichi Prefecture)	Jan 27, 2025	In-person

Source: Authors

Table 2: Classification of local governments according to the number of targets and indicators mentioned or used in the SFC plan

		Number of targets mentioned in the SFC plan							
		5>=	5<, 10>=	10<, 15>=	15<, 20>=	20<, 25>=	25<, 30>=	30<, 35>=	35<
Number of indicators used in the SFC plan	5>=	3	1	20	15	10	6	2	0
	5<, 10>=	0	0	25	37	23	5	3	7
	10<, 15>=	0	0	0	9	3	6	3	0
	15<, 20>=	0	0	0	0	3	1	0	0

Source: Authors
Note: The red cells highlight larger numbers, with stronger reds depicting higher values.

Table 3: Classification of indicators in the 182 SFC plans by number of related targets and KPIs

		Number of related target(s)														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15～
Number of related KPI(s)	1	497	299	129	59	18	19	3	8	5	6	2	1	2	0	2
	2	48	40	28	15	9	6	0	2	1	3	0	0	0	0	1
	3	14	15	5	9	2	3	5	3	1	0	1	1	0	3	2
	4	2	1	4	5	1	2	2	0	1	2	0	1	0	0	0
	5	1	1	3	1	1	0	2	0	1	1	1	0	0	0	0
	6～	4	0	0	0	1	1	0	0	0	0	2	0	0	0	0

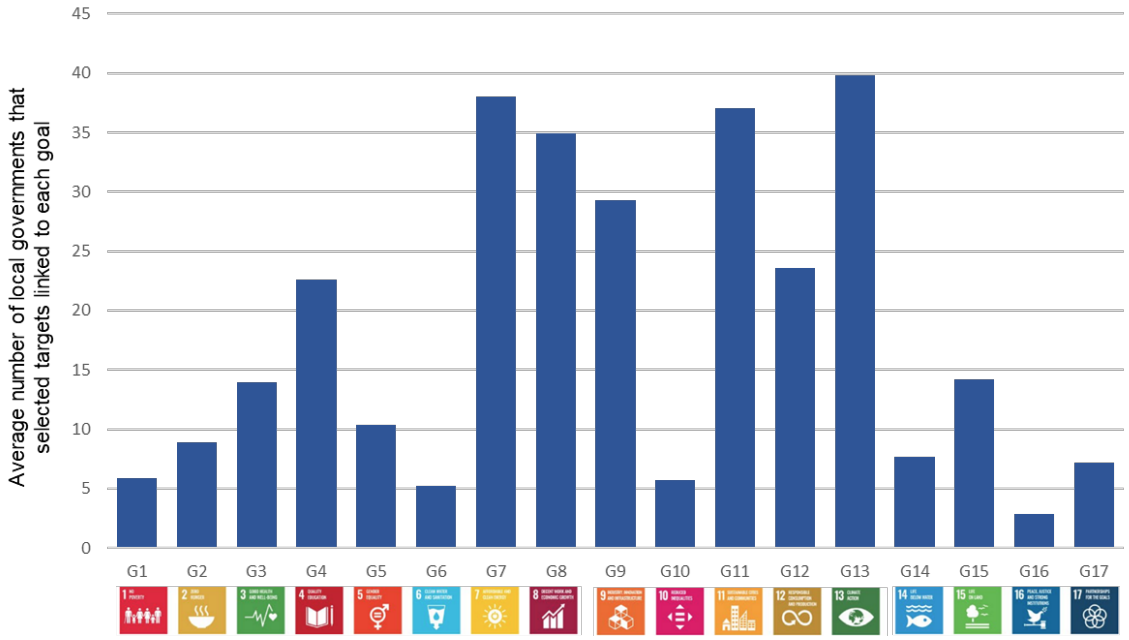
Source: Authors
Note: The red cells highlight larger numbers, with stronger reds depicting higher values.

Table 4: Indicators and corresponding SDG targets set out in Nagoya City's Future City Plan

	Indicator (KPIs)	Targets
1	(1) Gross city product per daytime worker (2) Number of created innovations	4.4, 8.1, 8.2, 8.3, 8.4, 8.5, 9.5
2	(1) Number of passengers at major stations (2) Total tourist expenditure	8.9, 9.1, 11.2, 11.3
3	(1) Greenhouse gas emissions (2) Waste disposal volume	7.2, 7.3, 12.3, 12.5, 12.8, 13.3

Source: Authors by using Nagoya City's Future City Plan

Figure 1: Focused goals in the SDG Future City plans (average number of local governments selecting targets linked to each goal)



Source: Authors

Note: The average value = (total counts of local governments that select targets under each goal) / (total number of targets for that goal) (e.g., 5.86 (=41/7) for Goal 1 that contains seven targets (i.e., 1.1–1.5, 1.a, 1.b)).

Figure 2: Focused targets in the SDG Future City plans (percentage of local governments selecting each target)

G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12	G13	G14	G15	G16	G17
1.1	2.1	3.1	4.1	5.1	6.1	7.1	8.1	9.1	10.1	11.1	12.1	13.1	14.1	15.1	16.1	17.1
1.2	2.2	3.2	4.2	5.2	6.2	7.2	8.2	9.2	10.2	11.2	12.2	13.2	14.2	15.2	16.2	17.2
1.3	2.3	3.3	4.3	5.3	6.3	7.3	8.3	9.3	10.3	11.3	12.3	13.3	14.3	15.3	16.3	17.3
1.4	2.4	3.4	4.4	5.4	6.4	7.a	8.4	9.4	10.4	11.4	12.4	13.a	14.4	15.4	16.4	17.4
1.5	2.5	3.5	4.5	5.5	6.5	7.b	8.5	9.5	10.5	11.5	12.5	13.b	14.5	15.5	16.5	17.5
1.a	2.a	3.6	4.6	5.6	6.6		8.6	9.a	10.6	11.6	12.6		14.6	15.6	16.6	17.6
1.b	2.b	3.7	4.7	5.a	6.a		8.7	9.b	10.7	11.7	12.7		14.7	15.7	16.7	17.7
	2.c	3.8	4.a	5.b	6.b		8.8	9.c	10.a	11.a	12.8		14.a	15.8	16.8	17.8
		3.9	4.b	5.c			8.9		10.b	11.b	12.a		14.b	15.9	16.9	17.9
		3.a	4.c				8.10.		10.c	11.c	12.b		14.c	15.a	16.10.	17.10.
		3.b					8.a				12.c			15.b	16.a	17.11
		3.c					8.b							15.c	16.b	17.12
		3.d														17.13
					<10%											17.14
					10%～15%											17.15
					≧15%											17.16
				* Cells without color (white) are targets for which no local government has set any indicators.												17.17
																17.18
																17.19

Source: Authors

Note: Cells are colored according to the percentage of local governments that have selected each target.

Figure 3: Progress of SDGs of Japan (SDG Report 2024)

Source: Sachs, Lafortune, and Fuller (2024, 252)

Figure 4: Share of the use of subjective indicators for each target

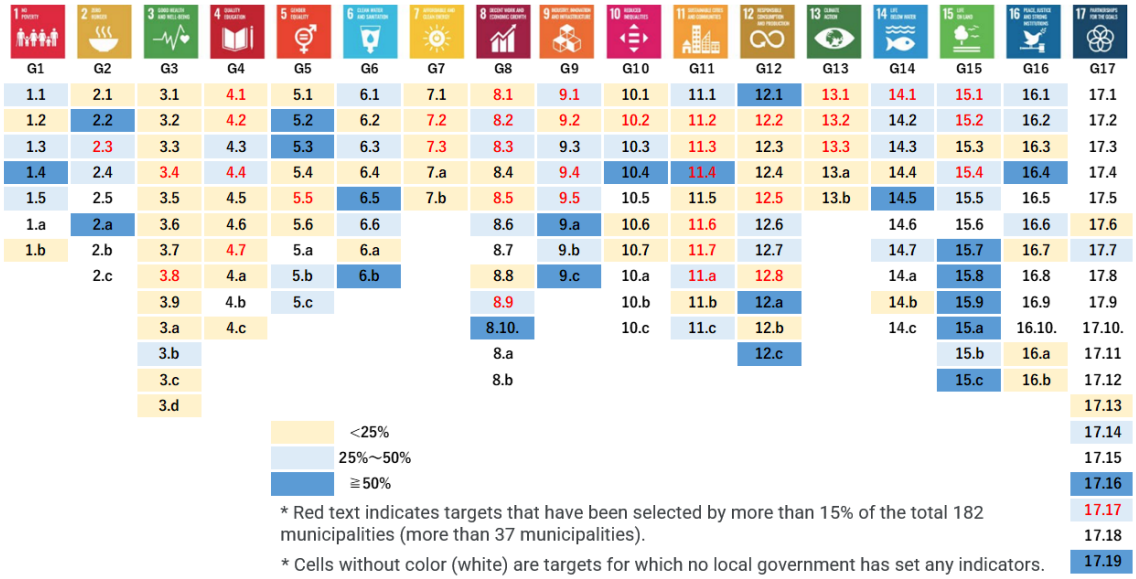
G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12	G13	G14	G15	G16	G17
1.1	2.1	3.1	4.1	5.1	6.1	7.1	8.1	9.1	10.1	11.1	12.1	13.1	14.1	15.1	16.1	17.1
1.2	2.2	3.2	4.2	5.2	6.2	7.2	8.2	9.2	10.2	11.2	12.2	13.2	14.2	15.2	16.2	17.2
1.3	2.3	3.3	4.3	5.3	6.3	7.3	8.3	9.3	10.3	11.3	12.3	13.3	14.3	15.3	16.3	17.3
1.4	2.4	3.4	4.4	5.4	6.4	7.a	8.4	9.4	10.4	11.4	12.4	13.a	14.4	15.4	16.4	17.4
1.5	2.5	3.5	4.5	5.5	6.5	7.b	8.5	9.5	10.5	11.5	12.5	13.b	14.5	15.5	16.5	17.5
1.a	2.a	3.6	4.6	5.6	6.6		8.6	9.a	10.6	11.6	12.6		14.6	15.6	16.6	17.6
1.b	2.b	3.7	4.7	5.a	6.a		8.7	9.b	10.7	11.7	12.7		14.7	15.7	16.7	17.7
	2.c	3.8	4.a	5.b	6.b		8.8	9.c	10.a	11.a	12.8		14.a	15.8	16.8	17.8
		3.9	4.b	5.c			8.9		10.b	11.b	12.a		14.b	15.9	16.9	17.9
		3.a	4.c				8.10.		10.c	11.c	12.b		14.c	15.a	16.10.	17.10.
		3.b					8.a				12.c			15.b	16.a	17.11
		3.c					8.b							15.c	16.b	17.12
		3.d														17.13
																17.14
																17.15
																17.16
																17.17
																17.18
																17.19

<25%
25%～50%
≧50%

* Red text indicates targets that have been selected by more than 15% of the total 182 municipalities (more than 37 municipalities).
* Cells without color (white) are targets for which no local government has set any indicators.

Source: Authors
Note: Cells are colored according to the percentage of subjective indicators among all indicators set by the municipalities.

Figure 5: Proportion of original indicators used for each target



Source: Authors
Note: Cells are colored according to the percentage of original indicators out of all indicators set by the municipality.

Figure 6: Interlinkages between SDG goals based on shared indicators in SFC plans

	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12	G13	G14	G15	G16	G17
G1	15																
G2	12	18															
G3	0	4	295														
G4	12	9	40	168													
G5	0	0	7	18	42												
G6	0	2	0	0	0	13											
G7	0	4	2	6	0	4	86										
G8	2	51	0	26	34	0	19	271									
G9	0	24	2	9	8	0	34	278	104								
G10	0	2	8	33	17	0	0	10	0	9							
G11	4	2	43	62	12	0	46	58	64	16	405						
G12	0	8	0	0	0	5	114	44	80	0	75	211					
G13	2	4	0	14	2	10	142	12	26	0	118	138	94				
G14	0	0	0	5	0	22	7	0	4	0	11	36	24	20			
G15	0	17	0	16	0	45	65	10	13	0	46	56	83	52	133		
G16	4	4	16	8	0	0	0	0	0	3	6	2	2	0	0	3	
G17	0	7	16	43	19	0	12	20	17	7	53	26	21	8	16	4	22

Source: Authors

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Abstract (in Japanese)

要　約

2015 年に持続可能な開発目標（SDGs）が策定されて以来、各国や自治体がそれぞれの文脈において SDGs をどのようにローカライズしていくかという点に注目が集まっており、これまで研究者たちはその理論的枠組みを探ってきた。しかしながら、地方自治体行政における地域 SDGs 指標の開発・活用に焦点を当てた研究は限定的な状況である。そこで本研究では、日本の地方自治体の事例を検証することにより、地方自治体が地域指標フレームワークをどのように開発・活用できるかを探った。本研究では、日本の地方自治体により SDGs 未来都市計画に示された指標の定量分析、および地方自治体へのインタビュー調査を通じ、地方自治体が一部の目標・ターゲットに偏って重点を置く傾向があること、そして、特定の目標・ターゲットに対して、地方自治体が主観的な指標や独自の地域指標を用いている傾向が明らかになった。これらの特徴は、地方自治体が目標・ターゲット・指標の優先順位を自主的に選択していることに起因すると示唆された。さらに、一部のターゲットに適切な指標が不足していることも、選択されたターゲットの不均衡を引き起こす潜在的な要因と考えられる。この結果に基づき、本研究は、他国にとっての参考となるよう、中央政府および地方自治体が地域 SDGs 指標を策定・適用する際に留意すべき事項を提示した。

キーワード：持続可能な開発目標（SDGs）、SDGs のローカライゼーション、地域 SDGs 指標、日本、地方自治体