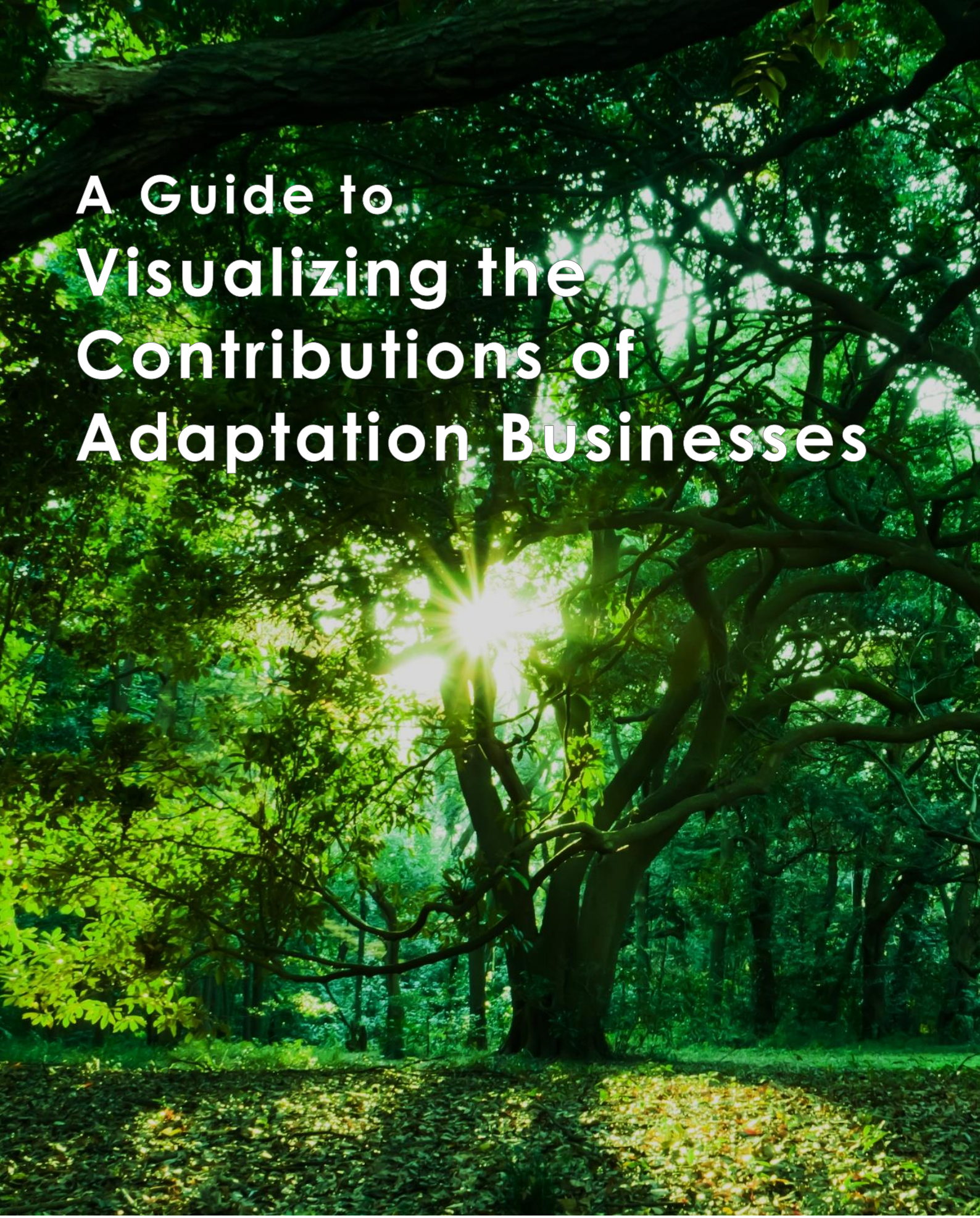

A Guide to Visualizing the Contributions of Adaptation Businesses

METI
Ministry of Economy, Trade and Industry

This document was compiled as part of the Ministry of Economy, Trade and Industry of Japan's "Fiscal Year 2022 Study on Countermeasures for Issues related to Climate Change (Visualization of Contributions of Japanese Companies in Adaptation Fields in Developing Countries) by Ernst & Young ShinNihon LLC, the project consultant.

1. The Purpose of this Guide

Adaptation businesses bring multifaceted benefits, including solutions to social issues caused by climate change. While economic benefits can be presented in monetary terms, it is often difficult to visualize other benefits. On the other hand, understanding the effects and disclosing them to investors and other external parties can be a new appeal feature for companies.

The movement to evaluate non-economic benefits is becoming mainstream internationally. The United Nations Sustainable Development Goals (SDGs) have set forth 17 goals and 169 targets common to the world to be achieved by 2030, and an increasing number of companies are proactively addressing these. In addition to existing financial information, ESG investment, which takes into account environmental, social, and governance factors, is also becoming more widespread, and ESG efforts are becoming more important in raising funds from investors.

In light of these social trends, A Guide to Visualizing the Contributions of Adaptation Businesses has been compiled to help companies in visualizing the contributions (effects) of their climate change adaptation businesses.

2. Steps to Visualizing Contributions

There are currently no set rules or procedures regarding the visualization of the contributions of adaptation businesses. The scope of the visualization varies as well – in some cases, it may be the strategy and business content of the entire company, while in other cases, it may be a specific project.

Table 1 shows an example of the steps to visualize the contributions of a specific project. To visualize, it is important to prepare well before the start of the project and collect effective data during project implementation.

Table 1. Steps to Visualizing Contributions

Preparation	**Step 1** Target Selection	Identify the target project for visualization.
	Step 2 Logic Setting	Identify the logic of the inputs, outputs and outcomes of the target project.
	Step 3 Indicator Setting	Set indicators to measure outcomes that can be quantified. Set target values whenever possible.
Project in Progress	**Step 4** Data Collection	Collect data for the set indicators on a regular basis.
Project in Progress – After Completion of the Project	**Step 5** Analysis	Analyze the collected data to find out if the expected results are being achieved.
	Step 6 Reporting and Improvement	Based on the analysis results, report results to stakeholders and others relevant parties, and make improvements as necessary.

The details of each step are as follows.

- **Step 1 Target Selection**: Clarify which project of the company in which country (countries) should be targeted for visualization.
- **Step 2 Logic Setting**: Organize the logic (cause-and-effect relationship) of the inputs, outputs, and outcomes of the target project (Table 2). Outcomes that are measured without clear logic are difficult to recognize as the effects of the project. Therefore, it is important to make the logic easy to understand for third parties.

Table 2. Inputs, Outputs, and Outcomes

Inputs	Resources (people, goods, and money) to be invested for the target project.
Outputs	Goods and services provided through the inputs.
Outcomes	Changes and effects brought about by the outputs. If possible, divide the time axis into short-term and long-term.

- **Step 3 Indicator Setting**: Set indicators to measure outcomes. While some outcomes are qualitative and difficult to measure, indicators should be set for outcomes that can be quantified. When setting indicators, data availability, comparability, validity, and sustainability should be considered. In addition, setting target values in advance whenever possible makes it easier to measure effectiveness and monitor progress.
- **Step 4 Data Collection**: Collect data on the indicators (the same data should be obtained at least three times – before the project starts (baseline), at the midpoint of the project, and at the end of the project). In the case of a project without an end date, it is recommended to set the frequency of data collection in advance, such as once a year.
- **Step 5 Analysis**: Compare the data obtained after the project started with the data before the project started (baseline) and analyze the effects of the project.
- **Step 6 Reporting and Improvement**: Report the analysis results to stakeholders and other relevant parties. If the expected results are not achieved, analyze the causes and consider improvements to the project.

3. Reference Indicators by Sector

As the specific indicators are determined based on data availability, validity, and so on, below is a summary of websites that can serve as a reference. Although there are no organizations or websites that deal with reference indicators which are specific to adaptation businesses, there are websites can be cited as reference indicators for relevant themes such as the SDGs (Table 3).

Table 3. Websites on Reference Indicators

Name (Managing Organization)		Overview and URL
A	SDG Indicators (United Nations Statistics Division)	169 targets and 232 indicators have been set for all 17 SDGs. https://unstats.un.org/sdgs/indicators/indicators-list/
B	SDG Compass – Inventory of Business Indicators (Global Reporting Initiative, UN Global Compact, World Business Council for Sustainable Development)	A collection of existing business indicators related to the SDGs. Filter searches and data downloads are available by specific SDGs or business themes. https://sdgcompass.org/business-indicators/
C	JICA Indicator Reference by Development Strategic Objective (Japan International Cooperation Agency)	Examples of indicators according to the type of development objective, for Financial Assistance, Grant Aid and Technical Cooperation projects. https://www.jica.go.jp/english/our_work/evaluation/indicators/index.html
D	IRIS+ Metrics (Global Impact Investing Network)	A set of indicators compiled and improved over time, which can be linked to the SDGs. https://iris.thegiin.org/metrics/

Based on the websites in Table 3, reference indicators related to seven areas where Japanese companies can expect adaptation business opportunities are summarized below by business area and technology (Table 4). It should be noted that these are some of the examples and do not represent all indicators. It is important to set indicators for which outcomes can be appropriately measured according to the nature of the project.

Table 4. Reference Indicators of the Seven Areas of Adaptation

*Sources [A] to [D] refer to the Name column in Table 3.

Business and Technology Examples	Reference Indicators [Source*]
(1) Resilient Infrastructure against Natural Disasters	
Resilient road systems • Road repair and maintenance taking into consideration climate change impacts • Promotion of climate change adaptation in transportation infrastructure	• Percentage of rural population living within two kilometers of all seasonally accessible roads [A] • Reduction in the number of days per year of impassable roads due to natural disasters (days/year) [C]
Resilient buildings • Resilient building design and materials • Waterproofing through coatings, impervious materials, multi-layering etc. • Flood and cyclone shelters	• [Evacuation facilities] Number of times a facility is used in the event of a disaster (times/year) [C] • [Evacuation facilities] Ratio of the number of people that can be accommodated in the facility to the local population (%) [C] • [Evacuation facilities] Number of evacuees (people saved) during a cyclone [C]
Assisting communities that are vulnerable to disasters • Assessment of vulnerability to disasters • Creation of hazard maps • Creation of disaster preparedness plans	• Number of accesses to webpages providing geographic information on disaster preparedness [C] • Percentage of municipalities that have published hazard maps and conducted disaster drills [C] • Percentage of people who know the location of evacuation facilities [C] • Percentage of people who are prepared to withstand disasters [C] • Experience in conducting evacuation drills under the cooperation of government and community [C]
Flood countermeasures • Drainage pumps • Drainage systems to deal with urban flooding • Levees • River construction and dredging • Flood prevention through integrated water resource management	• [Levee construction] Maximum annual flow rate (m^3), maximum annual water level (m) and discharge capacity (m^3/sec) at the flood control reference point [C] • [Drainage] Capacity of drainage channels (m^3/sec), capacity of drainage pump stations (m^3/sec) [C] • [Drainage] Decrease in the number of waterlogging events in the target area, decrease in the area of waterlogging [C]

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Business and Technology Examples	Reference Indicators [Source]
(1) Resilient Infrastructure against Natural Disasters (continued)	
Tsunami and storm surge countermeasures • Seawall construction • Coastal barriers and tidal barriers • Prevention of coastal erosion	• [Seawall construction and dredging] Increase in the number of observation points [C] • [Seawall construction and dredging] Increase in the number of data transmission points [C] • [Seawall construction and dredging] Decrease in shore maintenance cost due to the construction of solid seawalls [C]
Soil erosion, mudslide, and landslide countermeasures	• [Erosion control dam] Reduction of water storage capacity/sediment discharge [C] • [Erosion control dam] Number of mudslide disasters with respect to the standard amount of rainfall [C] • [Landslide prevention facilities] Landslide mitigation [C]
Disaster prevention through forest preservation and reforestation	• Forest area, number of trees planted [C]
(2) Sustainable Energy Supply	
Reduction of power generation output fluctuations • Systems/operations that minimize fluctuations in hydroelectric and renewable energy generation even during climate change	• Average power outage duration [B] • Frequency of power outages [B] • Duration of power generation [D]
Distributed energy system • Emergency power generation system • Mini-grids and micro-grids	• Percentage of population with access to electricity [B] • Average power outage duration [B] • Frequency of power outages [D]
Hybrid power generation system	• Power generation capacity [D]
(3) Food Security and Strengthening Food Productive Base	
Resilience and productivity improvement in agriculture • Resilient cultivation/production • Crop diversification and varieties that are resilient to risks such as salinization, drought, floods, heat waves and diseases • Land management techniques to combat soil erosion, desertification, and salinization • Soil nutrient management and remediation • Pest and vermin management • Food storage facilities resilient to extreme weather conditions • Precision (smart) agriculture • Irrigation efficiency improvement	• Percentage of area applying productive and sustainable agriculture [A] • Production value per unit labor by size of agricultural/pastoral/forestry company [A] • Agricultural income of farmers [C] • Livelihood of farmers [C] • Agricultural yield per farming area [C] • Productivity of target crop [C] • [Irrigation] Water pumped per second (m^3/sec) [C] • [Irrigation] Irrigable area [C] • [Crop diversification] Types of crops [D]

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Business and Technology Examples	Reference Indicators [Source]
(3) Food Security and Strengthening Food Productive Base (continued)	
Resilience and productivity improvement in pastoral industry • Livestock diversification • Climate resilient livestock • Livestock management (breeding and feeding system)	• Production value per unit labor by size of agricultural/pastoral/forestry company [A] • Revenue improvement of dairy farmers [C] • Adoption of improved breed and rearing management techniques by X% of dairy farmers in the target area [C] • Types of livestock [D]
Resilience and productivity improvement in fishing industry • Climate resilient aquaculture technology and equipment • Fisheries management and conservation	• Types of fish [D]
(4) Health and Sanitation	
Prevention of water pollution caused by extreme weather events, sewage infrastructure and water quality management	• Percentage of wastewater treated safely (prevalence of sewage treatment facilities) [A] • Degree to which environmental impacts have been reduced by products and services [B] • [Sewage infrastructure] Amount of wastewater treated [D]
Prevention of infectious diseases through insect repellent products, etc.	• Number of malaria cases per 1,000 persons [A] • Number of malaria cases in the target area (cases/year) [C]
(5) Climate Monitoring and Early Warning	
Weather monitoring and forecasting system	• Upper-air observation capability (when there is no precipitation: <wind direction/speed> from xx to xx kilometers above ground; when there is precipitation: <wind direction/speed> from xx to xx kilometers above ground; <temperature> up to xx kilometers above ground) [C] • Frequency and extent of rainfall information provided to disaster prevention related organizations [C] • Number of observation points (unit/km^2) [C] • Increase in observation coverage/density [C]
Weather information provision service	• Types of advisories and warnings issuable [C] • Weather forecast frequency (times/day) [C] • Coverage of disaster information [C]
Early warning system	• [Flood forecasting and warning system] Accuracy of precipitation and water level observation, space-time density [C]

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Business and Technology Examples	Reference Indicators [Source]
(5) Climate Monitoring and Early Warning (continued)	
Climate modeling and disaster simulation	• Accuracy of analytic models [C]
Climate change monitoring	• Reduction of missing observation data [C]
(6) Secure Resources and Sustainable Water Supply	
Water supply infrastructure • Management and networking of water pipes • Small-scale wind/solar pumps	• Percentage of population using safely managed drinking water services [A] • Population with access to water [C] • Volume of water supply (m^3/day) [C]
Securing water resource • Desalination • Groundwater utilization • Rainwater harvesting • Water purification/reutilization • Water storage facilities	• Percentage of population using safely managed drinking water services [A] • Distance from business premises to water supply [B] • Quality of drinking water [B] • Estimated improvement in individual access to improved water sources (e.g., number of employees with improved access to water at work, number of consumers with access to water at a reduced cost, etc.) [B] • Percentage and total amount of water recycled and reused [B] • Rainwater quality under the application of regulations and standards [B]
Monitoring and information management of ecosystems, natural resources, and water resources	• Degree of implementation of Integrated Water Resources Management (0-100) [A] • Change in area of aquatic ecosystem over time [A] • Percentage of fishery resources at biologically sustainable levels [A]
(7) Climate Change Finance	
Weather index insurance	• Number of applicants [D] • Average insurance premium [D]
Private sector investment and financing in agriculture and other sectors	• Balance of medium- to long-term loans for agricultural capital formation [C] • Number of farm households and groups of farm households on medium- to long-term loans for agricultural capital formation (units, groups) [C]

4. Example of Contribution Visualization

The following is an example of setting inputs, outputs, outcomes and indicators, in the case of a project to introduce resilient cultivation and food production methods (Figure 1).

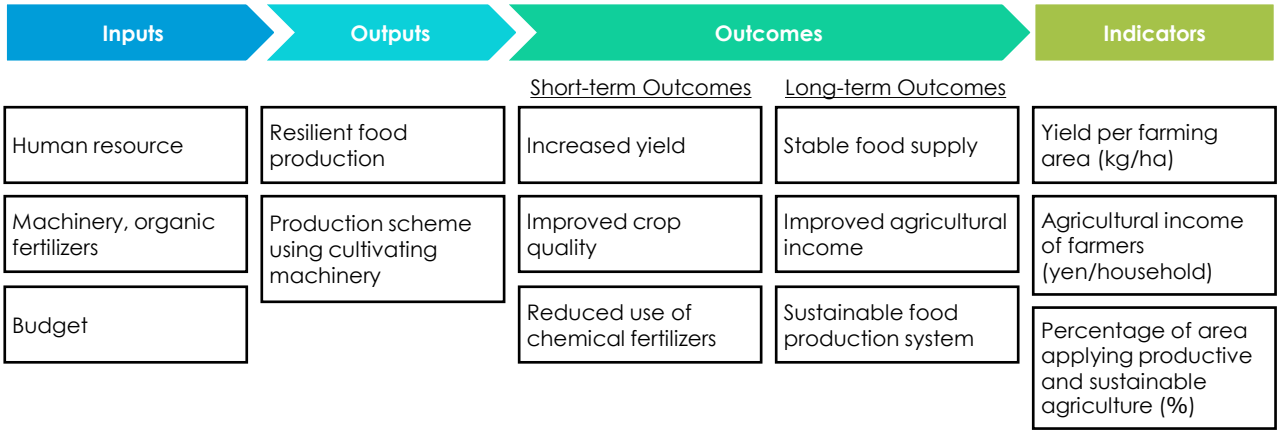

Figure 1. Example of project to introduce resilient cultivation and food production methods

In this case, the three indicators are (1) yield per unit farming area, (2) agricultural income of farmers, and (3) percentage of area applying productive and sustainable agriculture. Data of each indicator is confirmed in advance as a baseline before the project starts (it is also recommended to set a target value for the project for each indicator). After the project is implemented, the progress of the indicators are confirmed periodically, such as once a year, to visualize the contributions of the project.

It is preferable to use data that are guaranteed to be objective, such as published values from international organizations, federal governments, and local governments. However, if it is difficult to obtain data specific to the project site, or if there are no published values for the relevant data, a questionnaire survey or sample survey can be conducted to collect data. In addition, it is desirable to use the same data source before and after the project implementation as much as possible for the purpose of comparison.

5. Afterword and References

The visualization steps and area-specific indicators described in this guide were prepared by Ernst & Young ShinNihon LLC, based on the following references. As mentioned in the guide, there is no established evaluation method for visualizing the contributions of adaptation businesses at this point, but it is hoped that this guide will help visualize the contributions and further promote climate change adaptation efforts.

References

- GSG National Advisory Board "Social Impact Assessment Tool Set (Ver.2.0)"
- JICA "JICA Guidelines for Project Evaluation (Ver.1.1)"
- GRI, UN Global Compact, WBCSD "SDG Compass"
- GRI, UN Global Compact "Analysis of the Goals and Targets"
- GRI, UN Global Compact "Integrating the Sustainable Development Goals into Corporate Reporting: A Practical Guide"
- Nippon Foundation "The Logic Model Creation Guide"
- CTCN "Monitoring and evaluation for adaptation"