

**Feasibility assessment of proposed indicators,
using existing disaster damage statistics in Japan**

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Japan, which is frequently hit by a variety of disasters including floods, earthquakes and volcanic eruptions, is one of the countries which are most prepared for disasters through implementing a variety of disaster risk reduction measures.

In order to plan, implement and improve its DRR policies, programs and projects, several entities in the government manage and publicize their own “disaster damage statistics”, aiming at showing evidences of the severity of disaster impacts and the effects of DRR measures.

This paper reports the results of feasibility assessment of proposed indicators in “Working Text on Indicators”, using data from such statistics in Japan. It also includes some proposals on the global indicators.

The statistics and data used in the study are as follows:

1. **“Statistics of water-related disaster damage” (水害統計)**
Water and Disaster Management Bureau of the Ministry of Land, Infrastructure, Transport and Tourism
2. **“Statistics of disaster damage to public infrastructure” (災害統計)**
Water and Disaster Management Bureau of the Ministry of Land, Infrastructure, Transport and Tourism
3. **“Annual report of disaster damage” (災害年報)**
Fire and Disaster Management Agency of the Ministry of Internal Affairs and Communications
4. **“Survey on agricultural damage, farm product statistics” (作物統計 被害調査)**
Statistics Department, Minister's Secretariat, Ministry of Agriculture, Forestry and Fisheries
5. **“Statistics of disaster damage to farmland and agricultural facilities” (農地農業用施設災害統計)**
Rural Development Bureau, Ministry of Agriculture, Forestry and Fisheries

Comments from Japan based on the results of the feasibility assessment:

1. The most important criteria in selecting indicators are :

- Feasibility of practical data collection; and
- Relevancy to show the actual impacts of disasters.

Feasibility assessment of proposed indicators was conducted, using presently available data in Japan. It was found that some of the proposed indicators are difficult to measure.

The results are shown in the following pages, together with some proposals of feasible and relevant indicators.

2. The followings are some points to be considered in the indicator discussion :

- 1) To encourage establishing systems to sustainably survey, collect and accumulate basic data in all countries, we should clarify the priority of indicators to be monitored.
- 2) It is important to devise systems, in which the process of surveying, collecting and accumulating basic data is incentivized in each country.
For example, municipalities never fail to estimate the recovery cost of infrastructures, or economic loss of them, since it is linked to the allocation of funding from the central government in Japan.
- 3) Loss data should be collected for all disasters including small-scale disasters. It will lead to the reduction of accumulated impacts of small but frequent disasters.
- 4) Disaggregation by disaster types is important. It will provide basis for policy prioritization and decision of investment strategy in each country.

Results of the feasibility assessment

Global Target (a) - Substantially reduce global disaster mortality by 2030, aiming to lower average per 100,000 global mortality between 2020-2030 compared to 2005-2015.

Feasibility Assessment in Japan:

- Data for number of death (A-2) and number of missing persons (A-3) are surveyed, collected and accumulated.
- Data for number of displaced and evacuated are not available.

Our Proposal on the Global Indicators:

- The sum (A-1) of number of deaths (A-2) and number of missing persons (A-3) should be set as the indicator. Since the reduction of human loss is the most important outcome of disaster risk reduction, surveying, collecting and accumulating these data should be prioritized in all countries.

| | | Data in Japan | | | | | |
|----------|------------------------------------------------------------------------------------------------|---------------|------|------|-------------------------------------------------------------------------------------------------------|----------------------|---------------------------------------------------------------------------------|
| | | 2011 | 2012 | 2013 | Item / Data Source | Other Data Available | Feasibility |
| A-1 | Number of deaths and missing / presumed dead due to hazardous events per 100,000 | 19,993 | 192 | 173 | (A-2 + A-3) | | OK |
| A-1 alt. | Number of death, missing, injured, displaced or evacuated due to hazardous events per 100,000. | 17,051 | 189 | 166 | Number of death / Annual report of disaster damage | | No data available on number of people who were actually displaced or evacuated. |
| | | 2,942 | 3 | 7 | Number of missing / Annual report of disaster damage | | |
| | | 1,574 | 996 | 644 | Number of person seriously injured / Annual report of disaster damage *treatment of 1 month and up | | |

| | | | | | | | |
|-----|--------------------------------------------------------------------|-----------|-----------|-----------|---------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|----|
| | | 7,127 | 1,908 | 1,337 | Number of person slightly injured / Annual report of disaster damage *treatment of less than 1 month | | |
| | | 4,395,074 | 1,187,455 | 1,618,844 | | Number of persons to whom evacuation order was issued/ Annual report of disaster damage | |
| | | 867,502 | 574,485 | 585,425 | | Number of persons to whom received evacuation advisory was issue/ Annual report of disaster damage | |
| A-2 | Number of deaths due to hazardous events | 17,051 | 189 | 166 | Number of death / Annual report of disaster damage | | OK |
| A-3 | Number of missing persons / presumed dead due to hazardous events. | 2,942 | 3 | 7 | Number of missing / Annual report of disaster damage | | OK |

Global Target (b) - Substantially reduce the number of affected people globally by 2030, aiming to lower the average global figure per 100,000 between 2020-2030 compared to 2005-2015.

Feasibility Assessment in Japan:

- Data for number of injured (B-2) are surveyed, collected and accumulated.
- Data for number of people who left their places of residents (B-3) are not available.
- Data for number of people whose houses were damaged or destroyed (B-4, B-5) are surveyed, collected and accumulated.
- As data for number of people whose livelihoods were disrupted, destroyed or lost (B-7), the followings are available:
 - 1) Number of households of farmers and fishermen whose houses used as the workplace were damaged due to water-related disasters; and
 - 2) Number of workers in offices damaged due to water-related disasters.
 However, they do not cover disaster types other than water-related disasters. Existing data are not sufficient to grasp overall impacts of disasters to livelihoods of people.

Our Proposal on the Global Indicators:

- From the viewpoint of data availability, number of injured (B-2) and number of people whose houses were damaged or destroyed (B-4, B-5) are the most feasible among the proposed components of the indicator B-1.
- Although it is practically difficult to survey, collect and accumulate relevant data for the number of people whose livelihoods were disrupted, destroyed or lost (B-7), we should incorporate the concept of "damage to livelihoods".
- It is therefore recommended that as proxies for B-7, number of people whose houses were damaged or destroyed (B-4, B-5) are to be used, since damage to houses directly affects livelihoods of people regardless of their occupation.

| | | Data in Japan | | | | | |
|-----|-----------------------------------------------------------|---------------|-------|-------|---------------------------------------------------------------------------------------------------------|----------------------|-----------------------------------------------|
| | | 2011 | 2012 | 2013 | Item / Data Source | Other Data Available | Feasibility |
| B-1 | Number of affected people by hazardous event per 100,000. | | | | | | |
| B-2 | Number of injured or ill people due to hazardous events. | 1,574 | 996 | 644 | Number of person seriously injured / Annual report of disaster damage *treatment of 1 month and up | | Injure is OK. (Ill people cannot be counted.) |
| | | 7,127 | 1,908 | 1,337 | Number of person slightly injured / Annual report of disaster damage *treatment of less than 1 month | | |

| | | | | | | | |
|-----|-----------------------------------------------------------------------------------------------|-----------------------|--------------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| B-3 | Number of people who left their places of residence due to hazardous events. | 4,395,074 | 1,187,455 | 1,618,844 | | Number of persons who received evacuation order / Annual report of disaster damage | No data available on number of people who left their places of residence |
| | | 867,502 | 574,485 | 585,425 | | Number of persons who received evacuation advisory / Annual report of disaster damage | |
| B-4 | Number of people whose houses were damaged due to hazardous events. | 92,372 | 7,439 | 5,537 | Number of persons with house(s) half damaged / Annual report of disaster damage | Number of houses half damaged, partly damaged, flooded above floor and flooded below floor due to water-related disasters / Statistics of water-related disaster damage | OK |
| | | 617,449 | 26,805 | 16,786 | Number of persons with house(s) partly damaged / Annual report of disaster damage | | |
| | | 26,771 | 13,044 | 12,7727 | Number of persons with house(s) flooded above floor / Annual report of disaster damage | | |
| | | 75,493 | 59,928 | 53,749 | Number of persons with house(s) flooded below floor / Annual report of disaster damage | | |
| B-5 | Number of people whose houses were destroyed due to hazardous events. | 18,014 | 1,240 | 552 | Number of persons with house(s) totally damaged / Annual report of disaster damage | Number of houses totally damaged due to water-related disasters / Statistics of water-related disaster damage | OK |
| B-6 | Number of people who received aid including food and nonfood aid due to hazardous events. | | | | | | |
| B-7 | Number of people whose livelihoods were disrupted, destroyed or lost due to hazardous events. | 11,178 *households | 223 *households | 294 *households | Number of households of farmers and fishermen whose houses used as the workplace were damaged due to water-related disasters / Statistics of water-related disaster damage | | |
| | | 31,589 | 10,021 | 16,959 | Number of workers in offices damaged due to water-related disasters / Statistics of water-related disaster damage | | |

Global Target (c) - Reduce direct disaster economic loss in relation to global gross domestic product (GDP) by 2030.

Feasibility Assessment in Japan:

- For direct agricultural loss (C-2). the following data are surveyed, collected and accumulated:
 - 1) recovery costs of physical damage to farmlands and agricultural facilities such as irrigation channels and reservoirs;
 - 2) loss of damaged agricultural products; and
 - 3) economic loss to livestock industry, forestry and fishery.The second component is surveyed as a basis for the payment of the agricultural cooperative insurance.
- For direct economic loss to industrial facilities (C-3) and commercial facilities (C-4), various data are available. However, these data may cover only a limited portion of loss actually occurred. It is also difficult to identify loss to industrial and commercial facilities.
- Direct economic loss due to houses damaged and housed destroyed (C-5, C-6) is not calculated except for that of water-related disasters. However, using numbers of houses damaged and housed destroyed, direct economic loss can be derived through multiplying them by a unit cost. The method is applied to the economic loss estimation for water-related disasters.
- For direct economic loss due to damage to critical infrastructure (C-7), sufficient data are accumulated as recovery costs for various public infrastructure such as roads, bridges, ports, etc. The calculation of recovery cost is duly implemented for the purpose of estimating and requesting necessary budget for the recovery. The total recovery cost for each local government is reported to the central government to decide the subsidy rate from the central government, based on each local government's fiscal capacity.

Our Proposal on the Global Indicators:

- Direct agricultural loss (C-2) and direct economic loss due to housed damaged and destroyed (C-5, C-6) should be set as principal indicators. They can be calculated using basic data such as areas of farmlands affected and number of houses damaged and destroyed, if average unit costs are properly provided.
- The direct economic loss to industry and commercial sectors (C-3 and C-4), should surely be incorporated in the indicators, in consideration of the importance of explicitly showing the magnitude of impacts of disasters to economic activities. However, to cope with the difficulty in surveying, collecting necessary data, various approaches to estimate loss should be allowed, depending on the situation of countries.
- Direct economic loss due to damage to critical infrastructure (such as in C-7) should also be set as an indicator. Recovery costs of facilities can be available as basic data, since they are inevitably estimated in the process of requesting the funding in many countries.

| | | Data in Japan | | | | | |
|-----|--------------------------------------------------------------------------------------------|------------------------------|-----------------------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|-------------|
| | | 2011 | 2012 | 2013 | Item / Data Source | Other Data Available | Feasibility |
| C-1 | Direct economic loss due to hazardous events in relation to global gross domestic product. | | | | | | |
| C-2 | Direct agricultural loss due to hazardous events. | 352,080 *ha | 167,200 *ha | 163,040 *ha | Area (ha) of damaged farmlands / Survey on agricultural damage, farm product statistics | Area (ha) of flooded farmlands / Statistics of water-related disaster damage | OK |
| | | 350,300 *ton | 231,320 *ton | 116,300 *ton | Weight (ton) of damaged agricultural products / Survey on agricultural damage, farm product statistics | | |
| | | 36,240 *million yen | 16,490 *million yen | 10,500 *million yen | Loss (yen) of damaged agricultural products / Survey on agricultural damage in farm product statistics | Loss (yen) of damaged agricultural products due to water-related disasters / Statistics of water-related disaster damage | |
| | | 141,447,458 *thousand yen | 10,962,627 *thousand yen | 12,403,411 *thousand yen | Recovery cost (yen) of damaged farmlands / Statistics of disaster damage to farmland and agricultural facilities | | |
| | | 94,532,152 *thousand yen | 16,313,888 *thousand yen | 18,781,008 *thousand yen | Recovery cost (yen) of damaged agricultural facilities / Statistics of disaster damage to farmland and agricultural facilities | | |
| | | 7,115,974 *thousand yen | 2,485,786 *thousand yen | 620,823 *thousand yen | Direct economic loss (yen) to livestock industry / Annual report of disaster damage | | |
| | | 14,009,235 *thousand yen | 35,757,671 *thousand yen | 9,108,912 *thousand yen | Direct economic loss (yen) to forestry / Annual report of disaster damage | | |
| | | 332,737,316 | 5,517,423 | 3,482,840 | Direct economic loss (yen) to fishery / Annual | | |

| | | *thousand yen | *thousand yen | *thousand yen | report of disaster damage | | |
|-----|---------------------------------------------------------------------------------------------|------------------------------|-----------------------------|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------------------------|
| C-3 | Direct economic loss due to industrial facilities damaged or destroyed by hazardous events. | 826,775,004 *thousand yen | 12,434,737 *thousand yen | 7,731,110 *thousand yen | Direct economic loss (yen) to commerce and industry (other than buildings) / Annual report of disaster damage | | OK (However, only a limited portion is covered.) |
| | | 4,443 *number of offices | 1,502 *number of offices | 2,556 *number of offices | Number of offices (on the ground) damaged due to water-related disasters / Statistics of water-related disaster damage | | |
| | | 26 *number of offices | 31 *number of offices | 42 *number of offices | Number of offices (underground) damaged due to water-related disasters / Statistics of water-related disaster damage | | |
| | | 52,077 *million yen | 16,215 *million yen | 24,516 *million yen | Economic loss of assets in offices (yen) due to water-related disasters / Statistics of water-related disaster damage | | |
| | | 6,353 *million yen | 2,562 *million yen | 7,437 *million yen | Economic loss of assets of transport (yen) due to water-related disasters / Statistics of water-related disaster damage | | |
| | | 727 *million yen | 346 *million yen | 492 *million yen | Economic loss of assets of telecommunication (yen) due to water-related disasters / Statistics of water-related disaster damage | | |
| | | 22,437 *million yen | 2,456 *million yen | 3,214 *million yen | Economic loss of assets of power companies (yen) due to water-related disasters / Statistics of water-related disaster damage | | |
| | | 21 *million yen | 1 *million yen | 8 *million yen | Economic loss of assets of gas companies (yen) due to water-related disasters / Statistics of water-related disaster damage | | |
| | | 2,444 *million yen | 494 *million yen | 1,502 *million yen | Economic loss of assets of water suppliers (yen) due to water-related disasters / Statistics of water-related disaster damage | | |
| C-4 | Direct economic loss due to commercial facilities damaged or destroyed by hazardous events. | 826,775,004 *thousand yen | 12,434,737 *thousand yen | 7,731,110 *thousand yen | Direct economic loss other than buildings (yen) to commerce and industry / Annual report of disaster damage | | OK (However, only a limited portion is covered.) |
| | | 4,443 *number of offices | 1,502 *number of offices | 2,556 *number of offices | Number of offices (on the ground) damaged due to water-related disasters / Statistics of water-related disaster damage | | |

| | | | | | | | |
|-----|-----------------------------------------------------------------------|-----------------------------|-----------------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| | | 26 *number of offices | 31 *number of offices | 42 *number of offices | Number of offices (underground) damaged due to water-related disasters / Statistics of water-related disaster damage | | |
| | | 52,077 *million yen | 16,215 *million yen | 24,516 *million yen | Economic loss of assets in offices (yen) due to water-related disasters / Statistics of water-related disaster damage | | |
| C-5 | Direct economic loss due to houses damaged by hazardous events. | 256,994 | 3,165 | 2,328 | Number of houses half damaged / Annual report of disaster damage | Number of houses half damaged, partly damaged, flooded above floor, flooded below floor and flooded in underground space due to water-related disasters / Statistics of water-related disaster damage | OK |
| | | 730,699 | 12,657 | 16,516 | Number of houses partly damaged / Annual report of disaster damage | | |
| | | 30,983 | 7,883 | 7,000 | Number of houses flooded above floor / Annual report of disaster damage | | |
| | | 55,174 | 40,908 | 31,711 | Number of houses flooded below floor / Annual report of disaster damage | | |
| | | 140,548 | 85,429 | 84,360 | Direct economic loss to houses (buildings) due to water-related disasters / Statistics of water-related disaster damage *economic loss to houses totally damaged is included. | | |
| | | 93,429 | 53,356 | 50,157 | Direct economic loss to assets in houses due to water-related disasters / Statistics of water-related disaster damage *economic loss to houses totally damaged is included. | | |

| | | | | | | | |
|------|------------------------------------------------------------------------------------------------------|------------------------------|-----------------------------|-----------------------------|-----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| C-6 | Direct economic loss due to houses destroyed by hazardous events | 129,227 | 553 | 264 | Number of houses totally damaged / Annual report of disaster damage | Number of houses totally damaged due to water-related disasters / Statistics of water-related disaster damage | OK |
| C-7 | Direct economic loss due to damage to critical infrastructure caused by hazardous events. | 152 | 63 | 58 | Number of damaged hospitals / Annual report of disaster damage | | OK (Also available for other infra-structures) |
| | | 215,618,824 *thousand yen | 9,458,775 *thousand yen | 1,899,487 *thousand yen | Damage amount (yen) to educational facilities / Annual report of disaster damage | | |
| | | 5,582 | 1,134 | 978 | Number of damaged schools / Annual report of disaster damage | | |
| | | 288,714,668 *thousand yen | 81,041,581 *thousand yen | 45,092,436 *thousand yen | Recovery cost (yen) of damaged roads / Statistics of disaster damage to public infrastructure | | |
| C-8 | Direct economic loss due to cultural heritage damaged or destroyed by hazardous events. | | | | | | |
| C-9 | Direct economic loss due to environment degraded by hazardous events. | | | | | | |
| C-10 | Financial transfer and access to insurance. (Total insured direct losses due to hazardous events) | | | | | | |

| | | | | | | | |
|------|--------------------------------------------------------------------------------------------------------------------|------------------------------|-----------------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| C-11 | Direct economic losses due to disruptions to basic services | | | | | Number of houses with interruption of tap water service, electricity service, telephone, gas service / Annual report of disaster damage | |
| C-12 | Direct economic loss due to service sectors (such as transportation, tourism, finance) caused by hazardous events. | 288,714,668 *thousand yen | 81,041,581 *thousand yen | 45,092,436 *thousand yen | Recovery cost (yen) of damaged roads / Statistics of disaster damage to public infrastructure | | Available for some sectors. |
| | | 75,621,203 *thousand yen | 3,390,386 *thousand yen | 4,458,549 *thousand yen | Recovery cost (yen) of damaged bridges / Statistics of disaster damage to public infrastructure | | |
| | | 90,590,626 *thousand yen | 2,087,600 *thousand yen | 1,268,932 *thousand yen | Recovery cost (yen) of damaged ports / Statistics of disaster damage to public infrastructure | | |
| | | 6,353 *million yen | 2,562 *million yen | 7,437 *million yen | Economic loss of assets of transport (yen) due to water-related disasters / Statistics of water-related disaster damage | | |

Global Target (d) - Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030.

Feasibility Assessment in Japan:

- Number of damaged facilities such as hospitals (D-2) and schools (D-3) is surveyed, collected and accumulated. For public infrastructures, number of damaged places is reported as well as the recovery costs for them (such as in D-4, D-5 D-13 and D-14). However, it is difficult to collect data in other units such as length and percentage.
- Number of houses where basic service such as water and electricity is interrupted is surveyed, collected and accumulated.

Our Proposal on the Global Indicators:

- Recovery costs for public infrastructures can be available as basic data, since they are inevitably surveyed and collected in the process of requesting the funding in many countries. It is therefore recommended that economic loss to public infrastructures (C-7) should be used as an indicator. It may impose extra burden if we request reporting the damage to public infrastructures in other units.

| | | Data in Japan | | | | | |
|----------|------------------------------------------------------------------------------------------------|---------------|--------|--------|----------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------|
| | | 2011 | 2012 | 2013 | Item / Data Source | Other Data Available | Feasibility |
| D-1 | Damage to critical infrastructure due to hazardous events. | | | | | | |
| D-1 bis. | Number of electricity plants and transmission towers destroyed or damaged by hazardous events. | | | | | | |
| D-2 | Number of health facilities destroyed or damaged by hazardous events. | 152 | 63 | 58 | Number of damaged hospitals / Annual report of disaster damage | | OK |
| D-3 | Number of educational facilities destroyed or damaged by hazardous events. | 5,582 | 1,134 | 978 | Number of damaged schools / Annual report of disaster damage | | OK |
| D-4 | Number of transportation units and infrastructures destroyed or damaged by hazardous events. | 1,088 | 86 | 83 | Number of damages to ports / Annual report of disaster damage | Number of damages to ports / Statistics of disaster damage to public infrastructure | OK |
| | | 22,922 | 10,214 | 14,341 | Number of damages to roads / Annual report of disaster damage | Number of damages to roads / Statistics of disaster damage to public infrastructure | |

| | | | | | | | |
|-----|-----------------------------------------------------------------------|-----------|--------|--------|--------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|----|
| | | 726 | 146 | 140 | Number of damages to bridges / Annual report of disaster damage | Number of damages to bridges / Statistics of disaster damage to public infrastructure | |
| | | 747 | 323 | 288 | Number of places where railways were interrupted / Annual report of disaster damage | | |
| D-5 | Number of basic services have been disrupted due to hazardous events. | 152 | 63 | 58 | Number of damaged hospitals / Annual report of disaster damage | | OK |
| | | 5,582 | 1,134 | 978 | Number of damaged schools / Annual report of disaster damage | | |
| | | 1,088 | 86 | 83 | Number of damages to ports / Annual report of disaster damage | Number of damages to ports / Statistics of disaster damage to public infrastructure | |
| | | 22,922 | 10,214 | 14,341 | Number of damages to roads / Annual report of disaster damage | Number of damages to roads / Statistics of disaster damage to public infrastructure | |
| | | 726 | 146 | 140 | Number of damages to bridges / Annual report of disaster damage | Number of damages to bridges / Statistics of disaster damage to public infrastructure | |
| | | 747 | 323 | 288 | Number of places where railways were interrupted / Annual report of disaster damage | | |
| | | 1,350 | 530 | 176 | Number of ships destroyed / Annual report of disaster damage | | |
| | | 1,581,394 | 42,937 | 26,776 | Number of houses with interruption of tap water service / Annual report of disaster damage | | |
| | | 1,283 | 18 | 23 | Number of damages to sewage systems / Statistics of disaster damage to public infrastructure | | |
| | | 99 | 38 | 28 | Number of damages to solid waste management and excrement treatment / Annual report of disaster damage | | |

| | | | | | | | |
|------|------------------------------------------------------------------------------------------|-----------|-----------|-----------|-------------------------------------------------------------------------------------------------------------------|--|----|
| | | 7,463,822 | 1,278,506 | 1,045,135 | Number of houses with interruption of electricity service / Annual report of disaster damage | | |
| | | 376,189 | 55,513 | 10,856 | Number of houses with interruption of telephone / Annual report of disaster damage | | |
| | | 50,717 | 0 | 399 | Number of houses with interruption of gas service / Annual report of disaster damage | | |
| D-7 | Number of security service structures destroyed or damaged by hazardous events. | | | | | | |
| D-8 | Number of tourist infrastructure facilities destroyed or damaged by hazardous events. | | | | | | |
| D-10 | Number of communication infrastructure destroyed or damaged by hazardous events. | | | | | | |
| D-13 | Number of agricultural facilities destroyed or damaged by hazardous events. | 13,795 | 5,515 | 5,504 | Number of damaged agricultural facilities / Statistics of disaster damage to farmland and agricultural facilities | | OK |
| D-14 | Number of water and sanitation infrastructures destroyed or damaged by hazardous events. | 1,283 | 18 | 23 | Number of damages to sewage systems / Statistics of disaster damage to public infrastructure | | OK |
| | | 99 | 38 | 28 | Number of damages to solid waste management and excrement treatment / Annual report of disaster damage | | |
| D-15 | Number of days financial services have been disrupted due to hazardous events. | | | | | | |

Annex. Outline of the statistics used in the study

1. “Statistics of water-related disaster damage” (水害統計)

Administrated by:

Water and Disaster Management Bureau of the Ministry of Land, Infrastructure, Transport and Tourism

Purpose:

To obtain basic information necessary for implementing various policies, programs and projects related to water-related disaster risk reduction.

Types of Disasters:

Water-related disasters including riverine flood, pluvial flood, storm surge, tsunami and landslide.

Types of Damages:

1. Damage to general properties
Number of affected buildings, number of households affected, number of business facilities affected, etc.
2. Damage to public infrastructures
Affected public infrastructures, cost for disaster recovery works, etc. Public infrastructures include flood control facilities against river and coastal flooding, facilities against landslide disasters, roads, bridges, ports and harbors, sewage systems, parks, etc.
3. Damage to assets for public services
Damages to assets, damages due to business disruption, etc. Public services include railway/streetcar companies, operator of regular road transport, telecommunication companies, electric power companies, gas companies, water companies, operators of regular marine transport and operators of regular air transport.

Methods to collect data:

Basic data on damage to general asset and public infrastructures are collected by municipalities and submitted to prefectures. Prefectures aggregate the data from municipalities and submit to the central government. The central government aggregates the data and calculates economic loss in monetary terms.

Damages to public services are collected by service providers and submitted to prefectures. Prefectures aggregates the data and submit to the central government. The central government aggregates the data.

Threshold of data registration:

Data are collected for every water-related disaster, regardless of its magnitude.

2. “Statistics of disaster damage to public infrastructure” (災害統計)

Administrated by:

Water and Disaster Management Bureau of the Ministry of Land, Infrastructure, Transport and Tourism

Purpose:

The purpose of the data collection is to obtain the total cost for disaster recovery works in each local and central government, which will be a basis for deciding the percentage of a government subsidy to each local government. The statistics are compiled every year, based on the collected data.

Types of Disasters:

All types of natural disasters

Types of Damages:

Damage to public infrastructures

- Number of places and appraised costs for recovery works of damaged public infrastructures.

- Public infrastructures include Public infrastructures include flood control facilities against river and coastal flooding, facilities against landslide disasters, roads, bridges, ports and harbors, sewage systems, parks, etc.

Methods to collect data:

Number of places and appraised costs for disaster recovery works are collected by municipalities and submitted to prefectures. Prefectures aggregates the data from municipalities and submit to the central government. The central government aggregates the data.

Threshold of data registration:

If the estimated recovery cost of a damaged infrastructure due to a disaster exceeds a certain threshold, part of the cost will be covered by the subsidy from the central government. The statistics contain all damages that part of the recovery cost is subsidized for.

3. “Annual report of disaster damage” (災害年報)

Administered by:

Fire and Disaster Management Agency of the Ministry of Internal Affairs and Communications

Purpose:

To prepare basic information which contributes to the disaster management policy planning by the Fire and Disaster Management Agency of the Ministry of Internal Affairs and Communications and local governments, and exchanges of information among local governments.

Types of Disasters:

All types of natural disasters

Types of Damages:

Human damage (number of death; missing; seriously injured; and slightly injured)

Damage to residential buildings (number of buildings which are: totally destroyed; half destroyed; partially destroyed; flooded above floor; and flooded below floor, and number of households and persons dwelling in each category)

Damage to non-residential buildings (number of public buildings affected, number of other buildings affected)

Damage to farmland (areas of paddy fields and other farmlands which are eroded, buried with sediment or flooded)

Damage to public infrastructures (Number of damages to schools, agricultural facilities, other public infrastructures / Recovery costs of public schools, agricultural facilities, other public infrastructures)

Damage to public services (Number of households with interruption of water supply, telephone, electricity, gas, etc.)

Sufferers (number of households, persons who were not able to continue their ordinary lives due to damage to their houses)

Other economic loss (agriculture, forestry, livestock industry, fishery, commerce and industry)

Methods to collect data:

Data on damages are collected by municipalities and submitted to prefectures. Prefectures aggregate the data from municipalities and submit to the central government. The central government aggregates the data.

Threshold of data registration:

The municipalities are requested to report damages of disasters which meet the following criteria:

- The scale of disaster meets the threshold of applying the Disaster Relief Act;
- A Prefecture or a municipality set up headquarters for disaster response;
- Disaster extends to more than two prefectures and total damages are large;
- Special financial support from the central government is needed; and
- The Report is necessary due to the situation and its social impacts.

4. “Survey on agricultural damage, farm product statistics” (作物統計 被害調査)

Administrated by:

Statistics Department, Minister's Secretariat, Ministry of Agriculture, Forestry and Fisheries

Purpose:

The purpose of the survey is to prepare basic information necessary to plan and implement countermeasures against damage to agricultural products. The countermeasures include the estimation of the allocation of tax revenue to local governments and financing related to disasters.

Another purpose of the survey is to use in the approval of the amount of damage, needed for applying agricultural insurances.

Types of Disasters:

All types of natural disasters

Types of Damages:

Planted area, weight and estimated economic loss of damaged agricultural products.

5. “Statistics of disaster damage to farmland and agricultural facilities” (農地農業用施設災害統計)

Administrated by:

Rural Development Bureau, Ministry of Agriculture, Forestry and Fisheries

Purpose:

The purpose of the data collection is to obtain the total cost for disaster recovery works in each local and central government, which will be a basis for deciding the percentage of a government subsidy to each local government. The statistics are compiled every year, based on the collected data.

Types of Disasters:

All types of natural disasters

Types of Damages:

Damage to farmland and agricultural facilities

- Number of places and appraised costs for recovery works of damaged farmland and agricultural facilities
- Agricultural facilities include reservoirs, weirs, irrigation canals, pump stations, levees, etc.

Methods to collect data:

Number of places and appraised costs for disaster recovery works are collected by municipalities and submitted to prefectures. Prefectures aggregates the data from municipalities and submit to the central government. The central government aggregates the data.

Threshold of data registration:

If the estimated recovery cost of damaged farmland or a facility due to a disaster exceeds a certain threshold, part of the cost will be covered by the subsidy from the central government. The statistics contain all damages that part of the recovery cost is subsidized for.

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