



Sendai, Japan

Local progress report on the implementation of the 10 Essentials for Making Cities Resilient (First Cycle)

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Essential 1

Put in place organization and coordination to understand and reduce disaster risk, based on participation of citizen groups and civil society. Build local alliances. Ensure that all departments understand their role to disaster risk reduction and preparedness.

How well are local organizations (including local government) equipped with capacities (knowledge, experience, official mandate) for disaster risk reduction and climate change adaptation?

Level of Progress achieved: 5

Description of Progress & Achievements:

We thoroughly understand from past experience what disaster risks are most relevant to the city of Sendai: earthquakes — in addition to the Tohoku Earthquake, major earthquakes have recurred off the coast of Miyagi Prefecture every 30+ years; typhoons from summer to fall; and torrential rainstorms during the rainy season. The municipal government of Sendai has a chief crisis management officer (an assistant to the mayor) and three units that lead disaster prevention and emergency response operations — Crisis Management Section of General Planning Department, and Disaster Prevention Planning Section and Disaster Risk Reduction Promotion Section of Fire Department. Following the Tohoku Earthquake, a new unit — Reconstruction Operations Department — has been created mainly to coordinate various reconstruction programs, assist the rehabilitation of livelihoods for affected citizens, and handle the resettlement of communities and the restoration and reconstruction of residential land in affected areas. In addition to those noted above, all the other units of the municipal government understand what roles to take and what contributions to make, which are clearly defined in the regional disaster prevention plan that it has formulated under the Basic Act on Disaster Control Measures of Japan.

To what extent do partnerships exist between communities, private sector and local authorities to reduce risk?

Level of Progress achieved: 5

Description of Progress & Achievements:

The Sendai City regional disaster prevention plan specifies the roles of the municipal government, the prefectural government of Miyagi, private businesses, local associations and others in tackling disaster preparedness efforts — the plan calls for all actors involved to share the same understanding of its details and to cooperate in their implementation. In order to support the voluntary DRR efforts organized by neighborhood associations, we appoint our staff specialists as “regional disaster prevention advisors” to advise on their local activities. In order to further encourage the efforts of locally-based voluntary DRR associations, we also train “regional disaster prevention leaders” to play a central role in promoting these associations. Sendai City has concluded bilateral support agreements with the country’s 21 major cities whereby, if a disaster hits one city, the other partner provides relief upon request. We also have established arrangements with industries and private businesses for cooperation in disaster events to ensure the provision of personnel and energy and material supplies for disaster recovery efforts.

How much does the local government support vulnerable local communities (particularly women, elderly, infirmed, children) to actively participate in risk reduction decision-making, policy making, planning and implementation processes?

Level of Progress achieved: 5

Description of Progress & Achievements:

When drafting the regional disaster prevention plan, we invited the local welfare association for the disabled and the local gender equality foundation to sit on the Sendai City Disaster Prevention Committee so as to incorporate their viewpoints into disaster preparedness programs. In its basic policy statement, the plan emphasizes that “every disaster measure must be implemented with due consideration to different situations and different needs faced by different communities and individuals vulnerable to disasters.” The plan also stresses that “the participation of women in the implementation of measures must be encouraged so as to make their viewpoints and voices accurately heard and reflected at each phase of the process.” When reviewing the regional disaster prevention plan, we sent out questionnaires to and held opinion-exchange meetings with the citizenry. Through these outreach activities, the viewpoints of disaster-vulnerable communities and individuals were adopted, for example, as to how to operate shelters and what articles to add to the list of supplies for stockpiling there. In response to the Tohoku Earthquake, we formulated a Sendai City Earthquake Disaster Reconstruction Plan; in the drafting process, we held meetings to brief and discuss with the citizenry, in addition to inviting public comments, in order to hear views from a wide spectrum of stakeholders.

To what extent does the local government participate in the national DRR planning?

Level of Progress achieved: 4

Description of Progress & Achievements:

Based on the lessons and challenges identified from the Tohoku Earthquake, the national government of Japan is currently overhauling the DRR regime that centers on the Basic Act on Disaster Control Measures. Sendai City is calling for the national government, through the council of mayors of designated cities — where the Mayor of Sendai chairs a disaster reconstruction subcommittee — to revise the Act on Disaster Control Measures. Our stance is to clearly define the roles of designated cities and other major cities in regional support efforts so as to establish a system to maximize their potential for high-level disaster response. The Deputy Major of Sendai participates in and contributes to the project that the World Bank and the government of Japan have jointly initiated for the sharing and dissemination of lessons from the Tohoku Earthquake. Through this, we are communicating the experiences and lessons from affected regions throughout the world.

Essential 2

Assign a budget for disaster risk reduction and provide incentives for homeowners, low-income families, communities, businesses and public sector to invest in reducing the risks they face.

How far does the local government have access to adequate financial resources to carry out risk reduction activities?

Level of Progress achieved: 5

Description of Progress & Achievements:

Sendai City is adequately budgeted to implement both sides of the DRR endeavor: on one hand, the seismic reinforcement of bridges, a key element in reducing disaster risk, the upgrading of urban infrastructure, the seismic enhancement of municipal facilities and private-sector housing, and the protection against disasters of essential utilities such as water and gas supplies, mass transit, etc.; and on the other hand, the raising of awareness of DRR, etc.

To what degree does the local government allocate sufficient financial resources to carry out DRR activities, including effective disaster response and recovery?

Level of Progress achieved: 5

Description of Progress & Achievements:

The regional disaster prevention plan and the Sendai City Earthquake Disaster Reconstruction Plan, formulated in November 2011, both emphasize the creation of disaster-resilient urban infrastructure. The plans call for “implementation of disaster management measures, including the seismic enhancement and upgrading of facilities, so that the city will be able to maintain a certain level of functionality in disaster events.” The municipal government of Sendai is adequately budgeted as a whole to consistently implement DRR measures, while also making effective use of available state subsidies, etc.

What is the scope of financial services (e.g. saving and credit schemes, macro and micro-insurance) available to vulnerable and marginalised households for pre- disaster times?

Level of Progress achieved: 5

Description of Progress & Achievements:

We have created a Tohoku Earthquake-related lending scheme for Sendai-based, small and medium-sized enterprises that have suffered damage, directly or indirectly, from the major earthquake. We have also instituted an interest and guarantee fee subsidization program for SMEs who use above-described or similar lending after obtaining a certificate proving the damage done to their business-use buildings. Similarly, for the benefit of micro businesses, the Sendai Chamber of Commerce and Industry and another Sendai, Miyagi-based association of commerce and industry provide subsidies to cover the entirety of interest on said loans for the first three years of payment; the municipal government in turn supports them in assuming the subsidization cost. We focus on the proper administration of social security for the needy — which guarantees every citizen a national-minimum standard of living — as a way to support disaster-vulnerable and low-income individuals. We also support disaster-vulnerable and low-income households with non-statutory grants and other extra-relief programs if they are deemed to be in such a financial condition as to qualify them for social security benefits. Furthermore, we are working on programs for disaster-vulnerable and low-income households jointly with the employment, housing, education, and other relevant sectors. We are promoting programs for people with disabilities to assist them to lead an independent and fulfilling lifestyle despite disabilities. The municipal government has in place subsidies for medical bills, transportation charges, and housing renovation expenses, and disability pension benefits and allowances. In programs to reduce and exempt fees for various welfare services for the disabled, and tax and public utility charges, the municipal government shoulders a certain percentage (the entirety, for low-income individuals) of the fee/tax cost for disabled citizens.

To what extent are micro finance, cash aid, soft loans, lone guarantees etc available to affected households after disasters to restart livelihoods?

Level of Progress achieved: 5

Description of Progress & Achievements:

Sendai City is utilizing the disaster project for promoting community resettlement to acquire and develop land for the resettlement of households that have difficulties rebuilding a house on the original site mainly due to the Tohoku tsunami damage. It is also providing support such as purchasing affected residential land and subsidizing part of the expenses required for relocation. In addition, for areas other than districts covered by community resettlement projects, the municipal government plans to subsidize expenses required for relocation and amounts equivalent to interest on loans for relocation or reconstruction funds if such areas are still expected to be inundated by tsunami even after various measures are taken to prevent tsunami. Furthermore, it is subsidizing part of the construction expenses incurred when the victims wishing to rebuild a house on the original site take measures to prevent their houses from being damaged by tsunami. The municipal government is restoring to the former condition the residential areas damaged on an extensive scale through public works projects, but for the damaged residential land not covered by such projects, it has created a system to subsidize restoration work for residential land in Tohoku Earthquake-stricken areas and is supporting owners of residential land who plan restoration work by granting subsidies. The wide range of financial support provided by Sendai City is as described in the attached sheet.

Reference documents:

> Detail 2-4

<http://www.preventionweb.net/applications/hfa/lgsat//filedownloads/download/6ca1b5fd5fa5acb612e8e06e8b180dc5>

How well established are economic incentives for investing in disaster risk reduction for households and businesses (e.g. reduced insurance premiums for households, tax holidays for businesses)?

Level of Progress achieved: 4

Description of Progress & Achievements:

We have in place a subsidy scheme to promote the reinforcement of seismically-challenged old wooden houses and condominium buildings, and the retirement of concrete block walls in danger of collapsing in the event of a major earthquake. As a way to assist SMEs with business continuity planning, beginning in fiscal 2011, we provide SMEs with seminars by risk management specialists and by businesses that have successfully achieved business continuity by applying their BCP in a disaster event. Through these activities, we are disseminating and promoting the concepts and use of BCP among SMEs.

To what extent do local business associations, such as chambers of commerce and similar, support efforts of small enterprises for business continuity during and after disasters?

Level of Progress achieved: 4

Description of Progress & Achievements:

The local chambers of commerce and industry, and other business associations support SMEs in a variety of ways. They hold emergency business counseling for affected SMEs, and make rounds of visits and follow-up phone calls to keep track of their post-disaster situations. They provide disaster recovery/reconstruction-related assistance and lending programs, and organize seminars on working capital-raising, tax management and business rehabilitation, and one-on-one counseling sessions with professional specialists. They also support SMEs in expanding their markets in order to provide for damage due to post-disaster harmful rumors; they conduct events to support business reconstruction efforts jointly with tsunami-stricken communities. The Sendai Chamber of Commerce and Industry has collaborated with their counterparts across the country to assist affected SMEs to restart their operations as quickly as possible: they find businesses with unused equipment elsewhere in the country and match them to those local SMEs who need it. The Chamber has also worked with local municipalities to hold business continuity planning workshops for SMEs. The Miyagi prefectural federation of small business associations has organized SME financial seminars to assist affected SME associations in applying for state subsidies for the restoration of facilities for cooperative association use and also in obtaining financial assistance available for resolving post-disaster dual-debt problems. The Sendai City Industrial Promotion Organization has conducted seminars to assist SMEs with business continuity planning jointly with the municipal government of Sendai.

Essential 3

Maintain up-to-date data on hazards and vulnerabilities, prepare risk assessments and use these as the basis for urban development plans and decisions. Ensure that this information and the plans for your city's resilience are readily available to the public and fully discussed with them.

To what degree does the local government conducted thorough disaster risk assessments for key vulnerable development sectors in your local authority?

Level of Progress achieved: 4

Description of Progress & Achievements:

We locate hazardous sites, (at each of these sites) investigate past disasters (via interviews and visual surveys), conduct a simple analysis of hazards (and identify areas where damage is predicted), and assess the current condition (the number of houses needing monitoring and protection, the existence or otherwise of facilities for disaster-vulnerable individuals, etc.). We also collect ground-condition and historical-disaster information at developed sites, and build a database of the information. In the application of building regulations, in response to opinions from the Sendai City Residential Land Protection Council, the mayor designates areas that are at particularly high risk in terms of exposure to disasters. Such particularly high-risk areas are subject to the “designation of disaster-prone zones” as required in the Building Standards Act of Japan. We publish such hazardous-site information — in connection with the statutory designation of disaster-prone zones — on the official website of Sendai City so that it is available for checking by citizens at all times.

To what extent are these risk assessments regularly updated, e.g. annually or on a bi-annual basis?

Level of Progress achieved: 4

Description of Progress & Achievements:

In conjunction with monitoring the progress of restoration and reconstruction efforts, we keep track of current risk information, and update it as necessary. We also

examine the damage projections due to anticipated earthquakes that the national government releases and reviews from time to time.

How regularly does the local government communicate to the community, information on local hazard trends and risk reduction measures (e.g. using a Risk Communications Plan) including early warnings of likely hazard impact?

Level of Progress achieved: 5

Description of Progress & Achievements:

We strive to ensure the full dissemination of all types of disaster risks by means of risk-mapping and website publication, etc. We prepare earthquake hazard distribution maps categorized by predicted seismic intensity, degree of risk of predicted ground liquefaction, damage to buildings, damage due to collapsed concrete block walls, predicted tsunami arrivals, etc. This information is published via website, distributed over-the-counter at ward offices, and also shared at civic educational workshops. In order to raise awareness of the risks of damage due to tsunami, we have distributed a map of evacuation zones due to tsunami to all households in the city, and the information is also published via website. When it comes to the actual issuing of tsunami warnings, we will mobilize public-address vehicles as well as activate an automated voice message communication system (tsunami information system) to announce through outdoor public-address loudspeakers equipment and a mobile-phone e-mail system that automatically text-message tsunami information and evacuation advisories via mobile phones in order to alert coastal-area residents to the imminent threats. In order to disseminate projected risks of damage due to floods and inundations, we distribute a map showing the risks and publish it via website.

How well are local government risk assessments linked to, and supportive of, risk assessments from neighbouring local authorities and state or provincial government risk management plans?

Level of Progress achieved: 5

Description of Progress & Achievements:

The municipal government of Sendai reviews its disaster hazard projections as

necessary by reference to the materials released by the national government. We also ensure the overall alignment of the Sendai City regional disaster prevention plan with the state's Basic Plan for Disaster Prevention and the prefecture's regional disaster prevention plan, and review it from time to time by closely watching new developments at the state and prefectural levels.

How well are disaster risk assessments incorporated into all relevant local development planning on a consistent basis?

Level of Progress achieved: 5

Description of Progress & Achievements:

Our master plan for urban planning, which lays out Sendai City's basic land-use policy, takes account of disaster risks, and also is designed to align with our Earthquake Disaster Reconstruction Plan, which precedes it. The municipal government makes urban-planning decisions in accordance with said master plan, and makes urban-planning proposals available for public inspection and invites written public comments prior to finalizing urban-planning decisions.

Essential 4

Invest in and maintain critical infrastructure that reduces risk, such as flood drainage, adjusted where needed to cope with climate change.

How far do land use policies and planning regulations for housing and development infrastructure take current and projected disaster risk (including climate related risks) into account?

Level of Progress achieved: 5

Housing	Yes
Communication	Yes
Transportation	Yes
Energy	Yes

Description of Progress & Achievements:

Through the designation of disaster-prone zones under the Building Standards Act and through building regulations applicable within such zones, we ensure the prevention of hazards due to buildings within these designated disaster-prone zones. Also through the well-planned development of public housing, we ensure the safety of residences for the citizenry. Based on an analysis of the damage situation in the wake of the Tohoku Earthquake, at the disaster-prone zones that were at extremely high risk of damage from tsunami (the coastal areas in the eastern part of the city), in 2011 we adopted policy to ensure the availability of safe residences, for example by encouraging relocations to safer areas. With regard to the regulation of development projects, restrictions are imposed directly on development activities: the Sendai City Development Guidelines specifies that “development activities must be prohibited in disaster-prone zones and equivalents.”

How adequately are critical public facilities and infrastructure located in high risk areas assessed for all hazard risks and safety?

Level of Progress achieved: 4

Description of Progress & Achievements:

In principle, no essential public facilities are sited in hazardous areas. The Minami-Gamo water purification plant, located on a coastal area, in anticipation of an earthquake that had been said to occur in the near future off the coast of Miyagi, conducted seismic facility assessments, and, based on the results, implemented preparedness measures, including the rebuilding of the administrative building. However, because its water treatment facilities were devastated by huge tsunami in the Tohoku Earthquake, the details of the damage have been examined and analyzed. Plans for the construction of new facilities incorporate measures to make them tsunami-proof, such as the construction of facilities at higher elevations relative to the height of tsunami recorded after the earthquake, and the installation of covers over the facilities. For the sludge treatment facility, measures to prevent underground seepage have been implemented; tsunami-proof walls installed; and the doors and windows on the first floor replaced with watertight ones. To ensure the availability of electricity during disasters, solar power and small-scale hydroelectric power generation systems are scheduled to be constructed. At a junior high school located in a tsunami-prone area of Sendai, disaster supplies and equipment had been stored on the second floor before the major earthquake. In the event, the first floor got flooded, but the essential supplies that had been kept on the second floor were available for use when opening and operating an evacuation center there. Based on the post-earthquake experience, work has been undertaken to stockpile a fuller range of supplies and equipment at all schools in Sendai; blankets and private power generators have been added to the list of supplies for stockpiling. As for three tsunami-devastated elementary schools, plans for relocation to safer locations are now being considered.

How adequate are the measures that are being undertaken to protect critical public facilities and infrastructure from damage during disasters?

Level of Progress achieved: 5

Description of Progress & Achievements:

In preparation for earthquakes that were expected to occur off Miyagi Prefecture at a high probability, Sendai City had worked actively to make city-owned buildings, which were constructed before the new earthquake standards enforced in 1981, earthquake-resistant. Due to pre-Tohoku Earthquake seismic retrofitting, the percentage of earthquake-proof buildings to total city-owned ones at the end of fiscal 2009 reached 94.6%. Even after the Tohoku Earthquake, only a small portion of its buildings

suffered structural damage, and no one was injured for reasons such as their destruction and collapse, which indicated such seismic retrofitting was highly effective. In addition, it took similar measures for large ceilings, plate-glass windows, and tiled external walls systematically, and judging from the damage caused to these structures, it confirmed the effectiveness of such seismic retrofitting. The percentage of earthquake-proof buildings rose to 97.9% at the end of fiscal 2012, and the municipal government is striving to achieve the goal of increasing the percentage to 100% by the end of fiscal 2015. Initiatives for especially important public infrastructure such as water supply, city gas, and hospitals are as described in the attached sheet.

Reference documents:

> Detail 4-3

<http://www.preventionweb.net/applications/hfa/lgsat//filedownloads/download/c42a8043cc32fb7bd1fed9fa9cf4997b>

Essential 5

Assess the safety of all schools and health facilities and upgrade these as necessary.

To what extent have local schools, hospitals and health facilities received special attention for "all hazard" risk assessments in your local authority?

Level of Progress achieved: 4

Schools	Yes
Hospitals/ health facilities	Yes

Description of Progress & Achievements:

[Schools] Following the Tohoku Earthquake experience, 18 schools at each ward are designated as pilot schools for disaster prevention education. They are undertaking state-of-the-art research activities on disaster prevention education, and promoting the sharing of disaster prevention concerns among all school and community stakeholders via symposia and website publications. In order to learn from the Tohoku Earthquake, all schools have reviewed their disaster response manuals. All school personnel refresh their knowledge of manuals every year at training workshops; these manuals are also distributed to the communities to facilitate the community-wide sharing of issues. [Preschools] The Preschool Disaster Prevention Manuals, prepared in fiscal 2003, have been revised after the earthquake, and as per the revised manuals, each preschool conducts evacuation drills and keeps stockpiles of emergency food and supplies. [Children's centers] At each center, disaster prevention manuals are kept to ensure the safe use of facilities; emergency liaison arrangements are in place; and evacuation drills are conducted monthly in accordance with the national criteria. Efforts are being made to raise awareness and accumulate know-how among personnel, such as by providing training in disaster prevention and emergency life-saving. Designated center operators undergo annual assessments to determine their compliance with the best disaster-prevention and safety-management practice, thereby maintaining and enhancing their performance. [Municipal hospitals] Municipal hospitals strive to achieve complete preparedness for major disasters: they conduct disaster response training using manuals; organize ten rounds of tabletop exercises in a simulated disaster situation each year; conduct a triage exercise once every year in a simulated situation where great numbers of people injured in a major earthquake are rushing to hospital; and hold a once-a-year workshop with the participation of all staff, inviting external specialists to lecture on disaster response.

How safe are all main schools, hospitals and health facilities from disasters so that they have the ability to remain operational during emergencies?

Level of Progress achieved: 4

Schools	Yes
Hospitals/ health facilities	Yes

Description of Progress & Achievements:

[Schools] Schools have the responsibility to guarantee the safety of children who study there, and also provide shelters for the community, so school buildings have been assessed for their seismic resistance, and based on the results, seismic reinforcement work has been undertaken where necessary. The seismic reinforcement program has now been completed at all schools. At all elementary and junior high schools designated to serve as evacuation centers in disaster events, gas-cartridge-fueled power generators, and solar power generators (10 kW) and storage batteries (15 kW) are installed. These are intended for use in the operation of shelters to provide a minimum amount of electricity for telecommunication and lighting equipment during grid power outages. They are used during normal periods to reduce carbon footprint and to reduce and disperse peak-time demand. This program will be completed at all elementary and junior high schools over the next four years.

[Municipal hospitals] At municipal hospitals, emergency power generators are in place to prepare for outages in disaster events. Emergency power generators are subject to six-monthly and 12-monthly inspections each year. In order to prepare for earthquake disasters, since fiscal 1996, two rounds of earthquake resistance assessments were carried out on the buildings, and seismic reinforcement work was implemented and completed in fiscal 2004. In disaster preparedness efforts, municipal hospitals conduct regularly-scheduled disaster response drills every year, and conduct triage exercises and patient transportation drills by forming information-gathering and medical-treatment crews. They also conduct firefighting drills in simulated fire situations on a regular basis each year.

To what degree do local government or other levels of government have special programs in place to regularly assess schools, hospitals and health facilities for maintenance, compliance with building codes, general safety, weather-related risks etc.?

Level of Progress achieved: 5

Schools	Yes
Hospitals/ health facilities	Yes

Description of Progress & Achievements:

[Schools] Some 200 schools under the jurisdiction of Sendai City undergo regular inspections in accordance with the Building Standards Act; moreover, if problems or hazards with the building are detected through daily use or during routine rounds of visual inspections, they must be fixed or repaired immediately. [Preschools] In addition to regularly-scheduled examinations, seismic assessments have been conducted; the wooden preschool buildings that failed to meet municipal earthquake resistance criteria are sequentially being seismically reinforced. [Children’s centers] In addition to regularly-scheduled examinations, seismic assessments have been conducted; the wooden children’s-center buildings that failed to meet municipal earthquake resistance criteria are sequentially being seismically reinforced. [Municipal hospitals] Contractors are employed to undertake regular maintenance and inspection work to ensure the proper upkeep and management of emergency power generators, emergency elevators, firefighting equipment and other electric equipment, water supply and drainage equipment, and air-conditioning equipment. Regulatory inspection and examination are undertaken also by contractors by specifying these tasks in the terms of the outsourcing service contract. In disaster preparedness efforts, triage exercises with crews formed for information-gathering, patient transportation and medical treatment, and other disaster response drills are conducted regularly each year; firefighting drills are also conducted regularly each year.

How far are regular disaster preparedness drills undertaken in schools, hospitals and health facilities?

Level of Progress achieved: 5

Schools	Yes
Hospitals/ health facilities	Yes

Description of Progress & Achievements:

[Schools] All elementary and junior high schools conduct evacuation drills at least twice annually. Typically, one is an evacuation drill conducted in a simulated earthquake situation, and the other is in a simulated fire situation. In evacuation exercises, participating students hear lectures on disaster prevention, and practice hands-on activities such as fire extinguishing drills and experience simulated earthquakes. In addition to these school-wide evacuation drills, disaster prevention and other drills designed in collaboration with other elementary and junior high schools in the same jurisdiction and with residents in the same community are also conducted.

[Preschools] An evacuation drill takes place once in every month at each preschool.

[Children's centers] An evacuation drill takes place once in every month at each children's center. Certain children's centers carry out joint disaster prevention and other drills with schools and neighborhood associations in the same community.

[Municipal hospitals] Municipal hospitals conduct around ten rounds of tabletop training exercises in each year in simulated disaster event situations. They also conduct a triage exercise once in every year in a simulated earthquake situation in which great numbers of people injured due to a major earthquake are rushing to hospital.

Essential 6

Apply and enforce realistic, risk compliant building regulations and land use planning principles. Identify safe land for low-income citizens and develop upgrading of informal settlements, wherever feasible.

How well are risk-sensitive land use regulations and building codes, health and safety codes enforced across all development zones and building types?

Level of Progress achieved: 4

Description of Progress & Achievements:

With regard to the application of development permits under the relevant provisions of the City Planning Act of Japan, in accordance with the Sendai City Development Guidelines, developers are required to hold consultations prior to the granting of permits. The Guidelines state that development activities must be prohibited in disaster-prone zones; in a provision restrictions are placed directly on development activities. Even where any disaster-prone zone is not involved, disaster prevention criteria governing residential land are in place under said Guidelines pursuant to relevant laws and regulations, and developments are regulated by the application of permits. For hilly areas, there are designated zones in which restrictions are imposed on residential land development projects; for land developments at sites of 500 square meters to 1,000 square meters that fall outside of the development permission regime, the system of granting of permits in accordance with criteria is in force. Areas at high risk of disasters are designated as disaster-prone zones. Specifically, one district (1,213.8 ha) has been designated as such because of its risk of suffering from a tsunami disaster, and one district (2.2 ha) has been designated as such because of its risk of suffering from a residential land disaster. A third district is currently scheduled for designation as such because of residential land disaster risk. In the areas where damage has been done to residential land due to the major earthquake, the statutory “designation of disaster-prone zones” has already begun.

How strong are existing regulations (e.g. land use plans, building codes etc) to support disaster risk reduction in your local authority?

Level of Progress achieved: 4

Description of Progress & Achievements:

The municipal government of Sendai has in place its development permission regime, and designates disaster-prone zones. The efficacy of this building regulation regime is extremely high; for example, it may prohibit the initiation of building activities. Specifically, under this regime, building activities involving “buildings intended for residential use” such as dedicated detached housing, condominium housing, rooms for lease, dormitories, etc., are prohibited; and in certain areas, new housing building projects will not be permitted. In the case of the building of “buildings other than buildings for residential use,” special required criteria must be met; for example, the building must be no higher than two stories above ground; the foundation of the building must be constructed of monolithic reinforced concrete; and the building must be equipped with necessary features to be structurally resilient and safe from landslides and other seismic disturbances. The Sendai City Master Plan for Urban Planning is formulated in accordance with the City Planning Act of Japan, which states that all urban-planning decisions established by the municipal government must be in compliance with this Act. The Building Standards Act of Japan requires that no buildings shall be built unless they meet building criteria based on urban-planning policy and are approved appropriately. This building regime has a very strong force of law.

Essential 7

Ensure education programmes & training on disaster risk reduction are in place in schools and communities.

How regularly does the local government conduct awareness-building or education programs on DRR and disaster preparedness for local communities?

Level of Progress achieved: 5

Programs include cultural diversity issues	Yes
Programs are sensitive to gender perspectives	Yes

Description of Progress & Achievements:

In its annual general emergency drill, Sendai City works with local communities to practice evacuation at the time of earthquakes and tsunami, distribution of food, and so forth. For their part, local communities hold fire-fighting, life-saving, relief, evacuation, food distribution, and other drills under the leadership of voluntary DRR-related organizations and other civic groups so that each and every member of the community understands what he or she should do when a disaster occurs. Furthermore, in order to revitalize such organizations, some communities conduct hands-on map-based disaster response drills and prepare disaster-prevention maps for their residents, and the municipal government is supporting these initiatives. In addition, the municipal government hosts symposia and events to educate citizens in various subjects related to disaster prevention. In local communities, meanwhile, the government is striving to secure human resources ready to support disabled persons, who are vulnerable to damage when a disaster occurs, by developing and training dedicated volunteers (sign-language interpretation, summarizing what is spoken in writing, transcription into Braille, reading aloud, working as a helper, and driving) who can evacuate and guide them and provide them with disaster and life support information. Details of the initiatives mentioned above are as described in the attached sheet.

Reference documents:

> Detail 7-1

<http://www.preventionweb.net/applications/hfa/lgsat//filedownloads/download/dd93cf0ea7838d6856487cd438b32735>

To what extent does the local government provide training in risk reduction for local officials and community leaders?

Level of Progress achieved: 5

Description of Progress & Achievements:

The municipal government of Sendai is working to develop “regional disaster prevention leaders” who play a central role in community-based disaster prevention efforts and promote locally-tailored disaster prevention initiatives. We also provide assistance in the promotion of community-school-government collaborative disaster prevention activities and cooperative disaster response arrangements, and the development of community-specific disaster prevention exercises and manuals on how to act in emergencies. The Sendai municipal government’s Disaster Response Headquarters organizes map-based exercises with the participation mainly of its relevant departments and sections on a regular basis. In its annual comprehensive disaster prevention exercise for the current fiscal year, with the participation mainly of related departments and sections, we carried out simulation-based drills using maps. Sendai City also promotes shelter operation drills, and proactively sends government staff to take part in disaster prevention drills planned by local communities, in order to enhance partnerships with communities and shelter-facility operators.

To what degree do local schools and colleges include courses, education or training in disaster risk reduction (including climate related risks) as part of the education curriculum?

Level of Progress achieved: 5

Description of Progress & Achievements:

[Elementary and junior high schools] In addition to evacuation drills on the school calendar, schools provide DRR education and training in classes of moral learning and comprehensive studies, in special curriculum activities, and during disaster prevention-related sessions in regular subject classes, in an interlinked manner. We have prepared a side reader on disaster prevention, and distributed it to all elementary and junior high school students so that it can be used for disaster prevention education. We have designated pilot schools for the provision of disaster prevention education; these schools are carrying out various initiatives, e.g., the organization of disaster

prevention education lectures and training workshops and disaster drills conducted jointly with community residents and students' parents, and the production of DRR maps and handbooks. Jointly with the Fire Department's units in charge of disaster prevention, we distribute a DRR checklist for school students to prepare themselves for disaster events in their everyday lives. [Schools, associations, etc.] Sendai City provides an "on-demand municipal administration seminar" service that sends its Fire Department staff in charge of disaster prevention to provide first-hand introductions to earthquake preparedness and disaster prevention and risk reduction strategies that can be used at home. This service is available on request from schools and associations. We also conduct DRR courses at colleges in the city from time to time. [Tohoku University] Tohoku University has launched a new international research institute for the science of disasters; this world-class research center seeks to innovate disaster preparedness and crisis response methodologies and to lead efforts to prepare for new regional major disasters. It is working to integrate the sciences of practical disaster prevention, and advancing research and studies in this field; it is delivering the achievements of its work to global audiences.

How aware are citizens of evacuation plans or drills for evacuations when necessary?

Level of Progress achieved: 5

Description of Progress & Achievements:

According to a questionnaire survey of residents of Sendai, 73.4 percent of its citizens had known, before the Tohoku Earthquake, the location of the designated evacuation center in the region they resided in; an even higher proportion of the population must be familiar with their designated evacuation center now. In response to the question "from your experience in the recent earthquake, what drills or educational seminars do you think you want to participate in or hear most?," evacuation drills topped the list of the most exercises. These findings show that many citizens recognize the importance of knowing where to take shelter in disaster events and of participating in evacuation drills.

Essential 8

Protect ecosystems and natural buffers to mitigate floods, storm surges and other hazards to which your city may be vulnerable. Adapt to climate change by building on good risk reduction practices.

How well integrated are local government DRR policies, strategies and implementation plans with existing environmental development and natural resource management plans?

Level of Progress achieved: 5

Description of Progress & Achievements:

Sendai City is urging developers to take environmental impact into consideration in their large-scale projects by conducting environmental impact assessment(*) in accordance with the Sendai City Environmental Impact Assessment Ordinance.

*System wherein businesses investigate the present environmental condition prior to a project, predict and assess the project's impact on the environment, and publish the results. Then, relevant administrative agencies offer opinions while taking those of citizens and experts into account, thus encouraging businesses to avoid or reduce the impact or compensate for the damage on the environment as much as possible. If its projects meeting certain requirements in terms of project scale have environmental impact, the municipal government gives full consideration to and coordinates ways to restore the environment and offers recommendations in accordance with its Guidelines for Implementing the Environmental Coordination System. In the "project for restoring beautiful beaches to their former condition," the Sendai City Earthquake Disaster Reconstruction Plan calls for the development of coastal disaster-prevention forests to reduce tsunami damage, in cooperation with national and prefectural organizations, taking seashore landscapes and environmental needs into consideration. In the "energy conservation and new energy project for sustainable energy supply," the municipal government is striving to create an energy-efficient city that does not depend on a particular source of energy excessively. It has also announced a plan to promote model eco-towns with the aim of building a secure city even in case of emergency. Meanwhile, in order to secure diverse sources of energy, it is working to establish R&D bases for next-generation energy. Sendai City formulated a basic green plan to preserve and restore the natural environment and reduce natural disasters accordingly.

To what degree does the local government support the restoration, protection and sustainable management of ecosystems services?

Level of Progress achieved: 5

Forests	Yes
Coastal zones	Yes
Wetlands	Yes
Water resources	Yes
River basins	Yes
Fisheries	Yes

Description of Progress & Achievements:

In the case of development projects that exceed a certain amount of size, we instruct developers to properly apply required environmental impact assessments and to give due consideration to the natural environment in compliance with relevant laws and regulations. Guidance is also provided to encourage them to make proper land-use and location decisions. Sendai City preserves green land through regional green zoning — designation of green zones — based on laws and municipal ordinances, and also promotes the greening of urban areas through the establishment of greening regulations based on municipal ordinances.

How much do civil society organizations and citizens participate in the restoration, protection and sustainable management of ecosystems services?

Level of Progress achieved: 5

Description of Progress & Achievements:

In accordance with its ordinance-based “system to certify green organizations,” Sendai City certifies citizens’ groups engaged in urban afforestation, green conservation, green education, etc. as green organizations. In Sendai, there are 81

nonprofit organizations and other civic groups that have long worked to preserve the natural environment and serve other environmental causes. They have striven to protect the city's natural environment independently. Examples include Hirose River, a symbol of Sendai, known as the City of Trees, which runs through the center of the city slowly and gently; precious wild birds such as snipes and plovers as well as diverse plant communities; and the Gamo tidal flat, which is designated by the national government as a special reserve in the Sendai beach wildlife sanctuary. As part of its environmental impact assessments (Refer to replies to Question [4.1.1]), the municipal government has put a system of collecting citizens' opinions and replying to them in place, thus enabling them to involve themselves in ensuring that large-scale projects take the needs of the environment into consideration. Some specific examples of the city's initiatives are as described in the attached sheet.

Reference documents:

> Detail 8-3

<http://www.preventionweb.net/applications/hfa/lgsat//filedownloads/download/734e6a616360c12cbb4777d02010a68d>

How much does the private sector participate in the implementation of environmental and ecosystems management plans in your local authority?

Level of Progress achieved: 5

Description of Progress & Achievements:

Many private businesses in the city cooperate on ecosystem preservation initiatives: for example, they participate in tree-planting and forest-conservation activities; make donations to urban-greening and greenery conservation funds; and promote green awareness and education. The private sector sat on the executive committee of an energy-saving and electricity conservation campaign; sponsored an eco-themed hands-on fun program for children, designed to promote environment-friendly activities in everyday lives and the use of mass transit; and participated in an on-demand environmental seminar service that can be used by schools and community groups to provide environmental learning classes and workshops.

Essential 9

Install early warning systems and emergency management capacities in your city and hold regular public preparedness drills.

To what degree do local institutions have access to financial reserves to support effective disaster response and early recovery?

Level of Progress achieved: 5

Description of Progress & Achievements:

Sendai City is adequately budgeted to implement both sides of the DRR endeavor: on one hand, the seismic reinforcement of bridges, a key element in reducing disaster risk, the upgrading of urban infrastructure, the seismic enhancement of municipal facilities and private-sector housing, and the protection against disasters of essential utilities such as water and gas supplies, mass transit, etc.; and on the other hand, the raising of awareness of DRR, etc.

To what extent are early warning centres established, adequately staffed (or on-call personnel) and well resourced (power back ups, equipment redundancy etc) at all times?

Level of Progress achieved: 5

Description of Progress & Achievements:

Arrangements are in place to automatically launch disaster response headquarters in the event of a disaster — depending on the magnitude of the event — with the mayor serving as commander-in-chief with necessary personnel and organization to carry out response operations. A fixed site necessary for the location of headquarters is set aside at all times. Radio equipment intended for use in disaster prevention administration is installed at all units of the Sendai municipal government and at every designated evacuation center, in order to prevent any disruption in communications during disaster events. Emergency electricity supply systems are installed in each of the government buildings at the City Hall of Sendai in order to ensure the accommodation of electricity supplies during grid power outages. At each designated evacuation center, power generators are installed to supply electricity for information-

gathering and lighting equipment. Disaster supplies and equipment are stored at some 100 community disaster prevention centers, located across the city. In addition to the backup electricity installations described above, we plan to complete by fiscal 2015 the construction and deployment of solar power generation systems (10 kW) and storage batteries (15 kW) at all schools (some 200 in total) designated to serve as evacuation centers during disaster events; upon completion, overall, there will be a mega solar power capacity of more than 2 megawatts and a mega storage capacity of 3,000 kilowatt-hours. This project will enable the continued supply of a certain amount of electricity required for lighting and telecommunication equipment in the event of a grid power outage — during night hours as well.

How much do warning systems allow for adequate community participation?

Level of Progress achieved: 5

Description of Progress & Achievements:

1. An e-mail disaster alert service is in place to transmit emergency information, such as earthquake and tsunami, weather, evacuation advisory and order, to the citizenry via the text-messaging function of mobile phones. The same content is also released on the official website of Sendai City. 2. With regard to tsunami warnings, Sendai has established a tsunami information communication system using outdoor loudspeaker equipment on the disaster prevention administration radio network. There had been 50 outdoor loudspeakers erected along the coast of the city before the Tohoku Earthquake. This system is used to issue tsunami warnings and evacuation advisory and order messages to the citizenry. 3. The emergency earthquake alert service available from the Japan Meteorological Agency has been introduced at all relevant departments and sections as a way to enhance the city's disaster preparedness capabilities. When the Tohoku Earthquake hit the city, we utilized these systems; when it came to the dissemination of tsunami warnings and evacuation information, in particular, the tsunami information communication system came into its own. Based on the Tohoku Earthquake experience, especially regarding evacuation from tsunami, we will establish the transmission of emergency information via multiple routes to the citizenry, expand the range of reach currently possible via existing mechanisms, and explore the most reliable evacuation strategies possible. (1) We will introduce an e-mail emergency alert service (broadcast notification service offered by mobile carriers to alert all mobile phones at once within the same coverage area). (2) We will restore the old outdoor loudspeaker equipment on the tsunami information system that was damaged in the Tohoku Earthquake, and will also erect new equipment in those areas that were inundated by the tsunami but where none had been erected before the earthquake.

To what extent does the local government have an emergency operations centre (EOC) and/or an emergency communication system?

Level of Progress achieved: 5

Description of Progress & Achievements:

In the event of a disaster above a certain threshold, the Sendai City Disaster Response Headquarters will come into place, and the mayor will head the headquarters, directing and orchestrating all units of administration. The secretariat of the headquarters will centrally manage all administrative tasks: the gathering, organization and communication of disaster-related information, the preparation of requests for the dispatch of disaster crews and for the provision of disaster assistance, and the communication of disaster information to the citizenry, etc. In order to secure emergency telecommunication means, equipment on the disaster prevention administration radio system is installed at all places of government and at all designated evacuation centers. Moreover, all key units of government have satellite-based mobile phone installations as yet another way to ensure the availability of telecommunications.

How regularly are training drills and rehearsal carried out with the participation of relevant government, non-governmental, local leaders and volunteers?

Level of Progress achieved: 5

Description of Progress & Achievements:

Sendai City conducts a comprehensive disaster prevention exercise once a year; the program includes simulation-based drills using maps, which are carried out with the participation mainly of relevant departments and sections. In this exercise, local communities join us and together conduct drills for evacuations due to earthquakes and tsunami, and for the preparation of meals for evacuees. In addition to the annual comprehensive disaster exercise, we conduct on a regular basis drills for the operation of disaster shelters, and hands-on map-based disaster response drills, jointly with local communities and DRR-related organizatio

How available are key resources for effective response, such as emergency supplies, emergency shelters, identified evacuation routes and contingency plans at all times?

Level of Progress achieved: 5

Stockpiles of relief supplies	Yes
Emergency shelters	Yes
Safe evacuation routes identified	Yes
Contingency plan or community disaster preparedness plan for all major hazards	Yes

Description of Progress & Achievements:

Sendai City has formulated its regional disaster prevention plan laying out the details of action to take, city-wide, for the prevention of disaster hazards, disaster preparedness and emergency response, and disaster recovery and reconstruction. Emergency shelters are divided into those for temporary use only and those for evacuees to live in for the time being; some 200 municipal schools in the city are designated as evacuation centers. In a disaster event, once the municipal government issues an evacuation advisory or order, affected citizens are supposed or required to take shelter, as a general rule, at their nearest designated evacuation center. In order to allow local organizations, evacuation-center operators (schools, etc.), and government to share the same set of issues and priorities and to smoothly open and operate the evacuation center, we have prepared an easy-to-understand manuals for how to operate a shelter. Each designated evacuation center keeps stockpiles of government-issued relief supplies at all times to provide for disaster events; all the city's designated evacuation centers together keep a sufficient amount of food and drinking water to allow roughly 100,000 people to live for a period of two days. In the Tohoku Earthquake disaster, the number of evacuees in the city peaked at approximately 100,000, so the current level of stockpiles is adequate for evacuees to tide over their immediate crisis if a disaster of a similar magnitude occurs

Essential 10

After any disaster, ensure that the needs of the survivors are placed at the centre of reconstruction with support for them and their community organizations to design and help implement responses, including rebuilding homes and livelihoods.

How much access does the local government have to resources and expertise to assist victims of psycho-social (psychological, emotional) impacts of disasters?

Level of Progress achieved: 5

Description of Progress & Achievements:

In supporting victims of the Tohoku Earthquake, Sendai City has worked with local associations, NPOs, volunteer groups, existing social welfare organizations, etc. Specific support efforts included consultation and guidance by ward offices about health and welfare, community support at prefabricated temporary houses and other facilities, prevention by Sendai City Council of Social Welfare of occupants of city-requisitioned private houses from being isolated, support by NPOs for employment, closer communication with and watch on occupants of prefabricated temporary houses, operation of the system for supporting the lives of aged persons living alone through outsourcing to private businesses, and provision of information useful in reconstructing the lives of the earthquake victims through the municipal government, NPOs, and Sendai City Council of Social Welfare. The municipal government is also providing support in cooperation with the city's bar association and other professional organizations. One example is that lawyers hold meetings to give advice to solve problems such as the inheritance of land and other assets and the repayment of housing loans as the victims struggle to reconstruct their lost house. In addition, it is working with various institutions to help those who lost their job due to the disaster to find employment. By not only providing job placement service but also giving advice on diverse problems with which these job seekers are faced in their lives, it is providing comprehensive support so that they become independent as soon as possible. Moreover, the government is working to provide mental care to the victims by establishing organizations, and assigning personnel, dedicated to psychosocial support. Details of this initiative are as described in the attached sheet.

Reference documents:

> Detail 10-1

<http://www.preventionweb.net/applications/hfa/lgsat//filedownloads/download/87b65f9d738ea59c2c51cb5d0e492087>

How well are disaster risk reduction measures integrated into post-disaster recovery and rehabilitation activities (i.e. build back better, livelihoods rehabilitation)?

Level of Progress achieved: 5

Description of Progress & Achievements:

The Sendai City Earthquake Disaster Reconstruction Plan emphasizes the reconstruction, and upgrading to a new height, of Sendai as a disaster-resilient, green city, and aims to promote disaster risk reduction efforts accordingly. For example, our “protect lives from tsunami (tsunami hazard prevention and housing reconstruction) project” — which is aimed at the revival of the tsunami-ravaged eastern part of the city — sets for a variety of anti-tsunami DRR measures. Those include the filling of arterial prefectural highways to higher elevations, and the creation of coastal forests as natural tsunami buffers. Our “build the foundation for safe housing (urban residential land restoration) project” aims to restore safe and secure living, particularly in the hilly urban districts where the major earthquake caused landslides, collapsed retaining walls and other serious damage. To this end, it promotes the use of residential land restoration-related measures to accelerate reconstruction efforts, and also calls, where necessary, for considering the application of alternative approaches such as the resettlement of communities. These objectives are also reflected in the regional disaster prevention plan in order to integrate DRR and post-disaster programs.

To what degree does the Contingency Plan (or similar plan) include an outline strategy for post disaster recovery and reconstruction, including needs assessments and livelihoods rehabilitation?

Level of Progress achieved: 5

Description of Progress & Achievements:

We are currently reviewing the Sendai City regional disaster prevention plan, based on the new challenges and lessons identified from the Tohoku Earthquake experience. We have created a handbook on how to evacuate from tsunami, and a plan on how to assist the evacuation of disaster-vulnerable individuals. While examining views from a questionnaire survey of 15,000 citizens, we are also reviewing the shelter operation manuals and reexamining what function should be given to evacuation centers, e.g.,

what articles to add to the list of supplies for stockpiling there. Strategies for the restoration of essential utilities and for the support of livelihoods rehabilitation, such as via emergency housing measures, are also incorporated into the regional disaster prevention plan. The full process of disaster management from initial response to recovery and reconstruction is clearly defined in a single plan (regional disaster prevention plan).