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# Disaster Risk Reduction Management System in Sasayama Municipality

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## I. Research Background

the number of people at risk growing every year – 90% population in developing countries with smallest share of resources – burden of exposure to disasters – disaster threaten the poor most – disaster increasing and are unable to afford the reconstruction and recovery – culture of prevention – deserves importance.

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## Sasayama City in Hyogo



### II. A Brief Account of Sasayama Municipality

Location:- mid-western part of hyogo Prefecture – four towns( Sasayama, Nisiki, Tannan and Konda)-Sasayama City – Funai County,Kyoto P. to the east, Toyono County, Osaka P. to the south – Tannan and Nishiki City of Tokai County Hyogo P. to the north and west – total land area,377.61 sq. km. – total population, 47,142.

Physical Features:- elevation 221.64 m. – extent of town: 31.4 km (east-west) and 24.7 km. (north- south) –  $\frac{3}{4}$  mountainous city from 400 to 800m –  $\frac{1}{4}$  agriculture and settlements – mountains covered by forests

Economy:- fertile soil for rice production – climate suitable for cereal products – famous for black soyabeans, yams, chesnut, mushroom, tea – more than two million tourist visit.

### III. Methodology

secondary data and information – primary data generated by interview, questionnaires, expert judgments, field visits and meetings

### IV. Limitation of the Research Study

Disaster reduction management system in Sasayama Municipality – an approach to disaster prevention and mitigation – awareness programs

### Introductory Meeting with Authorities



Courtesy Speech by Deputy Mayor



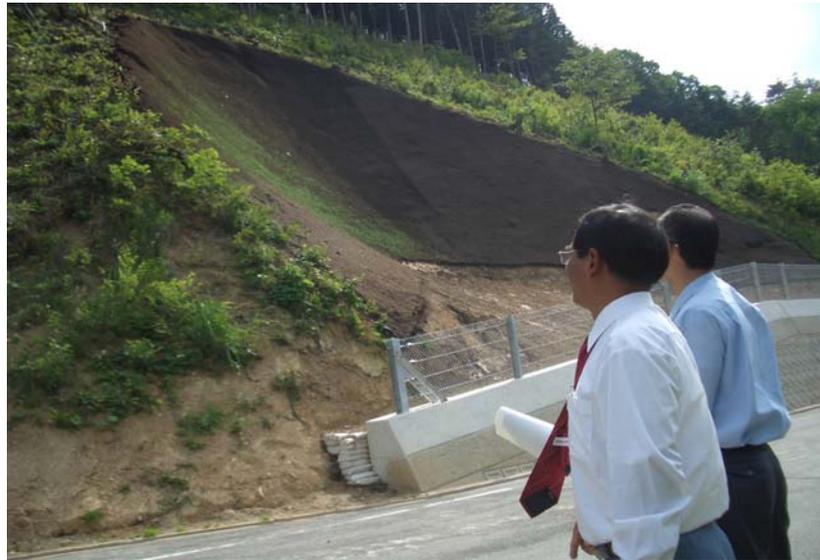
Authorities Briefing on Disaster Management System



### Briefing on Landslide Treatment



### Observation of Landslide Treatment



## V. Disasters in Sasayama City

Earthquakes  
Landslides  
Floods  
Fires  
Typhoons  
Droughts

## VI. Disaster Risk Analysis

1. What Disaster Risk is:- The probability of harmful consequences, or expected loss of lives, people injured, property, livelihoods, economic activity disrupted or environment damaged resulting from interactions between natural or human induced hazards and vulnerability capable condition is regarded as Risk.

$$\text{Risk} = \text{Hazard} \times \text{Vulnerability}$$

$$\text{Disaster Risk} = f(\text{Hazard, Exposure, Vulnerability})$$

where Vulnerability = f (physical, economic, social, environmental, political,..)

$$\text{Risk} = \text{Vulnerability} \times \text{Hazard} - \text{Mitigation}$$

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## 2. Identification of Disaster Risks

### i. Hazards Identification

Hazards	Location
Earthquakes	whole city
Floods	8 places
Landslides	761 places
Typhoons	whole city
Fires	7 places
Drought	whole city

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### ii. Vulnerability / Capacity Identification

#### (a). Physical Vulnerability / Capacity

1. Basic Services (water, telephone, electricity, gas,..)
2. Emergency Facilities (fire brigade, police ambulance)
3. School Building and Health Facilities
4. Building of High Occupancy (theatre, hall, church, mo)
5. Historical Monuments and Assets (museum, library..)
6. Transportation Facilities (railway, bus route)

#### (b). Social Vulnerability / Capacity

1. Well-being of Individuals
  2. Literacy & Education
  3. Peace and Security
  4. Social Equity
  5. Ethnic Minority
  6. Infants and Ageing People
  7. Disadvantaged and Marginalized Group
  8. Disabled & Handicapped
  9. Public Health
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(c). Economic Vulnerability / Capacity

1. Economic Status of Individuals
2. Individual Economic Reserves
3. Level of Debt
4. Degree of access to Credit, Loans & Insurance
5. Degree of Economic Diversification
6. Access to Critical and Basic Socio-Eco. Infras.
7. Situation of Agriculture Production

(d). Environmental Vulnerability / Capacity

1. Natural Resource Depletion
2. Resilience within Ecological Systems
3. Exposure to Hazardous Pollutants
4. Biodiversity
5. Water Scarcity
6. Wild Land Fires
7. Desertification

3. Risk Assessment

I. Hazard Assessment

Hazards	Location	Probability	Intensity	Impact
Earthquakes	whole city	high	medium	medium
Floods	8 places	high	„	„
Landslides	761places	„	„	low
Typhoons	whole city	„	high	medium
Fires	7 places	low	medium	low
Drought	whole city	high	high	„

Establishment of Priorities

Hazards	Priorities
Earthquakes	1 <sup>st</sup>
Floods	2 <sup>nd</sup>
Landslides	3 <sup>rd</sup>
Typhoons	4 <sup>th</sup>
Drought	5 <sup>th</sup>
The Acceptable Level of Risks	high

ii. Vulnerability / Capacity Assessment (VCA)

(a). Physical Infrastructure Vulnerability/Capacity Ass. (ph. VCA)

Physical Factors	Assessment (Capacity)
Basic Services (Lifelines)	high
Emergency Facilities	»
School Building & Health Facility	»
Buildings of High Occupancy	»
Historical Monument	»
Transportation Facilities	»

(b). Social Vulnerability / Capacity Assessment (soc. VCA).

Social Factors	Assessment (Capacity)
Well-being of Individuals	high
Literacy & Education	„
Peace and Security	„
Social Equity	„
Ethnic Minority	no
Infants and Ageing People	low
Disadvantaged and Marginalized Group	no
Disabled & Handicapped People	low
Public Health	high

(c). Economic Vulnerability / Capacity Assessment (eco. VCA)

Economic Factors	Assessment (capacity)
Economic Status of Individuals	high
Individual Economic reserves	„
Levels of Debt	low
Degree of Access to Credit, Loans & Insurance	high
Degree of Economic Diversification	„
Access to Critical and Basic Socio-Eco. Infrast.	„
Situation of Agricultural Production	„

(d). Environmental Vulnerability / Capacity (env VCA)

Environmental Factors	Assessment (Capacity)
Natural Resource Depletion	low
Resilience within Ecological Systems	high
Exposure to Hazardous Pollutants	low
Maintenance of Biodiversity	high
Water Scarcity	low
Wild Land Fires	„
Desertification	„

Vulnerability / Capacity Analysis

show high level capacity to fight against disasters – vulnerability of physical, social, economic and environmental conditions has decreased – The Socio-Economic and Gender Analysis shows effective change agents rather than beneficiaries only – equipped with sufficient knowledge of disasters and material to fight against them – impact of disasters very low.

## VII. Disaster Risk Reduction Measures

### 1. Disaster Prevention (Precautionary Measures)

#### i. Hazard Prevention (How hazards can be removed or avoided)

- (a). Earthquake: “Earth is alive, moving and changing”
- (b). Floods: plantation in the flood prone areas – implementation of land use planning.
- (c). Landslides: plantation in landslide threatened areas – construction of erosion control dams.
- (d). Typhoons: forest establishment and conservation – construction of tidal walls
- (e). Fires: management of awareness programs – regular monitoring of dangerous materials and fire prone zones
- (f). Drought: conservation of natural resources – preparation of reservoirs (drinking& irrigation)

#### ii. Vulnerability Reduction Measures (Prevention)

##### 1. Physical Infrastructures

Earthquakes: anti-seismic design buildings and infrastructure – retrofitting of vulnerable buildings and infsr.

Floods: acquiring, demolishing and relocating critical facility – construction of flood proofing buildings and infsr.

Landslides: plantation and conservation of forest in landslide areas – construction of retaining walls

Fires: regular management of fire awareness – proper inspection of new building constructions.

Typhoons: improvement and retrofitting of critical facility to resist wind related disasters – installation of storm shutters and up gradation of roofs.

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## 2. Social Vulnerability / Capacity (Prevention)

- Earthquakes: to impart anti-seismic awareness knowledge – to retrofit or dismantle the vulnerable houses
  - Floods: to provide the knowledge of flood prevention and awareness programs – to predict heavy rainfall for all.
  - Landslides: to remove public houses, institutions, health centers from landslide areas – to warn infants ageing and disabled to have access to landslide threatened areas
  - Fires: regular inspection of fire prone settlement – removal of dangerous materials from social settlement areas
  - Drought: construction of reservoirs – protection of natural water resources
  - Typhoons: awareness raising programs for elders – construction of hurricane walls
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## 3. Economic Vulnerability / Capacity (Prevention)

- Earthquakes: proper site selection for economic infrastructure retrofitting of industrial and business centers and financial institutions.
  - Floods: establishment of industries, business complexes, financial institutions in non-flooding areas – constructions of basins, dykes, barriers, flood walls, sabo or earth dams, flood
  - Landslides: protection of forests in and around landslide prone areas – prohibition of constructing eco. infr in landslide threatened areas
  - Fires: provision of sufficient fire protection measures in economic infrastructures – prohibition of economic in the fire prone zones.
  - Typhoons: improvement and retrofitting of buildings to resist wind, storm shutters and upgrading roofs.
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#### 4. Environmental Vulnerability / Capacity

- Earthquakes: protection of natural resources & biodiversity
  - Floods: preservation of forests and afforestation in flood prone areas – diversion of floods to non-natural resource site
  - Landslides: conservation of forests and afforestation in bare land – identification of landslide prone areas and their protection
  - Fires: protection of forests constructing fire lines – construction of fire break zones for environmental sites protection
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#### 2. Disaster Risk Mitigation Measures (making less severe, moderate)

##### Hazard Mitigation

- management of workshops, seminars, training & bus tours
- development of video tapes, pamphlets, posters, etc.
- television and radio programs on disaster mitigation
- disaster and environmental topic in School Curriculum
- system of 'town watching' program

##### Vulnerability Mitigation

- preparation of risk vulnerability mitigation plans and land improvement plans
  - development of land zoning plan and building codes
  - conducting engineering studies and designing of critical facility
  - vulnerability mitigation incentives
  - technical assistance to resolve hazard risk issues
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### 3. Plans and Programs for Disaster Risk Reduction

#### (a). Plans and Projects

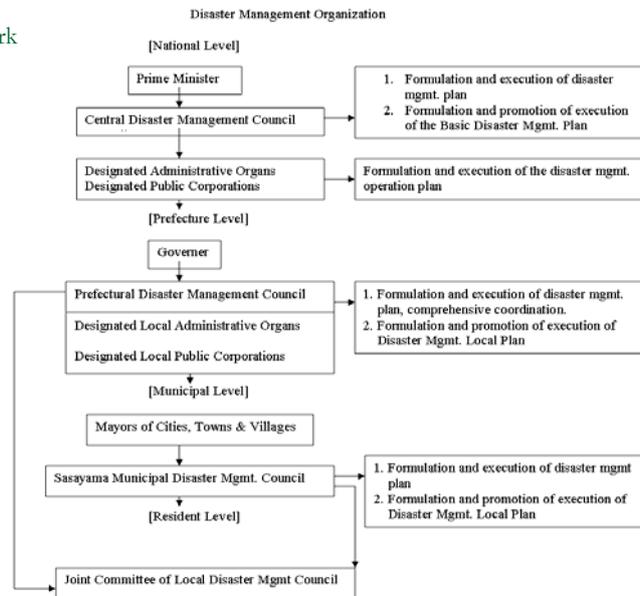
- i. The Basic Disaster Management Plan
- ii. The Disaster Management Operation Plan
- iii. The Local Disaster Management Plan
- iv. River Flood Control Project
- v. Land Use Planning

#### (b). Programs

- i. National Land Conservation
- ii. Public Awareness Raising Programs
- iii. Local Voluntary Disaster Management Organization
- iv. Disaster Management Drills
- v. Self Defense Community Organizations for Na. Dis.
- Vi. Education & Training
- vii. Information Management.

### viii. Risk Reduction Management (Institutional Capacity

#### 1. Institutional Framework



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### Municipality's Responsibilities for Disaster Risk Reduction

- i. to protect the area of city, the life and limb of its people, residents and their property from disasters.
- ii. to prepare and promote implementation of local disaster management plan

#### 2. Administrative Decisions

#### 3. Policy development

#### 4. Operation Skills

#### 5. Responsibilities

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### IX. Existing Acts & Laws on Disaster Risk Reduction

1. Disaster Countermeasures Basic Act, 1961.
  2. The Sabo Law, 1987.
  3. Landslide Prevention Law, 1958
  4. Sediment Related Disaster Prevention Law, 2000
  5. Flood Control Act, 2001.
  6. Sediment Disaster Management Countermeasures for Sediment Disaster Prone Areas Act
  7. Fire Laws (Fire Service Orgn. Law, 1947 & Fire Service Law)
  8. Large Scale Earthquake Countermeasures Act, 1976
  9. Law on the Prevention of Disasters in Petroleum Industrial Complex, 1975
  10. Laws Regulating Building Design: Building Standard Law,1950, Registered Architect Law,1950 & Industry Law,1949
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## X. Findings and Recommendations

1. Disaster risk identification as a first prerequisite for Disaster Risk Reduction Management System
2. Implementation of Land use Planning has made the city possible to adjust increasing population, migration, demand for settlements without aggravating the disaster situation.
3. Provision of providing hazard maps to residents, library resources and disaster data access through print and computer media.
4. Provision of vulnerability mitigation incentives such as loans, subsidies and grant programs.
5. Management of technical assistance for resolving hazard risk issues and reduction measures
6. Preparation and implementation of vulnerability reduction plans for disaster risk reduction
7. Formulation of Disaster Countermeasures Basic Act with plans for disaster risk reduction – Basic, Operation and Local Plans.
8. Designation of public awareness day and week: 1<sup>st</sup> Sept – “Disaster Management Day”, 30<sup>th</sup> Aug to 5<sup>th</sup> Sept – “Disaster Management Week” and 17<sup>th</sup> Jan – “ Disaster Management and Volunteer Day

9. Local Voluntary Disaster Management organizations with local people participation for immediate help and rescue in emergency and raising consciousness and awareness among people about disasters.
10. Self Defense Community Organization for Natural Disaster for handling disaster activities in the community under the initiation of the government.
11. National Land Conservation program a prerequisite for disaster risk reduction in a community for protecting land, lives and property from disasters.
12. Disaster Countermeasures Basic Act has made the Municipal Government responsible for discharging the primary responsibilities of disaster countermeasures.
13. The Basic Act has assigned the residents the responsibility of contributing to the cause of disaster prevention by taking their own measures to prepare for disaster and participating in Voluntary Disaster Prevention Group.

14. The Municipal Government enjoys the full-fledged power to formulate and implement the disaster prevention plans to protect its own areas of the city, according to the Act.
15. City Disaster Prevention Council with the authority to formulate Area Disaster Prevention Plan for the city and renew and revise the plan every year if it deems necessary.
16. Establishment of Fire Fighting Unit in Municipality
17. Provision of requests / recommendations by the chairman of LDPC or the representative of Joint Committee of LDPC for effective and accurate implementation of designated area disaster prevention plans.
18. Formulation of Sabo Law, Landslide Law, Fire Law, Building Standard Law and other many disaster specific laws

#### For Continuous Response

1. Weather forecasting (accurate and timely) has a significant role in reducing hydro meteorological disaster risk reduction.
2. Management of workshops and seminars for government officials and employees of private business and the general public, and “disaster bus tours” to politicians and the decision makers for the effective plans and policies.
3. Organization of community groups and conducting team building exercises for disaster risk reduction
4. Management of ‘Town Watching’ programs and workshops for neighborhood blocs and organizations
5. Management of ‘Fire Prevention Week’ twice a year in March (1-7) and in November (9-15) just before spring and winter seasons and provision of special fire fighting drills on 26<sup>th</sup> Jan. every year.

6. Disaster Reduction Leaders' Training course in the weekend to foster community leaders' knowledge about disasters and making at least one leader in every 30- 50 households

### Action Plan for Recommendations

#### For Immediate Response

SN	Proposed Activities	Implementing Agency	Supporting Agency	Time Frame.
1	Disaster risk identification and assessment	Related ministries and Departments	Cabinet, NPC	Dec. 2005
2	Formation of land use planning law	Ministry of Land Reforms and Mgmt.	Ministry of Law and Justice; Cabinet	Dec. 2006
3	Preparation of hazard maps and publicity	Ministry of Home Affairs and related ministries	Cabinet, NPC	Dec.2005
4	Vulnerability mitigation incentives	„	„	„
5	Hazard risk technical assistance unit	„	Ministry of Finance	„
6	Preparation of vulnerability reduction plans	„	Cabinet, NPC	„

7	Formulation of disaster countermeasure act.	„	Ministry of Law and Justice; NPC	Dec, 2006
8	Designation of public awareness day and weeks	Ministry of Home Affairs	Cabinet	Dec. 2005
9	Formation of local voluntary organization groups	„	Cabinet; Law and Justice	Dec. 2005
10	Formation of Self Defense Community Organization	„	„	Dec. 2005
11	Formulation of Land Conservation Act	Ministry of Land Reforms and Mgmt.	Cabinet; Ministry of Law and Justice	Dec. 2006
12	Making municipality responsible for primary disaster countermeasures	Ministry of Home Affairs	„	Dec. 2005
13	Management of residents' responsibility for disaster countermeasures	„	„	„

14	Delegation of power to Municipality for disaster prevention plans	„	„	„
15	Establishment of Fire Fighting Unit in Municipality	Ministry of Home Affairs	Cabinet; Ministry of Law and Justice	Dec. 2005
16	Designated area Disaster Prevention Plans on Request	„	„	„
17	Formulation of Sabo Law, Landslide Law, Fire Laws, Building Standard Laws	„	„	Dec. 2006

For Continuous Response

1	Weather Forecasting (accurate and timely)	Ministry of Water Resources	Meteorological Department	Continuou s
2	Management of Workshops, Seminars for Government and private employees and public community groups	Ministry of Home Affairs	Cabinet; Related Ministries	„
3	Team Building Exercises	„	„	„
4	Town Watching Program	„	„	„
5	Fire Drills and Educational Activities	„	„	„
6	Disaster Reduction Leaders' Training Course	„	„	„
7	Fire Prevention Week and Special Fire Fighting Drills	„	„	„

Asian Disaster Reduction Center and Visiting Research Program

The establishment of ADRC as a hub of regional cooperation in Asia is a landmark in the history of Disaster Reduction. Most of the South Asian countries are poor and the burden of disaster impacts fall on these countries because disaster impacts are severe on poverty. So, considering this situation, ADRC has initiated a stupendous task of disaster reduction in this region – the only way left to survive the disaster impacts. To achieve the goal, ADRC has launched, inter alia, VR Program.

ADRC's attempt to achieve some of its goals by creating the network of VRs in member countries is a practical and far-sighted attempt which is useful to ADRC as well as member countries. The most important problem that we have been facing in our country is lack of human resource of disaster reduction management which is being fulfilled, to some extent, by VR Program. It has provided opportunity to learn disaster related issues and challenges in the region thereby enhancing the knowledge of disaster risk reduction.

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Contd.

Further, VR Program is an effective tool for collecting disaster information from member countries. They should be further enhanced and mobilized properly to establish strong relationship between ADRC and the member countries. In my opinion, VR should be given investigative and intensive type of research works.

As a VR, I got chance to enhance my knowledge of disasters at this organization and will try to continue it in my country too. During my stay, I got homely environment which made my stay abroad easy and comfortable. I appreciate you all ADRC's staffs for your continuous, dependable, altruistic and justifiable cooperation extended to me.

I am grateful to you all and will remain grateful for ever. In fact, this has been a part and parcel of my life.

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