

**NATIONAL DISASTER MANAGEMENT  
AGENCY (BNPB)**

**THE STUDY  
ON  
NATURAL DISASTER MANAGEMENT  
IN  
INDONESIA  
  
FINAL REPORT**

**VOLUME 2:**

**MAIN REPORT**

**VOLUME 2-4: KABUPATEN PADANG PARIAMAN  
REGIONAL DISASTER MANAGEMENT PLAN**

**MARCH 2009**

**JAPAN INTERNATIONAL COOPERATION AGENCY**

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**ORIENTAL CONSULTANTS CO., LTD.  
ASIAN DISASTER REDUCTION CENTER**

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# KABUPATEN PADANG PARIAMAN REGIONAL DISASTER MANAGEMENT PLAN

## PART 1 EARTHQUAKE DISASTER MEASURES



**March 2009**



**SATLAK PENANGANAN BENCANA  
KABUPATEN PADANG PARIAMAN**

*In cooperation with*



**JICA STUDY TEAM**

Oriental Consultants Co., Ltd.  
Asian Disaster Reduction Center

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# **Section 1: GENERAL**

## **(Basic Concept of the Plan)**

### ***CHAPTER 1. ELEMENTS COVERED IN THE PLAN***

#### **1.1 Objective of the Plan**

SATLAK PB Kabupaten Padang Pariaman collaborated with JICA Study Team to prepare this Kabupaten Padang Pariaman Regional Disaster Management Plan based on Law No.24 year 2007 regarding Disaster Management enacted on 29th of April, 2007. This plan clearly mentions whole picture of disaster management in chronological order, consists of Measures in Disaster Mitigation, Preparedness, Emergency Response, Rehabilitation and Reconstruction. This plan aims to implement emergency response activity based on pre-prepared comprehensive plan, reduce damages and save residents lives and their assets, as well as maintaining social order and public welfare from disaster.

#### **1.2 Interrelations among National Disaster Management Plan, and Regional Disaster Management Plan**

This plan is interrelate with National Disaster Management Plan prepared by BNPB, and Provincial Regional Disaster Management Plan which will be formulated in near future.

#### **1.3 Revision of the Plan**

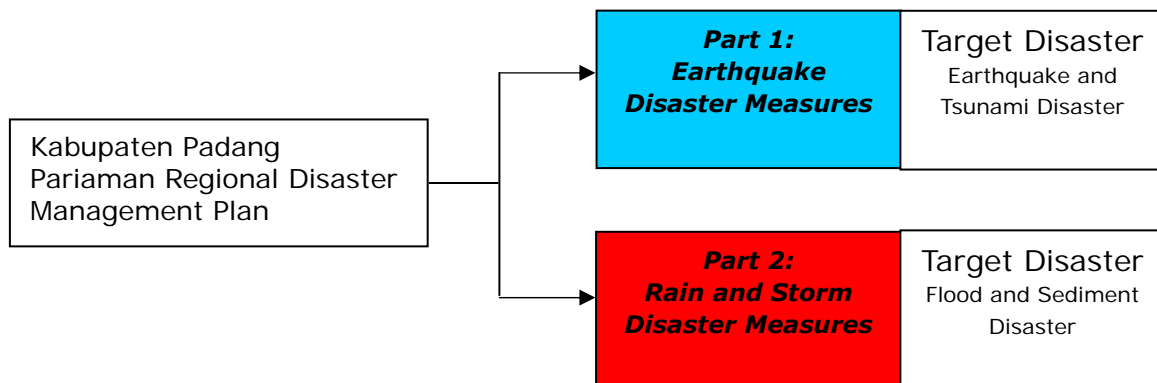
This plan is revised periodically and/or when required to keep efficiency of disaster management. In every revision, SATKORLAK PB should carefully investigate the contents of draft version of revised regional disaster management plan to keep the interrelations with disaster management plan in other area and in higher level.

## **CHAPTER 2.    STRUCTURE OF THE PLAN**

### **2.1    Structure of the Plan**

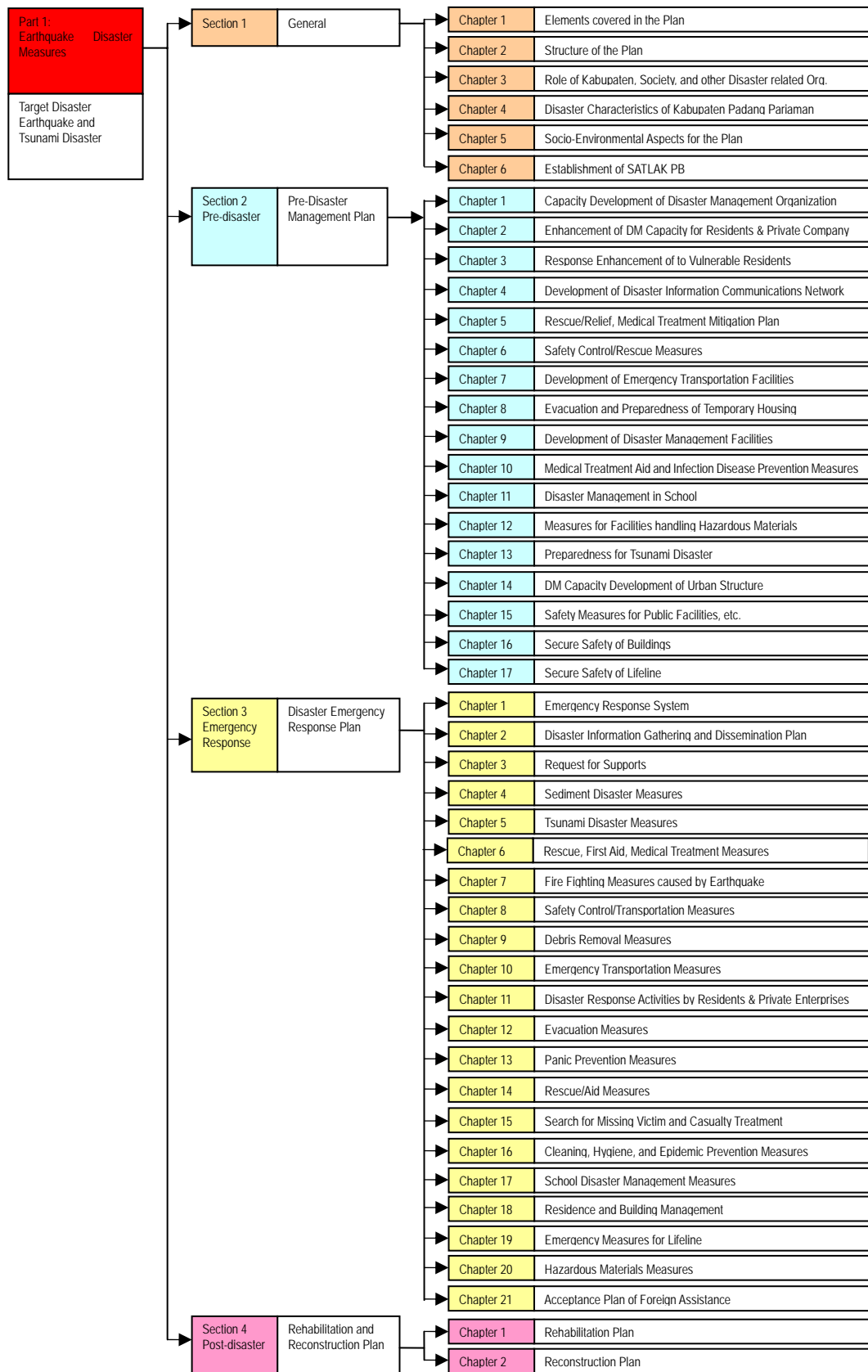
#### **1)    Composition of the Plan**

This plan is formulated as a basic plan to dealt with possible disasters in Kabupaten Padang Pariaman, and it composed of “Part 1: Earthquake Disaster Measures”, and “Part 2: Rain and Storm Disaster Measures”. This part of the plan contains “Part 1: Earthquake Disaster Measures”.



## 2) Contents of the Plan (Part 1: Earthquake Disaster Measures)

Contents of “Earthquake Disaster Measures” are as follows;





## **CHAPTER 3. ROLE OF KABUPATEN, SOCIETY, AND OTHER DISASTER RELATED ORGANIZATIONS**

Kabupaten Government and disaster management related organizations have obligations to prevent occurrence of disaster, or mitigate damage, and for securing resident's life, and their assets.

### **3.1 Obligations of Kabupaten Padang Pariaman in Disaster Management**

The Disaster management and refugee handling at local region through following actions/implementations:

1. Bupati as Unit Administrator Chief of the disaster management and refugee handling (SATLAK PB) is responsible for coordinating, leading, and controlling, the regional structural and non-structural activities in implementing disaster management and refugee handling in Kabupaten/Kota area before, during, and after disaster and evacuation.
2. Camat as Operational Unit Chief of the disaster management and refugee handling (Unit Ops PBP) is responsible for coordinating the sub-regional structural and non-structural activity in implementation before, during, and after disaster and evacuation in Kecamatan areas.
3. Wali Nagari as Hanship/Linmas Unit Chief is responsible to coordinate and control the Nagari activity in implementation of disaster management and refugee handling before, during, and after disaster and evacuation in Nagari areas.

### **3.2 Obligations of Disaster Management related Organizations**

Disaster management related organizations have obligation to support and help activity to mitigate damage by prompt action and with close coordination with Kabupaten Padang Pariaman in case of disaster occurrence.

## **CHAPTER 4. DISASTER CHARACTERISTICS IN KABUPATEN PADANG PARIAMAN**

Kabupaten Padang Pariaman is an area surrounded by other regencies and Indonesian Ocean, with boundaries as follows:

- North : Kabupaten Agam
- East : Kabupaten Agam and Tanah Datar
- South : Kabupaten Solok and Kota Padang
- West : Kota Pariaman and Indonesian Ocean

Administratively, Kabupaten Padang Pariaman are divided into 17 (seventeen) Kecamatan and 46 (forty-six) nagari.

The area of Kabupaten Padang Pariaman is about 1,386 km<sup>2</sup>, comprises with 17 (seventeen) Kecamatan and 46 (forty-six) Nagari. The widest Kecamatan is Kecamatan 2X11 Kayu Tanam which is 228.70 km<sup>2</sup> wide, while the smallest Kecamatan is Kecamatan Sintuk Toboh Gadang of 25.56 km<sup>2</sup>. Total amount of the population is 384,718 people, comprises with 183,926 males and 200,792 females. Kecamatan Batang Anai has the greatest number of population which is 43,620 people, while the least number of populations is in Kecamatan Padang Sago which is only 8,177 people.

### **4.1 Natural Conditions**

Padang Pariaman has an agriculture field of 24,091 hectares wide which can produce rice as much as 256,960.29 tons, so there is an increased 0.98 % compared to last year production. For *palawija* plants (crops planted as 2d crop in dry season) only increased 0.47% for the productions of cassava, sweet potato, soybean, green bean, peanut, string bean, eggplant, cucumber, red pepper and water spinach.

Plantation commodities also experience increased, such as rubber, areca nut, coconut, cinnamon, coffee and nutmeg. There are also more plantation crops with no production, such as clove, kapok, patchouli, sugar palm and sago palm.

Moreover, there are some other agriculture sectors, such as fishery and animal husbandry which are experiencing production fluctuation at this moment. While there are no crops from the forests since all forests in Kabupaten Padang Pariaman are protected forests.

For the industrial sector in Padang Pariaman there are few industries which are hoped would still be able to absorb enough labors in formal as well as in informal industries, such as metal, engines, chemistry and embroidery industries.

For mining sector, Kabupaten Padang Pariaman has a significant potential to increase the Regional Original Income, however, it has not yet been utilized optimally, such as *obsidian*, *andesit*, iron ore and *sirtu*.

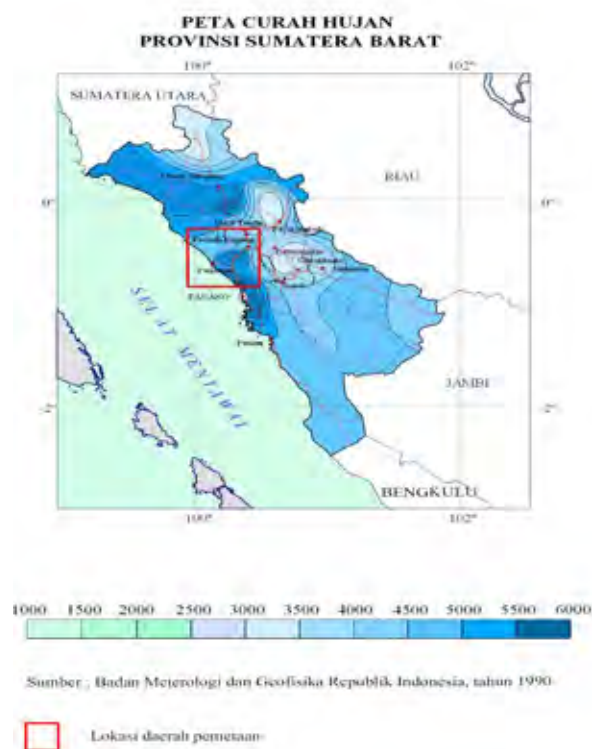
#### 4.1.1 Climate

The geographic rainfall zone based on the Indonesian Rainfall Map (Department of Communication, Institute of Meteorology and Geophysics, Vol. II, 1990), is divided into 7 yearly average rainfall zones (Figure 4.1.1). According to the regional mapping of Kabupaten Padang Pariaman, the highest rainfall is in the eastern side which belongs to Zone VI with the range of rainfall between 4000-4500 mm/year. Meanwhile, the lowest rainfall belongs to Zone I which located in the western coast with range of rainfall between 1500-2000 mm/year.

Zone I	: 1,500 – 2,000 mm
Zone II	: 2,000 – 2,500 mm
Zone III	: 2,500 – 3,000 mm
Zone IV	: 3,500 – 4,000 mm
Zone V	: 4,000 – 5,000 mm
Zone VI	: 5,000 – 6,000 mm
Zone VII	: 6,000 – 7,000 mm

Total average rainfall for Kabupaten Padang Pariaman is 338 mm/month with average rain day of 16.5 days per month. The highest rainfall occurs in December about 706.9 mm, while the lowest rainfall occurs in May about 129.2 mm. The average temperature is 25.30°C with relative humidity equivalent to 85.3%.

According to **F.H. Schmidt UMA Ferguson (1975)**, regarding quantitative rainfall evaluation, the size of rainfall to water absorbent into land is shown in Table 4.1.1.



**Figure 4.1.1 Rainfall Map of West Sumatera**

**Tabel 4.1.1 Relationship between Amount of Monthly Rainfall and Water Absorption into Ground Layer**

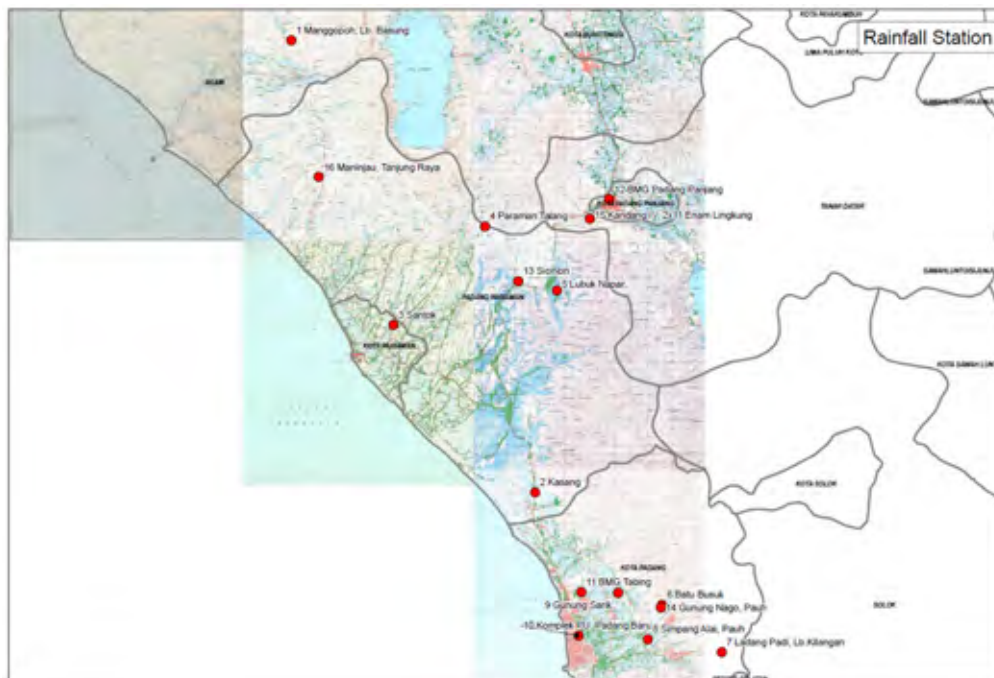
MONTHLY RAINFALL (MM)	POSSIBILITY OF WATER ABSORPTION INTO THE GROUND LAYER
< 60	All vaporized
60 – 100	Only moisted the ground
>100	Absorbable into ground

Rainfall characteristics of Kabupaten Padang Pariaman are as follows. The rainfall data used was collected and organized by PSDA (Dinas Pengelolaan Sumber Daya Air (Water Resource Management Agency)) from the following organizations:

- BMG : Badan Meteorologi dan Geofisika (Meteorological and Geo-physical Agency)
- PLN : Perusahaan Listrik Negara (National Electricity Company)
- DPU : Dinas Pekerjaan Umum (Public Works Department)
- Kimpraswil : Pemukiman Prasarana Wilayah (Region Settlements and Infrastructures)
- Dep Pertanian Irigasi (Agriculture and Irrigation Department)

**Table 4.1.2 Rain Gauge Stations and Annual Rainfall**

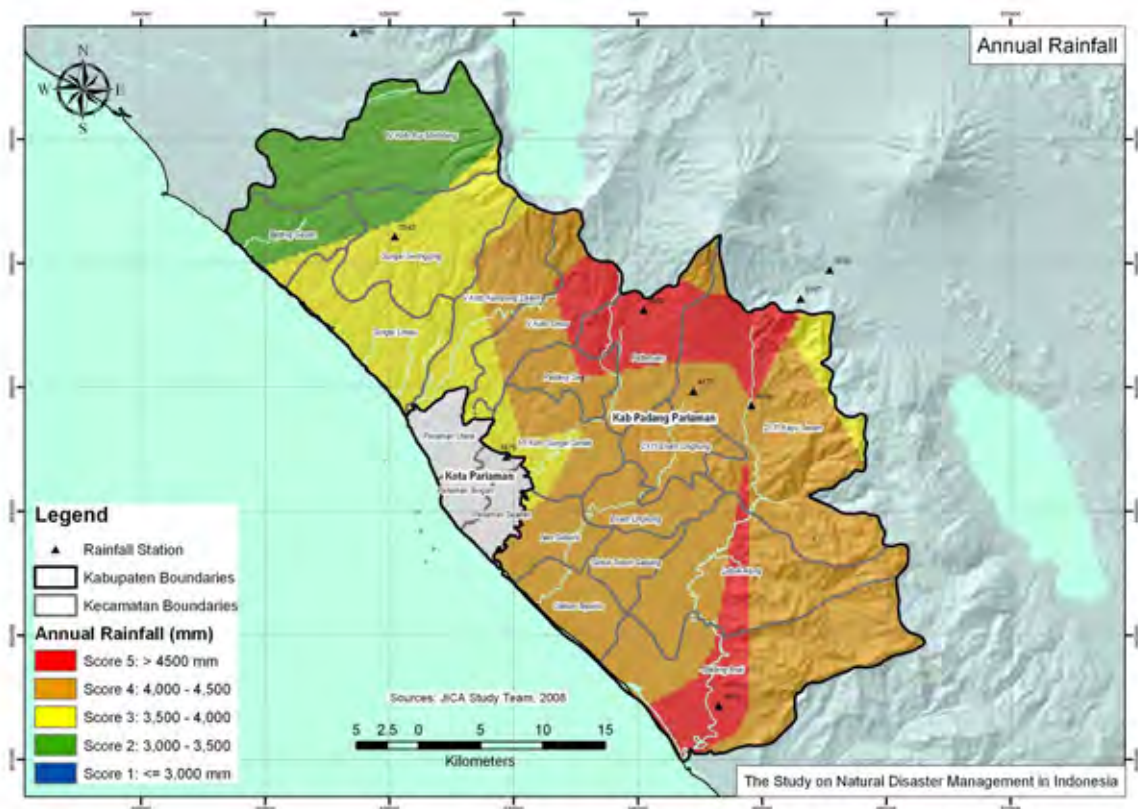
No.	Name of Station	Southern Latitude (LS)	Eastern Longitude (BT)	River Basin	Kabupaten	Administrator	MEAN	Observation Period
1	Manggopoh, Lb. Basung	00° 17' 02" LS	100° 03' 10" BT	Batang Antokan	Agam	DFU Kab.	2922.4	25
2	Kasang	00° 46' 30" LS	100° 19' 00" BT	Batang Anai	Padang Pariaman	Kimpraswil	4574.9	27
3	Santok	00° 35' 35" LS	100° 09' 46" BT	Batang Pariaman	Padang Pariaman	Dep Pertanian	3875.9	29
4	Pariaman Telang	00° 29' 10" LS	100° 15' 45" BT	Batang Mangau	Padang Pariaman	Kimpraswil	5062.4	23
5	Lubuk Naper	00° 33' 20" LS	100° 20' 35" BT	Batang Anai	Padang Pariaman	PSDA/Kimpraswil	4489.4	29
6	Batu Susuk	00° 53' 50" LS	100° 27' 15" BT	Batang Kuranji	Padang Pariaman	PSDA/Kimpraswil	3876.3	29
7	Ladang Padi, Lb. Kilangan	00° 56' 55" LS	100° 31' 08" BT	Batang Arau	Padang	PSDA/Kimpraswil	4113.1	31
8	Simpang Alai, Pauh	00° 56' 04" LS	100° 26' 30" BT	Batang Kuranji	Padang	PSDA/Kimpraswil	4024.2	31
9	Gunung Sarik	00° 53' 03" LS	100° 24' 24" BT	Batang Air Dingin	Padang	PSDA/Kimpraswil	4110.6	31
10	Komplek PU, Padang Baru	00° 55' 50" LS	100° 21' 50" BT	Batang Arau	Padang	PSDA/Kimpraswil	3459.5	20
11	BMG Tabing	00° 53' LS	100° 22' BT	Stg. Kuranji	Padang	BMG	4199.9	32
12	BMG Padang Panjang	00° 27' 24.6" LS	100° 23' 49.2" BT	Stg. Anai	Padang Panjang	BMG	3516.4	31
13	Sicincin	00° 32' 44" LS	100° 17' 54" BT	Stg. Anai	Padang Pariaman	BMG	4178.0	20
14	Gunung Nago, Pauh	00° 54' 00" LS	100° 27' 30" BT	Batang Kuranji	Kodya Padang	Kimpraswil	4087.9	19
15	Randang IV, 2x11 Enam Lingkung	00° 28' 40" LS	100° 22' 38" BT	Batang Anai	Padang Pariaman	Dep Pertanian	5167.6	23
16	Maninjau, Tanjung Raya	00° 25' 57" LS	100° 04' 57" BT	Batang Antokan	Agam	PSB	3542.8	22



**Figure 4.1.2 Rain Gauge Station Map**

Distribution map of annual average rainfall of Kabupaten Padang Pariaman was created using the annual average rainfall data from all stations. The result is shown in Figure 4.1.3.

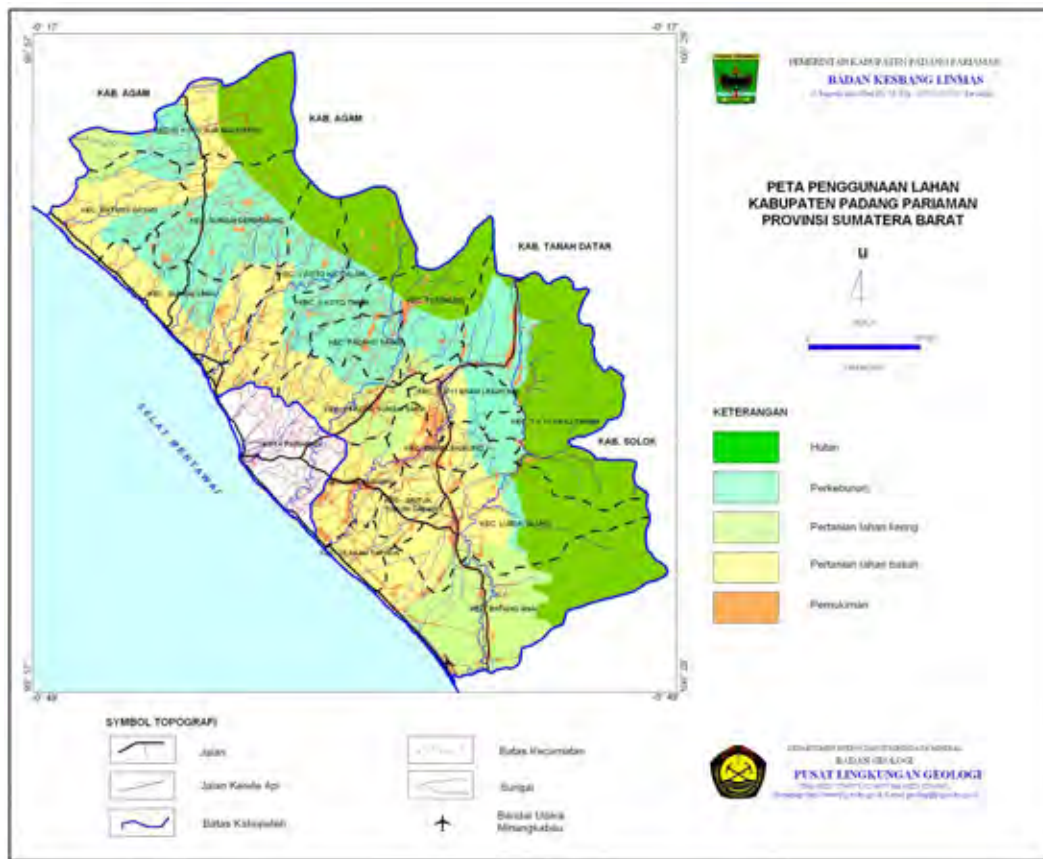
The result shows that the distribution of annual average rainfall is between 3,000 mm/year - 5,000 mm/year. The north side of Kabupaten Padang Pariaman receives comparatively small precipitation.



**Figure 4.1.3 Annual Average Rainfall Distribution Map of Kabupaten Padang Pariaman**

### 4.1.2 Land Use Arrangement

Land use of the mapping areas based on the Land Use Map of Kabupaten Padang Pariaman generally can be grouped in to 5 (five) groups, they are forest, plantation, dry land agriculture, wet land agriculture and villages (Figure 4.1.4).



Source: Badan Kesbang dan Linmas, 2007

**Figure 4.1.4 Land use Map of Kabupaten Padang Pariaman**

#### 4.1.2.1 Forest

Land use of forest in the mapping regions are generally protected forests which can be seen in the eastern part of Kecamatan IV Koto Aur Malintang, Sungai Geringging, V Koto Kp. Dalam, V Koto Timur, Patamuan, 2X11 Kayu Tanam, Lubuk Alung and Batang Anai. The dissemination of the land arrangement is quite wide, especially in the high topography and occupied region as wide as 422.32 km<sup>2</sup> or 30.47% of total width of the mapping areas.

#### 4.1.2.2 Plantation

This plantation land use has spreading in the entire mapping regions as wide as 356.40 km<sup>2</sup> or 25.71% from total width of all mapping regions. The spread of these plantation areas mainly occupy middle part of Kecamatan IV Koto Aur Malintang, northern and southern part of Gasan, almost all area in western part of Sungai Geringging. It also occupies western part of V Koto Kp. Dalam, middle part of V Koto Timur, southern part of Patamuan, almost all area of Sago, western

part of 2X11 Kayu Tanam, eastern part of 2X11 Enam Lingkung, small part in eastern area of Enam Lingkung, northern part of Lubuk Alung, and western and eastern part of Sungai Limau.

#### **4.1.2.3 Dry Land Agriculture**

Land use of dry land agriculture has spread in all of the mapping regions as wide as 162.55 km<sup>2</sup> or 11.73% from total width of the entire mapping regions. The spread of this dry land agriculture mainly occupies western part of Kecamatan IV Koto Aur Malintang, eastern part of VII Koto Sungai Sarik, northern part of Enam Lingkung, northern part of Nan Sabaris and southern part of Batang Anai.

#### **4.1.2.4 Wet Land Agriculture**

This land use of wet land agriculture has spread in all of the mapping regions as wide as 382.81 km<sup>2</sup> or 27.62% from total width of mapping regions. The spread of this wet land agriculture mainly occupies middle part of Kecamatan IV Koto Aur Malintang, western part of Batang Gasan, western and eastern part of Sungai Limau, western part of V Koto Kp. Dalam, southern part of V Koto Timur. It also occupies western part of VII Koto Sungai Sarik, western part of 2X11 Enam Lingkung, middle part of Enam Lingkung, almost all area in western part of Nan Sabaris, almost all area of Ulakan Tapakis and Sintuk Toboh Gadang, western part of Lubuk Alung, and north western part of Batang Anai.

#### **4.1.2.5 Villages**

Villages are spread in random in the entire Kecamatan in mapping regions as wide as 61.92 km<sup>2</sup> or 4.47% from width of the entire mapping regions. Generally, these villages occupy the roadside areas, either arterial roads or quarter roads. There are many residents live in simple houses and permanent houses with dense to rare distribution.

### **4.1.3 Morphology**

In broad outline, the regional morphology of Kabupaten Padang Pariaman can be divided into some units, where each unit has different characteristic and appearance, from the shape of the mountains, range of hills, slope declivity and the current pattern. The different shape of this nature landscape is generally caused by different types of rocks, geological structure, rocks endurance towards geodynamics and closing vegetation process. The height of the regions has a variation from 0 – 1425 meters above the sea surface. The highest mountains are Bt. Parmato (1425m), Bt. Kalang (1314m), Mountain Tanjung Erot (1292m), Bt. Barangin (428m) and Mountain Limau Hantu (172m). The lowest height is 0 meter, located along the west coastline.



### **4.1.3.1 Waters Condition**

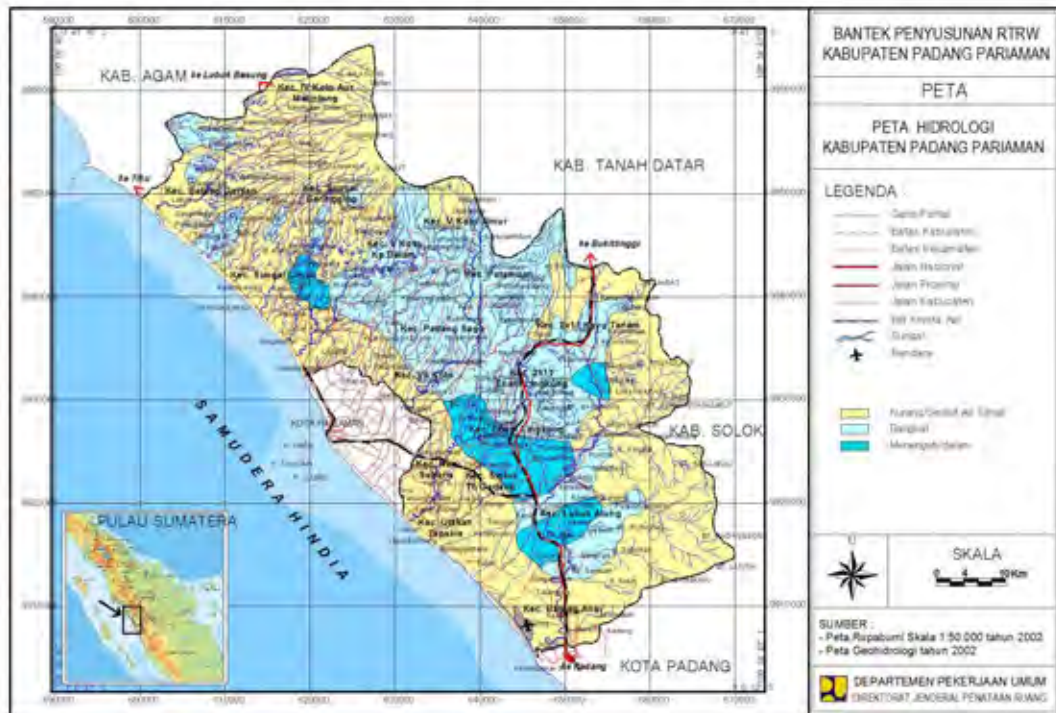
#### **4.1.3.1.1 Surface Water**

The river stream pattern determined based on interpretation from topographic map scale 1:50.000. From the interpretation result, river stream pattern in Padang Pariaman area are generally dendritic. Upstream valleys of big rivers are generally still in young stage (with the shape of letter “V”), while downstream valleys has already shown some changing to the adult stage (with the shape of latter “U”). It is indicated by these rivers, i.e., Batang Limau, Batang Anai, Batang Naras, Batang Ulakan, Batang Gasan, Batang Tapakis, Batang Mangau and other rivers. It is understandable that horizontal erosion is more intensive than the vertical erosion. Therefore, from the shape of the valley we can determine that erosion stadium in Padang Pariaman area is young towards adult. Rivers in this region are generally “intermittent” rivers, which means that those rivers have water in rainy season and almost dry in dry season. Waters condition of the mapping regions can be separated into 2 (two), i.e., surface water condition and under surface water condition.

#### **4.1.3.1.2 Under Surface Water Condition**

Under surface water condition was shaped by ground water which reflected by the existence of community wells. Condition of the community wells in Padang Pariaman generally has variation of depth between 2 – 5 meters. Depth of water surface at the wells will descend in dry season. Land area which bordered on the west coast of Sumatera Island has depth of ground water surface between 1.5 – 2.0 meter. In slope morphology area or valley area, which is in the middle part of Padang Pariaman, the depth of ground water surface is 2 – 5 meter. In hillside or mountainous areas, the depth of ground water surface is between 7 to more than 12 meters, constitute of free ground water and it’s stream follows the slope declivity.

There are many springs appear in the hillside areas as water resources with debit of more than 5 liter/second which is used as life needs and livelihood of the community (drinking water and agriculture).



#### 4.1.3.2 Slope Declivity Unit

Based on the slope declivity classification and morphology unit of **Nichols and Edmund, J.R., 1975**, the shape of natural landscape and slope angle of Padang Pariaman area can be divided to 6 (six) morphology units, as seen in Table 4.1.2.

**Tabel 4.1.3 The Slope Declivity and Morphology Units**

SHAPE OF FIELD	SLOPE DECLIVITY		MORPHOLOGY UNIT
	(%)	(°)	
Flat	0 – 5	0 - 3	Plain/ Level Land
Slope Slightly	5 – 15	3 - 9	Refine Relief Hills
Rather Steep	15 – 30	9 – 17	Moderate Relief Hills
Steep	30 – 50	17 – 27	Rather Coarse Relief Hills
Very Steep	50 – 70	27 – 36	Coarse Relief Hills
Erect/ Vertical	> 70	36 – 90	Very Coarse Relief Hills

##### 4.1.3.2.1 Palin/ Land

Land in Kabupaten Padang Pariaman composes of alluvial plain, rivers, swamps, and beach with field slope declivity between 0 – 5% (0 - 3°), regional height between 5 – 80 meters above sea level. This unit dissemination covers the northern, western and southern part of Padang Pariaman, which are at the western part of Kecamatan Koto Aur Malintang, Sungai Geringging, V Koto

Timur, Batang Gasan, Sungai Limau, Patamuan, 2X11 Kayu Tanam, Lubuk Alung and Batang Anai. These units occupy the mapping regions as wide as 300.97 km<sup>2</sup> or 21.72%.

#### **4.1.3.2.2 Refine Relief Hills**

This morphology unit has the shape of refine relief surface with field slope declivity of 5 – 15% (3 – 9°), regional height between 80 – 125 meters above sea level. Areas included in this morphology unit have a very low erosion level.

Dissemination of this unit still covers the northern, western and southern part of Padang Pariaman, which are the western to middle part of Kecamatan Koto Aur Malintang, Sungai Geringging, V Koto Timur, Batang Gasan, Sungai Limau, Patamuan, 2X11 Kayu Tanam, Lubuk Alung and Batang Anai. This unit occupies the mapping regions as wide as 75.04 km<sup>2</sup> or 5.41%.

#### **4.1.3.2.3 Moderate Relief Hills**

This morphology unit has the shape of moderate relief surface with field slope declivity of 15 – 30% (9 - 17°), regional height of 110 – 170 meters above sea level. Areas included in this morphology unit have a low to average erosion level. Dissemination of this unit is in the eastern and western part of Kecamatan Koto Aur Malintang, northern and middle part of Sungai Geringging, northern and middle part of V Koto Timur. It is also in eastern and western part of Batang Gasan, middle part of Sungai Limau, northern part of Patamuan, some northern, middle and southern part of 2X11 Kayu Tanam, middle part of Lubuk Alung, southern and some northwestern part of Batang Anai. This unit occupies the mapping regions as wide as 260.02 km<sup>2</sup> or 18.76%.

#### **4.1.3.2.4 Rather Coarse Relief Hills**

This morphology unit has the shape of rather coarse relief hills with slope declivity of 30 – 50% (17 - 27°), regional height is 170 – 750 meters above sea level. Areas included in this morphology unit have a moderate erosion level. Dissemination of this unit is still around the eastern and middle part of Kecamatan Koto Aur Malintang, northern and middle part of Sungai Geringging, northern and middle part of V Koto Timur and V Koto Kp.Dalam. It is also in eastern and western part of Batang Gasan, middle part of Sungai Limau, northern part of Patamuan, some northern, middle and southern part of 2X11 Kayu Tanam, middle part of Lubuk Alung, southern and some northwestern part of Batang Anai. This unit occupies the mapping regions as wide as 288.99 km<sup>2</sup> or 20.85%.

#### **4.1.3.2.5 Coarse Relief Hills**

This morphology unit has the shape of coarse relief surface with slope declivity of 50 – 70% (27 - 36°), regional height of 400 – 1200 meters above sea level. Areas included in this morphology

unit have a moderate to high erosion level. Dissemination of this unit is in the eastern part of Kecamatan Koto Aur Malintang, western part of Sungai Geringging, northern part of V Koto Timur and V Koto Kp.Dalam, eastern part of Batang Gasan, northern and some eastern part of 2X11 Kayu Tanam, southeastern part of Lubuk Alung and eastern part of Batang Anai. This unit occupies the mapping regions as wide as 145.44 km<sup>2</sup> or 10.49%.

#### **4.1.3.2.6 Very Coarse Relief Hills**

This morphology unit has the shape of very coarse relief surface with slope slightly more than 70° (36 - 90°), regional height of 500 – 1300 meters above sea level. Areas included in this morphology unit have a moderate to high erosion level. Dissemination of this unit is in the eastern part of Kecamatan Koto Aur Malintang, western part of Sungai Geringging, northern part of V Koto Timur, and V Koto Kp.Dalam, northern and some eastern part of 2X11 Kayu Tanam, southeastern part of Lubuk Alung and eastern part of Batang Anai. This unit occupies the mapping regions as wide as 315.56 km<sup>2</sup> or 22.77%.

#### **4.1.3.3 Rocks and Soil**

Identification and grouping of rocks unit in Padang Pariaman is based on the geological Map of **Padang** sheet with the scale of 1:250.000, which composed by **Kastowo dkk, 1996**. While, description of physical characteristics of rocks and corrosion soil is based on *megaskopis* observation results in the field.

According to geological map of Padang sheet, the rock unit in the mapping regions can be grouped in to 10 (ten) units with stratigraphy sequence from young to old.

##### **4.1.3.3.1 Alluvium (Qal)**

It composed of silt, sand and gravel. Generally exist at coastal land, including swamp sediment in the southeastern part of Padang, Padang Pariaman until west coast of Lubuk Alung. In those areas, there are some *tufa* pumice remainders. Silt, colored of blackness brown, soft characteristic, medium-high plasticity, while sand and gravel are liberated, with thickness between 1,00 – 2,50 m. The dissemination is wide, exist in the western part of Padang Pariaman, Ulakan Tapakis, Lubuk Alung and Batang Anai, occupies as wide as 330.11 km<sup>2</sup> or 23.82% of total width of the mapping regions.

##### **4.1.3.3.2 Hypersten hornblende pumice tufa (Qhpt)**

Almost all consist of pumice *tufa* layer, the measurement of the ground line is ranging from 2 – 10cm, contain 3 – 10% *hornblende*, *hypersthenes* and/or *biotit*, with slightly unified character. White or grayish yellow color on fresh rocks and brownish color on moldy rocks. Corrosion of

these rocks in the form of clayish silt, with deep brown color, have characteristics from loose to rather firm, average plasticity, and thickness between 1.50 – 2.75m.

physical characteristics based on the laboratory analysis are specific weight ( $G_s$ ) = 2.517 g/cm<sup>3</sup>, original volume weight ( $\gamma$ ) = 1.153g/cm<sup>3</sup>, dry volume weight ( $\gamma_d$ ) = 0.443/cm<sup>3</sup>, saturated volume weight ( $\gamma_s$ ) = 1.261/cm<sup>3</sup>, cohesion ( $c$ ) = 0.129 kg<sup>2</sup> and angle of interior displacement ( $\phi$ ) = 16.52<sup>0</sup>.

The dissemination of this unit can only be found at center to northern part of the mapping regions, existed around the V Koto Timur and V Koto Kp.Dalam, occupies as wide as 90.21 km<sup>2</sup> or 6.51% of total of the entire mapping regions.

#### **4.1.3.3.3 Pumice Tufa and Andesit (basal), (Qpt).**

Generally compose with glass fibers and 5 to 80% of white pumice fragment, have 1–20cm diameter with slightly unified characteristic. It is comprised with sand layer which is rich of small quartz, gravel and *berangkal* quartz, also fire mountain rocks and limestone.

Corrosion of this rocks unit is in the form of silt clay, have auburn color, with moldy to firm characteristic, average plasticity, thickness between 2.00 – 3.50m. Corrosion of this pumice *tufa* is used for good brick and road constructions because it is easy to plow and enough glued so that it forms steep walls.

Physical characteristics based on laboratory analysis are: Specific weight ( $G_s$ ) = 2.666, original volume weight ( $\gamma$ ) = 1.683g/cm<sup>3</sup>, arid volume weight ( $\gamma_d$ ) = 1.177g/cm<sup>3</sup>, saturated volume weight ( $\gamma_s$ ) = 1.735g/cm<sup>3</sup>, cohesion ( $c$ ) = 0.173kg/cm<sup>2</sup> and angle of inside displacement ( $\phi$ ) = 15.92<sup>0</sup>.

Dissemination of this rock unit existed in the center to northern part of the mapping regions, which are Batang Gasan, Sungai Limau, Sungai Geringging and IV Koto Aur Malintang, occupy as wide as 387.29 km<sup>2</sup> or 23.794% of the total width of the entire mapping regions.

#### **4.1.3.3.4 Andesite from Lake Maninjau Caldera (Qamj).**

In form of andesite rock which formed on the entire walls of Lake Maninjau Caldera, with dark gray color, solid state and unified. Dissemination of this rock unit is scattered around Lake Maninjau hills, formed a longitudinal caldera which shows a long period of eruption, when displacement of big Sumatera right lateral fault occurred. Corrosion of this rock unit is silt clay, auburn color, with loose to rather firm characteristic, low plasticity, and thickness between 1.50 until 3.00m.

Physical characteristics based on laboratory analysis are: Specific weight ( $G_s$ ) = 2.568, original volume weight ( $\gamma$ ) = 1.247g/cm<sup>3</sup>, arid volume weight ( $\gamma_d$ ) = 0.666g/cm<sup>3</sup>, saturated volume weight ( $\gamma_s$ ) = 1.407g/cm<sup>3</sup> cohesion ( $c$ ) = 0.127kg/cm<sup>2</sup> and angle of inside displacement ( $\phi$ ) = 16.28<sup>0</sup>.

This rock unit can be found in areas around hills which surrounding Danau Maninjau, IV Koto Aur Malintang, V Koto Timur, V Koto Kp. Dalam, Tanjung Erot hill which occupies as wide as 207.12 km<sup>2</sup> or 14.94% of total width of the entire mapping regions.

#### **4.1.3.3.5 Andesite from Singgalang and Tandikat Mountain (Qast)**

Andesite, brownish gray, solid state, unified, with andesite composition, wide firming structure, sometimes easily tears through its strapping.

Corrosion of this rock unit is silt sand, rust colored, coarse average grains, high permeability, high shaft, contain much quartz, glass, rugged size, with thickness between 0.50 until 1.00m.

Physical characteristics based on laboratory analysis are: Specific weight (Gs) = 2.610, original volume weight ( $\gamma$ ) = 1.843g/cm<sup>3</sup>, arid volume weight ( $\gamma_d$ ) = 1.488g/cm<sup>2</sup>, saturated volume height ( $\gamma_s$ ) = 1.918g/cm<sup>3</sup>, cohesion (c) = 0.218kg/cm<sup>2</sup> and angle of inside displacement ( $\phi$ ) = 13.91<sup>0</sup>

This rock unit existed in area around below part of Tandikat mountain slope, around Malibu Anai which occupies as wide as 82.26km<sup>2</sup> or 5.93% of total width of the entire mapping regions.

#### **4.1.3.3.6 Unexplained Currents (Qtau)**

Compose with lava sediment, *fanglomerat* and other *kolovium* sediments. Andesite, brownish gray, in moldy condition, with medium hardness, lava reaction, the fragment consists of andesite frozen rock at random with gravel to boulder size, float on *ufa*, basis period with thickness more than 3 meter.

The above rock had decayed strongly in form of clay sand, brown, soft – firm, high permeability, medium-high plasticity, gravel tuf with thickness between 1,50-2,50 meter.

Physical characteristic based on laboratory analysis are: Specific weight (Gs) = 2.516, original volume weight ( $\gamma$ ) = 1.493g/cm<sup>3</sup>, arid volume weight ( $\gamma_d$ ) = 1.930g/cm<sup>3</sup>, saturated volume weight ( $\gamma_s$ ) = 1.560g/cm<sup>3</sup>, cohesion (c) = 0.170 kg/cm<sup>2</sup> and angle of inside displacement ( $\phi$ ) = 12.38<sup>0</sup>

This rock unit can be found in the surrounding areas of below part of Tandikat mountain slope, around Malibu Anai which occupies as wide as 142.92 km<sup>2</sup> or 10.31% of total width of the mapping regions.

#### **4.1.3.3.7 Crystalline Tufa (QTI)**

This unit formed by *tuf* rock which already become crystalline, with brownish gray color, solid and unified. Dissemination is in the eastern and southern part of Lubuk Alung and occupies about 6% of the mapping regions. Corrosion of this unit is silt clay, auburn color, soft-firm consistency, high plasticity, thickness of 1.75 – 2.50m. Above rock occupy as wide as 22.82 km<sup>2</sup> or 1.65% of total width of the mapping regions.

#### 4.1.3.3.8 Granite Rocks (Tmgr)

This unit was formed by granite rock with brownish gray color, solid and unified. Its spread are located in southern part of Kayu Tanam, occupies the areas as wide as 37.15 km<sup>2</sup> or 2.68% of total width of the mapping regions.

Corrosion is a silt sand, with yellowish brown color, refine – average grains, similar, liberated – relatively solid and the thickness is between 1.75 – 3.50m.

Physical characteristics based on laboratory analysis are: Specific weight (Gs) = 2.504, original volume weight ( $\gamma$ ) = 1.326 g/cm<sup>3</sup>, arid volume weight ( $\gamma_d$ ) 1.036g/cm<sup>3</sup>, saturated volume weight ( $\gamma_s$ ) = 1.622 g/cm<sup>3</sup>, cohesion (c) = 0.124 kg/cm<sup>2</sup> and angle of inside displacement ( $\phi$ ) = 30.09<sup>0</sup>

#### 4.1.3.3.9 Jura Sediment Rocks (Ja)

In the form of quartz, splinter, silt, and slate attain the age of *jura*, with white color, gray, reddish solid, hard, and splinter. Spread of this rock unit only in the south eastern part of the mapping regions, which are in the northern, western and southern part of kayu Tanam and occupy about 70.28 or 5.07% of total width of the mapping regions.

#### 4.1.3.3.10 Perm Limestone (Pt)

In the form of limestone attain the age of *perm*, with white color, gray, reddish, solid, hollow, consists of slate, *phillit* and splinter. Spread of this stone unit only existed in the south eastern part of the mapping regions, which are in the northern, western and southern part of Kayu Tanam and occupies 15.85 km or about 11.14% of the mapping regions.

Geomorphologic Map legend and results are given in Table 4.1.4 and Figure 4.1.5.

**Table 4.1.4 Geomorphologic Map Legend of Kabupaten Padang Pariaman**

Landform Group	Landform type	State of landform
Lowland	Artificial land	Distribute mainly, at Minang Kabau International Airport
	Sand bar, Beach ridge and Sand dune	High place along the coast
	Coastal plain	The plain along the coast
	Meander belt	Flood plain with clear meander trace
	Alluvial fan	Flat lowland from mountain area to the coast consist of fluvial deposits
	Valley plain	Flat lowland in the valley
	Flood plain	Flat lowland by sequential floods
	Back marsh	Marsh behind the river channel
Terrace	River terrace	Fluvial terrace

Volcano	Tandikat volcano	Tandikat volcano
	Low relief hill	Low relief hills formed by Maninjau Caldera eruption. Because of the fine materials, many small valleys are developed.
	Pyroclastic flow upland	Pyroclastic flow upland formed by Maninjau Caldera eruption. Flat surface remains more than low relief hills .
	Old Maninjau volcano	Old Maninjau volcano slope
Mountain	Talus	The landform produced by slope failure debris
	Lithic tuff (QTt)	Mountain slope with Lithic tuff
	Andesite (Qtp)	Mountain slope with Andesite
	Miocene granite (Tmgr)	Mountain slope with Miocene granite
	Quartzite member of Permian (Pq)	Mountain slope with Quartzite member of Permian
	Undifferentiated rock (QTau)	Mountain slope with undifferentiated rock
Additional landform	Fault and lineament	Active faults and suspicious landform
	Slope failure	Old slope failure

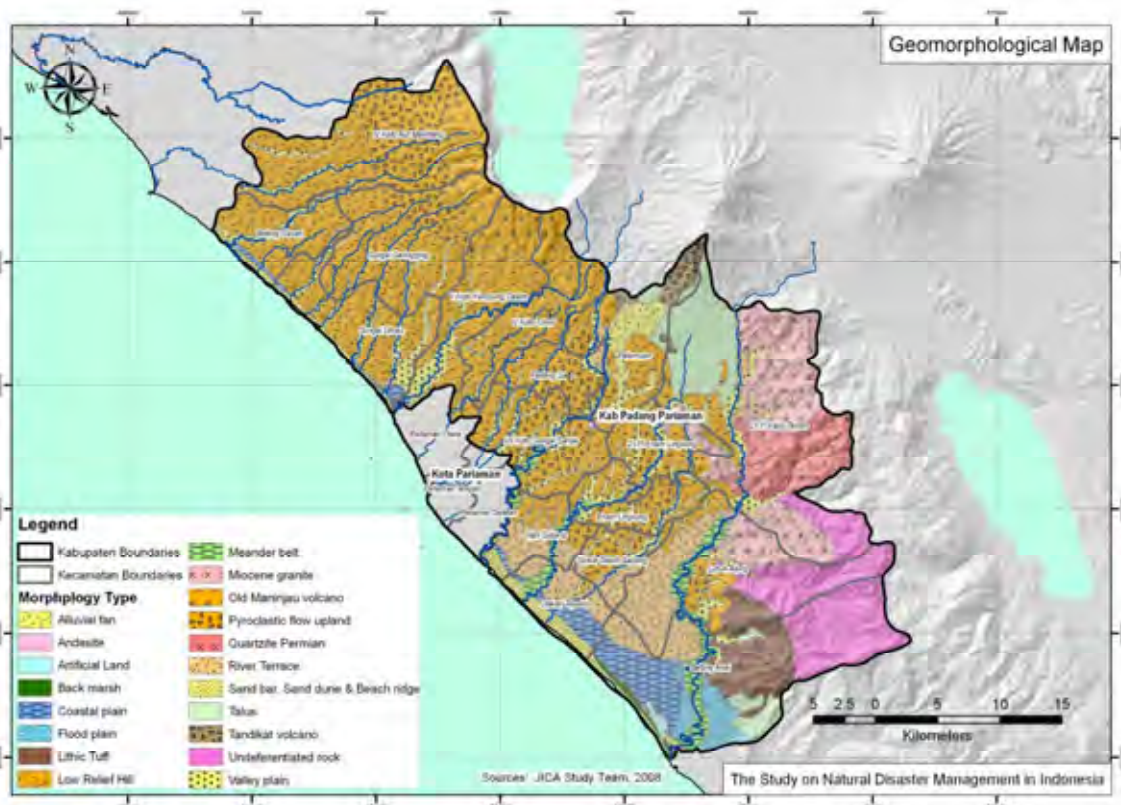


Figure 4.1.5 Geomorphologic Map of Kabupaten Padang Pariaman



#### 4.1.3.4 Geology Structure

Structure that existed in the mapping regions is in the form of fault structure which generally occupies exist in northern and eastern part of the mapping regions.

Fault structure is in the form of fault with directions north-western – south eastern and southwestern – north-western. Stone unit which hit by the fault are *hipersten hornblenda pumice Tuf (Qhpt)*, pumice *tuf* and andesite (*Qpt*) and andesite from Danau Maninjau caldera (*Qamj*).

Fault zone area could form weak area, because generally the stones have already experienced fractures and firming, which caused unstable area so in the area around fault zone often occurs ground movement.



Figure 4.1.6 Ground Condition Map

#### 4.1.3.5 Earthquake

Padang Pariaman is included in earthquake prone area, recorded earthquakes in Kabupaten Padang Pariaman areas are in Nagari Malalak, Kecamatan IV Koto, occurred at 23 January 2003, 3 February 2003, 16 February 2004, 22 February 2004, 4 October 2004 and 28 January 2007. Based on: *Beca Carter Holling and Ferner, Ltd, 1975*, this tectonic earthquake occurred with the



## 4.2 Social Conditions

### 4.2.1 Population

Information about population is an important consideration in disaster management. The main source of population data for Kabupaten Padang Pariaman is the Badan Pusat Statistic (BPS, Statistic Center Agency). The BPS conducted a survey in 2005. The following are population data at nagari level received from BPS Padang Pariaman office.

**Table 4.2.1 Population and Household Dissemination by Kecamatan for Year 2006**

NO	KECAMATAN	POPULATION			HOUSEHOLD
		MALE	FEMALE	TOTAL	
1	Batang Anai	21,555	22,065	43,620	8,313
2	Lubuk Alung	20,245	20,127	40,372	7,713
3	Sintuk Toboh Gadang	7,648	8,679	16,327	3,578
4	Ulakan Tapakis	9,201	10,537	19,738	3,849
5	Nan Sabaris	11,720	14,252	25,972	5,194
6	2 x 11 Enam Lingkung	8,329	8,757	17,086	3,763
7	Enam Lingkung	8,932	9,480	18,412	3,847
8	2 x 11 Kayu Tanam	11,980	12,017	23,997	5,108
9	VII Koto	15,180	17,718	32,898	7,128
10	Patamuan	7,325	8,038	15,363	3,461
11	Padang Sago	3,708	4,469	8,177	1,968
12	V Koto Kp. Dalam	10,749	11,750	22,499	4,890
13	V Koto Timur	6,734	7,943	14,677	3,440
14	Sungai Limau	13,645	14,995	28,640	5,372
15	Batang Gasan	5,260	5,834	11,094	2,297
16	Sungai Geringging	12,722	14,187	26,909	6,452
17	IV Koto Aur Malintang	8,993	9,944	18,937	9,123
Total		183,926	200,792	384,718	85,496

Source: (Office of Statistics Center Agency-Padang Pariaman), 2006

Figure 4.2.1 below shows administrative boundaries of Kabupaten Padang Pariaman at Kecamatan and Nagari level in year 1999.



**Figure 4.2.1 Administrative Boundaries**

Figure 4.2.2 shows the gross population density of Kabupaten Padang Pariaman. To know more clearly regarding population density map, Figure 4.2.3 which shows dissemination of net population density. To produce this map, population data was linked to both administrative boundaries and built-up areas map from Bakorsutanal. The map clearly shows that the population is distributed mainly along the main and collector roads from south to north and east of Kabupaten Padang Pariaman. Some of the significant settlements can be found in Kecamatan Lubuk Alung, Batang Anai, Sicincin and Sungai Sariak.

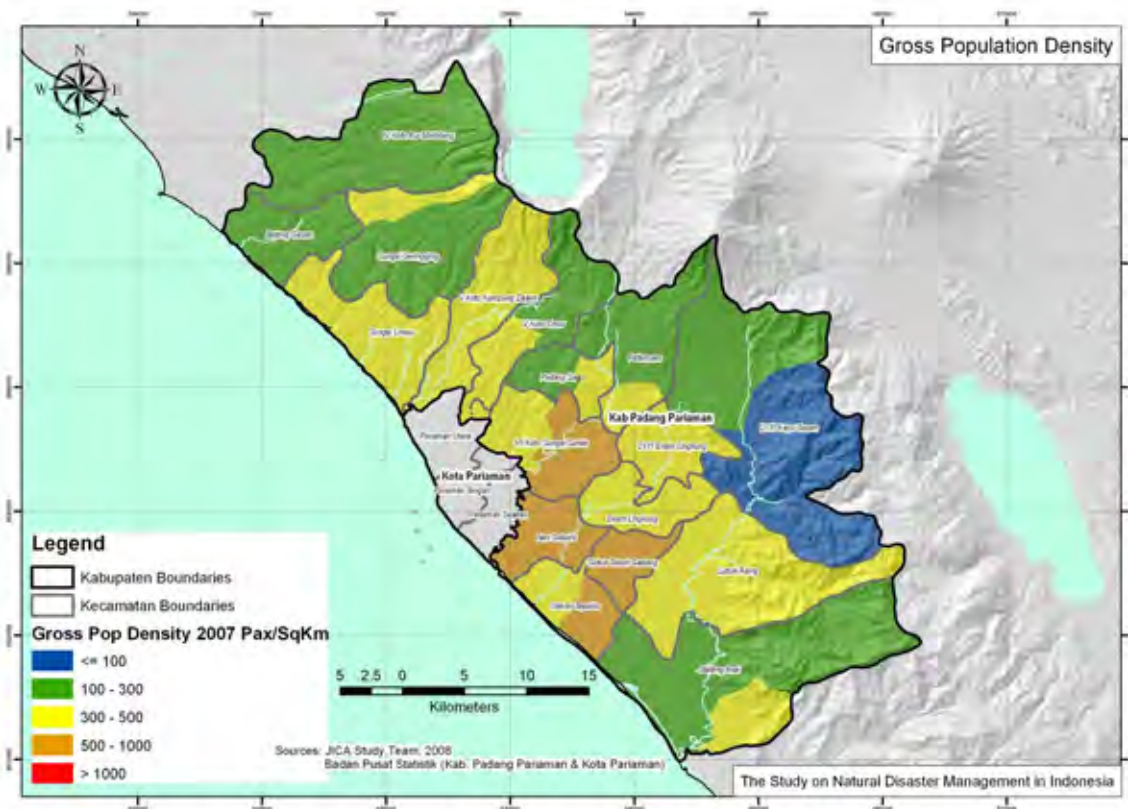
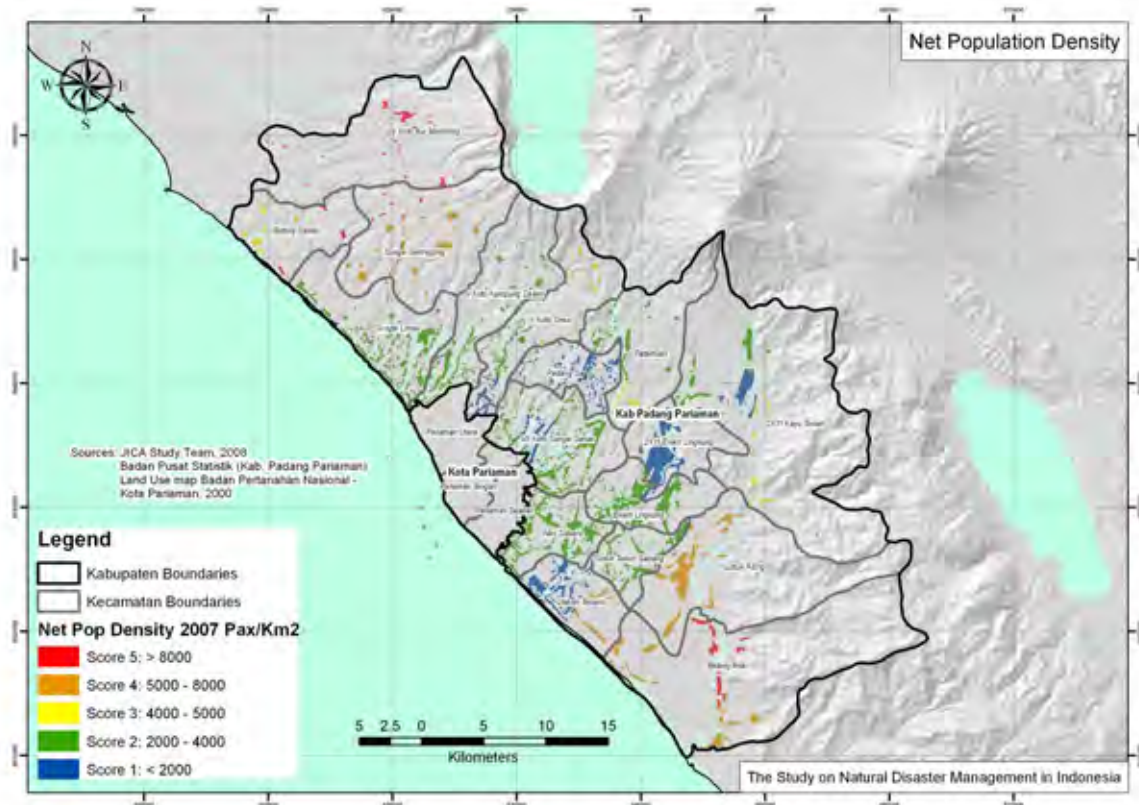


Figure 4.2.2 Gross Population Density of Kabupaten Padang Pariaman



**Figure 4.2.3 Net Population Density of Kabupaten Padang Pariaman**

#### **4.2.1.1 Building Structure**

Information on building structure is another significant consideration in disaster management. For Kabupaten Padang Pariaman, the main source of building inventory data is the Badan Pemberdayaan Masyarakat (BPM, Society Empowerment Board). They conducted building survey in cooperation with Kecamatan and Nagari offices at Kabupaten Padang Pariaman in 2006. The building data collected by Kecamatan is summarized as follows:

**Table 4.2.2** Number of Building and Type by Kecamatan

Kecamatan	Nagari	Total Number	Masonry	Concrete Masonry	Wood	RC	Other
2X11 Enam Lingkung		3,893	1,293	1,560	200	312	528
Enam Lingkung		3,682	727	2,039	294	167	455
IV Koto Aur Malintang		5,609	3,392	1,480	190	357	190
Nan Sabaris		5,194	1,025	2,877	415	236	642
Sintuk Toboh Gadang		3,265	644	1,808	261	148	403
V Koto Kampung Dalam		5,075	-	3,657	913	199	306
2X11 Kayu Tanam	Anduring	1,690	348	1,105	65	76	96
2X11 Kayu Tanam	Guguk	1,193	239	710	120	61	63
2X11 Kayu Tanam	Kayu Tanam	1,329	264	796	133	67	69
2X11 Kayu Tanam	Kepala Hilalang	1,329	266	799	135	68	61
Batang Anai	Kasang	2,548	503	1,411	204	116	315
Batang Anai	Ketaping	2,212	437	1,225	177	100	273
Batang Anai	Sungai Buluh	3,559	702	1,971	284	161	440
Batang Gasan	Gasan Gadang	1,024	328	394	131	37	134
Batang Gasan	Malai V Suku	1,370	259	623	218	47	223
Lubuk Alung	Lubuk Alung	8,131	118	7,418	393	145	57
Padang Sago	Batu Kalang	1,207	589	589	29	-	-
Padang Sago	Koto Baru	873	430	430	6	7	-
Padang Sago	Koto Dalam	1,600	658	658	284	-	-
Patamuan	Sungai Durian	1,663	328	921	133	75	205
Patamuan	Tandikat	2,778	548	1,539	222	126	343
Sungai Geringging	Kuranji Hulu	4,421	1,269	1,629	376	99	1,048
Sungai Geringging	Malai III Koto	1,261	311	391	245	151	163
Sungai Limau	Kuranji Hilir	2,931	-	2,423	228	157	123
Sungai Limau	Pilubang	3,025	-	2,578	190	171	86
Ulakan Tapakis	Tapakis	2,742	541	1,518	219	124	339
Ulakan Tapakis	Ulakan	1,206	238	668	96	55	149
V Koto Timur	Gunung Padang Alai	1,182	233	655	94	54	146
V Koto Timur	Kudu Gantiang	1,129	223	625	90	51	139
V Koto Timur	Limau Purut	624	123	345	50	28	77
VII Koto Sungai Sariak	Balai Aia	848	84	254	42	47	421
VII Koto Sungai Sariak	Lareh Nan Panjang	1,416	142	424	70	69	711
VII Koto Sungai Sariak	Lurah Ampalu	3,036	301	925	182	242	1,386
VII Koto Sungai Sariak	Sei Sarik	1,784	178	535	89	95	887
	<b>Total</b>	<b>84,830</b>	<b>16,741</b>	<b>46,980</b>	<b>6,778</b>	<b>3,848</b>	<b>10,478</b>

Figure 4.2.4 is a thematic map showing building distribution by type for Kabupaten Padang Pariaman. In terms of number, main material building is concrete, followed by bamboo and wood. Definition of concrete in the survey generally refers to structures with walls made of brick and cement. The highest concentration of building structures can be found in Kecamatan Lubuk Alung and VII Koto as supported by their high building density in the table. Spatially, thematic map indicates significant concentrations of concrete buildings also exist in coastal area, such as in Kecamatan Ulakan Tapakis, Sungai Limau and Batang Gasan.

Most number of houses made from bamboo can be found in Kecamatan V Koto Timur, Padang Sago and Patamuan. Bamboo material is generally used by poorer population.

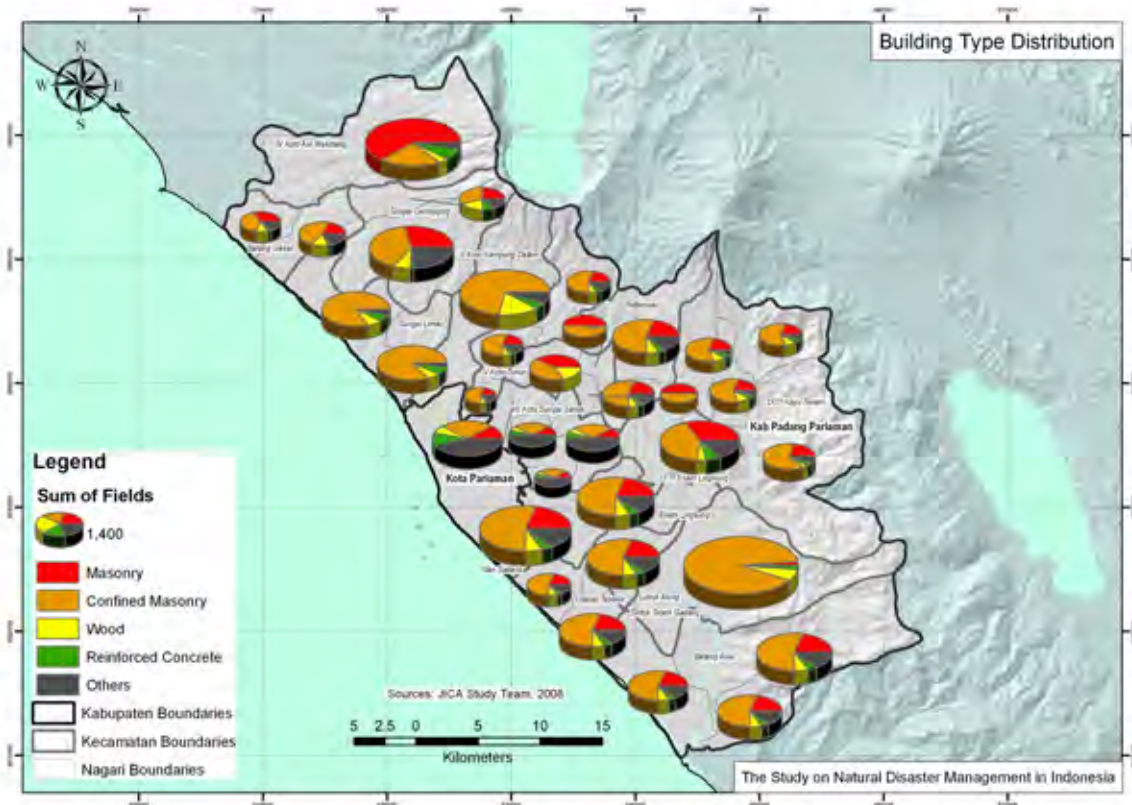


Figure 4.2.4 Building Type Distribution by Kecamatan

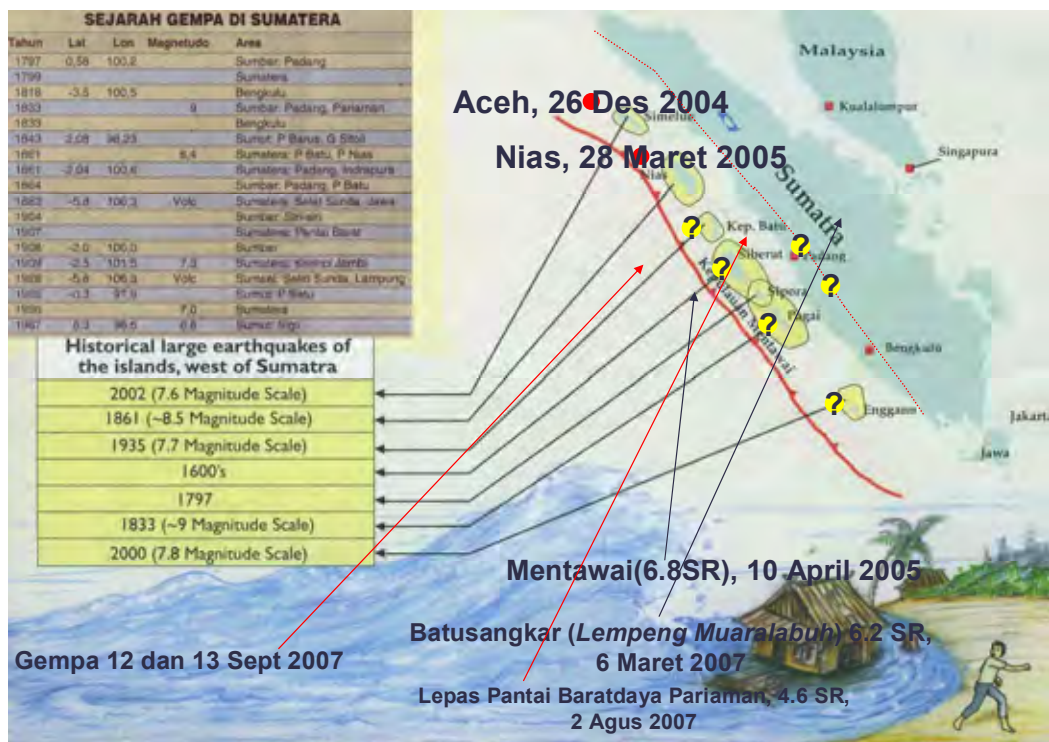


### 4.3 History of Earthquake and Tsunami Disasters

#### 4.3.1 History of Earthquakes in Padang Pariaman

Kabupaten Padang Pariaman is located in the western part of Sumatera Island, specifically in West Sumatera Province with area of 1,328.79 km<sup>2</sup> and length of coastal line of 60.2 km. Geographically, Kabupaten Padang Pariaman located in the position **00°11' – 00°49' South Latitude and 98°6' – 100°28' East Longitude**. Therefore, Padang Pariaman resided in two major lithospheric plates, i.e., Eurasian Plate and Indian-Australian Plate, which are active plate and vulnerable to Earthquake and Tsunami Disaster.

## Sejarah Gempa di Sumatera



Collides of the plates in front of Mentawai is a tectonic earthquake hazard area, there's a Mentawai plate also found in front of Padang which the faults/ fractures can cause an earthquake. In the mainland, West Sumatera divided by Semangko fault and many volcanoes which have the tectonic and vulcanic earthquake potential.

Great earthquakes have happened in West Sumatera which was also felt in Padang Pariama, which was in the year of 1797, 1833, 1861, 1864, 1904, 1926, 1943, 1977, 1995, 2004, 2005 and 2007 which damaged many houses.

Therefore, Padang Pariaman often experiences earthquake shock, both of strong earthquakes which cause damages and small ones. According to the records of BMG (Meteorology and Geophysics Board) Padang Panjang, Kabupaten Padang Pariaman experiences earthquake with above 5.00 SR averagely four (4) times every year. In 2007, there were three (3) earthquakes which caused damages. First one occurred in 6 March 2007 with the intensity of 6.3 SR, which caused building damages of  $\pm$  12,000 units. The others occurred in 12 September 2007 with the intensity of 7.3 SR and in 13 September 2007 with the intensity of 7.7 SR. These two earthquakes caused building damages of  $\pm$  13,000 units.

**Table 4.3.1 List of Damages Caused by Earthquake in 6 March 2007**

<b>4. Bencana Gempa Bumi</b>		
1	Waktu Kejadian	6 Maret 2007
2	Lokasi Kejadian	17 Kecamatan (46 Nagari)
3	Jumlah Korban	3 orang (meninggal) 11 orang (luka-luka)
4	Jumlah Kerusakan	
	1. Rumah Penduduk	12.201 unit
	2. Sarana Pendidikan	160 unit
	3. Sarana Ibadah	168 unit
	4. Sarana kesehatan	33 unit
	5. Perkantoran	75 unit
	6. Pasar	3 pasar
	7. Jalan dan Jembatan	14 ruas/unit
	8. Irigasi	25 unit
5	Perkiraan Kerugian	Rp. 376.820.000.-
6	Penanganan Bencana	<ul style="list-style-type: none"> <li>• Evakuasi Penduduk</li> <li>• Tanggap Darurat</li> <li>• Rehabilitasi dan Rekonstruksi</li> </ul>



**Table 4.3.2 List of Damages Caused by Earthquake in 12-13 September 2007**

**5. Bencana Gempa Bumi**

1	Waktu Kejadian	12-13 September 2007 Dengan kekuatan 7,3 dan 7,9 SR Pusat Gempa Bengkulu dan Sungai Penuh	
2	Lokasi Kejadian	17 Kecamatan (46 Nagari)	
3	Jumlah Korban	-	
4	Jumlah Kerusakan		
	1. Rumah Penduduk	6.979 unit	
	2. Sarana Pendidikan	87 unit	
	3. Sarana Ibadah	127 unit	
	4. Sarana kesehatan	1 unit	
	5. Perkantoran	23 unit	
	6. Pasar	11 unit	
	7. Jalan dan Jembatan	16 ruas/unit	
	8. Irigasi	27 unit	
5	Perkiraan Kerugian	Rp. 376.820.000.-	
6	Penanganan Bencana	<ul style="list-style-type: none"> <li>• Evakuasi Penduduk</li> <li>• Tanggap Darurat</li> <li>• Verifikasi Data</li> </ul>	

### 4.3.2 History of Tsunami Disaster in Kabupaten Padang Pariaman

The huge earthquakes and tsunamis occurred in Sumatera Island in recent years seems to affect the west coast including Kabupaten Padang Pariaman.

There is no any specific note about the total number of victims of tsunami disaster in Kabupaten Padang Pariaman, but from some collected working papers, the adjacent areas like Kota Padang, Mentawai and Aceh suffered of tsunami, as seen in the table below:

a. Earthquake Locations Which Brings Out Tsunami

Tahun	Lokasi>Nama	Magnitude	Keterangan
1797	Siberut/Padang	8.2	ada tsunami
1833	Pagai/Bengkulu	9.0	ada tsunami
1881	Andaman	7.9	Ada tsunami
1881	Andaman	>7.5	Ada tsunami
1861	Padang	8.5	ada tsunami
1907	Simeulue	7.6	Ada tsunami
1935	Pini Island	7.7	Ada tsunami
1941	Andaman	7.7	?
1984	Pulau Pini	7.2	Tdk ada tsunami
2000	Enggano/Bengkulu	7.9	Tdk ada tsunami
2002	Simeulue	7.2	Tdk ada tsunami
2004	Aceh	9.2	Ada Tsunami (besar)
2005	Nias/Sumut	8.7	Ada tsunami (kecil)

Source: Hamzah Latief, 2006.

b. Report of Tsunami History in 1797 and 1833 that stroked Kota Padang (formerly was part of Kabupaten Padang Pariaman region)

114.0 The strongest earthquake in the memory of the people in Padang, happened on February 10, 1797 around 10 p.m. The moon which was full shone brightly but darkened at the first quake and stayed so during the night - the first shock lasted for about one minute - the waves of the sea ran with fury up the river by which the whole place was flooded. Next, all the water ran out the river, which was suddenly dry: this repeated itself three times; the river banks were covered with fish; a sailing ship of 150 tons which was moored to a tree near the mouth of the river, broke loose when the sea entered and was driven to behind the (then fort), a distance of 3/4 Eng. miles; on the way the vessel hit a stone house and two wooden ones which were demolished. Several smaller vessels, which were moored in the river, were also dislodged and moved off by the sea; some of these were later found behind the great pasar, (market in Indonesian storage building in front of the house of the Resident) at the river bank was lifted by the rushing waves and put down in the Chinese kampong - all of Aijermanies (Air Manis, a village name meaning "Sweet Water"), a seaside village at the corner opposite the Padang harbor is flooded and many houses flushed away - the next day one found several of the unfortunate inhabitants dead on the tree branches, where they had climbed to save themselves.

The inhabitants of Padang left their houses and fled to the square outside the city; they saw the ground break open at some places some 3-4 inches wide, and then in further shaking close again.

25.5 Earthquakes are often felt at Padang, but rarely of such intensity that they endanger inhabitants. The most powerful earthquake since many years occurred on November 24, 1833, just after 8 p.m., for about 2 minutes. The air was damp, quiet and humid. In moonlight. The oscillating movement of the earth, together with underground shocks and a rattling sound that clearly came from the S.E., made everybody rush out of their houses and created fear in all. One heard everywhere a hard stomping of "rijstblokken" (rice blocks?) and people yelling. Along the river fissures had opened here and there, which then closed again. The sea had repeatedly run up the sloping beach, up to 10 to 12 "voel" (feet?) high. All wooden houses creaked and shook enormously; but the stone houses tared worse, with damaged walls, some fell over, and some roofs that collapsed. In some houses, furnilure had been thrown from one corner to the other. There was considerable damage but few accidents.

26.0 Only one native and two cows were lost.

**Table 4.3.3 Scenario of Maximum Height of Tsunami and Its Arrival Time to Several Locations**

Location	1833 Scenario 07		1797	
	Maximum height (m)	Arrival Time (minute)	Maximum height (m)	Arrival Time (minute)
Pariaman	1.40	37	3.70	33
Padang Utara	2.20	39	5.20	37
Padang	3.90	42	9.00	38
Teluk Bayur	4.40	39	6.20	37
Painan	2.99	38	4.20	38
Bengkulu (a)	2.50	69	0.80	75
Bengkulu (b)	1.50	66	0.96	72
Manna	1.00	71	1.10	75

**Historical Report = 10-12 feet**

Source: Hamzah Latief, 2006

The list of the huge Earthquake and tsunami in the past generated in Sunda trench in Western offshore of Sumatra which seems to affect the coast of Kabupaten Padang Pariaman is shown in Table 4.3.4.

The tsunami which affected most heavily the coast of Kabupaten Padang Pariaman is the tsunamis in 1797 and 1833 whose sources were located offshore of Kabupaten Padang Pariaman. Though there are no records that the flood damage occurred in Kabupaten Padang Pariaman, there are damage records in Kota Padang. In recent years, the huge tsunamis which caused serious damage in coastal area of Sumatra have come in groups in 2004, 2005, and 2007. These waves reached the coast of Kabupaten Padang Pariaman but didn't damage anything, and a remarkable tsunami have not occurred offshore of Kabupaten Padang Pariaman after the tsunami in 1797 and 1833. Accordingly, the area offshore of Kabupaten Padang Pariaman has attached attention as the area which has the high possibility that the huge earthquake and tsunami will occur in the future. Therefore, the recurrent earthquake and tsunami in 1797 and 1833 is fixed as a Target of tsunami disaster in Kabupaten Padang Pariaman on this plan.

**Table 4.3.4 Tsunami around Sumatra Sea**

No.	YEAR	EPICENTER	MAX RUN-UP HEIGHT(m)	VICTIM (DIED/INJURED)	AREA
1	1797	-	>5	NA	Offshore Padang, Sumatra
2	1833	-	3-4	NA	Offshore Padang, Sumatra
3	1843	-	2	NA	SW Sumatra
4	1861	-	7	1105	Nias Island, NW Sumatra
5	1907	-	2	400	NW Sumatra
6	1935	-	-	NA	Batu Island, NW Sumatra
7	2004	3,298 Lat. N; 95,6 Long.E	34.5	>300.000	NAD, NW Sumatra
8	2005	2,065 Lat. N; 97,01 Long.E	3.5	NA	Nias Island, NW Sumatra
9	2005	2,065 Lat. N; 97,01 Long.E	3.5	NA	Offshore Bengkulu, Sumatra

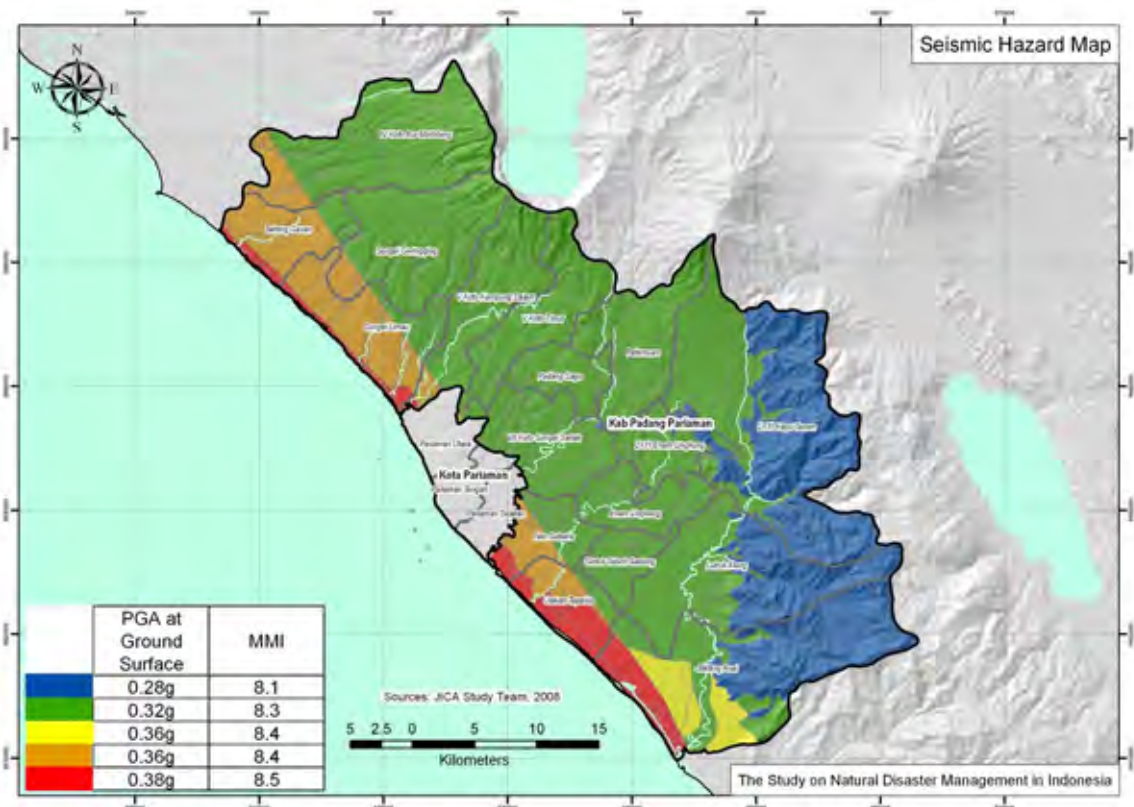
Source: S.Diposaptono, NOAA Tsunami Database, Solov'iev and Go (1975) Tsunami Catalogue:

## 4.4 Earthquake and Tsunami Disaster Hazard

### 1) Earthquake

#### (1) Hazard Map

The meaning of the word “Hazard” is defined as impact of disaster. Therefore, regarding earthquake, only the distribution of the ground surface acceleration intensity must be shown in “Hazard Map”. The estimated value distribution of the ground surface acceleration intensity is shown in Figure 4.4.1. The ground surface acceleration intensity is described using the title of PGA and MMI. Estimated MMI for Kabupaten Padang Pariaman is from 8 between 8 or more in the MMI display.



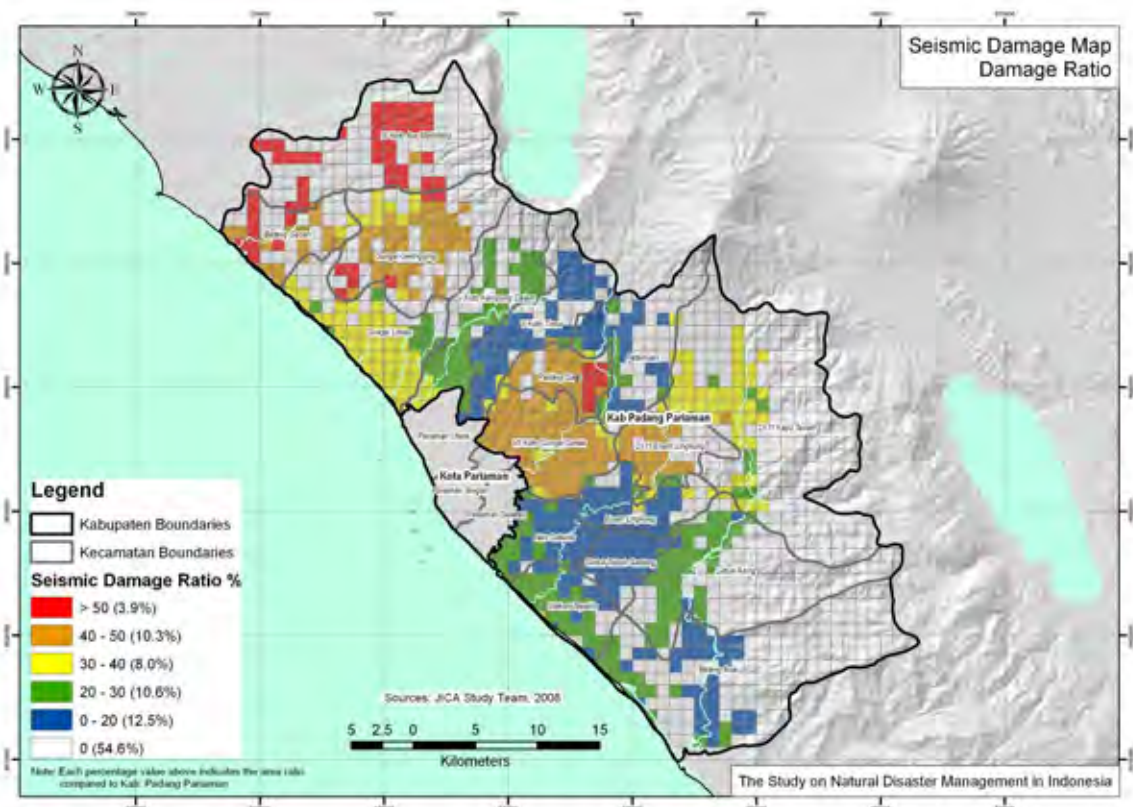
**Figure 4.4.1 Earthquake Hazard Map  
 (Distribution of Ground Surface Acceleration Intensity)**

As shown in the above figure, coastal side (western side of Kabupaten) is more hazardous than mountain area (eastern side of Kabupaten).

## (2) Risk Map

Regarding earthquake, disaster risks is the possibility of destruction that can be analyzed as a synergistic result of earthquake hazard and vulnerability of facility/building. Earthquake hazard, the intensity of surface ground motion, differs according to the location. The vulnerability of the building also differs according to the building type.

Figure 4.4.2 shows the earthquake risk map which indicates ratio of expected number of damaged buildings divided by total number of existing buildings located in each grid of 1km x 1km.



**Figure 4.4.2 Earthquake Risk Map (Ratio of Damaged Buildings)**

As shown in the above figure, earthquake risk is higher in northern area, especially in Kecamatan IV Kota Aur Malintang. Risk is comparatively high in central area such as Kecamatan Padang Sago.



## 2) Tsunami

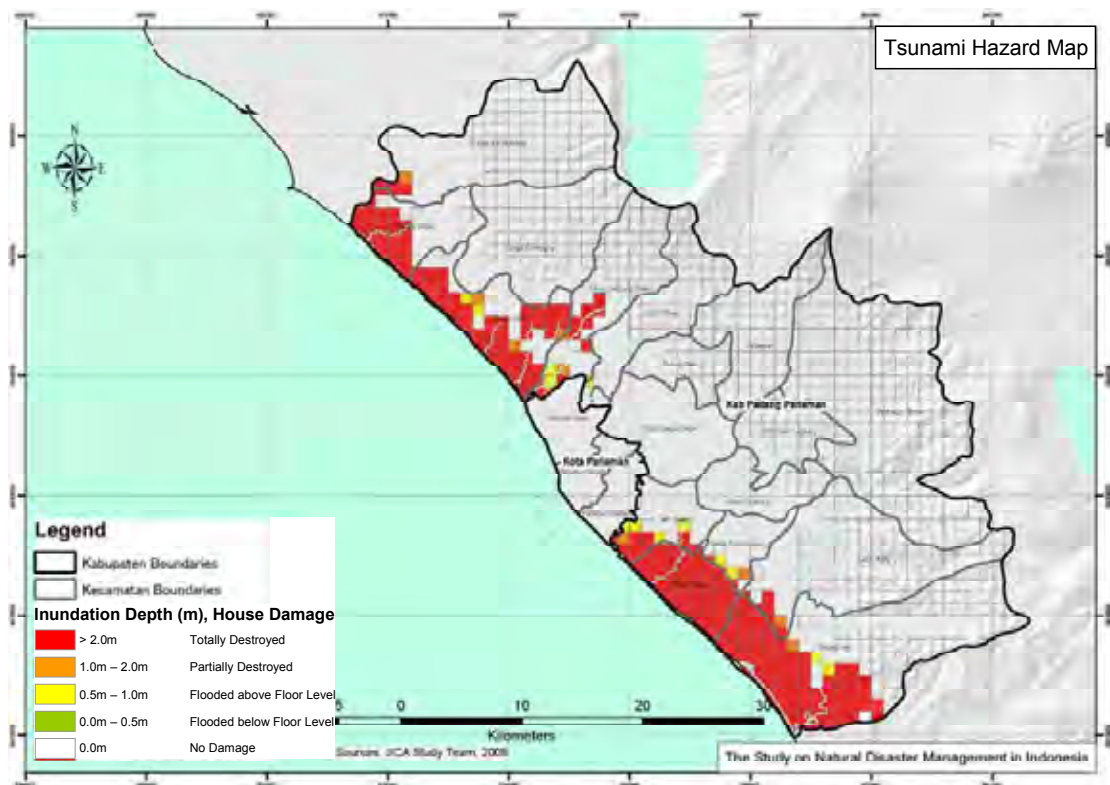
### (1) Hazard Map

Tsunami damage is caused by seawater intruding into land due to tsunami. Therefore, Tsunami hazard could be expressed by inundation depth and flow velocity of the flood. Under this plan, we shall define that Tsunami Hazard is expressed by inundation depth of flood because the macro estimation method to consider the synergy effect between the inundation depth and the flow velocity of flood has not established yet.

There are various methods to predict inundation area and depth due to tsunami, for example numerical simulation method, method based on historical inundation records, etc. Under this plan, Tsunami Hazard map was developed by estimation based on ground elevation, which is simple method to determine the hazard area and the level from relation between possible tsunami height given by numerical simulation and the ground elevation. The maximum height of run-up of the recurrent earthquake and tsunami in 1797 and 1833 was 5m or less. Therefore, 5m above sea level was set as standard height of the expected tsunami run-up. The grades are indicated as follows.

- i)  $2.0\text{m} <$  (Totally destroyed)
- ii)  $1.0\text{m} < H \leq 2.0\text{m}$  (Partially destroyed)
- iii)  $0.5\text{m} < H \leq 1.0\text{m}$  (Flooded above floor level)
- iv)  $0.0\text{m} < H \leq 0.5\text{m}$  (Flooded below floor level)
- v)  $H = 0.0\text{m}$  (No damage)

Figure 4.4.3 indicates that the tsunami hazard has concentrated on lowland area near the coast. The lowland area of the northwest of Kabupaten Padang Pariaman is comparatively narrow and 1-3km in width because the plateau is close to the coast as a geomorphic characteristic. In contrast, the southern part near the coast is a vast low-lying area which has extended 5-7km from the coast to inland. Accordingly, the tsunami hazard area has extended deeply to inland. Compared with the historical tsunami records of Padang in 1833 which describes that the tsunami intruded at least 1km from the coast, the expected tsunami hazard area has extended larger than it. Thus the expected tsunami flood area based on ground elevation is judged a little overestimation, which is dangerous side estimation. The actual flood area is predicted to be in the smaller area near the coast because the tsunami flood area depends on the total quantity of overflow seawater.



**Figure 4.4.3 Tsunami Hazard Map**

## (2) Risk Map

The damages due to tsunami hazard are of great variety. The main damages are shown as follows.

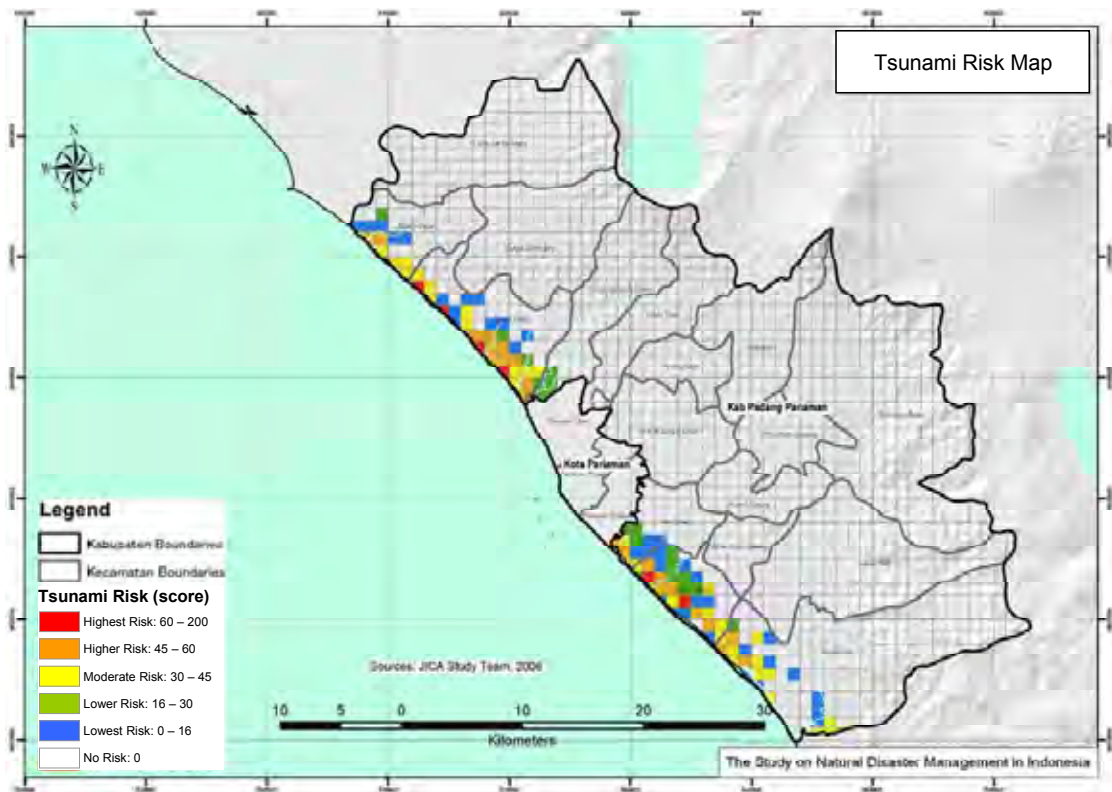
Human damage such as drawing death / House damage such as destruction due to flow / Public facilities damage such as destruction of roads, railways, and bridges / Lifeline damage such as shortage of electricity and water service / Fishery damage such as outflow of fishery boats / Commerce and industry damage such as destruction of factories near the coast / Agriculture damage caused by seawater and sediment inflowing to farm land / Forest damage / Fire damage / Landform change of coast / Destruction of power plant / etc.

The risk caused by tsunami hazard shall be estimated by focusing on house damage and human damage which are the main damages. Therefore, the risk was described by the following expressions. The damage rate based on inundation depth is neglected because the score of inundation depth includes it. However, the damage rate based on the distance from the coast is considered because it is thought that the house is not destroyed in inland where the flow velocity of flood becomes smaller. Exactly, The completely-destroyed and partially-destroyed houses could be assumed to be found within 1km from the coastline. In addition, the area where the house damage could occur is the range within 3km from the coastline.

Meanwhile, when the death body due to tsunami is calculated, the death rate corresponding to the tsunami height is multiplied by the population density settle around the coast. Human damage was also estimated by same method as that of house damage in the viewpoint of measuring only the level of the human damage. As indicated in Figure 4.4.4, the values of tsunami hazard were divided into 5 classes indicating relative hazardous classification. “Red” means the highest hazard and “Orange” indicates high hazard. Moderate hazard is shown in “Yellow” while “Green” means low hazard. Further, “Blue” shows the lowest hazard.

$$[\text{Tsunami Risk}] = [\text{Tsunami Hazard}] * [\text{Damage rate}] * [\text{Population Density} + \text{Built up Area}]$$

Figure 4.4.4 indicates that the tsunami risk has spread out all parts of coastal area of Kabupaten Padang Pariaman. Especially, the damage risk of Pasir Baru, Pilubang and Pasar Sungai Limau in Kecamatan Sungai Limau on which the population and the residential area concentrate is very high. In Kecamatan Batang Gasan which is northern area of Kabupaten Padang Pariaman, the area with high risk is limited to a part of coastal area. In southern area, Ulakan of Kecamatan Ulakan Tapakis has high risk for flood due to tsunami. Meanwhile, the risk of the south low-lying area in Kecamatan Batang Anai is low except the residential area of Kataping. Though the house damage and human damage seem to be low in southern area, the actual risk of tsunami hazard is very high because Minangkabau International Airport is located there. The above-mentioned areas are located near the coast and often have fishery port or slipways for fishing boat. Thus the risk of fishery damage is very high. Additionally, even in the inland which is far from the coastline, it is necessary to pay attention to the low-lying area along the river that the tsunami goes into easily.



**Figure 4.4.4 Tsunami Risk Map**

## **CHAPTER 5. SOCIO-ENVIRONMENTAL ASPECTS FOR THE PLAN**

In this chapter, recent trend and important points of disaster management is described briefly.

### **5.1 Learning from Past Disasters**

Indonesia is suffering from many earthquake and tsunami disasters from the past. Recently remarkable earthquake is in December 2004 in NAD and West Coast of Northern Sumatra. The Earthquake caused devastating tsunami and killed at least more than 173,981 people instantly.

Residents of West Sumatera and especially Kabupaten Padang Pariaman as well as west coast areas have to be more prepared in facing and living contiguous with earthquake disaster, including the possibility of tsunami wave, because of the fact that there are a subduction zone in front of Mentawai, Mentawai Fault in front of Kota Padang, and also the Semangka Fracture and many volcanoes along Bukit Barisan. Experiences shows that after the tsunami disaster in Aceh and the earthquake in Nias and Mentawai, it can be seen clearly that it is difficult to calm down the panic residents, and also hard to contend the impacts of the misleading and frightening issues and information.

From these unforgettable disasters, we must learn to mitigate damages from disasters coming in the future. Not only limited to the experiences in our country, we also need to learn from disasters occurred in many countries.

Lessons learnt from these past disasters must be assembled clearly compile and need to be used in disaster management measures mentioned in this regional disaster management plan.

### **5.2 Development of Computerized Information System**

Due to development of information technology recently, such as mobile communication tools, PCs, etc., information communication and data processing tools are widely use. In developed country, GPS and GIS are widely pervaded and it is possible to observe real time climate data. Moreover, information system showing picture of damage has been developed. These systems will not only change the way of communication, but also provide great improvement on collection of damage information for disaster management when disaster occur.

However, due to complication of the system, once the system is broken down by the disaster, all the system will be malfunctioned. Therefore, it is important to divide the system into multi system. This system is useful in the future if system malfunction occur. This kind of system may apply also in Kabupaten Padang Pariaman, however, weak point of the system must be considered in advance.

### **5.3 Security of Emergency Transportation Network**

At the time of disaster occurrence, security of road network is one of most important criteria in disaster management to implement various emergency response activities. Since there are limited road network in Kabupaten Padang Pariaman, it is necessary to design Emergency Transportation Network in Padang Pariaman. Security of Emergency Transportation Network will help quick response in emergency response.

### **5.4 Providing Lifeline during Disaster**

In the normal daily life, especially in urban area, dependence to lifeline facilities is extremely high, and malfunction or stoppage of these services will greatly affect to residents life. Lifeline companies are obligated to continue its service even in the period of emergency response. These lifeline companies must prepare and give great effort to minimize its damage when disaster occur.

### **5.5 Social Expectation to Volunteers and NGOs/NPOs**

From the past disasters, Volunteers and NGOs play variety of important roles in providing first aid to disaster victims, conduct rescue activities, operate evacuation facilities, etc, and their importance was recognized strongly. Volunteers and NGOs are active, and they are relatively flexible in many cases, therefore, their role is to support government activities during disaster. Moreover, by coordination with these Volunteers and NGOs/NPOs, more effective and appropriate activates can be materialized.

### **5.6 Special Care for Vulnerable Groups**

In Kabupaten Padang Pariaman, ratio of old and young person is relatively high. In case of disaster, especially for rain and storm or related disaster which is predictable, it will have certain time before disaster occur, the vulnerable groups will take longer time compare to the young, therefore, there is needs of special care for vulnerable groups, and need to prepare guideline or procedure to ask vulnerable group to evacuate in advance. These activities are undertaken within community groups.

### **5.7 Guidelines for Society Regarding Disaster Mitigation Awareness**

Not only government officials can be deal with natural disaster and disaster management must also be prepared with close collaboration among government officials, private enterprises and residents. Therefore, each player must aware of the importance of disaster management, and it is extremely important to increase their knowledge and awareness regarding disaster management. It is rather difficult to realize the seriousness of disaster management, however, disaster management is precious when disaster occurs. Mitigation measures could maximally reduce casualties.

## **CHAPTER 6. ESTABLISHMENT OF SATLAK PB**

### **6.1 Definition of SATLAK PB**

#### **6.1.1 Duties of SATLAK PB**

SATLAK PB has duty to conduct disaster and refugee management activities in the area guided by the policy of BNPB and governor as the leader of SATKORLAK PB, in the stage before, during and after the disaster occurs, there are preventive, taming, awareness, securing, rehabilitations, and reconstructions.

#### **6.1.2 SATLAK PB has functions:**

- 6.1.2.1 Illuminations, training, rehearsal and creations to increase the awareness of society on disaster management and evacuation in the area.
- 6.1.2.2 The enforcement of disaster countermeasure and evacuees enhancement directly in the area by using strength potency of disaster countermeasure and evacuees enhancement and also facilities in the area.
- 6.1.2.3 Cooperating enforcement of disaster countermeasure and evacuees enhancement with closer SATLAK of PB.
- 6.1.2.4 Accepting and distributing also responsibility of disaster countermeasure and evacuees enhancement aid in the area.
- 6.1.2.5 Other activities guided by governor as the leader of SATKORLAK PB.

## 6.2 Obligations of SATLAK PB in Disaster Management Cycle

Phase	Sub Phase	Task
Pre Disaster	Prevention	<ol style="list-style-type: none"> <li>1. Create map of disaster area (Hazard Mapping)</li> <li>2. Conduct and activate alert signals</li> <li>3. Formulate general spatial planning</li> <li>4. Formulate Regional Regulation on security, building, waste management condition, etc</li> <li>5. Procure supply and equipment for disaster management activities</li> <li>6. Formulate established procedure, implementation guidance, technical guidance of disaster management.</li> </ol>
	Mitigation	<ol style="list-style-type: none"> <li>1. Honoring the established rule</li> <li>2. Setting up the danger signs / disallowance signs</li> <li>3. Building the security unit, the controlling unit</li> <li>4. Building the danger securing facilities and retrofitting critical facilities (embankment, dam, tarsier and so on).</li> </ol>
	Preparedness	<ol style="list-style-type: none"> <li>1. Conducting the training and drill on the disaster countermeasures area.</li> <li>2. Publication of the history of the disaster and the way to avoid and to mitigate</li> <li>3. Activated radar / ranger unit</li> </ol>
Emergency Response		<ol style="list-style-type: none"> <li>1. Sounding the danger alert as the disaster is coming.</li> <li>2. Controlling the emotion, managing the violence to the people to mitigate victims.</li> <li>3. Recommending the emergency response team of SATLAK PB to the disaster stricken area in not least than 2 x 24 hours after the disaster occurred.</li> <li>4. Mobilizing the Emergency Response Action Unit to give assistance to the disaster victims.</li> <li>5. Searching and rescuing the lost victims.</li> <li>6. Assisting the evacuation action (civil and property evacuation).</li> <li>7. Securing the disaster stricken area especially the posses of the refugees.</li> <li>8. Supplying the facilities support needed by e.g. food, clothes, drugs, temporally accommodations and so on.</li> <li>9. Accepting government or public aid and distributing to the disaster victims through the Emergency Response Action Unit, Control unit (PUPSDALOPS PBP).</li> </ol>
Post-Disaster		<ol style="list-style-type: none"> <li>1. Aware the possibility of the next disaster occurrence or the following disaster.</li> <li>2. Recording the data of victims and property damaged.</li> <li>3. Rehabilitation of the mental and physical condition of the victims so as to enable them back to the previous life as before by reengineering the damaged public facilities so as to work again.</li> <li>4. Arranging a program and reconstructing accessibility, settlement, social and public facility so as to avoid or is powerful against the disaster that either the life or the living of the people and the welfare come to be better.</li> <li>5. Prepare report of the disaster story and applied effort in the disaster countermeasures and the report of acceptance and distribution of disaster aid to the head of SATKORLAK PB.</li> </ol>



### 6.3 Members and Organization of SATLAK PB

Members and Organization Structure of SATLAK PB are shown below.



### 6.4 Obligations of SATLAK PB Members

No.	SATLAK PB Sectors	Task
1	Head of Executive Organizer	1. Lead and coordinate disaster and refugee management activities.
2	Deputy Head of Executive Organizer	1. Assist task of the head of executive organizer in the disaster countermeasures and refugees handling actions.
3	Secretary I	1. Planning and coordinating disaster aid contribution / logistic to the disaster victims. 2. Coordinating and facilitating medical aid /healthcare distribution to the disaster victims. 3. Coordinating and facilitating the victim's rehabilitation and reconstruction of facilities.
4	Secretary II	1. Coordinating and facilitating rescuing action and evacuation task to the disaster victims. 2. Coordinating and facilitating the security of disaster area and refugee evacuation and relocation of the disaster area. 3. Coordinating and facilitating the communication and transportation facilities so as to succeeding the disaster

No.	SATLAK PB Sectors	Task
		countermeasures actions and publication as well as information dissemination to the public.
5	Secretary III	<ol style="list-style-type: none"> <li>1. Doing correspondences and reporting as well as data collecting.</li> <li>2. Recording the acceptance, storing and distributing and responsible to monetary and material aid.</li> <li>3. Facilitating documentation of the disaster countermeasures and refugees handling action.</li> </ol>
6	Evacuation and Security	<ol style="list-style-type: none"> <li>1. Coordinating all of victims searching and rescuing.</li> <li>2. Coordinating / securing disaster and refugee evacuation area and blocking the danger area to mitigate number of victims.</li> <li>3. Preparing temporary evacuation area / tent on a secure and accessible area.</li> <li>4. Obtaining suggestion of policy formulation on the disaster countermeasures based on its department.</li> <li>5. Conducting other task which is recommended by the head of SATLAK PB.</li> </ol>
7	Social Aid	<ol style="list-style-type: none"> <li>1. Planning and arranging the data of logistic supply and supporting facilities.</li> <li>2. Arranging data of the needs of materials, facility and equipment.</li> <li>3. Preparing and distributing logistic aid and all material needed.</li> <li>4. Forming and operating the public logistic on the needed area.</li> <li>5. Doing other task recommended by the head of SATLAK PB</li> </ol>
8	Health	<ol style="list-style-type: none"> <li>1. Preparing the facility of MCK (restroom and so on) and medical / physics action to the disaster victims and preparing accommodation supported by standard medical equipment and transfer victims to the hospital.</li> <li>2. Coordinating medical supporting service to the disaster victims.</li> <li>3. Doing other task recommended by the head of SATLAK PB.</li> </ol>
9	Rehabilitation and Reconstruction	<ol style="list-style-type: none"> <li>1. Arranging the plan rehabilitation caused by the disaster</li> <li>2. Preparing all kind of supporting facilities in the temporal accommodation and repairing the needed facility.</li> <li>3. Coordinating all the emergency action as well as rehabilitation and reconstruction actions.</li> <li>4. Obtaining the formulation suggestion of the disaster countermeasures policy due to the department concerned.</li> <li>5. Doing other task recommended by the head of SATLAK PB.</li> </ol>
4	Information and Publication	<ol style="list-style-type: none"> <li>1. Planning, preparing, and coordinating the information expanding and publicizing to the public about the case concerning with the disaster through news paper, electronic media to the public directly.</li> <li>2. Documentation and publication of the disaster countermeasures action.</li> <li>3. Obtaining formulation suggestion policy of the disaster countermeasures due to the department concerned.</li> <li>4. Implement training and give educating to the people around</li> </ol>

No.	SATLAK PB Sectors	Task
		the sensitive disaster area along with the others departments. 5. Doing other task recommended by the head of SATLAK PB.
5	Transportation	1. Arranging the facility and communication / transportation equipment. 2. Coordinating the communication and transportation equipment. 3. Obtaining formulation suggestion of the countermeasures policy due to the department concerned. 4. Doing other task recommended by the head of SATLAK PB.

## **Section 2: Pre-Disaster (Pre-Disaster Management Plan)**

Damages, caused by earthquake disasters including Tsunami, often generate huge impact that spread to wide areas. Devastating earthquake could totally disintegrate daily life of residents and force them to evacuate. Damages to educational, medical, social welfare facilities will also aggravate the situation. Therefore, preparedness measures against disasters which often occurs in Kabupaten Padang Pariaman should be taken.

### ***CHAPTER 1      CAPACITY DEVELOPMENT OF DISASTER MANAGEMENT ORGANIZATION***

#### **1.1      SATLAK PB**

<b><i>Responsible Agency:</i></b>	<b><i>SATLAK PB</i></b>
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##### **1) Roles of SATLAK PB**

- Responsible for coordinating, leading, and controlling, the regional structural and non structural activities in implementing disaster management before, during, and after disaster and refugee handling with close coordination of members of SATLAK PB.
- Approval of Regional Disaster Management Plan and actual measures mentioned in the plan.
- Collection of information regarding disasters and its damages

## 1.2 Improvement of RUPUSDALOPS PBP

<b>Responsible Agency:</b>	<b>BUPATI</b>
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Existing establishment system of RUPUSDALOPS PBP is not clear for all procedures of emergency response activities, and in case of large scale disaster, it could caused confusion and will affect on the smoothness of emergency response activities. Therefore, following measures are recommended to be implemented to improve existing RUPUSDALOPS PBP.

### 1) Revision of Initial Response System

#### (1) Primary Management System during Working Time

Information flow regarding hazard condition, appliances used to deliver information and the responsible person for the information should be clearly decided. In this context, hazard condition means when weather worsened which may cause disaster, disaster already occurred or other conditions which already decided where emergency response should be undertaken.

Moreover, to be able to decide this hazard condition promptly, SATKORLAK PB and related organizations must improve their information collection system.

#### (2) Primary Management System during Night and Weekend

To anticipate if disaster occurs during night and weekend, people to mobilize, communication appliances used and place to mobilize them should be decided in advance.

### 2) Preparedness Measures of RUPUSDALOPS PBP

Respond to disaster depends on damage condition and time after the disaster, operation after disaster indicated as follows;

#### (1) Secure Necessary Commodities to Establish RUPUSDALOPS PBP

Head of RUPUSDALOPS PBP organize a meeting basic policy of RUPUSDALOPS PBP by collecting and analyzing disaster information. In order to establish and operate RUPUSDALOPS PBP, secretariat of RUPUSDALOPS PBP should prepare necessary commodities, secure communication means and backup generators.

#### (2) Drill Implementation for RUPUSDALOPS PBP

Regular drill are implemented for members of RUPUSDALOPS PBP, so when disaster occurs they are able to coordinate disaster site and RUPUSDALOPS PBP, and transmit information smoothly, check equipment readiness, and able to perform procedures to decide basic policy..

**(3) Room Designation for RUPUSDALOPS PBP**

Room Designation for RUPUSDALOPS PBP will help in performs emergency response appropriately and smoothly without confusion. RUPUSDALOPS PBP is established at following location;

- RUPUSDALOPS PBP is established at following location;

<b>Priority</b>	<b>RUPUSDALOPS PBP Location</b>
1	Conference Room of Bupati Office
2	Conference Room of Bupati Residence
3	Special room that accessible from anywhere

- If large scale disaster occurs and these designated indoor buildings can not be used. Open space of *Alun-alun* will be used to establish RUPUSDALOPS PBP. In this case, tents are prepared for emergency use.
- If scale of disaster is relatively small and disaster site is far from PEMKAB, RUPUSDALOPS PBP will be established in nearer location.

### 1.3 Supports from Other Area

<b><i>Responsible Agency:</i></b>	<b><i>Social Agency</i></b>
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In case of large scale disaster, or if implementation requirement of emergency response and recovery already fulfilled, hence, food support for staff and other commodities can be requested from adjacent Kabupaten, Indonesian Red Cross, Military, and etc. through SATKORLAK PB. In order to prepare for aid request, the following measures are implemented.

#### 1) Preparation of Aid Acceptance from Other Area

- Coordination with related organizations, to be able to implement disaster mobilization activities smoothly, trainings and drills are implemented regularly by estimating disaster location.
- Prepare cooperation agreement for goods and foods, equipments etc.
- Cooperation Agreement with other Kabupaten. In order to implement the cooperation promptly and smoothly, base camp with all supporting activities must be prepared.
- Each supporting organization must conduct their responsibilities well.

#### 2) Designate Base Camp for Supporting Activities

Following location is designated as base camp for supporting activities;

- Main base camp for supporting activities is Alun-Alun in front of Bupati Office.
- If affected area is far from Alun-alun, base camp will relocate to nearer area and it is decided by Bupati.

## **CHAPTER 2    ENHANCEMENT OF DISASTER MANAGEMENT CAPACITY FOR RESIDENTS AND PRIVATE COMPANY**

Mind concept of “self-protection” is concerned as vital elements in disaster management. Preparation for natural disaster individually could increase residents awareness and company owners for disaster preparedness. Everyday effort will strengthen city and the residents against natural disasters.

### **2.1    Expectation to Residents**

<b><i>Responsible Agency:</i></b>	<b><i>SATLAK PB</i></b>
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#### **1)    Participation in Disaster Prevention Drill**

In order to develop awareness of disaster and appropriate emergency response, disaster prevention drills at community and company levels should be conducted regularly. Knowledge and skill of disaster prevention drill are disseminated in an appropriate way such as by seminars, brochures and websites. Also through these information tools, SATLAK PB will encourage residents to participate in disaster prevention drills.

#### **2)    Participation in Community Group**

Participating in community activities will make residents know each other and could share information. Residents and local businesses are strongly encouraged to participate in Community Organization for Disaster Risk Management so they could be familiar with activities that must be done when disaster occur.

#### **3)    Discussion with Family Members**

Family members are not always in same place when disaster occurs. Discussing a defined meeting place, how to communicate, and what should be done by each family members when actual disaster occurs will help greatly to mitigate any confusion. Therefore, every family are strongly encouraged to often have discussion with the family members.

#### **4)    Water and Food Supply**

After disaster occurs, transportation system is likely to be in trouble due to obstacle of road condition and social chaos. Hence, each household is suggested to keep water and food supply at least for three days in case Kabupaten and Kecamatan could not immediately deliver water and foods because of the above reasons. The following tangible advices for residents are considered.

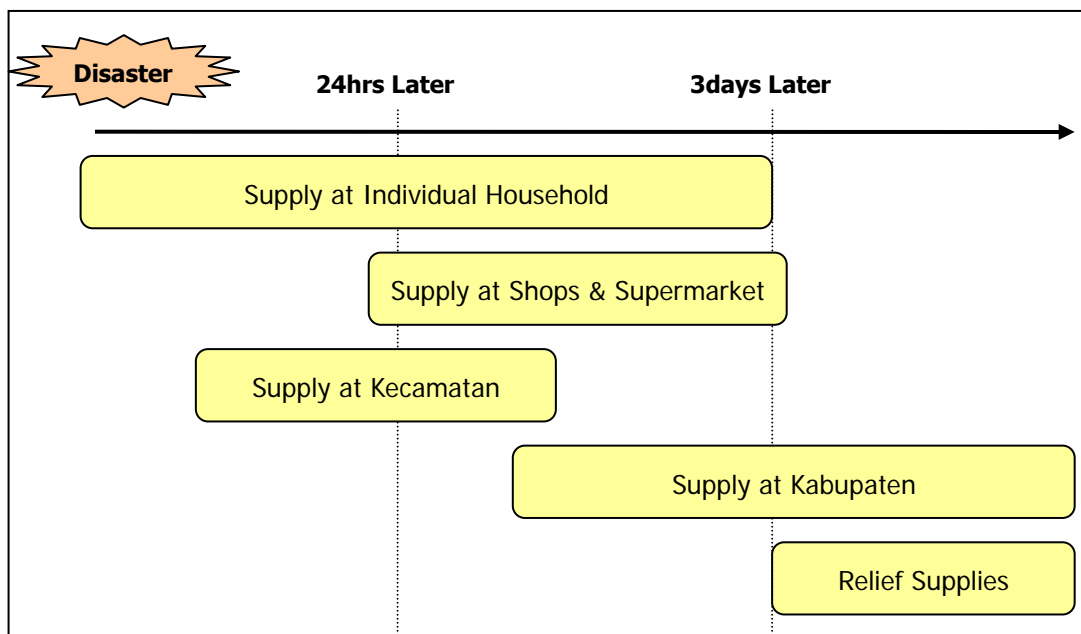


**(1) Water Supply**

Necessary water for drinking is considered approximately three liters per person per day. Stockpile of water should be three liters multiple number of family members at least. Apart from drinking water, extra amount of water for toilet and bath will be necessary. Bath tubs and buckets used in household are recommended to fill up with water regularly.

**(2) Foods Supply**

Appropriate amount of food should be kept as stockpile individually. Notably in case of the households with infants or/ and elderly, the stockpiles should be prepared in consideration of specific foods such as powder milk.



Source: Sapporo Emergency Management Office, 1998, SAPPORO: Provision Against Emergencies

**Figure 2.1.1 Necessary Supply Based on Time**

**5) Preparation of Commodities**

Under the emergency situation, some items as well as stockpiles are needs to bring out of the house quickly. These items including cash, torch, portable radio, first aid kit, clothes and foods are recommended to be packed for carry on.

**6) Safety Confirmation and Reinforcement of Houses**

Residents are encouraged to check structure of houses and other goods in order to confirm the safety against disaster. In case of the absence of safety, buildings and physical structures shall be reinforced. Things that strength is encouraged to be confirmed are as follows:

- Roofs and signboards

- Columns and outside antennas
- Fences and stonewalls

## **7) Confirmation of Evacuation Place**

Evacuation places near houses and the routes should be informed to residents.

## 2.2 Expectation to Society

<b><i>Responsible Agency:</i></b>	<b><i>SATLAK PB</i></b>
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Communities receive primary impact of disasters; meanwhile, the first and continued response on the disasters will come from community members itself. Well prepared and protected communities are important factors to reduce adverse impact of disasters. Therefore, establishing a well resourced, organized and sustainable community organization is a key strategy to effective disaster risk management.

### 1) **Activities of Community Organization for Disaster Risk Management**

Disaster risk management has collective responsibility to a large extent. When people bind themselves into a group, they play more active roles in realizing a better disaster risk management including disaster response in case of emergency and disaster preparedness in normal time. In addition, there are usually big gaps in understanding needs for disaster risk management between governments and communities. To share common understanding with governments, group actions of communities for identifying needs and priorities, developing proposals, and having risk communication would be promoted. Therefore, community organization for disaster risk management should conduct the following activities:

#### (1) **Development of Community Level Disaster Risk Management Plan**

To ensure dependable, timely and coordinated actions in case of emergency, advance planning for disaster risk management is very important. The plan includes (a) organization structures in case of emergency and in normal time, (b) community's emergency response activities such as information collection & dissemination, evacuation support, search and rescue, and coordination at evacuation shelters, and (c) annual plan of community organization activities.

#### (2) **Identification of Community Risks and Vulnerability**

To make an appropriate plan, it is important to identify accurate condition of risk and vulnerability of community. Community-based hazard map utilized local information should be developed in each community. Evacuation routes and places should be decided in advance based on the hazard map.

#### (3) **Knowledge Dissemination on Disaster Reduction**

To assure prompt and appropriate actions of community members in case of emergency, people should be well informed and educated by correct knowledge on disasters and disaster reduction.

Providing opportunities for learning disaster risk management to all community members is one of the important activities of community organization.

**(4) Conducting Disaster Risk Management Drills**

To be ready for proper actions in emergency situation, just merely having knowledge is not enough. Conducting regular drills is very important to understand the plans, confirming coordination with other related organizations, and practicing emergency actions that are very useful for further improvement and action implementation. Organizing community-oriented disaster risk management drills on regular basis is essential.

**(5) Maintenance of Shared Equipments and Materials for Disaster Risk Management**

Equipments and materials for community to conduct disaster risk management activities should be well prepared and maintained. The proposed equipments and materials to be prepared for the purpose include generator, two-wheeled cart, rescue tools, helmet, tool kit, (electrical) saw, hydraulic pump, shovel, and bucket, battery-powered radio, hand loud speaker, torch, blanket, first-aid kit, drinking water, and tent.

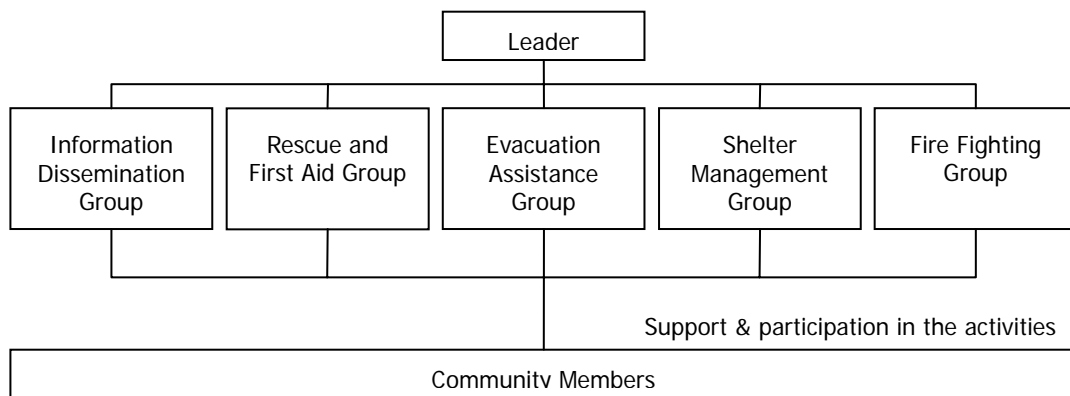
**(6) Safety Check of Facilities and Buildings/Houses**

To avoid damages caused by collapsed and falling objects/construction, regular safety check of facilities and buildings/houses should be promoted. Inspection conducted by people at their own home as well as community systematic inspection for each area should be conducted periodically.

**2) Establishment of Community Organization for Disaster Risk Management**

The existing community organizations or groups should be utilized for community organizations for disaster risk management rather than establishing a new organization. Especially, civilian defense unit (LINMAS) in village could be use as core group for this purpose. The Koran reading groups will be also effectively utilized for ensuring wider participation of the community.

The proposed organization structure is shown in the figure below.



### 3) Enhancement of Capacities in Community Organization for Disaster Risk Management

SATLAK PB has responsibility for promoting establishment of a community organization for disaster risk management in each village and capacities enhancement in the organization. The following activities should be conducted for the purpose; (a) conducting training programs for leaders of community organization, (b) providing subsidy program for activities and preparation of equipments in community organization, (c) development of publications or materials to be utilized in community activities, (d) promoting cooperation with neighboring villages, and (e) promoting collaboration of community organization with relevant organizations such as volunteer groups and local private company.

## 2.3 Expectation to Private Company

<b>Responsible Agency:</b>	<b>Trading Industry</b>
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### 1) Formulation of Disaster Management Plan for Private Company

Private company are expected to make their own disaster plan for preparedness and emergency responses according to characteristic of each company such as type of business, number of staff and office location .

### 2) Development of Disaster Formation in Each Private Company

In time of disaster, private company owners are required to lead emergency responses including giving instruction and communication to their employees. Under such circumstance, cross-sectional action would be necessary to mitigate damages and confusion. Development of internal special formation in advance is recommended. In certain situation, confirmation of communication procedure to RUPUSDALOPS-PBP is strongly advised in order to report damages suffered during disaster. Emergency telephone number at Rehabilitation and Construction Sector at RUPUSDALOPS-PBP must be distributed to all private companies in advanced.

### 3) Disaster Education for Employees and Conducting Disaster Prevention Drill

Discussion regarding disaster mitigation measures with employees periodically is efficient in handling disaster. Through series of discussions, awareness of disaster management in employees can be developed. Disaster prevention drill is also an effective way for disaster preparation. Information of disaster management plan for private company and good drill practice should be distributed to all private company in Kabupaten Padang Pariaman.

### 4) Confirmation Safety and Maintenance of Facilities

In order to mitigate damage of buildings and facilities, safety inspection should be carry out regularly, especially by reinforcement of facilities and improvement of emergency equipments.

Notably, there are many retail shops along the roads that sell gasoline (benzene) in bottles. The bottled-benzene may cause fire as secondary disaster. Shop owners are advised to change these bottles from glass container to plastic one.

### 5) Supply Encouragement for Private Company

Private companies are encouraged to keep stockpile such as water and foods, and emergency kits in their facilities. The amount of food and water for stockpile is at least for three days period

according to number of employees. Emergency kit includes rescue and relief facilities such as lamp, portable radio, first aid kit and blankets. Information of stockpile for private company will be delivered by brochures and website.

#### **6) Coordination with Community Organization for Disaster Risk Management**

When disaster occurs, private company should play emergency responses role as member of local community. For this, each private company could participate in disaster prevention drill at community level. Through such cooperative activities, linkage between Community Organization for Disaster Risk Management and private company will be strengthened enough in order to take appropriate actions under emergency circumstance.

## 2.4 Volunteer Organization

<b><i>Responsible Agency:</i></b>	<b><i>National Unity Agency</i></b>
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Based on experiences from previous disaster, volunteer organization including NGO has played an important role in emergency responses. Therefore in order to strengthen cooperation with volunteer organization it is vital to exploit all efforts for rescue and relief activities when disaster occurs. For this purpose, two major activities will be carried out before and after disaster.

Before disaster, National Unity, Society Protection and Fire Brigade of Kabupaten Padang Pariaman should collect data of local, regional, national also international volunteer organizations/groups, and make registration for those organizations in advance.

After disaster an “emergency sector” in order to coordinate with volunteer organization will be established under Social Aid in RUPUSDALOPS-PBP. This sector will develop a formation and clarification of each role for volunteer organization/groups in order to smooth activities and increase efficiency. The following activities are considered to carry out under emergency situation.

- Development of coalition with volunteer groups and organizations
- Supply controlling of voluntary activities

### 1) Establishment of Emergency Coalition

To establish emergency coalition among not only government agencies and volunteer organization but also local private company and Community Organization for Disaster Risk Management is important for efficient emergency responses after disaster occurred. Coordination with military service in terms of sharing information and dispatching volunteer groups will also increase efficiency.

### 2) Coordination with Volunteer Groups outside Kabupaten Padang Pariaman

Volunteer groups outside Kabupaten Padang Pariaman such as international NGOs will be coordinated under SATKORLAK-PB.



## 2.5 Dissemination of Disaster Management Knowledge

<b><i>Responsible Agency:</i></b>	<b><i>Information and Communication</i></b>
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Disaster management plan by government agencies is not enough to minimize damages caused by disaster, disaster risk management by community organization and residents also hold important role. Therefore, both employee of related government agencies and residents should have the right knowledge regarding disaster management and disaster itself.

For example, erosion and flood are generally caused by heavy rain or/and continuous rain in rainy season. Residents are required to increase their awareness and be aware of signs of disasters. Confirm the nearest evacuation place and routes in advance could be effective to mitigate number of victims.

The following activities will be carried out in order to disseminate disaster management knowledge for all parties

### 1) Explanation and Education of Disaster Management Knowledge

#### (1) Explanation on Disaster Management to Government Employee

Seminars and lectures regarding responses on disaster should be conducted for government employee in order to disseminate disaster management knowledge.

##### A. Methodology

- Seminar and workshop at office
- Work training
- Brochure distribution for disaster management
- Lecture

##### B. Contents

- Basic knowledge of rain and storm related disaster such as flood, erosion and storm wind
- Kabupaten Padang Pariaman regional disaster management plan
- Past natural disasters in Kabupaten Padang Pariaman
- Roles of government agencies
- Prevention of infection disease at the time of disaster

#### (2) Explanation regarding Disaster Management for Resident

Knowledge dissemination and explanation concerning disaster management should be conducted for residents in order to increase their awareness.

**A. Methodology**

- Publishing article concerning disaster management in public newspaper
- Brochure distribution regarding disaster management
- Exhibition regarding disaster management
- Making video related to disaster management
- Lecture
- Making internet site regarding natural disaster management

**B. Contents**

- Basic knowledge of rain and storm related disaster such as flood, erosion and storm wind
- Brief explanation about Kabupaten Padang Pariaman regional disaster management plan
- Preparation for disasters
- Emergency responses

**(3) Education for Students and Children**

Education in disaster management will be provided for the students and children with the purpose of protection against the disaster. In particular, it is efficient that residents are promoted to have an awareness of disaster prevention from their childhood.

**A. Methodology**

- Brochure distribution for disaster management
- Making video related to disaster management

**B. Contents**

- Basic knowledge of rain and storm related disaster such as flood, erosion and storm wind
- Preparation for disasters
- Emergency responses

**2) Disaster Prevention Drill**

Disaster drill and simulation will help all parties to take prompt and appropriate actions when actual disaster occurs. The disaster simulation should be comprehensive and involve all related parties also residents in disaster hazard location. In addition actions towards handicaps and sick people should also be taken into account.

**(1) Comprehensive Disaster Prevention Drill**

Comprehensive disaster prevention drill and simulation will be conducted as if large-scale disaster actually occurs in Kabupaten Padang Pariaman. The drill includes information dissemination regarding earthquake, establishment of disaster prevention headquarters, firefighter, rescue, relief, security, and recovery. Before conducting the drill, duties of each related parties should already be define in order to have smooth and efficient drill.

## **(2) Emergency Responses Drill for Related Agencies**

### **A. Mobilization Training**

This mobilization practice of government agencies will be conducted as if disaster occurs outside office hours in order to simplify mobilization of officer and establishment of RUPUSDALOPS-PBP as soon as possible.

### **B. Training on Establishment and Management of RUPUSDALOPS-PBP**

Training on establishment and management of RUPUSDALOPS-PBP will be conducted to attain efficient and quick emergency responses.

### **C. Training on Information Dissemination**

Training on disseminate the most basic information such as damages and casualties will be carried out according to disaster condition occurred.

### **D. Emergency Evacuation Drill**

This evacuation drill is not only for emergency condition but also will be conducted for rescue and relief activities in order to smooth evacuation process.

## **(3) Drill of Private Company**

### **A. Information and Communication**

Private companies suffering from damages because of disaster should report to the sector of Rehabilitation and Reconstruction at RUPUSDALOPS-PBP. For such circumstance, all companies are encouraged to understand the reporting procedure at normal condition. In addition, important telephone number of RUPUSDALOPS-PBP should already be disseminated to each company.

### **B. Evacuation Drill**

Every company is encouraged to conduct evacuation drill.

### **C. Training on First Aid and Rescue**

Private companies are encouraged to practices on emergency medical care including first aid and carrying casualties on a stretcher.

## **(4) Individual Emergency Prevention Drill**

### **A. Emergency Drill**

The drill includes evacuation and guiding drill for old and sick people who needs support to evacuate.

**B. Training on First Aid and Rescue**

Training of emergency care including first aid and method to carry casualties on stretcher.

## **CHAPTER 3      *RESPONSE ENHANCEMENT FOR VULNERABLE RESIDENTS***

### **3.1      Measures for Vulnerable Group**

<b><i>Responsible Agency:</i></b>	<b><i>Social Agency</i></b>
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Elderly, patient, and infant may need support for taking appropriate action under emergency circumstance. Therefore, measures for these physically weak people should be included in disaster management plan.

#### **1)      Measures for Invalids**

##### **(1)      Data Collection of Invalids**

Social Agency should collect data on amount and dissemination of invalid residents in order to have smooth evacuation at the time of. This registration system for the invalids should be conducted so invalids and their family know how to react properly when disaster occurs. Except the amount and dissemination, data that should be collected for registration are address and condition of the invalids. The registered information including their address and conditions will be updated every six months. This information should be shared with Army/Fire Fighters so evacuation plan for invalids can be prepared.

##### **(2)      Communication System for Invalids and their Families**

Information delivery system when disaster occurs for invalids and their families should be made to secure their safety, for example by using home telephone or mobile phone. In case that invalids and their families have no such communication facility, leader of the Community Organization for Disaster Risk Management or neighborhoods will be requested to deliver the information when disaster occur. Also exploit the speaker of Mosques are considered as alternative communication tool in emergency situation.

##### **(3)      Instruction for Families with Invalids**

Disaster management brochures should be distributed for the invalids and their families. They are also expected to participate in local community activities in order to have supports from other community member at emergency situation.

##### **(4)      Instruction for Community Organization on Disaster Risk Management**

Community Organizations for Disaster Risk Management which have invalids are expected to pay attention in helping those weak people in time of disaster. When the member is unable to

walk, Community Organization for Disaster Risk Management should prepare stretchers for emergency condition.

## 3.2 Foreigner Management

<b><i>Responsible Agency:</i></b>	<b><i>National Unity, Society Protection and Fire Brigade</i></b>
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Foreign resident anticipate increasing in accordance with the globalization. In case that a number of foreigners reside in Kabupaten Padang Pariaman, they might be suffered from disaster or/ and secondary disaster due to language barrier and absence of information about disaster management.

### 1) Registration of Foreign Residents

Kabupaten Padang Pariaman needs to collect data about foreign residents in order to disseminate information of disaster management for them. Therefore a registration system should be established. This system will encourage foreign residents in Kabupaten Padang Pariaman to register their data such as address, language ability and occupation at National Unity, Society Protection and Fire Brigade. Based on these data, an appropriate brochure will be formulated in English or other appropriate language which includes disaster management information and map with evacuation places and facilities, and emergency telephone numbers.

### 2) Disaster Prevention Drill with Foreigner

Area where foreign residents live is encouraged to conduct disaster prevention drills which involving foreigners. Private companies which hire foreigners are also requested to conduct the drills by involving them. Through these activities, foreign residents are expected to be able to obtain their awareness about disaster management and emergency responses.

### 3) Broadcasting for Foreigners

After establishment of registration system, urgent and important information such as metrological warning messages will be broadcast through radio or local television for public in Indonesian and English or other appropriate language.

### 3.3 Safety of Infants and Children

<b><i>Responsible Agency:</i></b>	<b><i>Health Agency</i></b>
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Infant and children are very vulnerable to become victim when disaster actually occurs because they are still unable to take appropriate action when flood, erosion, or mudflow happens. For securing their safety, following measures should be implemented.

#### 1) Disaster Management Instruction for Families

Information of disaster management and emergency responses will be provided to families with infants and children. Brochure which includes information on how to handle infants and children when disaster occurs will be planned to prepare and disseminate to related families to encourage their awareness.

#### 2) Dissemination and Instruction for Communities and Neighborhoods

Under emergency situation, parents or family members might not be with their infants or children. For such case, infants and children need help from community or neighborhoods for taking appropriate action. Therefore dissemination and instruction of disaster management on how to handle infants and children will be delivered to communities and neighborhoods.



## **CHAPTER 4 DEVELOPMENT OF DISASTER INFORMATION COMMUNICATIONS NETWORK**

Development and effective operation of disaster information communication network, capacity building of radio communication network, and multiplexing of information network will be advanced in order to disseminate relevant information precisely and accurately to residents as well as the agencies engaging in rescue and relief activities so that each could give information regarding damaged condition adequately.

### **4.1 Design of Disaster Communication System**

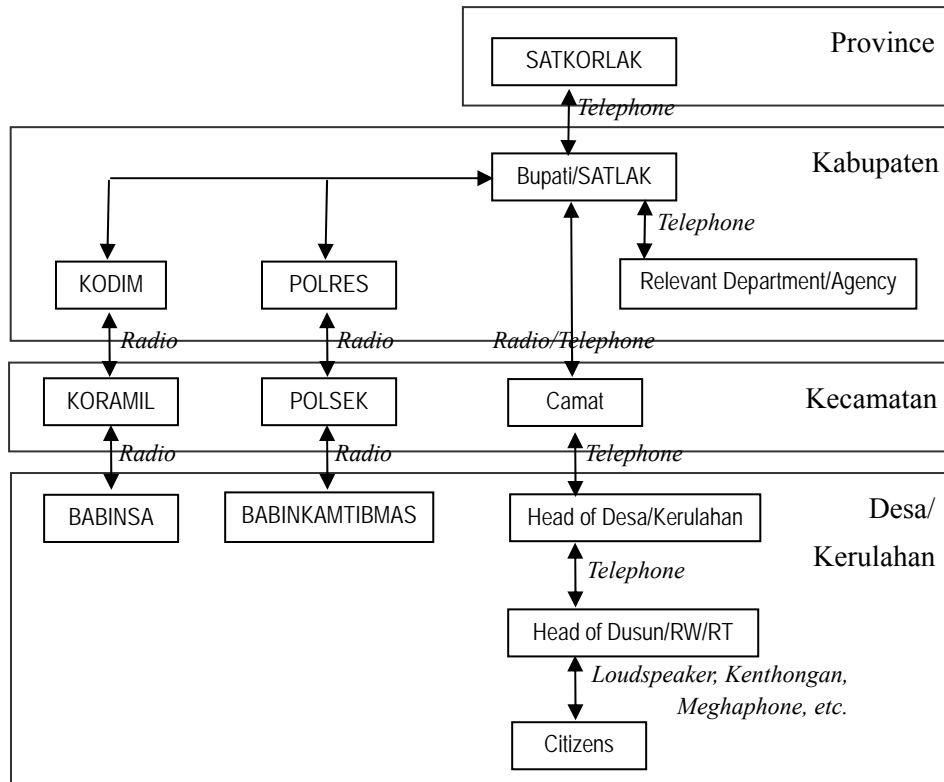
<b><i>Responsible Agency:</i></b>	<b><i>Transportation Agency Communication and Information</i></b>
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#### **1) Objective of Disaster Communication System**

- (1) Prepare means and route of information transfer for rapid and effective emergency response.
- (2) Disaster information like damage, affected area, etc. will be unified and shared among relevant agencies who responsible for emergency response at time of disaster.
- (3) Disaster information will be provided to society in order to give sense of safety.
- (4) Disaster information will be deliver to related agencies, provincial government also other Kabupaten/ city in West Sumatera province.

## 2) Information Transmission Route

Information transmission route will be defined to transfer the information clearly.



## 3) Development and Multiplexing of Information Transfer Device

The following various means for information transfer will be developed in order to provide and disseminate information rapidly and accurately.

- (1) Telephone (cable phone and mobile phone), SMS
- (2) Radio communications for disaster prevention and administration between SATLAK and Kecamatan

Radio communication system will be installed at desa/kelurahan and small government unit like dusun and RW/RT.

- (3) Other radio communication system such as military radio, police radio and amateur radio
- (4) Private radio station
- (5) Loudspeaker in mosques, Kentongan, car loudspeaker
- (6) Home Page of Kabupaten Padang Pariaman, E-mail through internet
- (7) Messenger

#### **4) Development of Disaster Information Network, and Information Gathering and Store System**

In addition to the above, disaster information network will be developed. Disaster information network will be used not only for information sharing at time of disaster, but information from each department/agency and the residents should also be compiled and stored. Based on these data, disaster information database in Kabupaten Padang Pariaman will be prepared and the database will be utilized to update emergency response plan, plan the structural and non-structural disaster countermeasures, and to prepare and revise the hazard map, etc.

##### **(1) System Outline**

This system is information sharing system using network by computer LAN system and WEB to connect with each department and relevant agencies in Kabupaten Padang Pariaman. Network among each department will be utilized as an administrative information system on normal days, and will be operated as disaster information communication network system at time of disaster. The network will also be utilized as disaster information database.

##### **(2) Centralization and Share of Disaster Information**

This system should be able to accommodate information from society by making link between communication network of military and police through WEB, and disaster information from each department using computer network. The system should also be able to access from entire Kabupaten Padang Pariaman.

##### **(3) Providing Information to Residents**

This system can be access by public through internet in order to enable them to have disaster information and method of handling.

This system will also be connected with computers at schools, especially schools which will be use as emergency shelter at time of disaster.

## 4.2 Operational of Disaster Information Communications Network

<b><i>Responsible Agency:</i></b>	<b><i>Transportation Agency, Communication and Information</i></b>
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### 1) Development and Implementation of Information Transfer Route

Following measures will be conducted in Communication Network for Disaster Information.

- (1) Collecting data of telephone number of agencies and persons in charge of information receiving and transmission, and update it regularly
- (2) Making priority information transmission equipment
- (3) Establishing flexible route of information transmission so as not to interrupt the information transmission on the way

### 2) Maintenance of Information Transfer Devices

Regular maintenance of equipments, regular test for confirming information transmission, and information transmission drill will be done to confirm the equipment could function well at emergency situation.

### 3) Capacity Enhancement of Human Resource Development/HRD

Trainings for personnel who are handling the communication network in the job will be implemented.

### 4.3 Improvement of Operational Skill for Employee

<b><i>Responsible Agency:</i></b>	<b><i>Transportation Agency, Communication and Information</i></b>
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It is important to increase official staff with good skills for information communication equipments so they could operate the disaster information communication system to function well at time of disaster. This skill enhancement is conducted through training by the equipments.

## **CHAPTER 5 RESCUE/ RELIEF, MEDICAL TREATMENT MITIGATION PLAN**

### **5.1 Capacity Building of Fire Fighting**

<b>Responsible Agency:</b>	<b>Public Works Agency</b>
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Firefighter takes primary role of rescue, relief, and medical treatment when disaster occurs. Capability of firefighter might influence to size of damages and casualties. Therefore enhancement of firefighter capability is quite useful to cope with disasters. Improvement of the internal formation and encouragement of disaster knowledge and their awareness for firefighters are strongly promoted.

#### **1) Capacity Building of Fire Fighting Facilities**

##### **(1) Facility Improvement**

Improvement of firefighter facilities is carried out for functional activities. At this moment, there are three fire engines in Kabupaten Padang Pariaman, in which one fire engine is old and can not function well. For this circumstance, The National Unity, Society Protection and Fire Brigade plan to increase number of fire engines or at least upgrade existing fire engines for preparation of emergency.

Built up area, especially urban and business district area is likely to have high density and complexity in accordance with progress of economic development. For efficient relief activities in these areas, equipments including ladder truck are very important in case emergency situation occurs in the area.

##### **(2) Establishment of Information System**

Emergency responses of firefighter are in collaboration with RUPUSDALOPS-PBP (emergency response head quarter) and fire brigades at community level (LWLP) when disaster occurs. Sharing information is vital to process smooth activities. Therefore, information system is planned to be establish to connect these three organizations. Emergency equipments such as radio transmission also should be introduced to firefighter and LWLPs in case of disconnect telephone line

##### **(3) Education for Firefighters**

To improve emergency responses of firefighters, an instruction manual intend will be made and distributed to them. This would encourage each firefighter to understand methods of rescue and relief under emergency circumstance.

## **2) Establishment of Fire Fighting Network**

### **(1) Organizing Firefighters**

Firefighter needs contact with many organizations and groups in time of disaster. Under emergency circumstance, for avoiding any confusion, firefighter should make sure how to communicate, and who is the contact person of organizations and groups in advance.

After disaster, firefighter should make contact with with Evacuation and Security sector at RUPUSDELOPS-PBP. For quick information gathering, an emergency committee for operations management will be established within the firefighter. Firefighters are also encouraged to exchange information with LWLPs.

On the other hand, firefighters are required to coordinate with Health Sector at RUPUSDELOPS-PBP. Firefighter needs to cooperate with and inform to hospitals and Red Cross Padang Pariaman for rescue effort of the casualties. For this occasion, firefighter also requires close communication with hospitals and Red Cross in advance.

### **(2) Network Development between Firefighters and LWLP**

In Kabupaten Padang Pariaman, there is only one firefighter facility. For preparing large scale disaster, the network between firefighter and LWLPs is a fundamentally important to cope with the emergency situation. Disaster prevention drills with LWLPs will be organized for development of strong linkage and sharing information between firefighter and LWLPs.

## **3) Increasing Member of Fire Fighters and Skill Increment like Life Guards Member**

### **(1) Increasing Member of Firefighters**

Total number of fire fighting personnel at this time is only 16 personnel, which is not enough to handle large scale or series disaster. Therefore, number of fire fighter member need to be added.

### **(2) Skill Increment like Life Guards Member**

Kabupaten Padang Pariaman does not have lifeguards. This could be weak point in disaster management efforts, especially in the implementation of medical treatment at emergency situation. The fire fighters would be better to have basic knowledge about first aid treatment and techniques. Therefore, National Unity, Society Protection and Fire Brigade are planning to request central government to dispatch a person to who can train the firefighter for such skills.

After obtain those skills, firefighter will disseminate the knowledge and skills to LWLPs, Community Organization for Disaster Risk Management and residents so that they could give first aid when emergency situation occurs.

## 5.2 Education for Residents and Communities

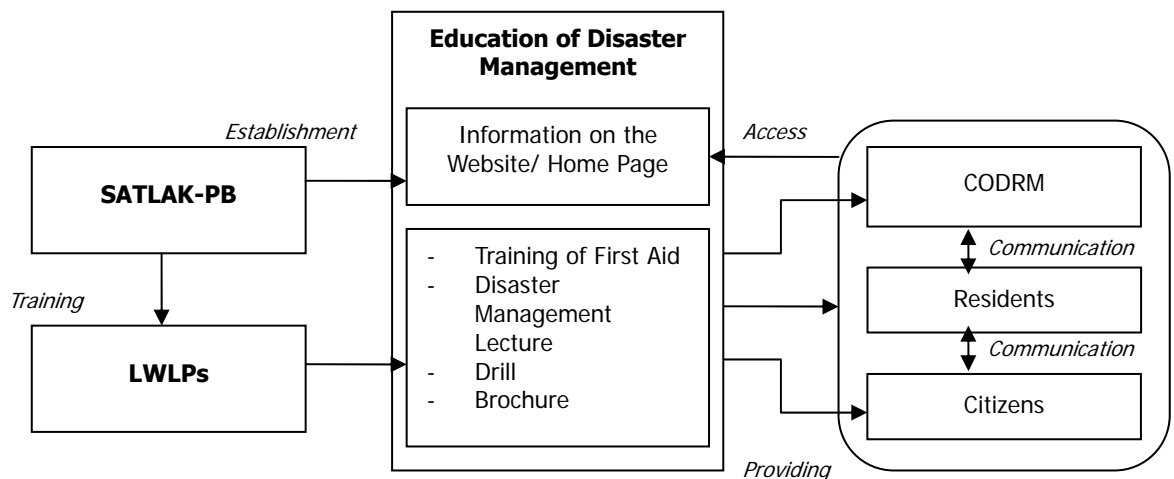
<b>Responsible Agency:</b>	<b>SATLAK-PB</b>
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### 1) Providing Education for Residents

Constant awareness of disaster management for residents could help to mitigate the damage from disasters. Through experiences of participating in disaster prevention drills and lectures, their knowledge of disaster prevention might be expanded enough to prepare for disaster by themselves. For this, the following actions are considered to be taken.

- First aid training
- Lecture on disaster management
- Disaster prevention drill
- Brochure of disaster management
- Establish information of disaster management on the web

For sufficient education of disaster management for residents, LWLPs and Community Organization for Disaster Risk Management take a central role in the education.



CODRM: Community Organization for Disaster Risk Management

**Figure 5.2.1 Education System**



## **2) Education for Households**

First responses when disaster occurs are fundamentally important for mitigation of damages from disaster. Therefore information of first responses which should be taken at the time of disaster should be disseminated to citizen. Following actions are necessary to give education to households:

### **(1) Public Information of Disaster Management**

#### **A. Public Information for Entire Kabupaten**

Information of storms, and heavy rains supposed to be disseminated to all residents in order to promote disaster management measures.

#### **B. Public Information by Each Kecamatan**

Information of flood and erosion should be disseminated to residents who live in the disaster risk Kecamatan. Dissemination of necessary information should be conducted by each Kecamatan.

### **(2) Distribution Method of Public Information**

#### **A. Disaster Management Week**

“Disaster Management Week” will be planned for 1 week every year to promote disaster management activities such as drills and lectures. On that week, series of promotions will be conducted by targeting on not only government agencies but also residents, Community Organization for Disaster Risk Management and private company.

#### **B. Explanation by Posters and Brochure**

Disaster prevention will be promoted for residents through audiovisual materials such as posters, brochures, stickers, public papers, video, films and slides.

#### **C. Explanation by Organizing Meeting**

After disaster prevention drill or disaster management lecture, discussions will take place among the related people or organizations of disaster management. These discussions are also effective in developing their awareness about disaster.

## **CHAPTER 6 SAFETY CONTROL/ RESCUE MEASURES**

### **6.1 Safety Control and Rescue Preparedness Measures by Police**

<b><i>Responsible Agency:</i></b>	<b><i>POLRES</i></b>
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#### **1) Improvement of Equipments**

Required equipment will be improved or upgraded for emergency responses by police such as rescue, evacuation induction, forecasting and warning notice, damage information gathering, and safety control of damaged area. In particular, radio transmission and related equipment are well maintained.

Police should also prepare supplies for themselves including drinking water, foods, fuels and batteries. Therefore, a procurement procedure should be established in Police.

#### **2) Participation in Drills**

For strengthening among related agencies of disaster management, police will participate in all drills organize by Kabupaten Padang Pariaman.

#### **3) Preparedness to Receive External Aid**

Under emergency situation, police will take an appropriate formation for acceptance of external supporting staff and agents in order to accelerate emergency response and rescue activities.

## 6.2 Safety Control and Rescue Preparedness Measures in Water

<b>Responsible Agency:</b>	<b>KAMLA</b>
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### 1) Improvement of Equipments

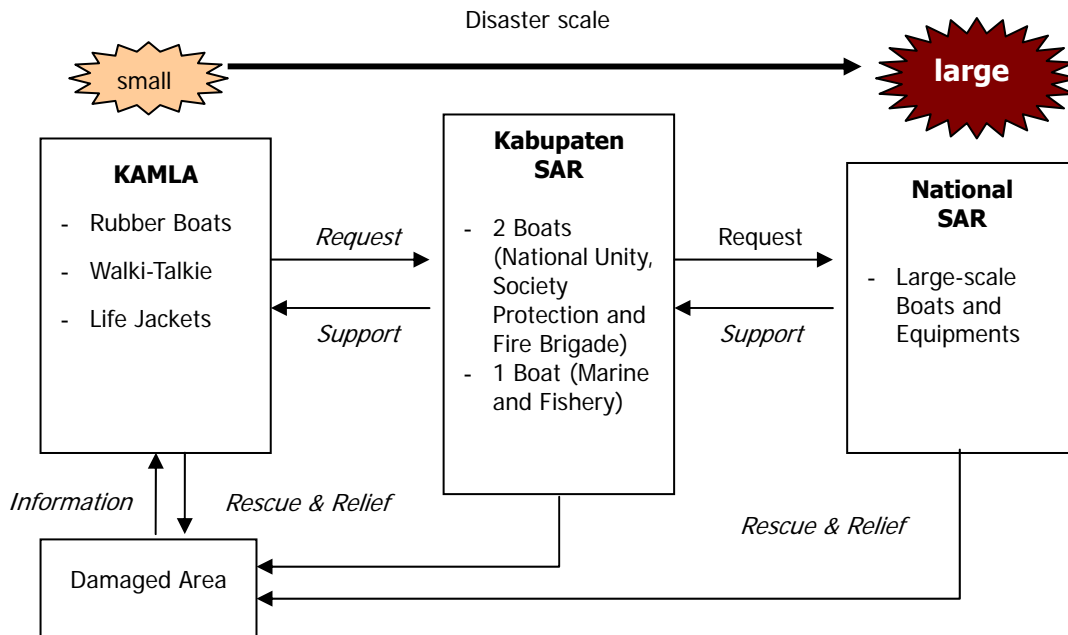
Required equipment will be improved or upgraded for emergency responses by sea such as marine salvage, and transportation of relief supply and manpower. KAMLA will request boats and any other necessary equipment to Kabupaten SAR and National SAR depends on the scale of disaster.

### 2) Participation in Drills

KAMLA will participate in drills organize by Kabupaten Padang Pariaman.

### 3) Information Gathering

KAMLA will collect weather information, metrological data and damage condition at the time of disaster, and convey to Kabupaten SAR. SAR will coordinate related organization and take appropriate action such as emergency responses, rescue and relief.



Source: JICA Study Team

**Figure 6.2.1 Framework of Rescue Measures in Sea**

## **CHAPTER 7      DEVELOPMENT OF EMERGENCY TRANSPORTATION FACILITIES**

### **7.1      Development of Emergency Transportation Facilities**

<b><i>Responsible Agency:</i></b>	<b><i>Transportation Agency</i></b>
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In the time of natural disaster, comprehensive transport network is necessary to smooth evacuation, rescue, and transportation of materials and supplies. Kabupaten Padang Pariaman is completely relies on land transportation mode, that is, roads and railways. For more efficient transportation at the time of disaster, roads and railways should always be maintained to anticipate emergency situation.

#### **1) Designation of Emergency Transportation Route**

Emergency transportation network mainly consists of primary and secondary emergency transportation routes. Primary emergency transportation route will be designated by Kabupaten Padang Pariaman with the purpose of transferring the injured and conveying materials and supplies from/ to outside Padang Pariaman. Meanwhile secondary emergency transportation routes will be designated by Kecamatan of Padang Pariaman with the aims of transferring inside Padang Pariaman.

##### **(1) Primary Emergency Transportation Route**

Primary emergency transportation routes should link between important facilities, that is, routes connect with RUPUSDALOPS-PBP and materials transportation bases such as airport and seaports. Figure 7.1.1 shows idea of two primary emergency transportation routes of Padang and Padang Panjang. Padang might be the most important city for Kabupaten Padang Pariaman in terms of gateway from/ to West Sumatera. There are not only physical facilities such as seaport and airport but also major emergency organization such as SATKORLAK and SAR National. Meanwhile Padang Panjang, is closer to Kabupaten Padang Pariaman and also has road transportation for aid gateway from eastern regions.

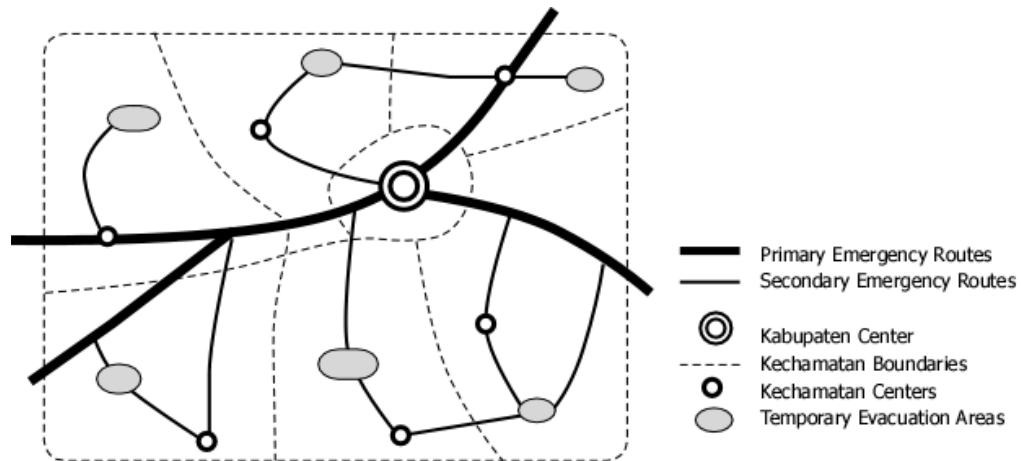


Source: DPU Kabupaten Padang Pariaman

**Figure 7.1.1 Idea of Primary Emergency Transportation Routes**

## **(2) Secondary Emergency Transportation Routes**

Secondary emergency transportation routes play a role as feeder routes. These routes hence shall branch off from primary routes and stretch out to Kecamatan centers and temporary evacuation areas. The route plan will be decided by each Kecamatan by considering smooth transferring of the injured and emergency supplies from/ to their centers and evacuation places. The general idea is illustrated in Figure 7.1.2.



Source: JICA Study Team

**Figure 7.1.2 Schematic Image of Emergency Transportation Route Network**

## **2) Maintenance of Emergency Transportation Routes**

### **(1) Maintenance of Emergency Transportation Routes in Kabupaten Padang Pariaman**

Roads designated as primary and secondary emergency transportation routes should be well maintained for preparation of emergency. These roads need to be kept at good condition by repaving and widening for evacuation, transportation and conveying at time of disaster. Particularly for primary emergency transportation routes should be always clear and forbidden for street parking.

On the other hand, Kabupaten Padang Pariaman has number of rivers and irrigation channels due to geographical condition and agricultural industries. Emergency transportation routes therefore require bridges to those rivers. Therefore, strengthening of those bridges is requires in order to enable it to be use in emergency situation.

### **(2) Maintenance of Arterial Roads outside Padang Pariaman**

Kabupaten Padang Pariaman already has an airport and road transportation facilities, therefore these facilities will be the vital accesses when disaster occurs. These roads must be well maintained, eespecially bridges that mostly exist on route to Padang, Padang Panjang and Lubuk Basung, also curved and steep road to Padang Panjang. Reinforcement of bridges and steep road is vital process to secure the connection between Kabupaten Padang Pariaman and outside. SATKORLAK is expected to help in maintaining these road facilities by Transportation Agency.

### **(3) Maintenance of Railways**

Existing railway links between Padang and Pariaman through Padang Panjang. When disaster occurs, after checking the safety, railway can play a role of transportation. For this, maintenance of railway facility is required.

### **3) Emergency Air Transportation**

Due to lack of airport in Kabupaten Padang Pariaman, helicopter is the only way to transfer by air. In the case that road network is cut off because of disaster, helicopter will play an important role in transportation. Therefore, tentative heliports should be prepared at each Kecamatan for emergency response. The following facilities might be appropriate places as tentative heliports.

- Parit Malintang Sport Centre
- Field Sports Hall of Sungai Sarik
- Horse Racing Field/Stadion Duku Banyak Balah Aie
- Soccer Field in Kampong Dalam
- Agricultural land (excluding paddy fields)

## **CHAPTER 8      *EVACUATION AND PREPAREDNESS OF TEMPORARY HOUSING***

When large-scale earthquake occurs, the effort to develop and repair the evacuation site condition is very much needed to secure the safety of the residents and to help them survive in the evacuation places. This chapter discusses about the planning of the evacuation area development.

### **8.1      Temporary Evacuation Area**

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency</i></b>
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#### **1)      Role of Temporary Evacuation Area**

When disaster such as heavy rain, storm and erosion occurs, temporary evacuation area will be established for residents protection from disaster suffering. Evacuation area also functioned as accommodation for refugees after disaster. For those two major roles, temporary evacuation areas should already be decided in each Kecamatan.

#### **2)      Criteria of Temporary Evacuation Area**

Selection of temporary evacuation area should consider following criteria.

- Safety places according to hazard map
- Jauh dari daerah pesisir sehingga dapat terhindar dari tsunami
- Accessible area
- In form of wide plain area
- No hazardous facilities in the neighborhood (e.g. chemical factories)

#### **3)      Selection of Temporary Evacuation Area**

##### **(1)      Selection of Temporary Evacuation Area**

Temporary evacuation areas are selected in each Kecamatan. These evacuation areas will be reviewed periodically in line with dynamics of population and building areas.

##### **(2)      Establishment of Signboard**

Establishment of signboard for temporary evacuation areas will be conducted in order to lead the citizen to suitable area. Signboard is also efficient to develop citizen awareness for disaster management.



## 8.2 Evacuation Facilities

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency</i></b>
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### 1) Selection of Evacuation Facilities

Appropriate evacuation facilities are needed to accommodate the people who lose their house because of storm or erosion. Evacuation facilities are basically selected from existing buildings in each Kecamatan. These buildings selected as evacuation facilities should have enough room to accommodate certain number of residents. Structure of the building should be strong enough against disaster and located in safe area according to hazard map.

#### (1) Evacuation Facilities

Some facilities such as schools and mosques are selected as evacuation facilities in advance by each Kecamatan. Required number and space of evacuation facilities are depended upon the population. At least, a certain number of the injured, children and elderly need to stay in evacuation facilities. These selected facilities will be maintained and reinforced for the disaster.

Several Kecamatan located along the coastal area must set an evacuation place in another Kecamatan in advance, and try to keep good relationship with the people there.

#### (2) Establishment of Signboard

Establishment of signboard for evacuation facilities should be conducted in order to lead the citizen to the right facilities without any confusion. Signboard is also efficient to develop citizen awareness of disaster management.

### 2) Equipments of Evacuation Facilities

#### (1) Required Equipments for Communication and Supply

After disaster occurred, required equipments are different between initial period (within 72 hours) and restoration period (after 72 hours). Equipment needed for both periods are as follows

##### A. Initial Period: within 72 hours after disaster occurred

- Radio transmission
- Mobile phone
- Radio
- Billboard
- Electric generator and battery
- Motorcycle and bike

**B. Restoration Period: 72 hours after disaster occurred**

- Radio transmission
- Mobile phone

**(2) Provision regarding Drinking Water and Foods**

Commodities, drinking water and foods are essential in evacuation facilities. Supply will be prepared in order to have sufficient amount of commodities, drinking water and food to be provided to refugees.

**A. Water Supply**

To guarantee enough water supply after disaster occurred, the following facilities should be inspected and maintained in advance.

- Water supply in schools and mosques
- Wells
- Plastic canteens or containers
- Rear cars

**B. Foods**

Following cooking equipments for food supply should be prepared.

- Cooking stove
- Large sized pan
- Propane gas
- Plates and utensils

**3) Establishment of Working Committee for Evacuation Facilities**

Working committee for each evacuation facility should be established with for two purposes. One, the committee will maintain the facilities themselves. The other, the committee should prepared the equipments so refugees are able to stay at the evacuation facilities without any confusion.

**(1) Organization of Working Committee**

Organization of working committee will be advised to include the following member.

- Leader of Community Organization for Disaster Risk Management, or private company such as plantation companies
- Member of Kecamatan Office
- Owner or manager of the facilities
- Others (private company, volunteers, and so on)

## **(2) Role of Working Committee**

The working committee will be expected to make the following preparation at each evacuation facility in order to smooth operational of the facility under emergency situation.

- Making a list of user of the evacuation facilities
- Formulation of manual for operating evacuation facility including rescue measures for the elderly, weak and handicaps
- Training for implementation of the manual
- Disseminate method of disaster management and enhancement of awareness
- Discussion disaster prevention measures with residents
- Conducting disaster prevention drill with residents and private company
- Prior discussion on how to close evacuation facility when refugees already occupy their houses or temporary housing

### 8.3 Formation of Evacuation Plan

<b><i>Responsible Agency:</i></b>	<b><i>National Unity Agency</i></b>
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#### 1) Community based Evacuation Plan

Community based evacuation plan will be promoted to formulate by each Community Organization for Disaster Risk Management. Formulation of an evacuation plan could encourage the residents to understand the location of evacuation area and facilities.

Evacuation route, which links between residence area and evacuation area/ facilities, will be designated in the evacuation plan. In case that the route includes slopes or/ and bridges, maintenance plan of these facilities should be included in the plan.

#### 2) Manual for Evacuation Instruction

Evacuation instruction shall be carried out with appropriate timing otherwise the damage would relatively increase to the delay of announcement. Manual for evacuation instruction which demonstrates the way of decision and instruction will be formulated in accordance with the disaster characteristics by each Kecamatan.

### 8.4 Preparedness of Temporary Housing

<b><i>Responsible Agency:</i></b>	<b><i>SATLAK PB</i></b>
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Temporary housing will be provided to people whose houses became uninhabitable because of disaster. The following preparation will be considered to carry out in advance.

Construction materials and enough space for temporary housing will be confirmed in coordination with Kabupaten Padang Pariaman and private company. Particularly available land for temporary housing will be decided and these data will be update periodically. Number of temporary housing that can be calculated based on the land space, will also be confirmed.

Temporary housing manual including criteria of tenant and operation methods will be established in order to prevent any confusion when transfer.

## **CHAPTER 9 DEVELOPMENT OF DISASTER MANAGEMENT FACILITIES**

Supplies are vital for disaster preparedness such as materials and equipments for damage prevention, rescue activities and restoration, foods and drinking water.

### **9.1 Supply of Disaster Management Equipments and Goods**

<b><i>Responsible Agency:</i></b>	<b><i>National Unity, Society Protection and Fire Brigade</i></b>
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In order to rescue activities and relief after the awake of disaster quickly, necessary materials will be stored as supply. For taking account of unavailability of resources and shut off the transportation in the aftermath of disaster, the materials shall be dispersed appropriately.

#### **1) Supply of Equipments and Goods**

The following equipments are quite useful for emergency response, rescue and restoration. These goods will be kept as supply.

- Tent (Company, Group and Family)
- Litter
- Public Kitchen Car
- Electric generator
- Cinshow
- Alley light
- Shovel
- Saw
- Chopping Knife
- Rope

#### **2) Supply Location**

The above supplies should be store at appropriate evacuation centers such as evacuation facilities and evacuation area. The list of location will be prepared.

## 9.2 Supply of Emergency Foods and Commodities

<b><i>Responsible Agency:</i></b>	<b><i>Social Agency</i></b>
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Distribution of food and supply should be conducted if large scale disaster occurs and resulted in refugee losing their houses. Therefore, certain amount of foods and commodities should be prepared by Social Agency.

### 1) Emergency Food Supply

Rice and canned foods are appropriate for emergency foods. Powdered milk and general medicines will also be prepared for infants, sick people and elderly. When necessary, Social Agency will cooperate and ask for aid from private company and other relevant companies to provide food.

### 2) Commodity Supply

As emergency commodities, blankets, disposable diaper and sanitary goods are appropriate for supply. When necessary, Social Agency will cooperate and ask for aid from private company and other relevant companies to provide those commodities.

### 3) Supply Location

Supplies of foods and commodities are planned to be stored in supply room at relevant agencies not only SATLAK but also Kecamatan offices, SAR, Red Cross, and other related offices. Emergency facilities such as schools and mosques could also be use as storage place. Location of supplies must be disseminated in order to keep on guard in case transportation route get disconnect when emergency situation occurs.

### 9.3 Supply of Drinking Water, and etc

<b>Responsible Agency:</b>	<b>Regional Drinking Water Company</b>
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Emergency response and relief activities are assumed to start three days after disaster. If water is needed by one person around three liter per day, hence every person requires at least twelve liters of water to keep as supply to survive for four days without any relief.

#### 1) Equipment Preparation for Emergency Water Supply

Kabupaten Padang Pariaman has seven water tank trucks at this moment. These trucks will take an important role for water supply to damaged area. Thus, maintenance of these trucks will be conducted periodically for preparation. In the meantime, small plastic tanks or containers will be prepared for receiving water from the water tank trucks.

Emergency water storage tank will be established at evacuation area. Particularly area which rely on water services or located far from water resources such as well and river are given priority to establish these equipments preparing for absence of water services due to disaster.

#### 2) Confirmation of Water Resources

Instead of water services, wells and rivers become important water resources under the emergency situation. Location of these water resources are confirmed and listed in advance.

#### 3) Water Supply for Household

Every household will be emphasized to keep certain amount of water in their house as supply when disaster occurs.

## **CHAPTER 10 MEDICAL TREATMENT AID AND INFECTION DISEASE PREVENTION MEASURES**

Supply of medical equipments and medicines will be prepared for medical treatment in time of disaster. Particularly immediate examination of corpse will prevent outbreak of infection disease.

### **10.1 Development of Activity Base of Medical Treatment**

<b><i>Responsible Agency:</i></b>	<b><i>Health Agency</i></b>
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#### **1) Secure Safety of Medical Facilities**

As emergency aid station at time of disaster, clinics (PUSKESMAS) and disaster management center which located in each Kecamatan will mainly accommodate heavy injured and pregnant people. Slightly injured will be accommodated in temporary facilities such as schools and mosques.

Disaster management center and clinics should secure the essential facilities such as electricity and communication tools including telephone and radio transmitter. In the meantime, certain amount of water is also needed for medical treatment. Therefore, supply of water is strongly encouraged for clinics and disaster management centers.

#### **2) Coordination with Medical Professionals**

In time of disaster medical professionals such as doctors and nurses must come to emergency aid station immediately. For dispatch of these medical professionals promptly, the sending system of medical manpower will be established in coordination with hospitals and Red Cross in advance.



## 10.2 Medicine Supply and Medical Equipments

<b><i>Responsible Agency:</i></b>	<b><i>Health Agency</i></b>
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Some medicines and medical equipments should be stored at clinics and disaster management centers as supply in case disaster occurs. To consider the possibility of disconnected transportation as result of disaster, certain amount of materials should be dispersed evenly not only at clinics and disaster management centers but also mosques and schools.

### 1) Supply of Medical Equipments

Medical equipments which are necessary for first aid and health care will also be stored as supply. For example, injection equipment and external medicines, disinfectant, and sanitary equipments will be stored.

### 2) Supply Location

- Clinics
- Disaster Management Centers
- Evacuation Facilities (schools, mosques and so on)

### 3) Procurement of Medicines and Medical Equipments

Apart from medicines supply and medical equipments, procurement method of extra medicines and medical equipments should be planned in coordination with Red Cross and SATKORLAC for preparation in case medicine shortage caused by large-scale disaster occurs.

### 10.3 Prevention of Infectious Disease

<b><i>Responsible Agency:</i></b>	<b><i>Health Agency</i></b>
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#### 1) Infection Disease Prevention Activity

Rain and storm related disasters are likely to cause a variety of infection disease. In order to prevent such disease, citizen must have the right knowledge about infection disease. Hence, information about major infection disease, the sources of outbreak and prevention method will be distributed by brochure and website in advance. Besides, examination of drinking water and rat destruction should be conduct periodically in order to reduce the possibility of outbreak in time of disaster.

#### 2) Supply of Materials for Infection Disease Prevention

Antiseptic and disinfectant will be kept as supply at each clinic and disaster prevention center in order to disinfect flooded houses and toilets, also well after disaster occurred.

## 10.4 Preparedness Measures of Corpse

<b><i>Responsible Agency:</i></b>	<b><i>Health Agency &amp; Indonesian Red Cross</i></b>
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### 1) Settlement of Mortuary

In case that disaster involves human lives, mortuary would be established in appropriate facilities. Enough room space for doctors to examine corpse is required. For avoiding any confusion under emergency situation, candidate facilities or buildings should be decided in each Kecamatan.

### 2) Establishment of Backup System

In case of large fatality caused by disaster, lack of doctors who can examine corpse might occur. For such case, Health Agency and Indonesian Red Cross will request assistance from other agency, NGO and related private company. For this, the backup system in coordination with these organizations will be established for disaster preparation.

## **CHAPTER 11 DISASTER MANAGEMENT IN SCHOOL**

### **11.1 Formulation of Evacuation Plan**

<b><i>Responsible Agency:</i></b>	<b><i>Education Agency</i></b>
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For protection of children and students from disaster, the following measures should be conducted.

- Establishment of security system for students
- Formulation of safety programs at school including communication networks system
- Development of disaster management plan for school

In addition to the above measures, to strengthen people's awareness of disaster will be emphasized especially targeting with teachers, school staff and students' parents.

#### **1) Formulation of Disaster Management Plan for School**

Establishment of disaster management committee which consists of principal, vice principal, school manager and so on will be emphasized in order to formulate disaster management plan for school.

#### **2) Contents of Disaster Management Plan for School**

For appropriate management in time of disaster, following activities will be conducted.

##### **(1) Person in Charge of Emergency Response at School**

Principals are advised to formulate school emergency response headquarter and to define responsible role of teachers and school staff.

##### **(2) Backup of Person in Charge for Emergency Response at School**

By considering that disaster happens when principle is absence, a backup system should be established. For example, vice principal or school manager could take over the leadership of emergency response headquarters instead of principal.

##### **(3) Coordination between School Elements**

Principal will be advised to develop a method of assemble teachers and school staff under the emergency situation. The system should involve a way of communication among the teachers and school staffs such as contact number list.

**(4) Communication System**

In time of disaster, schools will immediately contact students' parents, PTAs, disaster management center in Kecamatan, and clinic for exchanging information. Based on the garnered information, principals will instruct all teachers and school staffs. In case that disaster occurs when students are in school, instructions of emergency response such as evacuation or waiting in school will be announced to all students over through loudspeaker or explanation from teachers in each class.

**(5) Safety Confirmation for Routes to School**

In the case disaster happens at time of school commuting, school routes safety should be confirmed in advance.

**(6) Return Route from School**

Return route from school for students in the time of disaster is planned beforehand. Accordingly, communication procedure between school and parents should be formulated.

**(7) Protection System when Student Stranded in School**

School should prepare accommodation when in time of disaster, the students are stranded at school and isolated. Therefore, school must prepare communication equipment to contact student's parents, and prepare supply of drinking water, food, medicine and blanket.

**(8) Measures for Safety of School Building and its Facilities**

School must have lists of buildings and facilities that exist and which will be use for occasional security inspection. Important places should have more detailed explanation, and emergency supplies such as supplies will be checked periodically.

**(9) Measures of Important Commodity and Dangerous Material**

In the case that evacuation from school to other places must be conducted, important things such as documents and dangerous chemicals using for experiments has to be carried out from school. These things should be in the list for such circumstance.

**(10) Sanitary Management**

For appropriate sanitary management, principal will be encouraged to establish first aid group inside school. Besides supply of first aid equipments, medicine will be prepared and checked regularly.

**(11) Psychic Stress on Students caused by Disaster**

Disaster might cause not only physical damage but also psychic stress on children and students. In order to cope with the psychic trauma of students due to the disaster, principals will have discussion with school physicians and teachers beforehand.

## 11.2 Preparedness Measures of School Facilities for Emergency Situation

<b>Responsible Agency:</b>	<b>Education Agency</b>
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Due to that schools are likely to be used as evacuation places, schools are required to prepare the facilities and supplies for disaster prevention management. Schools have to secure the facilities, stationeries and teachers for reopening school as soon as possible after disaster.

### 1) Utilization of School Facilities for Disaster Prevention

#### (1) Evacuation Facilities

Schools can be used as evacuation facilities. This is because of existence of schools at every area along with its facilities.

#### (2) Improvement of School Facilities

To smooth school function as evacuation facilities, the following actions will be taken.

- School buildings and facilities will be reinforced against disaster occurrence.
- Electric facilities, propane gas, and gas (benzene) will be kept as supply and be inspected periodically

#### (3) Enhancement of Capacity for Evacuation Places

Evacuation activity because of disaster will take several days. Therefore, school must conduct preparation in order to be able to handle those refugees. Several preparations must be conducted, especially providing foods and medicines as supplies.

#### (4) School Management as Evacuation Places

Principals are encouraged to develop the management manual of school as evacuation place beforehand, and also recommended to discuss the disaster prevention measures and control system with related organization such as disaster management center, Kecamatan office, clinic, community groups and PTA.

### 2) Improvement of School Facilities for Reopening after Disaster

#### (1) Preparation of School Supplies

To reopen schools immediately after disaster, extra school supplies will be kept in schools.

**(2) Guarantee of Temporary Teacher**

Disaster might make teachers unable to engage in education or to attend school due to suffering or disconnected of transportation. To anticipate it, principal should contact with temporary teachers or communicate with Educational Agency.



### 11.3 Disaster Management Education

<b><i>Responsible Agency:</i></b>	<b><i>Education Agency</i></b>
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Teachers and school staffs should received education regarding disaster management in order to be able to take appropriate action under emergency circumstance. This education could be conducted in form of seminar or lectures. Information of disaster prevention measures for school should be distributed through brochure or/ and website.

Meanwhile, students should also get disaster management education. Proper knowledge about earthquake and tsunami will become basic idea for disaster prevention, and should be educated in school. Through this education, hopefully disaster management can be applied in school and household. Therefore, it is highly recommended that disaster management subject also included in student educational curriculum.

## **CHAPTER 12 MEASURES FOR FACILITIES HANDLING HAZARDOUS MATERIALS**

In case of earthquake disaster, there may be occurrence of fire outbreak at facilities handling hazardous materials such as high pressure gas, LPG, LNG, etc., and these hazardous materials have potential in creating secondary disasters.

Toxic and Dangerous Substances also have high risk if these materials are spread due to earthquake because the effects will remain for long period of time.

To secure safety of facilities handling these hazardous materials, and avoid occurrence of secondary disaster due to earthquake, necessary measures are planned in this chapter.

### **12.1 Preparedness Measures for Hazardous Materials**

<b><i>Responsible Agency:</i></b>	<b><i>POLRES</i></b>
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#### **1) Supervision to Storage Facility of Hazardous Materials**

- At investigation and examination of allocation or change of facilities storage or handle hazardous materials, necessary criteria for securing safety of these hazardous materials should be considered and give supervision to administrators of facilities storage or handle hazardous materials to prevent the secondary disasters.
- To prepare for disaster occurrence, examine manual which explaining about the appropriate measures, and chemicals substance, etc.

#### **2) Supervision to Storage Place and Handling Facility of Hazardous Materials**

- Conduct investigation with permission from person in charge of storage place and facility of handling hazardous materials also give guidance regarding appropriate measurement for dangerous material if earthquake occurs.

#### **3) Measures of Small Amount Hazardous Materials**

- In Kabupaten Padang Pariaman, there are many small shops selling petrol for bikes in front of shops along main roads. In case of large scale earthquake disaster, there are risks of occurrence of explosion when the bottles that contained gasoline are broken. Therefore, appropriate measures are very necessary to avoid secondary disaster as result of the hazardous materials.

## 12.2 Preparedness Measures for LPG, etc

<b>Responsible Agency:</b>	<b>POLRES</b>
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### 1) Investigation of Actual Conditions

- If approval of handling high pressure gas, LPG, LNG, etc. is requested, site investigation of company documents must be carried out to confirm condition of the place when there is request from administrators of the facilities to conduct it in order to guarantee safety of these facilities.

### 2) Prior Supervision

- For Installation of large scale gas storage tanks which contains flammable gases, to secure safety against earthquake disaster, give supervision in advance to administrators of facilities to consider earthquake disaster measures on structures and facilities.

### 3) Supervision for Personal Security

- Supervise on strengthening autonomy security system in case of occurrence of earthquake disaster, as well as supervise on formulation of disaster management plan, and implementation of practical drills.
- To prepare for disaster occurrence, supervise them on preparation of manual mentioning necessary measures, and chemicals, etc.

### 12.3 Preparedness Measures for Toxic and Hazardous Substance

<b><i>Responsible Agency:</i></b>	<b><i>POLRES</i></b>
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#### 1) Investigation of Actual Conditions

- If approval of handling Toxic and Hazardous Substances, etc. is requested, try to grasp actual condition to secure safety of these facilities and give supervision on prevention of fire outbreak.

#### 2) Supervision for Autonomy Security

- Supervise on strengthening autonomy security system in case of occurrence of earthquake disaster, as well as supervise on establishment of prompt alert system to fire department of Kabupaten Padang Pariaman if Toxic and Hazardous Substances leak or outflow, and inform surrounding neighborhood to evacuate.
- To prepare for disaster occurrence, examine manual mentioning necessary measures, substance chemicals, etc.

## **CHAPTER 13    *PREPAREDNESS FOR TSUNAMI DISASTER***

Kabupaten Padang Pariaman is located in the western coast of West Sumatera Province. Length of the coastal line of Kabupaten Padang Pariaman is about 60.8 km, which is a slope slightly sand field with the height of 2 – 4m in 9 Nagari occupied by residents.

In that coastal area there are fishermen communities who commonly work as fish catchers. Some of coastal area is used as boat resting place. Besides that, there are some shore tourism objects which are visited by many tourists where they can find some restaurants, coffee shops and traditional food shops.

In off-shore of Kabupaten Padang Pariaman, there are 2 small islands. Nobody lives in these islands, only some fishermen visit those places for fishing and resting their boats when the weather is bad in sea.

Tsunami caused by topographical changes of the sea floor as the effect of earthquake that create a long wave and spread to all direction. Not all earthquakes can cause Tsunami, but when Tsunami occurs it will cause serious damages and all buildings along the coastal area will be destroyed just like what happened in Nangroe Aceh Darussalam and North Sumatera at December 26<sup>th</sup> and East Java Province in 1994.

Kabupaten Government and related agency/institution should conduct the following measures as best as possible to prevent damage because of tsunami.

### **13.1    Estimation of Tsunami Hazard in Kabupaten Padang Pariaman**

<b><i>Responsible Agency:</i></b>	<b><i>Transportation Agency</i></b>
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Based history record, there was no tsunami ever occurred in Kabupaten Padang Pariaman. But for Kota Padang which is bordered on the southern part of Kabupaten Padang Pariaman has been hit by tsunami in year 1797 and 1883.

Maximum height of tsunami attack was in 1797. It was 5-10 meters with magnitude about 8,7-8,9 SR, while earthquake in 1833 with magnitude about 8,3 SR caused 5 meters of tsunami wave. That extreme height compared with height at other places is influenced by geological factor, which is the shape of bay and coral in coastal area.

## 13.2 Estimation of Tsunami Information Transmission Framework

<b><i>Responsible Agency:</i></b>	<b><i>Transportation Agency</i></b>
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### 1) Development of Tsunami Information Transmission System

In order to disseminate tsunami warning promptly and accurately to the residents, tsunami warning system such as siren network using radio transmission system will be installed in coastal area.

### 2) Establishment of Tsunami Information Transmission System

Each agency related to disaster management must confirm route and means of tsunami information transmission. Particularly, information transmission during night and/or in holiday should be clarified and familiarized.

### 3) Explanation on the Meaning of Tsunami Warning

In order to secure the exact transmission of tsunami warning and encourage the proper action, the meaning and contents of warning will be publicized to related parties and residents.

### 13.3 Preparation of Tsunami Hazard Map

<b><i>Responsible Agency:</i></b>	<b><i>National Unity Agency</i></b>
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In order to take effective tsunami measures, Tsunami Hazard Map based on investigation of past tsunami disaster was formulated. Based on Tsunami Hazard Map, the expected dangerous area and the common knowledge of Tsunami will be informed to residents through Internet, advertisement papers and pamphlets.

Additionally, based on Tsunami Hazard Map and Tsunami Risk Map, the following matters should be executed.

#### 1) Selection of Evacuate Difficult Area

Inundated area that has difficulty to evacuate to safe place until tsunami flood should be selected.

#### 2) Recognizing resident who have difficulty to evacuate

People, including tourist, that has difficulty to evacuate in the area chosen above should be kept under control.

#### 3) Making / Publishing tsunami hazard map

Tsunami Hazard Map reflected from the result of section 1), 2) in above should be informed to residents.

### 13.4 Formulation of Tsunami Evacuation Plan

<b><i>Responsible Agency:</i></b>	<b><i>National Unity Agency</i></b>
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In 2006, Bakesbang Linmas, which is one of sections of National Unity Agency, socialized, educated and simulated the leaders of community in 9 Nagari and 6 Kecamatan in Kabupaten Padang Pariaman about Tsunami Disaster Prevention. At that time the leaders formulated their own Tsunami evacuation plan including the decision of evacuees.

It is demanded that evacuees at the time of tsunami outbreak is executed quickly. On the account when tsunami warnings were announced, based on the formulated tsunami hazard map the evacuation places will be selected and procedure to inform direction of tsunami evacuees promptly will be planed.

In addition, it is important to take action voluntarily without waiting the warning issued by disaster prevention agencies. Thus, prompt evacuation to higher ground will be familiarized to residents in tsunami flood-hazard area. And direction board to evacuation area will be installed on coastline, evacuation place, and evacuation route, which are assumed to suffer damage caused by tsunami.

Companies located near coastline will be urged to formulate their evacuation plan to make it possible to evacuate organically and voluntarily.



### 13.5 Secure and Designate Evacuation Facilities for Tsunami

<b><i>Responsible Agency:</i></b>	<b><i>POLRES</i></b>
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The refugee facilities for tsunami will be designated with cooperation of public accommodation and establishments in tsunami flood-hazard area in order to ensure the security of the people who lives there.

When designating and ensure the refugee facilities, numbers of people who have difficulty with refugee, and the capacity and seismic capacity of the selected facilities should be considered.

## 13.6 Knowledge Dissemination regarding Tsunami

<b><i>Responsible Agency:</i></b>	<b><i>Communication and Information Agency</i></b>
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The following are information regarding tsunami that should be disseminate to society.

- Tsunami will come after earthquake.
- When earthquake occurs, people must immediately evacuate to higher place even without warning.

### 1) Knowledge Dissemination to residents

People often have incorrect knowledge of Tsunami because that there are few people who experienced it actually. Therefore, the correct knowledge of Tsunami will be disseminated to residents through every opportunity such as public information papers, pamphlets, and lectures.

### 2) Knowledge Dissemination to visitors

In Kabupaten Padang Pariaman, some tourist areas are located in part of sandy beaches where there are some pergola and sightseeing shops. And some tourist visits there. Thus, the correct knowledge of Tsunami will be disseminated to them.

### 3) Conducting Tsunami drill

Tsunami drill including communication training, evacuation guidance, and evacuation to shelters will be conducted by disaster prevention organization, local residents, and companies regularly. Based on result of the drill, evacuation plan will be improved.

## **CHAPTER 14 DISASTER MANAGEMENT CAPACITY DEVELOPMENT OF URBAN STRUCTURE**

In Kabupaten Padang Pariaman, there are many slope areas due to geographic characteristics. For taking advantage of such landform, many farm villages are existed in slope area for agriculture, agro-forest industries, and limestone excavation. In case of large-sized earthquake occurs, landslides and building corruption are supposed to happened. In the same time, area along the coast may suffer from break down of the roads and other infrastructure, liquefaction, and tsunami. In consideration of these expected damages, urban structure requires be strengthened against earthquakes.

### **14.1 Towards Disaster Safe Urban Structure**

<b><i>Responsible Agency:</i></b>	<b><i>Regional Development and Planning Board</i></b>
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Urban structure needs to be strong enough against earthquake in order to avoid residents to be in panic when disaster happens. Therefore improvement of living environment such as to encourage development of quake-resistance construction and to secure open spaces is vital step to formulate strong urban structure.

#### **1) Disaster Prevention Measures for Buildings**

Many building collapsed when large-scale earthquake happens due to vulnerable construction. The collapsed buildings might cause fire as secondary disaster and affect to urban function such as infrastructure. For prevention of these damages, disaster prevention measures for buildings are established.

##### **(1) Disaster Prevention Measures for Existing Buildings**

In build up area and densely populated area, safety inspection and appropriate advices will be conducted such as inspection of building structure, disaster prevention equipments, fire prevention equipments and evacuation route. In particular, renovation for disaster prevention in densely populated and vulnerable areas is also encouraged. Besides, renovation of buildings in surrounding area of evacuation places and routes area are considered to be carried out.

##### **(2) Disaster Prevention Measures for New Buildings**

In case of construction for new buildings, the owner and contractors are advised to build the houses or buildings according to appropriate construction methods of earthquake resistant.

**(3) Disaster Prevention Measures for Public Buildings**

Public buildings such as schools, mosques, hospitals and clinics, which are expected to be base of emergency activities, should conducted seismic performance evaluation or/ and earthquake resistant reinforcement. In addition, backup facilities for functional disorder of lifelines are considered.

**(4) Disaster Prevention Measure from Falling Objects including Windowpane**

To prevent falling objects including windowpane, roof tiles, signboards and advertising displays because of earthquake, the owners will be advised to repair it to become earthquake-resistant.

**(5) Disaster Prevention Measures from Collapsed Brick Wall**

Brick wall is likely to collapse when earthquake occurs. The owners of such brick wall and house with bricks are advised to maintain, reinforce and reconstruct the wall. Explanation of how to check bricks and safety structure of bricks are emphasized.

**2) Disaster Prevention for Open Space**

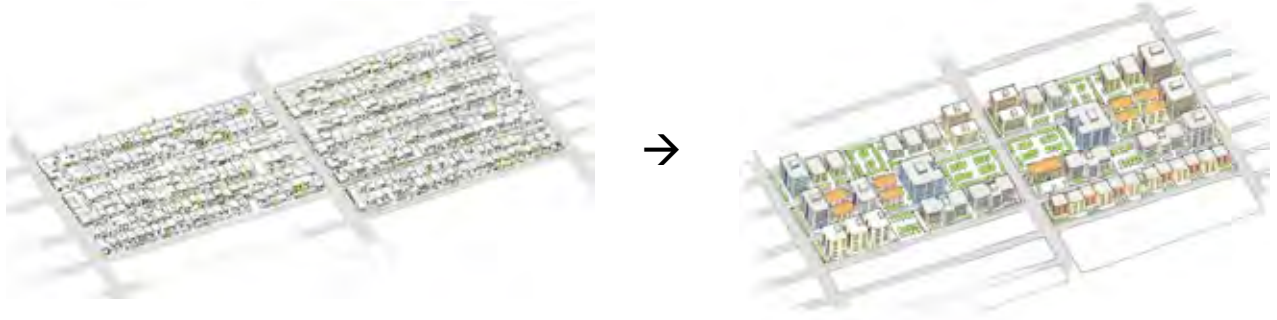
Open spaces including parks and green spaces serve as not only for recreation and relaxation but also evacuation places under emergency circumstance. In this sense, open spaces have the most important role in the disaster prevention measures. Therefore, improvement of open space is one of the necessary actions to increase resistance against disaster. Open spaces which are difficult to find in built up area should really be preserved.

**3) Improvement of Build-Up Area**

In order to avoid large-scale suffering from disasters, city should have strong structure against natural disasters. In particular, build-up area is likely to be difficult for evacuation and smooth relief activities due to high-dense buildings and lack of evacuation places. Hazardous build up area will be clearly determined by using hazard map. In such area, appropriate size and number of open space and evacuation roads will be planned.

**Area Development and Redevelopment**

Area development and redevelopment is one of drastic measures for strengthening the city against natural disasters. This measure is efficient for vulnerable area with high-dense buildings or residences. By means of area development and redevelopment, it could allow to maximum utilization of land use, especially, expanding open space for evacuation and emergency responses and widening evacuation roads. Additionally buildings and residences in hazardous area should be relocate to safe area. However this solution requires huge cost and long period of time, especially to obtain consensus from all residents. Besides, it also has high social impact, hence requires a careful study before implementation.



**Existing Condition**

**Redeveloped**

Source: JICA Study Team

**Figure 14.1.1 Image of Area Redevelopment**

## 14.2 Disaster Mitigation at Urban Area

<b><i>Responsible Agency:</i></b>	<b><i>Transportation Agency, Population Board</i></b>
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Our life has come to rely upon a variety of services such as transportation, communication, infrastructure that could make daily life easier. These services comprised of integrated system e.g. a transportation service needs communication and electricity. Therefore damage of one service may cause the whole service system that is needed by society to be stopped. To avoid these errors at emergency situation, the following disaster mitigation measures are considered important.

### 1) To Secure Lifelines

#### (1) Backup System

Owners of private company and managers of institute and organization related to lifeline service are emphasized to improve their backup system, to introduce multiplex system, and to secure emergency electric power source.

#### (2) Cooperation between Various Service Companies and Institutes

In order to mitigate damages of lifeline caused by earthquake and secondary disasters and immediate recovery, mutual help among related companies and institution is necessary. Framework will be established among these related organizations including government agencies, institutes, and private companies.

#### (3) To Secure Alternative Way

Each household and private company should prepare alternative measure if damage happens to lifeline.

### 2) To Minimize Confusion inside Buildings

#### (1) Evacuation Guidance System

Large-size buildings such as department stores and office buildings are encouraged to establish an evacuation guiding system individually in order to mitigate confusion under emergency circumstance.

#### (2) Education for Staff regarding Evacuation Guidance Method

Managers and owners of shops and office buildings are advised to educate their staff about evacuation guidance so they could take an appropriate action when disaster occurs.

**(3) Information for Building Users**

Managers and owners of shops and office buildings are emphasized to notice for building users and customers about disaster prevention measures such as to put signboards of emergency exit in their buildings.

**(4) Information by Manager and Building Owner**

Managers and owners of shops and office buildings are encouraged to make disaster prevention plan individually.

**3) To minimize Confusion on Road**

**(1) Information for Vehicle User**

In order that car users and drivers can take an appropriate action under emergency circumstance, clarification for car users is supposed to be conducted for them.

**(2) To Reduce Street Parking**

Under emergency situation, on street parking may block transportation of emergency vehicles and evacuation. Notably primary emergency transportation routes should always be clear and street parking should be forbidden on them.

### 14.3 Sediment Disaster Mitigation

<b><i>Responsible Agency:</i></b>	<b><i>Company of Forestry &amp; Agency of Forestry and Plantation</i></b>
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Direct shock of earthquake could caused buildings to collapse or damaged. The damage could also caused by false construction or vulnerable foundation. Thus, damage inflicted by earthquake is greatly influenced by characteristics of the foundation.

Earthquake could caused form alteration on building foundation, slope slide, houses collapsed, etc. In order to prevent such damage as much as possible, related organizations/agencies should conduct the following measures.

#### 1) Survey at-risk areas

Related organizations/agencies must conduct investigation and try to understand the actual condition of disaster hazardous places, the use of land also housing and roads, etc, that could be affected by disaster, so in the future the affect of disaster could be avoid or at least minimized. The required data will serve as a base to issue evacuation warning and such. Moreover, building administrators, occupants, owners, and construction should be given information on administrative guidance regarding improvement of disaster prevention measures improvement orders etc.

#### 2) Disaster prevention activities

The following matters should be carried out for disaster prevention after the collapse of a steep slope, etc.

- (1) Give residents thorough notification of the at-risk areas, and educates them about the necessity to make detailed planning and the effect.
- (2) Educate residents so they do not carry out any dangerous activities that could induce landslide, etc., and encourage them to observe steep cliff to obtain image of the present conditions.
- (3) Encourage residents of particularly at-risk areas to check the location of known risk spots, evacuation areas and routes.
- (4) Perform Landslide Disaster Prevention Patrol once every year in cooperation with local police department and local residents.



### **3) At-risk locations for Landslide**

Patrols in areas that are typically at-risk for landslide disaster and issue notification to all people resides in the area also give information on disaster prevention. Moreover, residents are thoroughly informed about nearby evacuation areas, and advised to take refuge in an evacuation area should there be any danger present.

## 14.4 Earthquake related Fire Mitigation

<b><i>Responsible Agency:</i></b>	<b><i>National Unity, Society Protection and Fire Brigade Agency</i></b>
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Fire caused by earthquake is likely to break out at several places at the same time, while firefighter brigade could not come to all locations due to lack of facility and manpower. Therefore preliminary fire fighting by residents is vital to mitigate the occurrence of secondary disaster.

### 1) Enhancement of Community Organization for Disaster Risk Management in Fire Fighting

Community Organization for Disaster Risk Management is encouraged to improve their capacity of fire fighting.

### 2) Inspection for Fire Prevention

Facilities which easily burn such as chemical factories should conduct inspection as preparation measure of disaster management plan in order to avoid such fire if earthquake happens.

### 3) To Prevent Fire Spreading

#### (1) Enhancement Capacity of Fire Fighting

To improve capacity of fire fighting including firefighter and their facilities should be improved in order to function well. In addition, if water is unavailable caused by broken pipe as result of earthquake, improvement of water tanks for quake resistance is necessary.

#### (2) Fire Defense and Control Plan

To prevent fires when earthquake occurs and to promote smooth evacuation for residents, the fire defense and control plan should be prepared.

- Cooperation development between firefighter and LWLPs
- Confirm locations of water resource to extinguish fire, such as water tanks, rivers and water channels

## **CHAPTER 15 SAFETY MEASURES FOR PUBLIC FACILITIES**

Damages of public facilities from earthquake might disturb emergency activities such as evacuation, fire fighting and medical treatment. Especially damages of lifeline could cause strong negative impacts on the civil life. To mitigate these impacts, related agencies should take appropriate actions as follows.

### **15.1 Road Facility Measures**

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency</i></b>
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Road facilities are important not only for emergency activities such as evacuation and fire fighting but also for any action in recovery period such as transportation of relief supplies and materials for reconstruction. For this, roads and facilities development plan should include the contents for upgrading their security.

#### **1) Improvement of Emergency Roads**

In terms of disaster prevention, road network designated as emergency road shall reflect upon land use plan and master plan in Kabupaten Padang Pariaman. These roads should be repaired to be strong road network against earthquake.

- Roads which connect to evacuation place and major places for relief activities
- Roads which could block fire spread caused by earthquake

#### **2) Opening Emergency Routes**

In case that road has some damages from earthquake and hampered emergency activities and transportation of supplies, hence, designated roads are given priority to be reopened. The following roads will be applied for priority.

- Roads which are designated as evacuation roads
- Roads which connects to hospitals and clinics

#### **3) To Keep Safety of Emergency Routes**

- To designate earthquake-resistance roads as emergency route to prevent/mitigate damages
- To consider alternative routes
- To improve electric poles and advertisement display along emergency routes in order to avoid obstacle at roads
- To reduce on street parking in order to prevent obstacle by cars and vehicles

#### **4) To Keep Safety of Bridges**

Inspection of the bridges especially those exist on the emergency route will be carried out regularly. In case these bridges collapse or drift away, the reconstruction will be conducted with high priority.

#### **5) To Keep Emergency Materials and Manpower**

Inspection of the bridges especially those exist on the emergency route will be carried out regularly. In case these bridges collapse or drift away, the reconstruction will be conducted with high priority.

### **15.2 River Measures**

<b><i>Responsible Agency:</i></b>	<b><i>Irrigation Agency</i></b>
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To prevent secondary disasters caused by earthquake such as flood, rivers in Kabupaten Padang Pariaman will be applied with appropriate safety measures.

### 15.3 Important Structure Measures

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency</i></b>
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Public structures which play an important role as bases for emergency response activities and evacuation facilities in time of disaster should be prevent from total collapse to be able to maintain necessary function. Therefore, public structures that require appropriate level of earthquake resistance must be maintained or upgraded.

#### 1) The Important Structures are as follows:

- PEMKAB Buildings
- Fire Stations
- Hospitals, Health Care Center, Social Welfare Center
- Schools
- Lifeline Facilities
- Other Important Structures

#### 2) Protection with Earthquake Resistance Construction

Structures listed above have important roles for emergency response activities. These facilities are required to prevent form collapse against earthquake and tsunami. Therefore, inventories of these facilities must be prepared and necessary strengthening measures should be carried out.

#### 3) Location Investigation of Important Structures

If these important structures are located in tsunami hazard area or steep slope area with risk of landslide due to earthquake, try not to designate these important structures form facilities utilize for base of emergency response activities or evacuation facilities. Those facilities under dangerous area should consider changing location in the future.

## **CHAPTER 16 SECURE SAFETY OF BUILDINGS**

### **16.1 Secure Safety of Private Buildings**

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency</i></b>
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Human death and casualty is caused by collapse of buildings at time of earthquake disaster. Therefore the most important and effective issue for mitigating number of human death is preventing the collapse of major dwelling buildings.

#### **1) Dissemination of Disaster Management Knowledge**

- Most general dwelling houses in Kabupaten Padang Pariaman are constructed by amateur builder who is inexperienced in structure engineering. When thinking about this respect the residents themselves should have practical knowledge and skill for construction in order to make appropriate earthquake-resistant dwelling buildings. For this purpose Responsible Agency in Kabupaten Padang Pariaman will disseminate disaster prevention knowledge i.e. building structure method and basic information of earthquake-resistant design method.

#### **2) Inspection on Existing Dwelling Buildings**

- Related Agency in Kabupaten Padang Pariaman will draw up an implementation outline of building inspection for existing dwelling buildings in Kabupaten Padang Pariaman.
- Responsible Agency in Kabupaten Padang Pariaman will carry out the building census investigation in order to have basic knowledge about the distribution of building structure type and building material type of all dwelling buildings in Kabupaten Padang Pariaman. Responsible Agency in Kabupaten Padang Pariaman will promote the implementation of building diagnosis on every dwelling building by the order of priority according to level of danger which becomes clear by the result of building census and hazard map.

#### **3) Reinforcement of building structure confirmation and permission system**

- Responsible Agency in Kabupaten Padang Pariaman will establish the building structure confirmation and permission system. Therefore only buildings which have efficient strength may be given construction permission. Related agencies will check the building condition at necessary timing and give effective guidance to builder when improper construction is found.

- Responsible Agency in Kabupaten Padang Pariaman will cancel the building permission if the builder does not make improvement. Legal compulsion should be applied when building constructor does not acknowledge the guidance and caused remarkable danger for the surrounding area.

#### **4) Earthquake Retrofitting and Strengthening in Existing Building**

- Responsible Agency in Kabupaten Padang Pariaman will promotes activity for retrofitting and earthquake strengthening in existing building when problem of earthquake-resistance is found by building diagnosis.

#### **5) Financial Support for Disaster Prevention Effort**

- Responsible Agency in Kabupaten Padang Pariaman will make the support plan for retrofitting and earthquake strengthening existing building. Responsible Agency in Kabupaten Padang Pariaman will inform this support system widely in order to encourage self-motivating disaster prevention works.
- Responsible Agency in Kabupaten Padang Pariaman will make best effort to achieve financing system for earthquake-resistance construction for individual who has a concrete plan to build earthquake-resistance construction.

## 16.2 Secure Safety of Public Buildings

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency</i></b>
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Medical facilities and school buildings should be completely protected because those facilities plays important role when large disaster occurs (i.e. emergency place, relief, and shelter place). Therefore Responsible Agency in Kabupaten Padang Pariaman should take following measures in order to prepare a strong institutional-building at the time of disaster.

### 1) Investigation on Existing Public Buildings

- Responsible Agency in Kabupaten Padang Pariaman will promote establishing an earthquake-disaster mitigation plan for the facilities, which have important role for medical purpose and shelter base, and inspect them. If unqualified building is found, order and guidance to implement improvement will be given.

### 2) Earthquake retrofitting and earthquake strengthening in existing institutional-building

- Responsible Agency in Kabupaten Padang Pariaman will draw up an implementation outline for building inspection on existing institutional-buildings in Kabupaten Padang Pariaman.
- Manager in each institutional-building will investigate disaster mitigation capacity of their building utilizing method that stipulated in implementation outline. Execution of the earthquake strengthening is scheduled when there is lack in the disaster mitigation capacity or earthquake-resistance of the building.
- Responsible Agency in Kabupaten Padang Pariaman should completely guide manager in each institutional-building to install important facilities (i.e. Fire protection system on disaster prevention, alarm equipment, refuge accommodation etc). Management system that enable mutual cooperation between each different management authority will be established if some usages are set for single facility and management authority has divided
- Responsible Agency in Kabupaten Padang Pariaman should organize activity plan of emergency aid monitoring and guide refugees who take shelter after earthquake occurred.

### 3) Function Reinforcement of Institutional Utility

- Reaction ability towards large disaster depends on whether the emergency response activity is promptly implemented or not. Responsible Agency in Kabupaten Padang Pariaman should check the required equipment and existing capacity of each institutional-utility which will



become bases of emergency activities of medical treatment relief and shelter accommodation.  
If those utilities are insufficient, hence plan to reinforce the function will be established.

## ***CHAPTER 17 SECURE SAFETY OF LIFELINE***

Utilities referred as “Lifeline” such as Water, Electricity, Telecommunication, and etc. are critical system of our life. Therefore, if these utilities are damaged because of flood and sediment disasters, urban malfunction will occur, and the effect is considered to be extremely large.

Consequently, to minimize damages to these utilities, following measures are promoted.

### **17.1 Coordination Enhancement among Lifeline Provider Companies and PEMKAB**

<b><i>Responsible Agency:</i></b>	<b><i>Social Agency, Regional Drinking Water Company, National Electricity Company, TELKOM</i></b>
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Lifeline provider companies and PEMKAB should conduct good coordination to perform facility recovery with high priority such as medical, social welfare facilities, and evacuation facilities, etc. To improve coordination method, PEMKAB and these companies should formulate a better method.

## 17.2 Water Supply Facility

<b>Responsible Agency:</b>	<b>Public Works Agency, Regional Drinking Water Company</b>
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Water is something indispensable for daily life of residents. Therefore, water supply facilities must take measures to avoid damages from earthquake related disasters. To build disaster resistance water facilities, continuous efforts must be taken in the future.

For water supply, if electric supply stopped for long period of time, hence water supplyt should be conducted by using back-up generator to pump the water. Therefore, increase of water stock in each water reservoirs are necessary. Moreover, even though parts of distribution pipes are damaged by disaster, to supply water smoothly, multiplex routes are promoted to be developed.

Furthermore, depends on weather condition, designated risk points (Information from Hazard Maps) requires patrol for inspection during bad weather. This inspection is useful to inspect whether dangerous situation occurs or not. In case of dangerous situation, hence surrounding residents should be informed so no one will enter the dangerous area. Besides, this inspection is also useful to decide the needs of evacuation for surrounding residents.

### 1) Existing Condition

#### (1) Water Purification Plant

River water should be processed first before it is usable, however still most part of the water cannot be drink directly. Therefore residents use mineral water as drinking water. At present, there are 3 water purification plants at Kabupaten Padang Pariaman with capacity of 75 liter/second (they are at Pasar Usang with capacity of 60 liter/second, Limau River with capacity of 10 liter/second and Gasan Gadang with 5 liter/second). .

#### (2) Water Reservoir

Water Reservoirs are constructed to control volume of water supply and to maintain water pressure and volume in order to have a smooth distribution. At present, there are 3 water reservoirs at Kabupaten Padang Pariaman with total capacity of 4.095m<sup>3</sup> (Sicincin 3.000m<sup>3</sup>, Pasar Usang 875m<sup>3</sup> and Gasan Gadang 320m<sup>3</sup>).

#### (3) Pump Station

Pump Station is constructed for distributing purified water at water reservoirs to higher locations. However, there is no pump station in Kabupaten Padang Pariaman.

#### **(4) Water Pipe**

Water Pipes are categorized as Raw Water Transmission Pipe (from water resource to purification plant), Distribution Pipe (purification plant to water reservoirs), and Service Pipes (water reservoirs to User). Total length of water pipes in Kabupaten Padang Pariaman is 528,538 m.

Water pipe are categorized as Raw Water Transmission Pipe (from water resource to purification plant), Distribution Pipe (purification plant to water reservoirs), and Service Pipes (water reservoirs to User). Total length of water piper in Kabupaten Padang Pariaman is 590,574 m, consist of transmission pipe, distribution pipe, and service pipe with consecutive length of 92,406 m, 408,933 m, 27,199m. Based on experinced of strucked by disaster, asbestos pipe is very vulnerable, while it is mostly used for transmission pipe and distribution pipe.

### **2) Mitigation Plan**

In order to implement water supply smoothly in case of disaster occurs, , continuous efforts for strengthening water facilities will be undertaken in the future at major facilities for water supply, by following measures.

#### **(1) Disaster Safe Facility**

For targeting disaster safe facility, replacement of old pipes especially for Asbestos pipes that have relatively high ratio in Kabupaten Padang Pariaman, strengthening pipe joints and major facilities should be conducted. Moreover, on emergency situation, emergency water tank should also be installed. To supply water normally when disaster occurs, construction of disaster safe facility will be strived continuously.

#### **(2) Installation of Backup Generators**

Electric malfunction will cause stoppage of clean water supply, therefore, to secure continuous water supply, backup generators should be installed at major facilities However, after installation periodical maintenance and check-up should be conducted to confirm the generators can still function well.

#### **(3) Equipments Supply**

In case of stoppage of water supply, to be able to supply water to residents, supply of portable water tanks is necessary, also, water tank engines must be maintained and checked periodically.

#### **(4) Secure Emergency Water Resources**

There are many wells in Kabupaten Padang Pariaman, therefore, these facilities must be maintained well for use when disaster occurs.

**(5) Preparation of Disaster Management Plan**

Preparation of individual disaster management plan starting from pre-disaster, emergency response, and post disaster is strongly encouraged.

### 17.3 Electric Facility

<b><i>Responsible Agency:</i></b>	<b><i>National Electricity Company</i></b>
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To prevent the occurrence of secondary disaster during recovery process at electric network facilities, it is necessary to announce it to residents in disaster affected area who become subject to recovery impact also to confirm their safety from damaged electric network, also information sharing among related organizations and companies should be implemented.

Moreover, in order to prepare for actual damages due to disaster, it is necessary to attempt to secure resources and equipments so later it will be able to implement recovery works, periodical disaster management drills on recovery and communication should also be implemented.

#### 1) Existing Condition

- Kabupaten Padang Pariaman owns electric facility which is PLTA Singkarak located at Asam Pulau Kecamatan Lubung Alung. There is 1 transformer station with 2 transformers with capacity of 1 x 10 MVA and 1 x 20 MVA at Lubuk Alung to distribute electricity. Then there are 3 transfer stations in Pariaman, Lubuk Alung and Sicincin to lower tension from 10 MVA and 20 MVA become 20 kV, furthermore, there are 1,023 transfer stations to lower 20kV become 230v/380v also to distribute to 71,083 customers in Kabupaten Padang Pariaman through 510 distribution transformer units with capacity of 50,996 kVA (Pariaman branch 10,232 kVA, Lubuk Alung branch 32,499 kVA and Sicincin branch 8,265 kVA)
- Every existing facilities shall be inspected at normal time also will be maintained at time of operational.

#### 2) Mitigation Plan

To mitigate damage to facilities and secure stable electric supply, following measures are promoted in the future.

##### (1) Electric Supply Facilities

Electric supply facilities are inspected periodically, and strive for their security. If level of transformer station cannot be constructed higher than water stage, level of foundation should be increased. If there is risk of flooding, drainage facilities should be installed.

##### (2) Preparation of Disaster Management Plan

Preparation of individual disaster management plan including pre-disaster, emergency response, and post disaster is strongly promoted.

## 17.4 Telecommunications Facility

<b>Responsible Agency:</b>	<b>TELKOM</b>
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Disaster prevention measures should be conducted to guarantee disaster-secure telecommunication facility. Safety of organizations and companies that related with emergency response activity, evacuation place and facilities, also temporary telephone facilities for emergency necessity should be confirmed. In addition, staff mobilization for recovery work must also be conducted. To guarantee smoothness of the work, staff with required specification should be determined and their safety should be guaranteed. Necessary training and drills for these staffs must also be continuously implemented.

If large scale disaster occurs, telephone line will be congested, and it will be very difficult to connect the affected area. Therefore, necessary measures to connect important numbers in priority such as emergency response relevant organizations and companies are highly recommended.

### 1) Existing Condition

- There is operator of cable telephone in Kabupaten Padang Pariaman, however communication service with operator at Kota Padang which is Telkom is still exist. Telkom control 100% pf cable telecommunication service in Kabupaten Padang Pariaman with approximately 50,000 customers.
- There are 8 BTS for telecommunication service using cable telephone and all of its station equipped with battery that last up to around 4 hours without electric supply. And for second back-up system, if electric off, automatically power from battery will flow to BTS for around 30 minutes. After that, if diesel generator (650kVA) is ready to channel power to BTS, the device will automatically on to replace the battery. There is 1000 liter supply of diesel fuel that could light generator for 12 hours at every BTS.
- There is also no mobile phone operator in Kabupaten Padang Pariaman, however almost entire area of Kabupaten Padang Pariaman could be served by mobile phone network from operator that exist in Padang such as Telkomsel, Indosat, Pro Xl and Esia. The biggest mobile phone service is Telkomsel owns around 125,.000 customers or 50% of total number of customers.
- Every existing telecommunication facility will be examined at normal time and maintenance during operation will also be conducted.

## **2) Mitigation Plan**

To mitigate damage to facilities and secure stable telecommunication, following measures are promoted in the future.

### **(1) Inundation Prevention Measure**

For measures on flood, tsunami, inundation, and etc., by using watertight doors etc. to prevent from inundation into building.

### **(2) Secure Communication Means when Disaster Occurs**

To prevent from disconnection of telecommunication disaster occur, multiplex transmission route should be promoted, by coordinating other means such as mobile phones, satellite phones, walkie-talkies, etc, communication must be secured. Especially for emergency response organizations, special care should be taking into account.

### **(3) Preparation of Disaster Management Plan**

Preparation of individual disaster management plan including pre-disaster, emergency response, and post disaster is strongly promoted.



## **Section 3: Emergency Response**

### **(Disaster Emergency Response Plan)**

When devastating earthquake disaster occurs, occurrence of variety of damages are expected such as collapse of buildings, roads and bridges damages, landslide, lifeline damage, tsunami, liquefaction, as well as fire.

This Disaster Emergency Response Plan is emergency response measures which should be implemented by, Kabupaten Padang Pariaman Government and other disaster management related agencies in the event of disaster in order to handle variety of damages promptly and effectively.

#### ***CHAPTER 1. EMERGENCY RESPONSE SYSTEM***

In case of disaster occurs such as excitation of the ground and tsunami, Kabupaten Padang Pariaman Government will establish response system with the following procedures in order to implement emergency response activities promptly and precisely to mitigate damages.

##### **1.1 Initial Response System (IRS)**

<b><i>Responsible Agency:</i></b>	<b><i>Bupati Office</i></b>
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In order to response disasters precisely, prompt response by Kabupaten Padang Pariaman Government together with related organizations is important for next emergency response activities. Initial Response System is defined as response that carried out until Emergency Response Headquarter (Rupusdalops) PBP is established. This Initial Response System should be ready for 24 hours to receive weather information from BMG.

## 1.2 Rupusdalops PBP (Emergency Response Headquarters) and SATLAK PBP

<b>Responsible Agency:</b>	<b>Bupati Office</b>
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When disaster occurs or in high risk of occurrence, to implement disaster emergency response, Rupusdalops PBP will be established and SATLAK PB meeting will be hold.

### 1) Rupusdalops PBP

#### (1) Establishment of Rupusdalops PBP

##### A. Criteria for Establishment of Rupusdalops PBP

<b>Criteria for establishment of Rupusdalops PBP</b>
1. More than MMI 5 Scale Earthquake is observed and announced in Kabupaten Padang Pariaman Region by BMG.
2. When Devastating Earthquake occurred in Kabupaten Padang Pariaman Region, and MMI scale can not be confirmed, but evidently large scale disaster occurred
3. When BMG announced occurrence of Tsunami in Kabupaten Padang Pariaman Region and Surrounding Area
4. When Bupati decided to do so

##### B. Substitution in case of Absence of Bupati

If Bupati is absent, the following are person who will substitute the position of Bupati.

1. Vice Bupati
2. Assistant I
3. Head of National Unity Agency

##### C. Announcement of Establishment of Rupusdalops PBP

Bupati or his substitution, when Bupati is absent, will report promptly to head of SATKORLAK PB of West Sumatera Province and related organizations regarding establishment of Rupusdalops PBP. Announcement of establishment of Rupusdalops PBP to community will be done through mass media and other means.

## (2) Organization of Rupusdalops PBP

Organization of Rupusdalops PBP is composed of related agencies in PEMKAB of Padang Pariaman based on duties described in “Disaster management and refugees handling established procedure (Protap PBP) of Kabupaten Padang Pariaman”.

From time to time, type of emergency response will change, thus organization must be reformulate in order to be able to handle emergency response activities.

### A. Organization and Role of Rupusdalops PBP

Organization and role of Rupusdalops PBP is based on Protap PBP.

### B. Duties of Substitution of Head of Rupusdalops PBP

Head of Rupusdalops PB is Bupati, however, if Bupati is absent or cannot execute his duties, all Bupati’s roles will be substituted by the following person, respectively;

- |  |
|--|
| <ol style="list-style-type: none"> <li>1. Vice Bupati</li> <li>2. Assistant I</li> <li>3. Head of National Unity Agency</li> </ol> |
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### C. Enhancement of Relationship with Related Organizations

Rupusdalops PBP has to share disaster information and implement emergency response promptly with well coordination and participation from military, police, Red Cross, lifeline providers, etc.

### D. Coordination with SATKORLAK PB of West Sumatera Province

If disaster level is low, it is not necessary to establish Rupusdalops PBP in Provincial level. However, if the disaster cannot be handled within Kabupaten level, Bupati should request support to the Province.

In order to have efficient coordination with SATKORLAK PB, necessary information was transmitted to SATKORLAK PB.

## (3) Location of RUPUSDALOPS PBP

RUPUSDALOPS PBP is established at following location;

Priority	RUPUSDALOPS PBP Location
1	Conference Room of Bupati Office
2	Conference Room of Bupati Residence
3	Special Room that accessible

- If large-scale disaster occurs and those designated indoor buildings cannot be used, open space of Alun-Alun could be used to establish RUPUSDALOPS PBP. In this case, tents are prepared for emergency use.
- If scale of disaster is relatively small and far from PEMKAB, remote RUPUSDALOPS PBP will be established close to disaster location.

## **2) SATLAK PB Meeting for Emergency Response**

### **(1) Holding SATLAK PB Meeting for Emergency Response**

When Rupusdalops PBP is established, SATLAK PB meeting will be held to decide basic strategy for emergency response measures.

### **(2) Composition and Operation of SATLAK PB Meeting for Emergency Response**

#### **A. Composition of SATLAK PB Meeting for Emergency Response**

All member of SATLAK PB will attend SATLAK PB Meeting for Emergency Reponse.

#### **B. Participation Request of Related Organizations**

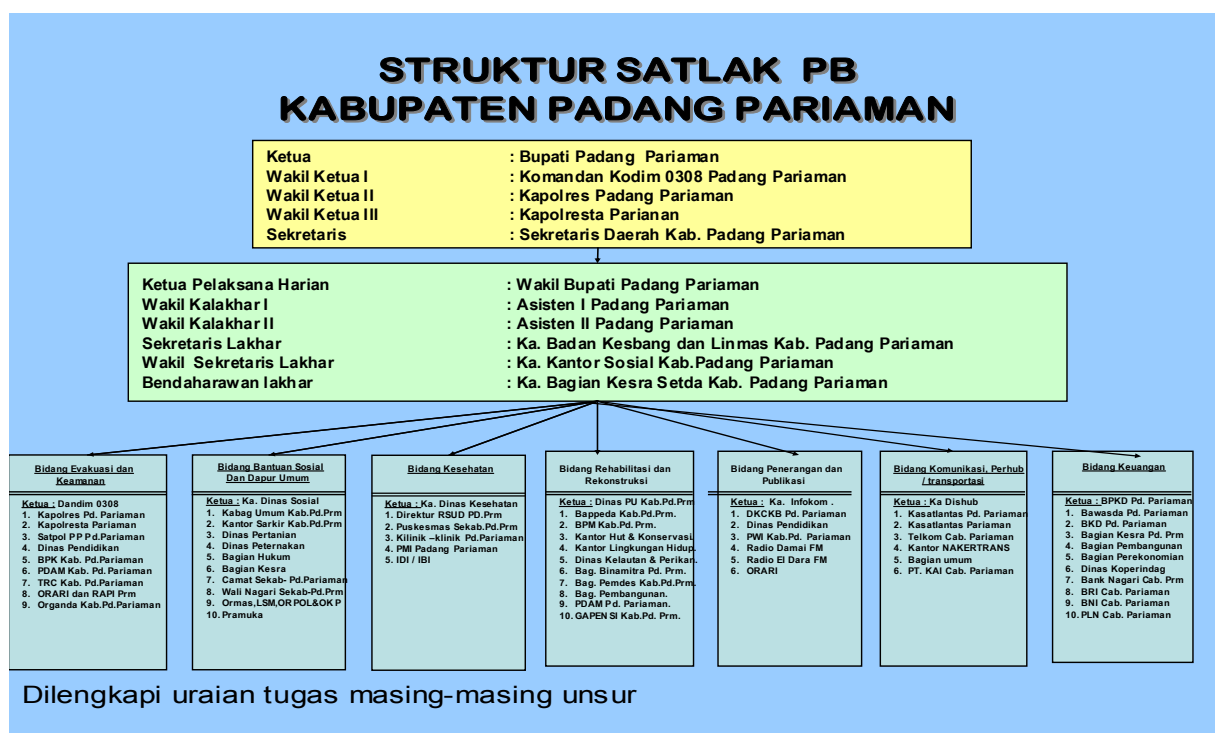
If necessary, all related organizations non-member of SATLAK PB are requested to participate in SATLAK PB Meeting for Emergency Response, such as lifeline companies, police, etc.

## **3) Dismissal of Rupusdalops PBP**

1. Bupati will dismiss Rupusdalops PBP when there is no more risk of disaster or emergency rehabilitation is almost completed after occurrence of disaster
2. Bupati will inform head of SATKORLAK PB regarding dismissal of Rupusdalops PBP and also inform the community through mass media and other means
3. After dismissal of Rupusdalops PBP, if still necessary, Bupati will order to continue implementation of emergency response measures based on Rupusdalops PBP.

#### 4) Organization of Rupusdalops PBP

##### (1) Organization Chart of Rupusdalops PBP



##### (2) Role of Each Agencies of Rupusdalops PBP

PEMKAB

Agencies	Chapter	Sub Chapter	Tasks
Bupati	5	5.3	Evacuation without receiving warnings
	11	11.1	Initiate disaster emergency response by community
	11	11.2	Emergency response activities by Community Group
	13	13.3	Avoid mass panic during evacuation
Bupati Office	1	1.1	Initial Response System (IRS)
	1	1.2	Rupusdalops PBP (Emergency Response Headquarters) and SATLAK PBP
SATLAK	5	5.2	Measures after Tsunami occurs
Health Agency	6	6.1	Rescue, First Aid, Medical Treatment Measures
	6	6.2	Medical Treatment System
	6	6.3	Procurement of Medicines and Medical Equipments
	6	6.4	Mental Health Care
	14	14.5	Set up of Temporary Toilet
	15	15.1	Searching for missing victim and casualties treatment
	15	15.2	Autopsy and transport of casualties
	15	15.3	Identification of casualties
	15	15.4	Casualties treatment
	16	16.1	Health care and Hygiene measures
16	16.4	Epidemic Preventive Measures	

<b>Agencies</b>	<b>Chapter</b>	<b>Sub Chapter</b>	<b>Tasks</b>
Public Works Agency	4	4.2	Preventive Measures for Secondary Disaster
	9	9.1	Target of Removal
	9	9.2	Team of Removal
	10	10.2	Securing Transportation Network
	14	14.5	Set up of Temporary Toilet
	15	15.5	Burial or Cremation of Casualties
	16	16.2	Solid Waste Management
	18	18.1	Investigation of Damaged Buildings
	18	18.2	Survey of Damaged Resident House
	18	18.3	Construction of Temporary Housing and Emergency Restoration of Damaged Buildings
Education Agency	19	19.2	Water Supply Facility
	17	17.1	Management of School Facilities
	17	17.2	Measures for Students and Pupils
	17	17.3	Procurement and Provision of School Supplies, etc.
Environment Office (KLH)	17	17.4	Management of Education Facilities
	9	9.4	Temporary Storage Sites for Debris
Social Agency	16	16.3	Human Waste Management
	3	3.1	National and Province
	3	3.2	Peripheral Kabupatens
	14	14.1	Food Provision
	14	14.3	Daily Commodity Provision
Transportation Agency	14	14.4	Acceptance of Goods from outside Disaster Affected Area
	1	1.4	Staff Mobilization for Tsunami Warnings
	2	2.1	Communication Tools
	2	2.2	Establishing Disaster Communication Operation System
	5	5.1	Receiving and Transmitting Weather Forecasts and Warnings
	7	7.2	Emergency Call and Mobilization
	8	8.3	Road Transport Management
	10	10.1	Securing Transport Equipments
National Unity Agency (Bakesbang Linmas)	13	13.2	Transportation for Panic Prevention
	14	14.3	Daily Commodity Provision
	3	3.3	Disaster Management Related Organizations
	5	3.5	Volunteers
	4	4.1	Warning, Evacuation, and Guidance Measures
	12	12.1	Evacuation Plan
	12	12.2	Announcement of Evacuation Warning
	12	12.3	Set up of Alert Area
	12	12.4	Advice for Evacuation and Transfer
	12	12.5	Set up of Temporary Evacuation Facility and Its Management and Operation
15	15.1	Searching for Missing Victim and Casualties Treatment	
19	19.1	Recovery Information of Lifeline	
21	21.1	Information Sharing with National and Provincial Organization	

Agencies	Chapter	Sub Chapter	Tasks
	21	21.2	Acceptance of Foreign Assistance
Information and Communication	2	2.1	Communication Tools
	2	2.2	Establishing Disaster Communication Operation System
	2	2.3	Collection of Disaster Information
	2	2.4	Publication of Disaster Information
	4	4.3	Publication and Dissemination of Information to Community
	7	7.3	Information Collection System
	15	15.6	Provision of Information to Community
Regional Secretary	1	1.3	Rupusdalops PBP Staff Mobilization
Head of Village	5	5.3	Evacuation without Receiving Warnings

## Other organizations

Agencies	Chapter	Sub Chapter	Tasks
Police	5	5.1	Receiving and Transmitting Weather Forecasts and Warnings
	8	8.1	Security Measures by Police
	13	13.1	Panic Prevention due to Lack of Information
	13	13.4	Panic Prevention at Public Facilities
	20	20.1	Hazardous Materials Storage Facility
	20	20.2	Vehicles for Transporting Hazardous Materials
Indonesian Red Cross	6	6.2	Medical Treatment System
	14	14.1	Food Provision
	18	18.3	Construction of Temporary Housing and Emergency Restoration of Damaged Buildings
TELKOM	19	19.4	Telecommunications Facility
Regional Drinking Water Company	14	14.2	Water Provision
National Electricity Company	19	19.3	Electric Supply Facility
Company of Forestry	14	14.3	Landslide Mitigation
KAMLA	8	8.2	Sea Safety Control and Security Measures
Water and Air Police	8	8.2	Sea Safety Control and Security Measures
Fire Fighter	7	7.1	Fire Fighting Organization
	7	7.4	Fire Fighting Activity
	7	7.5	Initial Fire Fighting Activity
Commander of District Military	3	3.4	Military, etc.
Republic of Indonesia Army	5	5.1.	Receiving and Transmitting Weather Forecasts and Warnings
SAR	15	15.1	Searching for Missing Victim and Casualties Treatment
BMG	5	5.1	Receiving and Transmitting Weather Forecasts and Warnings
Private Enterprises	11	11.3	Disaster Response Activities by Private Enterprises
Cooperation	9	9.3	Method of Removal

### 1.3 Rupusdalops PBP Staff Mobilization

<b><i>Responsible Agency:</i></b>	<b><i>Regional Secretary</i></b>
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#### 1) Mobilization Criteria

Bupati as a head of Rupusdalops PBP will mobilize staffs and implement relevant activities based on the criteria mentioned below.

<b>Category</b>	<b>Mobilization Criteria</b>
1 <sup>st</sup> Mobilization	1. When MMI 5 Scale Earthquake is observed and announced in Kabupaten Padang Pariaman Region by BMG.
2 <sup>nd</sup> Mobilization	1. When MMI 6 Scale Earthquake is observed and announced in Kabupaten Padang Pariaman Region by BMG.
3 <sup>rd</sup> Mobilization	1. When more than MMI 7 Scale Earthquake is observed and announced in Kabupaten Padang Pariaman Region by BMG. 2. Tsunami Warning is announced in Kabupaten Padang Pariaman Region by BMG.

#### 2) Component of Mobilization

##### (1) 1<sup>st</sup> Mobilization

Each head of Agencies will mobilize number of staffs assigned to designated location or to their offices.

##### (2) 2<sup>nd</sup> Mobilization

Each head of Agencies will mobilize number of staffs assigned to designated location or to their offices. Head of Social Welfare Agency and Health Agency have to mobilize number of staffs to take a role in evacuation faculties.

Moreover, in case of occurrence of disaster outside working time, to the facilities that each agency hold jurisdiction over, staffs must be mobilized.

##### (3) 3<sup>rd</sup> Mobilization

All staffs will be mobilized to designated location or to their offices, as assigned in advance.



### 3) Staff Mobilization

Staff mobilization of each agency is mentioned as below. Moreover, for 1<sup>st</sup>, and 2<sup>nd</sup> Mobilization, staffs in charge are designated in advance.

Agencies	Responsible Sector	1 <sup>st</sup> Mobilization	2 <sup>nd</sup> Mobilization	3 <sup>rd</sup> Mobilization
Health Agency	3. Health	3	1/3 of Staffs in each agency	All Staffs
Public Works Agency	4. Rehabilitation and Reconstruction	3		
Manpower and Transmigration Agency	6. Transportation	1		
Industry, Trading and Investment Agency	2. Social Aid	1		
Forestry and Plantation Agency	4. Rehabilitation and Reconstruction	2		
Livestock and Fishery Agency	2. Social Aid	2		
Regional Incoming Agency	4. Rehabilitation and Reconstruction	1		
Education Agency	1. Evacuation and Security	3		
Cleanliness and Live Environment Agency	4. Rehabilitation and Reconstruction	3		
Irrigation Agency	4. Rehabilitation and Reconstruction	2		
Social Agency	2. Social Aid	4		
Agriculture and Food Affairs Agency	2. Social Aid	2		
Cooperation, Industry and Trade Agency	2. Social Aid	1		
Transportation Agency	6. Transportation	3		
National Unity and Public Protection	1. Evacuation and Security	4		
Development Planning Board	4. Rehabilitation and Reconstruction	2		
Population, Family Planning and Civil Registration Board	2. Social Aid	2		
Public Capacity Board	4. Rehabilitation and Reconstruction	1		
Territorial Police Office	1. Evacuation and Security	3		
Information and Communication Office	5. Information and Publication	4		
Tourism Service and Culture Office	5. Information and Publication	2		
Parit Malintang Regional General Hospital	3. Health	2		
Puskesmas Sungai Sarik	3. Health	2		
Puskesmas Kampung Dalam	3. Health	2		

Note: For 1<sup>st</sup> and 2<sup>nd</sup> Mobilization, number of staffs include head of agencies.

#### 4) Order of Staffs Mobilization

##### (1) Commander

Staff Mobilization is ordered by head of Rupusdalops PBP (Bupati)

##### (2) Order Transmission System

###### A. During working hours

Transmitted by telephone line or public radio system in PEMKAB



###### B. After working hours

Transmitted by telephone line



##### (3) Mobilization not Depend on Order

During working hours, due to malfunction of communication systems, when order is not accessible, mobilize yourself by your own decision.

Moreover, when devastating disaster occurs or a high risk of disaster occurrence is anticipated after working hours, do not wait for mobilization order. Mobilize yourself to designated location based on mobilization criteria for mobilization.

#### 5) Mobilization Participant

Target at all the staffs belong PEMKAB Padang Pariaman. However, following staffs will be exempt from the audience.

1. Person with ill or handicapped and have difficulty to conduct emergency response activities
2. Due to occurrence of disaster, staff is in sudden ill or injured, therefore, not possible to mobilize

## 1.4 Staff Mobilization for Tsunami Warnings

<b><i>Responsible Agency:</i></b>	<b><i>Transportation Agency</i></b>
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When BMG issues Tsunami warning, staff mobilization and relevant activities are implemented as follows.

### 1) Mobilization Criteria

When BMB issues Tsunami warning for coastal area in Kabupaten Padang Pariaman.

### 2) Component of Mobilization

Each head of assigned Agencies will mobilize number of staffs to designated location or to their offices.

### 3) Staff Mobilization

Staff mobilization of each assigned Agencies is mentioned as follows:

<b>Agencies</b>	<b>Staff Number</b>
National Unity and Public Protection	4
Education Agency	3
Territorial Police Office	3
Fire Fighter Section of Public Works Agency	3
Transportation Agency	3
Information and Communication Office	4

### 4) Order of Staffs Mobilization

When BMG issues Tsunami warning after working hours and/or holidays, transportation agency will transmit the information to each head of assigned Agencies.

Each head of assigned Agencies will mobilize number of staffs.

## **CHAPTER 2. DISASTER INFORMATION GATHERING AND DISSEMINATION PLAN**

It is crucial for emergency response to gather and disseminate accurate information on climate and earthquake promptly and precisely. Moreover, providing accurate disaster information to the community will avert panic and create smooth evacuation.

This chapter will explain about plan for information gathering and dissemination in the event of disaster.

### **2.1 Communication Tools**

<b><i>Responsible Agency:</i></b>	<b><i>Transportation Agency, Information and Communication</i></b>
<b><i>Relevant Agency</i></b>	<b><i>All Type of Media, Army, Police</i></b>

#### **1) Telephone (Wired phone and Mobile phone), SMS, Radio Communication**

- (1) Telephone line such as wired phone and mobile phone, SMS and radio communications for administration (SATLAK-Kecamatan) was utilized in principal for gathering and disseminating disaster information and sharing necessary information for emergency response.
- (2) Installation of radio communication system in small government unit like Nagari and Korong will be processed to guarantee reliable communication network.

#### **2) Radio Communication in an Emergency**

The following radio communication system will be utilized to guarantee smooth communication in the event of disaster in case communication between Kabupaten and related departments/agencies were unable due to interruption in telephone line such as wired phone and mobile phone.

1. Army radio and Police radio communication system
2. Indonesian amateur radio organization (ORARI)
3. Private radio station (AM/FM) in Padang Pariaman

**3) Information Dissemination in an Emergency**

Private radio station AM/FM will be utilized to disseminate information widely in an emergency, such as evacuation instruction/order.

**4) Other Tools for Information Dissemination**

In order to multiply the communication tools, installation of other tools such as satellite telephone and email system via internet will be considered.

**5) Request of Equipments Reparation for Information Dissemination**

When communication tools were out of order, reparation will be requested to its provider promptly.

**6) Messenger, Mosque Loudspeaker, Kentongan and Car Loudspeaker**

In case that all of wired or wireless communication was interrupted, or if necessary, information gathering and dissemination will be done with every possible means such as messenger, mosque loudspeaker, Kentongan and car loudspeaker etc.

## 2.2 Establishing Disaster Communication Operation System

<b><i>Responsible Agency:</i></b>	<b><i>Transportation Agency, Information and Communication</i></b>
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Each information communication tools was operated as follows:

### 1) Information Transmission Tools

- (1) Movable communication was done by mobile phone, SMS and mobile radio transmission
- (2) Fixed communication was done by wired phone, fixed radio transmission, radio broadcast service, mosque loudspeaker and Kenthongan.

### 2) Type and Priority of Information Communication

#### (1) Type of Communication

1. Emergency communication: Communication required when emergency situation occurred or possible to occur
2. General communication: Communication except emergency communication
3. Concurrent communication: Communication to be done concurrently and unilaterally to a number of agencies/persons
4. Individual communication: Communication to be done individually between two agencies/persons

#### (2) Priority

Communication at occurrence of disaster was prioritized as follows:

High priority:	Emergency and concurrent communication
Medium high priority:	Emergency and individual communication
Medium low priority:	General and concurrent communication
Low priority:	General and individual communication

### 3) Operation of Communication

#### (1) Movable Concurrent Communication

Information such as evacuation order, call for establishment of Rupidalops PB and warning, which should be transmitted promptly and adequately to relevant agencies, are transmitted from SATLAK by concurrent communication of SMS and/or radio transmission.

**(2) Fixed Concurrent Communication**

The following information regarding disaster management are transmitted to Kecamatan office and/or community by radio transmission, mosque loudspeaker, Kenthongan and radio broadcast.

1. Climate condition affected occurrence of disaster
2. Damage by disaster and issues related with information dissemination

**(3) Communication Control**

Administrator will control information communication to prioritize the important communication when communication was congested or may be congested.

**4) Communication Route and Tools****(1) SATLAK-Kecamatan**

Gathering and disseminating disaster information between Kabupaten and Kecamatan were done by wired phone, mobile phone and radio transmission.

**(2) Kecamatan-Nagari**

Gathering and disseminating disaster information between Kecamatan and desa/kelurahan were done by wired phone and mobile phone.

**(3) Korong, Dusun, Community**

Gathering and disseminating disaster information between Nagari and korong/lingkungan/kampong/dusun are done by wired phone and mobile phone. While, information dissemination such as evacuation instruction was done by mosque loudspeaker and/or Kenthongan etc.

**(4) SATLAK-Disaster Related Agencies**

- (1) Gathering and disseminating disaster information between Kabupaten/SATLAK and related agencies including army and police were done by wired phone and mobile phone.
- (2) Gathering and disseminating disaster information in and between disaster related agencies were done by wired phone, mobile phone and radio transmission.

**(5) Bupati-Community**

Private radio stations AM/FM are utilized for dissemination of wider information such as evacuation instruction/order in an emergency.

## 2.3 Collection of Disaster Information

<b><i>Responsible Agency:</i></b>	<b><i>Information and Communication Office</i></b>
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Collection and reporting of disaster information and damage condition are set up as follows.

### 1) Collection of Information

#### (1) Damage Survey by Kabupaten (SATLAK)

Kabupaten/SATLAK conducts:

- damage survey in order to identify the damage condition,
- collection and consolidation of information from various sources in Rupusladops PBP, and
- provision of collected information to disaster related agencies.

#### (2) Multiplying of Information Collection Tools

Kabupaten/SATLAK sets up information desk in order to collect disaster information from community, voluntary disaster management organization, and enterprise etc.

#### (3) Reporting Obligation by Community

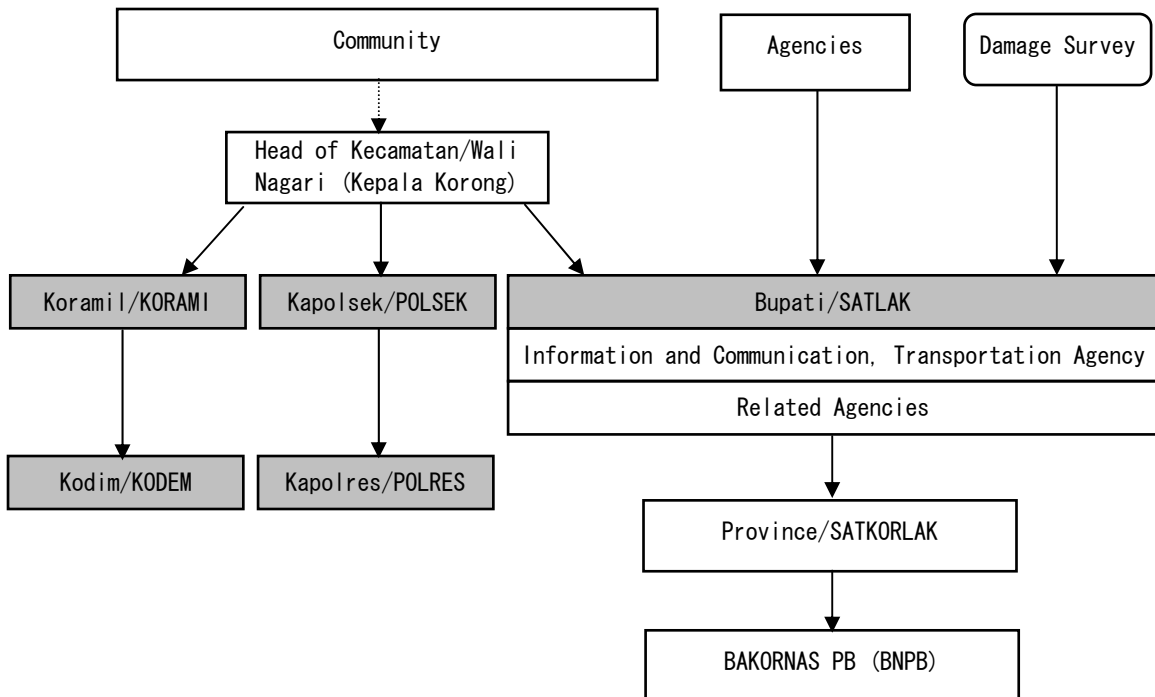
Resident who discover the occurrence of disaster and unusual phenomenon that may lead to disaster, should promptly report to nearest government organization, police or army.

### 2) Reporting Disaster Information

Disaster Information which surveyed and collected after occurrence of disaster will be disseminated by the following route.

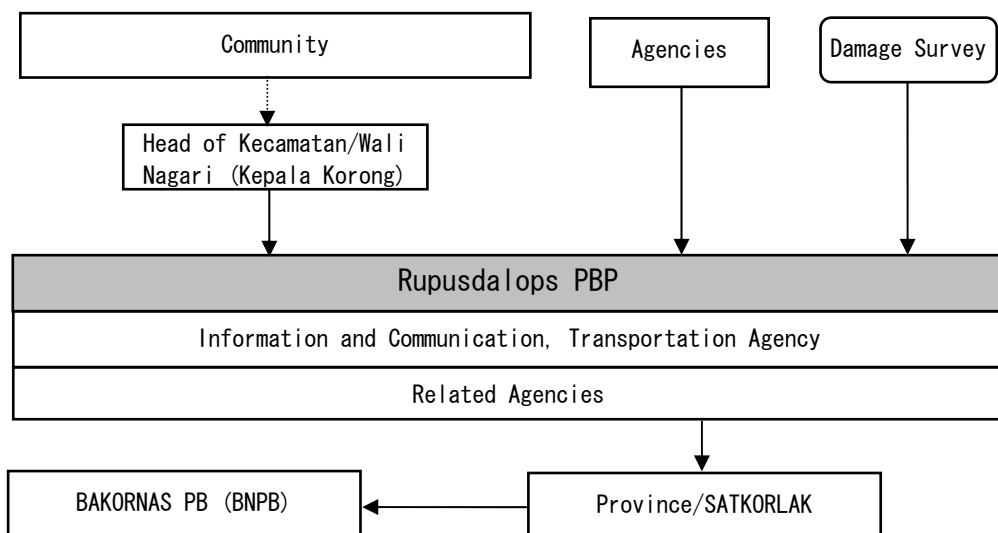


<Before Establishment of Rupusdalops PBP>



Note: Disaster information and the result of damage survey will be integrated by information and communication department.

<After Establishment of Rupusdalops PBP>



Note: Disaster information and the result of damage survey will be integrated by information and communication department.

### **3) Items of Collected Information**

#### **(1) Right after Disaster Occurs**

It is most important to identify place and scale of damage adequately in order to avoid more serious damages and secondary disaster. Therefore, the following information are collected.

1. High tide warning and water level in coastal area in case that warning is already issued
2. Fire occurrence and fire spread condition
3. Damage and risk of landslide condition
4. Condition of victim to be rescued
5. Damage condition of buildings
6. Damage condition of road and railway
7. Necessity of evacuation and evacuation process condition
8. Damage condition of lifeline

#### **(2) After Recovery from Confusion of Disaster**

After almost all disaster information were collected and damage condition of Kabupaten was identified, the following information are collected with purpose to rescue and give aid to community, and also to implement initial rehabilitation.

1. Review of damage
2. Condition of disaster victim
3. Necessity for giving rescue and aid
4. Action during disaster
5. Action after disaster

### **4) Information Communication Tools**

- (1) Information is transmitted by most secure and fast equipment among fixed and movable communication tools.
- (2) In case that fixed line is interrupted, radio communications of government, police and army are utilized.
- (3) In case that communication is disconnected, all of measures such as dispatch of messenger to area where communication is available are utilized.

### **5) Reporting to Province/SATKORLAK**

#### **(1) Reporting Tools**

Reporting disaster information was done by telephone and/or fax.

## **(2) Destination of Report**

When there was number of casualties caused by disaster, Kabupaten/SATLAK will report actual state to SAR and Province/SATKORLAK. If Kabupaten unable to report damage condition and emergency response measures to the Province/SATKORLAK, Kabupaten/SATLAK will directly report to BNPB.

## **(3) Contents and Procedure of Reporting**

Contents and procedure of report to the Province are as follows:

1. Disaster report produced by SATLAK PBP as a formal government report will include:
  - a. Date and hour
  - b. Reporting profile
  - c. Disaster intensity and disaster affected area
  - d. Number of saved, injured, died, and lost victims
  - e. Total amount of refugees and its condition
  - f. Damaged facilities and accessibility
  - g. Total amount of financial loss
  - h. Type and amount of delivered support
  - i. Type and amount of required support
  - j. Other important information needed for decision making by the head of SATKORLAK PBP as well as head of SATLAK PBP.
2. Due to difficulty in getting disaster information comprehensively, SATLAK PBP will send the report into 4 phases as follows:
  - a. Phase I  
Make first report within at least 1 x 24 hours after disaster occurs, which reported by SATLAK PBP to SATKORLAK PBP and will be sent to BNPB, includes:
    - 1) Disaster type
    - 2) Date and hour
    - 3) Disaster Location
    - 4) Disaster profile
    - 5) Worst disaster location area
    - 6) Disaster indicator
    - 7) Ongoing and past emergency response measures

b. Phases II

Make report of damage condition within at least 2 x 24 hours, which reported by SATLAK PBP to SATKORLAK PBP and will be sent to BNPB, includes:

- 1) Number of casualties, injured, missing victims, damaged house, refugee, and so on
- 2) Damage of public facilities and accessibility including house, school, church, mosque, hospital/puskesmas, clean water, roads and bridges, transportation facilities, and resources facilities
- 3) Damage of civil properties including house, field/farm/economic facilities
- 4) Financial loss estimation
- 5) Applied emergent response measures

c. Phase III

Make report to support phase II report including information of required support for disaster victim, includes:

- 1) Type of required support
- 2) Quantity of required support
- 3) Delivered support
- 4) Type and quantity of the support still needed

d. Phase IV

Make complementary report of all reported items and result of evaluation conducted by disaster study team, includes:

- 1) Rehabilitation and reconstruction object
- 2) Priority scale
- 3) Necessary budget
- 4) Table of support delivery and distribution (cost, material, personnel, expert, etc).

## 2.4 Publication of Disaster Information

<b><i>Responsible Agency:</i></b>	<b><i>Information and Communication</i></b>
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In occurrence of disaster or high risk of disaster occurrence, proper publication activities are conducted in order to disseminate disaster information and disaster management measures to community, with aim to stabilize community perspective and encourage them to take necessary actions.

### 1) Publication Items

#### (1) Publication soon after Disaster occurs

1. Climate information like heavy rain
2. Information of water level of river
3. Announcement to avert panic
4. Instructions, directive and guidance of Evacuation
5. Announcement to avert fire occurrence
6. Announcement of lifesaving support
7. Damage condition
8. Progress of emergency response
9. Information of emergency shelter, etc.

#### (2) Publication after Disaster

1. Climate information like heavy rain
2. Damage condition
3. State of achievement of emergency response
4. Transport facilities condition
5. Road traffic condition
6. Lifeline condition
7. Supply condition of aid supplies
8. Type of necessary support for disaster affected people

### 2) Publication Measures

Precise and accurate disaster information should be disseminated to community in order not to cause confusion at a disaster. In Kabupaten Padang Pariaman, accurate disaster information and precise instruction for evacuation/standby will be provided to community by the following manner

**(1) Emergency Radio Broadcast**

In order to disseminate accurate disaster information to community in an emergency, Bupati will call the community directly through private radio station (AM/FM)

**(2) Radio Communication for Administration**

Information will be transferred by radio communication.

**(3) Mosque Loudspeaker and Kentongan**

Information will be disseminated by Mosque Loudspeaker and Kentongan.

**(4) Car Loudspeaker and Occasional Public Relations Paper**

Publication will be conducted by public relations paper or sound by dispatch of car loudspeaker to the necessary area.

**(5) HP of Kabupaten**

Information is provided by HP of Kabupaten and internet etc.

**3) Disaster Records**

Damage situation will be recorded by photograph, video, etc. as material for publication activities.

**4) Utilization of Mass Media**

**(1) Multiplying of Publication Measures**

Information will be provided actively to mass media in order to disseminate information on damage condition and personal safety etc. to families and community who live in other area.

**(2) Publication of Support Information**

Publication activities will be conducted utilizing mass media in order to publicize information for necessary support such as aid supply and request of volunteer etc.

### CHAPTER 3. REQUEST FOR SUPPORTS

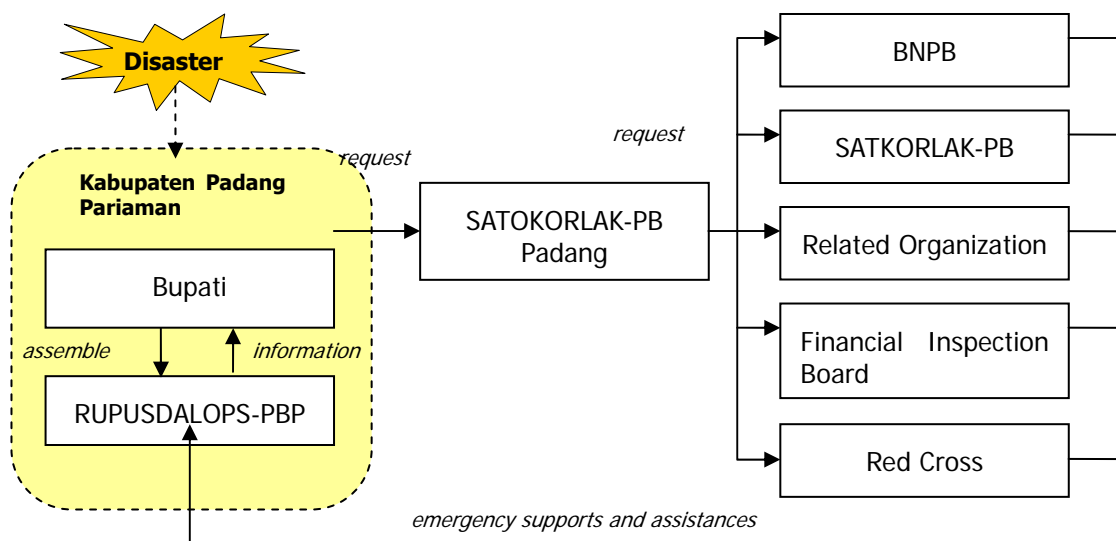
After a disaster occurs, RUPUSDALOPS-PBP (Emergency Response Headquarter) will request volunteer and related organizations supports in case that Kabupaten Padang Pariaman was unable to conduct emergency response and recovery activities without any external helps.

#### 3.1 National and Province

<b>Responsible Agency:</b>	<b>Social Agency</b>
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In case Bupati, head of RUPUSDALOPS-PBP, decides emergency assistance from outside Kabupaten due to heavy damage from disaster, SATOKORLAK-PB will be informed about the requests. After receiving requests from Kabupaten Padang Pariaman, SATKORLAK-PB will handle the arrangement with following organization and agencies in order to obtain necessary supports and assistances. The procedure is illustrated in Figure 3.1.1.

- National and provincial level, BNPB and SATKORLAK-PB
- Related organization such as SAR
- Fire fighting and Indonesian Red Cross



Source: JICA Study Team

**Figure 3.1.1 Request Procedure for Assistance from Concerned Organization**

### 3.2 Peripheral Kabupatens

<b>Responsible Agency:</b>	<b>Social Agency</b>
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There are five kabupaten/kota around Kabupaten Padang Pariaman; Kabupaten Agam is located in the North, Kabupaten Tanah Datar and Solok in the East, Kota Padang is located in the South, while Kota Pariaman and Indonesian Ocean in the West. In terms of distance, these kabupaten/kota have large opportunities to support Kabupaten Padang Pariaman under emergency circumstances.

#### 1) Support from the Peripheral Kabupatens

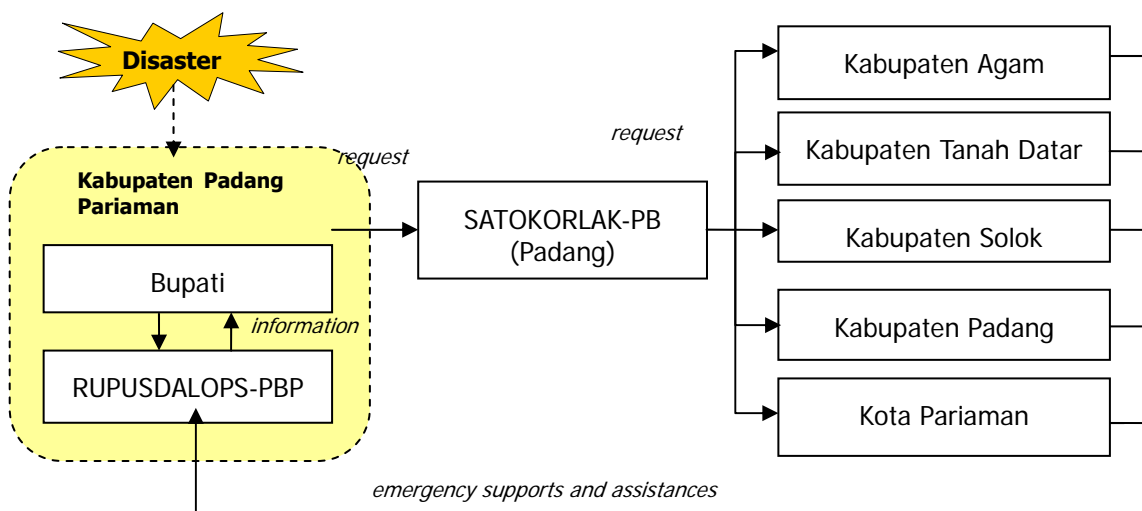
The five Kabupatens/Kota are expected to provide following supports and materials.

- Foods, drinking water, commodities and necessary equipments for supplying
- Rescue and recovery, first aid, infection disease prevention for refugees, and necessary equipments
- Vehicles for rescue and recovery
- Manpower for rescue and emergency medical treatment
- Others depending upon the requests

#### 2) Procedure of the Request

In case Kabupaten Padang Pariaman needs supports from the peripheral Kabupatens, formal requests shall be delivered through SATKORLAK-PB. The procedures are illustrated in

Figure 3.2.1.



Source: JICA Study Team

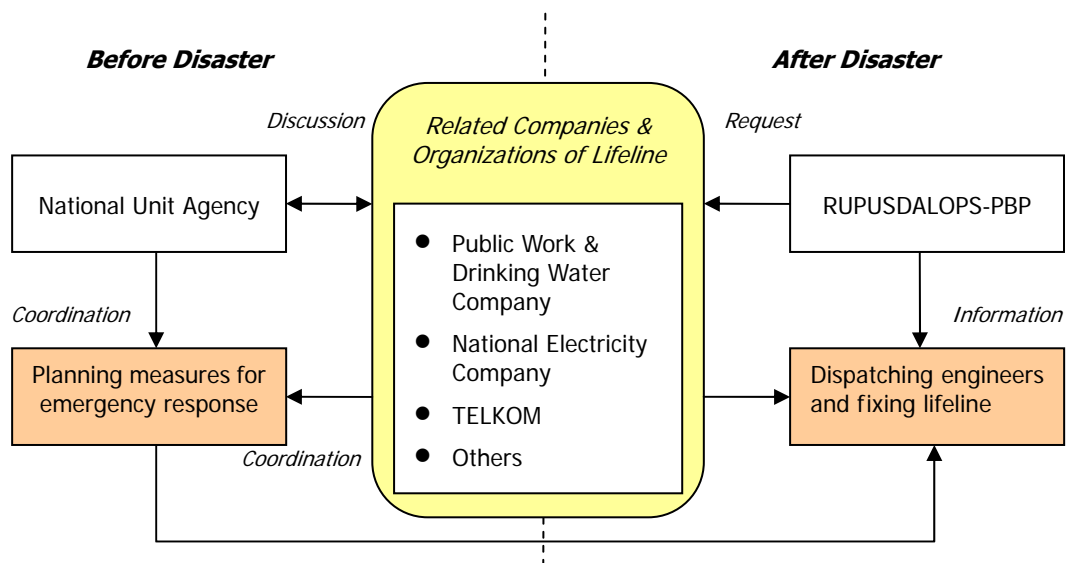
**Figure 3.2.1 Request Procedure for Assistance from Related Organization**



### 3.3 Disaster Management Related Organizations

<b>Responsible Agency:</b>	<b>National Unit Agency</b>
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In occurrence of disaster, RUPUSDALOPS-PBP takes a main role of manpower distribution for emergency response. In such emergency response, special techniques might be needed for repairing lifeline, such as water supply, gas, electricity and telecommunication. Therefore, National Unit Agency discusses with related organizations and companies in advance for formulating measures of emergency response, in particular, dispatching technical workers or/and engineers for immediate restoration works after occurrence of disaster. After disaster occurs, along with disaster management measures, RUPUSDALOPS-PBP requests physical helps to these organizations and companies for recovering lifeline. The procedure is illustrated in Figure 3.3.1



Source: JICA Study Team

**Figure 3.3.1 Request Procedure for Fixing Lifeline**

### 3.4 Military, etc.

<b><i>Responsible Agency:</i></b>	<b><i>Commander of District Military</i></b>
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In case RUPUSDALOPS-PBP needs supports from the military in order to lifesaving and/ or necessary property protection, Bupati will request for dispatching the military forces to SATKORLAK-PB. SATKORLAK-PB will convey the requests from Kabupaten Padang Pariaman to BNPB and the military.

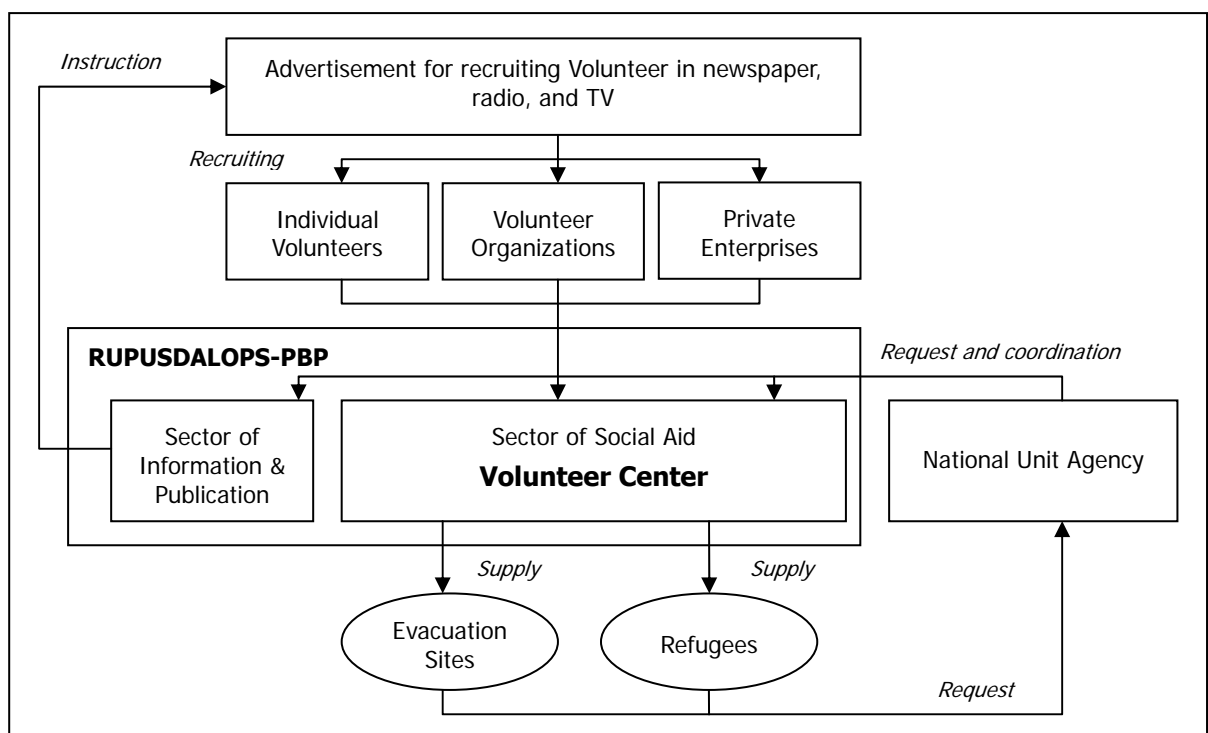
When it needs immediate action and no time to wait for formal procedure, Bupati will contact regional military office directly to request for their assistance and supports.

### 3.5 Volunteers

<b>Responsible Agency:</b>	<b>National Unit Agency</b>
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From the experience of disaster, volunteer organization including NGO has played an important role in emergency responses. For utilizing the workers, National Unit Agency will coordinate with volunteers for meeting demand such as recruiting, registration, and dispatching.

Volunteer coordination system is shown in Figure 3.5.1.



Source: JICA Study Team

**Figure 3.5.1 Volunteer Coordination System**

#### 1) Request

National Unity, Society Protection and Fire Fighting Agency will identify needs from other related organizations, agencies and damaged areas, and then convey the requests to a volunteer center which established under sector of social aid. The following items will be clarified for the requests.

- Name of facilities or evacuation sites subject to volunteers
- Period of activities
- Contents of activities

- Necessary expertise, knowledge and experience
- Number of volunteers

## **2) Recruiting**

Existing volunteer organizations/groups might not be enough to cope with problems caused by a disaster. Therefore, National Unity Agency will ask to recruit volunteers in individual, groups and organization through media such as radio, newspaper, and TV under Sector of Information & Publication of RUPUSDALOPS-PBP. The following information will be explained in the media.

- Contents of activities
- Period of activities
- Place
- Expertise, knowledge and experience
- Number of volunteers
- Contact person, address and telephone number

## **3) Information Desk**

The following items will be identified at information and registration desk of volunteer.

- Name of individual, group, and organization
- Expertise, knowledge and experience
- Number of volunteers
- Possible working period
- Time needed to destination
- Contact method

## **4) Control of Demand and Supply**

Based upon information from damaged areas and related agencies, volunteers will be dispatched appropriately to meet the demand.

## **5) International Volunteer**

Acceptance of international volunteers is mainly relied upon SATKORLAK-PB and BNPB.

## **CHAPTER 4. SEDIMENT DISASTER MEASURES**

### **4.1 Warning, Evacuation, and Guidance Measures**

<b><i>Responsible Agency:</i></b>	<b><i>National Unit Agency</i></b>
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Guidance is given to perform evacuation in order to secure safety of residents' lives in vulnerable areas such as landslide risk. Moreover, community cooperation should be obtained for prompt evacuation of those who may have difficulty to evacuate, such as infants, elderly, and disabled.

### **4.2 Preventive Measures for Secondary Disaster**

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency</i></b>
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#### **1) Confirming safe conditions of vulnerable area to landslide**

Any landslide prone areas by heavy rain are patrolled when a disaster occurs and necessary advice is given to the residents. Moreover, conditions of vulnerable area to secondary disaster are confirmed for safety and disaster countermeasures office will be contacted.

#### **2) Restrict access to a landslide area**

Surrounding of landslide prone area includes as a monitor zone until identification of its safety and considered as a restricted zone.

#### **3) Caution during search and rescue activities**

In case search activities are conducted for missing persons or for emergency rehabilitation work, sufficient cautions are taken and observation performed in preparation for a secondary disaster.

#### **4) Emergency measures**

In order to implement emergency measures to prevent escalation of damage caused by a secondary disaster, facilities and their surrounding area are checked and surveyed. Once they are deemed safe, emergency measures for secondary disaster prevention are performed.

### 4.3 Publication and Dissemination of Information to Community

<b><i>Responsible Agency:</i></b>	<b><i>Information and Communication</i></b>
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Information is transmitted to residents about vulnerable areas to landslide, evacuation sites, evacuation routes etc by television, radio, or community means (such as by an independent disaster prevention organization).

## **CHAPTER 5. TSUNAMI DISASTER MEASURES**

When there is huge movement caused by earthquake at sea bottom, it is assumed that tsunami occurs. In several cases, even earthquake felt only as small earthquake that occurred in the seas near coastal area or in the distant seas, huge tsunami could rush suddenly. As occurred on 12 September 2007 in West Sumatera Province, earthquake was not too big, only 7.3 SR. Most residents could feel it, however, they did not know that small tsunami has occurred and attacked coastal area in West Sumatera, especially Kota Padang. Height of the wave was 2,5 meters and community thought it was only a rising tide.

This chapter will elaborate emergency response measures when tsunami occurs.

### **5.1 Receiving and Transmitting Weather Forecasts and Warnings**

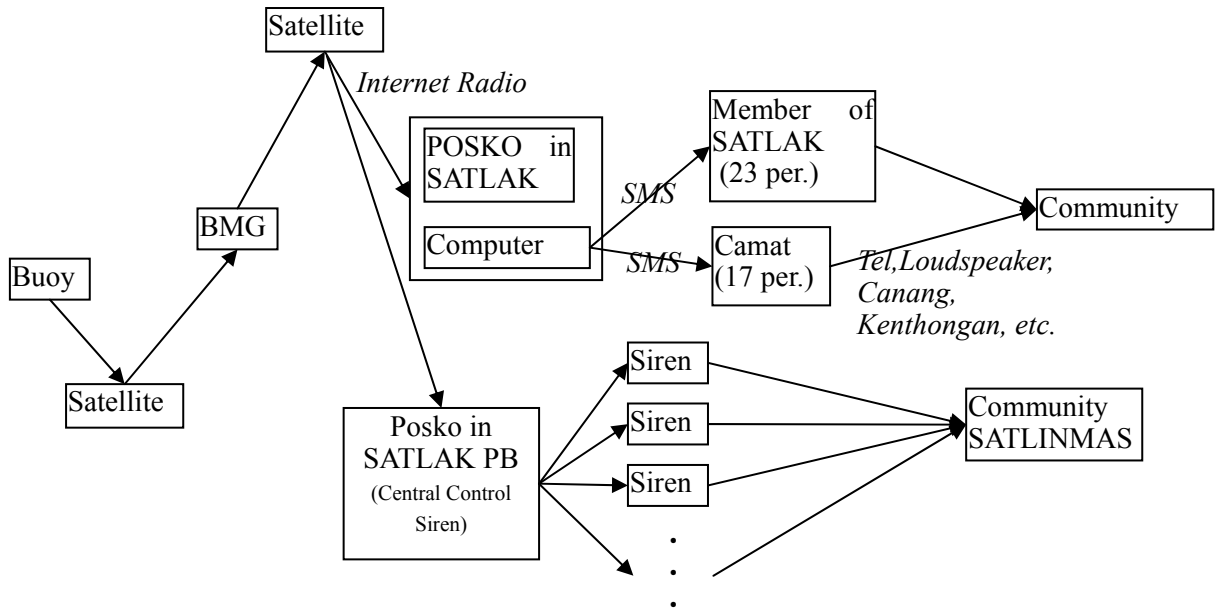
<b><i>Responsible Agency:</i></b>	<b><i>Transportation Agency, Army, Police, BMG</i></b>
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Since Tsunami might reach coastal area in a short time after earthquake occurs, emergent evacuation is needed. When there is issue of tsunami warning, the warning should be transmitted promptly and properly by the following procedure.

#### **1) Warning for Tsunami**

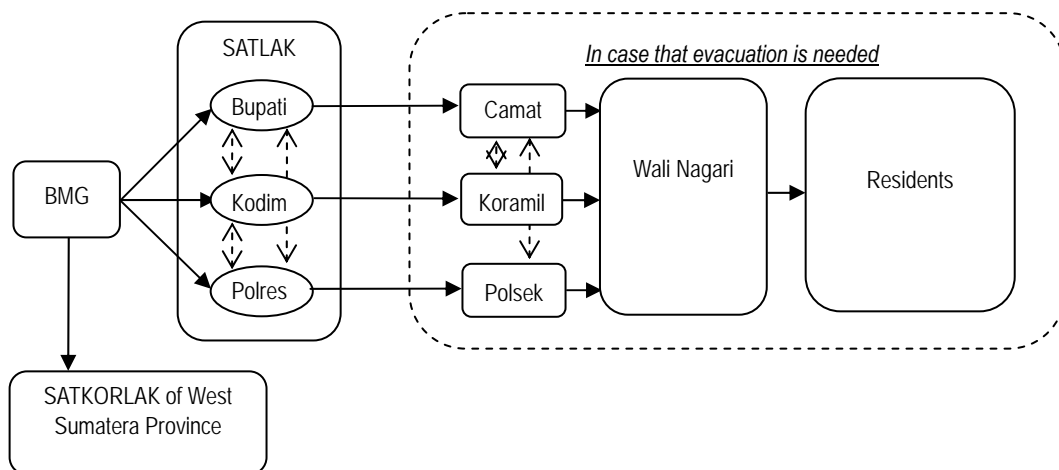
BMG issues warning for tsunami and transmits to Internet Radio in SATLAK PB Post. Automatically, internet radio will transmit the information by SMS to SATLAK PB members and Camat. SATLAK PB members and Camat will advice community to keep alert.

Simultaneously, SATLAK PB also receive information from BMG by satellite which received by Siren Control Center located in SATLAK PB Post. By order from Head of SATLAK PB, siren of tsunami warnings located in entire coastal area of Nagari will make a sound or give tsunami warning. Community that have alerted will directly go to evacuation route for evacuation.



**2) System for Receiving and Transmitting Weather Forecast and Warning**

Early warning (information) from BMG to Kabupaten Padang Pariaman will be received and transmitted by the following procedure. Necessity of evacuation is indicated by BMG and evacuation is ordered by Bupati.





## 5.2 Measures after Tsunami Occurs

<b><i>Responsible Agency:</i></b>	<b><i>SATLAK</i></b>
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### 1) Sea Surface Monitoring

When weather forecast and warning from BMG to Kabupaten is received or strong earthquake is felt around coastal area and need to evacuate arises, warning should be promptly transmitted to residents and companies near coastal area through mosque loudspeaker and drum. Moreover, sea surface monitoring will be conducted from safe position such as a hill.

### 2) Evacuation Instruction/Directive

When warning from BMG to Kabupaten is received or abnormal condition is recognized, and need to evacuate arises, evacuation instruction/directive is promptly informed to the residents and the companies near coastal area through mosque loudspeaker and drum.

### 3) Report/Communication

When evacuation instruction/directive was issued for Tsunami, Bupati should be immediately reported the effect.

When evacuation instruction/directive was originally issued for Tsunami although there is no tsunami warnings announced by BMG, SATLAK would contact BMG and peripheral Kabupaten.

### 5.3 Evacuation without Receiving Warnings

<b><i>Responsible Agency:</i></b>	<b><i>Bupati and Wali Nagari</i></b>
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Kabupaten Padang Pariaman has not yet been seriously damaged by tsunami for the last 50 years. However, according to the record, in year 1883 there was an earthquake with 8.3 SR that caused a tsunami in West Sumatera Province, average altitude of tsunami wave along the shore in Kabupaten Padang Pariaman is 0-5 m which occurred 30-40 minutes after the main vibration. Because tsunami occurs only apart of 30 minutes, is insufficient for evacuation. Residents near coastal area have to secure themselves immediately to higher place without any tsunami warnings.

Therefore, residents near coastal area shall leave the area and evacuate to higher place when they feel ground shock even small one. It is important to have a clear idea that tsunami will come after earthquake near coastal area.

## **CHAPTER 6. RESCUE, FIRST AID, MEDICAL TREATMENT MEASURES**

### **6.1 Rescue, First Aid, Medical Treatment Measures**

<b><i>Responsible Agency:</i></b>	<b><i>Health Agency</i></b>
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#### **1) Rescue, First Aid System**

##### **(1) Principle of Activity**

Rescue and first aid activities shall be operated based on following principles.

- Life saving is the first priority in any case.
- Fire extinguish and related life saving is high priority activity.
- Effectiveness of rescue operation shall be considered to save more life.
- Application of triage for victims is determined based on the treatment priority.

##### **(2) Information Collection**

Necessary information for rescue operation shall be collected as much as possible through related agencies such as Red Cross, National Unity, Society Protection and Fire Brigade, *Tagana*, police, residents, and community information network. Attention shall be paid to hospital, large shopping center, hotel, theater and related buildings.

#### **2) Medical Aid System**

Medical Aid Team shall be organized in Health Agency to collect information for emergency medical support, take coordination between hospitals for acceptance of injuries and dispatch medical aid team to necessary place. Medical Aid Team will work in cooperation with local doctor association. Main task of this group shall be as follows.

##### **(1) Information Collection**

Damage information for medical facilities shall be collected by telecommunication network such as hospitals, clinics and related facilities. Activity information of medical facilities shall also be collected such as doctor activity including medical staffs, insufficient medicine and medical equipments and available beds.

**(2) Open of Medical Aid Service Spot**

Medical aid service spot shall be opened at neighborhood of disaster affected area using existing medical facilities under coordination by Medical Aid Team. Necessary medical team and materials will be provided by Health Agency.

**(3) Procurement of Medicines and Equipments**

Necessary medicines and equipments for emergency medical aid will be supplied by using available stocks of hospitals and clinics. Procured medical materials shall be distributed by Health Agency to medical aid service spot.

**(4) Dissemination of Medical Aid Service Information**

Medical aid service information such as care center, hospitals shall be disseminated to residents through announcement by Health Agency.

**(5) Cooperation with Medical Facilities from Outside Kabupaten Padang Pariaman**

In case of over capacity of existing medical treatment in Kabupaten Padang Pariaman due to huge scale of disaster, outside medical function shall be utilized in cooperation with provincial Health Agency in Padang. Heavily injured patients who need an integrated care will be transferred to outside hospitals from disaster damaged area by special transportation such as military helicopter. Request of medical support team to outside medical functions will be made through coordination by Health Agency of Kabupaten Padang Pariaman.

**(6) Open of Supply Center for Medical Aid Material**

Supply center for medical aid material shall be opened to classify and manage necessary medicines and related medical materials. In cooperation with pharmacist, necessary medicines and related materials shall be distributed to request sites.

## 6.2 Medical Treatment System

<b><i>Responsible Agency:</i></b>	<b><i>Health Agency, Red Cross</i></b>
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### 1) Medical Aid Headquarter

In order to cope with big disaster occurrence, Medical Aid Headquarter shall be established under monitor of Health Agency. Main purpose of this headquarter is to act as a center for medical aid activities and take necessary coordination for dispatching medical aid team, transportation and accepting patients.

### 2) Activities of Medical Aid Headquarter

Following activities shall be conducted by Medical Aid Headquarter in corporation with local doctors association.

1. Collection of disaster medical information such as damages for hospital, health center, association of doctors, dentists, nurses and pharmaceuticals through telecommunication system.
2. Information collection for medical activities by medical agencies including working situation of medical staffs, insufficient medicines and equipments, and available beds.
3. Local medical aid center (spot) shall be opened near disaster affected area in corporation with existing nearest hospital.
4. Necessary medicines and equipments for local medical aid center (spot) shall be collected and provided by Staff of Headquarter utilizing stocks and available facilities.
5. Information such as place and service on local medical aid center, hospitals and clinics shall be disseminated to residents as disaster medical information.
6. Information on hospital capacity outside of disaster affected area shall be collected and provided.
7. Heavily injured patients shall be transported to outside hospitals from disaster affected area by car or helicopter.
8. Dispatching doctors for charnel house to check corpse and take coordination for acceptance of medical support team from outside of disaster affected area.
9. Management of medical support and establish distribution center of medical equipments.

### 6.3 Procurement of Medicines and Medical Equipments

<b><i>Responsible Agency:</i></b>	<b><i>Health Agency</i></b>
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Provincial health agency will be requested for procurement of medicines and medical equipments in order to response shortage medicines and medical equipments, .

### 6.4 Mental Health Care

<b><i>Responsible Agency:</i></b>	<b><i>Health Agency, Religion Board</i></b>
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PTSD is popular sickness caused by strong impact of big disaster. In order to care and ease mental condition for patients such as elderly and younger generation, Health Agency shall take various measures in corporation with health center, doctors association, and medical volunteer for long-term point of view.

## **CHAPTER 7. FIRE FIGHTING MEASURES CAUSED BY EARTHQUAKE**

In occurrence of big disaster or high risk of disaster occurrence, emergency response system by Fire Fighting Office shall be planned as follow.

### **7.1 Fire Fighting Organization**

<b><i>Responsible Agency:</i></b>	<b><i>Fire Fighting Office</i></b>
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- Emergency response headquarter shall be organized in Fire Fighting Office to take necessary measures for disaster management. Head of Fire Fighting Office shall be the head of emergency response headquarter. Under this organization, local fire fighting system shall be cooperated to cope with disaster.
- According to level of alert such as level 1~4, special warning system shall be established in Fire Fighting Office.

### **7.2 Emergency Call and Mobilization**

<b><i>Responsible Agency:</i></b>	<b><i>Transportation Agency</i></b>
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Emergency call and mobilization system of fire fighting staffs shall be established to take necessary response to disaster.

### 7.3 Information Collection System

<b><i>Responsible Agency:</i></b>	<b><i>Information and Communication</i></b>
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#### 1) Method of Information Collection

Information on disaster situation and fire fighting shall be collected promptly and smoothly by utilizing available telecommunication network and related information sources in order to apply earthquake fire fighting activity.

#### 2) Information Collection Items

Following information shall be collected to prevent fire extension, secondary disaster and life saving for confined people in collapsed building by fire.

- fire occurrence and extension
- damage situation of human casualties for necessary rescue operation
- necessity of evacuation and evacuation condition
- damage situation of road, bridge, tunnel, port and railway
- damage situation of water pipeline, electricity and gas network.
- available support equipments including fire fighting trucks and boat.

#### 3) Information Sharing Method

Fire fighting communication network shall be utilized for information sharing. Radio system, internet and possible sharing system shall also be used.



## 7.4 Fire Fighting Activity

<b><i>Responsible Agency:</i></b>	<b><i>Fire Fighting Office</i></b>
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Fire Fighting Office shall take necessary activities to mitigate disaster damage and protect human lives and assets. Following activities shall be taken.

- Collection of disaster information such as weather condition, water level, high tide, damage situation, and fire fighting operation.
- Patrolling by fire fighting staffs to check damage situation and disaster potential.
- Dissemination of weather condition and evacuation information to community.
- Giving guidance on evacuation activity of community in case of evacuation is ordered.
- Rescue operation shall be conducted in cooperation with community disaster management organizations or related agencies.
- Damage protection activities shall be taken to prevent secondary damage due to landslide, and high tide in cooperation with related agencies.

## 7.5 Initial Fire Fighting Activity

<b><i>Responsible Agency:</i></b>	<b><i>Fire Fighting Office</i></b>
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### 1) Initial Fire Fighting Activity by Community

After strong earthquake, fire will be occurred immediately at many places. In this case, existing fire fighting capacity is not enough to cope with the situation. Therefore, community should conduct initial fire fighting to prevent fire extension using available equipments.

### 2) Initial Fire Fighting Activity by Residents

Residents shall patrol around their own community to check fire occurrence just after strong earthquake. In case of fire occurrence, residents shall directly inform fire fighting office and conduct initial fire fighting by themselves.

### 3) Cooperation with Community and Enterprises

In house fire fighting team organized by individual enterprise shall cooperate to initial fire fighting activity at surrounding communities.

## **CHAPTER 8. SAFETY CONTROL/TRANSPORTATION MEASURES**

### **8.1 Safety Control Measures by Police**

<b><i>Responsible Agency:</i></b>	<b><i>Police</i></b>
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#### **1) Basic Policy for Safety Control**

In occurrence of natural disaster or high risk of disaster occurrence, Police shall establish safety control system to take emergency response measures for related area. Main purpose of safety control system is to save residents life, assets and maintenance of transportation in disaster affected area. Based on safety control measures, social safety will be attained.

#### **2) Establishment of Safety Control System**

Head of police shall organize emergency response system to cope with natural disaster. According to alert level of natural disaster, safety control system will be enhanced. Command system for emergency response shall be established and disaster information sharing system among related agencies shall be enhanced.

#### **3) Disaster Emergency Response Measures**

- Collection and dissemination of disaster information to community.
- Supporting kabupaten government to disseminate disaster warning to community.
- Supporting emergency rescue operation in cooperation with kabupaten and related agency.
- Commanding evacuation to community in terms of necessary time and place.
- Traffic control and management to support smooth operation of emergency activities.
- Control of criminal activities such as robbery in disaster affected area by regular patrol in disaster affected area and evacuation sites.
- Supporting volunteer activities in disaster affected area and evacuation sites to secure social stability.

## 8.2 Sea Safety Control and Security Measures

<b><i>Responsible Agency:</i></b>	<b><i>KAMLA and Air and Water Police</i></b>
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In response to natural disaster occurrence, KAMLA and Air and Water Police shall take safety control and security measures in the sea in order to protect human lives and assets. Following activities shall be conducted.

- Establishment of emergency response system according to disaster situation.
- Disaster information collection and sharing among related agencies.
- Information dissemination on damage of ships, situation of maritime rescue and so on in close cooperation with related agencies.
- Recommendation of evacuation and evacuation area in the sea and dispatch warning to ships.
- Operation of maritime rescue on ship wrecks at disaster occurrence.

### 8.3 Road Transport Management

<b><i>Responsible Agency:</i></b>	<b><i>Transportation Agency</i></b>
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Transportation Agency shall analyze disaster information and take necessary transportation control measures to secure emergency transportation network for emergency operation including necessary vehicle operation and evacuation of community. Following activities shall be planned.

- Transportation shall be controlled in disaster affected area to protect against traffic congestion and inflow traffic from outside. Alternative route and related traffic information shall be disseminated and displayed to solve congestion.
- Transportation of emergency vehicles such as ambulance or rescue operation shall be secured at first priority immediately after disaster occurrence.
- Traffic information shall be collected through police stations and related agencies to smooth operation of traffic control.
- Information of traffic control shall be disseminated by display board, announcement by car and utilizing radio broadcasting.
- Emergency vehicles used for giving evacuation warning, fire fighting, rescue operation, restoration of damaged facilities, cleaning and epidemic control, traffic control, police patrol, and related specific vehicles shall be checked and managed as priority traffic.

## **CHAPTER 9. DEBRIS REMOVAL MEASURES**

Debris such as rocks, sand and gravels, woods, bamboo etc, generated by landslide or building collapse will be a barrier not only for road transportation network but also for smooth operation of rescue activities in disaster affected area. Moreover, this debris will cause secondary damage such as flooding in river channel. Therefore, debris removal is important measures for emergency disaster management. Following measures are planned.

### **9.1 Target of Removal**

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency</i></b>
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Debris removal shall be operated by responsible agency for the following reason.

- Immediate removal of debris is necessary to protect human life and assets.
- To conduct emergency operation such as evacuation, fire extinguishes and rescue.
- To protect flooding in river channel.
- To keep traffic safety and transportation route.
- Necessary for related public purposes.

### **9.2 Team of Removal**

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency</i></b>
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Public Works Agency shall conduct debris removal in cooperation with community, NGO and voluntary members.

### 9.3 Method of Removal

<b><i>Responsible Agency:</i></b>	<b><i>Cooperation</i></b>
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Public Works Agency shall prepare necessary machines and equipments for debris removal such as bulldozer, crane, dump truck and related tools. Available private-owned heavy machines and vehicles shall be temporarily used for debris removal if necessary. Debris removal in main road network, rivers and canals will be given high priority.

### 9.4 Temporary Storage Sites for Debris

<b><i>Responsible Agency:</i></b>	<b><i>Environment Office</i></b>
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Temporary storage site for debris shall be prepared either at public open space or at private land. Attention shall be paid not to cause secondary disaster due to dumping of debris.

## **CHAPTER 10. EMERGENCY TRANSPORTATION MEASURES**

Demand for emergency transportations will rise when big disaster occurs such as transportation of victims and refugees, emergency response staffs and supplies. In order to conduct quick and adequate transportation for disaster activities, emergency transportation measure are planed as follows.

### **10.1 Securing Transport Equipments**

<b><i>Responsible Agency:</i></b>	<b><i>Transportation Agency</i></b>
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#### **1) Vehicles of PMKAB**

Transportation Agency registers vehicles of PEMKAB which are necessary for emergency transportation activity as an emergency vehicle beforehand and keep these under control. Transportation Agency requests to allocate the vehicles and use by order from the Agency.

<b>No.</b>	<b>Type</b>	<b>Name</b>	<b>Registration No.</b>	<b>Max. authorized payload (unit; tone, person)</b>	<b>Agency</b>

#### **2) Procurement Request**

In case they cannot cope with disaster activities only by using vehicles of PEMKAB, Transportation Agency requests vehicles as follows.

##### **(1) Request from Organizations in PEMKAB**

- Car, Truck and Special vehicle  
Request to a bus company and a transportation company
- Fishing boat  
Request to a fisherman

##### **(2) Request to the Province**

- Car, Truck and Special vehicle
- Vessel



### **(3) Request to a Railway Company**

In case of railway is suitable, request the railway company for cooperation

### **(4) Request for Air Transportation**

In case air transportation is needed, request to utilize airplanes of the army and the police.

## **3) Security of the Emergency Traffic Vehicle**

Transportation Agency issues an emergency vehicle certificate to vehicle engaged in emergency transportation activity. Driver has to put the vehicle certificate only for emergency transportation activity.

## **4) Transportation Plan**

### **(1) Prioritized Purpose**

Purpose of using emergency transportation is depended on urgent situation. The following are procedure for emergency transportation measures.

#### **A. 1<sup>st</sup> stage (From right after disaster until second day of disaster)**

To supports directly either dead or injured victim by occurrence of disaster, following items are necessary to be prioritized to reduce confusion of disaster.

- An ambulance service, medical service and staffs who manage medical supplies and other supplies
- Firefighting, flood control activity staffs and staffs who manage prevention of a disaster
- Staffs or supplies which are necessary for first aid disaster measures such as staffs from national and local government, information and communication, electricity, gas, the water service institution security guard
- Injured peoples who are transported to public health center or hospital
- Staffs and equipments that are necessary for emergency transportation such as transportation facilities, emergency rehabilitation of transportation center and traffic regulation

#### **B. 2<sup>nd</sup> stage (From the third day after the disaster during about first week)**

To mitigate damage and manage confusion caused by occurrence of disaster, following items are necessary to recover quality of life for emergency.

- The 1st stage continuation activity
- Supplies which are necessary to support daily life such as food, water, etc
- Disaster victims and handicapped who are transported to outside of disaster area

- Staffs and equipments that are necessary for emergency rehabilitation of transportation facilities

**C. 3<sup>rd</sup> stage (After about one week from the disaster)**

To supports daily life that became more difficult by disaster, and things which are necessary to be reconstructed after disaster, mainly focus on following items.

- The 2nd stage continuation activity
- Staffs and equipments that are necessary for reconstruction process after disaster
- Life needs

**(2) The Transfer Lines**

The transfer lines are refereed “2-11 Development of Emergency Transportation Facilities”.

## 10.2 Securing Transportation Network

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency</i></b>
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In occurrence of disaster, Public Works Agency handles immediately the damage situations of the roads and removes obstructions on the road and implements emergency rehabilitation to secure the transportation network. In emergency rehabilitation, securing transportation network is urgently implemented.

### 1) Report of the Traffic Barrier

Public Works Agency implements information sharing with related organization such as the province, police, and gains or reports the damage situations of the road for securing emergency transportation network.

### 2) Remove Barriers on Emergency Transportation Road

Public Works Agency in cooperation with the province removes barriers on emergency transportation road.

- After disaster occurs, Public Works Agency checks damage situation of emergency transportation roads. When responsible road management from the province checks the emergency transportation roads, Public Works Agency cooperates with them.
- When there are barriers by outflow of soil as emergency transportation road, Public Works Agency attempt to collect information of the road section and implement information sharing with the province and related organization.
- Public Works Agency will prioritize road section for removal of barriers in consideration of the importance and effectiveness of emergency transportation road.

## **CHAPTER 11. DISASTER RESPONSE ACTIVITIES BY COMMUNITY AND PRIVATE ENTERPRISES**

It is totally depend on mutual disaster damage mitigation and prevention activities by community and private enterprises to secure safety of individuals, family and community member. The following measures shall be taken by community and private enterprises.

### **11.1 Disaster Response Activities by Citizens**

<b><i>Responsible Agency:</i></b>	<b><i>Bupati</i></b>
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#### **1) In house Activities**

Resident shall take following disaster response activities:

- Keeping safety of family member as much as possible and prevent fire occurrence
- Information collection by radio or television to get update situation of disaster
- Preparation of portable lamp, radio, medicines, clothes, valuables goods and emergency food
- Saving drinking water
- Check safety of own house
- Check safety of family members

#### **2) Community Activities**

Community members shall take following activities to secure community safety.

- Community members shall conduct rescue activity and first aid for neighborhood, fire extinguishes and so on, cooperates with related agencies in emergency measures.
- Check safety of elderly or handicapped living within the community.
- Give first aid to slight injuries.
- Evacuate smoothly according to evacuation warning to temporary evacuation site.
- Actively join community disaster activities.

## 11.2 Disaster Response Activities by Community Groups

<b><i>Responsible Agency:</i></b>	<b><i>Bupati</i></b>
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In order to take effective emergency measures, it is important to prepare a well organized and trained community for disaster management. Expected disaster response activities by community are as follow.

- Rescue and first aid shall be conducted for confined victims within a building or house collapse by disaster. Emergency treatment shall be given to necessary victims. If medical treatment is necessary, injuries shall be transported to hospital. Safety check and rescue for elderly or handicapped living in the community is high priority activity.
- Evacuation guide and safety check of the community members at evacuation site is important. For movement of elderly or handicapped to evacuation site, special support should be made by community members.
- Disaster information collection and dissemination shall be conducted through hearing of community and site observation. Collected information shall be reported to Bupati and disseminated to community members precisely to prevent a panic.
- Community members shall support and cooperate to distribute drinking water and food services from kabupaten or social welfare agency.
- Management and operation of evacuation site shall be conducted by community members in cooperation with NGO or voluntary staffs.

### 11.3 Disaster Response Activities by Private Enterprises

<b><i>Responsible Agency:</i></b>	<b><i>Private Enterprises</i></b>
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Disaster response activities by private enterprises are as follow.

- Disaster and damage information collection shall be conducted to minimize damage and promote necessary activities effectively after occurrence of disaster. Private enterprises have to check safety of employees and their family and provide proper support if necessary.
- Rescue operation and first aid for employees shall be provided to victims by each private enterprise.
- Evacuation guide shall be conducted smoothly to employees according to emergency manuals prepared by each private enterprise.
- Private enterprises shall cooperate and join community disaster management activities as well as own organization.
- After completion of damage survey and emergency response, private enterprises shall start their own activities to restore regional economy.

## **CHAPTER 12. EVACUATION MEASURES**

When disaster occurs and there is a risk of secondary disaster, or there are vulnerable houses to landslide, etc, it is necessary to secure resident safety by evacuating to safe area temporarily.

This chapter will elaborate plan for evacuation measures, such as dissemination of evacuation preparedness information, evacuation guidance or order, call for evacuation/transfer, opening of evacuation site.

### **12.1 Evacuation Plan**

<b><i>Responsible Agency:</i></b>	<b><i>National Unity, Society Protection and Fire Brigade Agency</i></b>
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#### **1) Procedure of Evacuation**

Resident evacuation after occurrence of earthquake is basically carried out by self evacuation. However, considering uncertainty of road network damage, evacuation route could not be determined. Selection of evacuation routes could be based on actual damage conditions.

#### **2) Evacuation Action**

##### **(1) Evacuation Guidance / Order (or Self Evacuation)**

After occurrence of earthquake,

1. When residential house is totally or moderately collapsed and feels danger or anxious of human life,
2. When there is risks of fire outbreak or spreading of fire,
3. When there is risks of landslide,
4. When Tsunami warning is announced and houses are in danger, and
5. When PEMKAB announced evacuation guidance and order

Community is advised to start evacuation promptly.

In principle, evacuation activities to designated evacuation sites are self-evacuation. However, for vulnerable groups, Community Organization for Disaster Risk Management together with neighbor resident shall cooperate to carry out evacuation.

**(2) Temporary Evacuation**

As initial step, community will temporary evacuate to nearest evacuation sites or facilities such as schools, mosques, public buildings, and parks for risk aversion. After arrival at evacuation sites or facilities, attempt to report on personal and their family safety confirmation and building condition of their house to administrators of the areas. After some time, if safety of the house is confirmed, it was advised to return to the house.

**(3) Temporary Evacuation Facility**

After occurrence of earthquake, when houses are damaged or burned, or houses still under risk, disaster victims are accepted at evacuation facilities after safety confirmation of facilities.

**(4) Temporary Housings**

After establishment of evacuation facilities, temporary housings are constructed, disaster victims are transferred to these temporary housings considering priority for those with elderly groups.



## 12.2 Announcement of Evacuation Warnings

<b><i>Responsible Agency:</i></b>	<b><i>National Unity Agency</i></b>
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In occurrence of disaster, it is necessary to protect human life from disaster and prevent spreading of damages by following procedures of evacuatio (represent evacuation guidance and order).

<b>Type of Warnings</b>	<b>Description</b>
Evacuation Guidance	When disaster occurs or high risk of occurrence of disaster, evacuation warning is announced to community
Evacuation Order	Devastating disaster occurs or high risk of occurrence of devastating disaster, evacuation order is announced to community. This order is stronger than Evacuation Guidance

### 1) Decision Criteria of Evacuation Warnings

1. When Tsunami Warning is announced and there is risk of buildings collapse and inundation by Tsunami
2. When there is risk of building collapse by after shocks, or fire outbreak, and danger of resident life is anticipated
3. When land slide is occurred, or there are risk of occurrence, and danger of resident life is anticipated
4. When head of Rupusdalops PBP find necessity to evacuate by considering disaster condition

### 2) Person who give Evacuation Warning and Order

When there is danger on resident life, Bupati will announce warning to resident in the area, or in case of emergency, will order evacuation. However, if Bupati is absent or cannot execute his duties, by following order, substitute can act on behalf of Bupati and have the same authority to give evacuation warnings.

- |  |
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| <ol style="list-style-type: none"> <li>1. Vice Bupati</li> <li>2. Assistant I</li> <li>3. Head of National Unity Agency</li> </ol> |
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### **(1) Substitution by Supporting Organizations**

When there was upcoming danger due to occurrence of disaster, and no time for asking Bupati decision, or Bupati is absent, any related organizations could substitute authority of Bupati for giving evacuation warnings to secure lives of resident.

After announcement, related organizations who gave evacuation warnings, will report to Rupusdalops PBP promptly.

### **(2) Substitution by Governor**

Due to devastating disaster, if most of roles of Rupusdalops PBP in Kabupaten cannot be implemented, Governor has power to take over all or part of authority of Bupati. Governor will announce beginning and end of the take over. When Governor substitutes the role of Bupati, Governor will report to Bupati about the take over. Then, whenever Bupati have recovered and could execute his duty, Governor will return the roles to Bupati immediately.

## **3) Contents of Evacuation Warnings**

Person who announced evacuation warnings will warn or order evacuation by clearly mentioning the following items to community.

1. Reason of necessity of evacuation
2. Target area of evacuation guidance or order
3. Location of Evacuation Site
4. Evacuation Route
5. Caution Points for Evacuation

## **4) Deliverance of Evacuation Warnings**

Deliverance of evacuation warnings is done by radio communication, mosque loudspeaker, van loudspeaker, and traditional emergency bell (Kentongan). For Kabupaten Padang Pariaman level, need to assign institution or agency to announce evacuation warning. It is necessary in order to avoid miscommunication of the order caused by the irresponsible party who is trying to take advantage from mass panic.

## **5) Reporting, and etc**

### **(1) Report to Related Organizations**

When Bupati or related organizations announced evacuation warnings, the situation should be reported to Governor and other related organizations.

**(2) Dissemination to Community**

When evacuation warnings are announced or received notification that other related organizations gave evacuation warnings, the situation should be disseminated to community by using communication system of PEMKAB. Moreover, when evacuation warnings are announced, update situation will be informed to community.

**6) Announcement of Evacuation Warnings**

Bupati will announce evacuation warnings, when there was emergency condition. He will announce immediately and report to Governor.

## 12.3 Set up of Alert Area

<b><i>Responsible Agency:</i></b>	<b><i>National Unity Agency</i></b>
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When disaster occurs, or will occur immediately, in order to protect human lives from disaster, and prevent spreading of damages, alert status is determined. Alert Area is configured and strictly limited or prohibited access to the Alert Area except personals engaged for emergency response activities, or order to leave from the Alert Area.

### 1) Announcement to Set up of Alert Area

Measure to set up of Alert Area is ordered by Bupati. However, if Bupati is absent or cannot order for set up of Alert Area, by following order, substitute can act the same as Bupati and have the same authority to set up of Alert Area.

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| <ol style="list-style-type: none"><li>1. Vice Bupati</li><li>2. Assistant I</li><li>3. Head of National Unity Agency</li></ol> |
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### (1) Substitution by Supporting Organizations

When there is upcoming danger due to disaster, and no time for asking Bupati decision, or Bupati is absent, any related organization could substitute the authority of Bupati for set up of Alert Area to secure lives of residents.

Those supporting agencies/organizations are:

- Transportation Agency (related to BMG)
- Irrigation Agency (related to the increase of level water in river)
- Public Work Agency (Related to area condition)

After announcement, related organizations who gave evacuation warnings, will report to Rupusdalops PBP promptly.

### (2) Substitution by Governor

Due to devastating disaster, if most of roles of Rupusdalops PBP in Kabupaten cannot be implemented, Governor has power to take over all or part of authorities of Bupati. Governor will announce beginning and end of the take over. When Governor substitutes the role of Bupati, Governor will report to Bupati about the take over. Then, whenever Bupati have recovered and could execute his duty, Governor will return the roles to Bupati immediately.

## 12.4 Advice for Evacuation and Transfer

<b><i>Responsible Agency:</i></b>	<b><i>National Unity Agency</i></b>
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### 1) Advice for Evacuation

1. Advice for Evacuation will be implemented by coordination with Muspika (head of kecamatan, police at kecamatan level and army at kecamatan level), public figure and religion figure for disaster risk management.
2. At schools and public facilities, administrator of the facility will implement evacuation derivation.
3. Evacuation will give priority to vulnerable groups and next to ordinary residents.
4. Evacuation staff will attempt to confirm security of evacuation route and indicate danger area to avoid unnecessary accidents on the way to evacuation site.
5. During evacuation, community organizations for disaster risk management and neighbors and community groups cooperate to conduct disaster risk measures.
6. In order to avoid chaos and danger at evacuation sites, residents should advice to bring minimum personal items as possible.

### 2) Transfer

When refugees cannot evacuate themselves, evacuation should be done by using vehicles or other means of transportation, these refugees will be transferred.

### 3) Response for Persons Located in Public Space or Lodging Facility

#### (1) Response for Resident Located in Public Space or Lodging Facility

Administrators of public space and lodging facilities such as hotels, and department store, stadiums, etc, shall attempt to prevent confusion of refugee after occurrence of disaster, understand their facilities, and try to implement evacuation promptly and effectively. Moreover, inform the nearest evacuation sites and when disaster occurs, give advice to nearest evacuation sites promptly.

### 4) Remote Area Evacuation at Devastating Disaster

#### (1) Evacuation to neighboring Kecamatan or Kabupaten

When devastating scale of disaster occurs, and designated evacuation sites cannot be occupied, and secured, Bupati will request and report to Governor for usage of evacuation sites in neighbor Kabupaten. In case of Kecamatan level, Camat will request and report to Bupati.

However, if in urgent condition, or absence of Governor, or disorder of communication system, and cannot request and report to Governor or Bupati, Bupati or Camat can be requested to neighbor Kecamatan or Kabupaten directly.

At certain condition, there some kecamatans located in remote area and the only possible access is directing to neighboring Kabupaten; therefore, head of kecamatan, according to its hierarchy, can establish evacuation facility in neighboring kabupaten's area.

## **(2) Evacuation Method**

Basically, transfer of refugee will be implemented by its Kabupaten, however, in case of devastating scale of disaster and disorder of transportation function, could directly request to neighbor Kecamatan or Kabupaten and cooperate together for transferring these refugee.

Moreover, when land transport cannot be used due to roadblock, etc, other means of transport such as sea transport and air transport should be considered as necessary measures with flexibility.

## 12.5 Set up of Temporary Evacuation Site and Its Management and Operation

<b><i>Responsible Agency:</i></b>	<b><i>National Unity Agency</i></b>
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### 1) Self Evacuation before Establishment of Rupusdalops PBP

When disaster occurs and residents feel necessity of self-evacuation due to danger of damage, administrators of evacuation facilities will accept this refugee in order to secure safety of residents. Moreover, when administrators of these facilities accepted refugee, administrator shall report to National Unity Agency promptly.

### 2) Establishment of Temporary Evacuation Sites

#### (1) Criteria to Establish Temporary Evacuation Sites

When evacuation guidance is announced and necessity of self-evacuation is determined, Rupusdalops PBP in cooperation with administrators of facilities will discuss and check safety of designated temporary evacuation sites, then establish the facilities.

In urgent condition such as Rupusdalops PBP cannot respond, even before decision by Rupusdalops PBP, administrators of these facilities can decide establishment of temporary evacuation facilities.

#### (2) Period of Establishment

Period of establishment of temporary evacuation sites will be decided by considering condition of damage, emergency houses reparation, and construction of temporary housings. However, period can be extended by discussion with National Unity Agency and Facility Administrators.

### 3) Acceptance of Evacuation Sites

#### (1) Target Occupants

1. Residents who suffered from damage to their houses, and lost their living spaces
2. Residents who suffered from damage to their houses, and necessary to evacuate promptly
3. Residents who may suffer from damage due to disaster and need to evacuate promptly
4. Persons who visited the area temporary and cannot return to their own living area
5. Persons who has difficulty of living due to disaster

## **(2) Advice for Evacuation**

Staffs of PEMKAP, *Muspika*, public figure and religion figures for Disaster Risk Management will cooperate and accept refugee to evacuation sites.

The following remarks must be considered as follows;

1. Giving confirmation of safety of evacuation routes and prohibition to enter danger area. Especially for nighttime evacuation, try to evacuate with special care such as utilization of lights, etc.
2. Installing signboard of evacuation route that easy to follow either at noon or at night as well as installing dangerous sign along the evacuation route
3. Priority of evacuation is decided and implemented by discussion with facility administrators in advance.
4. Try to evacuate in household unit who has person in vulnerable group

## **4) Management and Operation of Temporary Evacuation Sites**

Due to limitation of staffs in PEMKAB, they cannot be assigned in each evacuation sites, and responsible persons for each evacuation facilities will be its administrators. Therefore, actual management and operation of temporary evacuation sites shall be implemented by refugee themselves. For this reason, the situation shall be disseminated to residents and try to understand their roles in evacuation sites by training leaders of community organizations for disaster risk management.

However, if the condition of community resources in evacuation site were low, management of evacuation facilities would becomes responsible of PEMKAB in order to have good management.

### **(1) Management and Operation Body of Evacuation Sites**

Management and Operation of Temporary Evacuation Sites are implemented by administrators of facilities. However, actual management and operation will be implemented by Community Organizations for Disaster Risk Management and local residents. Refugee in each evacuation sites should formulate Committee for Operation of Evacuation Sites.

### **(2) Fundamental Role of Committee for Operation of Evacuation Sites**

Role of Committee for Operation of Evacuation Sites are as follows;

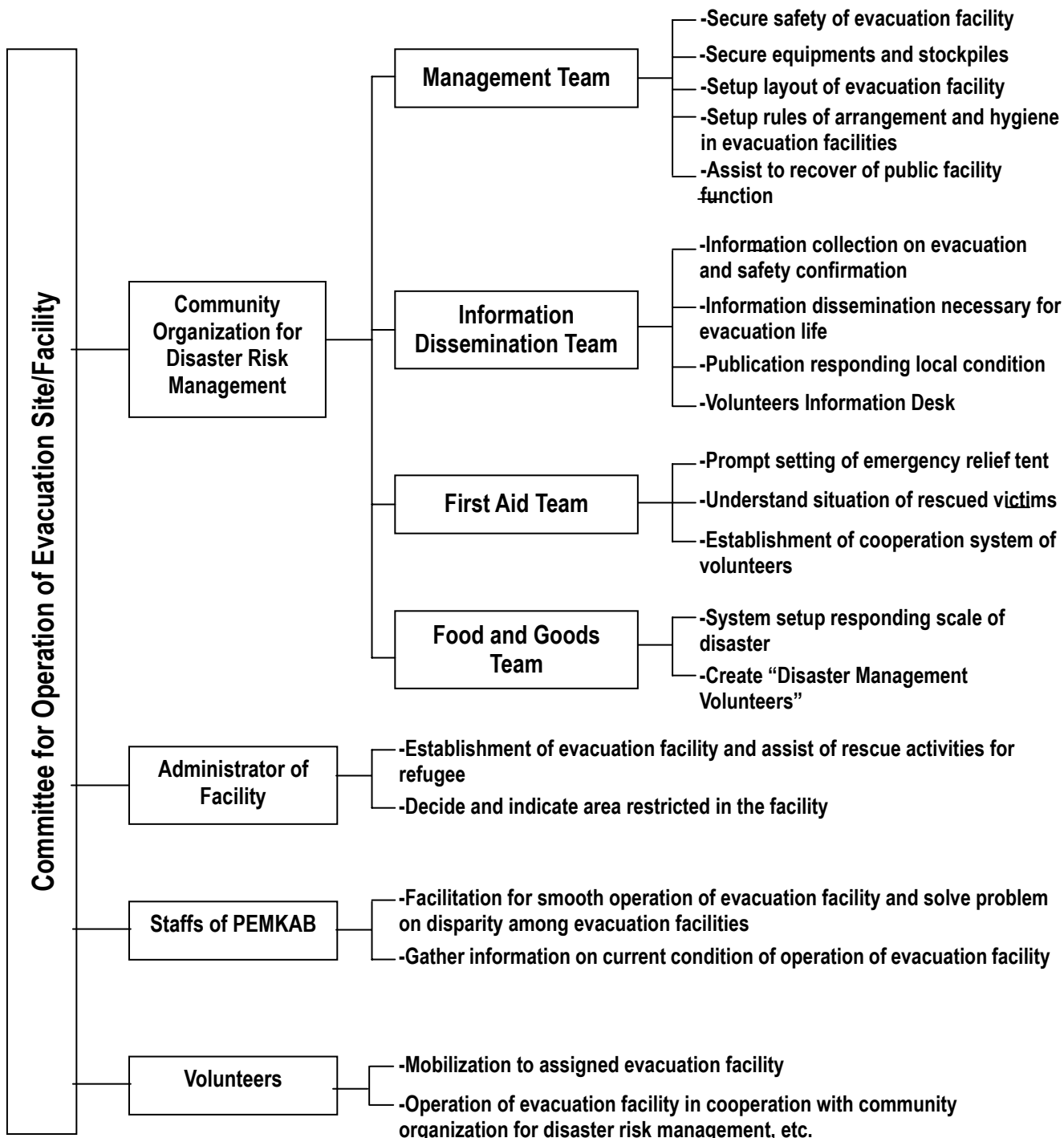
1. Information Dissemination from Rupusdalops PBP
2. Safety Confirmation of Residents, Preparation of List of Refugee
3. Discussion, Decision, Total Coordination of Aspects related to Operation of Evacuation Sites



4. Preparing Rules in Evacuation Life (Clean, Treatment of Garbage, Sanitation, Inquiry from Outside) and comprehensive implementation of the rules so that orderliness in evacuation sites can be achieved.

### (3) Composition and Role of Committee for Operation of Evacuation Sites

Committee for Operation of Evacuation Site is formulated by Community Organizations for Disaster Risk Management, Administrators of Evacuation Sites, Staffs of PEMKAB, Volunteers, etc, and each role is as follows;



#### **(4) Role of Evacuation Sites**

Evacuation Sites, establish not only for accepting refugee but also for supporting residents when urban malfunction occurs due to disaster, and as for regional disaster management base, evacuation sites have following roles;

- Distribution and receiving base of Water, Foods, Commodities, and other materials supports. However, if the supports are obtained in big amount, it must be received through SATLAK PB due to unavailability of sufficient warehouse in evacuation facility and in order to avoid rapid traffic in evacuation site.
- Base of Medical Treatment/Aid
- Base of Information Dissemination/Transmission

#### **(5) Report on Conditions of Evacuation Sites**

Reports on condition of evacuation sites are done at establishment of evacuation sites and at its operation. Contents of report and contacted agencies are as follows;

##### **A. At Establishment of Evacuation Sites**

RUPUSDALOPS PBP will report to SATKORLAK PB and related organizations promptly. In case of emergency, administrator of evacuation facility will promptly report its action to RUPUSDALOPS PBP, and RUPUSDALOPS PBP will report to SATKORLAK PB and related organizations.

##### **B. At Operation of Evacuation Sites**

Administrators of evacuation facility will report to RUPUSDALOPS PBP when evacuation action completes the first stage on number of refugee, health condition of refugee, and other necessary information. Furthermore, administrators will report to RUPUSDALOPS PBP on condition of evacuation sites once a day and RUPUSDALOPS PBP will summarize collected information (mainly number of refugee) and report to SATLAK PB and related organizations.

### **5) Environmental Considerations of Evacuation Sites**

#### **(1) Considerations on Medical and Health Care**

Understand information on refugee condition at evacuation sites, as well as necessary medical and health care, which needed to be improved. Moreover, if evacuation life continues for longer period, doctors and nurses will be dispatched for management of health care activities. For PTSD treatment, if necessary, attempt to send counselors to evacuation sites.

**(2) Health Care of Refugee**

Doctors and Nurses will visit evacuation sites for advice on health care and nutrition consultation, based on condition, refugee with bad condition will be delivered to hospitals.

**(3) Response for Long Term Evacuation Life**

If evacuation life continues for longer period, other than procurement of emergency commodities, attempt to procure televisions, air conditioners, refrigerators, cooking equipments, vacuums, etc., to support refugee life. Moreover, at open spaces or parks, water supply for shower, washing etc shall be installed and keep for hygiene control.

**(4) Privacy Protection**

In accordance with long evacuation life, attempt to keep their privacy as much as possible to reduce stress on evacuation life.

**(5) Response to Victims outside Evacuation Facilities**

If all disaster affected people cannot be accepted at evacuation sites, some of refugees stayed at open spaces and park in tents, these refugee also need special attention for supplying commodities and other facilities.

**6) Consideration for Vulnerable Groups (Especially for Elderly and Handicapped)**

- For preparation on evacuation guidance and order, evacuation preparedness information will be disseminated and vulnerable groups who will take longer time will start evacuation action to designated evacuation sites.
- PEMKAB and Administrator of facilities will cooperate with Community Organization for Disaster Risk Management on safety check and evacuation measures of vulnerable groups.
- For securing life environment at evacuation facilities, and acceptance in temporary shelters, with cooperation of Social Welfare Agency, Volunteers and Welfare Centers, following points will be paid attention;
  1. Designation of location for vulnerable groups and conducting prompt evacuation
  2. Transfer of staff from welfare centers to community who needs special care such as bedridden elderly, etc.
  3. Designation of Welfare Centers as special evacuation facilities to accept persons who need special care
  4. Utilization of Welfare Centers
  5. Secure life environment at evacuation sites and procurement of wheel chairs

6. Understanding health condition at evacuation sites
7. Provision of Mental Care Center like PTSD
8. Special information to vulnerable groups
9. Priority acceptance in temporary shelters

## **CHAPTER 13. PANIC PREVENTION MEASURES**

Strong earthquake will cause various types of disasters simultaneously at various places. Social panic will be expected to happen due to disaster. In order to prevent social panic, following measures shall be planned.

### **13.1 Panic Prevention due to Lack of Information**

<b><i>Responsible Agency:</i></b>	<b><i>Regional Police</i></b>
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Immediately after occurrence of strong earthquake disaster, following measures shall be taken to prevent social panic within community due to heavy concentration of telecommunication, lack of information by mass media, electricity black out, incorrect information and flooding of information etc.

#### **1) Provision of Necessary Information on Disaster Situation**

Necessary information will change sequentially from immediately after occurrence of earthquake until recovery or restoration phase. In order to avoid social panic due to flooding of information, accurate information on disaster situation shall be provided. Following points are planned.

1. Immediately after occurrence of earthquake, disaster information such as disaster situation, tsunami, after shock, damage, prevention of secondary disaster, evacuation, rescue operation and response of government to disaster will be mainly and actively provided. In this phase, attention will pay on social stability and information accuracy.
2. Information on provision of water, foods and daily commodities will be disseminated to settle down social panic which happened just after disaster occurrence and damage situation.
3. Information on lifeline facilities such as reopening of lifeline service, transportation, commodity flow, medical service, education and administrative information for reconstruction will be provided after 3 days of disaster occurrence.

#### **2) Method of Information Dissemination**

Various types of information dissemination will be utilized such as radio system, TV, internet, SMS and helicopter to provide necessary disaster information to community. Newsletter will be published after disaster occurrence.

## 13.2 Transportation for Panic Prevention

<b><i>Responsible Agency:</i></b>	<b><i>Transportation Agency</i></b>
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In order to prevent fire after disaster occurrence, following measures shall be planned for emergency transportation staffs and equipments.

### 1) Measures by PEMKAB

1. Rupusdalops PBP shall acquire correct information on disaster situation through set of road transportation information.
2. Barriers including vehicles on national road networks connecting peripheral Kabupatens shall be removed smoothly by relevant agency and communication network shall be established along direct or alternative route of general vehicles.
3. Removal of barriers and necessary landfill for emergency road network shall be given high priority.
4. Information on prohibition for general vehicles to enter emergency vehicle route as well as alternative route shall be announced through various media.

### 2) Measures by Disaster Management Agency

1. In order to secure smooth transportation for emergency vehicles and evacuation, Police shall control or prohibit evacuation by private car.
2. Police will control transportation at disaster affected area.
3. Responsible agency of road management will remove barriers on the road.

### 13.3 Panic Prevention during Evacuation

<b><i>Responsible Agency:</i></b>	<b><i>Bupati</i></b>
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In case of announcement of evacuation order or instruction for community, including commuters, students and visitors to reduce human casualties at disaster occurrence, following measures shall be planned.

#### 1) Measures by PEMKAB

1. Evacuation order/instruction shall be disseminated through existing radio communication system. Public announcement car will be also used in consideration of road condition and fire extension.
2. Management staffs of evacuation site will provide information and take proper actions.
3. After identification of safety in damaged area, persons who can go back to their own house will return to home, while persons who cannot go back to their own house will stay at evacuation site.

#### 2) Measures by Disaster Management Agency

1. Related agencies will take necessary evacuation measures based on their responsibilities.
2. Police shall conduct regular patrol in disaster affected area and evacuation sites in case of emergency evacuation take place.



### 13.4 Panic Prevention at Public Facilities

<b><i>Responsible Agency:</i></b>	<b><i>Regional Police</i></b>
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Management of public facilities, which could accept many people including railway terminal and high-rise building, shall take following disaster management activities to secure safety of users.

1. Disseminate warning and damage information as well as disaster situation to public facilities users.
2. Utilize own facility for evacuation and guide users to regional evacuation site if necessary.
3. In case of evacuation, priority shall be put for handicapped, elderly, infant, patients and pregnant women. Special care shall be provided if necessary.
4. In case of difficulty of self-evacuation and rescue/help, supporting staff, equipments, barriers removal and transportation control etc, shall be requested to related agency.

## **CHAPTER 14. RESCUE/AID MEASURES**

In occurrence of big disaster, many disaster-affected people will lose their cooking equipments including food supply itself and no availability of lifeline functions due to collapse of houses. Moreover, disaster affected people may not get their daily food in shops or markets t because of unusual condition of big disaster. Therefore, it will be necessary to supply water, food and daily commodities to disaster affected people to maintain social stability.

It is necessary to conduct cleaning of huge volume of waste and debris generated by big disaster and also necessary measures shall be taken to prevent epidemics in damaged area. Medical aid for injured people and rescue and search operation for missing people are also important activities. Based on above points, following items are planned.

### **14.1 Food Provision**

<b><i>Responsible Agency:</i></b>	<b><i>Social Agency, Red Cross</i></b>
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Emergency food services will be provided to disaster affected people and rescue operation staffs by using emergency food stock and local procurement.

#### **1) Conditions of Emergency Food Service**

Conditions of emergency food service are, 1) to support refugee, 2) to supply food for emergency rescue operation staffs.

#### **2) Target of Emergency Food Service**

Emergency food service will be provided to 1) refugee lived in temporally evacuation site, 2) people who cannot cook by themselves due to damage of houses and 3) emergency rescue operation staffs through public kitchen system.

#### **3) Term of Food Service**

Emergency food service will be started at the day of disaster occurrence and ended at the day of no necessity of this service.

#### **4) Procurement of Foods**

Necessary foods such as rice, noodles, instant foods, milk and sugar etc, will be procured at possible local market.

**5) Food Stocks**

Emergency food should be stocked at disaster management center such as Kabupaten office, Kecamatan office and related agencies such as Indonesian Red Cross.

**6) Transportation**

Emergency transportation vehicles will be prepared by Transportation Agency of Kabupaten to distribute food to necessary sites.

**7) Place of Emergency Food Service**

Emergency food will be serviced at evacuation sites. Those who cannot access evacuation site such as elderly or handicapped shall be distributed through volunteer or community network.

## 14.2 Water Provision

<b><i>Responsible Agency:</i></b>	<b><i>Regional Water Company</i></b>
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Emergency drinking water supply will be conducted to disaster affected people.

### 1) Minimum Supply

Emergency drinking water will be supplied 3 liters as a target for one person per day at minimum volume.

### 2) Term of Supply

Emergency drinking water supply will be started at the day of disaster occurrence and ended at the day of no necessity of supply.

### 3) Place of Water Supply

Emergency drinking water will be supplied at designated sites such as temporary evacuation site and disaster management center.

### 4) Water Supply Method

Emergency drinking water will be supplied by water tank truck at designated sites and its distribution time according to water distribution schedule. Those who cannot access water supply site such as elderly or handicapped will be distributed through volunteer or community network.

### 14.3 Daily Commodity Provision

<b><i>Responsible Agency:</i></b>	<b><i>Social Agency, Transportation Agency</i></b>
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Daily necessary commodities such as clothes, blanket, kitchen wears, soaps, etc., will be supplied those who have lost their own daily necessary materials due to damage of residential house by big disaster.

#### 1) Implementation Organization

Social Agency will be the responsible agency of daily commodity supply to disaster affected people.

#### 2) Term of Commodity Supply

Daily commodity supply will be started at the day of disaster occurrence and ended at the day of no necessity of supply.

#### 3) Procurement of Daily Commodities

Daily commodities will be procured by emergency stocks and purchase at local market under management of Social Agency. All procured commodities will be stocked at disaster management center in Kabupaten and distributed to necessary evacuation sites.

#### 4) Management of Commodities

Officer of Social Agency have responsible to manage all procured commodity.

#### 5) Transportation of Commodities

Transportation Agency shall prepare necessary logistics to transport daily commodities from storage place to necessary evacuation sites. Items and volume of commodities shall be recorded before transport to distribution sites. All distribution data shall be listed and reported to head of Rupusdalops through Social Agency.

#### 6) Distribution of Commodities

Daily commodities shall be distributed to each refugee at temporary evacuation site under management of evacuation site manager. The commodities will be also distributed to those who requested necessary commodity supply to Social Agency (Social Welfare) due to poor living condition by disaster damage.

## 14.4 Acceptance of Goods from outside Disaster Affected Area

<b><i>Responsible Agency:</i></b>	<b><i>Social Agency</i></b>
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In order to supply necessary daily needs to refugee, Social Agency will accept aid materials from outside of disaster affected area.

### 1) Acceptance of Aid Materials

Necessary list of aid materials for refugee shall be prepared based on request from related agencies. Contents of material list, address to send and term of collection will be determined and disseminated to public through mass media.

### 2) Acceptance Place of Aid Materials

Designated storage place by Social Agency will be the first place for acceptance of aid materials from outside of disaster affected area. All aid materials will be transported by air or land transportation system.

### 3) Distribution of Aid Materials and Its Management

All accepted aid materials would be classified and listed according to accepted date, volume, distribution day, items, place, volume, etc., under management of responsible officer at storage site.

## 14.5 Set up of Temporary Toilet

<b><i>Responsible Agency:</i></b>	<b><i>Health Agency, Public Works Agency</i></b>
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Temporary toilet shall be set up at evacuation site based on number of refugee and term of evacuation. It shall be set at public spaces such as park for those who cannot utilize own toilet due to house damage. Sanitary condition of temporary toilet shall be taken care by responsible agency and community.

## **CHAPTER 15. SEARCHING FOR MISSING VICTIM AND CASUALTIES TREATMENT**

### **15.1 Searching for Missing Victim and Casualties Treatment**

<b><i>Responsible Agency:</i></b>	<b><i>SAR, Health Agency, National Unity Agency</i></b>
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#### **1) Searching for Missing Victim and Casualties**

Search for missing victim in disaster area shall be conducted by Search and Rescue Agency from Kota Padang and Kabupaten Padang Pariaman. Under management of Search and Rescue Agency, navy and marines will join in searching activity. Community people will also join search work for missing victim under head of village responsible.

If missing person is found still in alive, then he will be transported to designated hospital by possible transportation system such as vehicles, or even a helicopter to give necessary medical treatment. Personal data such as address, name, age, male or female and contact place will be recorded as for reference.

If missing person is found dead, then he will be transported to the nearest medical care center (POST). After identification check and cleaning the dead body by medical doctor, he will be transported to designated hospital. Finally, family or relatives will check and recognize all identifications at hospital. Then, dead body will be transferred to family for funeral.

#### **2) Preparation of Charnel House**

Preparation of charnel house will be necessary in case of big disaster. Large space such as mosques or gymnasiums shall be designated in close sites to disaster affected area. Selection of candidate buildings shall be made before hand as a part of disaster management plan. In charnel house, medical check, cleaning dead body, identification by family and transfer service will be conducted.

#### **3) Information Dissemination to Community**

Missing victims, who have not been found, could be searched through photograph, body characteristics, personal belongings and clothes. This information will be disseminated to community through local community network or Tracing and Mailing Service (TMS) by Indonesian Red Cross.



## 15.2 Autopsy and Transport of Casualties

<b><i>Responsible Agency:</i></b>	<b><i>Health Agency</i></b>
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Autopsy of casualties shall be conducted by police at first. Dead body will be transported to temporary medical treatment site or nearest hospital by responsible agency in corporation with community members or volunteers.

## 15.3 Identification of Casualties

<b><i>Responsible Agency:</i></b>	<b><i>Health Agency</i></b>
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Charnel house shall be opened close to disaster affected area to accept dead body. Personal identification such as gender, size, worn clothes, age and specific characteristics of the body will be checked in detail and recorded by medical doctors.

## 15.4 Casualties Treatment

<b><i>Responsible Agency:</i></b>	<b><i>Health Agency</i></b>
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Medical doctors and related experts shall conduct necessary treatment for dead body such as detailed check of injured, necessary operation, cleaning etc. After treatment, based on personal identification data, dead body will be transferred to family.

### 15.5 Burial or Cremation of Casualties

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency and Public Welfare Agency</i></b>
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In case of the total number of casualty is limited, funeral and bury of dead shall be conducted by family. However, in case of huge number of casualty by big disaster, it is impossible to conduct bury individually. Bupati of Kabupaten Padang Pariaman shall order mass burial of dead in case of big disaster.

### 15.6 Provision of Information to Community

<b><i>Responsible Agency:</i></b>	<b><i>Information and Communication</i></b>
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Missing who are not identified by any family or relatives, photographs and recorded characteristics will be disseminated to citizens through community network or Tracing and Mailing Service (TMS) by Indonesian Red Cross.

## **CHAPTER 16. CLEANING, HYGIENE, AND EPIDEMIC PREVENTION MEASURES**

### **16.1 Health Care and Hygiene Measures**

<b><i>Responsible Agency:</i></b>	<b><i>Health Agency</i></b>
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#### **1) Hygiene Measures in Disaster Affected Area**

Hygiene measures shall be taken in disaster affected area to maintain sanitary condition and prevent epidemic infection. Public toilet space and shower space shall be prepared in evacuation site.

#### **2) PTSD**

Mental care shall be given to those who have heavy stress or mental damage such as PTSD by natural disaster. Medical doctors and volunteers in cooperation with Health Agency shall work together to support children, elderly and community for recovery from mental damage.

### **16.2 Solid Waste Management**

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency</i></b>
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In occurrence of big disaster, large volume of solid waste will be generated by building collapse. It is necessary to remove solid waste from damaged site and clean the area for reconstruction. Waste disposal site shall be prepared. Collected solid waste shall be divided according to its type of material before dumping. Woods, bamboo and related waste should be incinerated at disposal site or reutilized for reconstruction of local house. Other solid waste should be disposed as landfill.

### 16.3 Human Waste Management

<b><i>Responsible Agency:</i></b>	<b><i>Cleanliness and Environment Agency</i></b>
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Human waste management will be necessary at evacuation sites. Temporary toilet shall be prepared for refugee. Waste shall be treated properly as sanitary landfill.

### 16.4 Epidemic Preventive Measures

<b><i>Responsible Agency:</i></b>	<b><i>Health Agency</i></b>
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In occurrence of big disaster, epidemic prevention measures should be taken in disaster affected area, especially for evacuation site. It is very important to manage and control health and sanitary condition for refugee at evacuation site and damaged area. Health check is necessary for refugee. If patient is found at evacuation site, necessary treatment procedures shall be taken immediately such as transporting to hospital and give medical care. Following procedure shall be taken to control and prevent epidemics in disaster affected area.

- Conducting fast check of patient or carrier and take necessary preventive measures in disaster affected area and evacuation site.
- Conducting disinfection in disaster affected area and evacuation site to prevent epidemics.
- Conducting vaccination.
- Dissemination of necessary information and instruction for epidemic prevention in cooperation with community activity.
- Preparing necessary chemical materials and equipments for disinfection of the area by related agency.
- Hospital shall be designated beforehand to accept patients of epidemics.

## ***CHAPTER 17. SCHOOL DISASTER MANAGEMENT MEASURES***

In occurrence of big disaster, safety measures for pupils and students, school facilities and provision of temporary school education shall be planned as follows.

### **17.1 Management of School Facilities**

<b><i>Responsible Agency:</i></b>	<b><i>Education Agency</i></b>
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After occurrence of big disaster, each school principals have to assure safety of pupils, students, teachers and staffs. Moreover, each school principals have to check damage of school facilities and report its existing condition to Education Agency of Kabupaten Padang Pariaman through kabupaten government. Based on report submitted by kabupaten government, Education Agency should compile a list of damaged school in disaster affected area and prepare an emergency education plan.

## 17.2 Measures for Students and Pupils

<b><i>Responsible Agency:</i></b>	<b><i>Education Agency</i></b>
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### 1) Evacuation for Pupils and Students

Each school principals have to take proper evacuation measures for pupils and students when big disaster occurred during school time according to school disaster management plan. After checking school and surrounding area comprehensively, pupils and students should return to their parents under direction of class teachers.

If it is difficult to return pupils and students to their parents due to damage situation, they should be evacuated to preliminarily designated evacuation site. After felt safe situation, pupils and students should return to their home. It is necessary for teachers to contact parents directly to secure safety of pupils and students especially those who have handicap or need special care.

### 2) Check safety of Pupils and Students

Each school principals have to check safety of pupils and students if disaster occurred during holiday or nighttime in cooperation with available teachers by telephone.

### 3) Temporary School

In case of school facilities have heavily damaged, Education Agency shall prepare temporary school at damaged area using available building space. Education Agency will provide temporary teachers and school staffs for damaged area.

Each school principals shall prepare temporary education schedule and programs. After completion of total restoration of school facilities, school principals should inform schedule to return to ordinary school.

### 4) Exemption of School Payment

School payment will be exempted for those pupils and students who are suffered from disaster. School principals have to check damage situation and take necessary exemption procedure.

### 17.3 Procurement and Provision of School Supplies, etc

<b><i>Responsible Agency:</i></b>	<b><i>Education Agency</i></b>
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Each school principals have to check damage condition of teaching materials such as textbook, notebook, pencils etc. after occurrence of disaster and report its existing condition to Education Agency through kabupaten government. Based on report submitted by kabupaten government, Education Agency will collect and prepare necessary teaching materials. These materials will be provided to pupils and students in disaster affected area through local office of Education Agency.

### 17.4 Management of Education Facilities

<b><i>Responsible Agency:</i></b>	<b><i>Education Agency</i></b>
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Management of education facilities such as library, museum and gymnasium have to take necessary safety measures in accordance with disaster management manuals.

## **CHAPTER 18. RESIDENCE AND BUILDING MANAGEMENT**

Residential buildings will be damaged by strong earthquake, and there will be many people lose their houses. In order to support these refugees, construction of temporary houses and reparation of damaged houses shall be planned as follow.

### **18.1 Investigation of Damaged Buildings**

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency</i></b>
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#### **1) Preparation**

Damage information will be collected to understand volume of damage. Preparation of surveyors and survey tools including detailed map, assessment category and announcement of damaged house investigation will be disseminated by Public Works Agency.

#### **2) Survey Method**

As a primary survey and evaluation, two surveyors will conduct visual observation from outside of the house. Survey result will be classified into three categories and displayed at the entrance of surveyed house. Based on the survey, detailed survey for certain buildings will be reported by construction experts.

#### **3) Preparation of Damaged Houses List**

Survey results will be compiled into damaged houses list by Public Works Agency and utilized for necessary verification in future.



## 18.2 Survey of Damaged Residential Land

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency</i></b>
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Damaged residential land will be surveyed to protect from secondary damage and secure safety of residents in disaster area.

### 1) Preparation

Damage information of residential land will be collected to understand volume of damage. Preparation of surveyors and survey tools, and announcement of investigation will be disseminated by Public Works Agency.

### 2) Survey Method

As a primary survey and evaluation, one team of three surveyors will conduct visual observation on damaged land. Based on request of residents, technical advice for restoration or rehabilitation of damaged land will be recommended to protect from secondary damage.

### 3) Announcement of Survey and Evaluation

Result of survey and evaluation will be announced and displayed at disaster area to protect or reduce the secondary damage.

### **18.3 Construction of Temporary Housing and Emergency Restoration of Damaged Buildings**

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency, Red Cross</i></b>
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Temporary housing will be constructed for those who lost their house and unable to reconstruct by their own fund due to disaster damage. Emergency restoration of damaged houses will also be conducted to secure social stability.

#### **1) Implementation Organization**

SATLAK (Public Works Agency) and Community Empowerment Board are the responsible agency for construction of temporary housings and restoration and rehabilitation of damaged houses in disaster affected area.

#### **2) Construction of Temporary Housing**

Temporary housing will be provided to those with several criteria such as, (1) total collapse or burning of residential house (2) not having residential house, (3) elderly or handicapped who do not have residential house.

Public Works Agency and Social Agency shall work together to provide temporary housings to refugee.

#### **3) Location of Temporary Housing**

Location of temporary housing shall be selected at safety area, close to existing commercial facility, school, and hospital. Number of temporary housing will be decided by Bupati of Kabupaten Padang Pariaman.

#### **4) Emergency Restoration and Rehabilitation of Damaged Houses**

Public Works Agency and Community Empowerment Board will conduct and support emergency restoration and rehabilitation of damaged houses in disaster affected area. Light damaged houses will be the target for restoration and rehabilitation. Emergency restoration and rehabilitation shall be completed within one month after occurrence of disaster.

## ***CHAPTER 19. EMERGENCY MEASURES FOR LIFELINE***

If daily utilities such as water, sewerage, electricity, telecommunications, etc. were damaged by disaster, prompt and precise emergency response shall be planned as follows:

### **19.1 Information of Lifeline Recovery**

<b><i>Responsible Agency:</i></b>	<b><i>National Unity Agency</i></b>
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As emergency response on daily utilities such as water, sewerage, electricity, telecommunications, each utility suppliers attempt to establish appropriate rehabilitation team and rehabilitate damaged facilities promptly.

Moreover, since these utilities are related, need collected information sharing on damage condition and rehabilitation team allocation for comprehensive and effective rehabilitation by coordination among government, related organizations, and utility suppliers.

Furthermore, utility suppliers attempt to prevent secondary disaster by publication and dissemination of information on damage condition, recovery condition, safety confirmation, and release anxiety of users.

## 19.2 Water Supply Facility

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency and Regional Water Company</i></b>
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### 1) Damage Investigation

At the occurrence of disaster, damage investigation should be implemented with the following order. After identifying damage condition, appropriate water supply plan and emergency recovery plan are formulated.

1. Facility for Water Intake, Raw Water Transmission, Water Purification, and Transmission Pipe
2. Water Reservoir, Pumping Station, Distribution Pipe
3. Service Pipe, Water Distribution Facility

### 2) Emergency Recovery

Emergency Recovery activities are implemented and led by head of National Unity Agency with related suppliers.

#### (1) Facility for Water Intake, Raw Water Transmission, Water Purification

Due to rain and storm related disasters, risk of damages to water supply facilities is considered low, however, in case of suffering from damages, prompt recovery work should be implemented with full efforts to keep water supply provision.

#### (2) Facility for Water Distribution

After damage investigation, considering condition of each purification plants and capacity of water reservoirs, pipes with no damage will remain to support smooth water supply by changing distribution route. Then, based on priority from upper stream of main pipes, recovery works are implemented. If level of water leakage does not cause secondary disaster, then it considers as low priority and will be repaired after fixing priority points.

#### (3) Service Pipe

When damaged points of service pipes causes trouble on water flow and cause secondary disaster, priority emergency recovery work should be implemented.

### 19.3 Electric Supply Facility

<b><i>Responsible Agency:</i></b>	<b><i>National Electric Company</i></b>
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If electric supply facility is damaged due to occurrence of disaster, prevent from secondary disasters and implement emergency recovery activities promptly, and attempt to secure continuous electric supply in disaster affected area.

#### 1) Damage Investigation

At the occurrence of disaster, damage investigation is implemented. After identifying existing damage condition, emergency recovery plan is formulated.

#### 2) Emergency Recovery

##### (1) Basic Policy

##### A. Establishment of Emergency Response Post

Apart from Rupusdalops PBP, to implement prompt emergency recovery activities, Emergency Response Post is established.

##### B. Principal in Smooth Provision of Electric Supply and Risk Preventive Measures

Considering demand of electric supply, in principal supplier should continue supplying even in the occurrence of disaster and implement emergency response activities smoothly. If there is requests from police and fire fighting, etc., risk prevention measures such as stopping supply of electricity will be implemented.

##### C. Coordination among Related Organization

Based on request to Rupusdalops PBP, staffs are dispatched to have direct communication and coordination with related organizations.

##### (2) Emergency Response

- In temporary works due to disaster damage, considering there were permanent restoration work and according to its urgency, temporary works are implemented promptly and appropriately.
- Restoration of electric supply facilities is implemented by considering disaster condition, damage condition, and difficulty level.
- Supply electricity to the facilities related with emergency response activities will be given high priority.

- If damage scale is large, conduct coordination between staffs of electric company from peripheral kabupaten and related companies to formulate emergency recovery support team and implement emergency recovery works.

### **3) Measures taken by PEMKAB**

#### **(1) Cooperation and Support**

In case of serious damage to electric supply facilities and there is support request from National Electric Company, PEMKAB will coordinate and give support as appropriate.

#### **(2) Publication to Community**

PEMKAB will publish condition of electric supply facilities to the community, and if the following events are found, community should report to nearest National Electric Company.

1. Electric cable is cut and flagging to road surface
2. Trees, TV antennas, etc are falling down.
3. Sparks, sounds, smokes are detected form electric supply facilities
4. Electric poles are collapsed

## 19.4 Telecommunication Facility

<b><i>Responsible Agency:</i></b>	<b><i>TELKOM</i></b>
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Secure information transmission system due to occurrence of disaster, collect and disseminate the information.

In order to implement emergency response activities smoothly and effectively, coordinate closely with related organizations.

### 1) Damage Investigation

At the occurrence of disaster, damage investigation is implemented. After identifying existing damage condition, emergency recovery plan is formulated.

### 2) Emergency Recovery

#### (1) Basic Policy

##### A. Establishment of Emergency Response Post

Apart from Rupusdalops PBP, to implement prompt emergency recovery activities, Emergency Response Post is established.

##### B. Principal in Smooth Provision of Telecommunications Service and Risk Preventive Measures

Telecommunications for emergency response activities are indispensable for prompt and effective implementation. However, due to overflow of incoming calls to check safety of relatives and friend from outside disaster area, telecommunication is congested and important call cannot be reached. Avoiding such congestion, TELKOM must control incoming calls in case of disaster.

##### C. Coordination among Related Organization

Based on request to Rupusdalops PBP, staffs are dispatched to have close communication and coordination with related organizations.

#### (2) Emergency Response

- In temporary works due to disaster damage, considering there were permanent restoration work and according to its urgency, temporary works are implemented promptly and appropriately.

- Restoration of telecommunication service facilities is implemented by considering disaster condition, damage condition, and difficulty level.
- Telecommunication service to facilities related with emergency response activities will be given high priority.
- If damage scale is large, conduct coordination between staffs from neighboring TELKOM office and related companies to formulate emergency recovery support team and implement emergency recovery works.

### **3) Measures taken by PEMKAB**

#### **(1) Cooperation and Support**

In case of serious damage to telecommunication facilities and there was support request form TELKOM, PEMKAB will coordinate and give support as appropriate.

#### **(2) Publication to Community**

PEMKAB will publish recovery condition to the community.



## **CHAPTER 20. HAZARDOUS MATERIAL MANAGEMENT**

### **20.1 Hazardous Materials Storage Facility**

<b><i>Responsible Agency:</i></b>	<b><i>Police</i></b>
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#### **1) Information of Hazardous Materials Storage Facility**

Hazardous materials storage facility is storage facility for petroleum, explosive, high-pressure gas, LPG, toxic and dangerous materials.

#### **2) Preparation of Preventive Activity for Secondary Disaster**

To prevent occurrence of secondary disaster by earthquake at hazardous materials storage facility, PEMKAB and Companies will prepare necessary efforts.

##### **(1) Measures by PEMKAB**

Rupusdalops PBP gather information regarding safety guarantee of hazardous materials storage facility, and carry out necessary measures to prevent occurrence of secondary disaster.

##### **(2) Measures by Provider of Hazardous Materials**

Administrator, security manager, and company manager will carry out security measures in the facility, and will report its measures condition to Rupusdalops PBP.

## 20.2 Vehicles for Transporting Hazardous Materials

<b><i>Responsible Agency:</i></b>	<b><i>Police</i></b>
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### 1) Preparation of Preventive Activity for Secondary Disaster

To prevent occurrence of secondary disaster by earthquake at vehicles for transporting hazardous materials, PEMKAB and Transportation Company, provider of hazardous materials and its management will prepare necessary efforts.

#### (1) Measures by PEMKAB

Rupusdalops PBP gather information regarding safety guarantee of hazardous materials storage facility, and carry out necessary measures to prevent occurrence of secondary disaster.

#### (2) Measures by Provider of Hazardous Materials

Transportation Company, provider of hazardous material and its management will stop its operation, if there is risk of outflow or explosion, and carries out emergency inspection, fire prevention, prevent leakage of hazardous materials, and report to police and army immediately.

## **CHAPTER 21. ACCEPTANCE PLAN OF FOREIGN ASSISTANCE**

International assistance will be expected for large-scale natural disaster. Emergency rescue operations including search and rescue, medical services, construction and management of evacuation facilities will be the first necessary items for disaster management. International aid teams will join immediately after occurrence of disaster. In order to accept international assistance for emergency operation, basic acceptance plan including information sharing with national and provincial organization and necessary procedures should be prepared.

### **21.1 Information Sharing with National and Provincial Organization**

<b><i>Responsible Agency:</i></b>	<b><i>National Unity Agency</i></b>
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Assistance from various countries will be concentrated after occurrence of disaster. Most important subject is coordination. In order to accept foreign assistance smoothly and effectively, methodology and procedures for information sharing between Central Government and provincial/local government shall be established beforehand.

Responsible agency of disaster affected area shall collect damage information and transfer to related agencies both national and provincial/local government. In this damage information, necessary items for assistance shall be mentioned such as medical equipments, equipments for rescue operations, human resources, etc.

### **21.2 Acceptance of Foreign Assistance**

<b><i>Responsible Agency:</i></b>	<b><i>National Unity Agency</i></b>
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Based on experiences of foreign assistance for disaster management in Indonesia, important lessons shall be reviewed and checked. When big disaster occurs, many countries will offer help and send assistance teams to disaster affected area. Local government shall accept teams and manage their activities. Coordination between countries, assistance areas and activities are most important responsibility of local government. Basic manuals and standard procedures for acceptance of foreign assistance for disaster management should be prepared.

## **Section 4: Post-Disaster (Rehabilitation and Reconstruction Plan)**

Earthquake and Tsunami disasters cause extensive damages. Demolition of houses, land slide, tsunami, soil liquefaction, and etc. caused by Earthquake is extremely disturbing the resident's daily life and activities. Rehabilitation and Reconstruction Planning are management plans to be implemented by PEMKAB and related organizations/agency for recovering from damages as soon as possible, so the residents would be able to live normally everyday without any trouble.

### ***CHAPTER 1. REHABILITATION PLAN***

For Rehabilitation Measures, prompt recovery on daily life and facilities of disaster victims, industries, etc. are expected. PEMKAB plans, to return resident's lives back to normal by establishing service post, temporary housing management, emergency funding, etc. and so on.

#### **1.1 Recovery Measures to Normal Life**

<b><i>Responsible Agency:</i></b>	<b><i>Social Agency</i></b>
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##### **1) Issuing Disaster Victim Certificate**

People suffered from damage will receive aid from government, if disaster victims want to receive such aid; they are required to receive a Disaster Victim Certificate. Kabupaten Padang Pariaman will formulate system to publish such certificate in the future.

##### **2) Giving Aid for Daily life and Residence**

###### **(1) Permanent Housing Management**

Supporting long term house rental by developing public housing for disaster victims, and as an alternative is by giving assistance for renting vacant private houses.

###### **(2) Temporary Housing Guarantee**

In rehabilitation process, by utilizing provision of temporary houses, give aid for daily life and guarantee safety for residence for certain period.

### **3) Establishing Disaster Inspection Post**

Service post for disaster victims are established to cover many fields such as safety guarantee, clothing, and shelter, health, mental care, education, occupation, finance, etc, and perceptive consultation to minimize their problems.

1. Based on disaster scale, if necessary Disaster Service Post will be established
2. To implement service promptly and appropriately to disaster victims, requires close coordination with related organizations
3. On service contents, damage condition, establish service concept with close coordination with related organizations

### **4) Aid for Mental Care and PTSD**

In cooperation with Province, establish service post for victims having mental problem or PTSD suffered form disaster, and based on necessity, counselor, doctor, and nurse will be dispatched to evacuation facilities for consultation for these disaster victims.

### **5) Aid for Disaster Vulnerable Group**

#### **(1) Information Dissemination to Vulnerable Group**

Started from disaster occurrence until reconstruction phase, to be able to support special care for vulnerable groups such as elderly and handicapped, etc., enforce coordination system of information gathering and transmission with organizer of social welfare facilities, and relevant organizations.

### **6) Management of Disaster Debris**

To guarantee implementation framework of debris management from disaster, will be conducted planned collection/transfer, recycle and appropriate management/disposal.

### **7) Management of Emergency Fund**

People suffered from damage will receive support from government, if Kabupaten Padang Pariaman has such supporting system, they are expected to indicate the system here. Also, National and Provincial System could also be indicated here.

#### **(1) Distribution of Calamity Fund**

How to distribute calamity fund is indicated here.

#### **(2) Loan and Tax Exemption**

To support disaster victims, Kabupaten Padang Pariaman is preparing a system for low interest loan and tax exemption.

## 1.2 Rehabilitation of Public Facilities

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency</i></b>
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Rehabilitation are conducted on damaged public facilities so they could function again, and by considering the damage condition thoroughly, to prevent damage in future disaster, necessary actions such as reconstruction or improvement of facilities are implemented. In the implementation, depend on the level of damage, facilities with high priority and urgency are selected, then rehabilitation works are implemented.

The following Disaster Rehabilitation Works are implemented.

- 1) Public Work Facility Damage Rehabilitation Works
  - A River Damage Rehabilitation Works
  - B Road Damage Rehabilitation Works
  - C Park Damage Rehabilitation Works
  - D Port Damage Rehabilitation Works
- 2) Agriculture, Forestry, Fishery Facility Damage Rehabilitation Works
- 3) Water Supply Facility Damage Rehabilitation Works
- 4) Sewage Facility Damage Rehabilitation Works
- 5) Housing Damage Facility Damage Rehabilitation Works
- 6) Social Welfare Facility Damage Rehabilitation Works
- 7) Public Medical Facility and Hospital Damage Rehabilitation Works
- 8) Educational Facility Damage Rehabilitation Works
- 9) Other Public Facility Damage Rehabilitation Works

### 1.3 Declaration of National Disaster

<b><i>Responsible Agency:</i></b>	<b><i>Bupati</i></b>
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This section will be added after enacting Governmental Regulation regarding “Level of Disaster”.

## **CHAPTER 2. RECONSTRUCTION PLAN**

In order to create disaster-resilient city, the following basic concepts are formulated.

### **2.1 Gathering Relevant Information for Preparation of Reconstruction**

<b><i>Responsible Agency:</i></b>	<b><i>Development Planning Board</i></b>
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#### **1) Initial Consideration of Direct Character and Concept Criteria of Rehabilitation and Reconstruction at Urban Area**

- For urban area, based on damage condition, existing infrastructure condition, long term development plan, urban planning orientation, relevant official suggestion, etc., depend on precise rehabilitation at disaster area, or to prepare aforethought urban reconstruction plan for constructing disaster resistance city requires appropriate time schedule. Furthermore, it is necessary to consider direct character and concept criteria of rehabilitation and reconstruction at urban area in advance.

#### **2) Consolidation and Storage of Various Data**

- For smooth reconstruction, various data, such as landscape, building, ownership, facility, underground facility, etc., are consolidated and stored, and backup system is also developed.



## 2.2 Basic Concept Formulation of Urban Reconstruction

<b><i>Responsible Agency:</i></b>	<b><i>Development Planning Board</i></b>
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### 1) Basic Concept of Urban Reconstruction

- Reconstruction policy at disaster area when region is annihilated by large scale disaster, and extensive damages on socio-economic activities, having consistency in urban structure and industry infrastructure, attempt to solve issues on mid to long term such as constructing more disaster-resilient city. To support aforethought reconstruction, by asking for comprehension from residents, reconstruction plan will be formulated. Furthermore, observing condition progress on emergency response and rehabilitation activities, Development Planning Board together with related agencies and organizations will start the preparation of reconstruction activities.
- City development towards urban reconstruction is necessary not only for present residents, but also for other residents in the future, therefore, residents are required to understand the importance of construction of disaster-resilient city with sustainability. Furthermore, establishment of reconstruction committee for disaster damaged region including residents of the area, and formulate reconstruction planning. This process will be cooperated as best as possible between PEMKAB and local residents.

### 2) Urban Reconstruction Measures

#### (1) Basic Policy Formulation of Urban Reconstruction

In cooperation with Province, considering damage condition of each region, existing condition of basic infrastructure, long term development plan, urban planning orientation, etc., depend on the latest condition of reconstruction planning or formulate consideration of region reconstruction, and announce the basic policy officially.

#### (2) Basic Planning Formulation of Regional Urban Reconstruction and Content Description

By gathering opinion from residents, Development Planning Board together with related agencies and organizations will formulate Basic Plan of regional Urban Reconstruction showing specific reconstruction management, such as reconstruction target, land use policy, development policy of urban facilities, basic policy of urban reconstruction, etc.

**(3) Formulation of Temporary Urban Development Plan**

Until completion of full-scale reconstruction, by implementing emergency repair of houses and construction of temporary shops, construction of temporary housings, etc., attempt to mitigate evacuation to other region and try to keep local community in the area, Development Planning Board together with related agencies and organizations will formulate Temporary Urban Development Plan.

# KABUPATEN PADANG PARIAMAN REGIONAL DISASTER MANAGEMENT PLAN

## PART 2 RAIN AND STORM DISASTER MEASURES



**March 2009**



**SATLAK PENANGANAN BENCANA  
KABUPATEN PADANG PARIAMAN**

*In cooperation with*



**JICA STUDY TEAM**

Oriental Consultants Co., Ltd.  
Asian Disaster Reduction Center

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1.3.	Declaration of National Disaster	<b>Bupati</b>	4-1
CHAPTER 2	RECONSTRUCTION PLAN		4-2
2.1	Gathering Relevant Information for Preparation of Reconstruction	<b>Development Planning Board</b>	4-2
2.2	Basic Concept Formulation of Urban Reconstruction	<b>Development Planning Board</b>	4-2

# **Section 1:GENERAL**

## **(Basic Concept of the Plan)**

### ***CHAPTER 1. ELEMENTS COVERED IN THE PLAN***

#### **1.1 Objective of the Plan**

SATLAK PB Kabupaten Padang Pariaman collaborated with JICA Study Team to prepare this Kabupaten Padang Pariaman Regional Disaster Management Plan based on Law No.24 2007 regarding Disaster Management enacted on 29th of April, 2007. This plan clearly mentions whole picture of disaster management in chronological order, consists of Measures in Disaster Mitigation, Preparedness, Emergency Response, Rehabilitation and Reconstruction. This plan aims to implement emergency response activity based on pre-prepared comprehensive plan, and reduce damages and save citizens lives and their assets, as well as maintaining social order and public welfare from disaster.

#### **1.2 Interrelations among National Disaster Management Plan, and Regional Disaster Management Plan**

This plan is interrelate with National Disaster Management Plan prepared by BNPB, and Provincial Regional Disaster Management Plan which will be formulated in near future.

#### **1.3 Revision of the Plan**

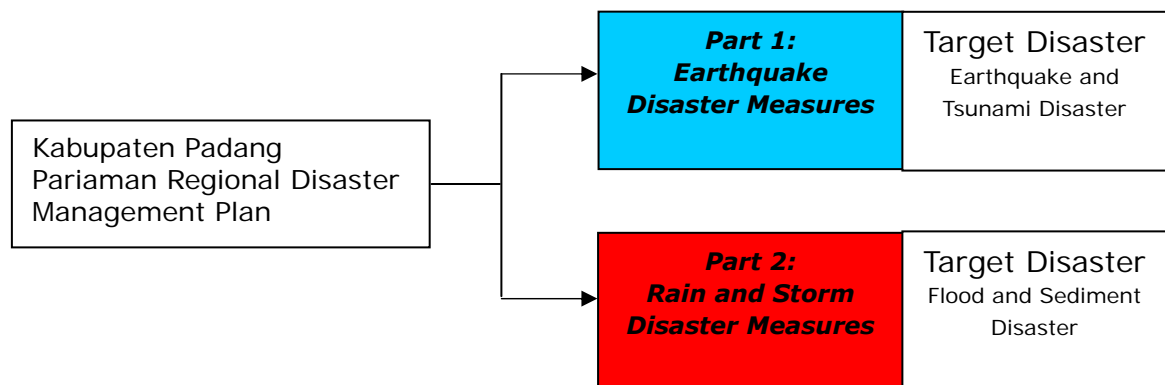
This plan is revised periodically and/or when required to keep efficiency of disaster management. In every revision, SATKORLAK PB should carefully investigate the contents of draft version of revised regional disaster management plan to keep the interrelations with disaster management plan in other area and in higher level.

## **CHAPTER 2.    STRUCTURE OF THE PLAN**

### **2.1    Structure of the Plan**

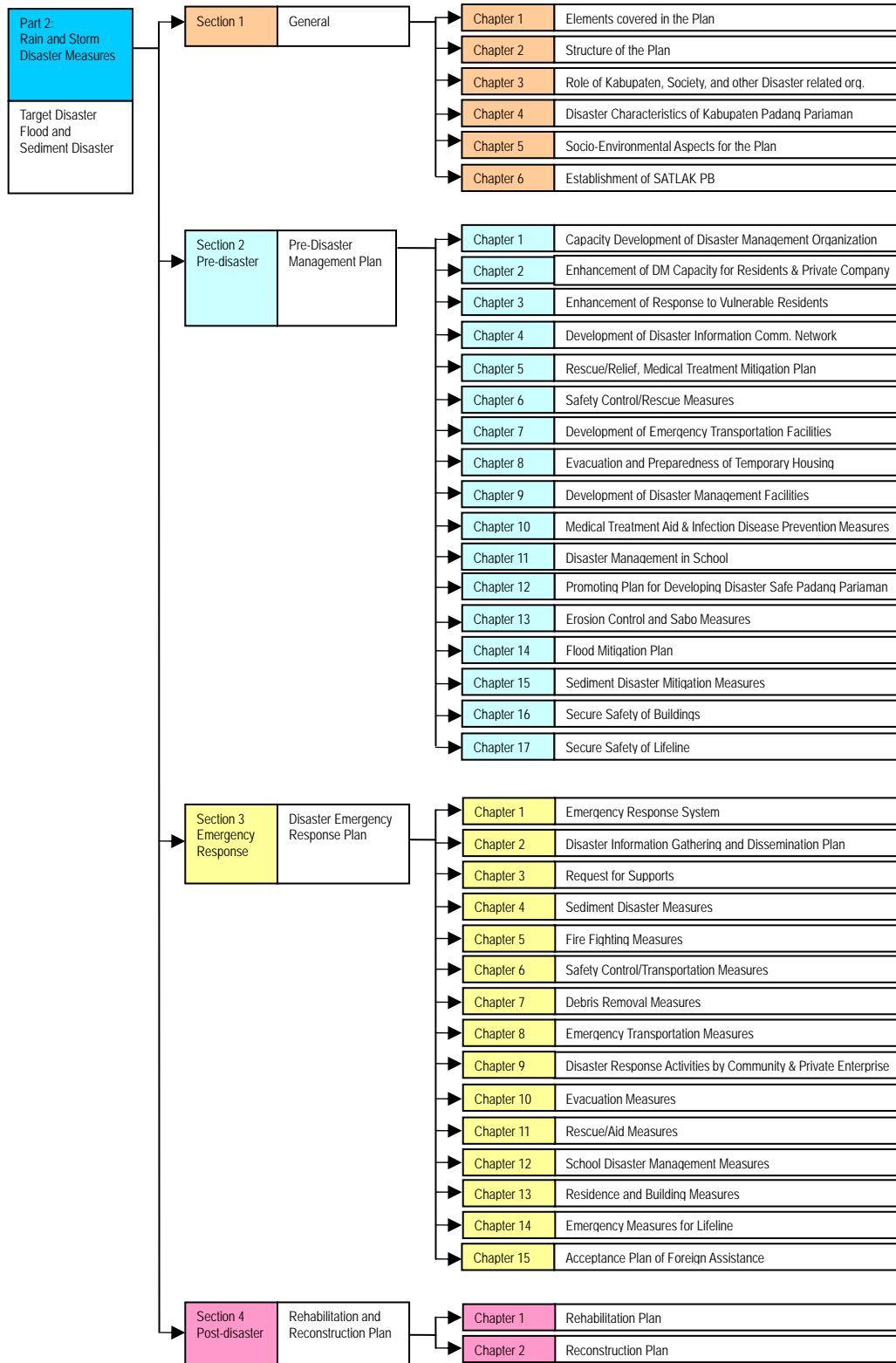
#### **1)    Composition of the Plan**

This plan formulated as a basic plan to dealt with possible disasters in Kabupaten Padang Pariaman, and it composed of “Part 1: Earthquake Disaster Measures”, and “Part 2: Rain and Storm Disaster Measures”. This part of the plan contains “Part 2: Rain and Storm Disaster Measures”.



## 2) Contents of the Plan (Part 2: Rain and Storm Disaster Measures)

Contents of “Rain and Storm Disaster Measures” are as follows;



### **CHAPTER 3.    ROLE OF KABUPATEN, SOCIETY AND OTHER DISASTER RELATED ORGANIZATIONS**

Kabupaten Government and disaster management related organizations have obligations to prevent occurrence of disaster, or mitigate damage, and for securing citizen's life, and their assets.

#### **3.1    Obligations of Kabupaten Padang Pariaman related to Disaster Management**

The disaster management and refugee handling at local region through following actions/implementations:

1. Bupati as Unit Administrator Chief of the disaster management and refugee handling (SATLAK PB) is responsible for coordinating, leading, and controlling, the regional structural and non structural activities in implementing disaster management and refugee handling in Kabupaten/Kota area before, during, and after disaster and evacuation.
2. Camat as Operational Unit Chief of the disaster management and refugee handling (Unit Ops PBP) is responsible in coordinating the sub-regional structural and non structural activity in implementation before, during, and after disaster and evacuation in Kecamatan areas.
3. Wali Nagari as Hanship/Linmas Unit Chief responsible to coordinate and control the Nagari activity in implementation of disaster management and refugee handling before, during, and after disaster and evacuation in Nagari areas.

#### **3.2    Obligations of Disaster Management related Organizations**

Disaster management related organizations have obligation to support and help activity to mitigate damage by prompt action and with close coordination with Kabupaten Padang Pariaman in case of disaster occurrence.

## **CHAPTER 4. DISASTER CHARACTERISTICS OF KABUPATEN PADANG PARIAMAN**

Kabupaten Padang Pariaman is an area surrounded by other regencies and Indonesian Ocean, with boundaries as follows:

- North : Kabupaten Agam
- East : Kabupaten Agam and Tanah Datar
- South : Kabupaten Solok and Kota Padang
- West : Kota Pariaman and Indonesian Ocean

Administratively, Kabupaten Padang Pariaman are divided into 17 (seventeen) Kecamatan and 46 (forty six) nagari.

The landmass of Kabupaten Padang Pariaman is about 1,386 km<sup>2</sup>, comprises with 17 (seventeen) Kecamatan and 46 (forty six) Nagari. The widest Kecamatan is Kecamatan 2X11 Kayu Tanam, which is 228.70 km<sup>2</sup> wide, while the smallest Kecamatan is Kecamatan Sintuk Toboh Gadang of 25.56 km<sup>2</sup>. Total amount of the population is 384,718 people, comprises with 183,926 males and 200,792 females. Kecamatan Batang Anai has the greatest number of population, which is 43,620 people, while the least number of populations is in Kecamatan Padang Sago, which is only 8,177 people.

### **4.1 Natural Conditions**

Padang Pariaman has an agriculture field of 24,091 hectares wide which can produce rice as much as 256,960.29 tons, so there is an increase of 0.98 % compared to production last year. For *palawija* plants (crops planted as 2d crop in dry season) only increased 0.47% for the productions of cassava, sweet potato, soybean, green bean and peanut, string bean, eggplant, cucumber, red pepper and water spinach.

Plantation commodities also experience increased, such as rubber, areca nut, coconut, cinnamon, coffee and nutmeg. There are also more plantation crops with no production, such as clove, kapok, patchouli, sugar palm and sago palm

Moreover, there are some other agriculture sectors, such as fishery and animal husbandry which at the moment are experiencing production fluctuation. While there are no crops from the forests since all forests in Kabupaten Padang Pariaman are protected forests.

For the industrial sector in Padang Pariaman there are few industries which are hoped would still be able to absorb enough labors in formal as well as in informal industries, such as metal, engines, chemistry and embroidery industries.



For mining sector, Kabupaten Padang Pariaman has a significant potential to increase the Regional Original Income, however, it has not yet been utilized optimally, such as *obsidian*, *andesit*, iron ore and *sirtu*.

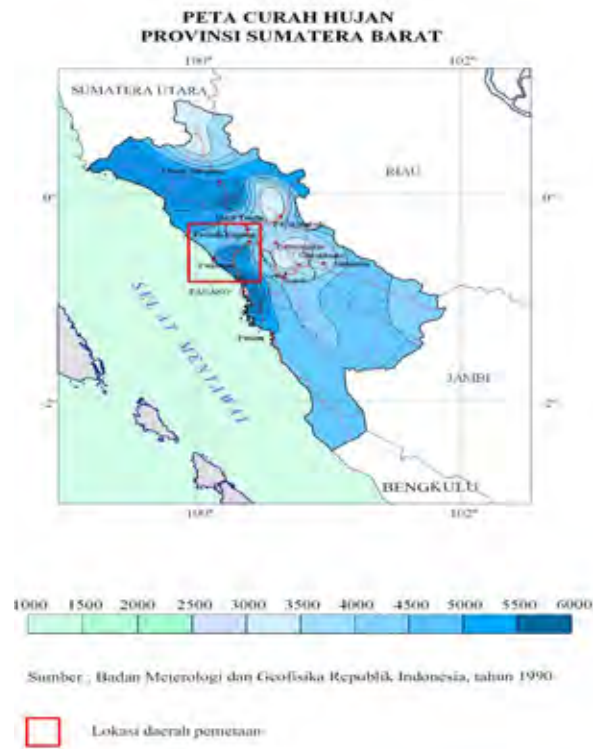
#### 4.1.1 Climate

The geographic rainfall zone based on the Indonesian Rainfall Map (Department of Communication, Institute of Meteorology and Geophysics, Vol. II, 1990), are divided into 7 yearly average rainfall zones (Figure 4.1.1). According to the regional mapping of Kabupaten Padang Pariaman, the highest rainfall is in the eastern side which belongs to Zone VI with the range of rainfall between 4000-4500 mm/year. Meanwhile, the lowest rainfall belongs to Zone I which located in the western coast with range of rainfall between 1500-2000 mm/year.

Zone I	: 1,500 – 2,000 mm
Zone II	: 2,000 – 2,500 mm
Zone III	: 2,500 – 3,000 mm
Zone IV	: 3,500 – 4,000 mm
Zone V	: 4,000 – 5,000 mm
Zone VI	: 5,000 – 6,000 mm
Zone VII	: 6,000 – 7,000 mm

Total average rainfall for Kabupaten Padang Pariaman is 338 mm/month with average rain day of 16.5 days per month. The highest rainfall occurs in December about 706.9 mm, while the lowest rainfall occurs in May about 129.2 mm. The average temperature is 25.30°C with relative humidity equivalent to 85.3%.

According to **F.H. Schmidt UMA Ferguson (1975)**, regarding quantitative rainfall evaluation, the size of rainfall to water absorbent into land is stated at Table 4.1.1.



**Figure 4.1.1 Rainfall Map of West Sumatera**

**Table 4.1.1 Relationship between Amount of Monthly Rainfall and Water Absorption into Ground Layer**

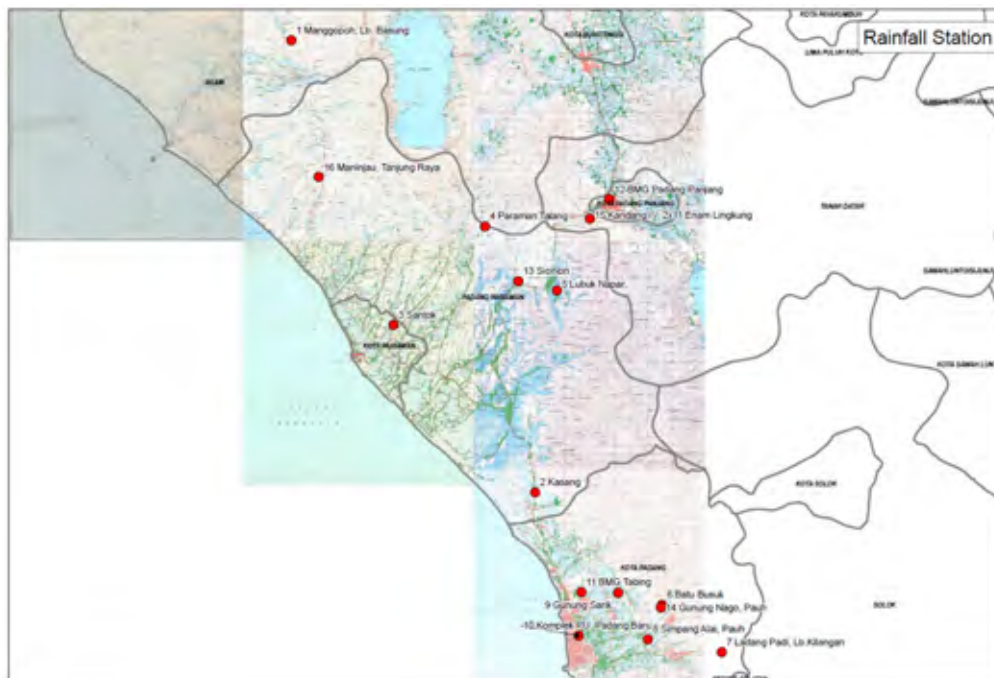
AMOUNT OF MONTHLY RAINFALL (MM)	POSSIBILITY OF WATER ABSORPTION INTO GROUND LAYER
< 60	All vaporized
60 – 100	Only moisted the ground
>100	Absorbable into ground

Rainfall characteristics of Kabupaten Padang Pariaman are as follows. The rainfall data used was collected and organized by PSDA (Dinas Pengelolaan Sumber Daya Air (Water Resource Management Agency)) from the following organizations:

- BMG : Badan Meteorologi dan Geofisika (Meteorological and Geo-physical Agency)
- PLN : Perusahaan Listrik Negara (National Electricity Company)
- DPU : Dinas Pekerjaan Umum (Public Works Department)
- Kimpraswil : Pemukiman Prasarana Wilayah (Region Settlements and Infrastructures)
- Dep Pertanian Irigasi (Agriculture and Irrigation department)

**Table 4.1.2 Rain Gauge Stations and Annual Rainfall**

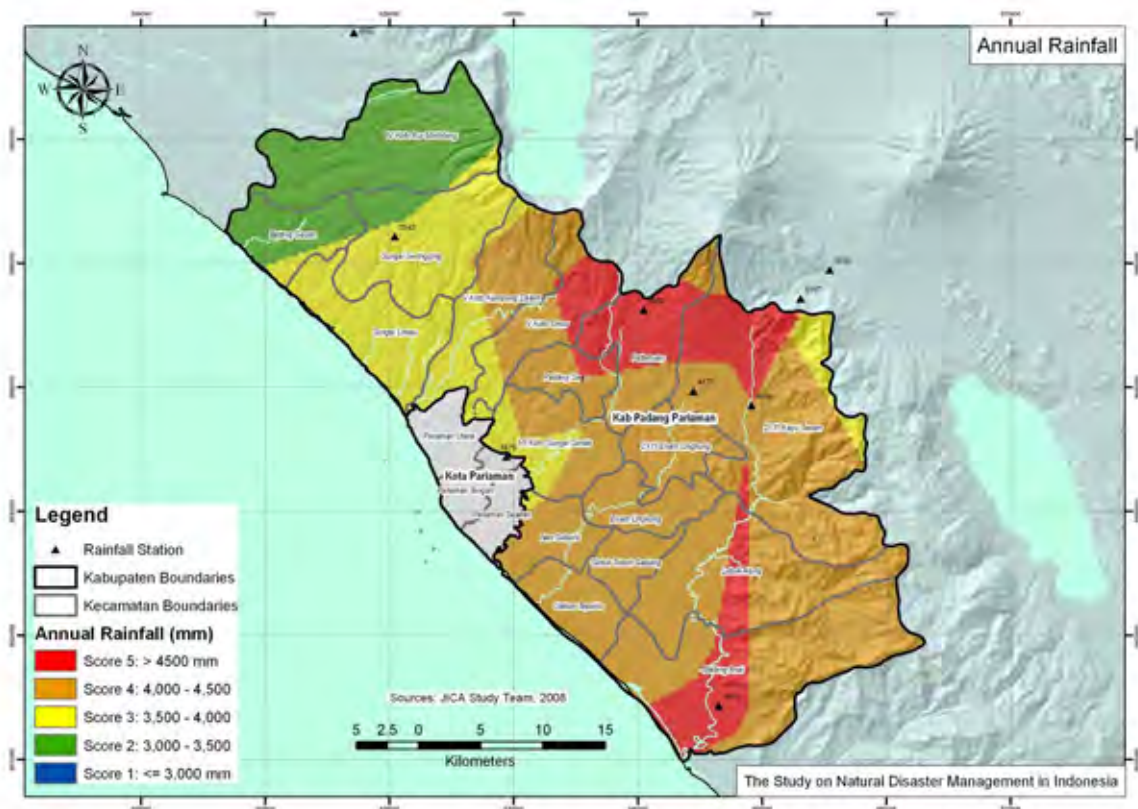
No.	Name of Station	Southern Latitude (LS)	Eastern Longitude (BT)	River Basin	Kabupaten	Administrator	MEAN	Observation Period
1	Manggopoh, Lb. Basung	00° 17' 02" LS	100° 03' 10" BT	Batang Antokan	Agam	DFU Kab.	2922.4	25
2	Kasang	00° 46' 30" LS	100° 19' 00" BT	Batang Anai	Padang Pariaman	Kimpraswil	4574.9	27
3	Santok	00° 35' 35" LS	100° 09' 46" BT	Batang Pariaman	Padang Pariaman	Dep Pertanian	3875.9	29
4	Pariaman Telang	00° 29' 10" LS	100° 15' 45" BT	Batang Mangau	Padang Pariaman	Kimpraswil	5062.4	23
5	Lubuk Naper	00° 33' 20" LS	100° 20' 25" BT	Batang Anai	Padang Pariaman	PSDA/Kimpraswil	4489.4	29
6	Batu Susuk	00° 53' 50" LS	100° 27' 15" BT	Batang Kuranji	Padang Pariaman	PSDA/Kimpraswil	3876.3	29
7	Ladang Padi, Lb. Kilangan	00° 56' 55" LS	100° 31' 08" BT	Batang Arau	Padang	PSDA/Kimpraswil	4113.1	31
8	Simpang Alai, Pauh	00° 56' 04" LS	100° 26' 20" BT	Batang Kuranji	Padang	PSDA/Kimpraswil	4024.2	31
9	Gunung Sarik	00° 53' 02" LS	100° 24' 24" BT	Batang Air Dingin	Padang	PSDA/Kimpraswil	4110.6	31
10	Komplek PU, Padang Baru	00° 55' 50" LS	100° 21' 50" BT	Batang Arau	Padang	PSDA/Kimpraswil	3459.5	20
11	BMG Tabing	00° 53' LS	100° 22' BT	Stg. Kuranji	Padang	BMG	4199.9	32
12	BMG Padang Panjang	00° 27' 24.6" LS	100° 23' 49.2" BT	Stg. Anai	Padang Panjang	BMG	3516.4	31
13	Sicincin	00° 32' 44" LS	100° 17' 54" BT	Stg. Anai	Padang Pariaman	BMG	4178.0	20
14	Gunung Nago, Pauh	00° 54' 00" LS	100° 27' 10" BT	Batang Kuranji	Kodya Padang	Kimpraswil	4087.9	19
15	Randang IV, 2x11 Enam Lingkung	00° 28' 40" LS	100° 22' 38" BT	Batang Anai	Padang Pariaman	Dep Pertanian	5167.6	23
16	Maninjau, Tanjung Raya	00° 25' 57" LS	100° 04' 57" BT	Batang Antokan	Agam	PSB	3542.8	22



**Figure 4.1.2 Rain Gauge Station Map**

Annual average rainfall distribution map of Kabupaten Padang Pariaman was created using the annual average rainfall data from all stations. The result is shown in Figure 4.1.3.

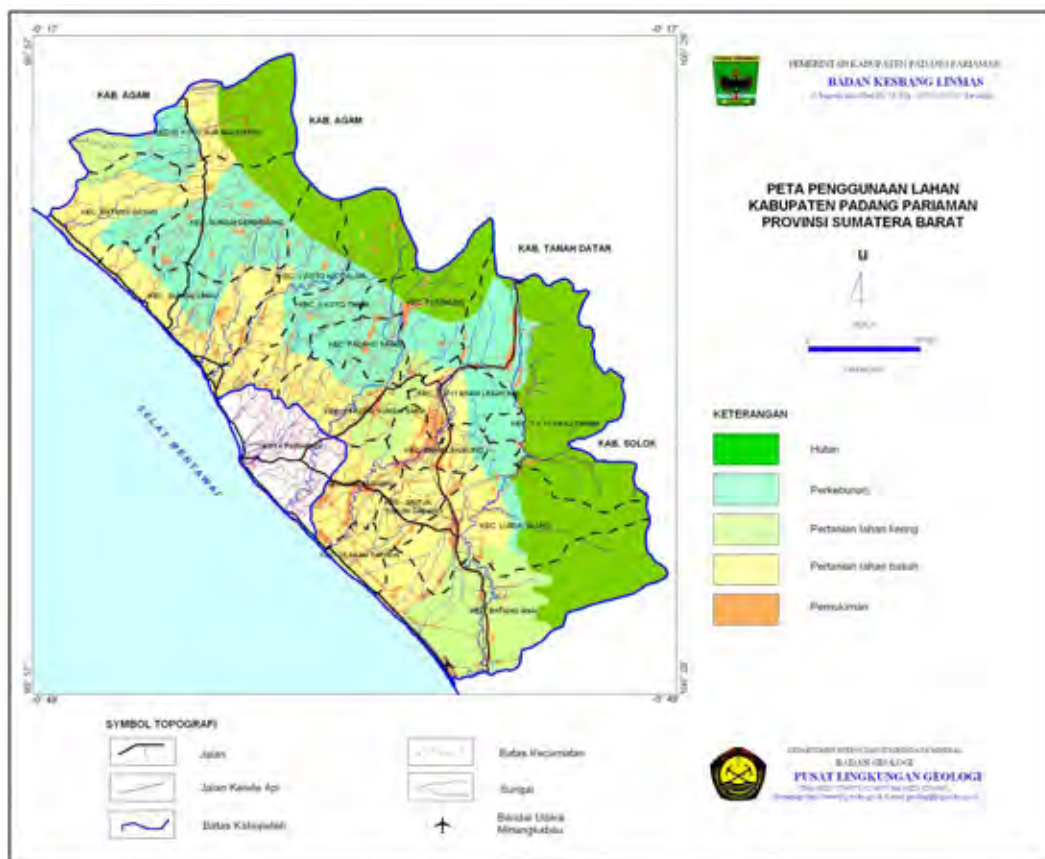
The result shows that distribution of annual average rainfall is between 3,000 mm/year – 5,000 mm/year. North side of Kabupaten Padang Pariaman receives comparatively small precipitation.



**Figure 4.1.3 Annual Average Rainfall Distribution Map of Kabupaten Padang Pariaman**

### 4.1.2 Land Use Arrangement

Land use arrangement of the mapping areas based on the Land Use Map of Kabupaten Padang Pariaman generally can be grouped in to 5 (five) groups, they are : forest, plantation, dry land agriculture, wet land agriculture and villages (Figure 4.1.4).



Source: Badan Kesbang dan Linmas, 2007

**Figure 4.1.4 Land use Map of Kabupaten Padang Pariaman**

#### 4.1.2.1 Forest

Land use arrangement as forest in the mapping regions are generally protected forests which can be seen in the eastern part of Kecamatan IV Koto Aur Malintang, Sungai Geringging, V Koto Kp. Dalam, V Koto Timur, Patamuan, 2X11 Kayu Tanam, Lubuk Alung and Batang Anai. The dissemination of the land arrangement is quite wide, especially in the high topography and occupied region as wide as 422.32 km<sup>2</sup> or 30.47% of total width of the mapping areas.

#### 4.1.2.2 Plantation

This plantation land use has spreading in the entire mapping regions as wide as 356.40 km<sup>2</sup> or 25.71% from total width of all mapping regions. The spread of these planting sheets especially occupies the middle (center) part of Kecamatan IV Koto Aur Malintang, northern and southern part of Gasan, in Sungai Geringging, almost all the spread is in the western part, and also in V Koto Kp. Dalam, in the center part of V Koto Timur, southern part of Patamuan, almost all parts of Sago, western part of 2X11 Kayu Tanam, eastern part of 2X11 Enam Lingkung, small spread in

the eastern part of Enam Lingkung, northern part of Lubuk Alung and western and eastern part of Sungai Limau.

#### **4.1.2.3 Dry Land Agriculture**

This land use arrangement of dry land agriculture has spread in all of the mapping regions as wide as 162.55 km<sup>2</sup> or 11.73% from total width of the entire mapping regions. The spread of this dry land agriculture especially occupies the western part of Kecamatan IV Koto Aur Malintang, eastern part of VII Koto Sungai Sarik, northern part of Enam Lingkung, northern part of Nan Sabaris and southern part of Batang Anai.

#### **4.1.2.4 Wet Land Agriculture**

This land use arrangement of wet land agriculture has spread in all of the mapping regions as wide as 382.81 km<sup>2</sup> or 27.62% from total width of mapping regions. The spread of these wet land agriculture especially occupies the middle or center part of Kecamatan IV Koto Aur Malintang, western part of Batang Gasan, western and eastern part of Sungai Limau, western part of V Koto Kp. Dalam, southern part of V Koto Timur, western part of VII Koto Sungai Sarik, western part of 2X11 Enam Lingkung, middle or center part of Enam Lingkung, western part of Nan Sabaris (almost all of the spread), most parts of Ulakan Tapakis, most parts of Sintuk Toboh Gadang, western part of Lubuk Alung and north western part of Batang Anai.

#### **4.1.2.5 Villages**

Villages are spread in random in the entire Kecamatan in mapping regions as wide as 61.92 km<sup>2</sup> or 4.47% from width of the entire mapping regions. Generally, these villages occupies the road side areas, whether the arterial roads and/or quarter roads. There are many communities live in simple/plain houses and also permanent houses with the spread in the level of dense and rare.

### **4.1.3 Morphology**

In broad outline the regional morphology of Kabupaten Padang Pariaman can be divided into some units, where each unit has different characteristic and appearance, whether from the shape of the mountains, range of hills, slope declivity and also the current pattern. The different shape of this nature landscape is generally caused by different types and kinds of rocks, geological structure, rocks endurance towards the geodynamics and closing vegetation process. The height of the regions has a variation from 0 – 1425 meters above sea surface. The highest mountains are Bt. Parmato (1425m), Bt. Kalang (1314m), Mountain Tanjung Erot (1292m), Bt. Barangin (428m) and Mountain Limau Hantu (172m). The lowest height is 0 meter, located along the west coastline.

### **4.1.3.1 Waters Condition**

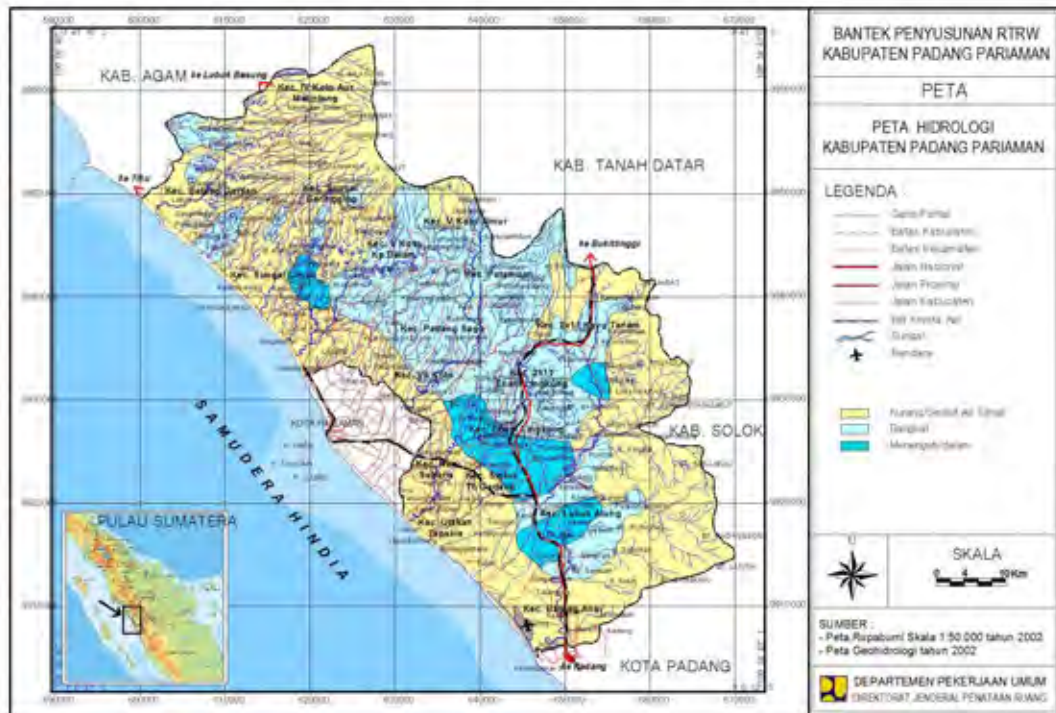
#### **4.1.3.1.1 Surface Water**

The river current pattern in the mapping regions determined based on interpretation from topographic map scale 1 : 50.000. From the interpretation result, river current pattern in Padang Pariaman area are generally dendritic. Valleys of big rivers are generally still in young stage (with the shape of letter “V”) in the upper course, however in the lower course already shown some changing to the adult stage (with the shape of latter “U”), which indicated by these rivers; Batang Limau, Batang Anai, Batang Naras, Batang Ulakan, Batang Gasan, Batang Tapakis, Batang Mangau and other rivers. It is understandable that horizontal erosion is more intensive than vertical erosion. Therefore, from the shape of the valley we can determine that erosion stadium in Padang Pariaman regions is young towards adult. Rivers in this region are generally “intermittent” rivers, which means that those rivers have debit in rainy season and almost dry in dry season. Water condition of the mapping regions can be separated into 2 (two), which are : surface water condition and under surface water condition.

#### **4.1.3.1.2 Under Surface Water Condition**

Under surface water condition was shaped by ground water which reflected by the existence of community wells. Condition of the community wells in Padang Pariaman regions generally has variation of depth between 2 – 5 meters. Depth of water surface at the wells will descend in dry season. Plain area which bordered on the west coast of Sumatera Island has depth of ground water surface between 1.5 – 2.0 meters. In slope morphology area or valley region, which is in the middle part of the mapping regions, the depth of ground water surface is 2 – 5 meter. In the hillside or mountainous area, the depth of ground water surface is between 7 to more than 12 meters, constitute of free ground water and it’s current is following the slope declivity.

There are many springs appear in the hillside areas as water resources with debit of more than 5 liter/second which is used as fulfillment of life needs and livelihood of the community (drinking water and agriculture).



#### 4.1.3.2 Slope Declivity Unit

Based on the slope declivity classification and morphology unit of **Nichols and Edmund, J.R., 1975**, the shape of natural landscape and slope angle of Padang Pariaman region can be divided to 6 (six) morphology units, as stated in Table 4.1.3.

**Tabel 4.1.3 Slope Declivity and Morphology Units**

SHAPE OF FIELD	SLOPE DECLIVITY		MORPHOLOGY UNIT
	(%)	(°)	
Flat	0 – 5	0 - 3	Plain/ Level Land
Slope Slightly	5 – 15	3 - 9	Refine Relief Hills
Rather Steep	15 – 30	9 – 17	Moderate Relief Hills
Steep	30 – 50	17 – 27	Rather Coarse Relief Hills
Very Steep	50 – 70	27 – 36	Coarse Relief Hills
Erect/ Vertical	> 70	36 – 90	Very Coarse Relief Hills

##### 4.1.3.2.1 Plain/ Land

Plain in Kabupaten Padang Pariaman constitutes of alluvial plain, river, swamp, and beach with field slope declivity between 0 – 5% (0 - 3°), regional height between 5 – 80 meters above sea surface. This unit dissemination covers the north, west and south part of Padang Pariaman region, which are at the western part of Kecamatan Koto Aur Malintang, Sungai Geringging, V Koto



Timur, Batang Gasan, Sungai Limau, Patamuan, 2X11 Kayu Tanam, Lubuk Alung and Batang Anai. These units occupy the mapping regions as wide as 300.97 km<sup>2</sup> or 21.72%.

#### **4.1.3.2.2 Refine Relief Hills**

This morphology unit has the shape of refine relief surface with field slope declivity of 5 – 15% (3 – 9°), regional height between 80 – 125 meters above sea surface. Regions that are included in this morphology unit have a very low erosion level.

Dissemination of this unit still covers the northern, western and southern part of the mapping regions, which are the western to middle part of Kecamatan Koto Aur Malintang, Sungai Geringging, V Koto Timur, Batang Gasan, Sungai Limau, Patamuan, 2X11 Kayu Tanam, Lubuk Alung and Batang Anai. This unit occupies the mapping regions as wide as 75,04 km<sup>2</sup> or 5,41%.

#### **4.1.3.2.3 Moderate Relief Hills**

This morphology unit has the shape of moderate relief surface with field declivity of 15 – 30% (9 - 17°), regional height of 110 – 170 meters above sea surface. Areas which are included in this morphology unit have a low to average erosion level. Dissemination of this unit is in the eastern and western part of Kecamatan Koto Aur Malintang, North and Center of Sungai Geringging, northern and center of V Koto Timur, east and west part of Batang Gasan, center of Sungai Limau, northern of Patamuan, a part of northern, center and southern of 2X11 Kayu Tanam, center of Lubuk Alung, southern and some north-western part of Batang Anai. This unit occupies the mapping regions as wide as 260.02 km<sup>2</sup> or 18.76%.

#### **4.1.3.2.4 Rather Coarse Relief Hills**

This morphology unit has the shape of rather coarse relief hills with slope declivity of 30 – 50% (17 - 27°), regional height is 170 – 750 meters above sea surface. Areas which are included in this morphology unit have a moderate erosion level. Dissemination of this unit is still around eastern and middle part of Kecamatan Koto Aur Malintang, northern and middle part of Sungai Geringging, northern and middle part of V Koto Timur and V Koto Kp.Dalam, eastern and western part of Batang Gasan, center of Sungai Limau, northern part of Patamuan, half part of the northern, middle and southern of 2X11 Kayu Tanam, center of Lubuk Alung, southern and some parts of the north-western of batang Anai. This unit occupies the mapping regions as wide as 288.99 km<sup>2</sup> or 20.85%.

#### **4.1.3.2.5 Coarse Relief Hills**

This morphology unit has the shape of coarse relief surface with slope declivity of 50 – 70% (27 - 36°), regional height of 400 – 1200 meters above sea surface. Areas which are included in this morphology unit have a moderate to high erosion level. Dissemination of this unit is in the eastern

part of Kecamatan Koto Aur Malintang. Western of Sungai Geringging, northern of V Koto Timur and V Koto Kp.Dalam, eastern of Batang Gasan, northern and half eastern part of 2X11 Kayu Tanam, southeastern part of Lubuk Alung and eastern part of Batang Anai. This unit occupies the mapping regions as wide as 145.44 km<sup>2</sup> or 10.49%.

#### **4.1.3.2.6 Very Coarse Relief Hills**

This morphology unit has the shape of very coarse relief surface with slope slightly more than 70% (36 - 90°), regional height of 500 – 1300 meters above sea surface. Areas which are included in this morphology unit have a moderate to high erosion level. Dissemination of this unit is in the eastern part of Kecamatan Koto Aur Malintang, western part of Sungai Geringging, northern of V Koto Timur, and V Koto Kp.Dalam, northern and half of eastern part of 2X11 Kayu Tanam, southeastern part of Lubuk Alung and eastern part of Batang Anai. This unit occupies the mapping regions as wide as 315.56 km<sup>2</sup> or 22.77%.

#### **4.1.3.3 Rocks and Soil**

Planting and grouping of rock unit in the mapping regions is based on the geological Map of **Padang** sheet with scale of 1 : 250.000, which was composed by **Kastowo dkk, 1996**. Meanwhile, description of physical characteristics of rocks and corrosion soil based on the field *megaskopis* observation results.

According to geological map of Padang sheet, the rock unit in the mapping regions can be grouped in to 10 (ten) units with stratigraphy sequence from young to old.

##### **4.1.3.3.1 Alluvium (Qal)**

Composed of : silt, sand and gravel. Generally exist at shore plain, including swamp sediment in the southeastern part of Padang, Padang Pariaman until west coast of Lubuk Alung. In those areas, there are some *tufa* pumice remainders. Silt, colored of blackness brown, soft characteristic, medium-high plasticity, while sand and gravel are liberated, with thickness between 1.00 – 2.50 m. The dissemination is wide, existed in the western part of mapping regions, Ulakan Tapakis, Lubuk Alung and Batang Anai, occupies as wide as 330.11 km<sup>2</sup> or 23.82% of total width of the mapping regions.

##### **4.1.3.3.2 Hipersten hornblenda pumice tufa (Qhpt)**

Almost all consist of pumice *tufa* layer, the measurement of the ground line is ranging from 2 – 10cm, contain 3 – 10% *hornblende*, *hipersten* and/or *biotit*, with slightly unified character. White or grayish yellow color on fresh rocks and brownish color on decayed rocks. Corrosion of these rocks with the shape of clayish silt, with deep brown color, with characteristics from loose to rather firm, average plasticity, thickness between 1.50 – 2.75m.

Physical characteristics based on laboratory analysis are: Specific weight ( $G_s$ ) = 2.517 g/cm<sup>3</sup>, original volume weight ( $\gamma$ ) = 1.153g/cm<sup>3</sup>, dry volume weight ( $\gamma_d$ ) = 0.443/cm<sup>3</sup>, saturated volume weight ( $\gamma_s$ ) = 1.261/cm<sup>3</sup>, cohesion ( $c$ ) = 0.129 kg<sup>2</sup> and angle of interior displacement ( $\phi$ ) = 16.52<sup>0</sup>.

The dissemination of this unit can only be found from center to northern part of the mapping regions, existed around V Koto Timur and V Koto Kp. Dalam, occupies as wide as 90.21 km<sup>2</sup> or 6.51% of total of the entire mapping regions.

#### **4.1.3.3.3 Pumice Tufa and Andsite (basal), (Qpt).**

Generally consist of glass fibers and 5 to 80% of whitepumice fragment, have 1 – 20cm diameter, with slightly unified characteristic. It is comprised with sand layer which is rich of small quartz, gravel and *berangkal* quartz, also fire mountain rock and limestone.

Corrosion of this rock unit is in the form of silt clay, have auburn color, with moldy to firm characteristic, average plasticity, thickness between 2.00 – 3.50m. Corrosion of this pumice *tufa* is used for good brick and road constructions because it is easy to plow and enough glued so that it forms steep walls.

Physical characteristics based on laboratory analysis are: Specific weight ( $G_s$ ) = 2.666, original volume weight ( $\gamma$ ) = 1.683g/cm<sup>3</sup>, arid volume weight ( $\gamma_d$ ) = 1.177g/cm<sup>3</sup>, saturated volume weight ( $\gamma_s$ ) = 1.735g/cm<sup>3</sup>, cohesion ( $c$ ) = 0.173kg/cm<sup>2</sup> and angle of inside displacement ( $\phi$ ) = 15.92<sup>0</sup>.

Dissemination of this rock unit existed in the center to northern part of the mapping regions, which are Batang Gasan, Sungai Limau, Sungai Geringging and IV Koto Aur Malintang, occupy as wide as 387.29 km<sup>2</sup> or 23.794% of total width of the entire mapping regions.

#### **4.1.3.3.4 Andesite from Lake Maninjau Caldera (Qamj).**

In form of andesite rock which formed on the entire walls of Lake Maninjau Caldera, with dark gray color, solid state and unified. Dissemination of this rock unit is scattered around Lake Maninjau hills, formed a longitudinal caldera which shows a long period of eruption, when displacement of big Sumatera right lateral fault occurred. Corrosion of this rock unit is silt clay, auburn color, with loose to rather firm characteristic, low plasticity, and thickness between 1.50 until 3.00m.

Physical characteristics based on laboratory analysis are: Specific weight ( $G_s$ ) = 2.568, original volume weight ( $\gamma$ ) = 1.247g/cm<sup>3</sup>, arid volume weight ( $\gamma_d$ ) = 0.666g/cm<sup>3</sup>, saturated volume weight ( $\gamma_s$ ) = 1.407g/cm<sup>3</sup> cohesion ( $c$ ) = 0.127kg/cm<sup>2</sup> and angle of inside displacement ( $\phi$ ) = 16.28<sup>0</sup>.

This rock unit can be found in areas around hills which surrounding Danau Maninjau, IV Koto Aur Malintang, V Koto Timur, V Koto Kp. Dalam, Tanjung Erot hill which occupies as wide as 207.12 km<sup>2</sup> or 14.94% of total width of the entire mapping regions.

#### 4.1.3.3.5 Andesite from Singgalang and Tandikat Mountain (Qast)

Andesite, brownish gray, solid state, unified, with andesite composition, wide firming structure, sometimes easily tears through its strappings.

Corrosion of this rock unit is silt sand, rust colored, coarse average grains, high permeability, high shaft, contain much quartz, glas, rugged size, with thickness between 0.50 until 1.00m.

Physical characteristics based on laboratory analysis are: Specific weight (Gs) = 2.610, original volume weight ( $\gamma$ ) = 1.843g/cm<sup>3</sup>, arid volume weight ( $\gamma_d$ ) = 1.488g/cm<sup>2</sup>, saturated volume height ( $\gamma_s$ ) = 1.918g/cm<sup>3</sup>, cohesion (c) = 0.218kg/cm<sup>2</sup> and angle of inside displacement ( $\phi$ ) = 13.91<sup>0</sup>

This rock unit existed in area arround below part of Tandikat mountain slope, around Malibu Anai which occupies as wide as 82.26km<sup>2</sup> or 5.93% of total width of the entire mapping regions.

#### 4.1.3.3.6 Unexplained Currents (Qtau)

Consist of lava sediment, *fanglomerat* and other *kolovium* sediment. Andesite, brownish gray, in moldy condition, with medium hardness. Lava reaction, the fragment consists of andesite frozen rock at random with gravel to boulder size, float on *tufa* basis period, with thickness more than 3 meter.

The above rock had decayed strongly in form of clay sand, brown, soft – firm, high permeability, medium-high plasticity, gravel tuf with thickness between 1,50-2,50 meter

Physical characteristic based on laboratory analysis are: Specific weight (Gs) = 2.516, original volume weight ( $\gamma$ ) = 1.493g/cm<sup>3</sup>, arid volume weight ( $\gamma_d$ ) = 1.930g/cm<sup>3</sup>, saturated volume weight ( $\gamma_s$ ) = 1.560g/cm<sup>3</sup>, cohesion (c) = 0.170 kg/cm<sup>2</sup> and angle of inside displacement ( $\phi$ ) = 12.38<sup>0</sup>

This rock unit can be found in the surrounding areas of below part of Tandikat mountain slope, around Malibu Anai which occupies as wide as 142.92 km<sup>2</sup> or 10.31% of total width of the mapping regions.

#### 4.1.3.3.7 Crystalline Tufa (QTI)

This unit formed by *tuf* rocks which already become crystalline, with brownish gray color, solid and unified. The dissemination is in the eastern and southern part of Lubuk Alung and occupies about 6% of the mapping regions. Corrosion of this unit is silt clay, auburn color, soft-firm consistency, high plasticity, thickness of 1.75 – 2.50m. Above rock occupy as wide as 22.82 km<sup>2</sup> or 1.65% of total width of the mapping regions.

#### 4.1.3.3.8 Granite Rocks (Tmgr)

This unit was formed by granite rock with brownish gray color, solid and unified. Its spread are located in the southern part of Kayu Tanam, occupies the areas as wide as 37.15 km<sup>2</sup> or 2.68% of total width of the mapping regions.

The corrosion is silt sand, with yellowish brown color, refine – average grains, similar, liberated – relatively solid and thickness is between 1.75 – 3.50m.

The physical characteristics based on laboratory analysis are: Specific weight (Gs) = 2.504, original volume weight ( $\gamma$ ) = 1.326 g/cm<sup>3</sup>, arid volume weight ( $\gamma_d$ ) 1.036g/cm<sup>3</sup>, saturated volume weight ( $\gamma_s$ ) = 1.622 g/cm<sup>3</sup>, cohesion (c) = 0.124 kg/cm<sup>2</sup> and angle of inside displacement ( $\phi$ ) = 30.09<sup>0</sup>

#### 4.1.3.3.9 Jura Sediment Rocks (Ja)

In the form of quartz, splinter, silt, and slate attain the age of *jura*, with white color, gray, reddish, solid, hard and splinter. Spread of this stone unit only exist in the south eastern part of Padang Pariaman, which are in the northern, western and southern part of kayu Tanam and occupy about 70.28 or 5.07% of total width of the mapping regions.

#### 4.1.3.3.10 Perm Limestone (Pt)

In the form of limestone attain the age of *perm*, with color white, gray, reddish, solid, hollow, consists of slate, *phillit* and splinter. Spread of this stone unit only existed in the south eastern part of Parang Pariaman, which are in the northern, western and southern part of Kayu Tanam and occupies 15.85 km or about 11.14% of the mapping regions.

Geomorphologic Map legend and results are given in Table 4.1.4 and Figure 4.1.5.

**Table 4.1.4 Geomorphological Map Legend of Kabupaten Padang Pariaman**

Landform Group	Landform type	State of landform
Lowland	Artificial land	Distribute mainly, at Minang Kabau International Airport
	Sand bar, Beach ridge and Sand dune	High place along the coast
	Coastal plain	Plain along the coast
	Meander belt	Flood plain with clear meander trace
	Alluvial fan	Flat lowland from mountain area to the coast consist of fluvial deposits
	Valley plain	Flat lowland in valley
	Flood plain	Flat lowland by sequential floods
	Back marsh	Marsh behind the river channel

Terrace	River terrace	Fluvial terrace
Volcano	Tandikat volcano	Tandikat volcano
	Low relief hill	Low relief hills formed by Maninjau Caldera eruption. Because of the fine materials, many small valleys are developed.
	Pyroclastic flow upland	Pyroclastic flow upland formed by Maninjau Caldera eruption. Flat surface remains more than low relief hills .
	Old Maninjau volcano	Old Maninjau volcano slope
Mountain	Talus	Landform produced by slope failure debris
	Lithic tuff (QTt)	Mountain slope with Lithic tuff
	Andesite (Qtp)	Mountain slope with Andesite
	Miocene granite (Tmgr)	Mountain slope with Miocene granite
	Quartzite member of Permian (Pq)	Mountain slope with Quartzite member of Permian
	Undifferentiated rock (QTau)	Mountain slope with undifferentiated rock
Additional landform	Fault and lineament	Active faults and suspicious landform
	Slope failure	Old slope failure



Figure 4.1.5 Geomorphological Map of Kabupaten Padang Pariaman

#### 4.1.3.4 Geology Structure

Structure that existed in the mapping regions is in the form of fault structure which generally occupies exist in the northern and eastern part of the mapping regions.

Fault structure is in the form of fault / straightening with directions north-western – south eastern and southwestern – north-western. Stone unit which hit by the fault are *hipersten hornblenda pumice Tuf (Qhpt)*, *pumice tuf* and *andesite (Qpt)* and *andesite from Danau Maninjau calderra (Qamj)*.

Fault zone area could form weak area, because generally the stones have already experienced fractures and firming, which caused unstable area, so in the area around fault zone often occurs ground movement.



Figure 4.1.6 Ground Condition Map

## 4.2 Social Conditions

### 4.2.1 Population

Information about population is an important consideration in disaster management. The main source of population data for Kabupaten Padang Pariaman is Badan Pusat Statistic (BPS, Statistic Center Agency). BPS conducted a survey in 2005. The following are population data at nagari level received from BPS Padang Pariaman office.

**Table 4.2.1 Population and Household dissemination by Kecamatan for Year 2006**

NO	KECAMATAN	POPULATION			HOUSEHOLD
		MALE	FEMALE	TOTAL	
1	Batang Anai	21,555	22,065	43,620	8,313
2	Lubuk Alung	20,245	20,127	40,372	7,713
3	Sintuk Toboh Gadang	7,648	8,679	16,327	3,578
4	Ulakan Tapakis	9,201	10,537	19,738	3,849
5	Nan Sabaris	11,720	14,252	25,972	5,194
6	2 x 11 Enam Lingkung	8,329	8,757	17,086	3,763
7	Enam Lingkung	8,932	9,480	18,412	3,847
8	2 x 11 Kayu Tanam	11,980	12,017	23,997	5,108
9	VII Koto	15,180	17,718	32,898	7,128
10	Patamuan	7,325	8,038	15,363	3,461
11	Padang Sago	3,708	4,469	8,177	1,968
12	V Koto Kp. Dalam	10,749	11,750	22,499	4,890
13	V Koto Timur	6,734	7,943	14,677	3,440
14	Sungai Limau	13,645	14,995	28,640	5,372
15	Batang Gasan	5,260	5,834	11,094	2,297
16	Sungai Geringging	12,722	14,187	26,909	6,452
17	IV Koto Aur Malintang	8,993	9,944	18,937	9,123
Total		183,926	200,792	384,718	85,496

Source: (Office of Statistics Center Agency-Padang Pariaman), 2006

Figure 4.2.1 below shows administrative boundaries of Kabupaten Padang Pariaman at Kecamatan and Nagari level in year 1999.





**Figure 4.2.1 Administrative Boundaries**

Figure 4.2.2 shows the gross population density of Kabupaten Padang Pariaman. To know more clearly regarding population density map, Figure 4.2.3 which shows dissemination of net population density. To produce this map, population data was linked to both administrative boundaries and built-up areas map from Bakorsurtanal. The map clearly shows that the population is distributed mainly along the main and collector roads from south to north and east of Kabupaten Padang Pariaman. Some of the significant settlements can be found in Kecamatan Lubuk Alung, Batang Anai, Sicincin and Sungai Sariak.

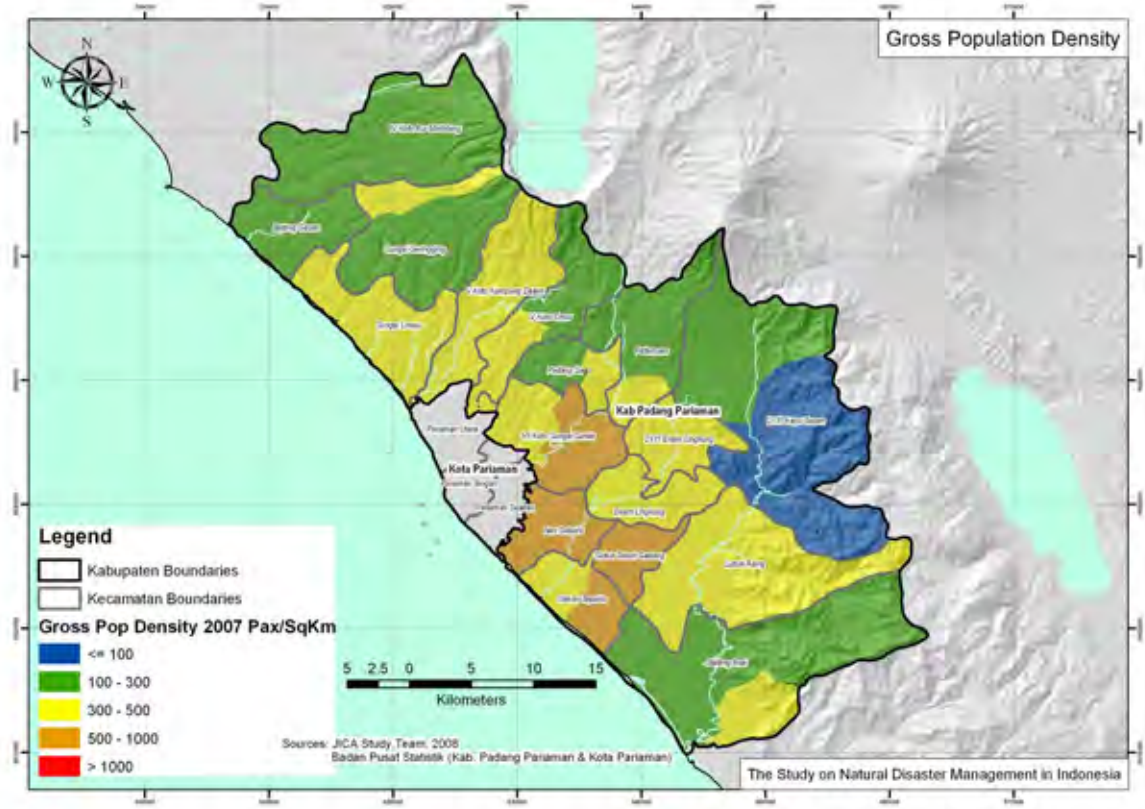
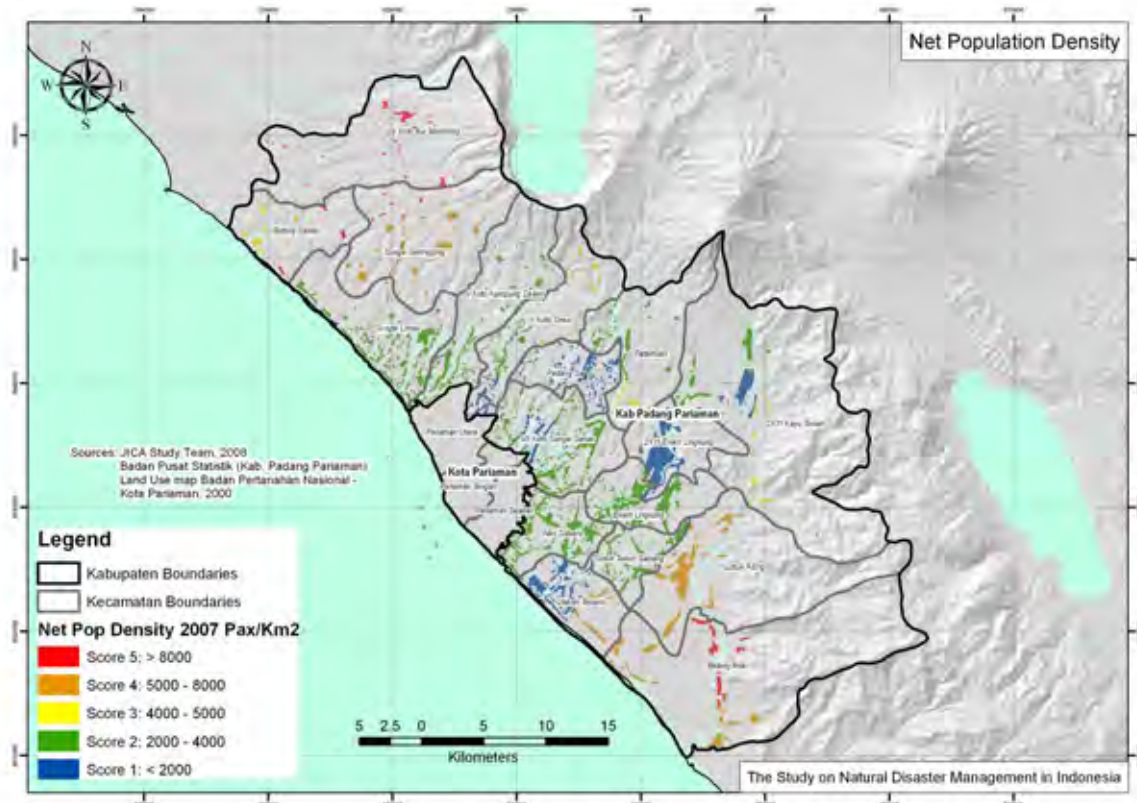


Figure 4.2.2 Gross Population Density of Kabupaten Padang Pariaman



**Figure 4.2.3 Net Population Density of Kabupaten Padang Pariaman**

#### 4.2.1.1 Building Structure

Information on building structure is another significant consideration in disaster management. For Kabupaten Padang Pariaman, the main source of building inventory data is Badan Pemberdayaan Masyarakat (BPM, Society Cultivation Board). They conducted building survey in cooperation with Kecamatan and Nagari offices at Kabupaten Padang Pariaman in 2006. The building data collected by Kecamatan is summarized as follows:

**Table 4.2.2** Number of Building and Type according to Kecamatan

Kecamatan	Nagari	Total Number	Masonry	Concrete Masonry	Wood	RC	Other
2X11 Enam Lingkung		3,893	1,293	1,560	200	312	528
Enam Lingkung		3,682	727	2,039	294	167	455
IV Koto Aur Malintang		5,609	3,392	1,480	190	357	190
Nan Sabaris		5,194	1,025	2,877	415	236	642
Sintuk Toboh Gadang		3,265	644	1,808	261	148	403
V Koto Kampung Dalam		5,075	-	3,657	913	199	306
2X11 Kayu Tanam	Anduring	1,690	348	1,105	65	76	96
2X11 Kayu Tanam	Guguk	1,193	239	710	120	61	63
2X11 Kayu Tanam	Kayu Tanam	1,329	264	796	133	67	69
2X11 Kayu Tanam	Kepala Hilalang	1,329	266	799	135	68	61
Batang Anai	Kasang	2,548	503	1,411	204	116	315
Batang Anai	Ketaping	2,212	437	1,225	177	100	273
Batang Anai	Sungai Buluh	3,559	702	1,971	284	161	440
Batang Gasan	Gasan Gadang	1,024	328	394	131	37	134
Batang Gasan	Malai V Suku	1,370	259	623	218	47	223
Lubuk Alung	Lubuk Alung	8,131	118	7,418	393	145	57
Padang Sago	Batu Kalang	1,207	589	589	29	-	-
Padang Sago	Koto Baru	873	430	430	6	7	-
Padang Sago	Koto Dalam	1,600	658	658	284	-	-
Patamuan	Sungai Durian	1,663	328	921	133	75	205
Patamuan	Tandikat	2,778	548	1,539	222	126	343
Sungai Geringging	Kuranji Hulu	4,421	1,269	1,629	376	99	1,048
Sungai Geringging	Malai III Koto	1,261	311	391	245	151	163
Sungai Limau	Kuranji Hilir	2,931	-	2,423	228	157	123
Sungai Limau	Pilubang	3,025	-	2,578	190	171	86
Ulakan Tapakis	Tapakis	2,742	541	1,518	219	124	339
Ulakan Tapakis	Ulakan	1,206	238	668	96	55	149
V Koto Timur	Gunung Padang Alai	1,182	233	655	94	54	146
V Koto Timur	Kudu Gantiang	1,129	223	625	90	51	139
V Koto Timur	Limau Purut	624	123	345	50	28	77
VII Koto Sungai Sariak	Balai Aia	848	84	254	42	47	421
VII Koto Sungai Sariak	Lareh Nan Panjang	1,416	142	424	70	69	711
VII Koto Sungai Sariak	Lurah Ampalu	3,036	301	925	182	242	1,386
VII Koto Sungai Sariak	Sei Sarik	1,784	178	535	89	95	887
	<b>Total</b>	<b>84,830</b>	<b>16,741</b>	<b>46,980</b>	<b>6,778</b>	<b>3,848</b>	<b>10,478</b>

Figure 4.2.4 is a thematic map showing building distribution by type for Kabupaten Padang Pariaman. In terms of number, main material building is concrete, followed by bamboo and wood. Definition of concrete in the survey generally refers to structures with walls made of brick and cement. The highest concentration of building structures can be found in Kecamatan Lubuk Alung and VII Koto as supported by their high building density in the table. Spatially, the thematic map indicates significant concentrations of concrete buildings also exist in coastal area, such as in Kecamatan Ulakan Tapakis, Sungai Limau and Batang Gasan.

Most number of houses made from bamboo can be found in Kecamatan V Koto Timur, Padang Sago and Patamuan. Bamboo material is generally used by poorer population.

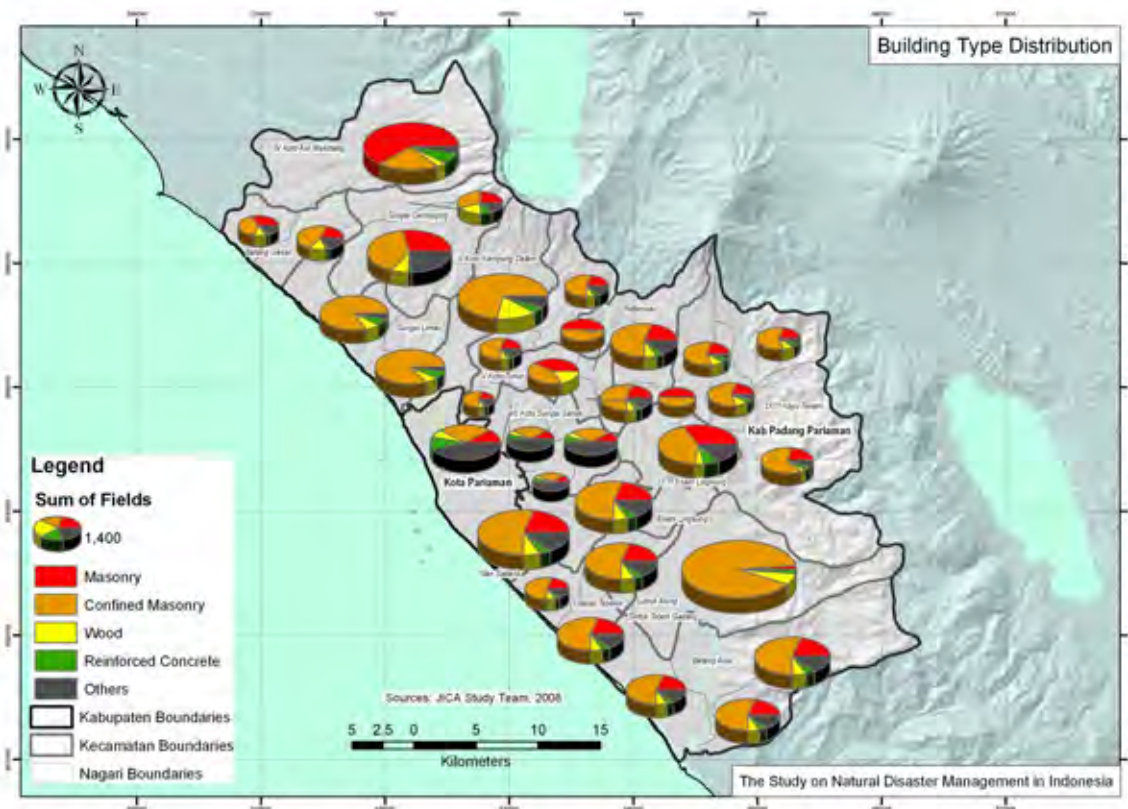


Figure 4.2.4 Building Type Distribution by Kecamatan

### 4.3 History of Flood and Landslide Disasters

The water-related disasters in Kabupaten Padang Pariaman are shown in the table below which indicates recent flood and sediment disasters in Kabupaten Padang Pariaman. Other than those mentioned in the table, a number of flood and sediment disasters had often struck Kabupaten Padang Pariaman.

**Table 4.3.1 Recent History of Major Flood and Sediment Disasters in Kabupaten Padang Pariaman**

Date (DD/MM/YY)	Type	Profile of Damages due to Disaster
24/04/07	Flood	Flood with height of 0.5 – 1.5 meter in 2 Kecamatan (Kec. Ulakan Tapakis and Kec. Sintoga), drowned 98 houses and 816 Ha rice fields, and 65 Ha of rice field failed to crop.
22-23/01/07	Flood	Flood with height of 0.5 – 2 meter in 8 Kecamatan (Kec. Batang Gasan, Kec. Sungai Limau, Kec. V Koto Kp. Dalam, Kec. Nan Sabaris, Kec. Ulakan Tapakis and Kec. Batang Anai), flooded houses were 1,506 units, flooded school were 8 units, collapsed <i>mushalla</i> (small prayer house) 3 units, failed to crop agriculture 108 Ha, crashed embankment about 2 Ha.
12/01/07	Flood	Flood with height of 0.5 – 1.5 meter in 5 Kecamatan (Kec. Batang Anai, Kec. Lubuk Alung, Kec. Ulakan Tapakis, Kec. Batang Gasan and Kec. V Koto Kp. Dalam), 234 units of houses were flooded, 14 unit of houses were damaged, 2 unit <i>mushalla</i> (smallprayer house) damaged, 1 damaged school, 327 Ha of agriculture areas inundated, 85 Ha of rice field were failed to crop.
08/01/07	Sediment	Landslide in Kolam Janiah, Nagari Kudu Gantian Kec. V Koto Timur caused 13 people died, 4 houses damaged and 1 <i>mushalla</i> (small prayer house) collapsed.
17/01/06	Flood	Flood with height of 0.5 – 1.5 meter happened in 3 Kecamatan, road's damaged for 2,215 meter, 7 unit bridges were collapsed, 9 irrigation channels crashed, 18 locations of Catchment area were damaged, 233 Ha of agriculture land inundated, 89 Ha of rice field were seriously damaged/failed to crop, 212 Ha of embankment crashed, 1 port's damaged, 49 big livestocks died and 5,608 small livestocks were gone/disappeared, 1,917 of houses inundated and 74 other were collapsed/seriously damaged, 2 units of puskesmas were inundated and 1 mosque were collapsed, 5 schools were unundated and gate of an ice factory was collapsed.
02/09/05	Flood	Landslide of road body at 37 dots on 9 internode roads, 3 houses collapsed and damaged.
02/09/05	Flood	Puddle flood in 9 Kecamatan with height of 0.5 – 1.5 meter and drowned 13,115 houses, damaged 32 irrigation channels, 9 houses collapsed, damaged 1 school, 1,036 houses were inundated, 1,200 Ha of agriculture were damaged/failed to crop, 7,084 Ha of rice field were drowned, 20 cows died and 53 goats disappeared.
25/08/05	Flood	Flood in 4 Kecamatan with height of 0.5 – 1 meter, made 532 houses flooded, 712 Ha of rice field areas flooded and 35 Ha of them were damaged/failed to crop. 2 units of <i>mushalla</i> (small prayer house) collapsed, 300 big livestocks disappeared and 3 Ha of embankment/fish pool crashed or damaged.

Source: Board of National Unity and Society Protection, Kabupaten Padang Pariaman

## **4.4 Flood and Landslide Disaster Hazard**

### **1) Flood**

#### **(1) Hazard Map**

Figure 4.4.1 shows hazard map for flood disaster in Kabupaten Padang Pariaman. As indicated in the figure, values of flood hazard were divided into five (5) classes indicating relative hazardous classification. “Red” indicates the highest hazard and “Orange” indicates higher hazard. Moderate hazard is shown in “Yellow” while “Green” shows lower hazard. Then, “Blue” shows the lowest hazard. The higher scores of flood hazard (in “Red” and “Orange”) are concentrated in alluvial/sediment lowland area along coastal line in front of Indian Ocean in Kabupaten Padang Pariaman. Along the coastal line, river mouths tend to be blocked by sand bars, beach ridges and sand dunes which may cause flooding from main rivers, poor drainage, forming marsh and thus higher potential of flooding. Especially, lowland area along the southern coastal line in Kecamatan Ulakan Tapakis may be significantly subject to the tendency, when rainfall in rainwater reservoir and sea water level are high, thus emerged flood hazard will be very high (in “Red”) compared with other lowland area. Furthermore, the highest level of flood hazard (in “Red” or “Orange”) are also indicated along the northern coastal line of Kecamatan Batang Gasan and Kecamatan Sungai Limau, which located in very narrow lowland area between coastal line and beach terrace which formed along the fault line. Certain levels of flood hazards can be seen in some flat area along Anai river, Ulakan river, Tapakis river, Mangau river, Naras river and Gasan river.

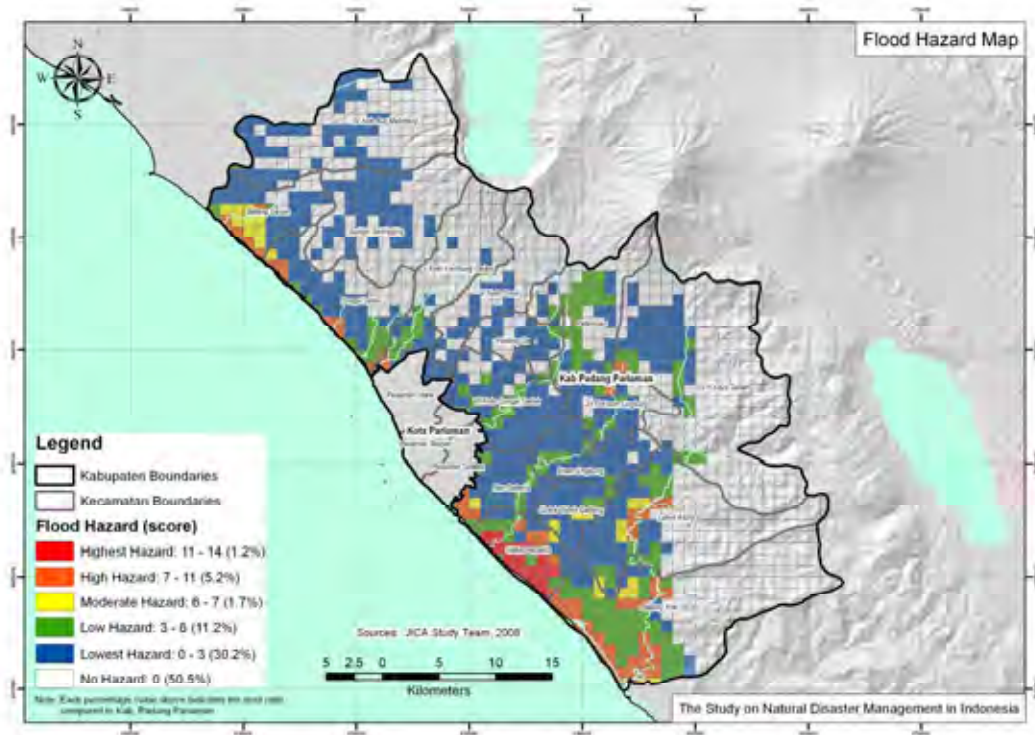
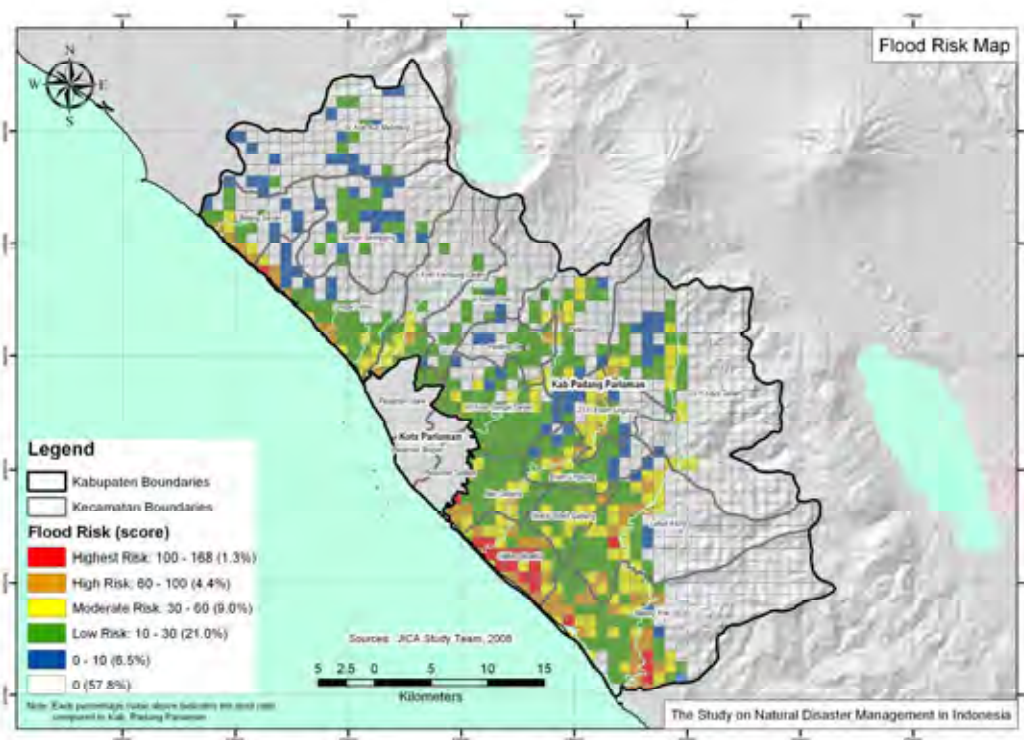


Figure 4.4.1 Flood Hazard Map



**(2) Risk Map**

Basically, higher risk area may be regarded as area where population and property are concentrated, being exposed to higher level of flood hazard. Risk map for flood disaster in Kabupaten Padang Pariaman is shown in Figure 4.4.2. As shown in the figure, values of flood risk were divided into five (5) classes indicating risk classification level. “Red” indicates the highest risk and “Orange” indicates higher risk. Moderate risk is shown in “Yellow” while “Green” means lower risk. Then, “Blue” shows the lowest risk. Overall tendency direction of Kabupaten Padang Pariaman shows that relatively highest level were observed in the southern part of Kabupaten (Kecamatan Name: Batang Anai, Lubuk Alung, 2x11 Kayu Tanam, 2x11 Enam Lingsung, Enam Lingsung, Sintuk Toboh Gadang, Ulakan Tapakis, Patamuan, Padang Sago and VII Koto Sungai Sariak) compared to the northern part (Kecamatan Name: V Koto Timur, V Koto Kampung Dalam, Sungai Limau, Sungai Geringging, Batang Gasan and IV Koto Aur Malintang). Especially, in areas adjacent with river mouths along coastal line such as Anai river, Ulakan river, Tapakis river, Mangau river, Naras river and Gasan river which indicated in “Red” or “Orange”, which means highest or higher risk. Certain levels of flood risk can be seen along Anai river, Ulakan river, Tapakis river, Mangau river and Naras river.



**Figure 4.4.2 Flood Risk Map**

## 2) Sediment Disaster

### (1) Hazard Map

There is a clear danger of sediment disaster in Padang Pariaman regency due to the wide dispersion of various pyroclastic flow sediment that cover most of the area, with exception at the western plains. Steep slopes in the area require close attention, particularly during rainy season. The *highest* and *high* hazard areas most vulnerable to sediment disaster had reached 77% of the total (mapped) areas, particularly the north side of Kec.V Kamung Dalam, north side of Kec.V Koto Timur, nearly entire region of Kec.Palamuan and steep slope areas of west side of 2x11 Kayu Tanam.

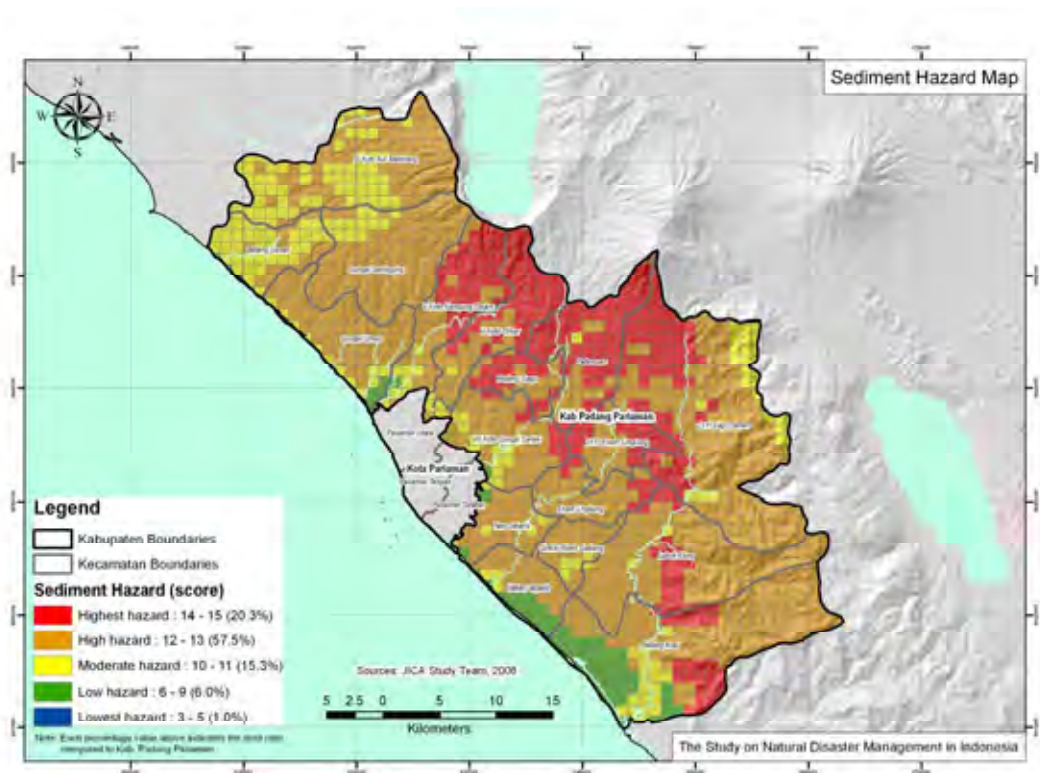
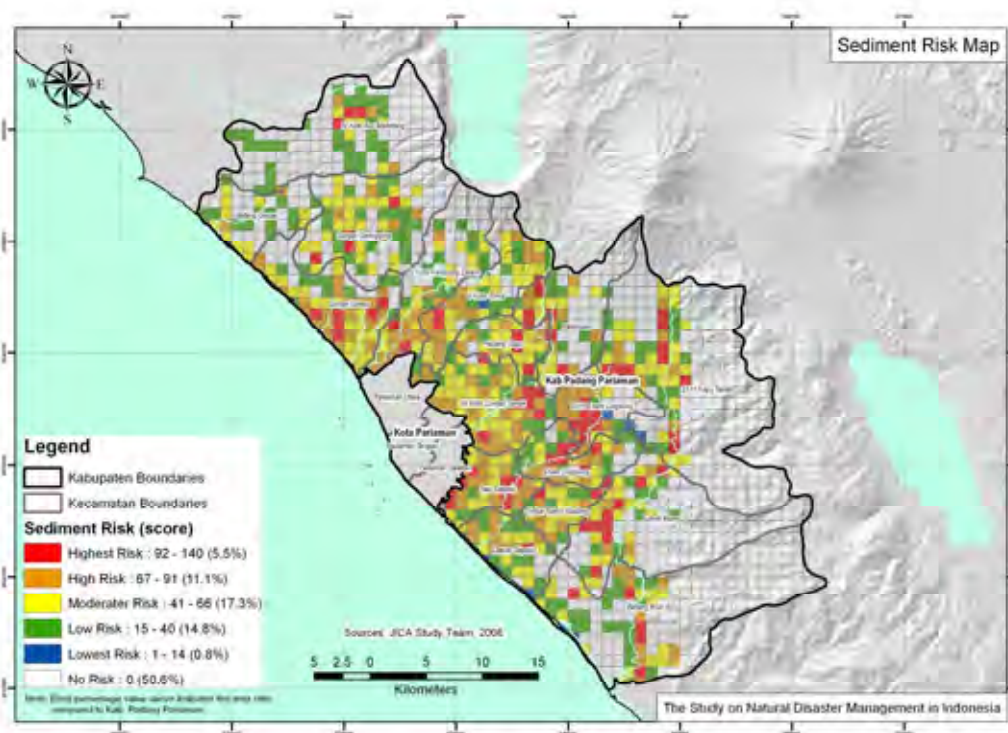


Figure 4.4.3 Hazard Map of Sediment Disaster

**(2) Risk Map**

Essentially, high risk areas are areas where houses and people are concentrated. Moreover, based on past disasters in Padang Pariaman regency shows that many of roadsides and sea terrace at coast area have been damaged by sediment collapse. There are also numerous areas where the steep incline to be above road which runs through mountain area that had been dredged. However, despite of the great disaster caused by soil content and slopes at the eastern part of mountain area, vulnerability of this area is tend to be low, so the risk is small.

*Highest and high risk areas when combined become about 17% of the entire (mapped) area. However, as area that located at high sediment hazards area, then it is natural to conduct thorough survey and investigation before proceeding with land use planning and land condition*



**Figure 4.4.4 Risk Map of Sediment Disaster**

## **CHAPTER 5. SOCIO-ENVIRONMENTAL ASPECTS FOR THE PLAN**

In this chapter, recent trend and important points of disaster management is described briefly.

### **5.1 Data related with Disaster from Rain and Storm.**

Indonesia own steep hilly mountain and valleys area that is much greater than the lowland area,, and due to rapid deforestation in recent years, caused high risk of flood and sediment disasters which often occurred in the past .

Flash flood and sediment disaster are the main disasters in the region, causes potential of human losses. Of all victims by natural disaster, most of them are killed by flash flood in the region.

Rain and Storm related Disasters are predictable by observing rainfall data, and by increasing community awareness, number of victims can be reduced significantly.

### **5.2 Development of Computerized Information System**

Due to development of information technology recently, such as mobile communication tools, PCs, and etc., information communication and data processing tools are widely pervaded. In developed country, GPS and GIS are widely pervaded and make it possible to observe real time climate data. Moreover, visual damage information system was also established. These systems will not only change means of communication, but also give great improvement on damage information gathering for disaster management when disaster occurs.

However, due to complication of the system, once the system broke down by disaster, all the system will be malfunctioned, therefore, dividing the system into multi system is highly important. This distribution is useful when malfunction occur in the future. This kind of system could also be applied in Kabupaten Padang Pariaman, however, weak points of the system must be considered in advance.

### **5.3 Safety of Emergency Transportation Network**

At the time of disaster occurrence, safety of road network is one of most important criteria in disaster management to implement various emergency response activities. Since there is limited road network in Kabupaten Padang Pariaman, it is necessary to design Emergency Transportation Network including Airport (under construction) in Padang Pariaman. Safety of Emergency Transportation Network will help immediate response in emergency response.

### **5.4 Providing Lifeline During Disaster**

In normal daily life, especially in urban area, dependence on main lifeline is extremely high, and malfunction or ceasing of these services will greatly impinge on citizen's life. Lifeline provider

companies have mandate to continue their service even in emergency periods. Those companies must stringently prepare and organize in minimizing damages when disaster occurs.

### **5.5 Understanding the needs of Special Care for Vulnerable Group**

In Kabupaten Padang Pariaman, ratio of elderly persons and young children is relatively high. In case of occurrence of disaster, especially for rain and storm related disaster which could be predictable in advance, so there will be certain time before disaster occurs, these vulnerable groups will need longer time to heal compare to young people. Therefore, requires special care for these vulnerable groups. Besides, it requires certain criteria of preparation, guideline or design to help this vulnerable group to evacuate in advance. These activities are undertaken within the community surrounding itself.

### **5.6 Guidelines for Society Regarding Disaster Mitigation Awareness**

Not only government officials can be dealt with natural disaster. Disaster management must also prepare together with close collaboration with government officials, private enterprises and citizens. Therefore, each player must aware of the importance of disaster management, and it is extremely important to increase their knowledge and awareness regarding disaster management. It is rather difficult to realize the seriousness of disaster management, however, disaster management is precious when disaster occurs. Mitigation measures could maximally reduce casualty.

## ***CHAPTER 6. ESTABLISHMENT OF SATLAK PB***

### **6.1 Definition of SATLAK PB**

### **6.2 Obligations of SATLAK PB in Disaster Management Cycle**

### **6.3 Members and Organization of SATLAK PB**

### **6.4 Obligation of SATLAK PB Members**

For 6.1 to 6.4, refer to Section 1 General Chapter 6, 6.1 to 6.4 in “Part 1: Earthquake Disaster Measures”

## **Section 2:Pre-Disaster (Pre-Disaster Management Plan)**

Damages, caused by rain and storm related disasters, sometimes exert great effects with spreading in wide areas. Due to heavy rains causing flooding and landslides affects and sometimes collapse daily life of citizens and force them for evacuation life. Damages to educational, medical, social welfare facilities will also increase the level of damages. Therefore, to prepare for disasters in Kabupaten Padang Pariaman, which are often occurs, necessary measures are implemented in advance.

### ***CHAPTER 1 CAPACITY DEVELOPMENT OF DISASTER MANAGEMNET ORGANIZATION***

#### **1.1 SATLAK PB**

<b><i>Responsible Agency:</i></b>	<b><i>SATLAK PB</i></b>
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#### **1.2 Improvement of RUPUSDALOPS PBP**

<b><i>Responsible Agency:</i></b>	<b><i>BUPATI</i></b>
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#### **1.3 Supports from Other Area**

<b><i>Responsible Agency:</i></b>	<b><i>Social Agency</i></b>
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For 1.1 to 1.3, refer to Section 2 Pre-Disaster Chapter 1, 1.1 to 1.3 in “Part 1: Earthquake Disaster Measures”

## **CHAPTER 2    ENHANCEMENT OF DISASTER MANAGEMENT CAPACITY FOR CITIZENS AND PRIVATE COMPANY**

Mind concept of “self-protection” is concerned as vital elements in disaster management. Preparation for natural disaster individually could increase awareness of citizens and company owners for disaster preparedness. Everyday effort will strengthen city and the residents against natural disasters.

### **2.1    Expectation to Citizens**

<b><i>Responsible Agency:</i></b>	<b><i>SATLAK PB</i></b>
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### **2.2    Expectation to Society**

<b><i>Responsible Agency:</i></b>	<b><i>SATLAK PB</i></b>
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### **2.3    Expectation to Private Company**

<b><i>Responsible Agency:</i></b>	<b><i>Trading Industry</i></b>
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### **2.4    Volunteer Organization**

<b><i>Responsible Agency:</i></b>	<b><i>National Unity Agency</i></b>
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### **2.5    Dissemination of Disaster Management Knowledge**

<b><i>Responsible Agency:</i></b>	<b><i>Information and Communication</i></b>
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For 2.1 to 2.5, refer to Section 2 Pre-Disaster Chapter 2, 2.1 to 2.5 in “Part 1: Earthquake Disaster Measures”



## **CHAPTER 3    RESPONSE    ENHANCEMENT    FOR    VULNERABLE RESIDENTS**

### **3.1    Measures for Vulnerable Group**

<b><i>Responsible Agency:</i></b>	<b><i>Social Agency</i></b>
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### **3.2    Foreigner Management**

<b><i>Responsible Agency:</i></b>	<b><i>Social Agency</i></b>
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### **3.3    Safety of Infants and Children**

<b><i>Responsible Agency:</i></b>	<b><i>Health Agency</i></b>
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For 3.1 to 3.3, refer to Section 2 Pre-Disaster Chapter 3, 3.1 to 3.3 in “Part 1: Earthquake Disaster Measures”

## **CHAPTER 4 DEVELOPMENT OF DISASTER INFORMATION COMMUNICATIONS NETWORK**

Development and effective operation of disaster information communication network, capacity building of radio communication network, and multiplexing of information network will be advanced in order to disseminate relevant information precisely and accurately to residents as well as the agencies engaging in rescue and relief activities so that each could give information regarding damaged condition adequately.

### **4.1 Design of Disaster Communication System**

<b><i>Responsible Agency:</i></b>	<b><i>Transportation Agency Communication and Information</i></b>
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### **4.2 Operational of Disaster Information Communications Network**

<b><i>Responsible Agency:</i></b>	<b><i>Transportation Agency, Communication and Information</i></b>
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### **4.3 Operational Skill Improvement for Employee**

<b><i>Responsible Agency:</i></b>	<b><i>Transportation Agency, Communication and Information</i></b>
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For 4.1 to 4.3, refer to Section 2 Pre-Disaster Chapter 4, 4.1 to 4.3 in “Part 1: Earthquake Disaster Measures”

## **CHAPTER 5 RESCUE/ RELIEF, MEDICAL TREATMENT MITIGATION PLAN**

### **5.1 Capacity Building of Fire Fighting**

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency</i></b>
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### **5.2 Education for Residents and Communities**

<b><i>Responsible Agency:</i></b>	<b><i>SATLAK-PB</i></b>
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For 5.1 and 5.2, refer to Section 2 Pre-Disaster Chapter 5, 5.1 and 5.2 in “Part 1: Earthquake Disaster Measures”

## **CHAPTER 6 SAFETY CONTROL/ RESCUE MEASURES**

### **6.1 Safety Control and Rescue Preparedness Measures by Police**

<b><i>Responsible Agency:</i></b>	<b><i>POLRES</i></b>
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### **6.2 Safety Control and Rescue Preparedness Measures in Waters**

<b><i>Responsible Agency:</i></b>	<b><i>KAMLA</i></b>
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For 6.1 and 6.2, refer to Section 2 Pre-Disaster Chapter 6, 6.1 and 6.2 in “Part 1: Earthquake Disaster Measures”

## **CHAPTER 7    *DEVELOPMENT OF EMERGENCY TRANSPORTATION FACILITIES***

### **7.1    Development of Emergency Transportation Facilities**

<b><i>Responsible Agency:</i></b>	<b><i>Transportation Agency</i></b>
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For 7.1, refer to Section 2 Pre-Disaster Chapter 7, 7.1 in “Part 1: Earthquake Disaster Measures”

## **CHAPTER 8      *EVACUATION AND PREPAREDNESS OF TEMPORARY HOUSING***

When large-scale flood or sediment disaster occurs, the effort to develop and repair the evacuation site condition is very much needed to secure the safety of the residents and to help them survive in the evacuation places. This chapter discusses about the planning of the evacuation area development.

### **8.1      Temporary Evacuation Area**

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency</i></b>
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#### **1)      Role of Temporary Evacuation Area**

When disaster such as heavy rain, storm and erosion occurs, temporary evacuation area will be established for citizens protection from disaster suffering. Evacuation area also functioned as accommodation for refugees after disaster. For those two major roles, temporary evacuation areas should already be decided in each Kecamatan.

#### **2)      Criteria of Temporary Evacuation Area**

Selection of temporary evacuation area should consider the following criteria.

- Safety places according to hazard map
- Accessible area
- In form of wide plain area
- No hazardous facilities in the neighborhood (e.g. chemical factories)

#### **3)      Selection of Temporary Evacuation Area**

##### **(1)      Selection of Temporary Evacuation Area**

Temporary evacuation areas are selected in each Kecamatan. These evacuation areas will be reviewed periodically in line with dynamics of population and building areas.

##### **(2)      Establishment of Signboard**

Establishment of signboard for temporary evacuation areas will be conducted in order to lead the citizen to suitable area. Signboard is also efficient to develop citizen awareness for disaster management.

## 8.2 Evacuation Facilities

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency</i></b>
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### 1) Selection of Evacuation Facilities

Appropriate evacuation facilities are needed to accommodate the people who lose their house because of storm or erosion. Evacuation facilities are basically selected from existing buildings in each Kecamatan. These buildings selected as evacuation facilities should have enough room to accommodate certain number of citizens. Structure of the building should be strong enough against disaster and located in safe area according to hazard map.

#### (1) Evacuation Facilities

Some facilities such as schools and mosques are selected as evacuation facilities in advance by each Kecamatan. Required number and space of evacuation facilities are depended upon the population. At least, a certain number of the injured, children and elderly need to stay in evacuation facilities. These selected facilities will be maintained and reinforced for the disaster.

#### (2) Establishment of Signboard

Establishment of signboard for evacuation facilities should be conducted in order to lead the citizen to the right facilities without any confusion. Signboard is also efficient to develop citizen awareness of disaster management.

### 2) Equipments of Evacuation Facilities

#### (1) Required Equipments for Communication and Supply

After disaster occurred, required equipments are different between initial period (within 72 hours) and restoration period (after 72 hours). Equipment needed for both periods to be set at the each evacuation facilities are as follows.

##### A. Initial Period: within 72 hours after disaster occurred

- Radio transmission
- Mobile phone
- Radio
- Billboard
- Electric generator and battery
- Motorcycle and bike

## **B. Restoration Period: 72 hours after disaster occurred**

- Radio transmission
- Mobile phone

### **(2) Provision regarding Drinking Water and Foods**

Commodities, drinking water and foods are essential in evacuation facilities. Supply will be prepared in order to have sufficient amount of commodities, drinking water and food to be provided to refugees.

#### **A. Water Supply**

To guarantee enough water supply after disaster occurred, the following facilities should be inspected and maintained in advance.

- Water supply in schools and mosques
- Wells
- Plastic canteens or containers
- Rear cars

#### **B. Foods**

Following cooking equipments for food supply should be prepared.

- Cooking stove
- Large sized pan
- Propane gas
- Plates and utensils

### **3) Establishment of Working Committee for Evacuation Facilities**

Working committee for each evacuation facility should be established with for two purposes. One, the committee will maintain the facilities themselves. The other, the committee should prepared the equipments so refugees are able to stay at the evacuation facilities without any confusion.

#### **(1) Organization of Working Committee**

Organization of working committee will be advised to include the following member.

- Leader of Community Organization for Disaster Risk Management, or private company such as plantation companies
- Member of Kecamatan Office
- Owner or manager of the facilities
- Others (private company, volunteers, and so on)



## **(2) Role of Working Committee**

The working committee will be expected to make the following preparation at each evacuation facility in order to smooth operational of the facility under emergency situation.

- Making a list of user of the evacuation facilities
- Formulation of manual for operating evacuation facility including rescue measures for the elderly, weak and handicaps
- Training for implementation of the manual
- Disseminate method of disaster management and enhancement of awareness
- Discussion disaster prevention measures with citizens
- Conducting disaster prevention drill with citizens and private company
- Prior discussion on how to close evacuation facility when refugees already occupy their houses or temporary housing

### 8.3 Formation of Evacuation Plan

<b><i>Responsible Agency:</i></b>	<b><i>National Unity Agency</i></b>
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### 8.4 Measures of Temporary Housing

<b><i>Responsible Agency:</i></b>	<b><i>SATLAK PB</i></b>
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For 8.3 and 8.4, refer to Section 2 Pre-Disaster Chapter 8, 8.3 and 8.4 in “Part 1: Earthquake Disaster Measures”

## **CHAPTER 9 DEVELOPMENT OF DISASTER MANAGEMENT FACILITIES**

Supplies are vital for disaster preparedness such as materials and equipments for damage prevention, rescue activities and restoration, foods and drinking water.

### **9.1 Supply of Disaster Management Equipments and Goods**

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency</i></b>
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### **9.2 Supply of Emergency Foods and Commodities**

<b><i>Responsible Agency:</i></b>	<b><i>Social Agency</i></b>
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### **9.3 Supply of Drinking Water, and etc**

<b><i>Responsible Agency:</i></b>	<b><i>Region Drinking Water Company</i></b>
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For 9.1 to 9.3, refer to Section 2 Pre-Disaster Chapter 9, 9.1 to 9.3 in “Part 1: Earthquake Disaster Measures”

## **CHAPTER 10 MEDICAL TREATMENT AID AND INFECTION DISEASE PREVENTION MEASURES**

Supply of medical equipments and medicines will be prepared for medical treatment in the time of disaster. Notably immediately examination of dead bodies will prevent outbreak of infection disease.

### **10.1 Development of Activity Base of Medical Treatment**

<b><i>Responsible Agency:</i></b>	<b><i>Health Agency</i></b>
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### **10.2 Supply of Medicine and Medical Equipments and Goods**

<b><i>Responsible Agency:</i></b>	<b><i>Health Agency</i></b>
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For 10.1 and 10.2, refer to Section 2 Pre-Disaster Chapter 10, 10.1 and 10.2 in “Part 1: Earthquake Disaster Measures”

### 10.3 Prevention of Infectious Disease

<b><i>Responsible Agency:</i></b>	<b><i>Health Agency</i></b>
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#### 1) Infection Disease Prevention Activity

Rain and storm related disasters are likely to cause a variety of infection disease. In order to prevent such disease, citizen must have the right knowledge about infection disease. Hence, information about major infection disease, the sources of outbreak and prevention method will be distributed by brochure and website in advance. Besides, examination of drinking water and rat destruction should be conduct periodically in order to reduce the possibility of outbreak in time of disaster.

#### 2) Supply of Materials for Infection Disease Prevention

Antiseptic and disinfectant will be kept as supply at each clinic and disaster prevention center in order to disinfect flooded houses and toilets, also well after disaster occurred.

### 10.4 Preparedness Measures of Corpse

<b><i>Responsible Agency:</i></b>	<b><i>Health Agency &amp; Indonesian Red Cross</i></b>
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#### 1) Settlement of Mortuary

In case that disaster involves human lives, mortuary would be established in appropriate facilities. Enough room space for doctors to examine dead bodies is required. For avoiding any confusion under emergency situation, candidate facilities or buildings should be decided in each Kecamatan.

#### 2) Establishment of Backup System

In case of large fatality caused by disaster, lack of doctors who can examine dead bodies might occur. For such case, Health Agency and Indonesian Red Cross will request assistance from other agency, NGO and related private company. For this, the backup system in coordination with these organizations will be established for disaster preparation.

## **CHAPTER 11 DISASTER MANAGEMENT IN SCHOOL**

### **11.1 Formulation of Evacuation/ Derivation/ Protection Plan**

<b><i>Responsible Agency:</i></b>	<b><i>Education Agency</i></b>
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### **11.2 Preparedness Measures of School Facilities for Emergency Situation**

<b><i>Responsible Agency:</i></b>	<b><i>Education Agency</i></b>
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For 11.1 and 11.2, refer to Section 2 Pre-Disaster Chapter 11, 11.1 and 11.2 in “Part 1: Earthquake Disaster Measures”

### 11.3 Disaster Management Education

<b><i>Responsible Agency:</i></b>	<b><i>Education Agency</i></b>
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Teachers and school staffs should received education regarding disaster management in order to be able to take appropriate action under emergency circumstance. This education could be conducted in form of seminar or lectures. Information of disaster prevention measures for school should be distributed through brochure or/ and website.

Meanwhile, students should also get disaster management education. Proper knowledge about flood and erosion will become basic idea for disaster prevention, and should be educated in school. Through this education, hopefully disaster management can be applied in school and household. Therefore, it is highly recommended that disaster management subject also included in student educational curriculum.

## **CHAPTER 12 PROMOTING PLAN FOR DEVELOPING DISASTER SAFE PADANG PARIAMAN**

### **12.1 Promoting Disaster Safe Land Use Planning**

<b><i>Responsible Agency:</i></b>	<b><i>Department Planning Board</i></b>
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Efficient land use could contribute to strengthen the city against natural disasters such as flood and erosion. Land use plan is necessary to take account of evacuation routes and evacuation spaces for disaster mitigation.

#### **1) Improvement and Multiplexing of Evacuation Routes**

When disaster occurs, secured evacuation and transportation routes are needed for smooth evacuation and emergency activities. Main roads such as state roads and provincial roads designated as evacuation and emergency routes will be included in the land use plan. These roads should link among evacuation places and emergency facilities. Additionally, based on the multiplexing evacuation route system, alternative roads should be selected as evacuation route and will be shown in the land use plan.

The following actions for implementation of evacuation routes are improved;

- To select evacuation routes and alternative routes in the land use plan
- To assign high priority to improve these roads such as road widening and repaving

#### **2) To Secure Open Spaces for Promoting Disaster Measures**

In build-up and residential area, open spaces such as parking spaces and green spaces play an important role as evacuation places when natural disaster occurred. Therefore existing open spaces outside hazardous zone selected by hazard analyses should be improved and maintained for the purpose of developing appropriate evacuation area. The current vacant lands and public spaces also could utilize as open space.

Each Kecamatan will select their open space as evacuation places based on the population and density. These evacuation places are reflected in the land use plan in Kabupaten Padang Pariaman.

#### **3) To Mitigate Buildings in Vulnerable Zone**

Based on hazard map, vulnerable areas are clearly designated, and some residences and buildings are recognized as hazardous. In order to mitigate such vulnerabilities, priority of development



and redevelopment is given to these vulnerable areas in land use plan. The following measures are considered to carry out.

- To strengthen existing buildings in vulnerable area against natural disasters
- To distribute open spaces appropriately in high dense area

On the other hand, the land use plan shows constraints in these vulnerable areas.

- To avoid construction of new buildings in vulnerable area
- To postpone development of vacant land in high dense area

Area development and redevelopment in vulnerable area are also concerned.

## 12.2 Development of Disaster Mitigation Facilities

<b><i>Responsible Agency:</i></b>	<b><i>National Unity Agency</i></b>
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Development of disaster mitigation facilities including basic infrastructure, parking space, roads, railways, and bridges is vital process in order to strengthen city against natural disasters.

### 1) Facility Improvement at Evacuation Routes

For smooth and safe evacuation and emergency responses when disaster occurred, facilities at evacuation routes are necessary to be improved and well maintained. In Kabupaten Padang Pariaman, bridges on roads and tunnels on the railway to/ from Surabaya are important transportation facilities. In case these facilities are recognized as hazardous, upgrading and maintenance would be delivered by concerned agencies.

In addition, alternative transportation is necessary to consider in case of large-scale disaster. Kabupaten Padang Pariaman might be isolate when large-scale flood and erosion happen due to complete reliance on land transportation inside and outside the Kabupaten, if lifeline belongs to only road and rail transportation. For this, it will be necessary to consider air and sea transportations as alternative ways. Facilities improvement for this alternative ways such as airport, heliport and seaport will be considered. Especially, improvement of Noto Hadinegoro Airport located in Kecamatan Ajung will be conducted.

### 2) Improvement of Slope Area

Kabupaten Padang Pariaman has many slope areas due to the geographic characteristics. There are Argopuro Mountain in the north, Raung Mountain in the northeast, and South-Eastern Hills and Mountains in Southeast. For taking advantage of such landform, many farm villages are existed in slope area for agriculture, agro-forest industries, and limestone excavation. In terms of disaster prevention management, many people can be said to live in the vulnerable area. Therefore these areas need disaster management measures against natural disaster in particular erosion and land slide. Two measures could contribute to mitigate damage from disasters.

First, to secure roads is the most important measures for people who live in the slope area for evacuation and relief activities. Not only major roads such as state roads and provincial roads but also community roads are emphasized to be improved and maintain. To formulate road networks based on community roads is also promoted.

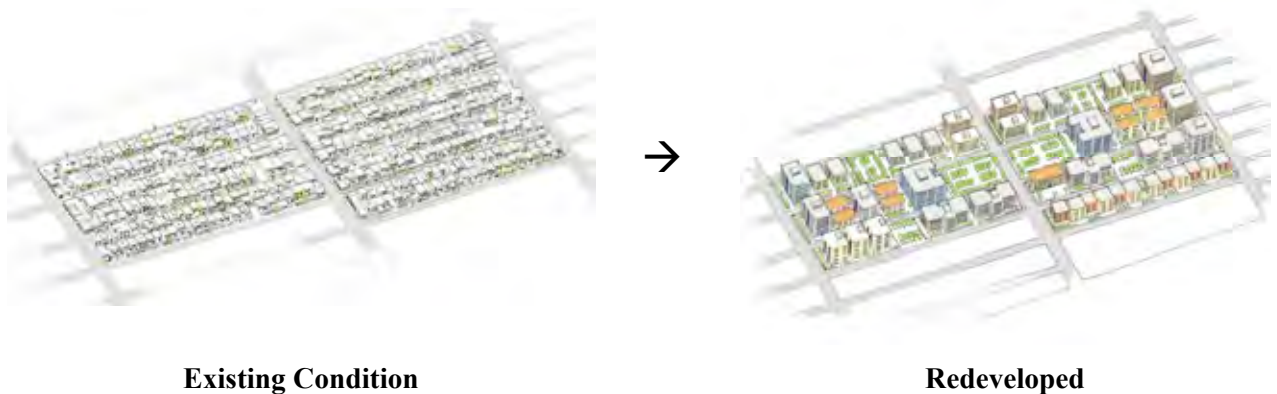
Second, to encourage awareness of people who live in the slope areas about disaster management and basic knowledge of natural disaster should be carried out through conducting drills and distribution of brochure and posters.

### 3) Improvement of Build-Up Area

In order to avoid large-scale suffering from disasters, the city should have strong structure against natural disasters. In particular, build-up area is likely to be difficult for evacuation and smooth relief activities due to high-dense buildings and lack of evacuation places. Hazardous build up area will be clearly determined by using the hazard map. In such area, appropriate size and number of open space and evacuation roads will be planned.

#### Area Development and Redevelopment

Area development and redevelopment is one of drastic measures for strengthening the city against natural disasters. This measure is efficient for vulnerable area with high-dense buildings or residences. By means of area development and redevelopment, it could allow to maximum utilization of land use, notably, expanding open space for evacuation and emergency responses and widening evacuation roads. Additionally buildings and residences in hazardous area are promoted to remove into safe places. However this solution needs not only time and costs in order to obtain consensus from the residence but also social impact. Hence, implementation of this measure intends to be examined carefully.



Source: JICA Study Team

**Figure 12.2.1** Image of Area Redevelopment

## **CHAPTER 13    *EROSION CONTROL AND SABO MEASURES***

### **13.1    Erosion Control Measures**

<b><i>Responsible Agency:</i></b>	<b><i>Forestry Office</i></b>
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The pyroclastic flow upland comprises a large area of northwest Kabupaten Padang Pariaman, is mostly composed of unconsolidated pumiceous sand and gravel, and is relatively prone to slope failure. This area has experienced slope failure every year, although there have been few large-scale incidences, small-scale collapses occur along roads and such. Given the large number of these slopes that are at high risk, the locations at which to construct countermeasures must be prioritized each year.

#### **1)    Afforestation plan**

Vegetation in this regency is relatively favorable; however, gully erosion is advancing along the rivers. Forest planning efforts that will guard against disaster are to be carried out, such as continuing to protect vegetation and planning any cutting so as to allow the vegetation to develop as much as possible.

#### **2)    Prevention of collapse and sediment outflow**

Exposed hillsides are extremely vulnerable to heavy and extended rainfall which increases the potential for slope failure or debris flow. As such, an important aspect of disaster prevention is to maintain or increase the water-retention capacity of forests. In planning forest improvements, flood control afforestation will be used as an effort to prevent collapse or earth flow, valley sediment movement and erosion of the underlying rock.

## 13.2 Sabo Measures

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency</i></b>
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In this regency, guidance will be given for road disaster prevention due to the large number of areas at risk to landslide disaster along main roads in the mountainous area.

## CHAPTER 14 FLOOD MITIGATION PLAN

### 14.1 Measures for Rivers

<b>Responsible Agency:</b>	<b>Public Works Agency</b>
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#### 1) Major Rivers in Kabupaten Padang Pariaman

There are more than 10 rivers in Kabupaten Padang Pariaman which are Anai river, Tapakis river, Ulakan river, Mangau river, Pariaman river, Naras river, Sungai Sirah river, Limau river, Kamumuan river, Paingan river, Gasan river and Tiku river. The profiles of the rivers are shown in Table 14.1.1.

**Table 14.1.1 Major Rivers Flowing through Kabupaten Padang Pariaman**

River	Catchments Area	Length
Anai river	684.2km <sup>2</sup>	68.2km
Tapakis river	(214.84km <sup>2</sup> )	27.8km
Ulakan river	(214.84km <sup>2</sup> )	40.2km
Mangau river	268.49km <sup>2</sup>	37.1km
Piaman river	71.56km <sup>2</sup>	28.5km
Naras river	155.54km <sup>2</sup>	39.2km
Sungai Sirah river	33.21km <sup>2</sup>	19.9km
Limau river	30.70km <sup>2</sup>	21.2km
Kamumuan river	25.50km <sup>2</sup>	16.3km
Paingan river	22.21km <sup>2</sup>	14.0km
Gasan river	74.77km <sup>2</sup>	28.0km
Tiku river	117.76km <sup>2</sup>	-

Note: The total catchment area of Tapakis river and Ulakan river is 214.84km<sup>2</sup>.

Source: Kabupaten Padang Pariaman and PSDA (Pengelolaan Sumber Daya Air) of West Sumatra Province



probable flood map based on the hydro-dynamic simulation model. The methodology for creation of flood map should be decided based on personnel, budget, available technological level, etc.

**(2) Development and Improvement of System for Early Warning and Evacuation**

A concrete methodology should be formulated for development and improvement of system for early warning and evacuation. It is also indispensable to raise public awareness. In order to develop the awareness and behavior in the time of natural disaster, participation in disaster prevention drills regularly is highly promoted.

Not only non-structural countermeasure mentioned above but also structural countermeasure (e.g. river improvement works, construction of dike, etc.) will be implemented appropriately in terms of integrated flood management.



## 14.2 Drainage Measures

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency</i></b>
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Drainage channel shall be planned to allow the safe passage of rainwater in order to minimize flood damage as well as improvement of life environment and conservation of water quality in Kabupaten Padang Pariaman. The effort should be made for strengthening main drainage network and facilities to minimize flood damage. The specific measures are shown below.

### **(1) Prevention of Inundation**

The storm-water drainage facilities shall be developed in a planned and consistent way for prevention of inundation during heavy rainfall.

### **(2) Maintenance of Existing Facilities**

The maintenance of existing facilities (e.g. Reparation, Dredging, Cleaning, etc.) should be performed sufficiently at regular intervals for maximization of the capacity in case of flood event.

### **(3) Development of Drainage Facilities**

The development of drainage facilities will be performed especially for the expected flood area to minimize damage from flood disaster.

### **(4) Inspection of Facilities for Necessary Protection**

In case of flood disaster expected, inspection for important facilities should be performed and the appropriate protection works before flood event shall be done if necessary.

### **(5) Store of Equipment and Materials**

The necessary equipment and materials should be stored at facilities in order to perform emergency rehabilitation in case of flood disaster. Further, the equipment and materials should be inspected at regular intervals so that one can confirm whether they functions sufficiently or not.

### 14.3 Maintenance and Repair of Flood Disaster Mitigation Facilities

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency</i></b>
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There are a number of facilities which can be utilized for minimizing flood disaster (e.g. Dike, Water-gate, Revetment Works, etc.) in Kabupaten Padang Pariaman. It is indispensable to grasp the conditions of obsolescence and breakage of the facilities at regular intervals in order to perform appropriate maintenance and reparation of the facilities. The followings are the specific items for the proper maintenance and reparation.

#### (1) Inspection of Facilities

The inspection for the existing facilities should be performed at regular intervals so that the security and reliability against flood disaster will be assured. Further, in case of inappropriate occupational structure in river zone, the owner of the structure shall be warned for implementation of necessary measures.

#### (2) Rehabilitation and reinforcement of dike structure

Rehabilitation reinforcement of dike structure should be performed such as 1) Raising the height of dike, 2) Qualitative improvement of dike structure, 3) Rehabilitation & reinforcement of Sluiceway structure, etc.

#### (3) Rehabilitation and reinforcement of agricultural facilities

- Rehabilitation and reinforcement of agricultural facilities shall be performed in organized manner such as rehabilitation works for deteriorated channel, revetment, etc.
- Agricultural drainage channel facilities should be strengthened in organized manner especially for the area where inundation or flood is expected in case of excessive discharge along the channel.

## **CHAPTER 15    SEDIMENT DISASTER MITIGATION MEASURES**

### **15.1    Disaster Mitigation Measures for Failure of Steep Slope**

<b><i>Responsible Agency:</i></b>	<b><i>Forestry Office</i></b>
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The soil in most areas of Kabupaten Padang Pariaman consists of failure-prone volcanic products and heavy rainfall presents a particularly high risk of landslide disaster along the rivers and roads. As such, the following preventive measures are recommended in order to minimize this danger.

#### **1)    The survey of areas at-risk for sediment collapse**

At-risk areas are investigated in advance in order to prevent disaster before it happens and keep damage to a minimum when disasters occur. Moreover, the actual condition and use of at-risk areas, homes and roads that could be affected, and so forth are taken into consideration as the underlying data to create an evacuation advisory.

#### **2)    Disaster prevention activities**

##### **a.    Issue warnings for at-risk areas**

A warning is issued to alert the concerned residents to any specific area known to present a danger. Moreover, while forbidding any dangerous conduct that could induce sediment collapse, concerned residents are encouraged to observe the dangerous area themselves and grasp an understanding of the present condition.

##### **b.    Comprehension of actual condition of at-risk areas**

A close watch is kept over the areas deemed to be at-risk, and strive to comprehend the actual conditions over a larger area or new at-risk areas in addition to this.

##### **c.    Advocate residents to check at-risk areas**

Efforts are made to urge residents to check the location of areas at-risk for sediment disaster, along with evacuation areas, and evacuation routes.

##### **d.    Measures in established residential areas**

Support the construction of disaster prevention for the purpose of preventing established residential areas from suffering sediment disasters. Moreover, safety patrols are performed with citizens, particularly during seasons with much rain.

### **3) Regulate construction in sediment disaster areas**

When new construction is expected within range of a sediment disaster area, it is desirable to select location which avoids the danger of sediment disaster. When unavoidable, it is advisable to construct the appropriate preventive structures, such as retaining walls, according to the soil properties or scale of the structure.

## 15.2 Disaster Mitigation Measures for Reclaimed Land

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency</i></b>
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When development projects take place in an area where there is a danger of sediment disaster present, the related city office is consulted as matters proceed. If sediment disaster prevention is deemed necessary, recommendations and improvements are given concerning the suspension of construction in order to prevent disaster that would accompany construction.

## 15.3 Comprehend location of High Risk Area of Sediment Disaster

<b><i>Responsible Agency:</i></b>	<b><i>Forestry Office</i></b>
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Investigations are carried out based on past disaster history etc. of the places where earth-and-sand disaster tends to occur, and the places where new sediment disasters are expected to occur, and a ledger of those at-risk places is created.

## **CHAPTER 16 SECURE SAFETY OF BUILDINGS**

### **16.1 Secure Safety of Private Buildings**

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency</i></b>
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To prevent accidents caused by collapse of building and falling objects from rain and storm related disasters, implementation of preventive measures are necessary by maintaining building safety to minimize damages. Following measures are effective;

#### **1) Dissemination of Disaster Management Knowledge**

- Most general dwelling houses in Kabupaten Padang Pariaman are constructed by amateur builder who do not experience a special education of structure engineering. When thinking about this respect the citizens themselves should have practical knowledge, and the skill for construction, in order to make these dwelling buildings strong against disasters. For this purpose responsible Agencies in PEMKAB will disseminate the disaster management knowledge to citizens.

#### **2) Inspection on Existing Dwelling Buildings**

- Responsible Agency in Kabupaten Padang Pariaman will draw up an implementation outline for building diagnosis for existing dwelling buildings in Kabupaten Padang Pariaman.
- Responsible Agency in Kabupaten Padang Pariaman will carry out the building census investigation in order to have basic knowledge about the distribution of building structure type and building material type of all dwelling buildings in Kabupaten Padang Pariaman. Responsible Agency in Kabupaten Padang Pariaman will promotes the implementation of building diagnosis on every dwelling building by the order of priority according to level of danger which becomes clear by the result of building census and hazard map.

#### **3) Reinforcement of Building Structure Confirmation and Permission System**

- Responsible Agency in Kabupaten Padang Pariaman will establish the building structure confirmation and permission system. Therefore only buildings which have efficient strength may be given construction permission. Related agencies will check the building condition at necessary timing and give effective guidance to builder when improper construction is found.

- Responsible Agency in Kabupaten Padang Pariaman will cancel the building permission if the builder does not make improvement. Legal compulsion should be applied when building constructor does not acknowledge the guidance and caused remarkable danger for the surrounding area.

#### **4) Retrofitting and Strengthening in Existing Building**

- Responsible Agency in Kabupaten Padang Pariaman will promotes activity for retrofitting and strengthening in existing building when problem against disaster is found by building diagnosis.

#### **5) Financial Support for Strengthening of Existing Buildings**

- Responsible Agency in Kabupaten Padang Pariaman will make support plan for retrofitting and strengthening existing building. Responsible Agency in Kabupaten Padang Pariaman will inform this support system widely in order to encourage self-motivation on strengthening of existing buildings.

## 16.2 Secure Safety of Public Buildings

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency</i></b>
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Medical facilities and school buildings should be completely protected because those facilities plays important role when large disaster occurs (i.e. emergency place, relief, and shelter place). Therefore Responsible Agency in Kabupaten Padang Pariaman should take following measures in order to prepare a strong institutional-building at the time of disaster.

### 1) Investigation on Existing Public Buildings

- Responsible Agency in Kabupaten Padang Pariaman will promote establishing an earthquake-disaster mitigation plan for the facilities, which have important role for medical purpose and shelter base, and inspect them. If unqualified building is found, order and guidance to implement improvement will be given.

### 2) Earthquake retrofitting and earthquake strengthening in existing institutional-building

- Responsible Agency in Kabupaten Padang Pariaman will draw up an implementation outline for building inspection on existing institutional-buildings in Kabupaten Padang Pariaman.
- Manager in each institutional-building will investigate disaster mitigation capacity of their building utilizing method that stipulated in implementation outline.
- Responsible Agency in Kabupaten Padang Pariaman should completely guide manager in each institutional-building to install important facilities (i.e. Fire protection system on disaster prevention, alarm equipment, refuge accommodation etc). Management system that enable mutual cooperation between each different management authority will be established if some usages are set for single facility and management authority has divided
- Responsible Agency in Kabupaten Padang Pariaman should organize activity plan of emergency aid monitoring and guide refugees who take shelter after disaster occurred.

### 3) Function Reinforcement of Institutional Utility

- Reaction ability towards large disaster depends on whether the emergency response activity is promptly implemented or not. Responsible Agency in Kabupaten Padang Pariaman should check the required equipment and existing capacity of each institutional-utility which will become bases of emergency activities of medical treatment relief and shelter accommodation. If those utilities are insufficient, hence plan to reinforce the function will be established.



## **CHAPTER 17 SECURE SAFETY OF LIFELINE**

Utilities referred as “Lifeline” such as Water, Electricity, Telecommunication, and etc. are critical system of our life. Therefore, if these utilities are damaged because of flood and sediment disasters, urban malfunction will occur, and the effect is considered to be extremely large.

Consequently, to minimize damages to these utilities, following measures will be implemented.

### **17.1 Coordination Enhancement among Lifeline Provider Companies and PEMKAB**

<b><i>Responsible Agency:</i></b>	<b><i>Social Agency, Regional Drinking Water Company, National Electricity Company, TELKOM</i></b>
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### **17.2 Water Supply Facility**

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency, Regional Drinking Water Company</i></b>
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### **17.3 Electric Facility**

<b><i>Responsible Agency:</i></b>	<b><i>National Electricity Company</i></b>
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### **17.4 Telecommunications Facility**

<b><i>Responsible Agency:</i></b>	<b><i>TELKOM</i></b>
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For 17.1 to 17.4, refer to Section 2 Pre-Disaster Chapter 17, 17.1 to 17.4 in “Part 1: Earthquake Disaster Measures”

## **Section 3: Emergency Response**

### **(Disaster Emergency Response Plan)**

Damages as well as responses to Rain and Storm related disaster could be in various ways. Rain could cause flood, flash flood, and landslide, while storm could cause fire and falling objects. To mitigate the damage, requires disaster preparedness plan, system and resources development, and emergency response measures. This Disaster Emergency Response Plan is emergency response measures which should be implemented promptly and efficiently by Kabupaten Padang Pariaman Government and other disaster management related agencies in case of occurrence of a large variety of damages.

#### ***CHAPTER 1. EMERGENCY RESPONSE SYSTEM***

In case of heavy rains occur, Kabupaten Padang Pariaman Government will establish response system by the following procedures in order to implement emergency response activities promptly and precisely to mitigate damages.

##### **1.1 Initial Response System (IRS)**

<b><i>Responsible Agency:</i></b>	<b><i>Bupati Office</i></b>
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In order to response disaster precisely, prompt response by Kabupaten Padang Pariaman Government together with related organizations is important for next emergency response activities. Initial Response System is defined as response that carried out until Emergency Response Headquarter (Rupusdalops PB) is established. This Initial Response System should be ready for 24 hours to receive weather information from BMG.

Initial Response System is proposed based on criteria mentioned in 1.3 Rupusdalops PBP (Emergency Response Headquarters) and SATLAK PBP.

##### **1) IRS during Working Hours**

When continuous heavy rain occurs, if there is a risk of disaster occurrence, Bupati Office will coordinate with SATLAK PB to collect and analyze necessary information and share information with related agencies within PEMKAB, SATKORLAK PB, Police, and other organizations. The result will be reported to Bupati and ask for decision on further response activities.

## **2) IRS during Night and Weekends**

When there is a risk of disaster occurrence, Bupati Office will coordinate with SATLAK PB representatives to gather in PEMKAB and collect and analyze necessary information and share information with related agencies within PEMKAB, SATKORLAK PB, Police, and other organizations. The result will be reported to Bupati and ask for decision on further response activities.

## 1.2 Warning Deployment System

<b>Responsible Agency:</b>	<b>Bupati Office</b>
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When warning level is not reached criteria for establishing Rupusdalops PB, however, there is still a risk of occurrence of disasters due to heavy rain, Vice Bupati will discuss on deployment system, and if necessary, Bupati will order warning deployment.

### 1) Deployment Criteria

1. **Alert III** is announced, when forecasted that certain amount of rainfall will continue

### 2) Deployment of Staffs

Deployment Staffs for each agency are as follows:

<b>Agency</b>	<b>Deployed Staffs</b>
National Unity Agency	3
Social Agency	2
Social Welfare Agency	2
Health Agency	2
Public Works Agency	2

### 3) Implementation Order for Staff Mobilization

1. *When Warning Deployment System is decided, Bupati office will announce to SATLAK PB*
2. *Each head of agencies command Warning Deployment System to staffs assigned in advance*

### 1.3 Rupusdalops PBP (Emergency Response Headquarters) and SATLAK PBP

<b>Responsible Agency:</b>	<b>Bupati Office</b>
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When disaster occurs or in high risk of occurrence, to implement disaster emergency response, Rupusdalops PBP will be established and SATLAK PB meeting will be hold.

#### 1) Rupusdalops PBP

##### (1) Establishment of Rupusdalops PBP

###### A. Criteria for Establishment of Rupusdalops PBP

<b>Criteria for establishment of Rupusdalops PBP</b>
1. Heavy rain, flood, windstorm warning is announced in Kabupaten Padang Pariaman Region and there is possibility of occurrence of large scale disaster
2. Large scale disaster occurs
3. When Bupati decided to do so

###### B. Substitution in case of Absence of Bupati

If Bupati is absent, the following are person who will substitute the position of Bupati.

1. Vice Bupati
2. Assistant I
3. Head of National Unity Agency

###### C. Announcement of Establishment of Rupusdalops PBP

Bupati or his substitution, when Bupati is absent, will report promptly to head of SATKORLAK PB of West Sumatra Province and related organizations regarding establishment of Rupusdalops PBP. Announcement of establishment of Rupusdalops PBP to community will be done through mass media and other means.

##### (2) Organization of Rupusdalops PBP

Organization of Rupusdalops PBP is composed of related agencies in PEMKAB based on duties described in “Disaster management and refugees handling established procedure (Protap PBP) of Kapupaten Padang Pariaman”.

From time to time, type of emergency response will change, thus organization must be re-formulated in order to handle emergency response activities.

#### **A. Organization and Role of Rupusdalops PBP**

Organization and role of Rupusdalops PBP is based on Protap PBP.

#### **B. Duties of Substitution of Head of Rupusdalops PBP**

Head of Rupusdalops PB is Bupati, however, if Bupati is absent or cannot execute his duties; all Bupati's role will be substituted by the following person, respectively:

- |  |
|--|
| <ol style="list-style-type: none"><li>1. Vice Bupati</li><li>2. Assistant I</li><li>3. Head of National Unity Agency</li></ol> |
|--|

#### **C. Enhancement of Relationship with Related Organizations**

Rupusdalops PBP has to share disaster information and implement emergency response promptly with well coordination and participation from military, police, Indonesian Red Cross, lifeline providers, etc.

#### **D. Coordination with SATKORLAK PB of West Sumatera Province**

If the disaster level is low, it is not necessary to establish Rupusdalops PBP in Provincial level. However, if the disaster cannot be handled within Kabupaten level, Bupati should request for support.

In order to have efficient coordination with SATKORLAK PB, necessary information is transmitted to SATKORLAK PB.

### **2) SATLAK PB Meeting for Emergency Response**

#### **(1) Holding of SATLAK PB Meeting for Emergency Response**

When Rupusdalops PBP is established, SATLAK PB meeting will be held to decide basic strategy for emergency response measures.

#### **(2) Composition and Operation of SATLAK PB Meeting for Emergency Response**

##### **A. Composition of SATLAK PB Meeting for Emergency Response**

All member of SATLAK PB will attend SATLAK PB Meeting for Emergency Response.

##### **B. Participation Request from Related Organizations**

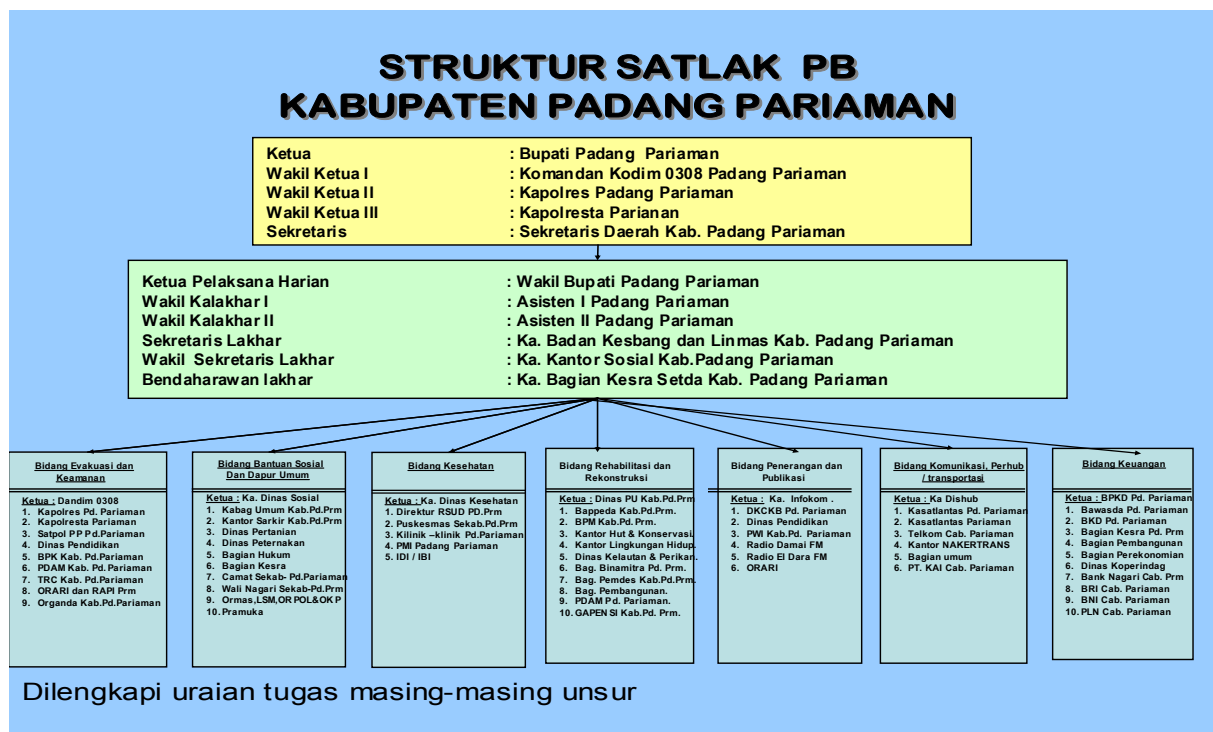
If necessary, all related organizations non-member of SATLAK PB are requested to participate in SATLAK PB Meeting for Emergency Response, such as lifeline companies, police, etc.

### 3) Dismissal of Rupusdalops PBP

1. Bupati will dismiss Rupusdalops PBP when there is no more risk of disaster or emergency rehabilitation is almost completed after occurrence of disaster
2. Bupati will inform head of SATKORLAK PB regarding dismissal of Rupusdalops PBP and also inform the community through mass media and other means
3. After dismissal of Rupusdalops PBP, if still necessary, Bupati will order to continue implementation of emergency response measures based on Rupusdalops PBP.

### 4) Organization of Rupusdalops PBP

#### (1) Organization Chart of Rupusdalops PBP



#### (2) Role of Each Agencies of Rupusdalops PBP

PEMKAB

Agencies	Chapter	Sub Chapter	Tasks
Bupati	9	9.1	Disaster Response Activities by Community
	9	9.2	Disaster Response Activities by Community Groups
Bupati Office	1	1.1	Initial Response System (IRS)
	1	1.2	Warning Deployment System
	1	1.3	Rupusdalops PBP (Emergency Response Headquarters) and SATLAK PBP

<b>Agencies</b>	<b>Chapter</b>	<b>Sub Chapter</b>	<b>Tasks</b>
Health Agency	11	11.5	Rescue, First Aid, Medical Treatment Measures
	11	11.6	Procurement of Medicines and Medical Equipments
	11	11.7	Health Care and Hygiene Measures
	11	11.10	Epidemic Prevention Measures
	11	11.11	Searching for missing victim and casualties treatment
Public Works Agency	2	2.3	Receiving and Transmitting Weather Forecasts and Warnings
	4	4.2	Preventive Measures for Secondary Disaster
	7	7.1	Target of Removal
	8	8.2	Securing Transportation Network
	13	13.1	Investigation of Damaged Buildings
	13	13.2	Survey of Damaged Resident House
	13	13.3	Construction of Temporary Housing and Emergency Restoration of Damaged Buildings
Education Agency	12	12.1	Management of School Facilities
	12	12.2	Measures for Students and Pupils
	12	12.3	Procurement and Provision of School Supplies, etc.
	12	12.4	Management of Education Facilities
Cleanliness and Environment Agency	7	7.2	Team of Removal
	7	7.4	Temporary Storage Sites for Debris
	11	11.8	Solid Waste Management
	11	11.9	Human Waste Management
Social Agency	3	3.1	National and Province
	3	3.2	Peripheral Kabupatens
	11	11.1	Food Provision
	11	11.3	Daily Commodity Provision
	11	11.4	Acceptance of Goods from outside Disaster Affected Area
Transportation Agency	2	2.1	Communication Tools
	2	2.2	Establishing Disaster Communication Operation System
	2	2.3	Receiving and Transmitting Weather Forecasts and Warnings
	5	5.2	Emergency Call and Mobilization
	6	6.3	Road Transport Management
	8	8.1	Securing Transport Equipments
	11	11.3	Daily Commodity Provision
National Unity Agency	3	3.3	Disaster Management Related Organizations
	3	3.5	Volunteers
	4	4.1	Warning, Evacuation, and Guidance Measures
	10	10.1	Announcement of Evacuation Warning
	10	10.2	Set up of Alert Area
	10	10.3	Advice for Evacuation and Transfer
	10	10.4	Set up of Temporary Evacuation Facility and Its Management and Operation
	14	14.1	Recovery Information of Lifeline
	14	14.2	Water Supply Facility
15	15.1	Information Sharing with National and Provincial Organization	



Agencies	Chapter	Sub Chapter	Tasks
	15	15.2	Acceptance of Foreign Assistance
Information and Communication	2	2.1	Communication Tools
	2	2.2	Establishing Disaster Communication Operation System
	2	2.4	Collection of Disaster Information
	2	2.5	Publication of Disaster Information
	4	4.3	Publication and Dissemination of Information to Community
Regional Secretary	1	1.4	Rupusdalops PBP Staff Mobilization

## Other Organizations

Agencies	Chapter	Sub Chapter	Tasks
Indonesian Police	6	6.1	Security Measures by Police
Indonesian Red Cross	11	11.1	Food Provision
	13	13.3	Construction of Temporary Housing and Emergency Restoration of Damaged Buildings
TELKOM	14	14.4	Telecommunication Facility
Regional Water Company	11	11.2	Water Provision
National Electric Company	14	14.3	Electric Supply Facility
KAMLA	6	6.2	Sea Safety Control and Security Measures
Air and Water Police	6	6.2	Sea Safety Control and Security Measures
Fire Fighting Office	5	5.1	Fire Fighting Organization
	5	5.3	Fire Fighting Activity
Commander of District Military	3	3.4	Military, etc.
SAR	11	11.11	Searching for Missing Victim and Casualties Treatment
BMG	2	2.3	Receiving and Transmitting Weather Forecasts and Warnings
Private Enterprises	9	9.3	Disaster Response Activities by Private Enterprises
Cooperation	7	7.3	Method of Removal

## 1.4 Rupusdalops PBP Staff Mobilization

<b>Responsible Agency:</b>	<b>District Secretary</b>
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### 1) Mobilization Criteria

Bupati as a head of Rupusdalops PBP will mobilize staffs and implement relevant activities based on the criteria mentioned below.

<b>Category</b>	<b>Mobilization Criteria</b>
1 <sup>st</sup> Mobilization	1. When heavy rain, flood, or windstorm warnings were announced in Kabupaten Padang Pariaman Region, and actual damages were able to observe and certain level of damages were anticipated  2. When heavy rain, flood, or windstorm warnings are announced in Kabupaten Padang Pariaman Region and BMG forecasted there will be certain level of rain fall occurred
2 <sup>nd</sup> Mobilization	When heavy rain, flood, or windstorm warnings were announced in Kabupaten Padang Pariaman Region, rainfall and damage occurred at certain level of danger situation
3 <sup>rd</sup> Mobilization	When heavy rain, flood, or windstorm warnings were announced in Kabupaten Padang Pariaman Region, and devastating damage occurred or anticipated

### 2) Component of Mobilization

#### (1) 1<sup>st</sup> Mobilization

Each head of Agencies will mobilize number of staffs assigned to designated location or to their offices.

#### (2) 2<sup>nd</sup> Mobilization

Each head of Agencies will mobilize number of staffs assigned to designated location or to their offices. Head of Social Welfare Agency and Health Agency have to mobilize number of staffs to take a role in evacuation faculties.

Moreover, in case of occurrence of disaster after working hours, each agency which hold jurisdiction on facility utilized for emergency response activities, should mobilize staffs.

#### (3) 3<sup>rd</sup> Mobilization

All staffs will be mobilized to designated location or to their offices, as assigned in advance.

### 3) Staff Mobilization

Staff mobilization of each agency is mentioned as below. Moreover, for 1<sup>st</sup>, and 2<sup>nd</sup> Mobilization, staffs in charge are designated in advance.

Agencies	Responsible Sector	1 <sup>st</sup> Mobilization	2 <sup>nd</sup> Mobilization	3 <sup>rd</sup> Mobilization
Health Agency	3. Health	3	1/3 of Staffs in each agency	All Staffs
Public Works Agency	4. Rehabilitation and Reconstruction	3		
Manpower and Transmigration Agency	6. Transportation	1		
Industry, Trading and Investment Agency	2. Social Aid	1		
Forestry and Plantation Agency	4. Rehabilitation and Reconstruction	2		
Livestock and Fishery Agency	2. Social Aid	2		
Regional Incoming Agency	4. Rehabilitation and Reconstruction	1		
Education Agency	1. Evacuation and Security	3		
Cleanliness and Live Environment Agency	4. Rehabilitation and Reconstruction	3		
Irrigation Agency	4. Rehabilitation and Reconstruction	2		
Social Agency	2. Social Aid	4		
Agriculture and Food Affairs Agency	2. Social Aid	2		
Cooperation, medium and small scale business Agency	2. Social Aid	1		
Transportation Agency	6. Transportation	3		
National Unity and Public Protection	1. Evacuation and Security	4		
Development Planning Board	4. Rehabilitation and Reconstruction	2		
Population, Family Planning and Civil Registration Board	2. Social Aid	2		
Public Capacity Board	4. Rehabilitation and Reconstruction	1		
Territorial Police Office	1. Evacuation and Security	3		
Information and Communication Office	5. Information and Publication	4		
Tourism Service Office	5. Information and Publication	2		
Pariaman Regional Public Hospital	3. Health	2		
Parit Malintang Regional Hospital	3. Health	2		
Puskesmas Lubuk Alung	3. Health	2		

Note: For 1<sup>st</sup> and 2<sup>nd</sup> Mobilization, number of staffs include head of agencies.

## 4) Order of Staffs Mobilization

### (1) Commander

Staff Mobilization was ordered by head of Rupusdalops PBP (Bupati)

### (2) Order Transmission System

#### A. During working hours

Transmitted by telephone line or public radio system in PEMKAB



#### B. After working hours

Transmitted by telephone line



### (3) Mobilization not Depend on Order

During working hours, due to malfunction of communication systems, when order was not accesible, mobilize yourself by your own decision.

Moreover, when devastating disaster occurs or a high risk of disaster occurrence was anticipated after working hours, do not wait for mobilization order. Mobilize yourself to designated location based on mobilization criteria.

## 5) Mobilization Participant

Mobilization target are all staffs of PEMKAB Padang Pariaman. However, the following staffs will be exempt.

1. Person with ill or handicapped and have difficulty to conduct emergency response activities
2. Due to occurrence of disaster, staff was in sudden ill or injured, therefore, not possible to mobilize

## **CHAPTER 2. DISASTER INFORMATION GATHERING AND DISSEMINATION PLAN**

It is crucial for emergency response to gather and disseminate accurate information on climate and disaster promptly and precisely. Moreover, providing accurate disaster information to the community will avert panic and create smooth evacuation.

This chapter will explain about plan for information gathering and dissemination in the event of disaster.

### **2.1 Communication Tools**

<b><i>Responsible Agency:</i></b>	<b><i>Transportation Agency, Information and Communication</i></b>
<b><i>Relevant Agency</i></b>	<b><i>All Type of Media, Army, Police</i></b>

### **2.2 Establishing Disaster Communication Operation System**

<b><i>Responsible Agency:</i></b>	<b><i>Transportation Agency, Information and Communication</i></b>
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For 2.1 and 2.2, refer to Section 3 Emergency Response Chapter 2, 2.1 and 2.2 in “Part 1: Earthquake Measures”

## 2.3 Receiving and Transmitting Weather Forecasts and Warnings

<b>Responsible Agency:</b>	<b>Transportation Agency, BMG Irrigation Agency</b>
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In the event of disaster caused by climate phenomenon like rainfall, high temperature, low humidity and strong wind, BMG will issue warning refers to its conditions.

Irrigation agency issues warning according to the condition of rainfall and water level.

These information will be received and transferred by the following procedure.

### 1) Climate Forecast and Warning etc.

#### (1) Definision of Forecast and Warning

BMG issues the following forecast and warning.

Type	Definition
Forecast	Prediction of phenomenon based on the results of observation
Warning	Forecast to call the attention to disaster occurrence in case that disaster is expected to occur
Information	Explanation of actual state and transition of abnormal phenomenon like heavy rain.

#### (2) Type of Waning and Criteria

Type of waning and criteria of BMG are as follows:

Type	Criteria
Warning of heavy rain and flood	In case that damage will be expected by heavy rain. In particular, in case that the rainfall of more than 30mm/hour is observed.
Warning of high temperature	In case that damage will be expected by high temperature. In particular, in case that temperature of more than 36 degrees centigrade is observed.
Warning of low humidity (fire)	In case that fire will be expected by low humidity. In particular, in case that humidity of less than 50% is observed.
Warning of tsunami, high wave and high tide	In case that damage will be expected by tsunami, high wave, high tide and sea level rise. Criteria is under study.

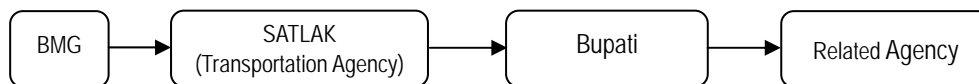
Type of waning and criteria of Irrigation Agency are as follows:

Type	Criteria
Heavy rain warning	In case that damage will be expected by heavy rain. In particular, in case that the rainfall of more than 100mm/day is observed.
Flood warning	In case that damage will be expected by raising of water level. In particular, in case that the water level rise to a dangerous level.

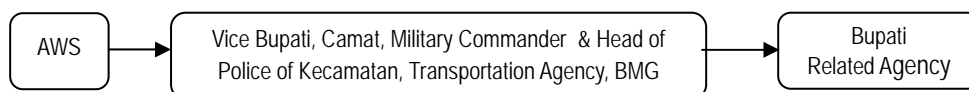
## 2) System for Receiving and Transmitting Forecast and Warning

- (1) Forecast and warning from BMG to Kabupaten will be received and transmitted by the following procedure.

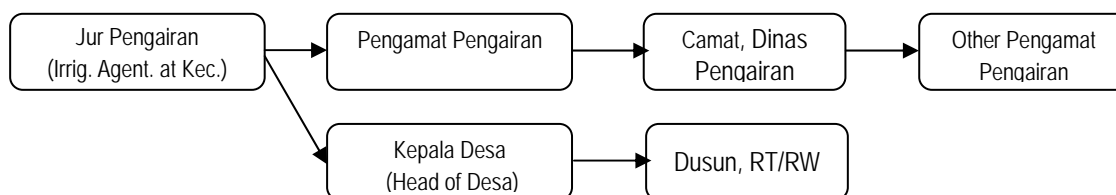
<Telephone>



<SMS by Automatic Weather Station (AWS)>



- (2) Warning based on observation result in observation station of Irrigation agency will be transmitted using telephone by the following procedure.



## 2.4 Collection of Disaster Information

<b><i>Responsible Agency:</i></b>	<b><i>Information and Communication</i></b>
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## 2.5 Publication of Disaster Information

<b><i>Responsible Agency:</i></b>	<b><i>Information and Communication</i></b>
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For 2.4 and 2.5, refer to Section 3 Emergency Response Chapter 2, 2.3 and 2.4 in “Part 1: Earthquake Measures”



### **CHAPTER 3. REQUEST FOR SUPPORTS**

After a disaster occurs, RUPUSDALOPS-PBP (Emergency Response Headquarter) will request volunteer and related organizations supports in case that Kabupaten Padang Pariaman is unable to conduct emergency response and recovery activities without any external helps.

#### **3.1 National and Province**

<b><i>Responsible Agency:</i></b>	<b><i>Social Agency</i></b>
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#### **3.2 Peripheral Kabupatens**

<b><i>Responsible Agency:</i></b>	<b><i>Social Agency</i></b>
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#### **3.3 Disaster Management Related Organizations**

<b><i>Responsible Agency:</i></b>	<b><i>National Unity Agency</i></b>
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#### **3.4 Military, etc**

<b><i>Responsible Agency:</i></b>	<b><i>Commander of District Military</i></b>
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#### **3.5 Volunteers**

<b><i>Responsible Agency:</i></b>	<b><i>National Unity Agency</i></b>
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For 3.1 to 3.5, refer to Section 3 Emergency Response Chapter 3, 3.1 to 3.5 in “Part 1: Earthquake Measures”

**CHAPTER 4. SEDIMENT DISASTER MANAGEMENT****4.1 Warning, Evacuation, and Guidance Measures**

<b><i>Responsible Agency:</i></b>	<b><i>National Unity Agency</i></b>
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**4.2 Preventive Measures for Secondary Disaster**

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency</i></b>
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**4.3 Publication and Dissemination of Information to Community**

<b><i>Responsible Agency:</i></b>	<b><i>Information and Communication</i></b>
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For 4.1 to 4.3, refer to Section 3 Emergency Response Chapter 4, 4.1 to 4.3 in “Part 1: Earthquake Measures”

## **CHAPTER 5. FIRE FIGHTING MEASURES**

In occurrence of big disaster or high risk of disaster occurrence in Kabupaten Padang Pariaman, emergency response system by Fire Fighting Office shall be planned as follow.

### **5.1 Fire Fighting Organization**

<b><i>Responsible Agency:</i></b>	<b><i>Fire Fighting Office</i></b>
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- Emergency response headquarter shall be organized in Fire Fighting Office to take necessary measures for disaster management. Head of Fire Fighting Office shall be the head of emergency response headquarter. Under this organization, local fire fighting system shall be cooperated to cope with disaster.
- According to level of alert such as level 1 - 4, special warning system shall be established in Fire Fighting Office.

## 5.2 Emergency Call and Mobilization

<b><i>Responsible Agency:</i></b>	<b><i>Transportation Agency</i></b>
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Emergency call and mobilization system of fire fighting staffs shall be established to take necessary response to disaster.

### 5.3 Fire Fighting Activity

<b><i>Responsible Agency:</i></b>	<b><i>Fire Fighting Office</i></b>
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Fire Fighting Office shall take necessary activities to mitigate disaster damage and protect human lives and assets. Following activities shall be taken.

- Collection of disaster information such as weather condition, water level, high tide, damage situation, and fire fighting operation.
- Patrolling by fire fighting staffs to check damage situation and disaster potential.
- Dissemination of weather condition and evacuation information to community.
- Giving guidance on evacuation activity of community in case of evacuation is ordered.
- Rescue operation shall be conducted in cooperation with community disaster management organizations or related agencies.
- Damage protection activities shall be taken to prevent secondary damage due to landslide, flood and high tide in cooperation with related agencies.

## **CHAPTER 6. SAFETY CONTROL/TRANSPORTATION MEASURES**

### **6.1 Safety Control Measures by Police**

<b><i>Responsible Agency:</i></b>	<b><i>Indonesian Police</i></b>
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#### **1) Basic Policy for Safety Control**

In occurrence of natural disaster or high risk of disaster occurrence, Police shall establish safety control system to take emergency response measures for related area. Main purpose of safety control system is to save resident life, assets and maintenance of transportation in disaster affected area. Based on safety control measures, social safety will be attained.

#### **2) Establishment of Safety Control System**

Head of police shall organize emergency response system to cope with natural disaster. According to alert level of natural disaster, safety control system will be enhanced. Command system for emergency response shall be established and disaster information sharing system among related agencies shall be enhanced.

#### **3) Disaster Emergency Response Measures**

- Collection and dissemination of disaster information to community
- Supporting kabupaten government to disseminate disaster warning to community
- Supporting emergency rescue operation in cooperation with kabupaten and related agency
- Commanding evacuation to community in terms of necessary time and place
- Traffic control and management to support smooth operation of emergency activities
- Control of criminal activities such as robbery in disaster affected area by regular patrol in disaster affected area and evacuation sites.
- Supporting volunteer activities in disaster affected area and evacuation sites to secure social stability.

## 6.2 Sea Safety Control and Security Measures

<b><i>Responsible Agency:</i></b>	<b><i>KAMLA and Air and Water Police</i></b>
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In response to natural disaster occurrence, KAMLA and Air and Water Police shall take safety control and security measures in the sea in order to protect human lives and assets. Following activities shall be conducted.

- Establishment of emergency response system according to disaster situation
- Disaster information collection and sharing among related agencies
- Information dissemination on damage of ships, situation of maritime rescue and so on in close cooperation with related agencies
- Recommendation to evacuate and evacuation area in the sea and dispatch warning to ships
- Operation of maritime rescue on ship wrecks at disaster occurrence.

### 6.3 Road Transport Management

<b><i>Responsible Agency:</i></b>	<b><i>Transportation Agency</i></b>
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Transportation Agency shall analyze disaster information and take necessary transportation control measures to secure emergency transportation network for emergency operation including necessary vehicle operation and evacuation of community. Following activities shall be planned.

- Transportation shall be controlled in disaster affected area to protect against traffic congestion and inflow traffic from outside. Alternative route and related traffic information shall be disseminated and displayed to solve congestion.
- Transportation of emergency vehicles such as ambulance or rescue operation shall be secured at first priority immediately after disaster occurrence.
- Traffic information shall be collected through police stations and related agencies to smooth operation of traffic control.
- Information of traffic control shall be disseminated by display board, announcement by car and utilizing radio broadcasting.
- Emergency vehicles used for giving evacuation warning, fire fighting, rescue operation, restoration of damaged facilities, cleaning and epidemic control, traffic control, police patrol, and related specific vehicles shall be checked and managed as priority traffic.



## **CHAPTER 7. DEBRIS REMOVAL MEASURES**

Debris such as rocks, sand and gravels, woods, bamboo etc, generated by landslide or building collapse will be a barrier not only for road transportation network but also for smooth operation of rescue activities in disaster affected area. Moreover, this debris will cause secondary damage such as flooding in river channel. Therefore, debris removal is important measures for emergency disaster management. Following measures are planned.

### **7.1 Target of Removal**

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency</i></b>
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Debris removal shall be operated by responsible agency for the following reason.

- Immediate removal of debris is necessary to protect human life and assets.
- To conduct emergency operation such as evacuation, fire extinguishes and rescue.
- To protect flooding in river channel.
- To keep traffic safety and transportation route.
- Necessary for related public purposes.

### **7.2 Team of Removal**

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency</i></b>
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Public Works Agency shall conduct debris removal in cooperation with community, NGO and voluntary members.

### 7.3 Method of Removal

<b><i>Responsible Agency:</i></b>	<b><i>Cooperation</i></b>
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Public Works Agency shall prepare necessary machines and equipments for debris removal such as bulldozer, crane, dump truck and related tools. Available private-owned heavy machines and vehicles shall be temporarily used for debris removal if necessary. Debris removal in main road network, rivers and canals will be given high priority.

### 7.4 Temporary Storage Sites for Debris

<b><i>Responsible Agency:</i></b>	<b><i>Environment Agency</i></b>
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Temporary storage site for debris shall be prepared either at public open space or at private land. Shall be paid attention that debris removal is not causing secondary disaster.

## **CHAPTER 8. EMERGENCY TRANSPORTATION MEASURES**

Demand for emergency transportations will rise when big disaster occurs such as transportation of victims and refugees, emergency response staffs and supplies. In order to conduct quick and adequate transportation for disaster activities, emergency transportation measures are planned as follows.

### **8.1 Securing Transport Equipments**

<b><i>Responsible Agency:</i></b>	<b><i>Transportation Agency</i></b>
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#### **1) Vehicles of PMKAB**

Transportation Agency registers vehicles of PEMKAB which are necessary for emergency transportation activity as an emergency vehicle beforehand and keep these under control. Transportation Agency requests to allocate the vehicles and use by order from the Agency.

<b>No.</b>	<b>Type</b>	<b>Name</b>	<b>Registration No.</b>	<b>Max. authorized payload (unit; tone, person)</b>	<b>Agency</b>

#### **2) Procurement Request**

In case they cannot cope with disaster activities only by using vehicles of PEMKAB, Transportation Agency requests vehicles as follows.

##### **(1) Request to Other Agencies in PEMKAB**

- Car, Truck and Special vehicle  
Request to a bus company and a transportation company
- Fishing boat  
Request to a fisherman

##### **(2) Request to the Province**

- Car, Truck and Special vehicle
- Vessel

### **(3) Request to a Railway Company**

In case railway is suitable, request the railway company for cooperation

### **(4) Request for Air Transportation**

In case of air transportation is needed, request to utilize airplanes of the army and the police.

## **3) Security of the Emergency Traffic Vehicle**

Transportation Agency issues an emergency vehicle certificate to vehicle engaged in emergency transportation activity. Driver has to put the vehicle certificate only for emergency transportation activity.

## **4) Transportation Plan**

### **(1) Prioritized Purpose**

Purpose of using emergency transportation is depended on urgent situation. The following are procedure for emergency transportation measures.

#### **A. 1<sup>st</sup> stage (From right after until second day of disaster)**

To support directly either dead or injured victim by occurrence of disaster, following items are necessary to be prioritized to reduce confusion after disaster.

- An ambulance service, medical service and staffs who manage medical supplies and other supplies
- Firefighting, flood control activity staffs and staffs who manage prevention of a disaster
- Staffs or supplies which are necessary for first aid disaster measures such as staffs from national and local government, information and communication, electricity, gas, water service institution security guard
- Injured peoples who are transported to public health center or hospital
- Staffs and equipments that are necessary for emergency transportation such as transportation facilities, emergency rehabilitation of transportation center and traffic regulation

#### **B. 2<sup>nd</sup> stage (From the third day to first week after disaster)**

To mitigate damage and manage confusion caused by occurrence of disaster, following items are necessary to recover quality of life for emergency.

- The 1st stage continuation activity
- Supplies which are necessary to support daily life such as food, water, etc.
- Disaster victim and handicapped who are transported to outside of disaster area

- Staffs and equipments that are necessary for emergency rehabilitation of transportation facilities

**C. 3<sup>rd</sup> stage (After one week from the disaster)**

To supports daily life that became more difficult by disaster, and things which are necessary to be reconstructed after disaster, mainly focus on following items.

- The 2nd stage continuation activity
- Staffs and equipments that are necessary for reconstruction process after disaster
- Life needs

**(2) The Transfer Lines**

The transfer lines are refereed “2-11 Development of Emergency Transportation Facilities”.

## 8.2 Securing Transportation Network

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency</i></b>
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In occurrence of disaster, Public Works Agency handles immediately the damage situations of the road and removes barriers on the road, and implements emergency rehabilitation to secure the transportation network. In emergency rehabilitation, securing transportation network is urgently implemented.

### 1) Report of the Traffic Barrier

Public Works Agency implements information sharing with related organization such as the province, police, and gains or reports the damage situations of the road for securing emergency transportation network.

### 2) Remove Barriers on Emergency Transportation Road

Public Works Agency in cooperation with the province removes barriers on emergency transportation road.

- After disaster occurs, Public Works Agency checks damage situation of emergency transportation roads. When responsible road management from the province checks emergency transportation roads, Public Works Agency cooperates with them.
- When there are barriers by outflow of soils at emergency road sections, Public Works Agency attempt to collect information of the road section and implement information sharing with the province and related organization.
- Public Works Agency will prioritize road section for removal of barriers in consideration of the importance and effectiveness of emergency transportation road.

## **CHAPTER 9. DISASTER RESPONSE ACTIVITIES BY COMMUNITY AND PRIVATE ENTERPRISES**

It is totally depend on mutual disaster damage mitigation and prevention activities by community and private enterprises to secure safety of individuals, family and community member. The following measures shall be taken by community and private enterprises.

### **9.1 Disaster Response Activities by Citizens**

<b><i>Responsible Agency:</i></b>	<b><i>Head of District</i></b>
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### **9.2 Disaster Response Activities by Community Groups**

<b><i>Responsible Agency:</i></b>	<b><i>Head of District</i></b>
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### **9.3 Disaster Response Activities by Private Enterprises**

<b><i>Responsible Agency:</i></b>	<b><i>Private Enterprises</i></b>
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For 9.1 to 9.3, refer to Section 3 Emergency Response Chapter 11, 11.1 to 11.3 in “Part 1: Earthquake Measures”

## **CHAPTER 10. EVACUATION MEASURES**

When disaster occurs, and there is a risk of secondary disaster, or there are vulnerable houses to landslide, etc, it is necessary to secure resident safety by evacuating to safe area temporarily.

This chapter will elaborate plan for evacuation measures, such as dissemination of evacuation preparedness information, evacuation guidance or order, advice for evacuation/transfer, opening of evacuation site.

### **10.1 Announcement of Evacuation Warnings**

<b>Responsible Agency:</b>	<b>Kodim</b>
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In occurrence of disaster, it is necessary to protect human life from disaster and prevent spreading of damages by following procedures of evacuation (represent evacuation preparedness information, evacuation guidance and order).

<b>Type of Warnings</b>	<b>Description</b>
Alert II Evacuation Preparedness Information	This warning is for elderly and handicapped resident. These people need more time to evacuate, so that information on risks of disaster occurrence should be announced several days before to prepare for evacuation
Alert I Evacuation Guidance	When disaster occurs or high risk of occurrence of disaster, evacuation warning is announced to community
Evacuation Order	Devastating disaster occurs or high risk of occurrence of devastating disaster, evacuation order is announced to community. This order is stronger than Evacuation Guidance

#### **1) Decision Criteria of Evacuation Warnings**

1. When landslide occurred or there is risk of occurrence, and anticipation to danger that could cause casualties
2. When flood occurred, or there is risk of occurrence, and anticipation to danger that could cause casualties
3. By condition of other types of disaster related to rain and storm which considered dangerous by head of Rupusdalops PBP



## **2) Announcement of Evacuation Preparedness Information and Person who give Evacuation Warning and Order**

When there is danger on resident life, Bupati will announce warning to resident in the area, or in case of emergency, will order evacuation. However, if Bupati is absent or cannot execute his duties, by following order, substitute can act on behalf of Bupati and have the same authority to give evacuation warnings.

1. Vice Bupati
2. Assistant I
3. Head of National Unity Agency

### **(1) Substitution by Supporting Organizations**

When there was upcoming danger due to occurrence of disaster, and no time for asking Bupati decision, or Bupati is absent, any related organization could substitute authority of Bupati for giving evacuation warnings to secure lives of residents.

Those supporting agencies are:

- Transportation Agency (related to BMG)
- Irrigation Agency (related to the increase of water level in river)
- Public Work Agency (related to area condition)

After announcement, related organizations who gave evacuation warnings, will report to Rupusdalops PBP promptly.

### **(2) Substitution by Governor**

Due to devastating disaster, if most of roles of Rupusdalops PBP in Kabupaten cannot be implemented, Governor has power to take over all or part of authorities of Bupati. Governor will announce beginning and end of the take over. When Governor substitutes the role of Bupati, Governor will report to Bupati about the take over. Then whenever Bupati have recovered and could execute his duty, Governor will return the roles to Bupati immediately.

### **3) Contents of Evacuation Warnings**

Person who announced evacuation warnings will warn or order evacuation by clearly mentioning the following items to community.

1. Reason of necessity of evacuation
2. Target area of evacuation guidance or order

3. Location of Evacuation Area
4. Evacuation Route
5. Caution Points for Evacuation

#### **4) Deliverance of Evacuation Warnings**

Deliverance of evacuation warnings is done by radio communication, mosque loudspeaker, van loudspeaker, and traditional emergency bell (Kentongan).

#### **5) Reporting, and etc**

##### **(1) Report to Related Organizations**

When Bupati or related organizations announced evacuation warnings, the situation should be reported to Governor and other related organizations.

##### **(2) Dissemination to Community**

When evacuation warnings are announced or received notification that other related organizations gave evacuation warnings, the situation should be disseminated to community by using communication system of PEMKAB. Moreover, when evacuation warnings are announced, update situation will be informed to community.

#### **6) Announcement of Evacuation Warnings**

Bupati will announce evacuation warnings when there was emergency condition. He will announce immediately and report to Governor.

## 10.2 Set up of Alert Area

<b><i>Responsible Agency:</i></b>	<b><i>National Unity Agency</i></b>
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## 10.3 Advice for Evacuation and Transfer

<b><i>Responsible Agency:</i></b>	<b><i>National Unity Agency</i></b>
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## 10.4 Set up of Temporary Evacuation Facility and Its Management and Operation

<b><i>Responsible Agency:</i></b>	<b><i>National Unity Agency</i></b>
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For 10.2 to 10.4, refer to Section 3 Emergency Response Chapter 12, 4.3 to 4.5 in “Part 1: Earthquake Measures”

## **CHAPTER 11. RESCUE/AID MEASURES**

In occurrence of big disaster, many disaster-affected people will lose their cooking equipments including food supply itself and no availability of lifeline functions due to collapse of houses. Moreover, disaster affected people may not get their daily food in shops or markets because of unusual condition of big disaster. Therefore, it will be necessary to supply water, food and daily commodities to disaster affected people to maintain social stability.

It is necessary to conduct cleaning of huge volume of waste and debris generated by big disaster and also necessary measures shall be taken to prevent epidemics in damaged area. Medical aid for injured people and rescue and search operation for missing people are also important activities. Based on above points, following items are planned.

### **11.1 Food Provision**

<b><i>Responsible Agency:</i></b>	<b><i>Social Agency, Indonesian Red Cross</i></b>
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### **11.2 Water Provision**

<b><i>Responsible Agency:</i></b>	<b><i>Regional Water Company</i></b>
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### **11.3 Daily Commodity Provision**

<b><i>Responsible Agency:</i></b>	<b><i>Social Agency, Transportation Agency</i></b>
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### **11.4 Acceptance of Goods form outside Disaster Affected Area**

<b><i>Responsible Agency:</i></b>	<b><i>Social Agency</i></b>
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For 11.1 to 11.4, refer to Section 3 Emergency Response Chapter 14, 14.1 to 14.4 in “Part 1: Earthquake Measures”

## 11.5 Rescue, First Aid, Medical Treatment Measures

<b><i>Responsible Agency:</i></b>	<b><i>Health Agency</i></b>
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### 1) 1. Rescue, First Aid System

#### (1) Principle of Activity

Rescue and first aid activities shall be operated based on following principles.

- Life saving is the first priority in any case.
- Fire extinguish and related life saving is high priority activity.
- Effectiveness of rescue operation shall be considered to save more life.
- Application of triage for victims to be determined by treatment priority

#### (2) Information Collection

Necessary information for rescue operation shall be collected as much as possible through related agencies such as fire fighting, police, community, and community information network. Attention shall be paid to hospital, large shopping center, hotel, theater and related buildings.

### 2) Medical Aid System

Medical Aid team shall be organized in Health Agency to collect information for emergency medical support, take coordination between hospitals for acceptance of injuries and dispatch medical aid team to necessary place. Medical Aid team will work in cooperation with local doctor's association. Main task of this group shall be as follows.

#### (1) Information Collection

Damage information for medical facilities shall be collected by telecommunication network such as hospitals, clinics and related facilities. Activity information of medical facilities shall be collected such as doctor's activity including their staffs, insufficient medicine and medical equipments and available beds.

#### (2) Open of Medical Aid Service Spot

Medical aid service spot shall be opened at neighborhood of disaster affected area using existing medical facilities under coordination by Medical Aid team. Necessary medical team and materials will be provided by Health Agency.

**(3) Procurement of Medicines and Equipments**

Necessary medicines and equipments for emergency medical aid will be supplied by using available stocks of hospitals and clinics. Procured medical materials shall be distributed by Health Agency to medical aid service spot.

**(4) Dissemination of Medical Aid Service Information**

Medical aid service information such as care center, hospitals shall be disseminated to community through announcement by Health Agency.

**(5) Cooperation with Medical Facilities Outside Kabupaten Padang Pariaman**

In case of over capacity of existing medical treatment in Kabupaten Padang Pariaman is estimated due to huge scale of disaster, outside medical function shall be utilized in cooperation with provincial Health Agency in Padang. Heavily injured patients who need an integrated care will be transferred to outside hospitals from disaster damaged area by special transportation such as military helicopter. Request of medical support team to outside medical functions will be also made through coordination by Health Agency of Kabupaten Padang Pariaman.

**(6) Open of Supply Center for Medical Aid Material**

Supply center for medical aid material shall be opened to classify and manage necessary medicines and related medical materials. In cooperation with pharmacist, necessary medicines and related materials shall be distributed to request sites.

## 11.6 Procurement of Medicines and Medical Equipments

<b><i>Responsible Agency:</i></b>	<b><i>Health Agency</i></b>
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In order to response shortage of medicines and medical equipments, provincial health agency will be requested for procurement of these materials.

## 11.7 Health Care and Hygiene Measures

<b><i>Responsible Agency:</i></b>	<b><i>Health Agency</i></b>
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### 1) Hygiene Measures in Disaster Affected Area

Hygiene measures shall be taken in disaster affected area to maintain sanitary condition and prevent epidemic infection. Public toilet space and shower space shall be prepared in evacuation site.

### 2) PTSD

Mental care shall be given to those who have heavy stress or mental damage such as PTSD by natural disaster. Medical doctors and volunteers in cooperation with Health Agency shall work together to support children, elderly and community for recovery from mental damage.

## 11.8 Solid Waste Management

<b><i>Responsible Agency:</i></b>	<b><i>Cleanliness and Environment Agency</i></b>
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In occurrence of big disaster, large volume of solid waste will be generated by building collapse. It is necessary to remove solid waste from damaged site and clean the area for reconstruction. Waste disposal site shall be prepared. Collected solid waste shall be divided according to its type of material before dumping. Woods, bamboo and related waste should be incinerated at disposal site or reutilized for reconstruction of local house. Other solid waste should be disposed as landfill.

## 11.9 Human Waste Management

<b><i>Responsible Agency:</i></b>	<b><i>Cleanliness and Environment Agency</i></b>
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Human waste management will be necessary at evacuation sites. Temporary toilet shall be prepared for refugee. Waste shall be treated properly as sanitary landfill.



## 11.10 Epidemic Prevention Measures

<b><i>Responsible Agency:</i></b>	<b><i>Health Agency</i></b>
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In occurrence of big disaster, epidemic prevention measures should be taken in disaster affected area, especially for evacuation site. It is very important to manage and control health and sanitary condition for refugee at evacuation site and damaged area. Health check is necessary for refugee. If patient is found at evacuation site, necessary treatment procedures shall be taken immediately such as transporting to hospital and give medical care. Following procedure shall be taken to control and prevent epidemics in disaster affected area.

- Conducting fast check of patient or carrier and take necessary preventive measures in disaster affected area and evacuation site.
- Conducting disinfection in disaster affected area and evacuation site to prevent epidemics.
- Conducting vaccination.
- Dissemination of necessary information and instruction for epidemic prevention in cooperation with community activity.
- Preparing necessary chemical materials and equipments for disinfection of the area by related agency.
- Hospital shall be designated beforehand to accept patients of epidemics.

## 11.11 Searching for Missing Victim and Casualties Treatment

<b><i>Responsible Agency:</i></b>	<b><i>SAR, Health Agency</i></b>
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### 1) Searching for Missing Victim and Casualties

Search for missing victim in disaster area shall be conducted by Search and Rescue Agency from Padang and Padang Pariaman. Under management of Search and Rescue Agency, navy and marines will join in searching activity. Community will also join search work for missing victim under head of village responsible.

If missing person is found still in alive, then he will be transported to designated hospital by possible transportation system such as vehicles, or even a helicopter to give necessary medical treatment. Personal data such as address, name, age, male or female and contact place will be recorded as for reference.

If missing person is found dead, then he will be transported to the nearest medical care center (POST). After identification check and cleaning the dead body by medical doctor, he will be transported to designated hospital. Finally, family or relatives will check and recognize all identifications at hospital. Then, dead body will be transferred to family for funeral.

### 2) Preparation of Charnel House

Preparation of charnel house will be necessary in case of big disaster. Large space such as mosques or gymnasiums shall be designated in close sites to disaster affected area. Selection of candidate buildings shall be made beforehand as a part of disaster management plan. In charnel house, medical check, cleaning dead body, identification by family and transfer service will be conducted.

### 3) Information Dissemination to Community

Missing victims, who have not been found, could be searched through photograph, body characteristics, personal belongings and clothes. This information will be disseminated to community through local community network or Tracing and Mailing Service (TMS) by Indonesian Red Cross.

## **CHAPTER 12. SCHOOL DISASTER MANAGEMENT MEASURES**

In occurrence of big disaster, safety measures for pupils and students, school facilities and provision of temporary school shall be planned as follows.

### **12.1 Management of School Facilities**

<b><i>Responsible Agency:</i></b>	<b><i>Education Agency</i></b>
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### **12.2 Measures for Students and Pupils**

<b><i>Responsible Agency:</i></b>	<b><i>Education Agency</i></b>
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### **12.3 Procurement and Provision of School Supplies, etc**

<b><i>Responsible Agency:</i></b>	<b><i>Education Agency</i></b>
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### **12.4 Management of Education Facilities**

<b><i>Responsible Agency:</i></b>	<b><i>Education Agency</i></b>
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For 12.1 to 12.4, refer to Section 3 Emergency Response Chapter 17, 17.1 to 17.4 in “Part 1: Earthquake Measures”

## ***CHAPTER 13. RESIDENCE AND BUILDING MANAGEMENT***

Residential buildings will be damaged by big disaster, and there will be many people lose their houses. In order to support these refugees, construction of temporary houses and reparation of damaged houses shall be planned as follow.

### **13.1 Investigation of Damaged Buildings**

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency</i></b>
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#### **1) Preparation**

Damage information will be collected to understand volume of damage. Preparation of surveyors and survey tools, and announcement of damaged house investigation will be disseminated by Public Works Agency.

#### **2) Survey Method**

As a primary survey and evaluation, two surveyors will conduct visual observation from outside of the house. Based on the survey, detailed survey for certain buildings will be reported by construction experts.

#### **3) Preparation of Damaged Houses List**

Survey results will be compiled into damaged houses list by Public Works Agency and utilized for necessary verification in future.

## 13.2 Survey of Damaged Residential Land

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency</i></b>
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Damaged residential land will be surveyed to protect from secondary damage and secure safety of residents in disaster area.

### 1) Preparation

Damage information of residential land will be collected to understand volume of damage. Preparation of surveyors and survey tools, and announcement of investigation will be disseminated by Public Works Agency.

### 2) Survey Method

As a primary survey and evaluation, a team of three surveyors will conduct visual observation on damaged land. Based on request of residents, technical advice for restoration or rehabilitation of damaged land will be recommended to protect from secondary damage.

### 3) Announcement of Survey and Evaluation

Result of survey and evaluation will be announced and displayed at disaster area to protect or reduce secondary damage.

### 13.3 Construction of Temporary Housing and Emergency Restoration of Damaged Buildings

***Responsible Agency:***

***Public Works Agency, Indonesian Red Cross***

Temporary housing will be constructed for those who lost their house and unable to reconstruct by their own fund due to disaster damage. Emergency restoration of damaged houses will also be conducted to secure social stability.

#### 1) Implementation Organization

SATLAK (Public Works Agency) and Community Empowerment Board are the responsible agency for construction of temporary housings, restoration and rehabilitation of damaged houses in disaster affected area.

#### 2) Construction of Temporary Housing

Temporary housing will be provided to those with several criteria such as, (1) total collapse or burning of residential house (2) not having residential house, (3) elderly or handicapped who do not have residential house.

Public Works Agency and Social Agency shall work together to provide temporary housings to refugee.

#### 3) Location of Temporary Housing

Location of temporary housing shall be selected at safety area, close to existing commercial facility, school, and hospital. Number of temporary housing will be decided by Bupati of Kabupaten Padang Pariaman.

#### 4) Emergency Restoration and Rehabilitation of Damaged Houses

Public Works Agency and Community Empowerment Board will conduct and support emergency restoration and rehabilitation of damaged houses in disaster affected area. Light damaged houses will be the target for restoration and rehabilitation. Emergency restoration and rehabilitation shall be completed within one month after occurrence of disaster.

## **CHAPTER 14. EMERGENCY MEASURES FOR LIFELINE**

If daily utilities such as water, sewerage, electricity, telecommunications, etc. were damaged by disaster, prompt and precise emergency response shall be planned as follows:

### **14.1 Recovery Information of Lifeline**

<b><i>Responsible Agency:</i></b>	<b><i>National Unity Agency</i></b>
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### **14.2 Water Supply Facility**

<b><i>Responsible Agency:</i></b>	<b><i>National Unity Agency</i></b>
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### **14.3 Electric Supply Facility**

<b><i>Responsible Agency:</i></b>	<b><i>National Electric Company</i></b>
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### **14.4 Telecommunication Facility**

<b><i>Responsible Agency:</i></b>	<b><i>TELKOM</i></b>
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For 14.1 to 14.4, refer to Section 3 Emergency Response Chapter 19, 19.1 to 19.4 in “Part 1: Earthquake Measures”

## **CHAPTER 15. ACCEPTANCE PLAN OF FOREIGN ASSISTANCE**

International assistance will be expected for large-scale natural disaster. Emergency rescue operations including search and rescue, medical services, construction and management of evacuation facilities will be the first necessary items for disaster management. International aid teams will join immediately after occurrence of disaster. In order to accept international assistance for emergency operation, basic acceptance plan including information sharing with national and provincial organization and necessary procedures should be prepared.

### **15.1 Information Sharing with National and Provincial Organization**

<b><i>Responsible Agency:</i></b>	<b><i>National Unity Agency</i></b>
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### **15.2 Acceptance of Foreign Assistance**

<b><i>Responsible Agency:</i></b>	<b><i>National Unity Agency</i></b>
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For 15.1 and 15.2, refer to Section 3 Emergency Response Chapter 21, 21.1 and 21.2 in “Part 1: Earthquake Measures”



## **Section 4: Post-Disaster (Rehabilitation and Reconstruction Plan)**

Rain and storm related disasters sometimes cause extensive damages. Demolition of houses, land slide, flood, etc. caused by heavy storm, etc. is extremely disturbing for the resident's daily life and activities. Rehabilitation and Reconstruction Planning are management plans to be implemented by PEMKAB and related organizations/agency for recovering from damages as soon as possible, so the residents would be able to live normally everyday without any trouble.

### ***CHAPTER 1. REHABILITATION PLAN***

For Rehabilitation Management, prompt recovery on daily life and facilities of disaster victims, industries, etc. are expected. PEMKAB plans, to return resident's lives back to normal by establishing service post, temporary housing management, emergency funding, etc. and so on.

#### **1.1 Recovery Measures to Normal Life**

<b><i>Responsible Agency:</i></b>	<b><i>Social Agency</i></b>
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#### **1.2 Rehabilitation of Public Facilities**

<b><i>Responsible Agency:</i></b>	<b><i>Public Works Agency</i></b>
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#### **1.3 Declaration of National Disaster**

<b><i>Responsible Agency:</i></b>	<b><i>Bupati</i></b>
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For 1.1 to 1.3, refer to Section 4 Post Disaster Chapter 1, 1.1 to 1.3 in "Part 1: Earthquake Measures"

## **CHAPTER 2. RECONSTRUCTION PLAN**

To reconstruct safe and pleasant city by facing disasters, following basic concepts are formulated.

### **2.1 Gathering Relevant Information for Preparation of Reconstruction**

<b><i>Responsible Agency:</i></b>	<b><i>Development Planning Board</i></b>
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### **2.2 Basic Concept Formulation of Urban Reconstruction**

<b><i>Responsible Agency:</i></b>	<b><i>Development Planning Board</i></b>
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For 2.1 and 2.2, refer to Section 4 Post Disaster Chapter 2, 2.1 and 2.2 in “Part 1: Earthquake Measures”