

CHAPTER III OVERVIEW OF THE STUDY AREA

3.1 Overview of Klaten

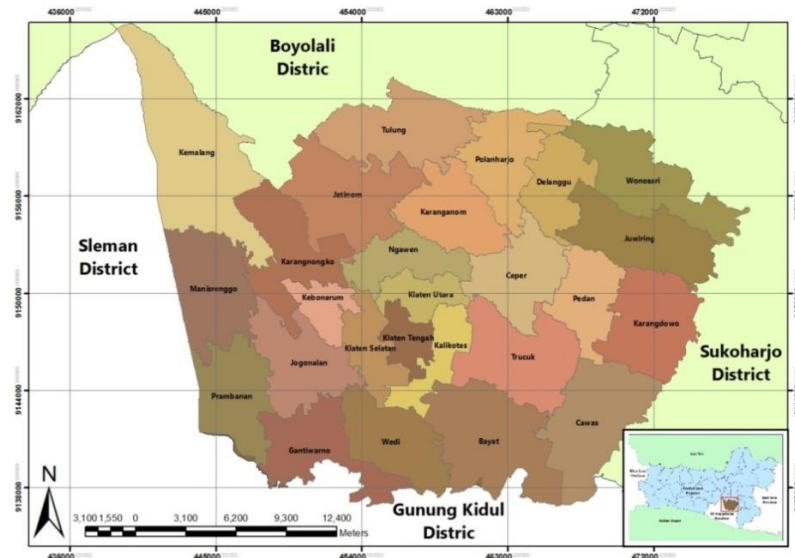
Geographically, Klaten stretches along the equator line. It is between 7°30' to 7°45' South Latitude and 110°30' to 110°45' East Longitude. Klaten is located in the north part of Central Java with administrative border as follows:

North: Boyolali District

East: Sukoharjo District

South: Gunung Kidul District (DIY Province)

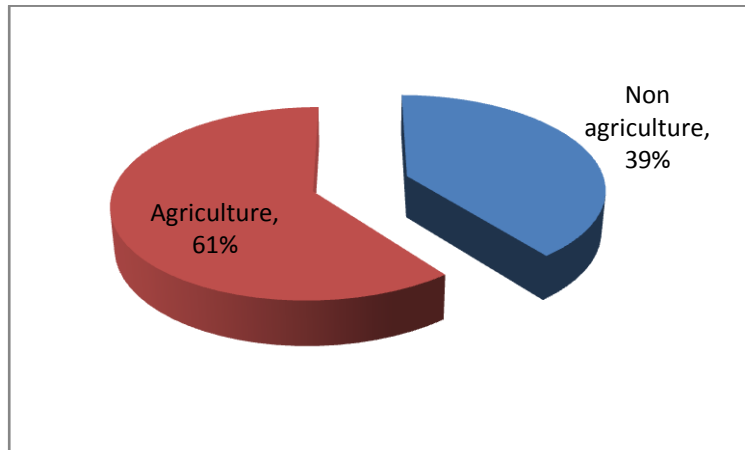
West: Sleman District (DIY Province)



Source: *Spatial Plan of Klaten, 2011*

**FIGURE 3.1
ADMINISTRATIVE MAP OF KLATEN**

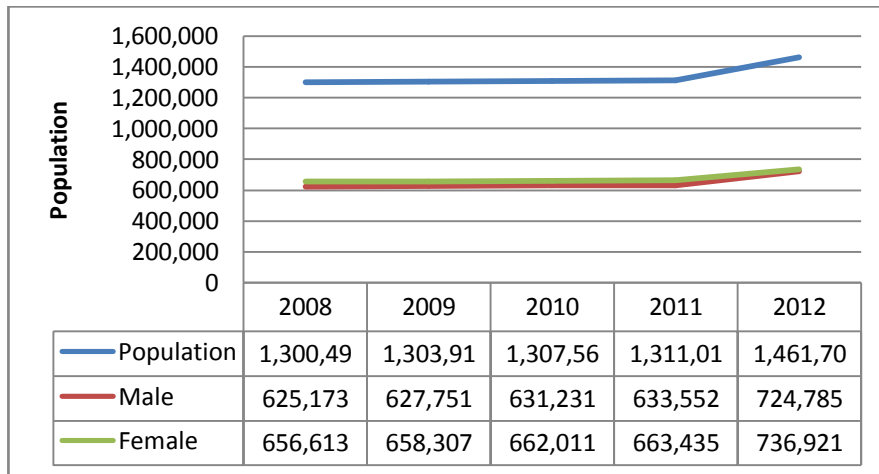
Klaten Regency area covers 65,556 hectares. Based on the land use, it divides into agricultural land and non-agricultural land. In 2012, 39,710 hectares are agricultural land while the area of non-agricultural land is 25,856 hectares. Agricultural land comprises an area of 33,334 hectares of wetland and 6,396 hectares of dry land.



Source: Klaten in Figures of 2012

FIGURE 3.2
AGRICULTURAL AND NON AGRICULTURAL
LAND OF KLATEN

Total population of Klaten in 2012 is 1,461,706 people. It is divided into 724.859 of males and 736.847 of females. The population growth during 2011 to 2012 is 30.687 inhabitants, with 2.230 inhabitants/km² of population density.



Source: Klaten in Figures of 2012

FIGURE 3.3
POPULATION OF KLATEN
2008 - 2012

The graphic shows a drastic increasing number of population in 2011 to 2012. In 2011, the population increased from 1,311,019 inhabitants to 1,461,706 inhabitants. This means that within a year there has been an increase in population

of 135.075 inhabitants. It is unusual considering average population growth in each year is about several thousand lives only.

3.2 Overview of Kemalang

Kemalang is located in the northern part of Klaten, right on the Mount Merapi slopes. Kemalang lies at 7'35 to 7'39 south latitudes and 110'28 to 110'31 east longitude. The boundaries are as follows:

North: Boyolali district

South: Manisrenggo sub-district

East: Karangnongko sub-district

West: Sleman district

This district is at altitude of 300 to 1000 meters above sea level. Kemalang consists of 13 villages, 211 hamlets, 302 RT and 108 RW.

TABLE III.1
VILLAGE, RT AND RW IN KEMALANG

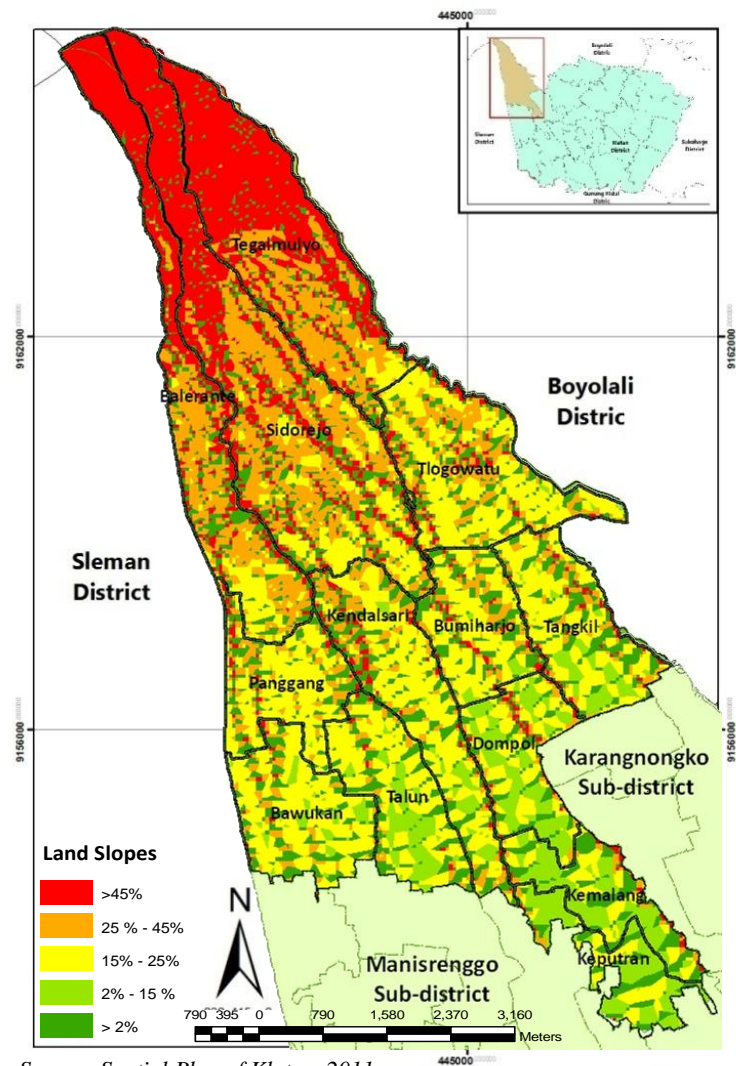
No.	Village	Hamlets (<i>dukuh</i>)	RW	RT
1	Bawukan	15	10	26
2	Panggang	14	5	16
3	Talun	10	10	21
4	Kendalsari	15	9	23
5	Kaputran	21	11	27
6	Kemalang	17	6	21
7	Dompok	11	8	18
8	Tangkil	24	10	24
9	Bumiarjo	11	6	21
10	Tlogowatu	23	10	25
11	Sidorejo	18	10	28
12	Balerante	14	8	17
13	Tegalmulyo	23	6	41
Total	2012	216	109	308

Source: Kemalang in Figures 2012

3.2.1 Physical Condition of Kemalang

a. Land Slopes Condition

Slopes level in Klaten is varied. Majority of area has an elevation level between 0 - 8%, except for Kemalang. The elevation level of slopes is quite varied in Kemalang. It is between 15-25%, 25-40% and above 40%. The details can be seen on figure 3.4.



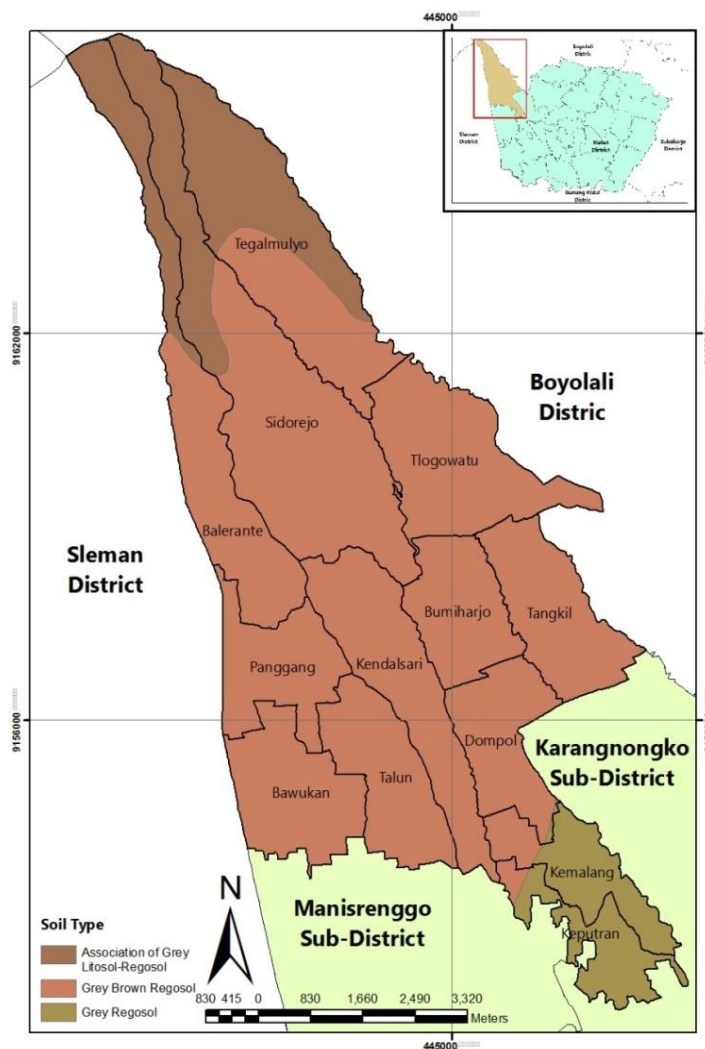
Source: Spatial Plan of Klaten, 2011

FIGURE 3.4
LAND SLOPES OF KEMALANG

b. Soil Types Condition

The Soil found in Kemalang is Latosol and Regosol. Latosol is formed by the process of rock weathering, while regosol formed due to deposition of volcanic

material from Merapi. Considering the location which is near Merapi, it is not uncommon to find this type of soil in Kemalng. This condition is shown in the figure 3.5.

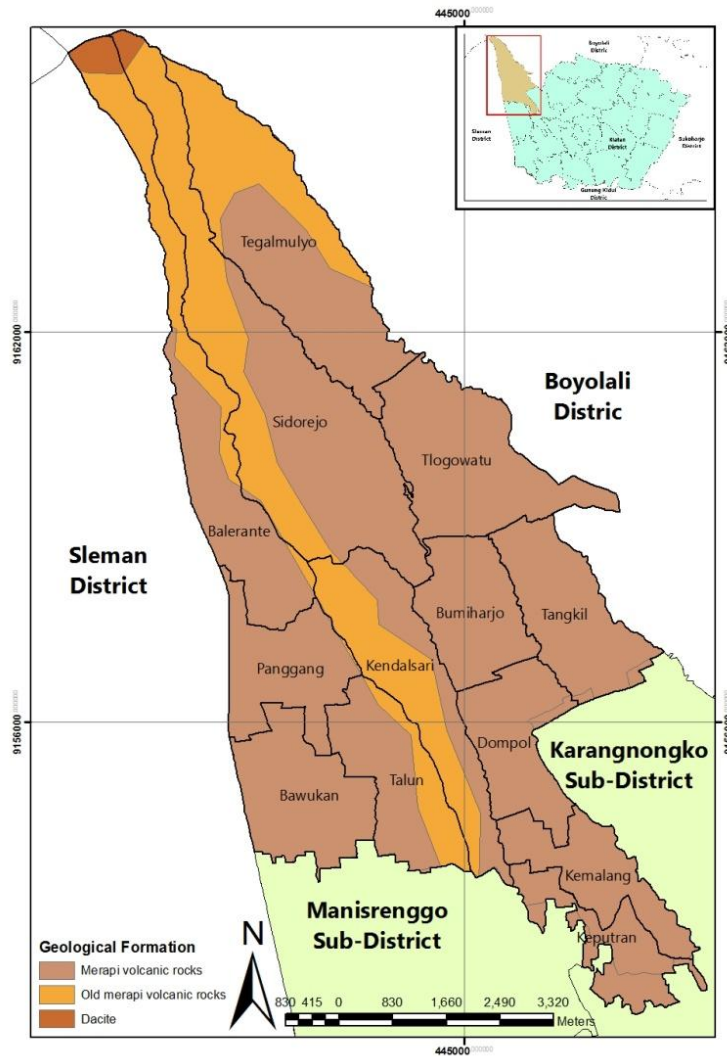


Source: Spatial Plan of Klaten, 2011

FIGURE 3.5
SOIL TYPES OF KEMALNG

c. Geology Condition

Geological structures are resulted from powerful tectonic forces that occur within the earth. These forces fold and break rocks, form deep faults, and build mountains. The geological structure in Kemalng is divided into three parts; merapi volcanic rocks, old merapi volcanic rocks and dacite. Geological condition in Kemalng is shown in the figure 3.6.

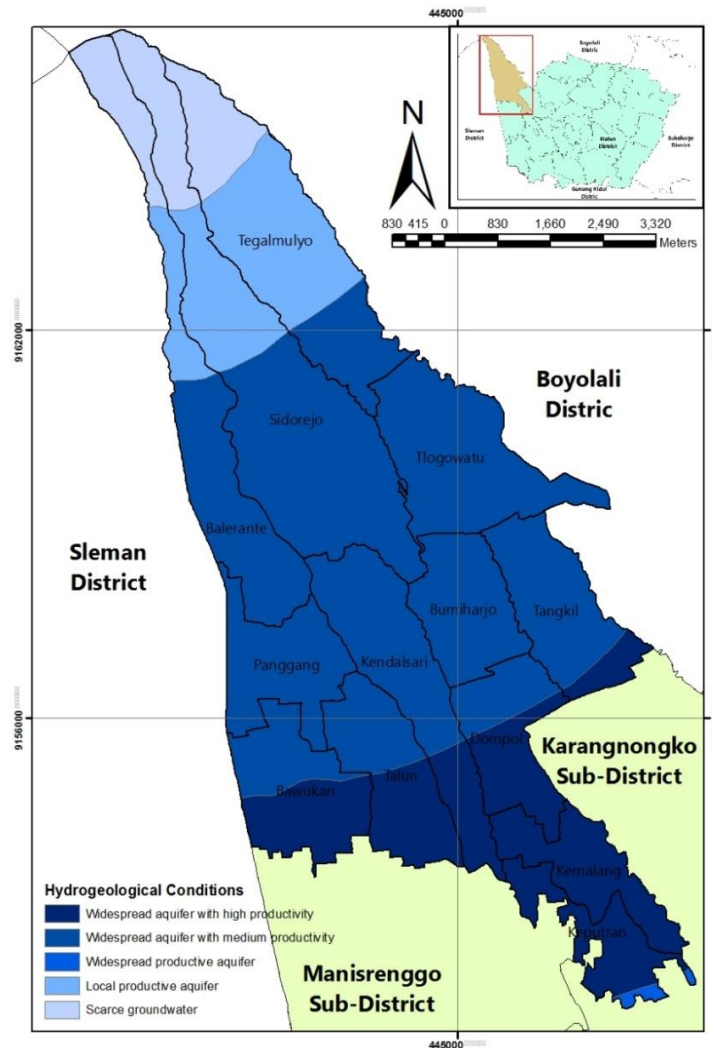


Source: *Spatial Plan of Klaten, 2011*

FIGURE 3.6
GEOLOGY CONDITION OF KEMALANG

d. Hydrology Condition

Hydrology Condition in Kemalang is divided into several categories. They are high aquifer productivity, medium aquifer productivity, productive aquifer, low aquifer productivity and scarce aquifer. As it is seen on the figure, Balerante and Sidorejo village has high productivity aquifer while Tegalmulyo village has low aquifer productivity.

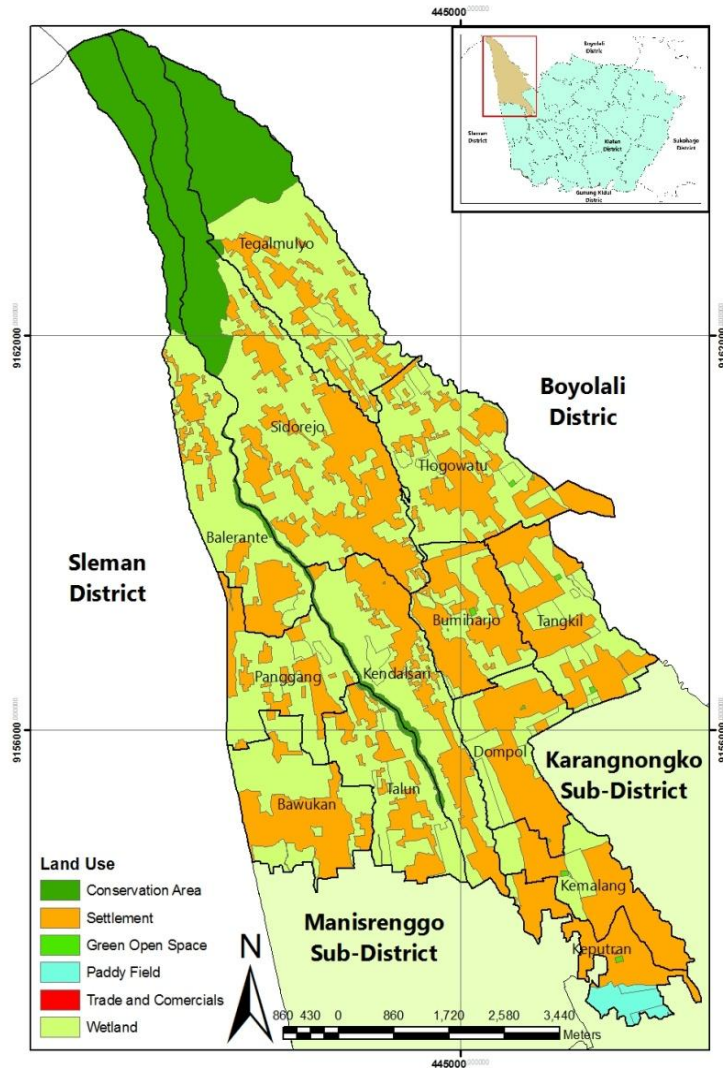


Source: Spatial Plan of Klaten, 2011

FIGURE 3.7
HYDROLOGY CONDITION OF KEMALANG

3.2.2 Land Use of Kemalang

Land use in Kemalang is dominated by paddy fields, both irrigated and non-irrigated while the rest are followed by dry land, forests and settlements. Kemalang covers an area of 5166 hectares. It consists of 54.1 hectares of wetland and 5111.9 hectares of dry land. This wetland covers 1.05% from the total area of land, while area of dry land is 98.95%. 54.1 hectares area of wetland mentioned before is categorized as technical irrigation paddy fields. Kemalang does not have semi-technical irrigation paddy fields because it is located in plateau area.



Source: Spatial Plan of Klaten, 2011

FIGURE 3.8
LAND USE OF KEMALANG

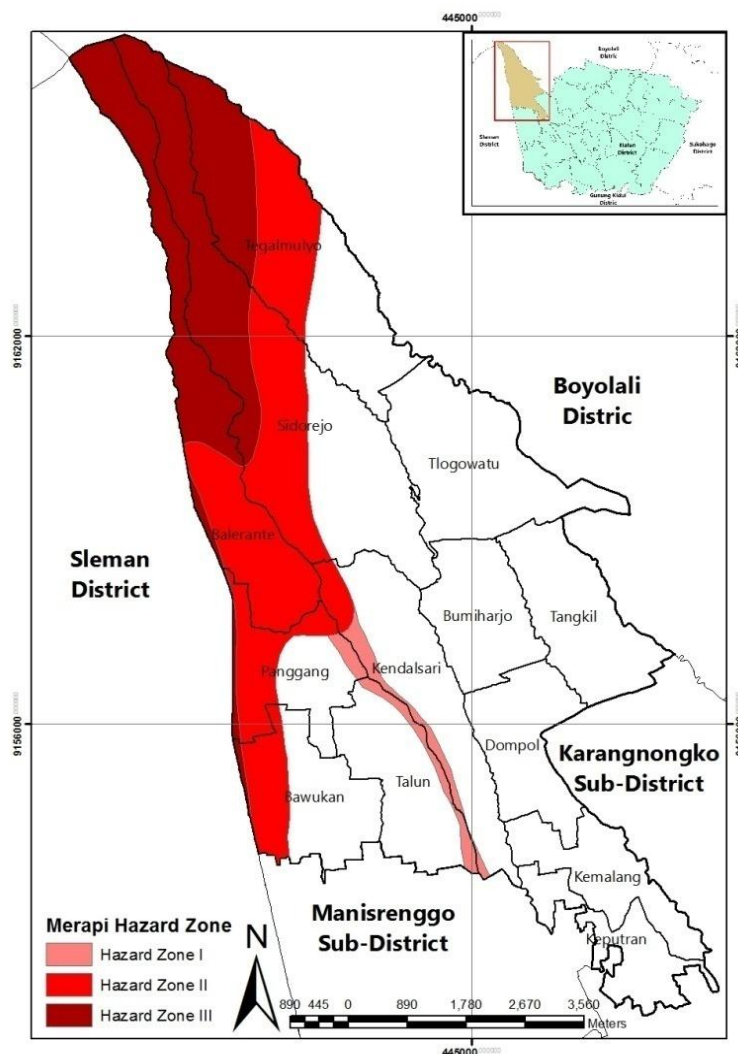
3.2.3 Volcano Hazard Zone of Kemalang

A volcano hazard zone in Kemalang is divided into three categories, i.e. hazardous zones I, hazardous zones II and hazardous zones III. Villages that belong into these are:

- Disaster Hazard Zone III (*KRB III*): located close to the source of danger. The location is often stricken by hot clouds, lava flows, rock falls, rock burst and heavy ash fall. Villages belong into this zone are some part of Tegalmulyo, Sidorejo, Balerante.

- Disaster Hazard Zone II (*KRB II*): the location is potentially stricken by the mass flow of hot cloud, lava flows, as well as material drops and hurls incandescent rocks. Villages belong into this zone are part of Tegalmulyo, Sidorejo, Balerante, panggang and bawukan.
- Disaster Hazard Zone I (*KRB I*): the location is potentially stricken by cold lava or flooding and have the possibility of being affected by the expansion of hot clouds and lava flows. Villages belong into this zone are some part of Panggang, Kendalsari, Talun.

The areas of volcano hazardous zone are shown in the following figure (figure 3.9).



Source: Spatial Plan of Klaten, 2011

FIGURE 3.9
VOLCANO HAZARD ZONE OF
KEMALANG

3.2.4 Community Condition of Kemalang

a. Population

Kemalang broadly covers an area of 51.66 hectares. The total population in 2012 is 35.656 inhabitants. During the year of 2011 to 2012, population in Kemalang has increased as many 214 inhabitants per kilometer squares. In 2011, the population density is 686 inhabitants per kilometer square. While in 2012, the density has increased to 90 inhabitants per kilometer square. It indicates 0.60 % of growth.

TABLE III.2
POPULATION OF KEMALANG
2012

No.	Gender	Inhabitants	Population Density (Inhabitants/km ²)	Population Growth Ratio
1	Male	17.623	690	0,60 %
2	Female	18033		
Total		35.656		

Source: Klaten in figure, 2012

TABLE III.3
POPULATION IN VOLCANO HAZARD ZONE OF KEMALANG
2012

No.	Village	Population		KK
		Male	Female	
1	Sidorejo	2071	2028	1234
2	Balerante	828	920	573
3	Tegalmulyo	1059	1144	741
Total		2010	3958	2548

Source: Klaten in Figure, 2012

b. Education Level

The average level of public education in Kemalang is only up to secondary level. In the academic year of 2012 to 2013, there is a decline in number of students in a primary and secondary level. The decline is quite significant in comparison to the academic year of 2011 to 2012. Teachers reduction also occurs in primary and secondary public school.

c. Occupation

Due to its close location to the slopes of Merapi, Kemalang have fertile soil. As the result, most of the inhabitants work as farmers. Besides farmers, there are also some people who work as artisan excavation.

d. Public Facilities in Kemalang

- Education Facilities

Education is an important indicator of the successful development. Improving the quality of human resources through education is a common goal of development. Therefore, adequate educational facilities are necessary to support the improvement of the human resources quality. In 2012, the educational facilities in Kemalang are 19 kindergartens, 26 elementary schools, 2 junior high schools, and 3 senior high schools.

- Health Facilities

Health facilities are places that provide health care. It includes hospitals, health center, clinics, and specialized care centers, such as birthing centers or maternity clinics. Health facilities in 2012 are 1 health center, 3 sub health center, 1 maternity clinic and 2 clinics.

- Worship Facilities

Worship facility is important to accommodate the society in accessing worship needs. Kemalang is a place with multilateral religion society. Nevertheless, Islam is the religion embraced by majority of the society. Worship facilities in Kemalang accommodate almost all religion except Buddhist. Worship facilities in 2012 are 68 Mosques, 95 Mushollas, 3 Catholic Churches, 5 Christian churches and 1 Temple.

TABLE III.4
PUBLIC FACILITIES IN KEMALANG
2010-2012

Public Facility		Year		
		2010	2011	2012
Education Facility	Kindergarten	19	19	19
	Elementary School	27	26	26
	Junior High School	2	2	2
	Senior High School	3	3	3
Health facility	Health Center	1	1	1
	Sub Health Center	3	3	3
	Maternity Clinic	1	1	1
	Clinic	1	1	2
Worship facility	Mosque	49	49	68
	Musholla	95	95	95
	Catholic Church	2	2	3
	Christian Church	5	5	5
	Temple	1	1	1
	Monastery	0	0	0

Source: Klaen in figures 2012

CHAPTER IV

ANALYSIS OF SETTLEMENT RELOCATION MODEL

There are several steps on relocation model analysis in the discussion of chapter four. The first step is the identification of eruption zone and relocation object. Analyses on three aspects are executed. The first is the physical aspect which is done to find land suitability from the aspect of physical condition or nature condition. Meanwhile, the second step is the community aspect which is related to the fulfillment of community's basic needs and focuses on the accessibility of the place in reaching public facilities and infrastructures. The last one is governmental aspect. The new area of settlement relocation should be compatible with government's directions and regulation.

4.1 Identification of Impacted Settlement as Relocation Object

Most areas of Kemalang are vulnerable to eruption. Balerante Village, as a part of Kemalang sub-district, has been impacted by Merapi eruption. Balerante is not the only area hit by the eruption, but it experienced the most damages. Other villages in Kemalang sub-district are also considered as vulnerable based on the level of hazard.

Balerante Village is considered as the most vulnerable because settlements damages caused by Merapi's eruption in 2010 are mostly happened in this place. Dealing with upcoming disaster, Balerante Village should be prioritized in the relocation to avoid either physical damages or financial losses. The following map shows areas that belong to vulnerable zones.

The Geological Agency of Indonesia (parent agency for CVGHM, BPPTK and MVO) monitors the eruptive activity and issues warnings and recommendations for areas to be evacuated (Phillipe, 2013). The area marked by a blue circle indicates the object of relocation. Inside the circle, there are 573 household belong to hazardous zone III, which are very prone to the volcano eruption. However, according to Emergency Response Agency Of Central Java