



# Evacuation in Mt. Merapi: Cultural Beliefs, Socio-Economic and Hazards Related Factors

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**Merapi Volcano**



# Cultural Belief and Disaster

- Cultural belief (Lavigne et al 2008; Gaillard 2008) – mystical interpretation (Schlehe 1996; 2007)
- OED: belief is feeling that something is real and true, trust, confidence
- OED: mystical is having spritual meaning or value.

# Studies on cultural belief and disaster

- Chester et al (2008): Mt. Etna and Mt. Vesuvius, Italy
- Schlehe (1996; 2007): Mt. Merapi, Indonesia
- Bankoff (2004): Mt. Pinatubo, Philippines
- Two Saints (holy man) St Gennaro and St Agatha
- Annually giving offering to the spirits in Mt. Merapi
- Eruption was the wrath of God.

# Hazard Related Factors and Evacuation

- Previous disaster experience related to decision to evacuate (Lindell et al 2005)
- Hazard proximity related to decision to evacuate (Lindell et al 2005)
- Observation to the environment cues (sounds, smells, appearance, etc) related to decision to evacuate.

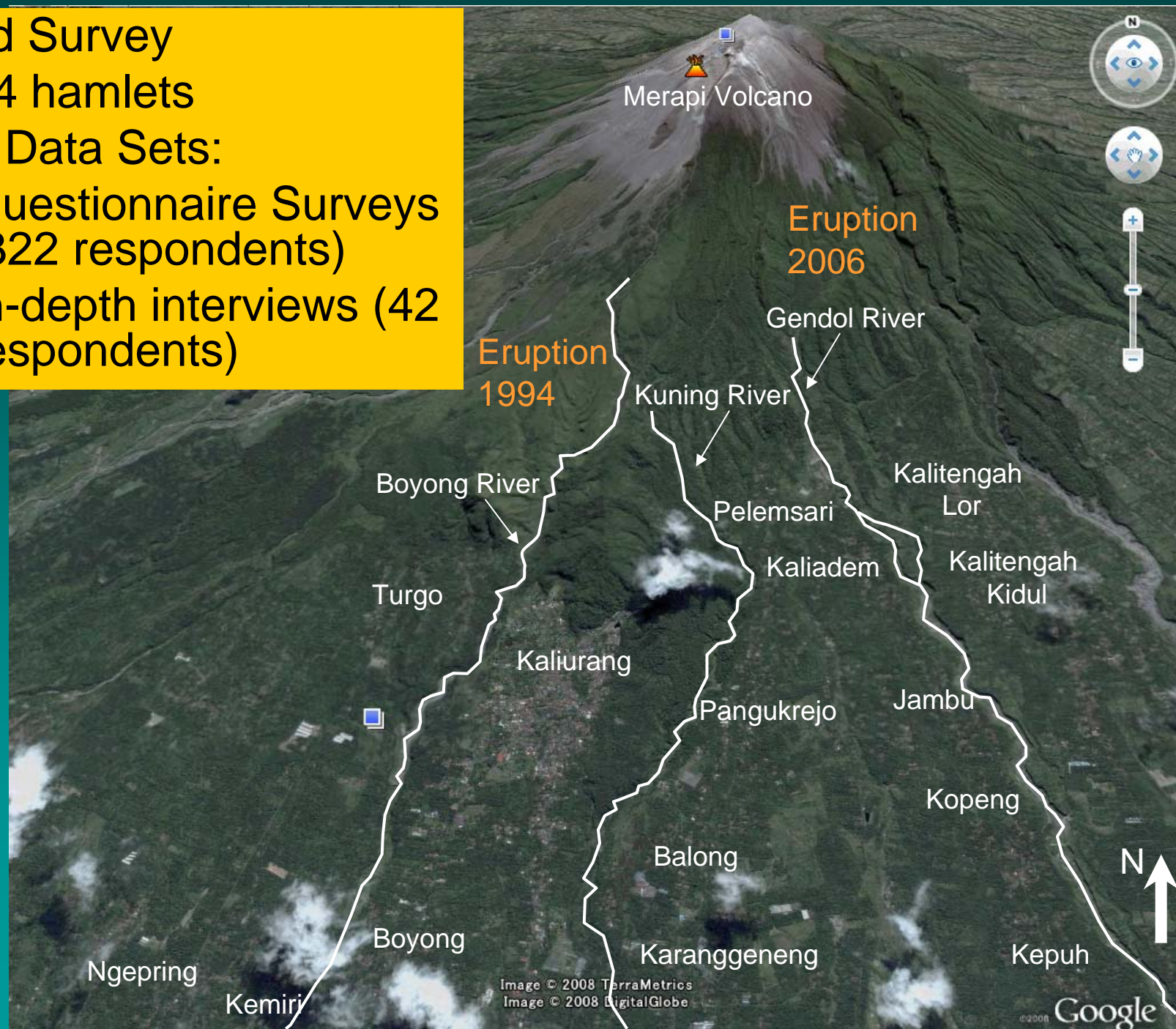
# Research Question

- To what extent the cultural belief influence people's decision to evacuate?
- Do other factors, socio-economics and hazards related, play role and how much the role of those factors?

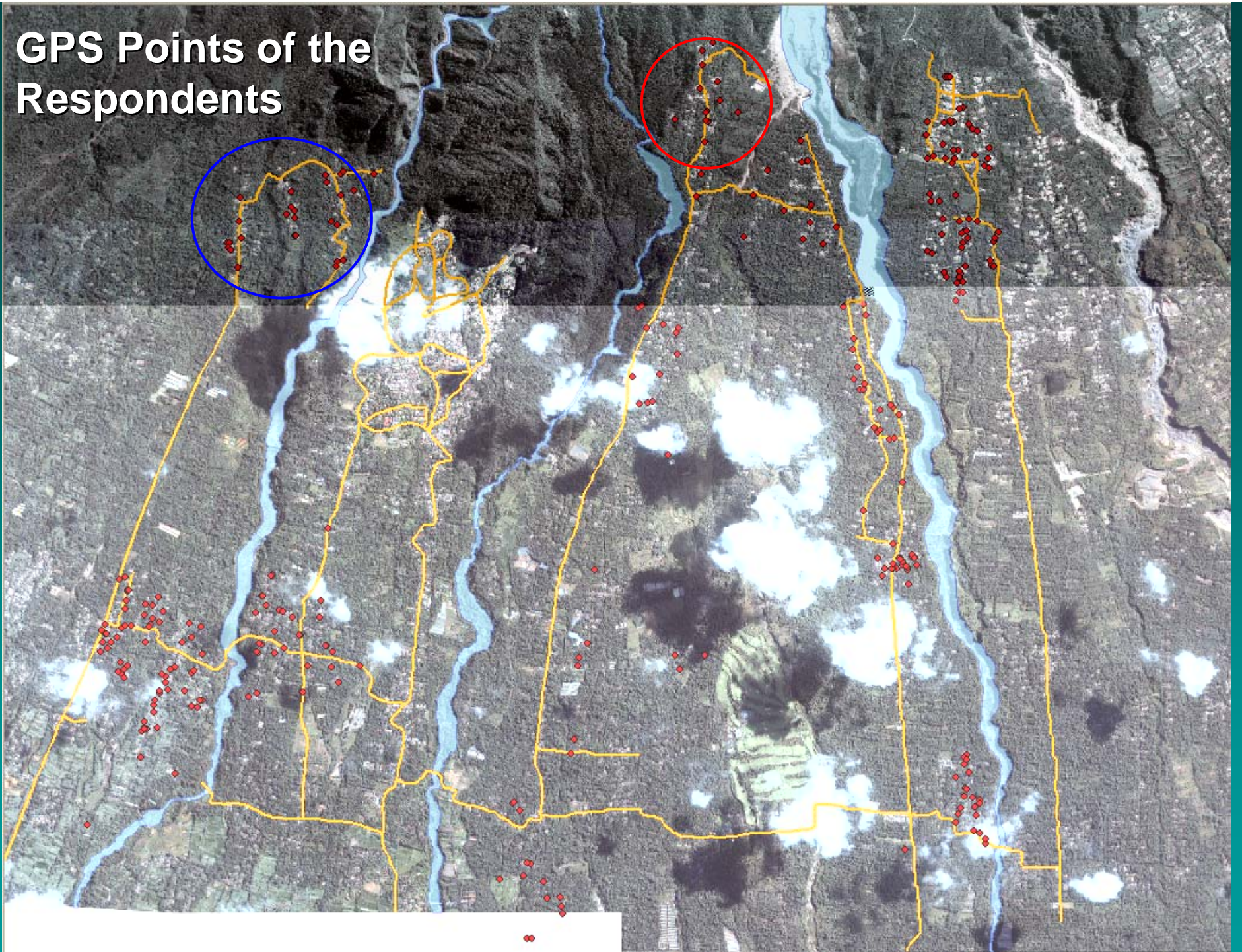


## Field Survey

- 14 hamlets
- 2 Data Sets:
- Questionnaire Surveys (322 respondents)
- In-depth interviews (42 respondents)



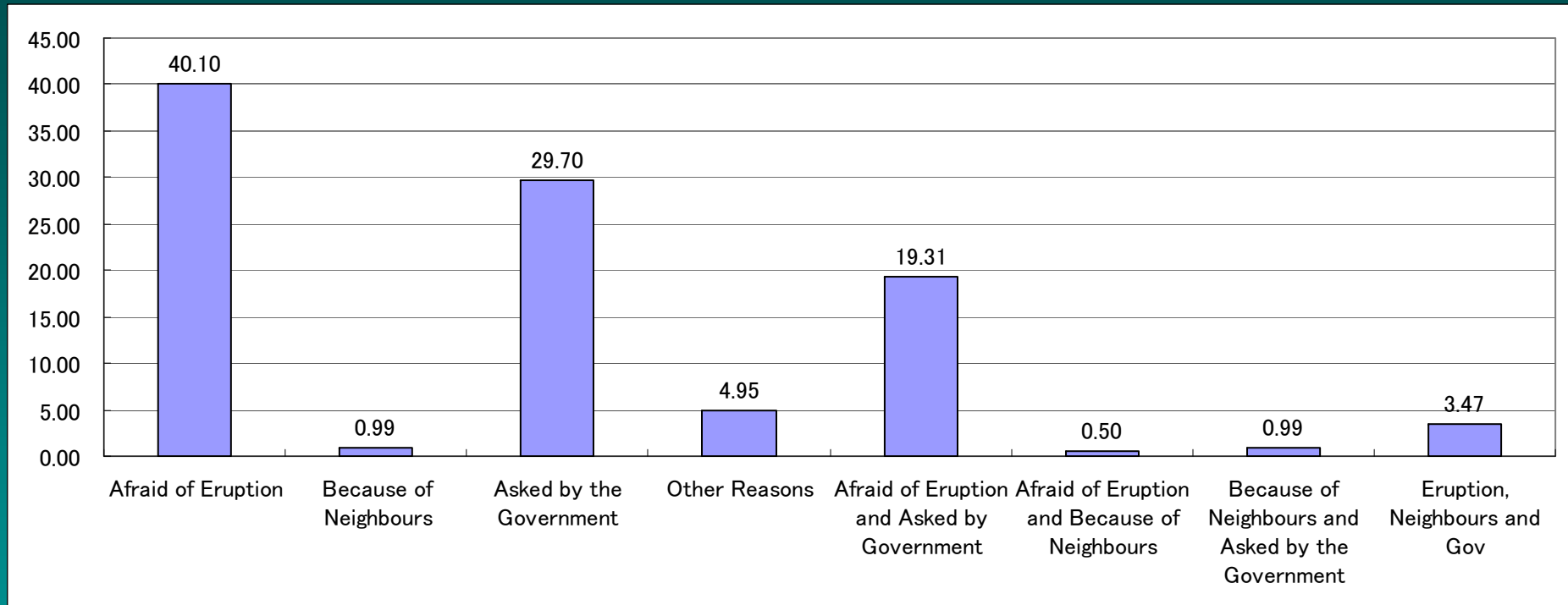
# GPS Points of the Respondents



# Results

Characteristics	Variables	%	Characteristics	Variables	%
<b>Age</b>	20s and 30s	54.8	<b>Household Size</b>	1	0.9
	40s	20.6		2	9.6
	50s	15.3		3	25.5
	60s and > 60s	6.5		4	29.2
					5 or more
<b>Gender</b>	Male	96.4	<b>Eruption 1994</b>	Yes	8.7
	Female	4.0		No	91.3
<b>Income / month</b>	< USD 110	67.1	<b>Eruption 2006</b>	Yes	55.9
	110 – 220 USD	23.9		No	44.1
	220 – 550 USD	3.4	<b>Type of House</b>	Concrete	79
	550 – 1100 USD	1.9		Wood	21
<b>House Ownership</b>	Own	97			
	Rental	3			

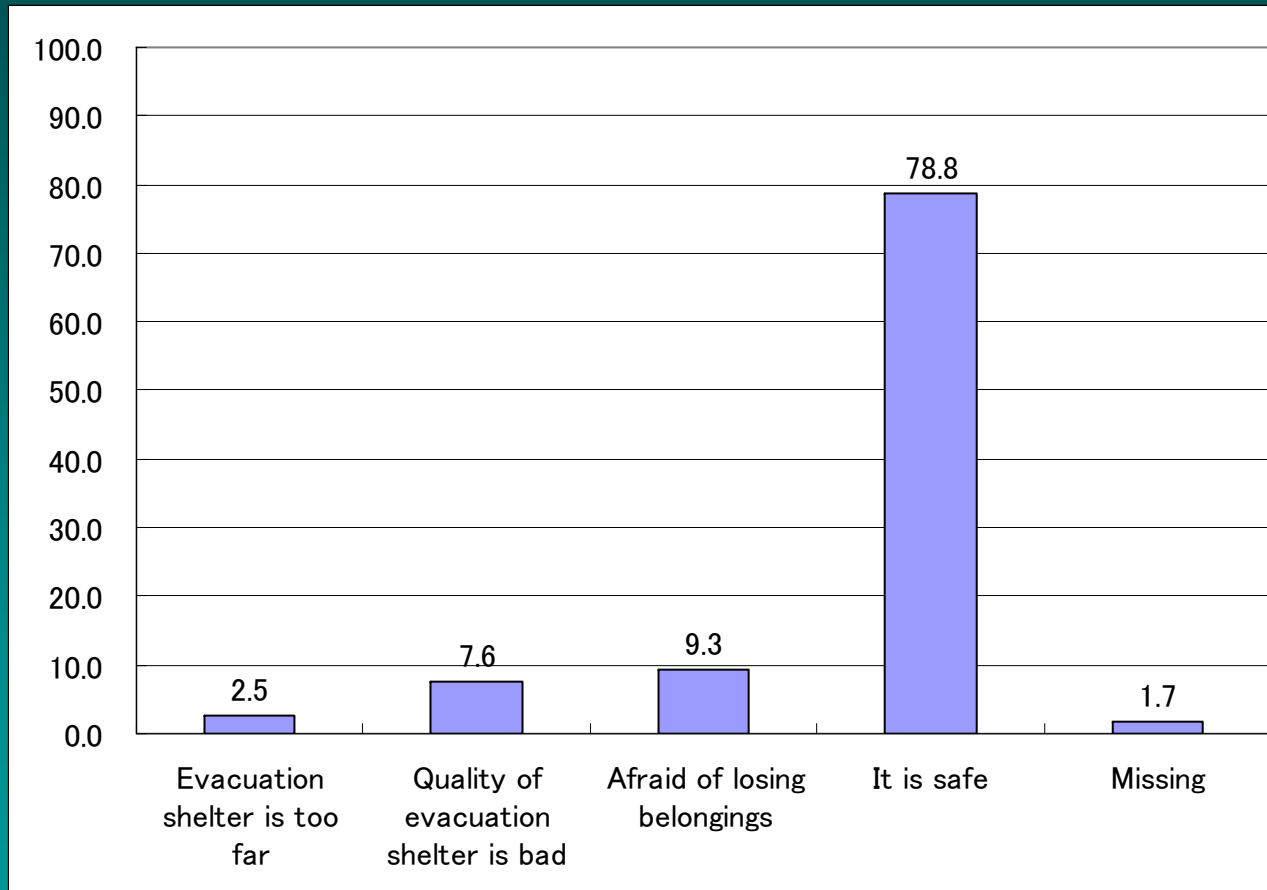
# Why Evacuated?



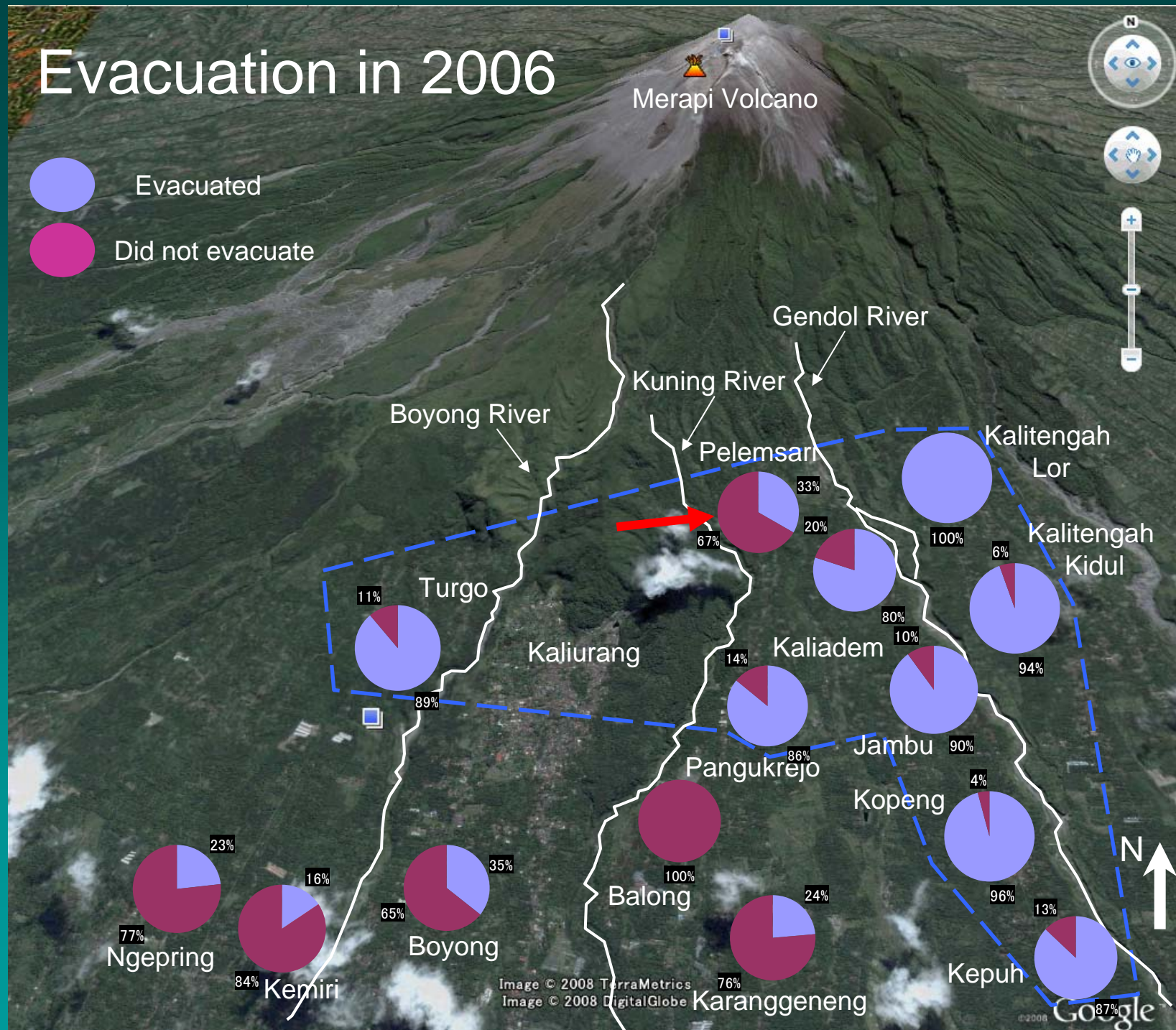
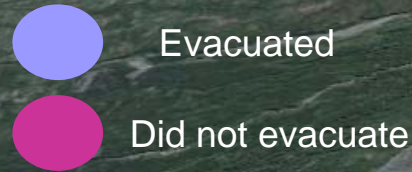
Afraid of Eruption = 62.88%

Asked by the Government = 42.48

# Why Did not Evacuate?



# Evacuation in 2006



# Between Cultural Beliefs and Evacuation

- 21% of the sample (n = 42) holds cultural belief
- Relationship between cultural beliefs and evacuation
  - *No significant relationship between cultural beliefs and those who evacuated ( $X^2 = 0.243$ ;  $P = 0.622$ )*
- Relationship between cultural beliefs and hamlet
  - *No significant relationship between cultural beliefs and locations of the hamlets ( $X^2 = 13.491$ ;  $P = 0.411$ )*
- Relationship between cultural beliefs and age
  - *No significant relationship between cultural beliefs and age of the respondents. ( $X^2 = 3.988$ ;  $P = 0.408$ ); n = 42)*

# Between Socio-Economic Factors and Evacuation

- Income and evacuation (n= 322)
  - *No significant relationship between income and evacuation ( $X^2 = 3.491$ ;  $P = 0.322$ )*
- Household Size and evacuation
  - *No significant relationship between HS and evacuation ( $X^2 = 6.067$ ;  $P = 0.532$ )*



# Between Hazards Related Factors and Evacuation

- Previous disaster experience and evacuation (n = 322)
  - *Significant relationship between disaster experience and evacuation ( $X^2 = 8.409$ ;  $p = 0.004$ )*
- Hazard Proximity and evacuation
  - *Not clear relationship between hazard proximity and evacuation*
  - *Hamlets close to Merapi evacuated and hamlets close to where the lava flew also evacuated.*
  - *Hamlets further from Merapi (except Pelemsari Hamlet) tend not to evacuate*
- Observation to environmental cues
  - *Checking the wind flow, sounds, appearance*

# Conclusion

- **Fear of injury / casualties and asked by the governments are the main reasons to evacuate.**
- **Disaster experience and proximity to disaster turn out to be the main reasons for people to evacuate (Lindell and Perry 2004)**
- **Those who did not evacuate were due to: feeling safe and cultural beliefs**
- **Development of appropriate disaster education (as a replacement of disaster experience) to those who are at high risk but refuse to evacuate.**

QA  
Thank you!

# Hamlets and Percentage of Evacuation

Z	Hamlet	Evac. (%)
3	Turgo Lama	88.9
2	Ngepring	23.3
2	Kemiri	15.6
2	Boyong	35.5
3	Pelemsari	33.3
3	Pangukrejo	85.7
2	Balong	0.0

Z	Hamlet	Evac. (%)
2	Karanggeneng	23.5
3	Kaliadem	80.0
2*	Jambu	90.0
2	Kopeng	95.8
2	Kepuh	87.0
3	Kalitengah Lor	100.0
3	Kalitengah Kidul	94.4