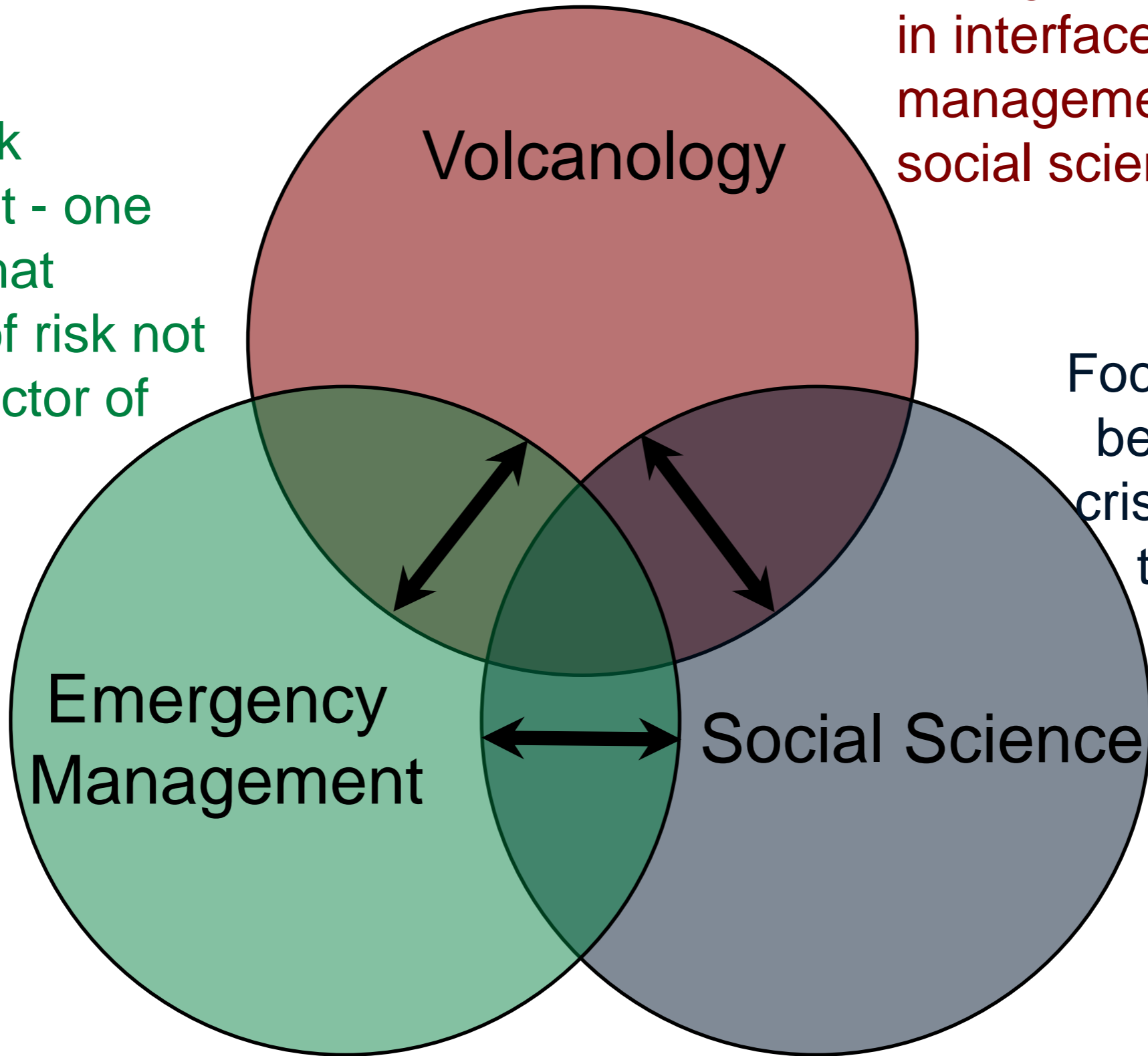


# AXA Master Class

*The role of scientists during periods of volcanic unrest*

Focus on risk management - one problem is that knowledge of risk not a good predictor of behavior



Focus on what happens  
BUT growing interest  
in interfaces with hazard  
management and with  
social scientists

Focus on human  
behavior during  
crises [over long  
term - cultural  
resilience]

# Mount Erebus 1978

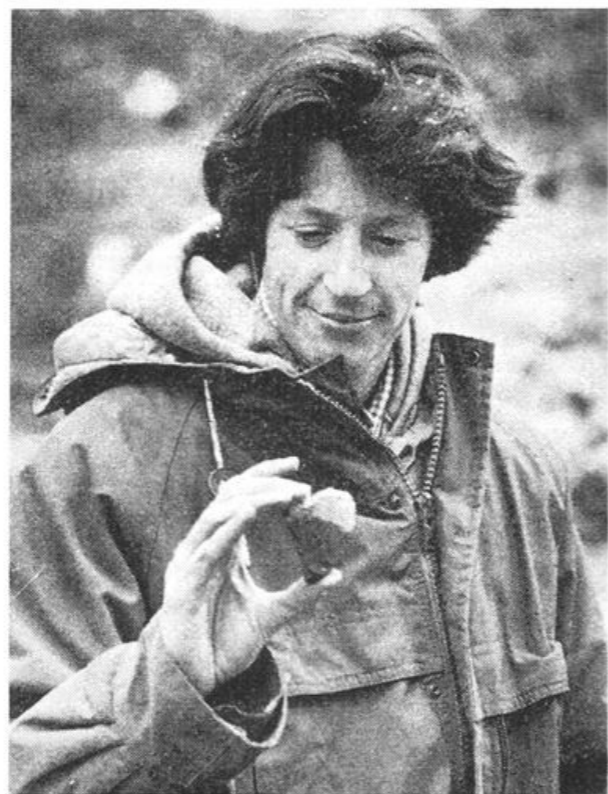


Media veracity?

# Mount St. Helens 1980



People magazine 1982



**Snow sprinkles her hair while Kathy Cashman, an expert in volcanic rocks, examines a freshly erupted fragment.**



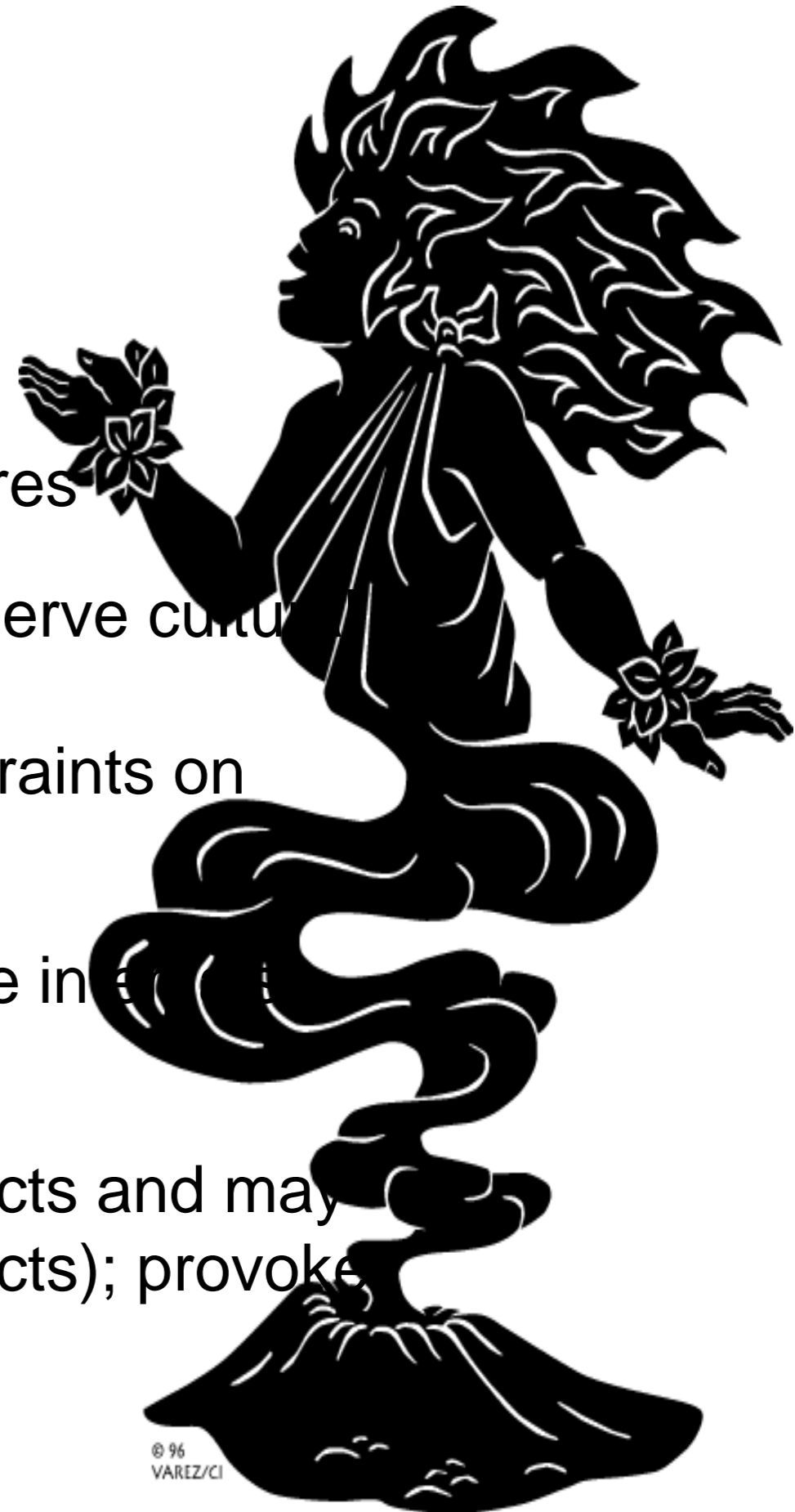
# Scientific Advisory Committee - Montserrat

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# Volcanoes & human history

- Volcanoes are impressive landscape features
- Deposits are well preserved and often preserve cultural artifacts; tephra beds and lava flows act as chronostratigraphic markers; provide constraints on 'time depth' of oral traditions
- Events are unpredictable, have long repose intervals and catastrophic consequences
- Individual eruptions produce range of impacts and may have long durations (both events and impacts); provoke a range of cultural responses



# Modern Challenges

Studies find that knowledge of risk is poor predictor of behavior, where behavioral change is geared toward reduction of vulnerability

- costs outweigh benefits
- trust placed elsewhere



# Modern Challenges

Studies find that knowledge of risk is poor predictor of behavior, where behavioral change is geared toward reduction of vulnerability

- costs outweigh benefits
- trust placed elsewhere

Psychological recovery often takes much longer than physical recovery

- trauma created by natural disasters challenges the world view of individuals and communities
- forces a search for meaning (and often placement of blame/transferral of responsibility)



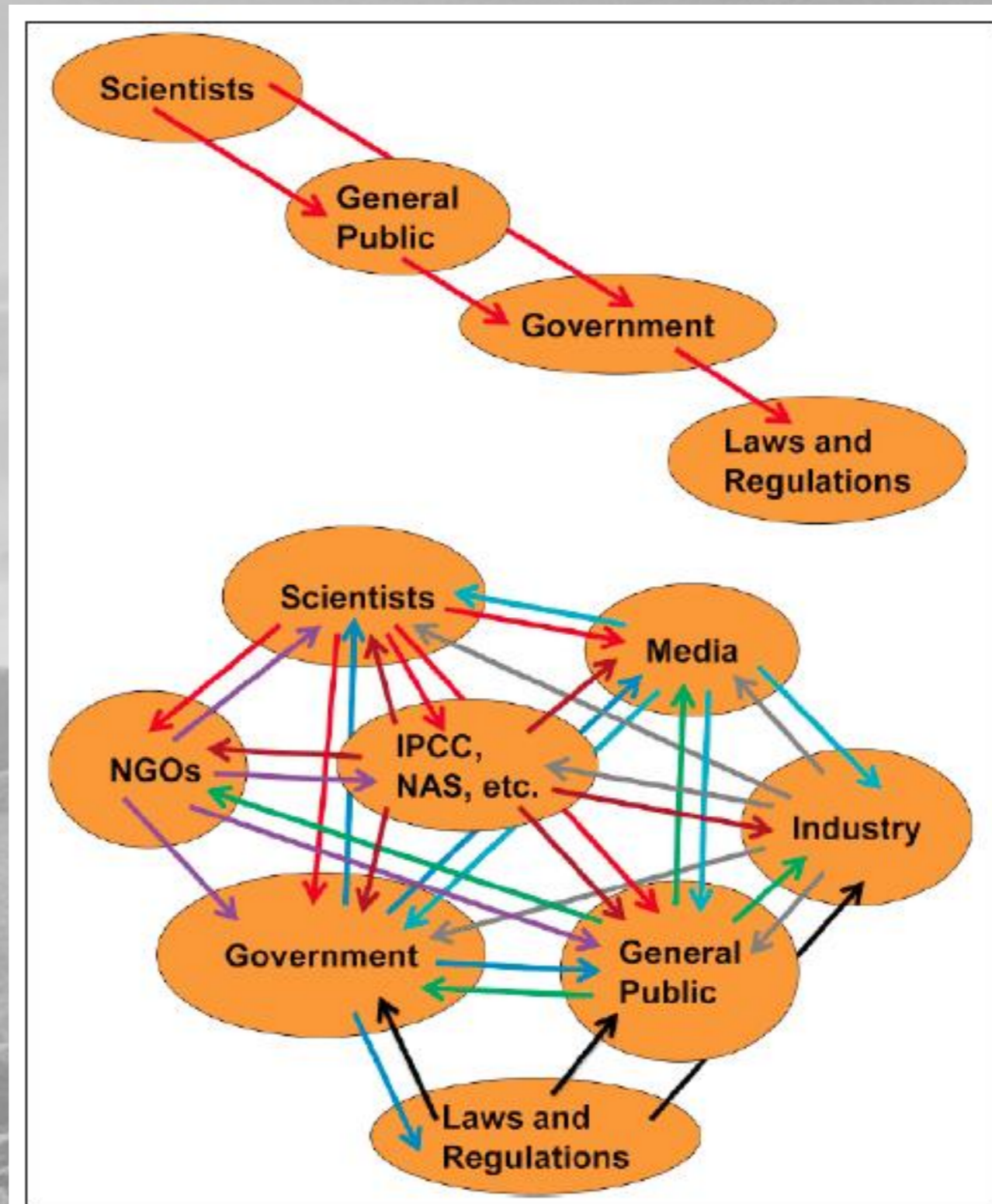


# Topics for discussion

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- What were the precursory events and anticipated outcomes?
- What did the volcano actually do?
- What role did science play in the decision-making?
- How did the scientists communicate with each other? with public officials? with the media?
- What lessons were learned? Have these lessons changed through time?

# Topics for discussion



# Role of uncertainty in decision-making

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“There are known knowns; there are things we know we know. We also know there are known unknowns; that is to say we know there are some things we do not know. But there are also unknown unknowns – there are things we do not know we don't know. ”

[United States Secretary of Defense Donald Rumsfeld](#)

# Assessing risk

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Risk = Hazard (probability) x Vulnerability

Condition of uncertainty (can characterize outcomes but cannot assign probabilities)

Condition of ambiguity (can characterize probabilities but not the outcomes)

Condition of ignorance (neither outcomes nor probabilities can be properly characterized)

*Stirling (2007)*