

“KNOWLEDGE MANAGEMENT”

OR

“IT REALLY DOESN’T MATTER”

THE CHALLENGE

FACING CHINA AFTER THE

MAY 12, 2008

SICHUAN/WENCHUAN EARTHQUAKE

WALTER HAYS

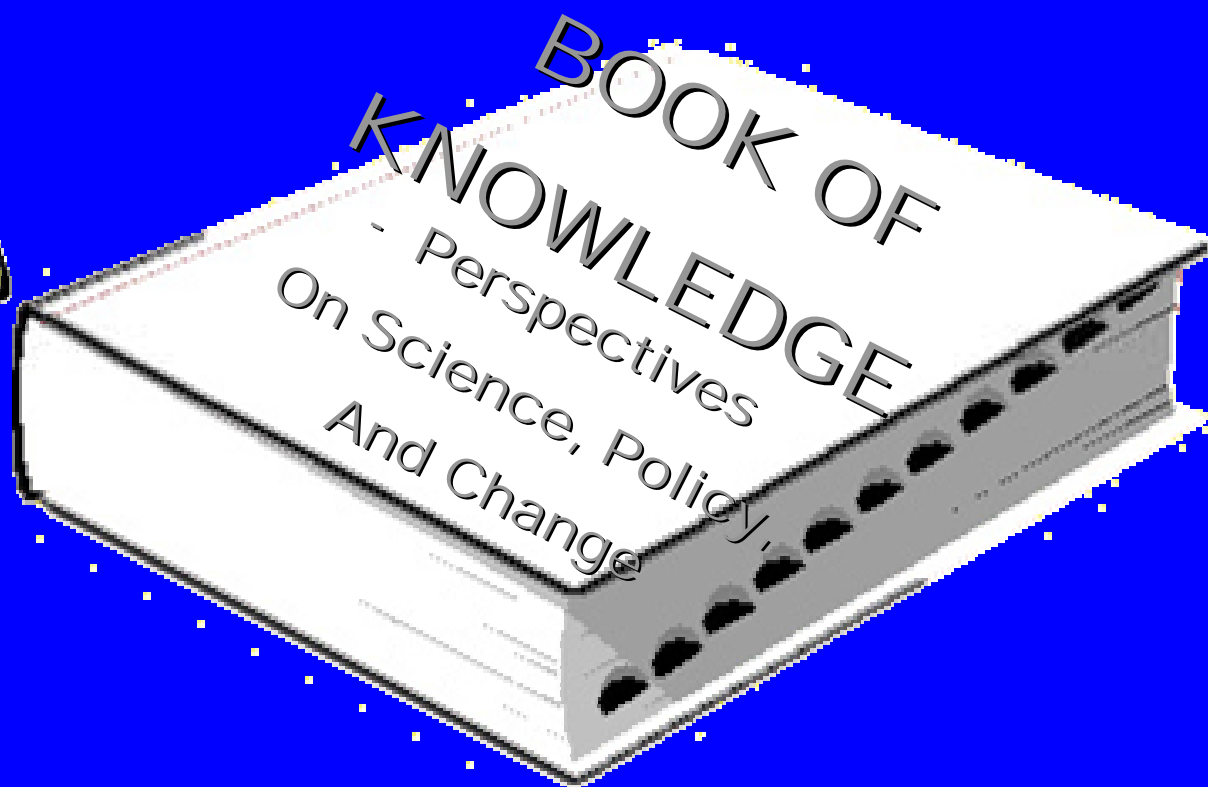
GEORGE MASON UNIVERSITY

PREMIER WEN JIABAO URGES KNOWLEDGE MANAGEMENT DURING RECONSTRUCTION



- WEN JIABAO ISSUED A POLITICAL MANDATE TO CONSTRUCT EARTHQUAKE-RESILIENT BUILDINGS AND TO PROTECT THE ENVIRONMENT.

商人秦刚表示，截至13日下午，尚未收到有外国人在地震灾区住



**SEISMIC ZONATION IS
KNOWLEDGE MANAGEMENT**

**CHINA IS NOT THE ONLY
NATION THAT HAS RECEIVED A
POLITICAL MANDATE FOR
KNOWLEDGE MANAGEMENT
DURING RECONSTRUCTION**

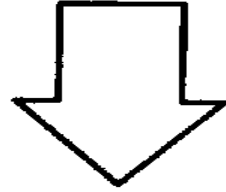
SEISMIC ZONATION ON A GLOBAL SCALE

**CAN ALL NATIONS USE TECHNOLOGY
TO IMPROVE THEIR
GLOBAL KNOWLEDGE MANAGEMENT
SIMULTANEOUSLY WITH
RECONSTRUCTION IN THE
SICHUAN PROVINCE, CHINA?**

KNOWLEDGE MANAGEMENT IS SEISMIC ZONATION

**SEISMIC ZONATION ADVANCES
BEST PRACTICES BECAUSE IT
USES THE SIX PRINCIPLES OF
SUSTAINABILITY**

TECHNICAL



SOCIAL

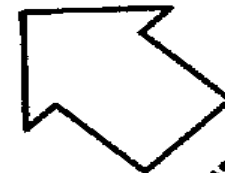


ADMINISTRATIVE



**NATURAL
DISASTER
REDUCTION**

POLITICAL

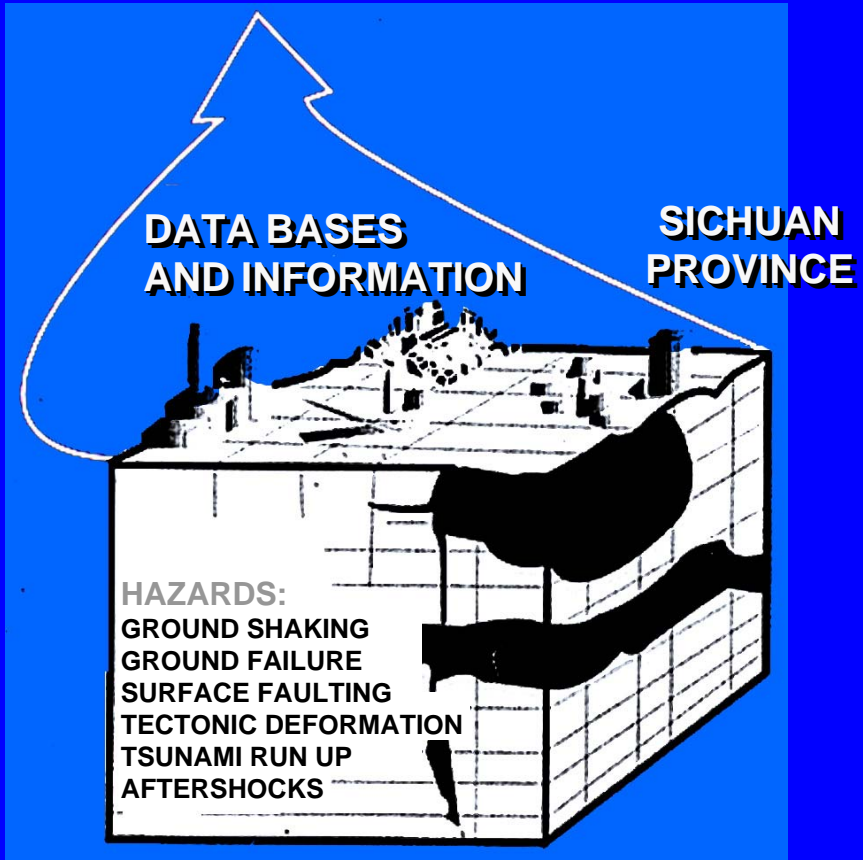
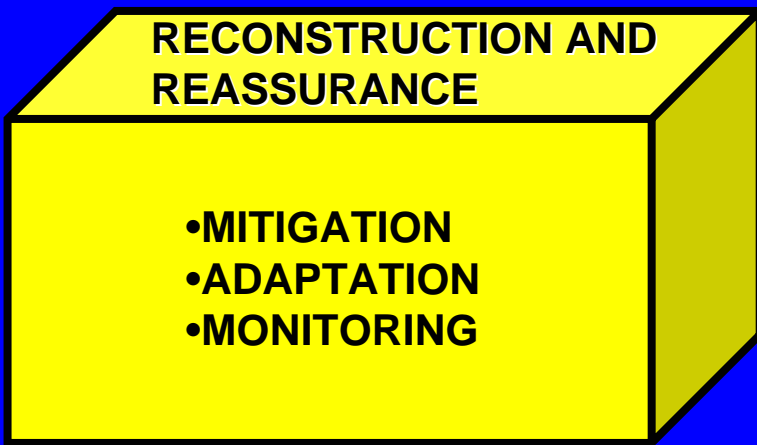
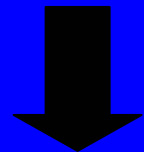
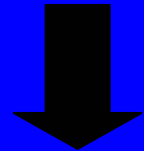
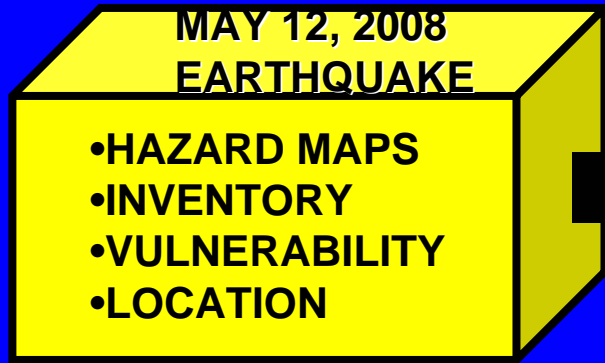


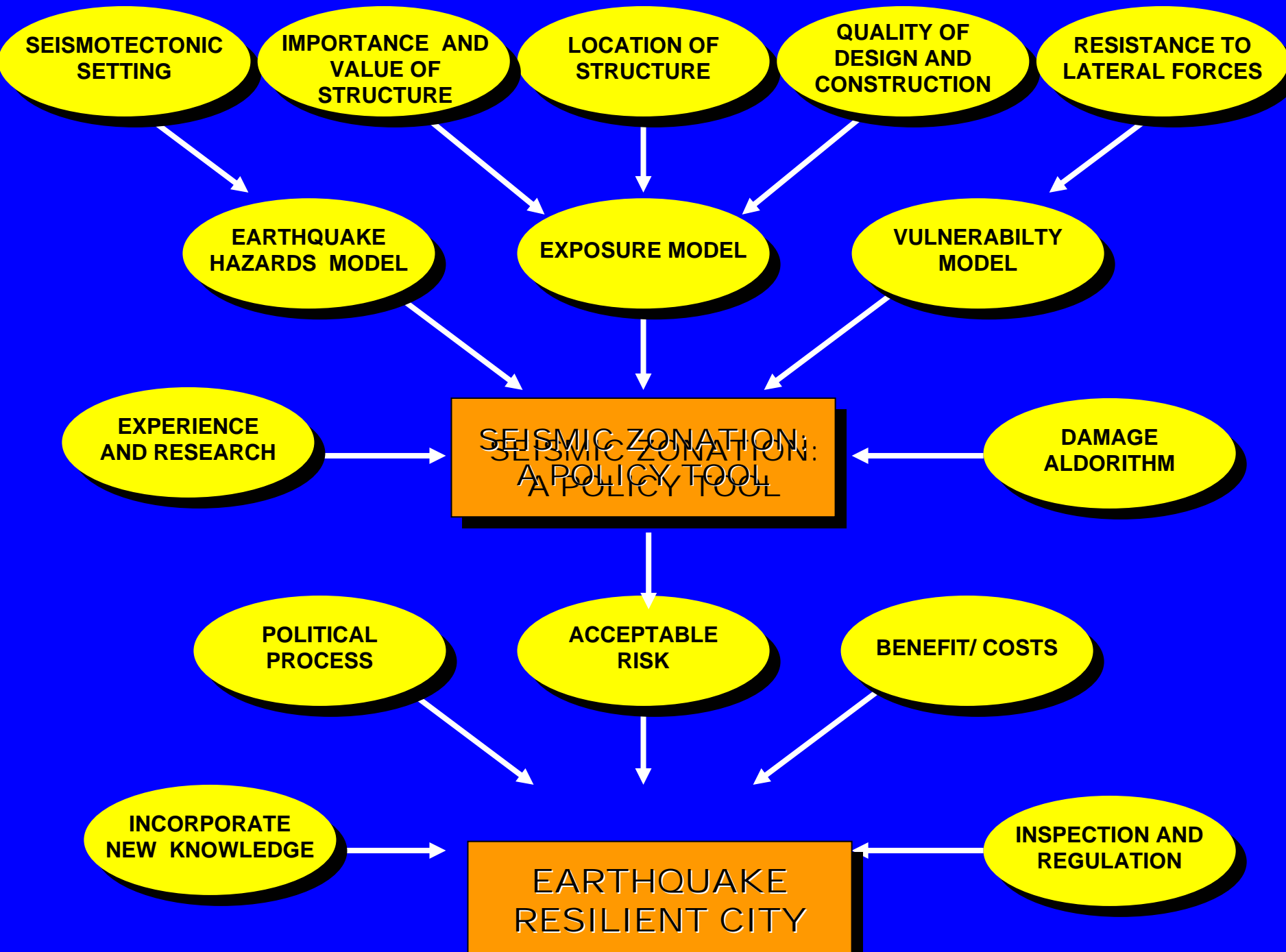
LEGAL

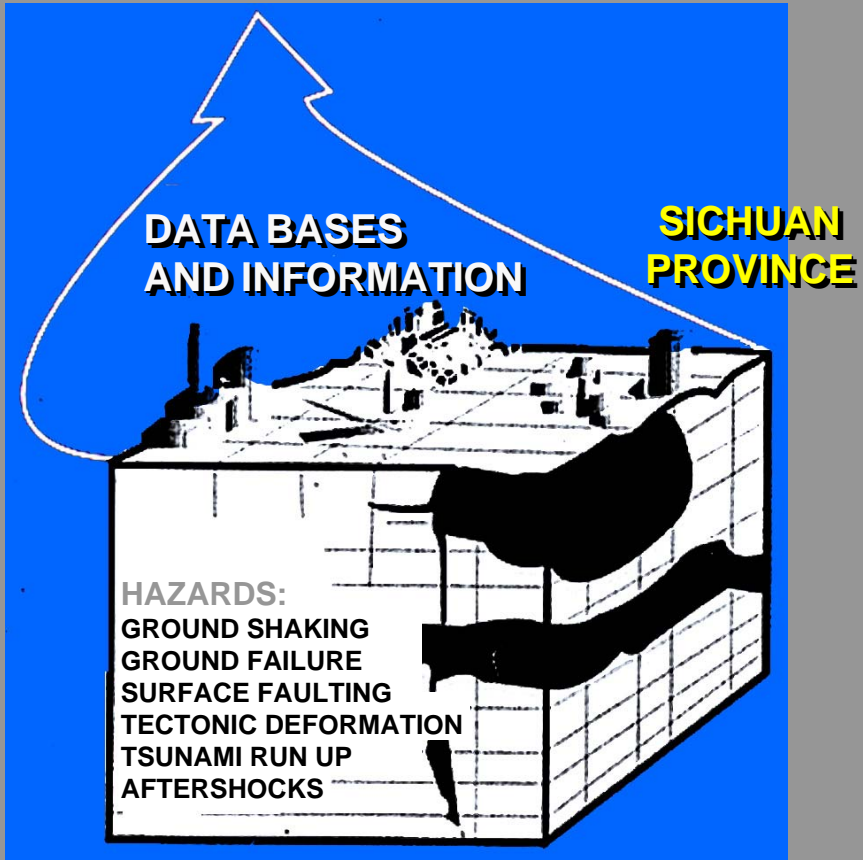
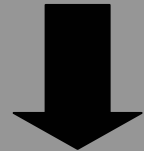
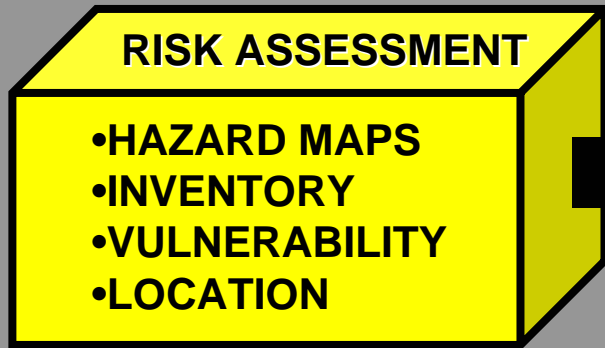


ECONOMIC







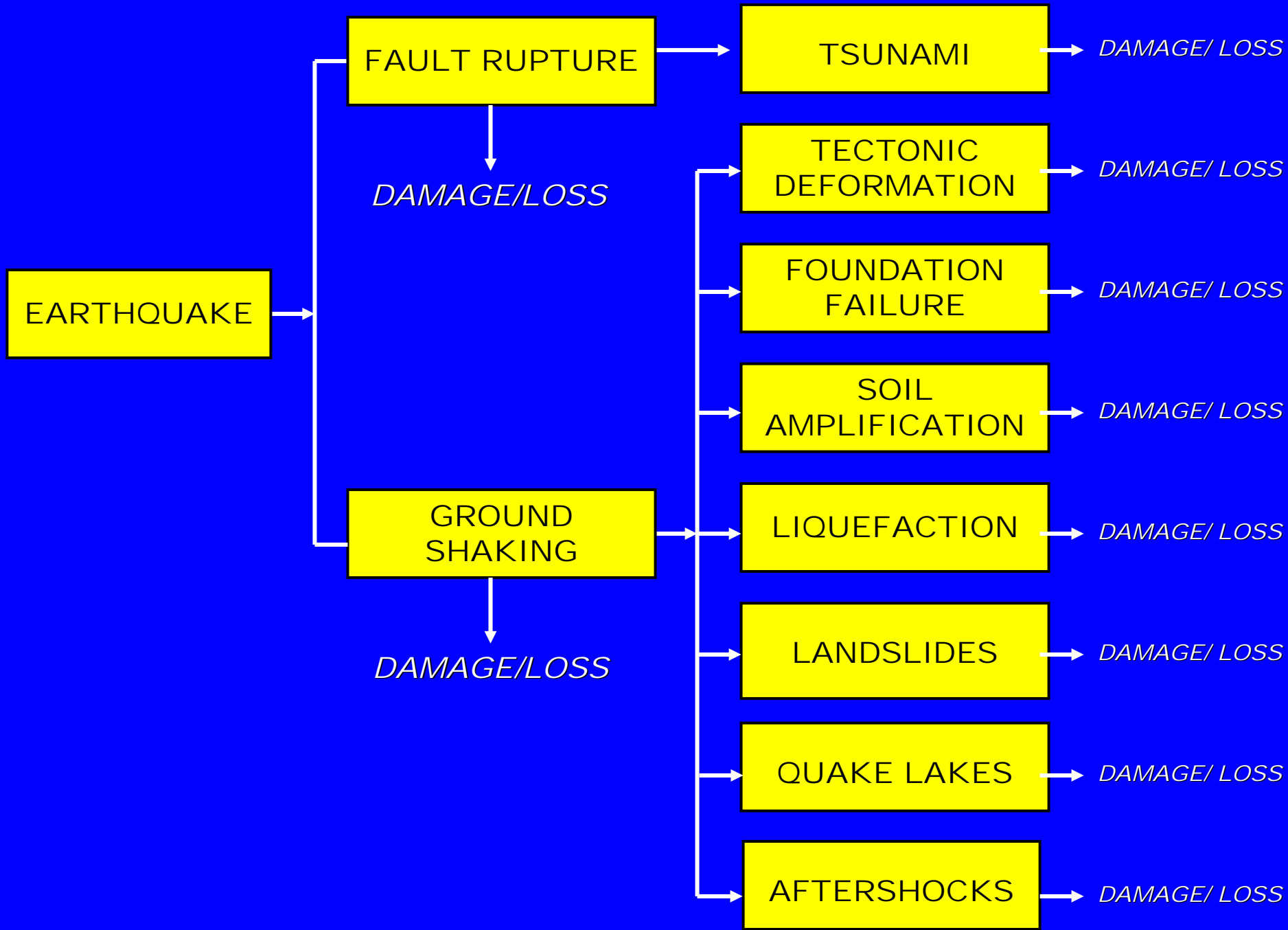


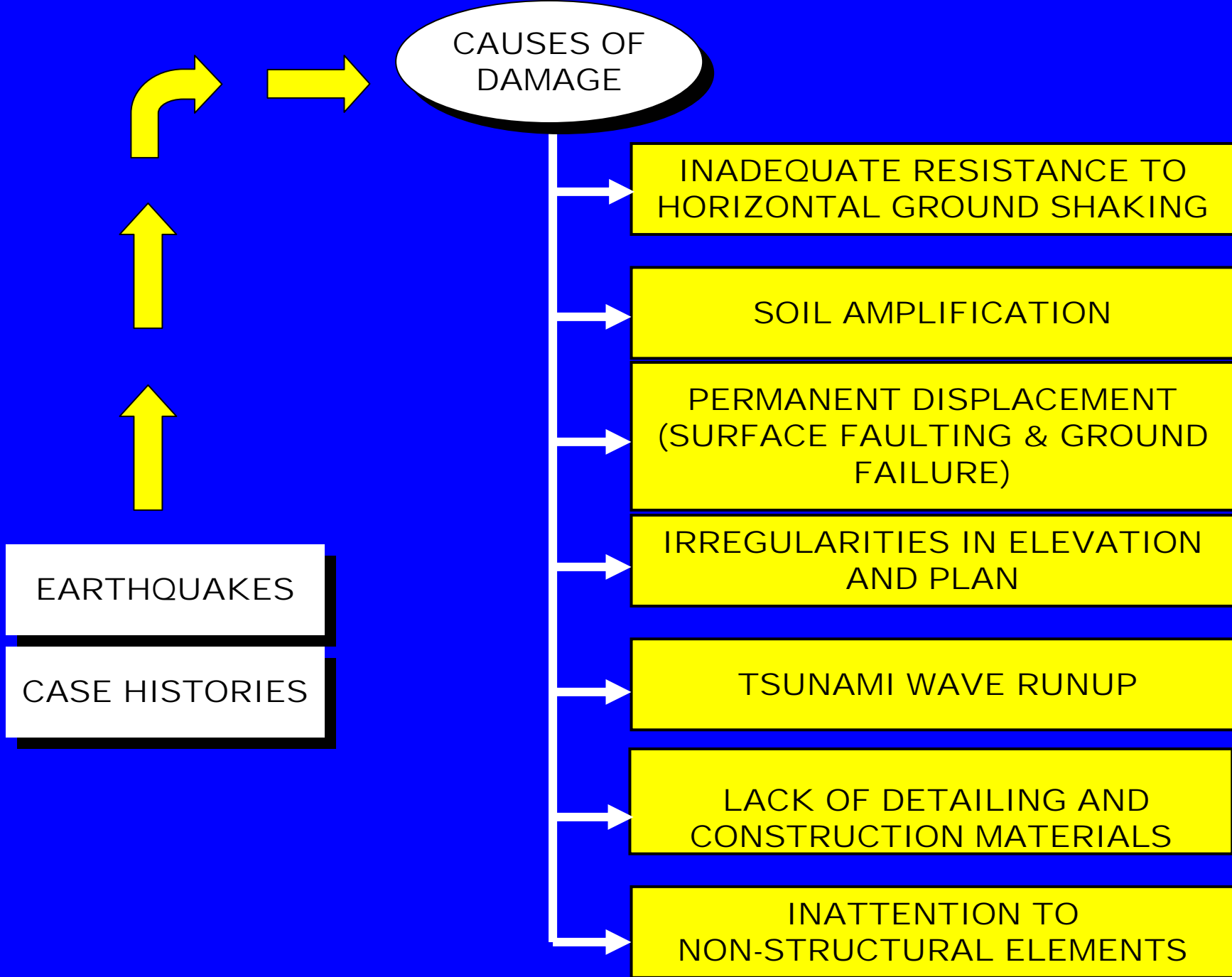
SEISMIC ZONATION PROVIDES

A POLICY TOOL

FOR RECONSTRUCTION IN THE

SICHUAN PROVINCE





CAUSES OF DAMAGE

EARTHQUAKES
CASE HISTORIES

INADEQUATE RESISTANCE TO HORIZONTAL GROUND SHAKING

SOIL AMPLIFICATION

PERMANENT DISPLACEMENT (SURFACE FAULTING & GROUND FAILURE)

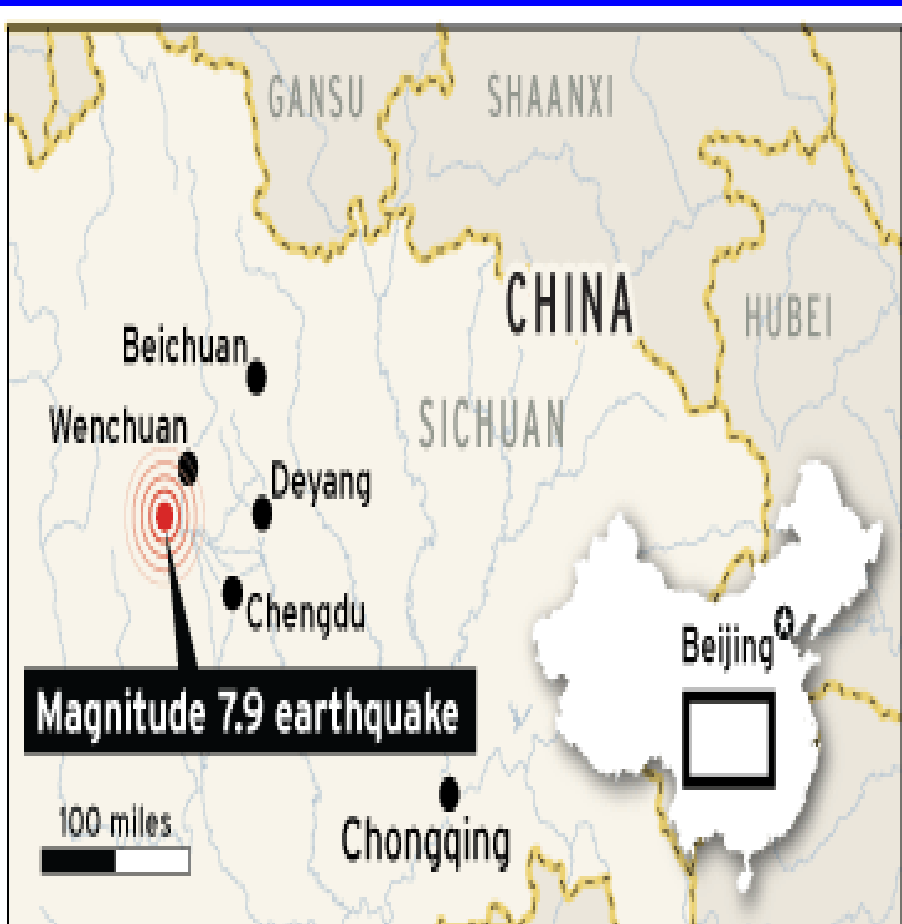
IRREGULARITIES IN ELEVATION AND PLAN

TSUNAMI WAVE RUNUP

LACK OF DETAILING AND CONSTRUCTION MATERIALS

INATTENTION TO NON-STRUCTURAL ELEMENTS

SEISMIC ZONATION WILL START WITH KNOWN ACTIVE FAULT ZONES

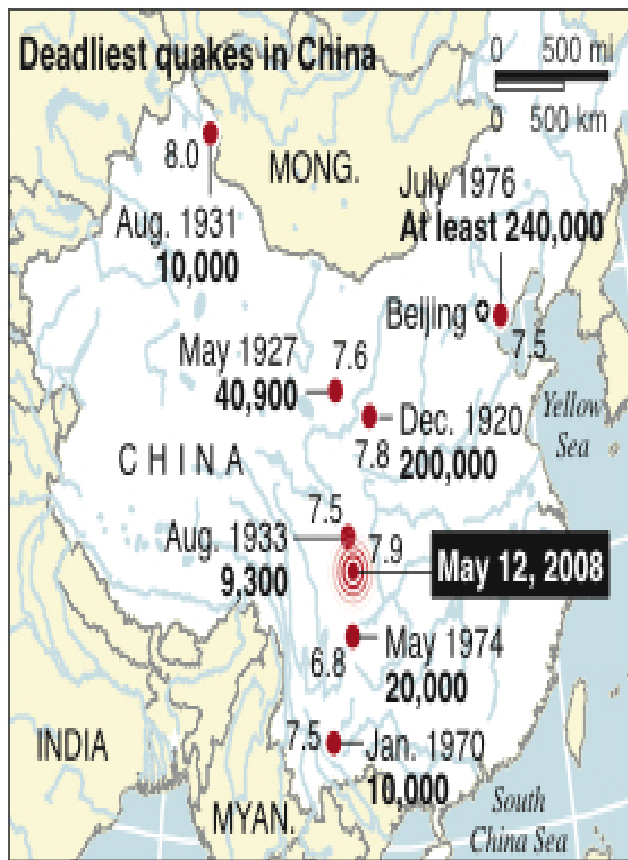


- **LONGMENSHAN FAULT ZONE**
- **A ZONE OF BLIND THRUST FAULTS**
- **SEISMICITY ASSOCIATED WITH THESE FAULT ZONES**

SEISMIC ZONATION WILL USE KNOWLEDGE FROM PAST EARTHQUAKES

China quake toll climbs

Monday's earthquake was the deadliest since one in 1976 near Beijing that killed at least 240,000 people, the most devastating in modern history.



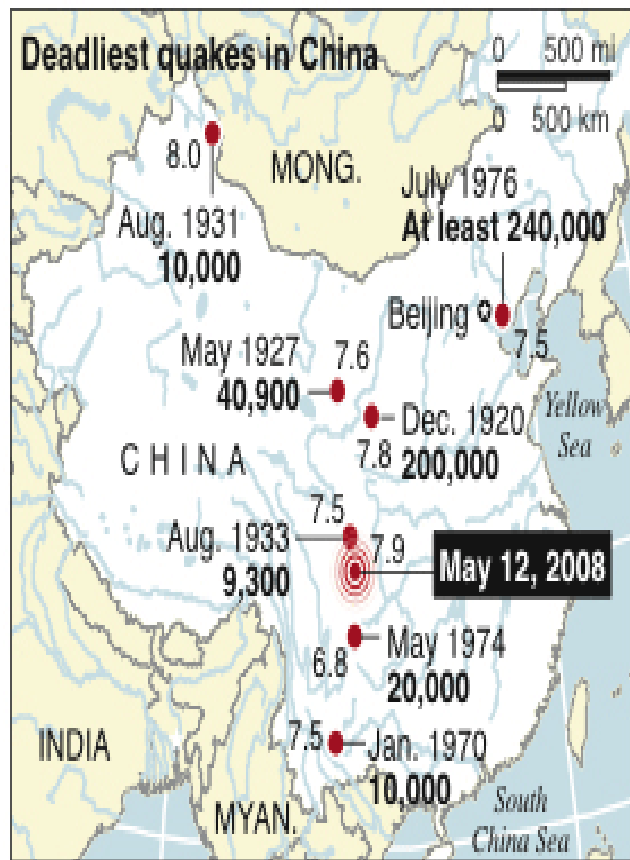
- **DECEMBER 1920**
- **MAY 1927**
- **AUGUST 1931**
- **AUGUST 1933**
- **JANUARY 1970**
- **MAY 1974**
- **JULY 1976**

SEISMIC ZONATION WILL USE KNOWLEDGE FROM PAST EARTHQUAKES

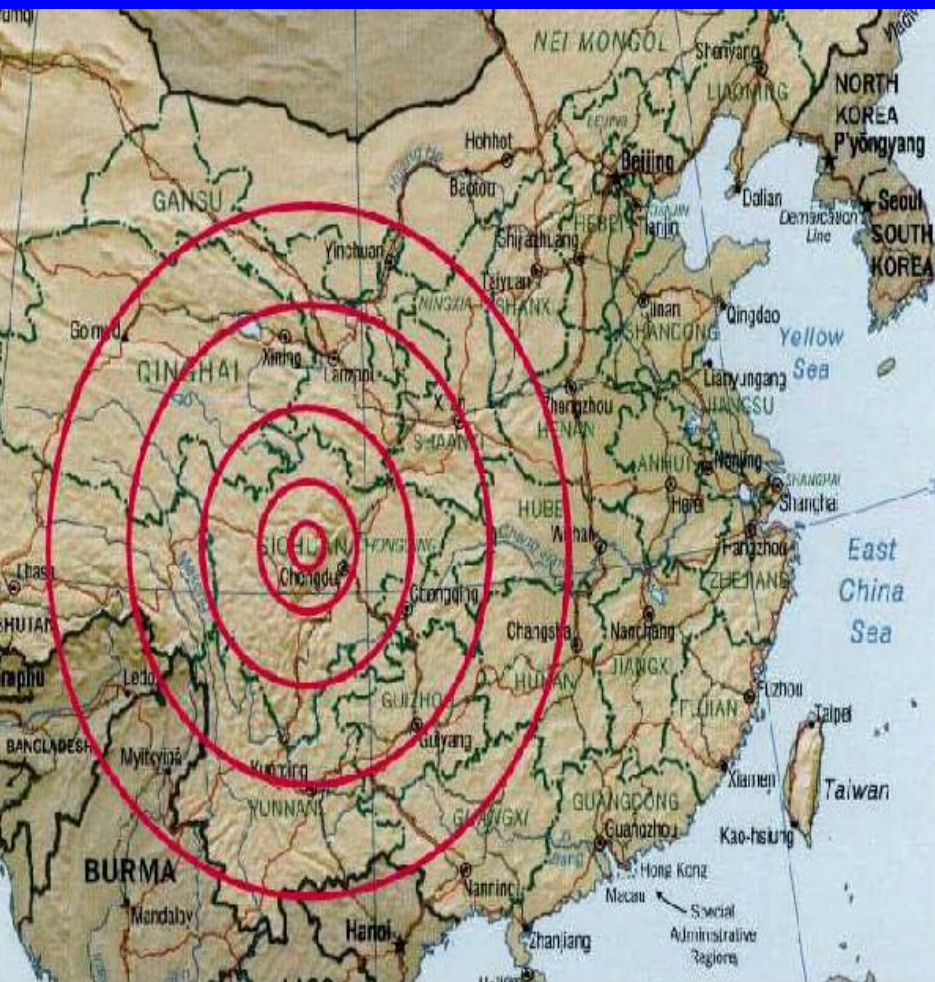
- **MAY 12, 2008**

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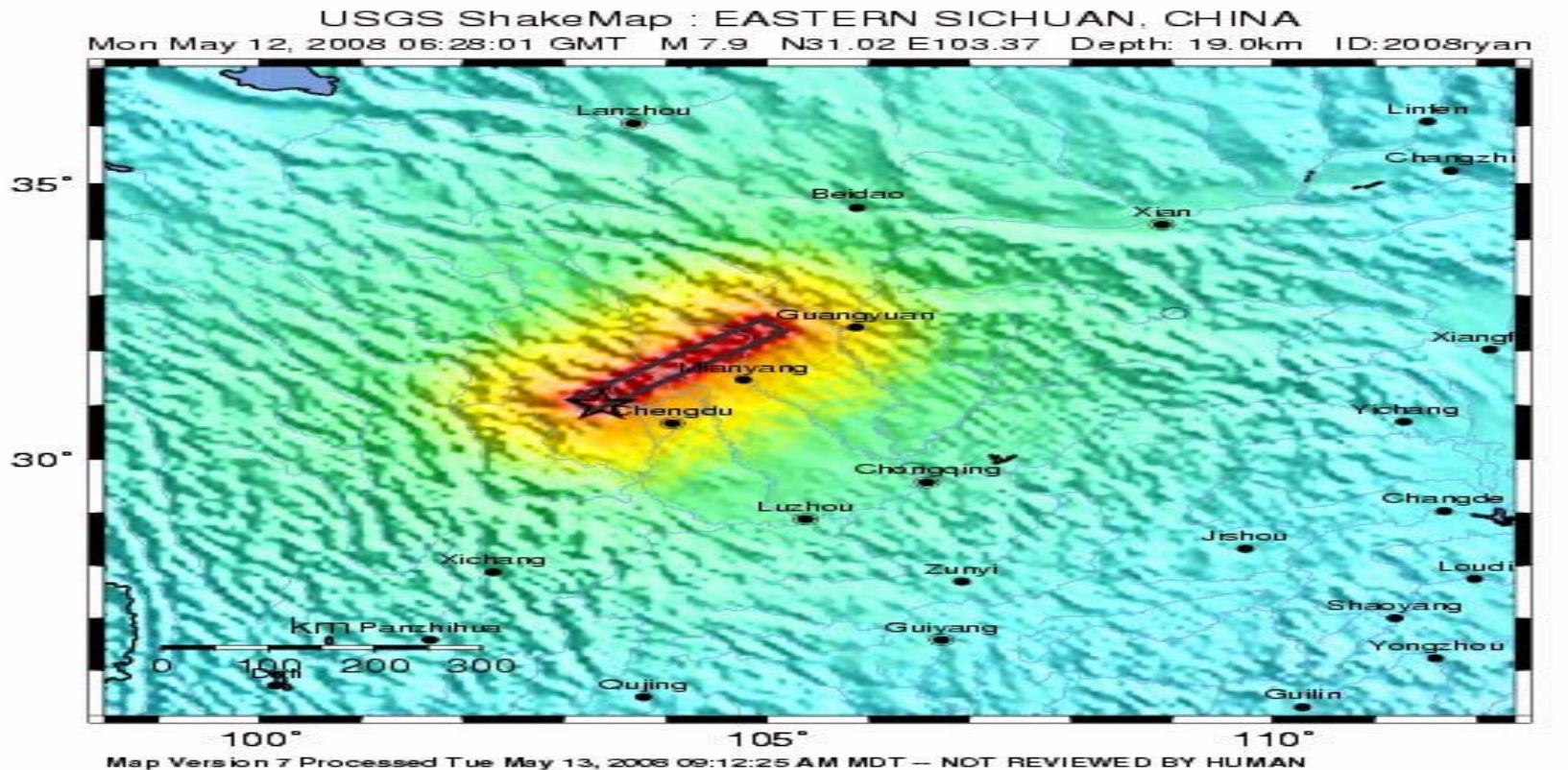


SEISMIC ZONATION WILL USE SPECIFIC KNOWLEDGE FROM WENCHUAN EARTHQUAKE



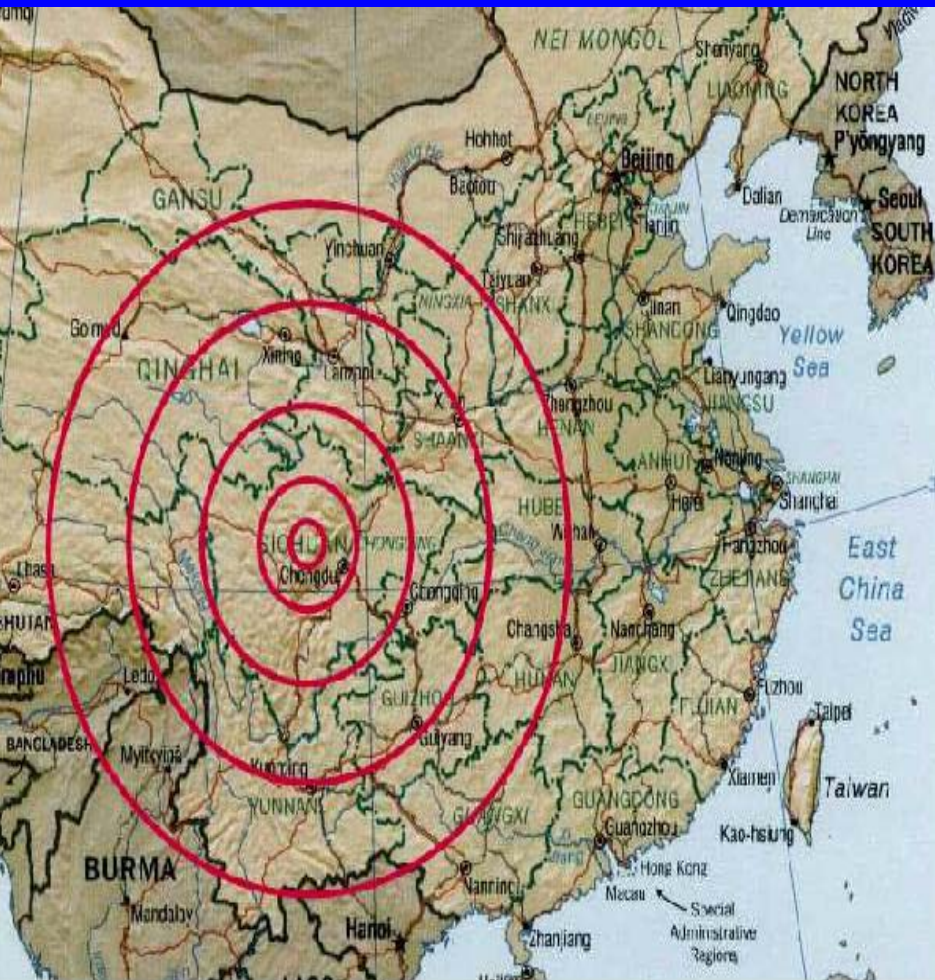
- **A 200-KM-FAULT RUPTURE WITH 5-M SLIP**
- **120 SECONDS OF GROUND SHAKING**
- **POSSIBLE “KILLER PULSE”**

LONGMENSHAN FAULT: SHAKE MAP



PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<.17	.17-1.4	1.4-3.9	3.9-9.2	9.2-18	18-34	34-65	65-124	>124
PEAK VEL.(cm/s)	<0.1	0.1-1.1	1.1-3.4	3.4-8.1	8.1-16	16-31	31-60	60-116	>116
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

SEISMIC ZONATION WILL USE SPECIFIC KNOWLEDGE FROM WENCHUAN EARTHQUAKE



- **OVER 25 MILLION BUILDINGS (INCLUDING SCHOOLS) NEEDING RE-CONSTRUCTION OR REPAIR**

THE LONGMENSHAN FAULT SYSTEM MARKS A MAJOR COLLISION ZONE



- **ALTHOUGH THE REGION WILL LIKELY BE SEISMICALLY QUIET FOR A FEW DECADES, THE MOUNTAINS ARE EVIDENCE OF ONGOING TECTONIC ACTIVITY**

THE LONGMENSHAN FAULT SYSTEM MARKS A MAJOR COLLISION ZONE



- ON MAY 12, STRESS WAS TRANSFERRED TO SEISMICALLY ACTIVE THRUST FAULTS NEAR **CHENGDU**, THE CAPITOL.

SEISMIC ZONATION WILL IDENTIFY ZONES OF LIKELY STRONG GROUND SHAKING



- PROXIMITY TO THE FAULT
- SHALLOW FOCUS
- LONG DURATION OF SHAKING
- SOIL AMPLIFICATION

SEISMIC ZONATION WILL IDENTIFY ZONES OF LIKELY GROUND FAILURE



- **LANDSLIDES IN
BEICHUAN
AREA**
- **EXTENSIVE
LANDSLIDES IN
EPICENTRAL
REGION**

SEISMIC ZONATION WILL IDENTIFY LOCATIONS OF LIKELY “QUAKE LAKES”



- ONE OF 69 “QUAKE LAKES”

SEISMIC ZONATION WILL IDENTIFY ZONES OF LIKELY FLOODING FROM QUAKE LAKES



- **BEI HE RIVER**
- **OTHER RIVERS**

**CHINA IS NOT THE ONLY
NATION THAT HAS RECEIVED A
POLITICAL MANDATE FOR
KNOWLEDGE MANAGEMENT
DURING RECONSTRUCTION**

SOLOMON ISLANDS: 2007



ICA, PERU; 2007



ISLAMABAD, PAKISTAN; 2005



Quake Waves Hit African Coast



BAM, IRAN; 2003



ERZICAN, TURKEY; 1992



KOACELI, TURKEY; 1999



KOBE, JAPAN; 1995

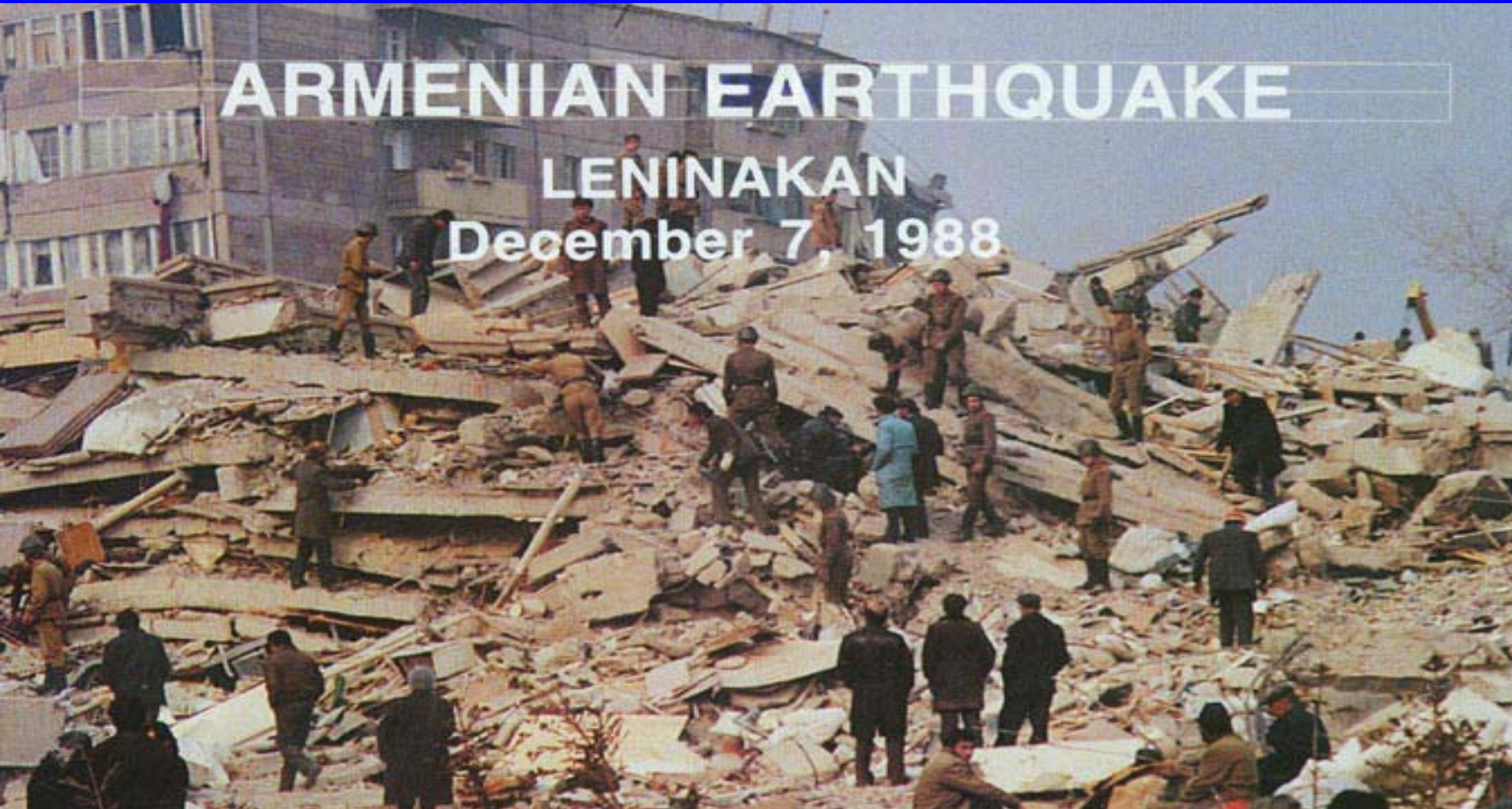


SPITAK, ARMENIA; 1988

ARMENIAN EARTHQUAKE

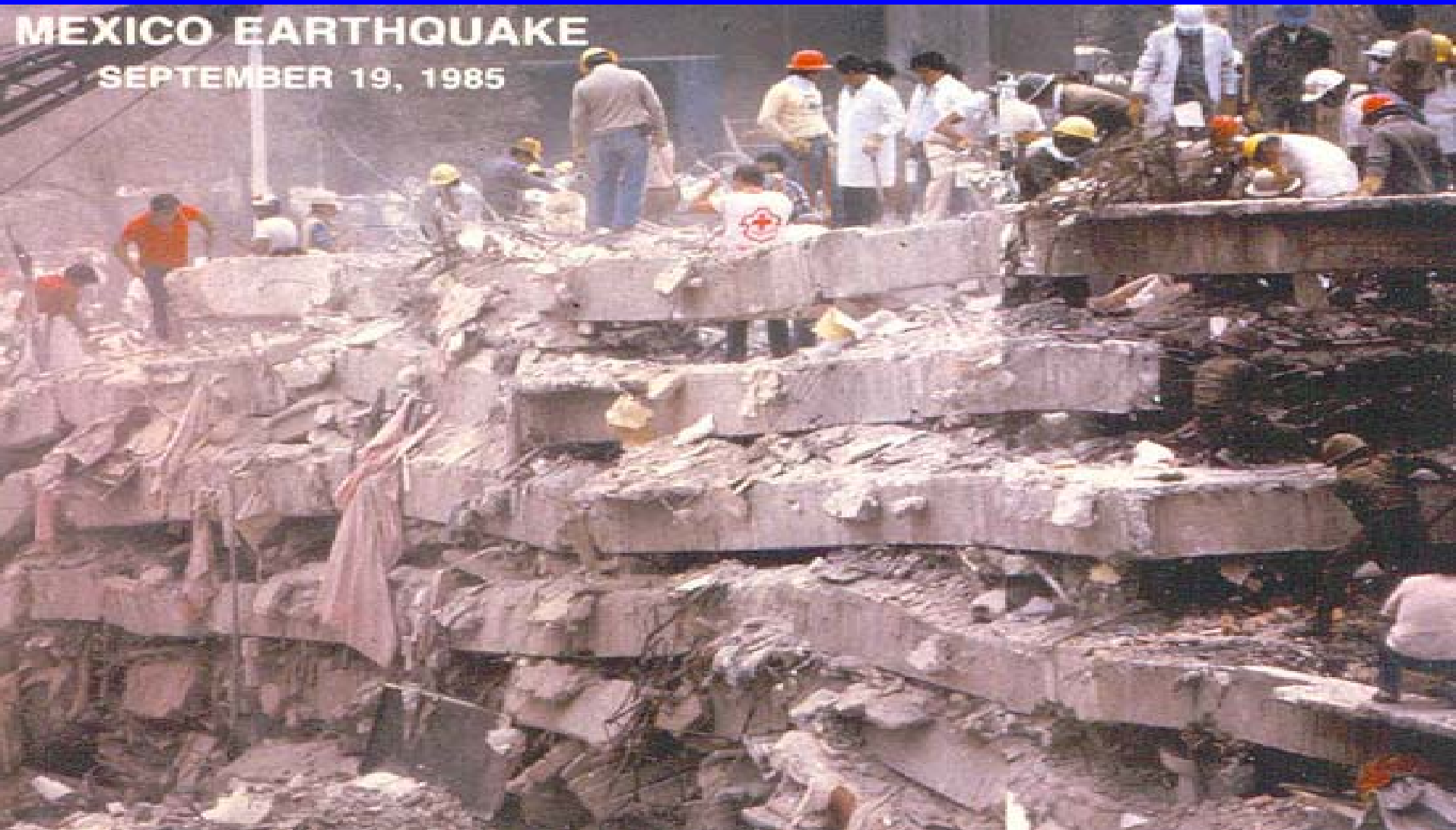
LENINAKAN

December 7, 1988



MEXICO, 1985

MEXICO EARTHQUAKE
SEPTEMBER 19, 1985



MEXICO, 1985



TANGSHAN, CHINA; 1976



NIIGATA, JAPAN; 1964

NIIGATA, JAPAN EARTHQUAKE

1964



From K. V. Stemmerud

KANTO-TOKYO, 1923



SAN FRANCISCO, 1906

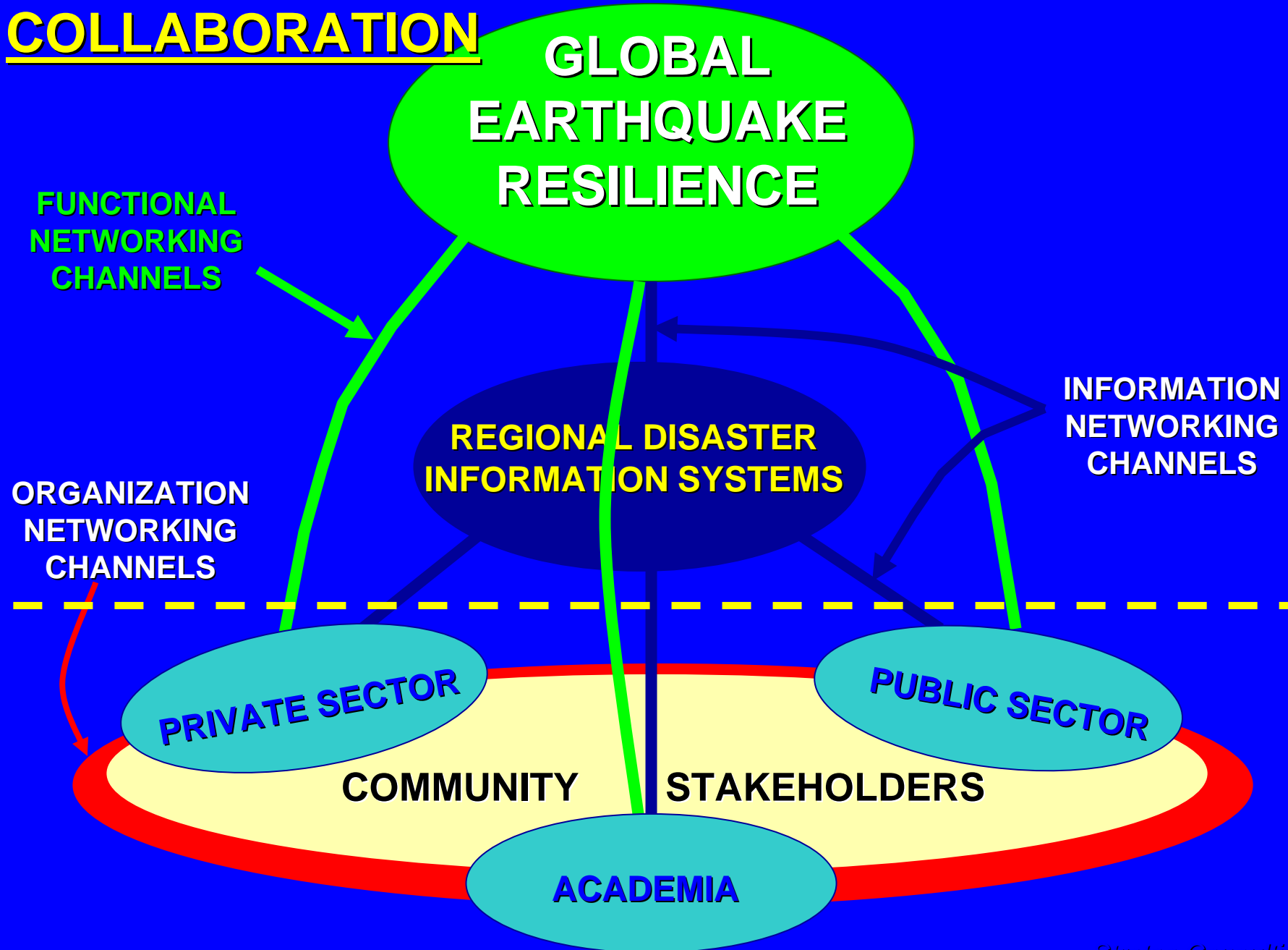


SEISMIC ZONATION ON A GLOBAL SCALE

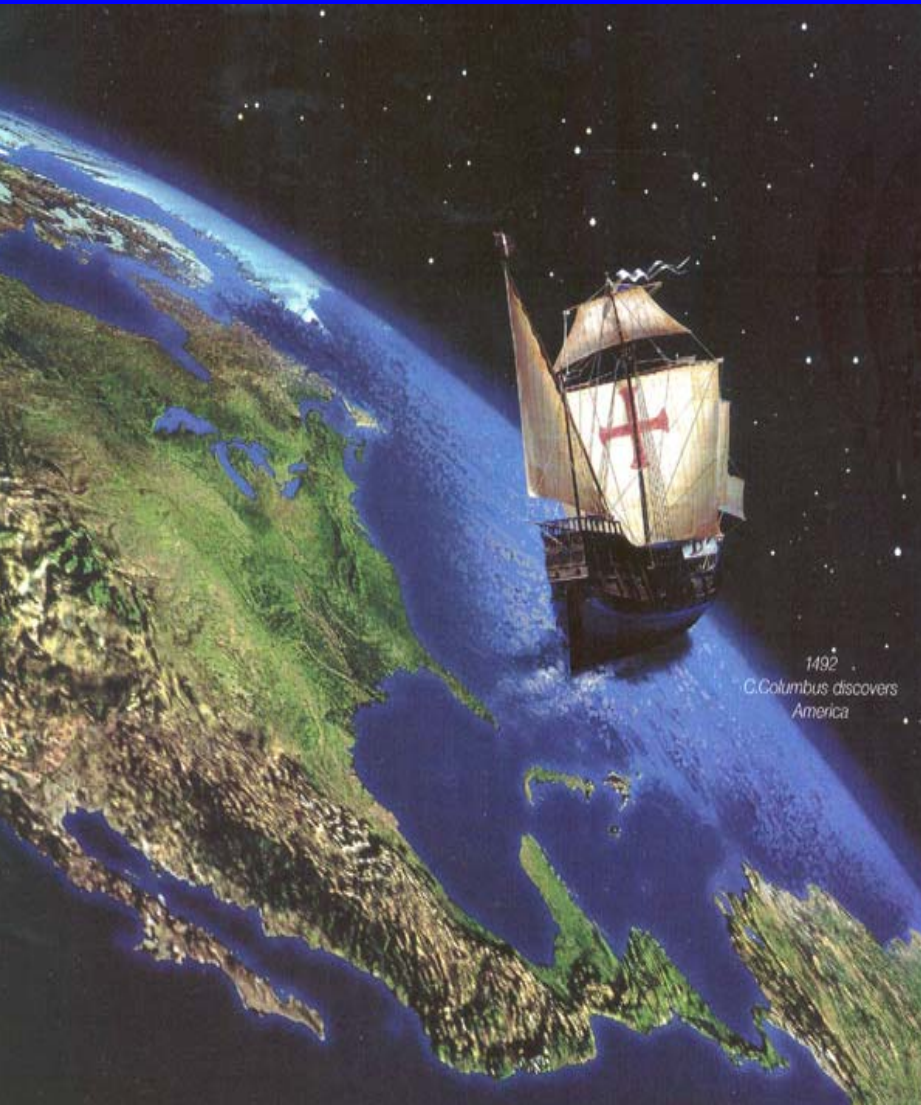
**CREATE AND IMPLEMENT
GLOBAL KNOWLEDGE MANAGEMENT
SIMULTANEOUSLY WITH
RECONSTRUCTION IN THE
SICHUAN PROVINCE, CHINA**

**COLLABORATION AND
TECHNOLOGY TRANSFER
WILL INCREASE GLOBAL
CAPACITY FOR LIVING WITH
RISK**

COLLABORATION



IT CAN BE DONE!



- GLOBAL TECHNOLOGY TRANSFER
- REGIONAL INFORMATION SYSTEMS

ELEMENTS OF SUCCESS

LEADERS WITH A VISION OF SUSTAINABLE DEVELOPMENT AND A COMMITMENT TO LONG-TERM REGIONAL AND GLOBAL COLLABORATION.

IT CAN BE DONE!



- **IMPLEMENTATION OF EXISTING AND EMERGING TECHNOLOGIES**

ELEMENTS OF SUCCESS

**PROFESSIONALS WHO
WILL TRANSFER OWNERSHIP
OF EXISTING KNOWLEDGE,
EXISTING TECHNOLOGY, AND
BEST PRACTICES.**

IT CAN BE DONE!



1492
C.Columbus discovers
America

- GLOBAL EARTHQUAKE RESILIENCE
- REGIONAL EARTHQUAKE RESILIENCE

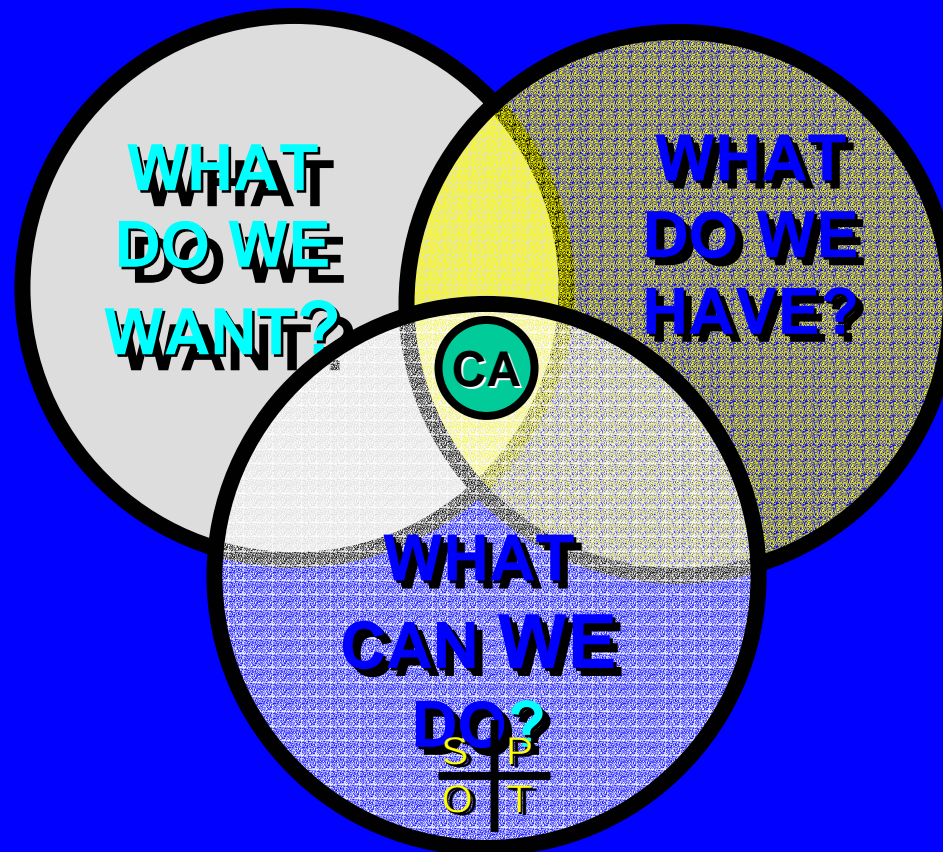
IT CAN BE DONE!



- **REGIONAL SUSTAINABLE DEVELOPMENT**
- **URBAN SUSTAINABLE DEVELOPMENT**

STRATEGIC PLANNING ENHANCES COLLABORATION

W³ MODEL FOR STRATEGIC PLANNING



ELEMENTS OF SUCCESS

- **3) PROFESSIONALS ABLE TO THINK STRATEGICALLY AND BUILD TECHNICAL AND POLITICAL CAPACITY FOR REDUCING PHYSICAL, SOCIAL, AND ENTERPRISE VULNERABILITIES**

TECHNOLOGIES FOR REDUCING URBAN VULNERABILITIES

- **MONITORING TECHNOLOGIES (E.G., GLOBAL EARTH OBSERVING SYSTEM)**
- **SATELITES AND REMOTE SENSING TECHNOLOGY**
- **INFORMATION TECHNOLOGY (E.G., COMPUTERS, GIS)**

TECHNOLOGIES FOR REDUCING URBAN VULNERABILITIES

- TECHNOLOGY FOR HAZARD ASSESSMENT
- TECHNOLOGY FOR ASSESSING PHYSICAL VULNERABILITIES
- TECHNOLOGY FOR RISK ASSESSMENT

TECHNOLOGIES FOR REDUCING URBAN VULNERABILITIES

- **DATABASES FOR EXPERT SYSTEMS**
- **CASE HISTORIES**
- **BEST PRACTICES**

TECHNOLOGIES FOR REDUCING URBAN VULNERABILITIES

- ADVANCED MATERIALS**
- AUTOMATED CONSTRUCTION TECHNIQUES**
- COMPUTER-AIDED DESIGN**
- ACTIVE AND PASSIVE ENERGY DISSIPATION DEVICES**
- PERFORMANCE BASED DESIGN**

IT CAN BE DONE!



- **TOWARDS
INCREASED
DISASTER
RESILIENCE IN
EVERY
COMMUNITY
AND REGION OF
THE WORLD**

CREATING GLOBAL TURNING POINTS FOR EARTHQUAKE SUSTAINABILITY

- **INTEGRATION OF SCIENTIFIC AND
TECHNICAL SOLUTIONS**
- **CREATING EQUITY AS ALL SECTORS
CONTRIBUTE TO IMPLEMENTATION**

GOALS FOR BUILDING A CULTURE OF EARTHQUAKE RESILIENCE

**ESSENTIAL
TURNING
POINTS**

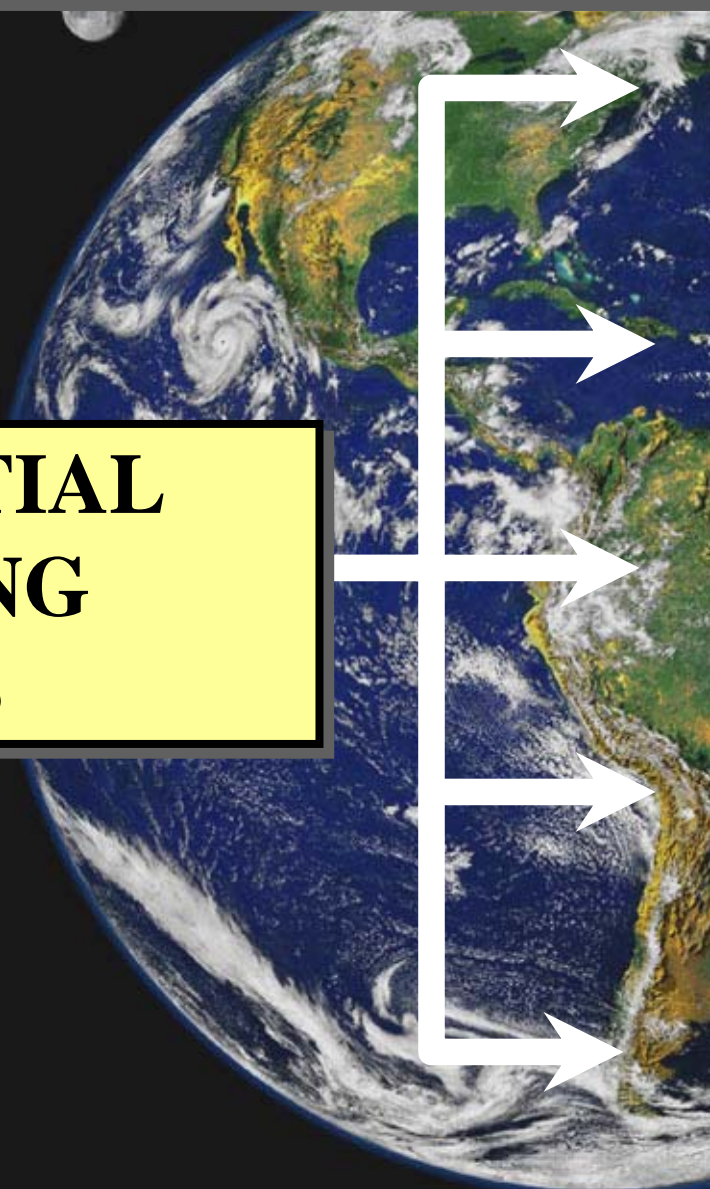
EDUCATION

**FROM IGNORANT TO
ENLIGHTENED**

**FROM APATHY TO
EMPOWERED**

**FROM BOUNDARIES
TO SEAMLESS**

**FROM LACK OF
POLITICAL WILL TO
ENABLED**

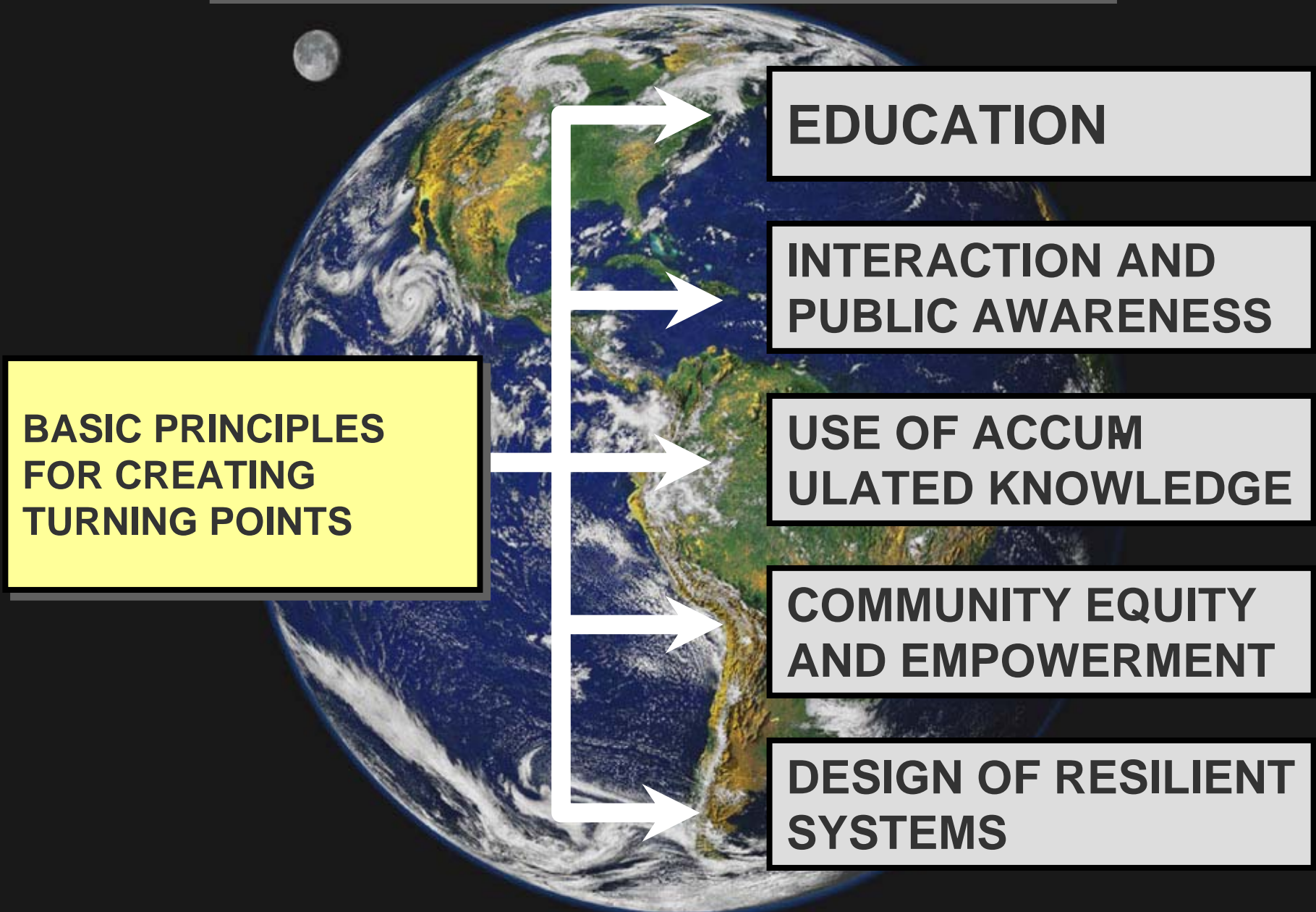


BARRIERS TO SUCCESS

INEVITABLE OBSTACLES

- **COMMUNITIES
UNABLE TO
OVERCOME
IGNORANCE,
APATHY,
ORGANIZATIONAL
BOUNDARIES, AND
LACK OF
POLITICAL WILL**

KNOWLEDGE MANAGEMENT



**BASIC PRINCIPLES
FOR CREATING
TURNING POINTS**

EDUCATION

**INTERACTION AND
PUBLIC AWARENESS**

**USE OF ACCUM
ULATED KNOWLEDGE**

**COMMUNITY EQUITY
AND EMPOWERMENT**

**DESIGN OF RESILIENT
SYSTEMS**

KNOWLEDGE MANAGEMENT

■ PRINCIPLES

- **TURNING POINT**
- **GOVERNMENTS PROVIDING THE BEST POSSIBLE KNOWLEDGE MANAGEMENT TO THE PEOPLE AT RISK**

KNOWLEDGE MANAGEMENT

- **PRINCIPLES**
 - **TURNING POINT**
 - **KNOWLEDGE MANAGEMENT IS AN INTER-ACTIVE PROCESS AMONG THE INSTITUTIONS INVOLVED IN IT**

KNOWLEDGE MANAGEMENT

- **PRINCIPLES**
 - **EACH COMMUNITY HAS ASSESSED ITS LEVEL OF IGNORANCE, APATHY, DISCIPLINARY BOUNDARIES, AND LACK OF POLITICAL WILL**

KNOWLEDGE MANAGEMENT

- **PRINCIPLES**
- **EACH COMMUNITY HAS FORMULATED STRATEGIES TO INCREASE PUBLIC AWARENESS**

KNOWLEDGE MANAGEMENT

- **PRINCIPLES**
- **TURNING POINTS**
- **DESIGNS THAT WILL PROTECT PEOPLE, INFRASTRUCTURE, AND LIVELIHOODS ARE MANDATED**

KNOWLEDGE MANAGEMENT

- **PRINCIPLES**
- **TURNING POINTS**
- **PROFESSIONALS AND POLICY MAKERS AT COMMUNITY AND NATIONAL LEVELS ARE EM-POWERED AND ENABLED**

KNOWLEDGE MANAGEMENT

- **PRINCIPLES**
- **TURNING POINTS**
- **IGNORANCE IS TRANSFORMED INTO ENLIGHTENMENT**

KNOWLEDGE MANAGEMENT

- **PRINCIPLES**
- **TURNING POINTS**
- **APATHY IS TRANSFORMED INTO EMPOWERMENT**

KNOWLEDGE MANAGEMENT

- PRINCIPLES
- TURNING POINTS
- DISCIPLINARY AND POLITICAL BOUNDARIES ARE TRANSFORMED INTO SEAMLESS, ENRICHED UNIVERSES

KNOWLEDGE MANAGEMENT

- **PRINCIPLES**
- **TURNING POINTS**
- **LACK OF POLITICAL WILL IS TRANSFORMED INTO POLITICAL ENABLEMENT AND SUCCESSES**

KNOWLEDGE MANAGEMENT

- **PRINCIPLES**
- **TURNING POINTS**
- **COOPERATION, COMMUNICATION, COORDINATION, AND COLLABORATION IS THE NORM IN ALL COMMUNITIES**

KNOWLEDGE MANAGEMENT

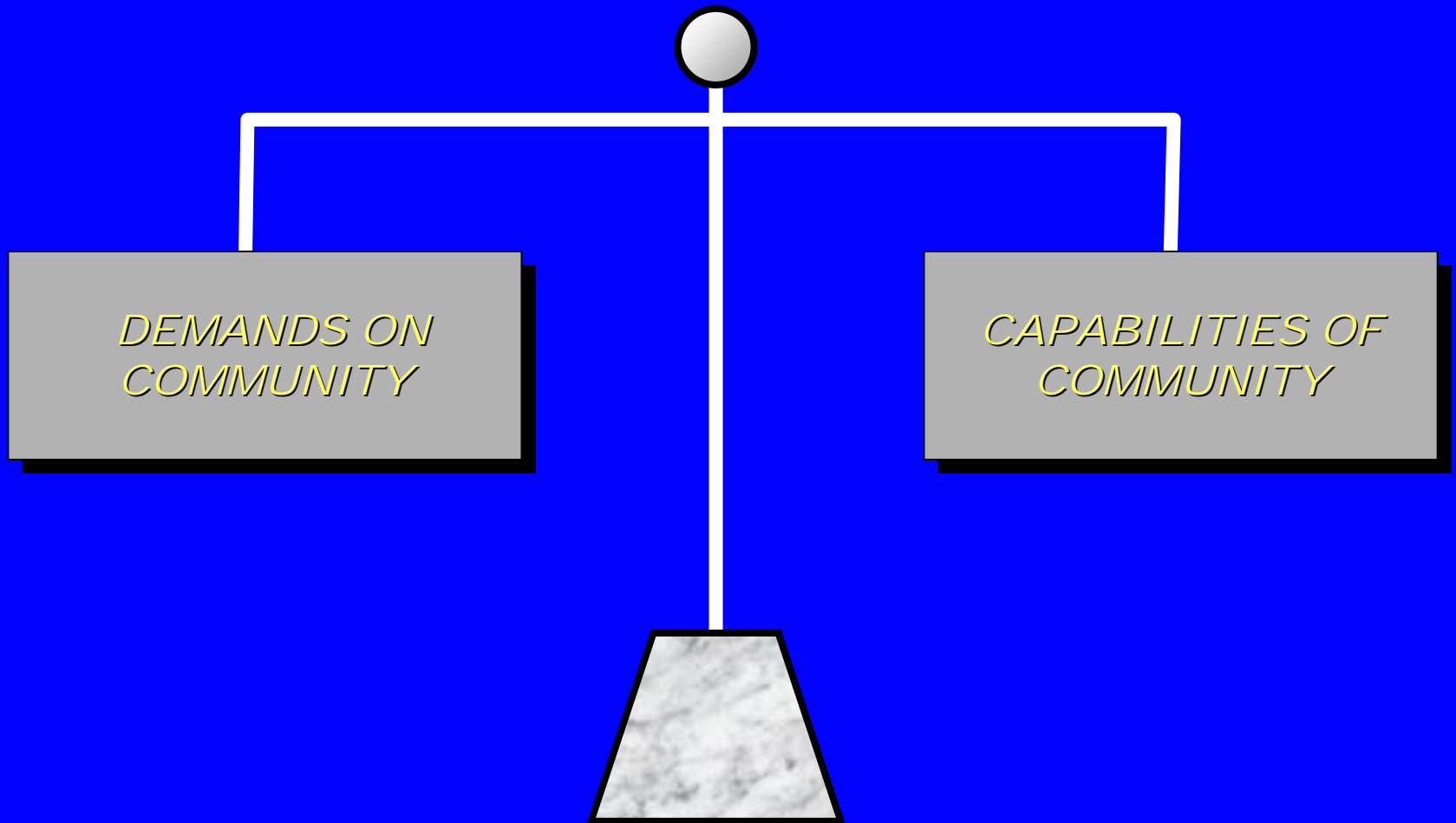
- **PRINCIPLES**
- **TURNING POINTS**
- **COMMUNITIES OF DEVELOPED NATIONS ASSISTING COMMUNITIES IN LESS DEVELOPED NATIONS**

KNOWLEDGE MANAGEMENT

- **PRINCIPLES**
- **TURNING POINTS**
- **THE DIALOGUE ON THE PROBLEMS AND THE SOLUTIONS BECOMES A CONTINUING PROCESS**

LIVING WITH RISK

SUCCESS



LIVING WITH RISK *FAILURE*

