UNDERSTANDING RISK AND RISK REDUCTION

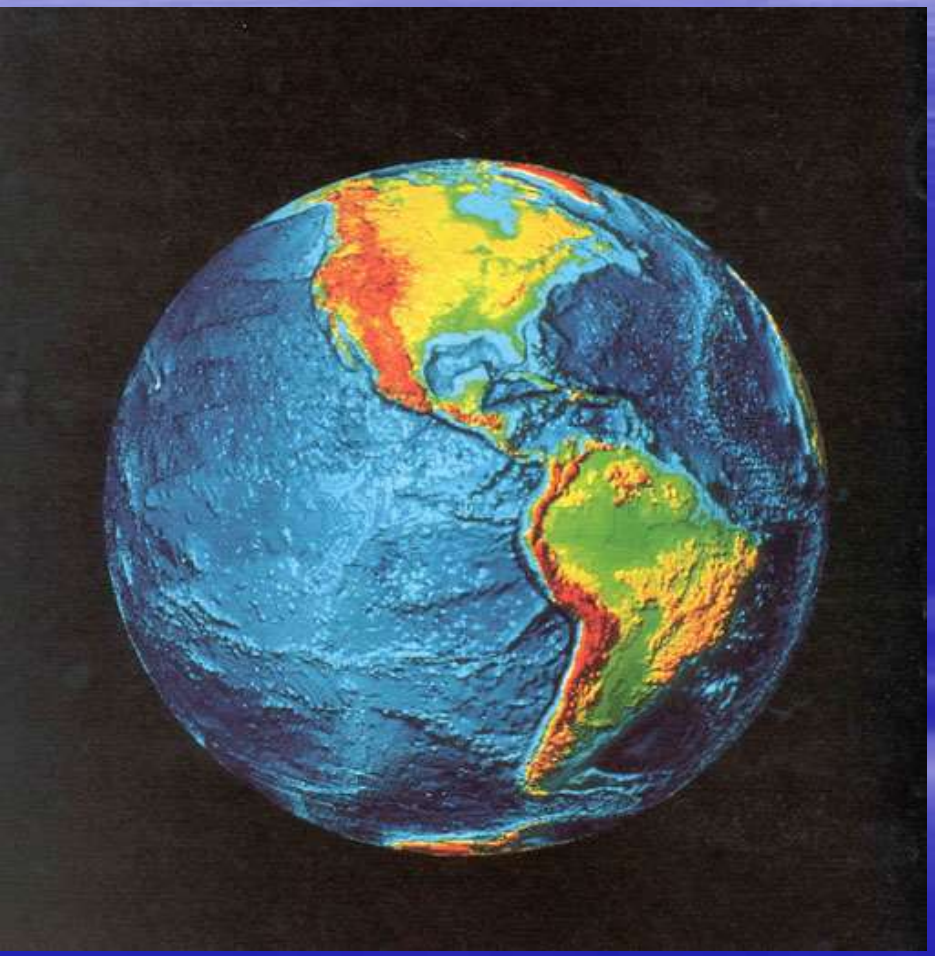
Dr. Walter Hays,

Global Alliance For Disaster Reduction

APPLYING WHAT WE KNOW INNOVATIVELY AND STRATEGICALLY TO ACHIEVE SOCIETAL SUSTAINABILITY

A FRAMEWORK FOR LIVING WITH THE INSTABILITIES CAUSED BY THE ONSET OF ENVIRONMENTAL EXTREMES

OUR WORLD IS AT RISK



- FLOODS
- SEVERE WINDSTORMS
- EARTHQUAKES
- TSUNAMIS
- DROUGHTS
- VOLCANIC ERUPTIONS
- LANDSLIDES
- WILDFIRES

ANNUAL FREQUENCY

- 100,000 THUNDERSTORMS
- 10,000 FLOODS
- THOUSANDS OF MODERATE TO LARGE-VOLUME LANDSLIDES
- THOUSANDS OF WILDFIRES
- 100 DAMAGING SIZE EARTHQUAKES
- SCORES TO HUNDREDS OF SEVERE WINDSTORMS
- ABOUT TEN VOLCANIC ERUPTIONS, TSUNAMIS, AND DROUGHTS

EVERY COMMUNITY IS AT RISK FROM NATURAL HAZARDS, WHICH CREATES AN URGENT NEED FOR PUBLIC POLICIES AND STRATEGIC PLANS TO PREVENT, MITIGATE, AND PREPARE FOR THE INEVITABLE

RISK ASSESSMENT

- HAZARD MAPS
- INVENTORY
- VULNERABILITY
- LOCATION

RISK

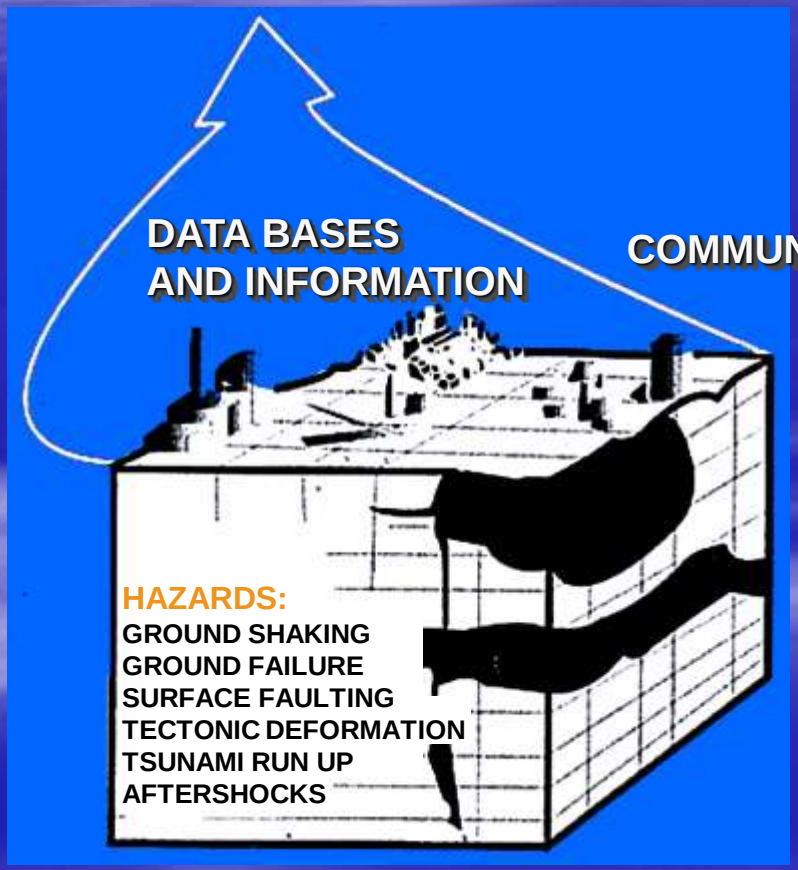
ACCEPTABLE RISK

UNACCEPTABLE RISK

DISASTER RISK REDUCTION

POLICY OPTIONS

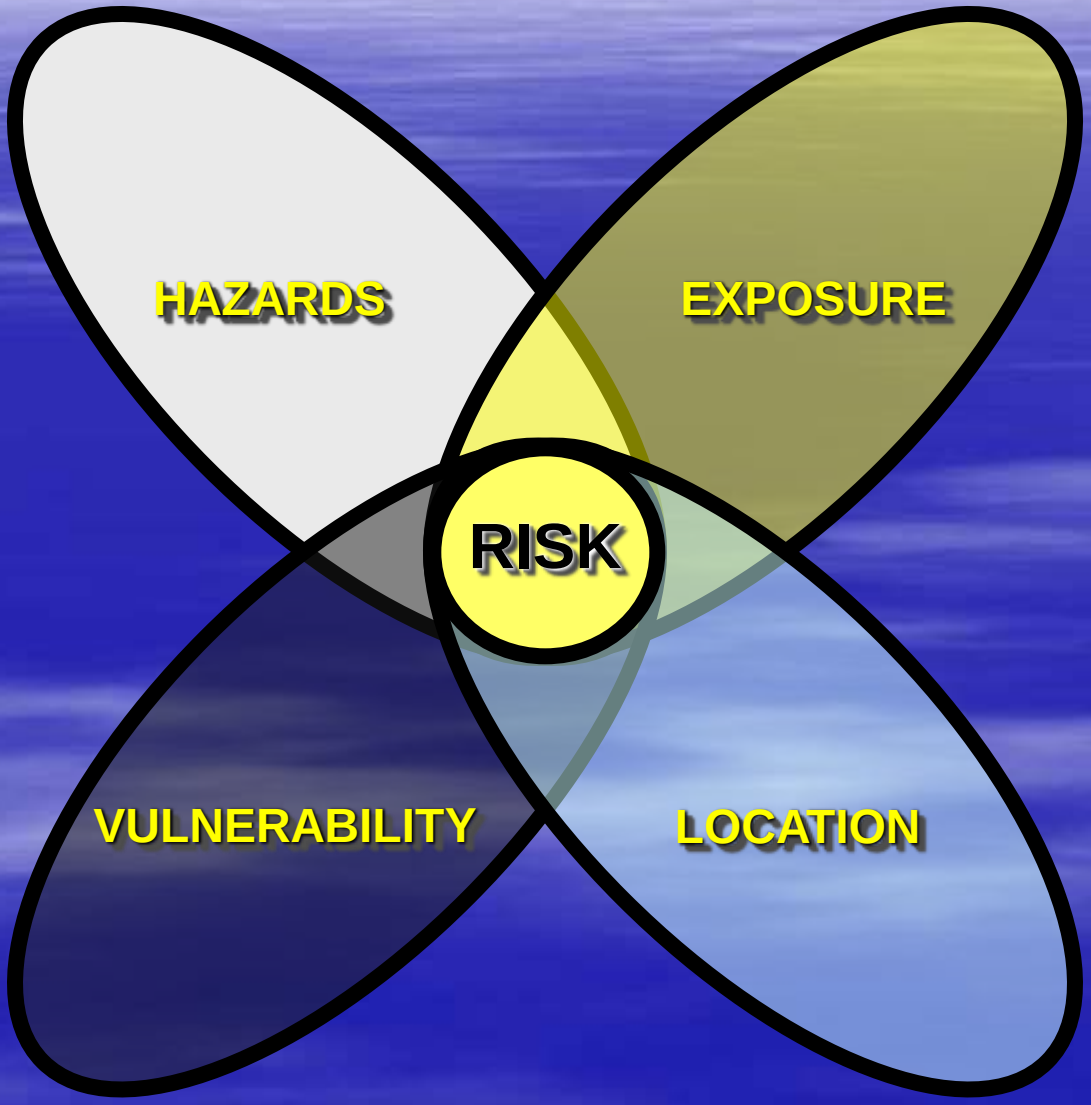
- PREVENTION-MITIGATION
- PREPAREDNESS
- EMERGENCY RESPONSE
- RECOVERY
- ADAPTATION



ALL PUBLIC POLICIES SHOULD BE BASED ON AN UNDERSTANDING OF WHAT CAN HAPPEN AND AN IMPLEMENTATION PLAN TO KEEP IT FROM HAPPENING.

THE VISION
IS
SUSTAINABLE URBAN DEVELOPMENT AND QUALITY OF LIFE
IN EVERY COMMUNITY

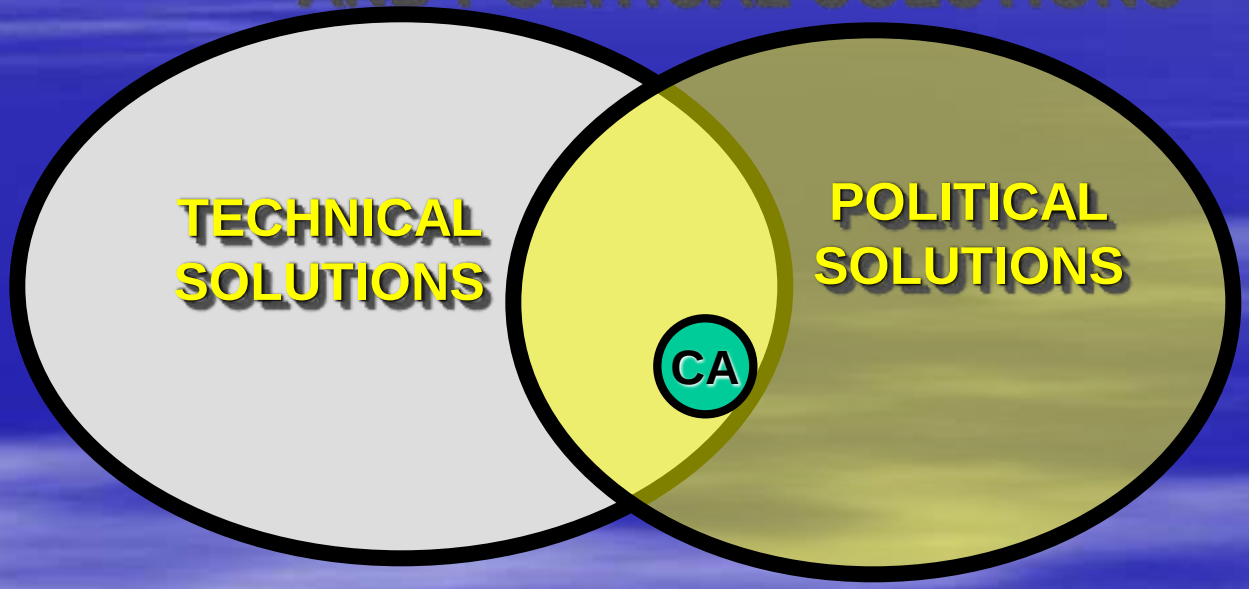
ELEMENTS OF RISK



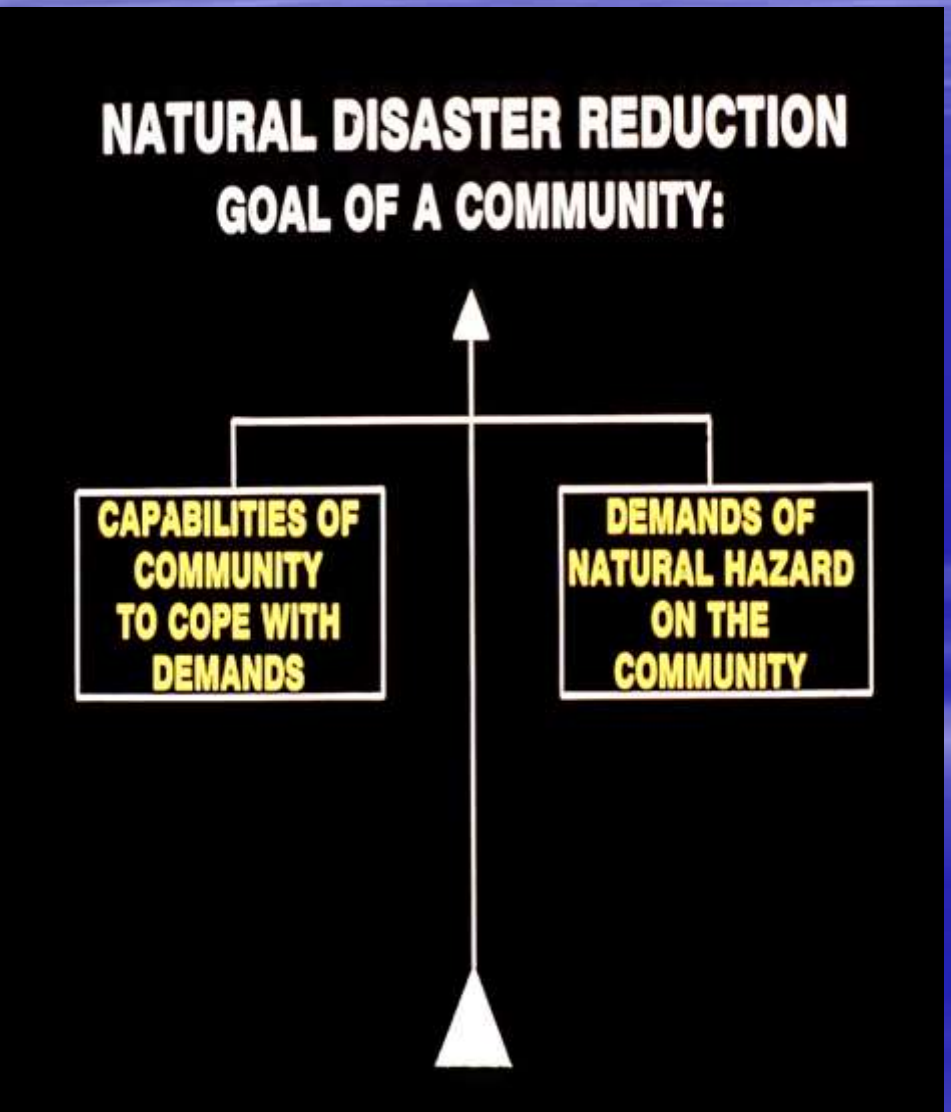
A DISASTER IMPACTS ALL SOCIETAL ELEMENTS

INSTITUTIONALIZATION OF DISASTER REDUCTION

GOAL: TO FIND THE COMMON AGENDA (CA) OF TECHNICAL AND POLITICAL SOLUTIONS

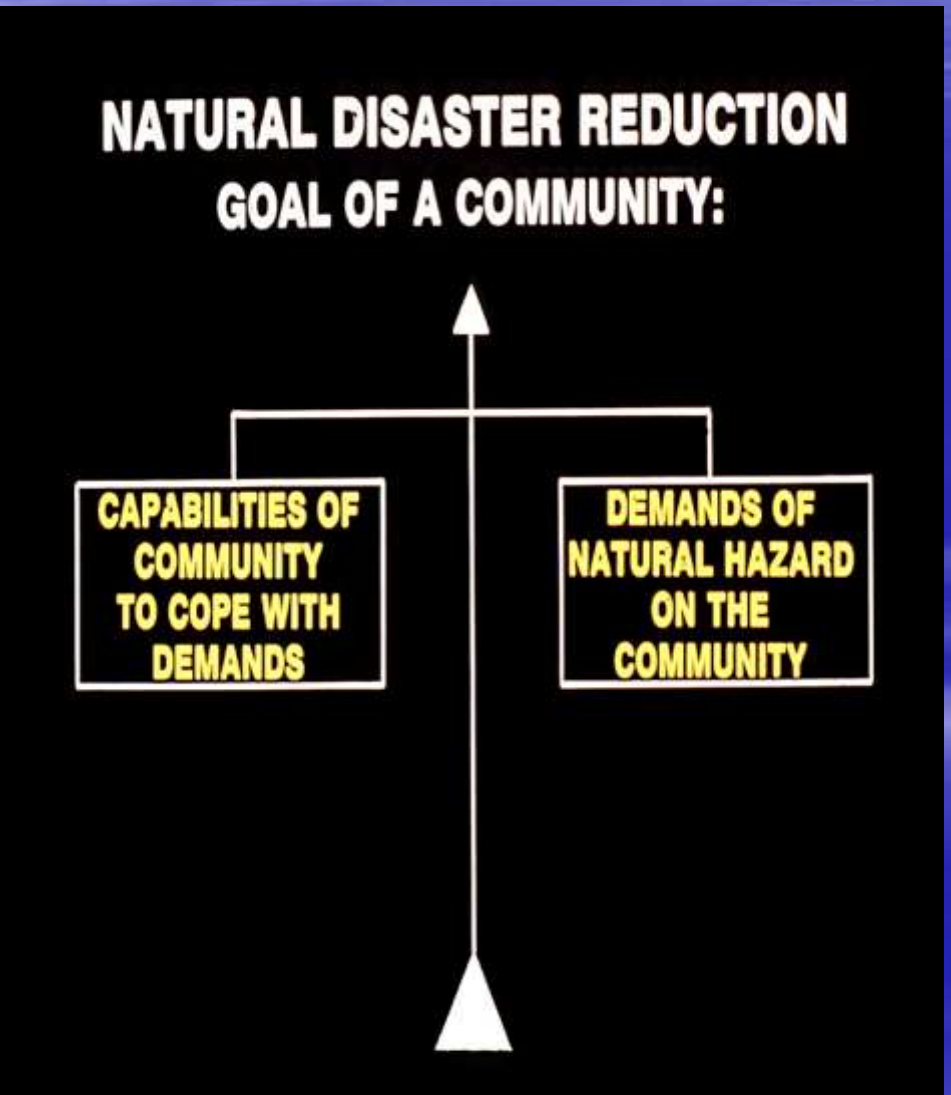


COMMON AGENDA FOR DISASTER RESILIENCE



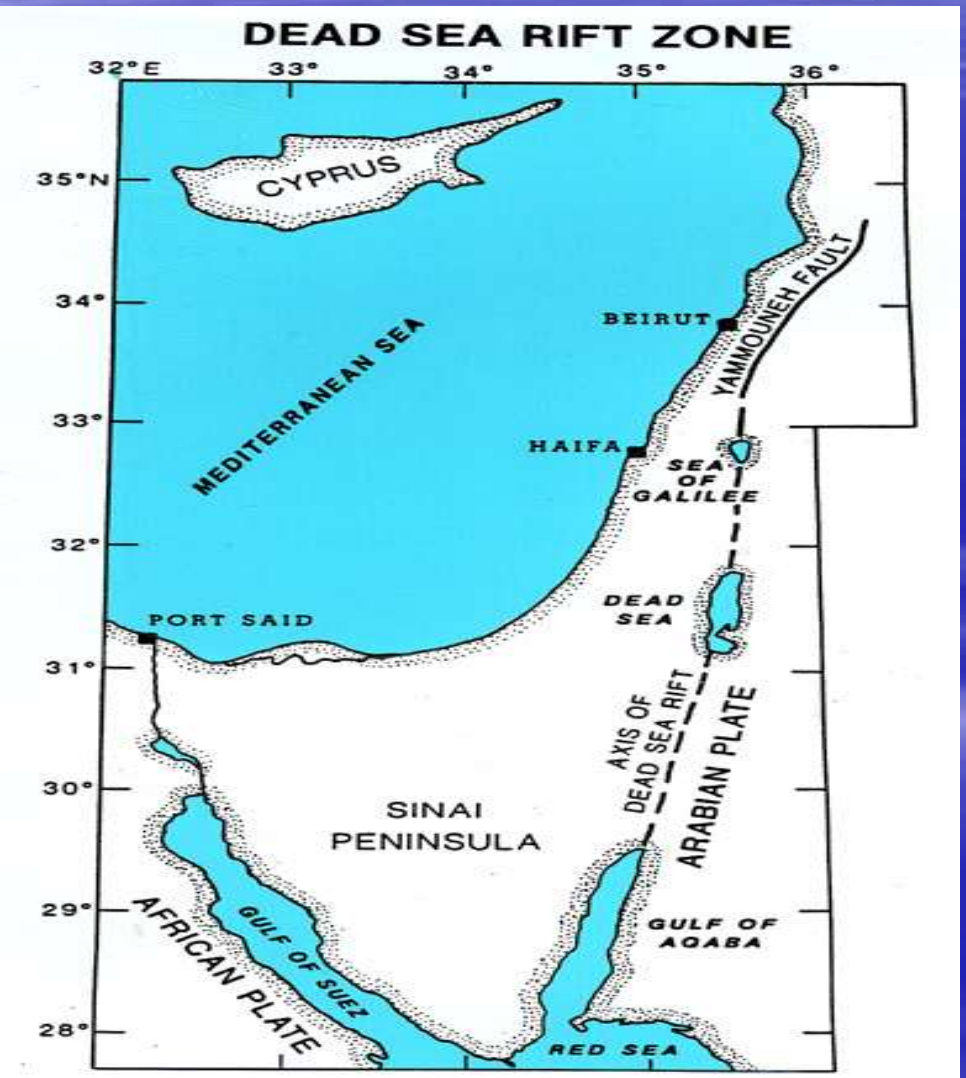
- **PREVENTION** (CONTROL THE SOURCE)
- **PROTECTION** (BUILD TO WITHSTAND)
- **LAND-USE CONTROL** (AVOIDANCE)

COMMON AGENDA FOR DISASTER RESILIENCE



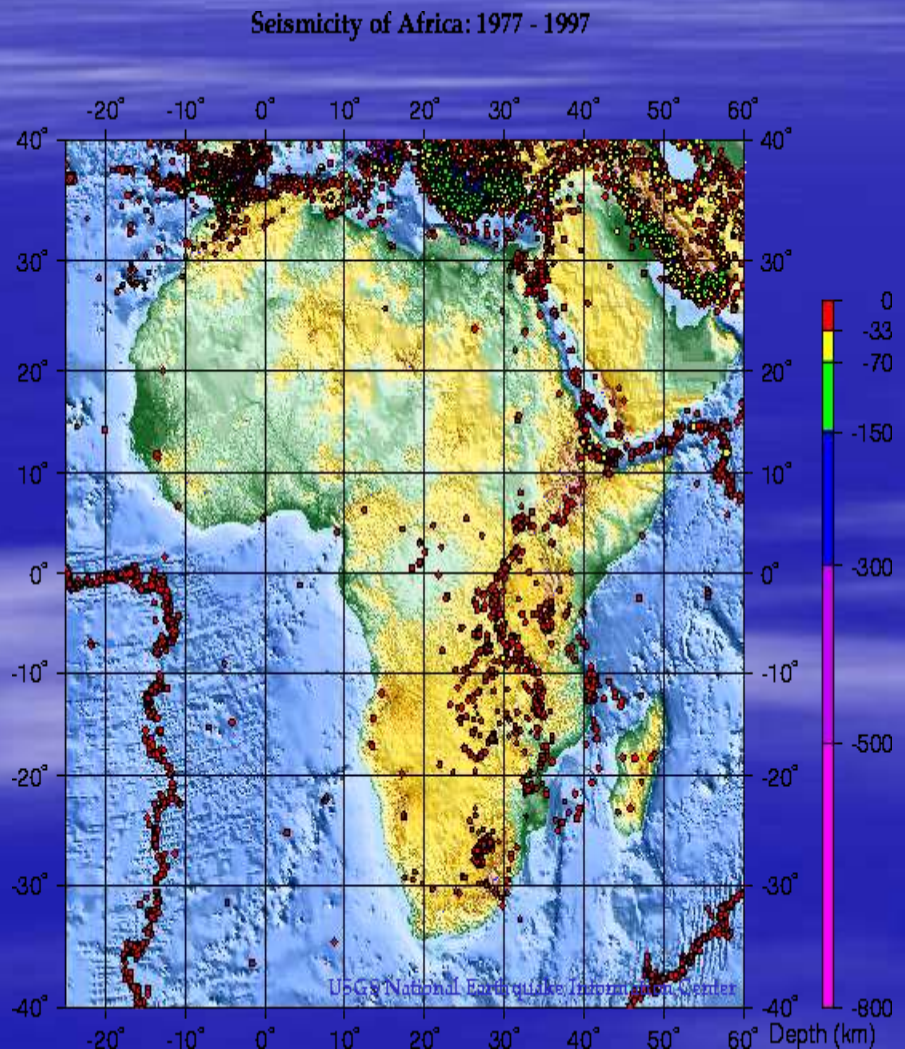
- SITE MODIFICATION
- ALERT/WARNING/ MAPS/MONITORING
- RESPONSE TO ALERT/WARNING/ MAPS/MONITORING TO MOVE PEOPLE OUR OF HARM'S WAY

MEDITERRANEAN REGION'S HAZARDS



- EARTHQUAKES
- FLOODS
- DROUGHTS
- LANDSLIDES
- TSUNAMIS
- VOLCANIC ERUPTIONS
- ENVIRONMENTAL DEGRADATION

SUB-SAHARA AFRICA'S PROBLEMS AND HAZARDS

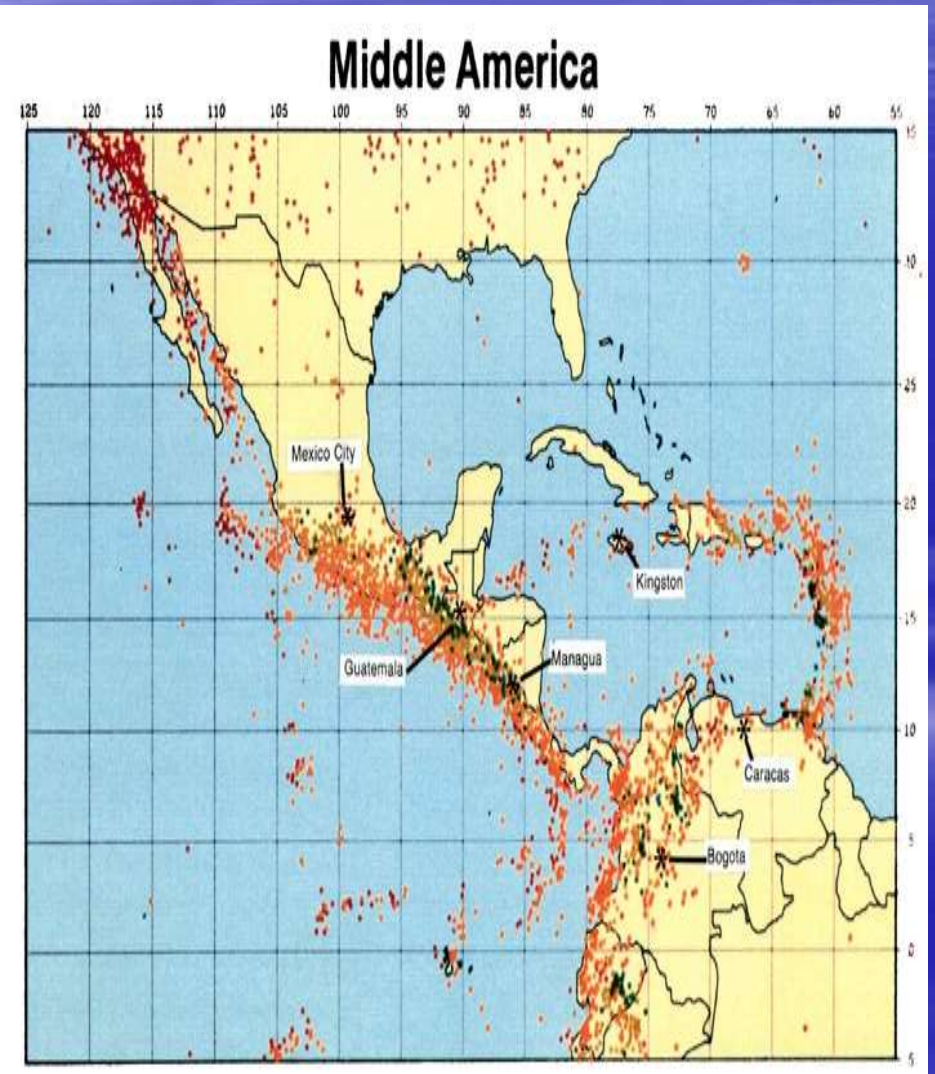


- POLITICAL INSTABILITY
- FLOODS
- DROUGHTS
- ENVIRONMENTAL IMPACTS ON AIR, WATER, AND SOIL
- ENDANGERED SPECIES
- HEALTH CONCERNS

EUROPE'S HAZARDS

- FLOODS
- GLOBAL CHANGE
- SEVERE WINDSTORMS
- EARTHQUAKES
- ENVIRONMENTAL DEGRADATION

LATIN AMERICA/CARIBBEAN BASIN'S HAZARDS

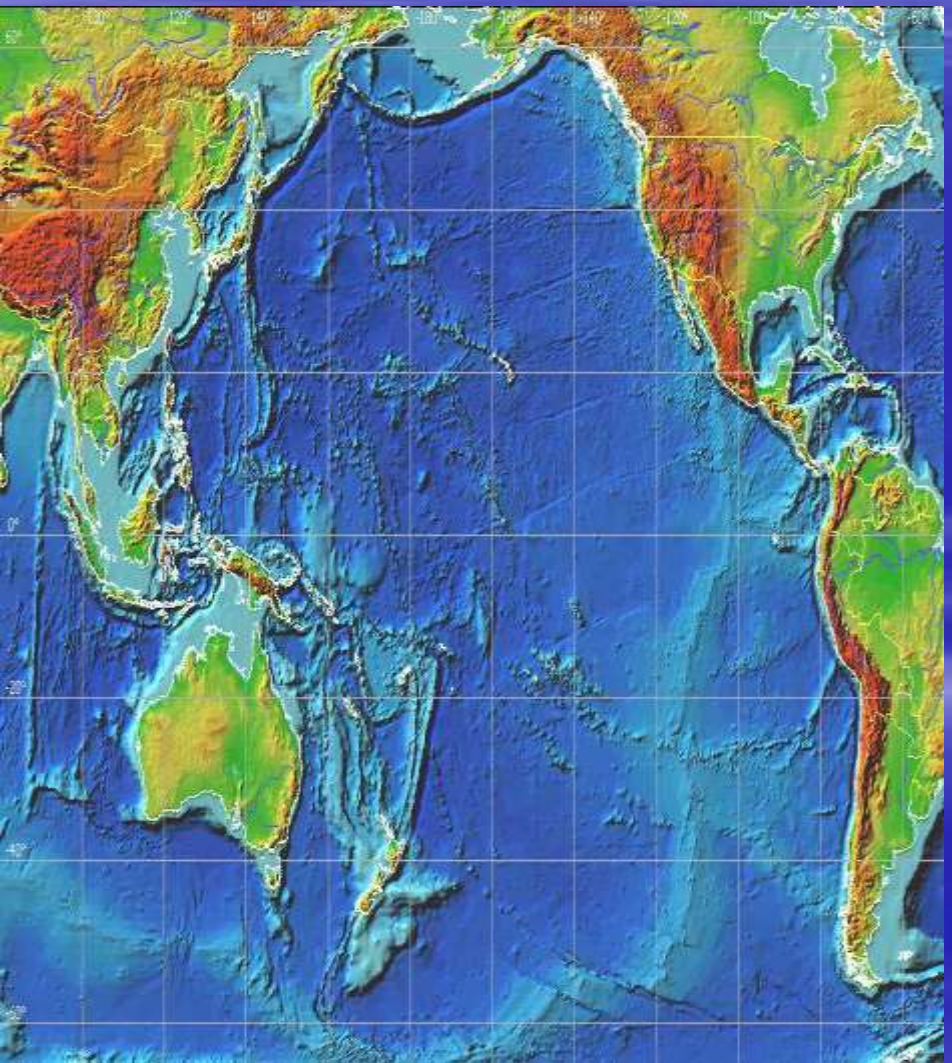


- HURRICANES
- EARTHQUAKES/TSU-NAMIS
- FLOODS
- GLOBAL CHANGE
- LANDSLIDES
- VOLCANIC ERUPTIONS
- ENVIRONMENTAL IMPACTS

SOUTH AMERICA/CARIBBEAN BASIN'S HAZARDS

- HURRICANES
- EARTHQUAKES/TSU-NAMIS
- FLOODS
- GLOBAL CHANGE
- LANDSLIDES
- VOLCANIC ERUPTIONS
- ENVIRONMENTAL IMPACTS

PACIFIC REGION'S HAZARDS

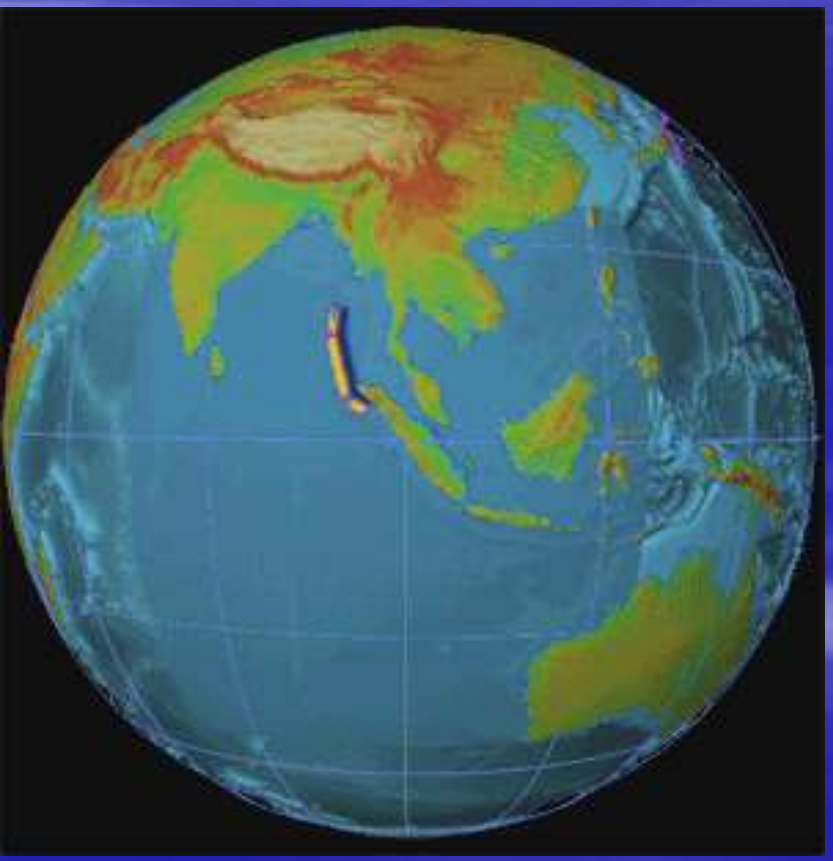


- SEVERE WINDSTORMS
- FLOODS
- EARTHQUAKES/TSUNAMIS
- WILDFIRES

ASIA'S HAZARDS

- FLOODS
- EARTHQUAKES
- TSUNAMIS
- CYCLONES/TYPHOONS
- VOLCANIC ERUPTIONS
- LANDSLIDES
- DROUGHTS
- ENVIRONMENTAL DEGRADATION

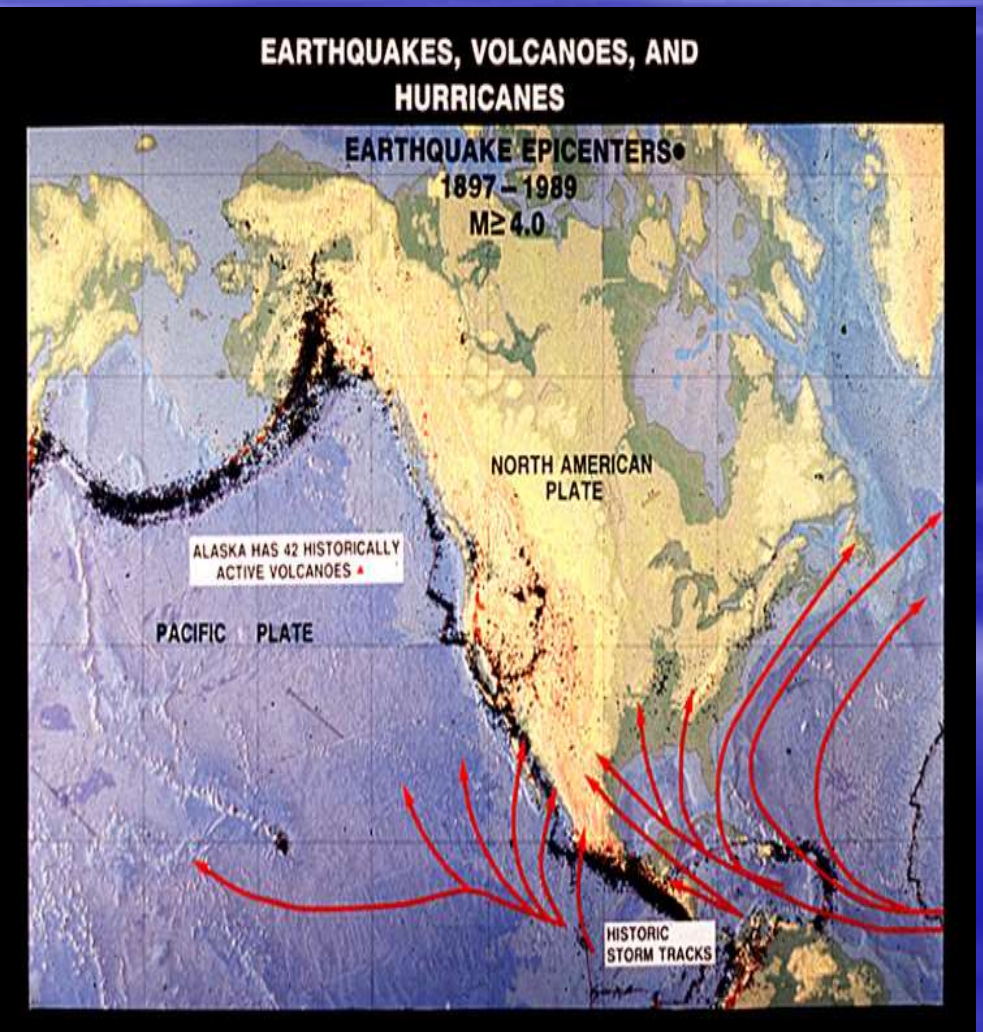
INDIAN OCEAN AREA'S HAZARDS



- FLOODS
- EARTHQUAKES
- TSUNAMIS
- CYCLONES/TYPHOONS
- VOLCANIC ERUPTIONS
- LANDSLIDES
- DROUGHTS
- ENVIRONMENTAL DEGRADATION

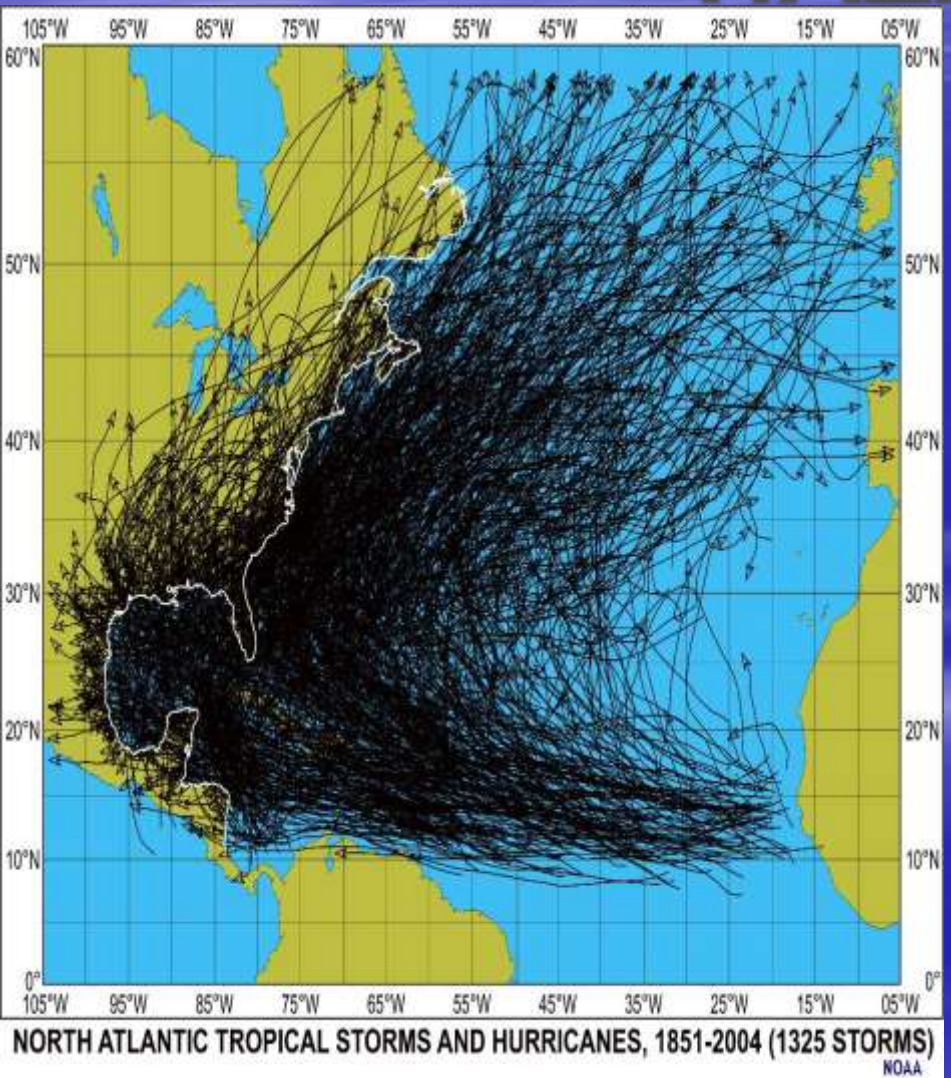
INDIAN OCEAN TSUNAMI: 26 DECEMBER 2004

NORTH AMERICA'S HAZARDS



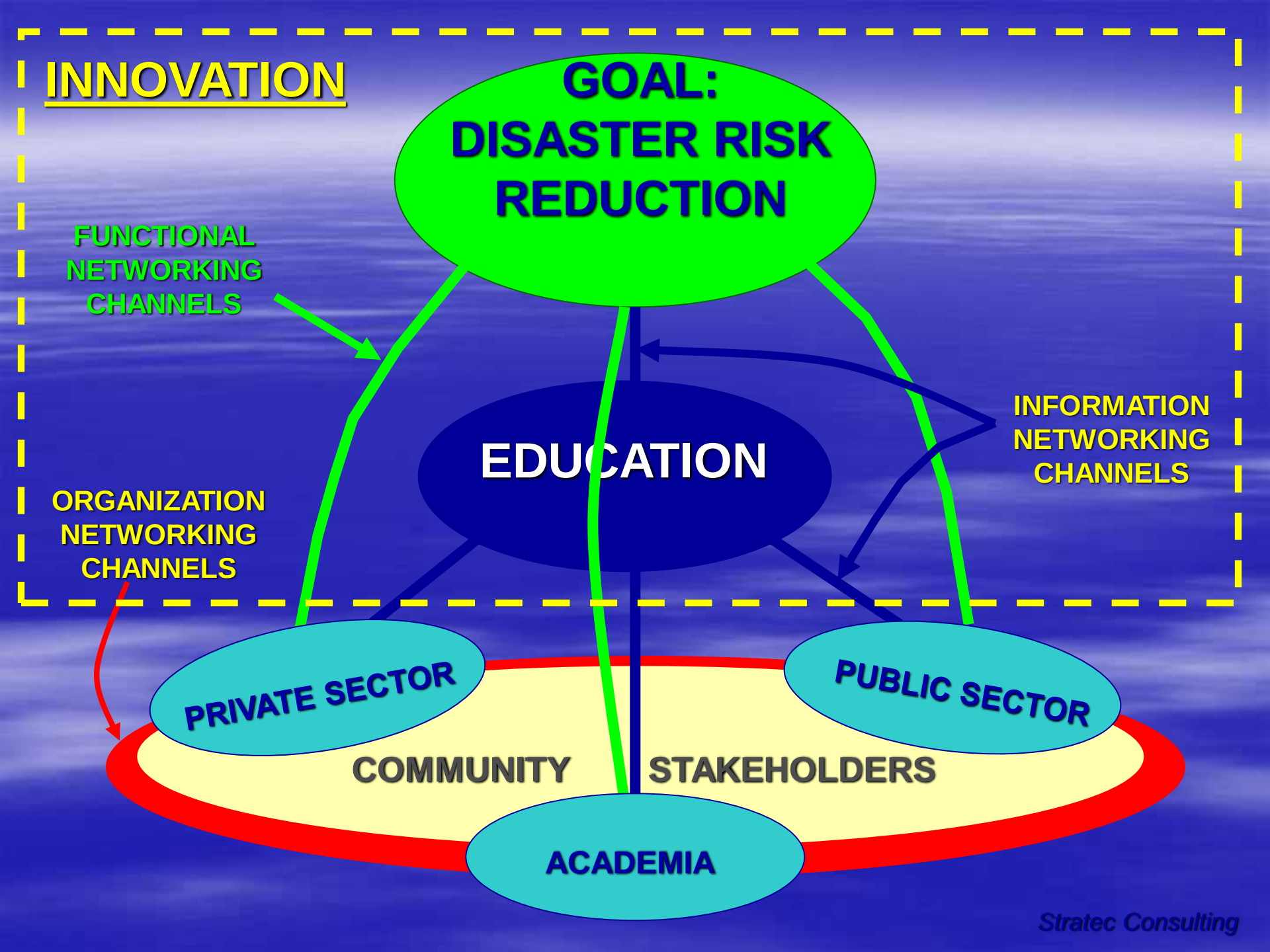
- FLOODS
- HURRICANES
- EARTHQUAKES
- TORNADOES
- ICE STORMS
- VOLCANIC ERUPTIONS
- LANDSLIDES

EASTERN NORTH AMERICA'S HAZARDS

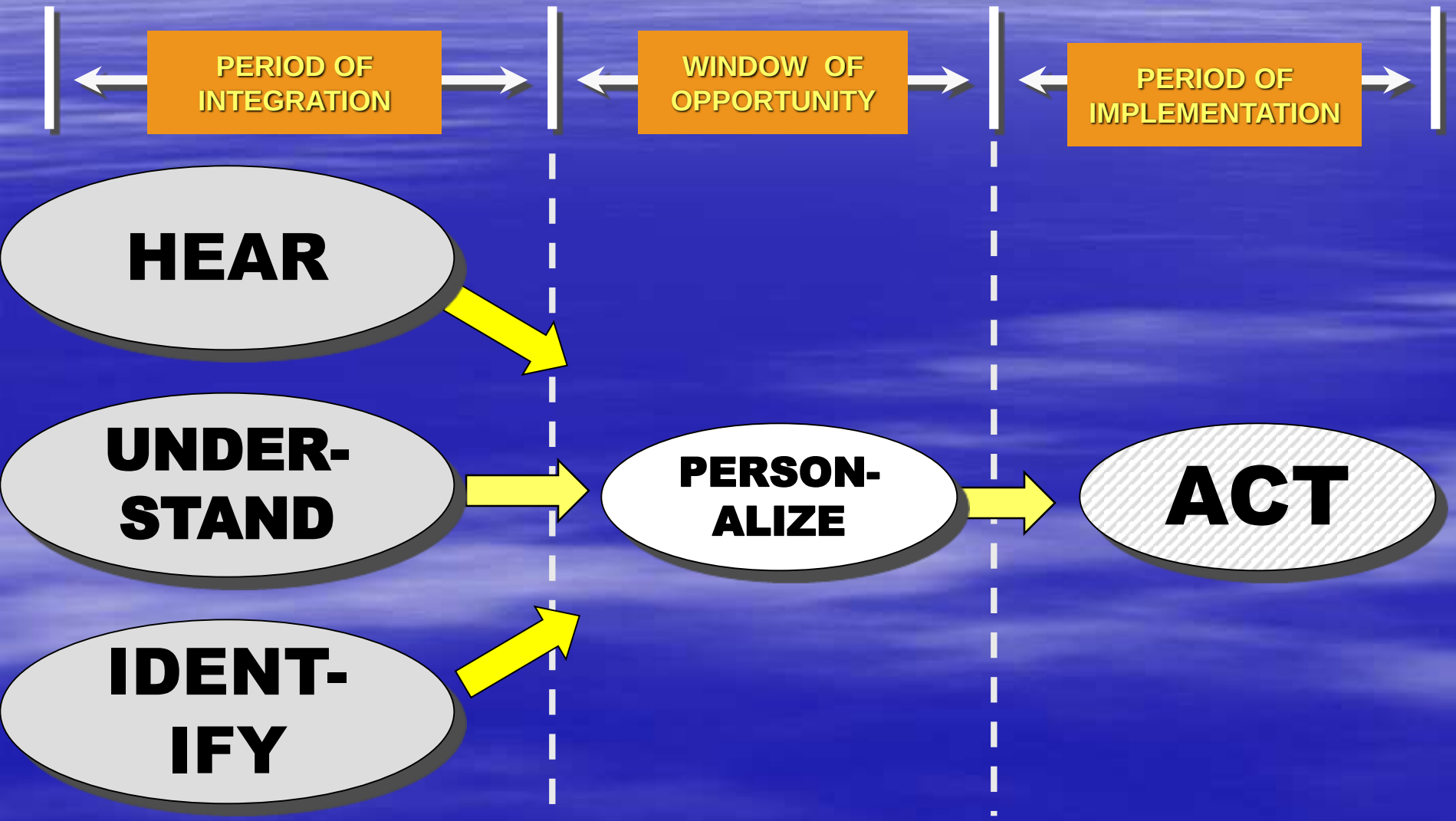


NORTH ATLANTIC TROPICAL STORMS AND HURRICANES, 1851-2004 (1325 STORMS)
NOAA

- FLOODS
- HURRICANES
- EARTHQUAKES
- TORNADOES
- ICE STORMS
- LANDSLIDES


INNOVATION
GOAL:
DISASTER RISK
REDUCTION
FUNCTIONAL
NETWORKING
CHANNELS
EDUCATION
INFORMATION
NETWORKING
CHANNELS
ORGANIZATION
NETWORKING
CHANNELS
PRIVATE SECTOR
PUBLIC SECTOR
COMMUNITY
STAKEHOLDERS
ACADEMIA
Stratec Consulting

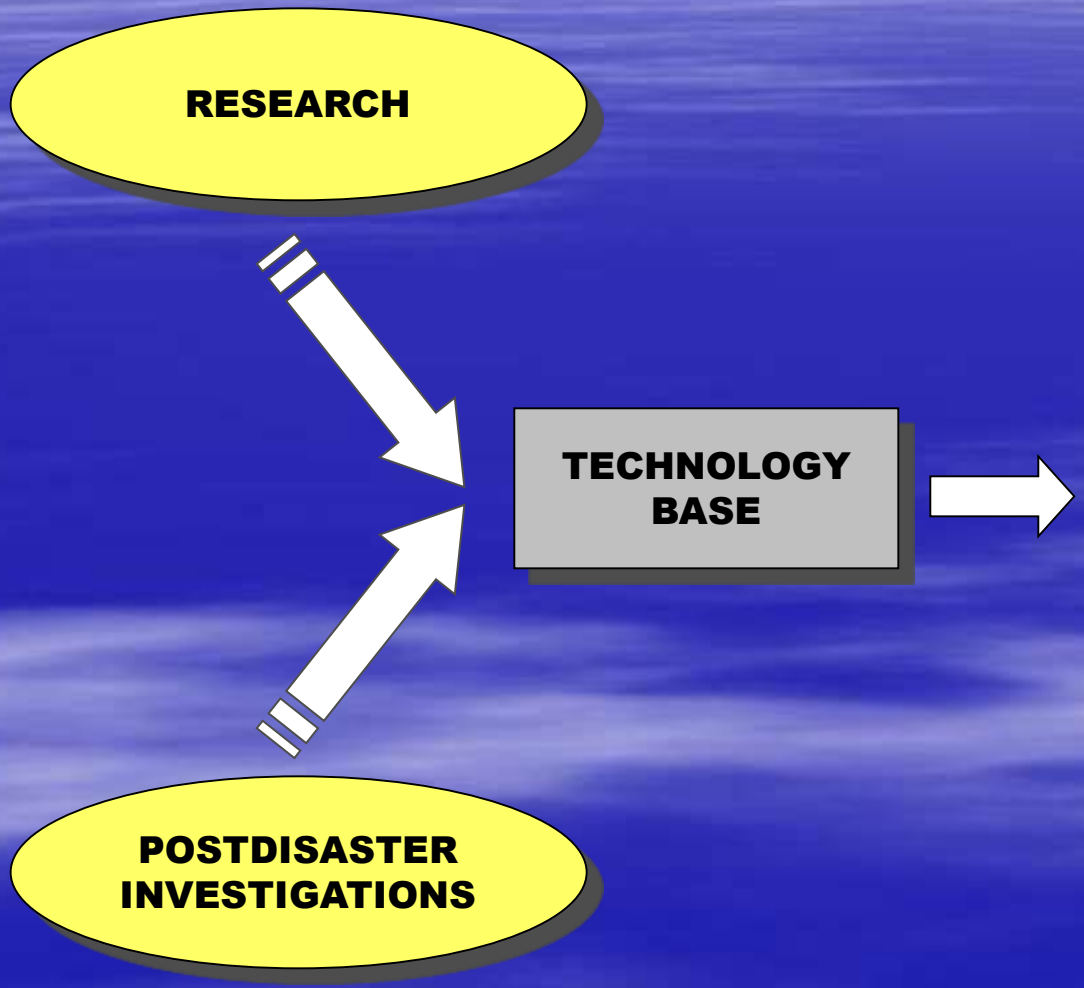
EDUCATION


PERIOD OF INTEGRATION
WINDOW OF OPPORTUNITY
PERIOD OF IMPLEMENTATION
HEAR
UNDER-STAND
IDENT-IFY
PERSON-ALIZE
ACT

EMERGING KNOWLEDGE AND TECHNOLOGY FOR RISK REDUCTION

- TSUNAMI WARNING SYSTEM
- REAL-TIME MONITORING
- REMOTE SENSING AND MEASURMENT TECHNOLOGIES (E.G., GPS)
- INFORMATION TECHNOLOGIES (E.G., GIS)
- DISASTER SCENARIOS
- HAZARD ZONATION
- ACTIVE AND PASSIVE ENERGY DISSIPATION DEVICES
- CASE HISTORIES AND BEST PRACTICES

REDUCTION OF COMMUNITY VULERABILTY



RISK REDUCTION

- PREVENTION-MITIGATION
- **PREPAREDNESS**
- PREDICTION, WARNING, AND EVACUATION
- **ADAPTATION**
- EMERGENCY RESPONSE
- **RECOVERY**
- MONITORING

BENEFIT/COST OF BECOMING DISASTER RESILIENT

PUBLIC AWARENESS

ENABLES ALL SECTORS OF THE PUBLIC TO KNOW THEIR RISKS AND COPE WITH THEM

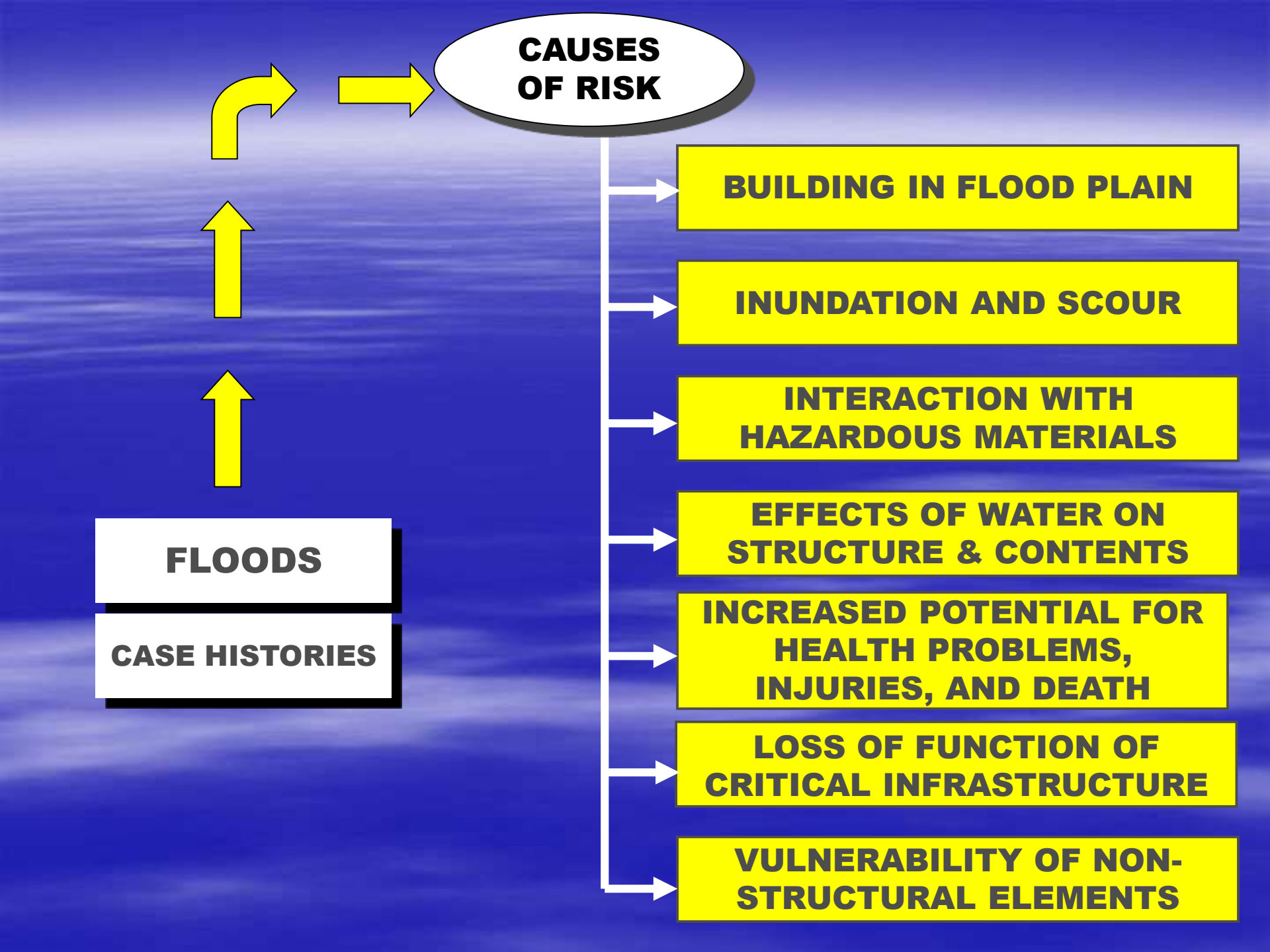
1 < BENEFIT/COST < 1,000

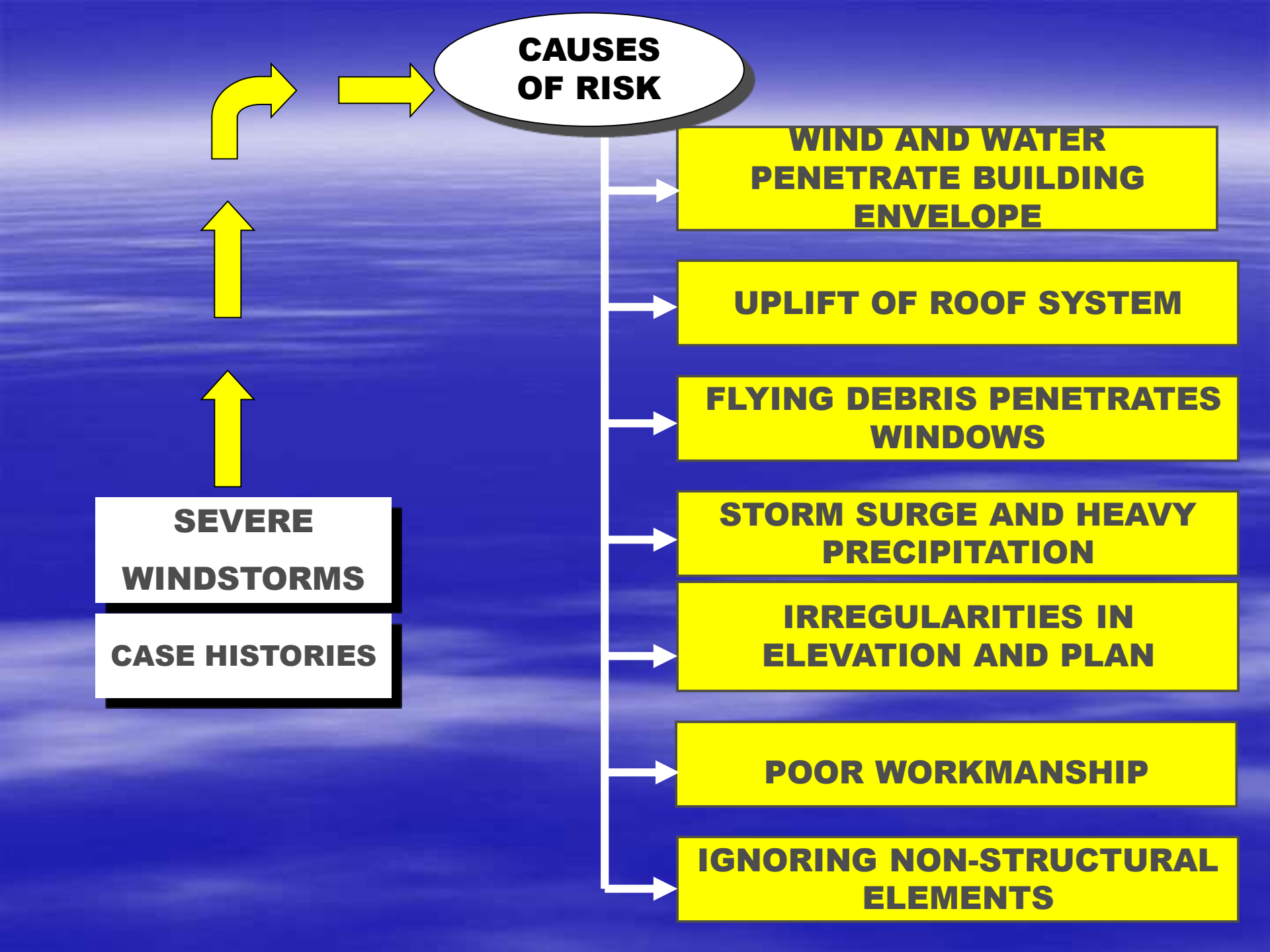
BENEFIT/COST OF BECOMING DISASTER RESILIENT

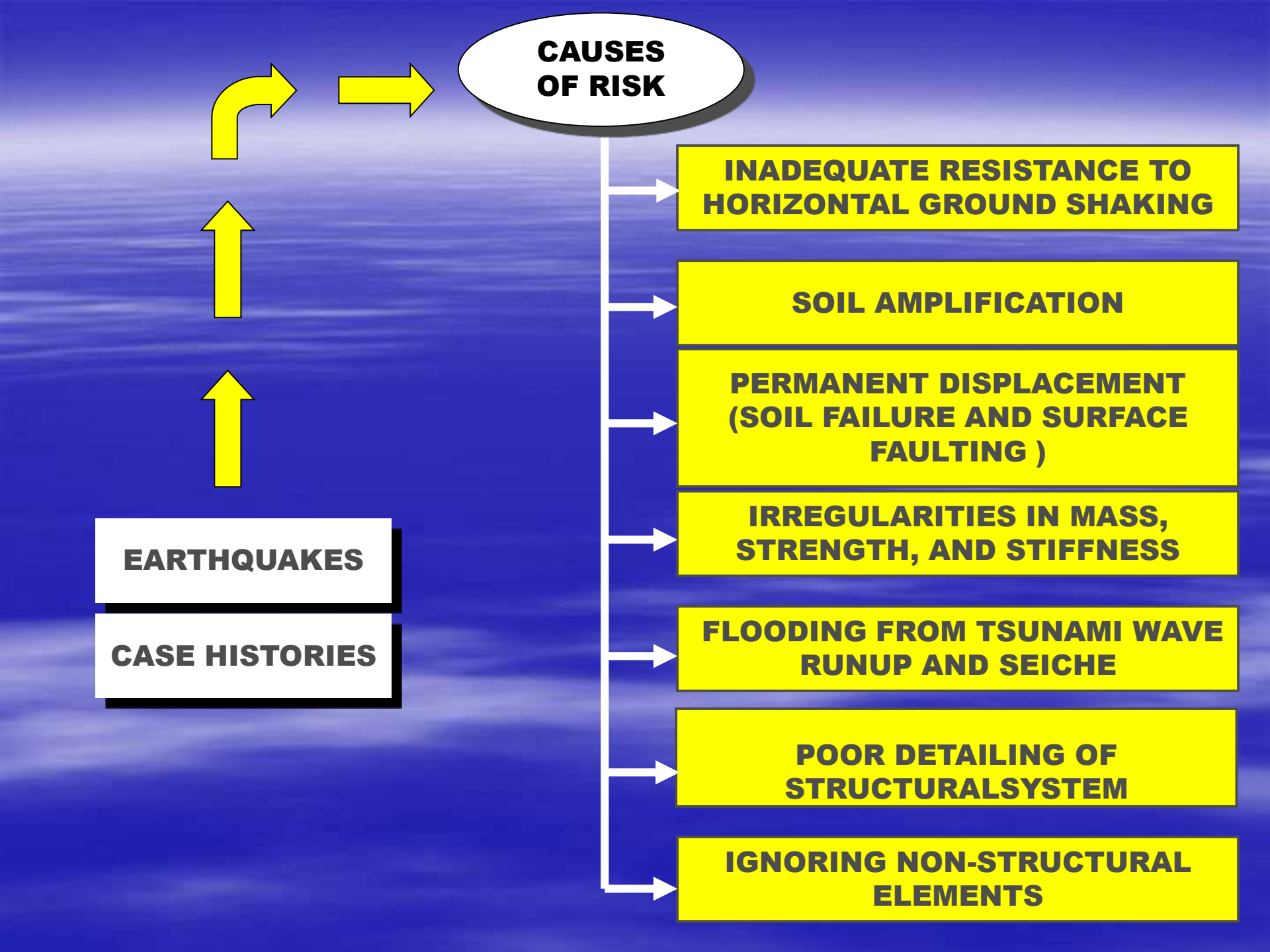
EDUCATION AND TRAINING

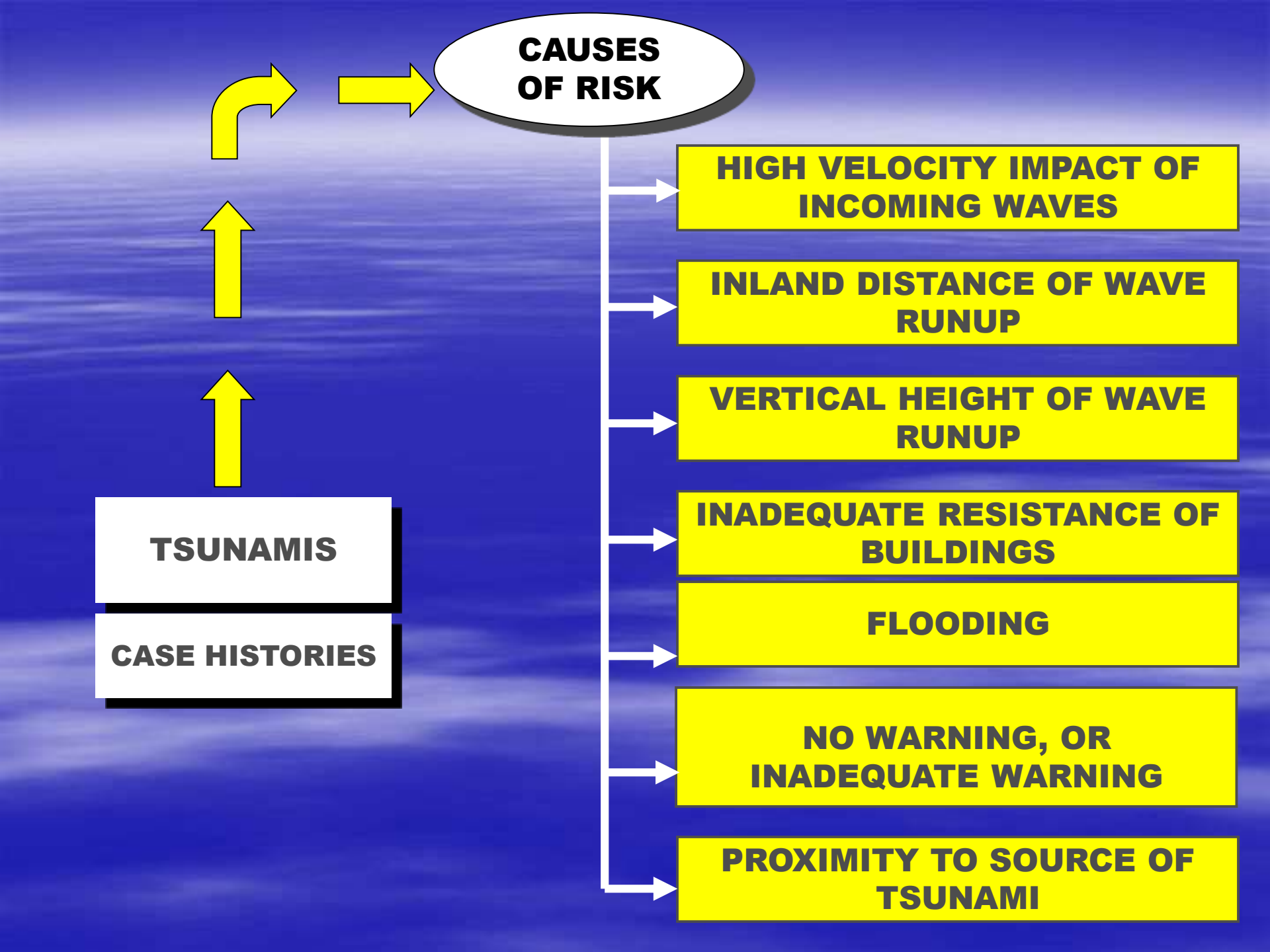
EXPANDS PROFESSIONAL AND POLITICAL CAPACITY

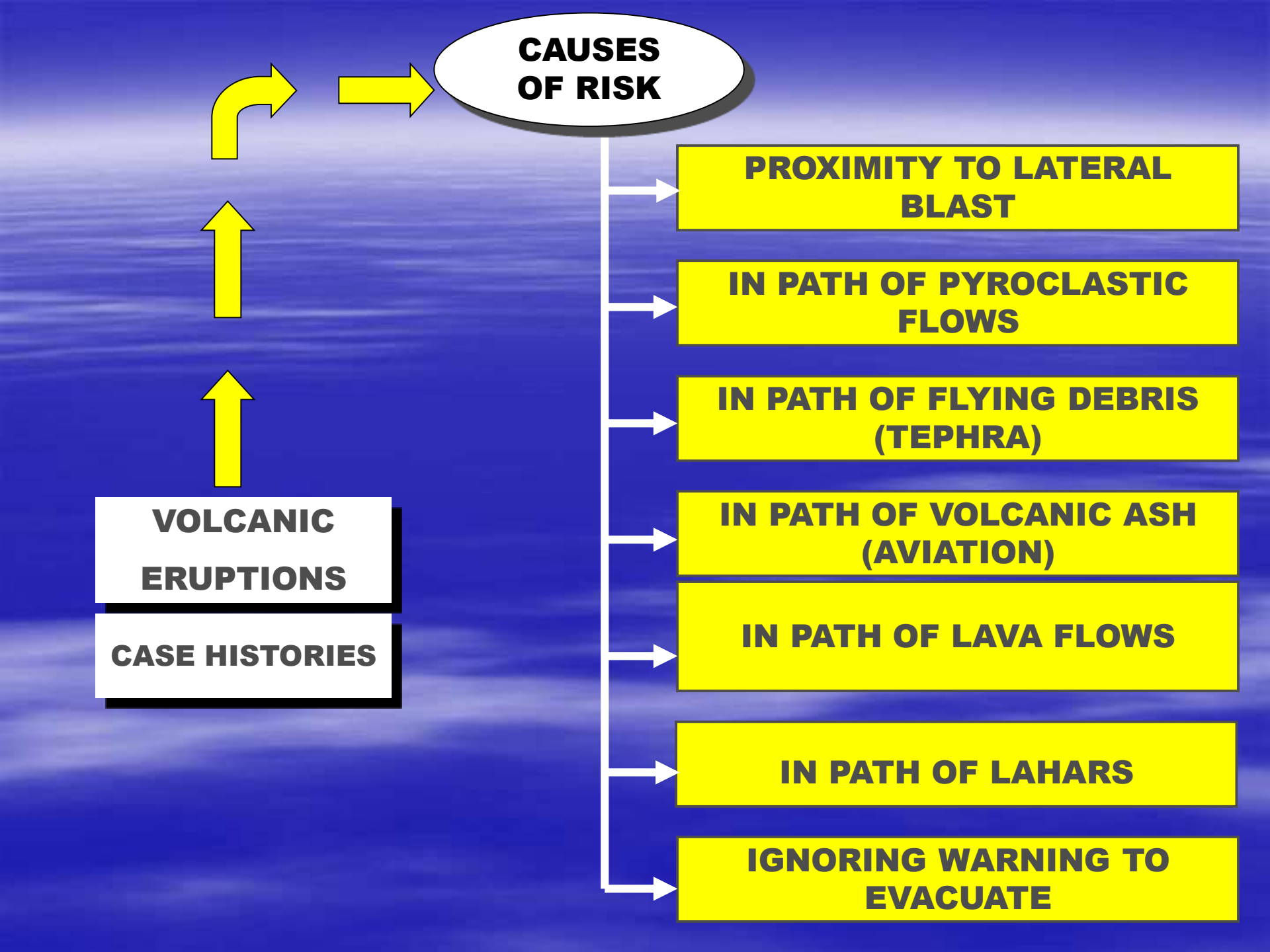
1 < BENEFIT/COST < 100

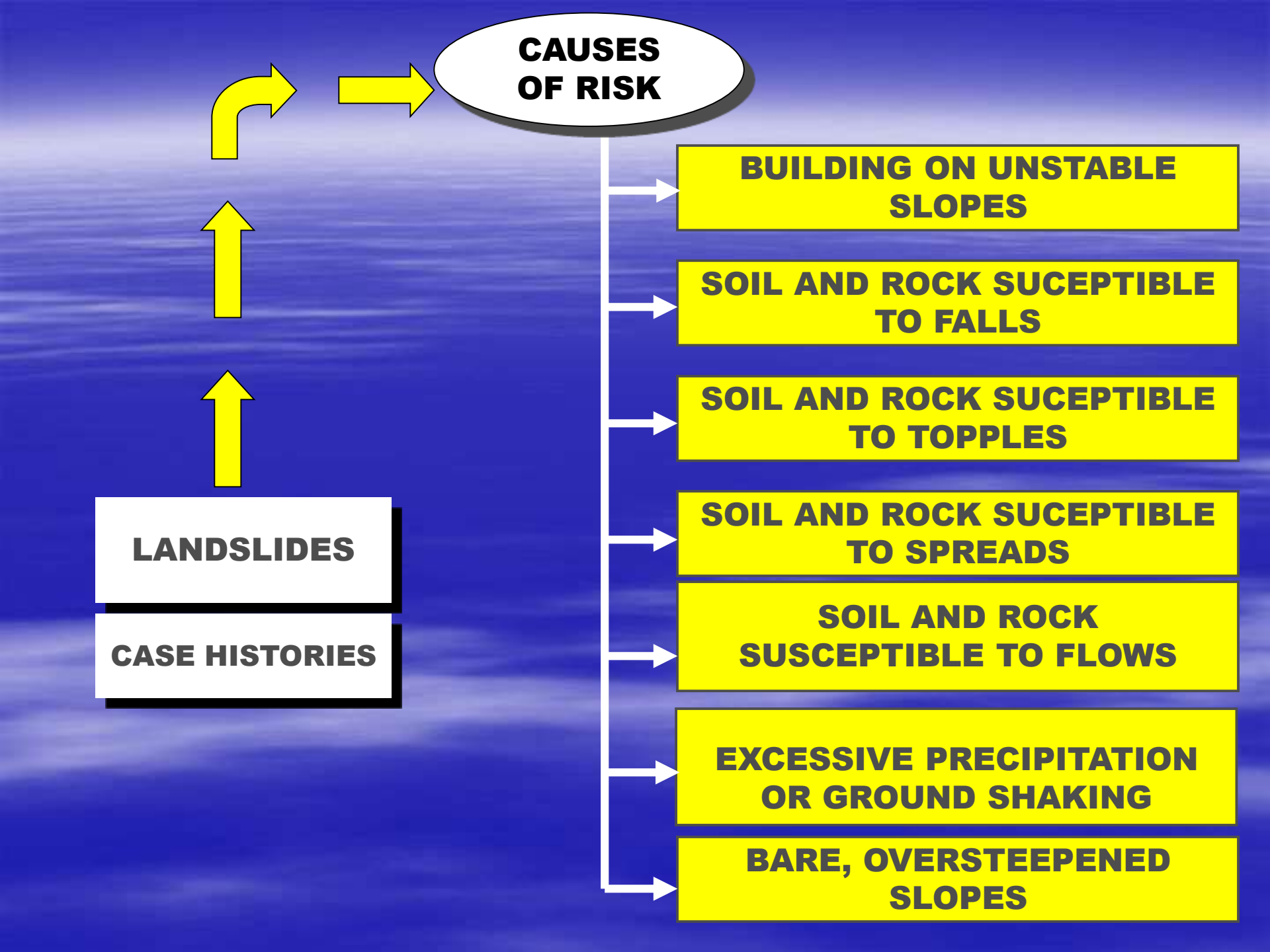

CAUSES OF RISK
BUILDING IN FLOOD PLAIN
INUNDATION AND SCOUR
INTERACTION WITH HAZARDOUS MATERIALS
EFFECTS OF WATER ON STRUCTURE & CONTENTS
INCREASED POTENTIAL FOR HEALTH PROBLEMS, INJURIES, AND DEATH
LOSS OF FUNCTION OF CRITICAL INFRASTRUCTURE
VULNERABILITY OF NON-STRUCTURAL ELEMENTS
FLOODS
CASE HISTORIES

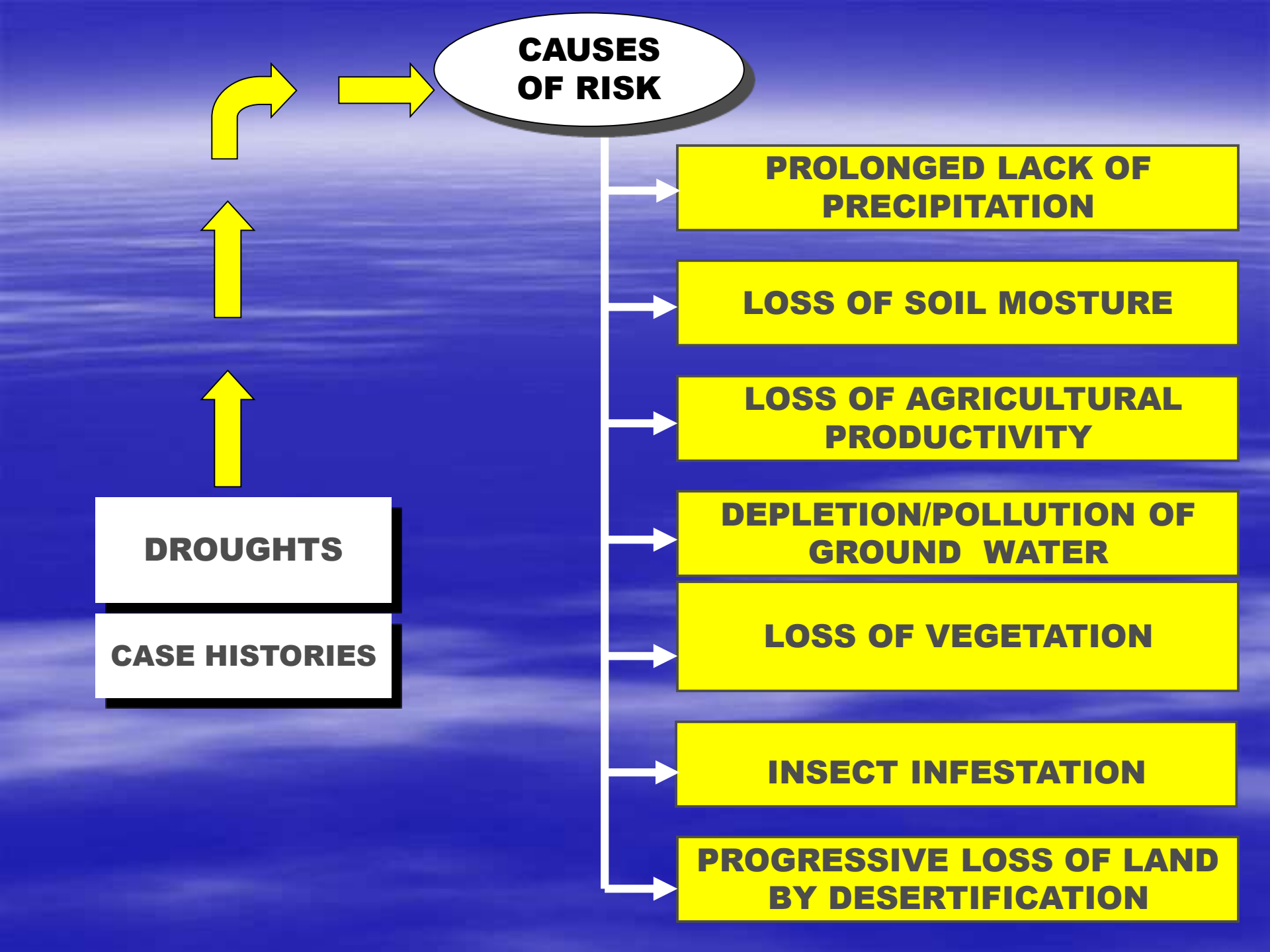

CAUSES OF RISK
WIND AND WATER PENETRATE BUILDING ENVELOPE
UPLIFT OF ROOF SYSTEM
FLYING DEBRIS PENETRATES WINDOWS
STORM SURGE AND HEAVY PRECIPITATION
IRREGULARITIES IN ELEVATION AND PLAN
POOR WORKMANSHIP
IGNORING NON-STRUCTURAL ELEMENTS
SEVERE WINDSTORMS
CASE HISTORIES

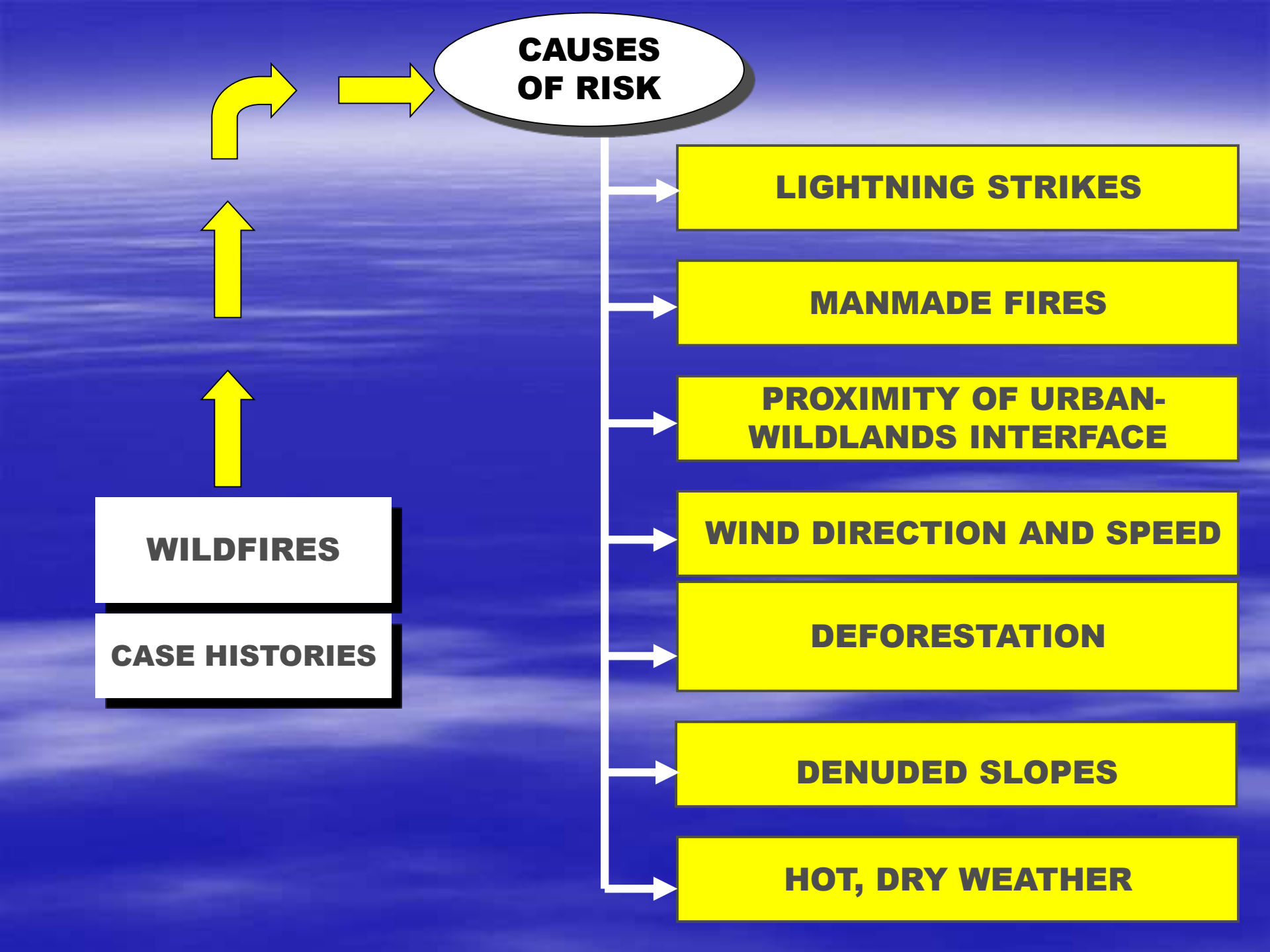

CAUSES OF RISK
INADEQUATE RESISTANCE TO HORIZONTAL GROUND SHAKING
SOIL AMPLIFICATION
PERMANENT DISPLACEMENT (SOIL FAILURE AND SURFACE FAULTING)
IRREGULARITIES IN MASS, STRENGTH, AND STIFFNESS
FLOODING FROM TSUNAMI WAVE RUNUP AND SEICHE
POOR DETAILING OF STRUCTURALSYSTEM
IGNORING NON-STRUCTURAL ELEMENTS
EARTHQUAKES
CASE HISTORIES


CAUSES OF RISK
HIGH VELOCITY IMPACT OF INCOMING WAVES
INLAND DISTANCE OF WAVE RUNUP
VERTICAL HEIGHT OF WAVE RUNUP
INADEQUATE RESISTANCE OF BUILDINGS
FLOODING
NO WARNING, OR INADEQUATE WARNING
PROXIMITY TO SOURCE OF TSUNAMI
TSUNAMIS
CASE HISTORIES

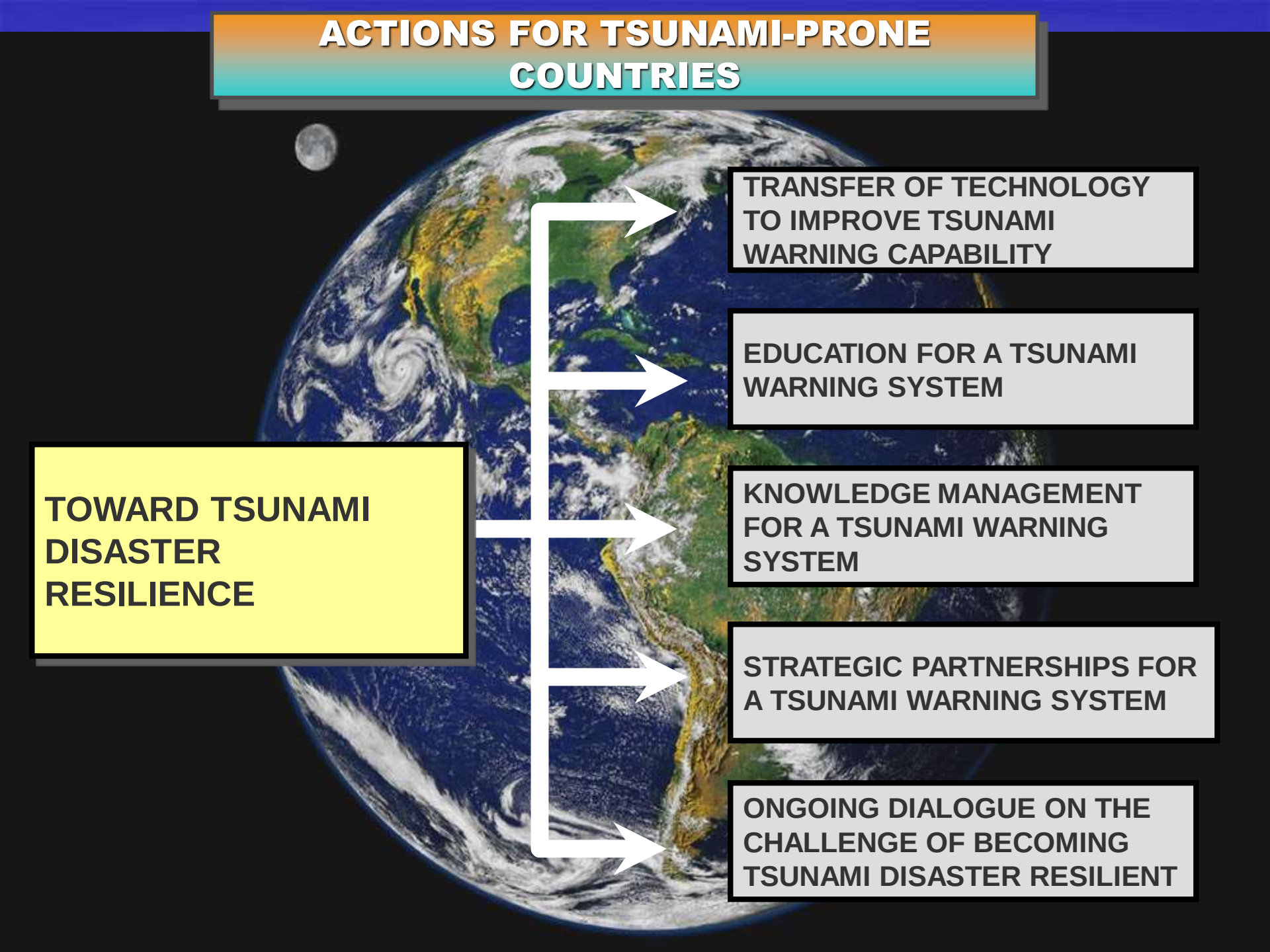

CAUSES OF RISK
PROXIMITY TO LATERAL BLAST
IN PATH OF PYROCLASTIC FLOWS
IN PATH OF FLYING DEBRIS (TEPHRA)
IN PATH OF VOLCANIC ASH (AVIATION)
IN PATH OF LAVA FLOWS
IN PATH OF LAHARS
IGNORING WARNING TO EVACUATE
VOLCANIC ERUPTIONS
CASE HISTORIES


CAUSES OF RISK
BUILDING ON UNSTABLE SLOPES
SOIL AND ROCK SUCEPTIBLE TO FALLS
SOIL AND ROCK SUCEPTIBLE TO TOPPLES
SOIL AND ROCK SUCEPTIBLE TO SPREADS
SOIL AND ROCK SUSCEPTIBLE TO FLOWS
EXCESSIVE PRECIPITATION OR GROUND SHAKING
BARE, OVERSTEEPENED SLOPES
LANDSLIDES
CASE HISTORIES


CAUSES OF RISK
PROLONGED LACK OF PRECIPITATION
LOSS OF SOIL MOSTURE
LOSS OF AGRICULTURAL PRODUCTIVITY
DEPLETION/POLLUTION OF GROUND WATER
LOSS OF VEGETATION
INSECT INFESTATION
PROGRESSIVE LOSS OF LAND BY DESERTIFICATION
DROUGHTS
CASE HISTORIES

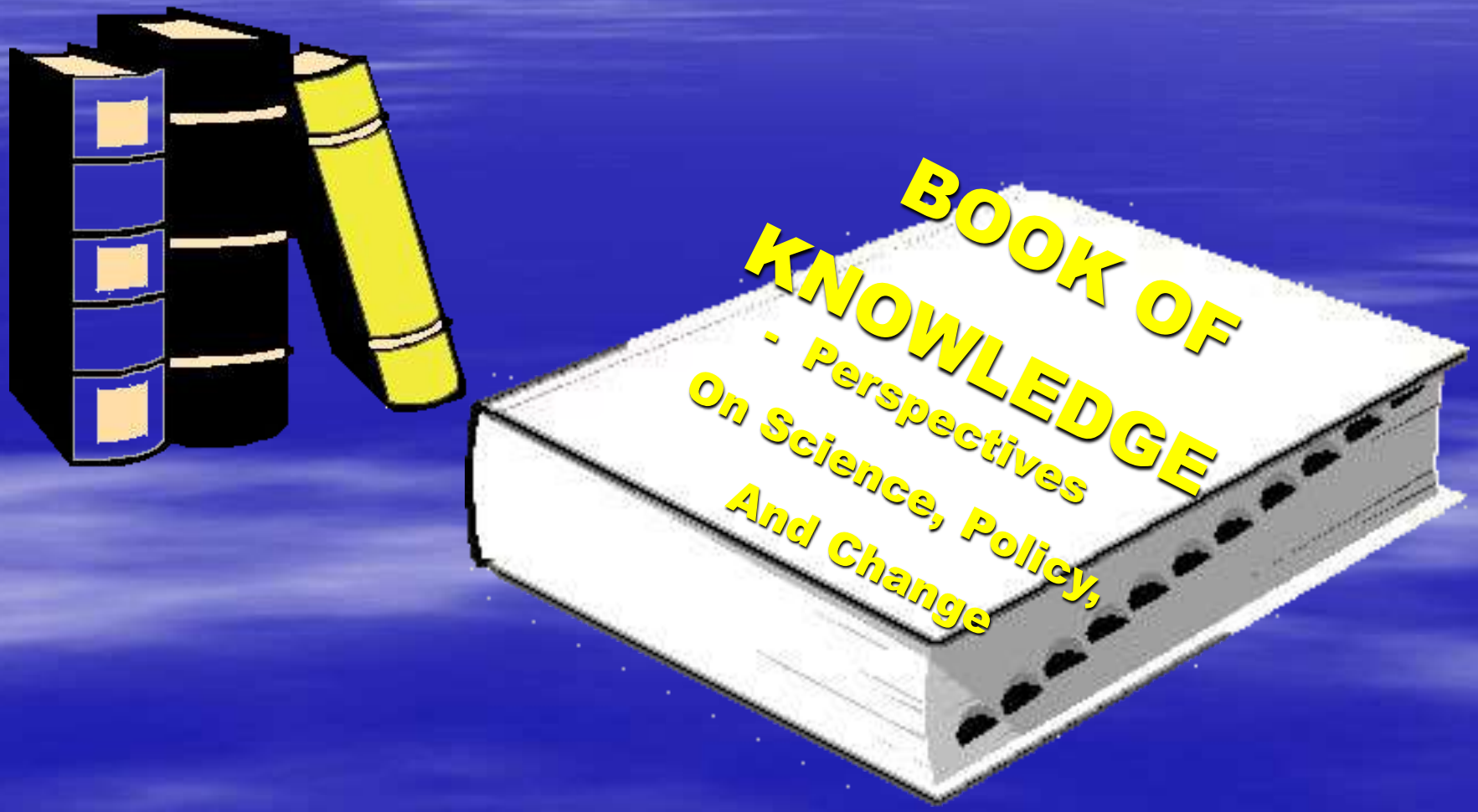

CAUSES OF RISK
LIGHTNING STRIKES
MANMADE FIRES
PROXIMITY OF URBAN-WILDLANDS INTERFACE
WIND DIRECTION AND SPEED
DEFORESTATION
DENUDED SLOPES
HOT, DRY WEATHER
WILDFIRES
CASE HISTORIES

ACTIONS FOR TSUNAMI-PRONE COUNTRIES



TOWARD TSUNAMI DISASTER RESILIENCE

- TRANSFER OF TECHNOLOGY TO IMPROVE TSUNAMI WARNING CAPABILITY
- EDUCATION FOR A TSUNAMI WARNING SYSTEM
- KNOWLEDGE MANAGEMENT FOR A TSUNAMI WARNING SYSTEM
- STRATEGIC PARTNERSHIPS FOR A TSUNAMI WARNING SYSTEM
- ONGOING DIALOGUE ON THE CHALLENGE OF BECOMING TSUNAMI DISASTER RESILIENT


BOOK OF
KNOWLEDGE
- Perspectives
On Science, Policy,
And Change