Hawaii Hazards Awareness & Resilience Program

Produced by

Hawaii State Civil Defense

HAWAII HAZARDS AWARENESS & RESILIENCE PROGRAM:

GOAL: To enhance community resilience to multiple hazards through a facilitated education and outreach program that promotes hazard understanding and awareness, and offers tools and information resources to guide mitigation, preparedness, response and recovery.

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Module 5: Risk Assessment

Part 4: Sample Methodologies for Assessing Risk

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Contents

- Sample Methodologies for Assessing Risk
  - International Federation of the Red Cross (IFRC) Vulnerability and Capacity Assessment (VCA).
  - Federal Emergency Management Agency (FEMA) Risk Assessment.
  - National Oceanic and Atmospheric Administration (NOAA) Coastal Services Center (CSC) Roadmap for Adapting to Coastal Risk.

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Module 5: Risk Assessment

IFRC VULNERABILITY & CAPACITY ASSESSMENT (VCA)

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Vulnerability and Capacity Assessment (VCA)

- Developed by the International Federation of Red Cross and Red Crescent Societies (IFRC).
- Highly participatory approach
  - Helps community groups to identify major issues of concern; and
  - Increase their own ability to plan and implement programs to mitigate those issues or problems.
- Offers four documents that provide guidance and tools for facilitating and implementing a community VCA.

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Vulnerability and Capacity Assessment (VCA) Documents

1. *What is a VCA* – An explanation of VCA.
2. *How to do a VCA* – A step-by-step guide.
3. *VCA toolbox* – Instructional guidance for using various information-gathering techniques.
4. *VCA training guide* – Instructional guidance for VCA facilitators.

IFRC VCA Toolbox

- On the web: http://www.ifrc.org/Global/Publications/disasters/vca/vca-toolbox-en.pdf
- Includes a variety of tools and methods for collecting and assessing vulnerability and capacity information. Some examples:
  – Baseline Data Collection
  – Community Mapping
  – Household/Neighborhood Vulnerability Assessment
  – Brainstorming
  – Wall Method
  – Problem Tree

Collecting Information

- Tools to facilitate community research.
- Examples:
  – RRS 2: Community Baseline Data
  – RRS 6: Mapping
  – RRS 10: Household/Neighborhood Vulnerability Assessment

RRS 2: Community Baseline Data

- A checklist for collecting information to assess a community's vulnerability to disaster and its capacities to respond.
- Checklist is divided into categories that facilitate collection of information.

RRS2: Community Baseline Data Categories

- Location of community
- Physical description of the community
- Climatic conditions and extreme events
- Demographics
- Local authorities and organizations
- Human vulnerability to disasters
- Health and nutritional conditions
- Health services
- Physical vulnerability of the community
- Infrastructure and access
- Food
- Housing and shelter
- Water
- Sanitation
- Planning and preparedness
- Emergency response resources
- Local capacities for disaster mitigation and response

RRS 6: Mapping

- Provides a broad overview of the area of interest, and how it has changed over time.
- Can cover many different sectors at a time; less time consuming than other methods.
- The visual nature of this exercise enables participates to quickly see relationships, linkages and patterns.
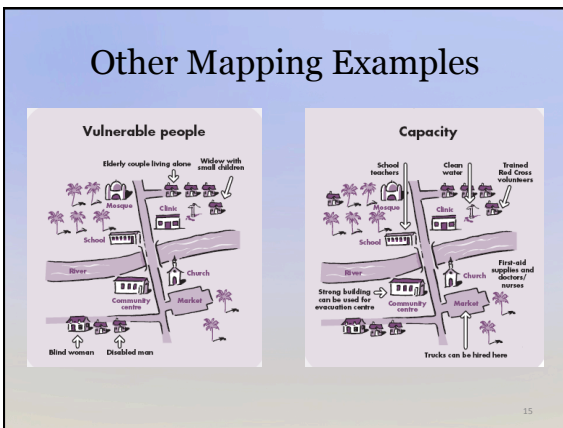- Useful for assessment, planning, monitoring and evaluation.

Mapping Example 1
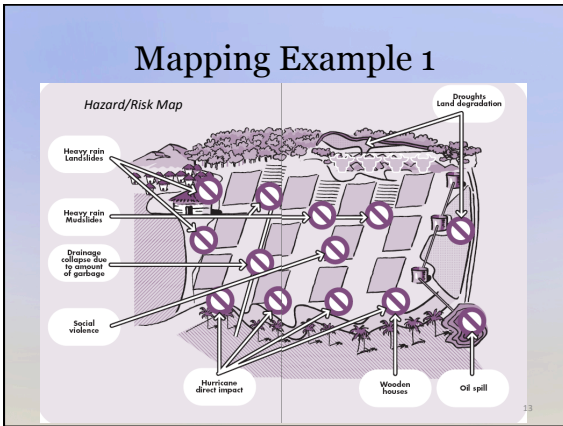
Mapping Example 2
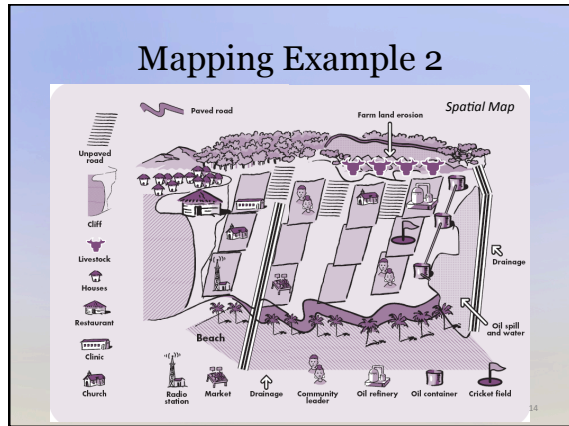
Other Mapping Examples

RRS 10: Household/Neighborhood Vulnerability Assessment

- Used to assess the level of vulnerability of households and neighborhoods to likely hazards and risks.
- Graphically portrays the main vulnerabilities, enabling actions to be taken to reduce the potential effects of a threat.

RRS 10: Household/Neighborhood Vulnerability Assessment

- Participants create a matrix, with identified threats along the horizontal axis, and parts of their household (indoors and outdoors) along the vertical axis.
- The material or condition of each household element (e.g., roof, walls, foundation) are ranked from 1 to 5 according to the level of vulnerability, with 1 being the lowest and 5 the highest.

Household Vulnerability Assessment Example

Household	Mother	Type of work		School teacher				
Family members	5	Adult	3	Children	2	Male 2	Female	3

House	Hurricane/ winds	Fire	Earthquake	Eruption	Floods	Landslides	Mudslides	Forest fire
Roof	Zinc 3	Zinc 2	Zinc 3	Zinc 1	Zinc 1	Zinc 1	Zinc 1	Zinc 1
Ceiling	Wood 2	Wood 5	Wood 1	Wood 1	Wood 1	Wood 1	Wood 1	Wood 3
Walls	Mix 3	Mix 3	Mix 1	Mix 1	Mix 3	Mix 3	Mix 3	Mix 3
Floors	Wood 1	Wood 4	Wood 1	Wood 1	Wood 3	Wood 3	Wood 2	Wood 3
Windows	Wood 5	Wood 5	Wood 2	Wood 1	Wood 1	Wood 3	Wood 3	Wood 4
House base	Concrete 1	Concrete 1	Concrete 2	Concrete 1	Concrete 1	Concrete 1	Concrete 1	Concrete 1
Exits	2	2	2	2	2	2	2	2
Drainage	Iron 5	Iron 1	Iron 1	Iron 1	Iron 5	Iron 5	Iron 5	Iron 1
Trees around	5	5	1	1	1	2	3	4
Evacuation route/road	5	1	3	1	3	2	2	1
Electricity cables	3	5	1	1	3	1	1	2
Water access	2	4	1	1	1	1	1	1
Telephone access	4	3	5	1	1	1	1	1
Electricity service	4	5	4	1	2	1	1	3
Total Vulnerability	45	46	28	15	28	27	27	30
Rank- Vulnerability	64.28% High	65.71% High	40% Medium	21.42% Low	40% Medium	38.57% Medium	38.57% Medium	42.85% Medium

Neighborhood Vulnerability Assessment Example

Household	77% male	23% female	82% formal employee	18% part-time employee			
Neighbourhood	Forest	Adults 980	Children 520	Males 784	Females 716		

Risk	Hurricane/ winds	Fire	Earthquake	Eruption	Floods	Landslides	Mudslides	Forest fire
Homes 402	25 vulnerability	10 vulnerability	32 vulnerability	80 vulnerability	35 vulnerability	8 vulnerability	22 vulnerability	3 vulnerability
Streets/roads 14	4 vulnerability	-	3 vulnerability	1 vulnerability	1 vulnerability	5 vulnerability	2 vulnerability	-
Mountain 3	-	-	-	1 vulnerability	-	1 vulnerability	1 vulnerability	3 vulnerability
Cliffs 1	-	-	High vulnerability	-	-	High vulnerability	High vulnerability	-
Evacuation routes 5	2 vulnerability	1 vulnerability	2 vulnerability	1 vulnerability	2 vulnerability	1 vulnerability	2 vulnerability	1 vulnerability
Evacuation meeting points 3	1 Pitt Rd	-	2 B Kate Rd Kane St	1 R Kate Rd	1 R Cliff St	1 R Kate Rd	1 R Pitt Rd	1 R Dude Rd
Drainage 50	15 vulnerability	-	15 vulnerability	15 vulnerability	15 vulnerability	5 vulnerability	21 vulnerability	-
Trees 1000 +	120 vulnerability	120 vulnerability	-	200 vulnerability	-	18 vulnerability	35 vulnerability	120 vulnerability
Electricity cables	High vulnerability	High vulnerability	High vulnerability	Low vulnerability	Low vulnerability	Low vulnerability	Low vulnerability	Low vulnerability
Contingency plans	Yes	No	No	No	Yes	No	No	No
Telephone access	High vulnerability	Low vulnerability	High vulnerability	Low vulnerability	Low vulnerability	Low vulnerability	Low vulnerability	Low vulnerability
Information protocols	High vulnerability	High vulnerability	High vulnerability	High vulnerability	Low vulnerability	Medium vulnerability	Medium vulnerability	High
Frequency of events within the past 10 years	3	28	1	-	7	1	3	1
Magnitude of the events	High	High	Low	High	Low	Medium	Medium	Low

- Consolidate the information gathered from the individual household vulnerability assessments into one chart to summarize neighborhood vulnerability.
- Share the combined data with community members to verify conclusions and generate discussion about ways that vulnerabilities can be reduced.

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Analyzing Information

- Tools to facilitate analysis of collected information include:
  - MRS 1: Brainstorming
  - MRS 3: Wall Method
  - MRS 4: Problem Tree

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MRS 1: Brainstorming

- Gathers many ideas in a short period of time.
- Encourages spontaneity and creativity.
- Applicable to all stages of an assessment:
  - Identification of problems or issues
  - Proposing possible solutions
  - Planning to implement solutions
  - Evaluation of outcomes

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MRS 1: Brainstorming

- Most effective when carried out in small groups (maximum of 5 persons).
- When dividing a larger group into small groups, consider ways to encourage different outcomes. For example:
  - Group women and men in different groups.
  - Have each group represent a different part of the community.
- Have each group summarize discussions on flipcharts or large sheets of paper, and share with the larger group.

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Brainstorming Techniques

- **Go around the circle:** Each person takes a turn to share thoughts and ideas. Recorder takes notes.
- **Group storm:** Assign small groups a topic. After discussion, have them present their main ideas to the larger group.
- **Popcorn:** Participants call out ideas as they pop into their heads. Recorder takes notes.
- **Silent storm:** Pass out paper and have participants write down their thoughts and ideas in silence. Then have each participant present out-loud to the group.
- **Sticky circle:** Each person receives 3-5 circles of paper with tape on the back (or Post-it notes), and writes down ideas. Post ideas on a wall, grouping them together into different categories.

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MRS 3: Wall Method

- Utilizes a good-sized wall to be able to display a large amount of information at one time.
- Enables data collected during interviews, mapping, or other research activities to be clustered into groups that represent similar ideas.
- Facilitates the triangulation and verification of information.
- Helps to "funnel" or distill collected information to that key themes are identified.

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Wall Method Example

Question: *"What could communities do to protect themselves before, during and after a disaster?"*

1. Triangulation of collected information

2. Wall Method of clustering information

3. Result: Key themes

MRS 4: Problem Tree

- A flow diagram that shows the relationship between different aspects of a particular issue or problem.
- Can help visualize the root causes of an issue or problem that needs to be addressed in order to reduce vulnerability.
- Tree trunk represents the *problem*, roots are the *causes*, and leaves are the *effects*.

Problem Tree Example

Effects

Problem(s)
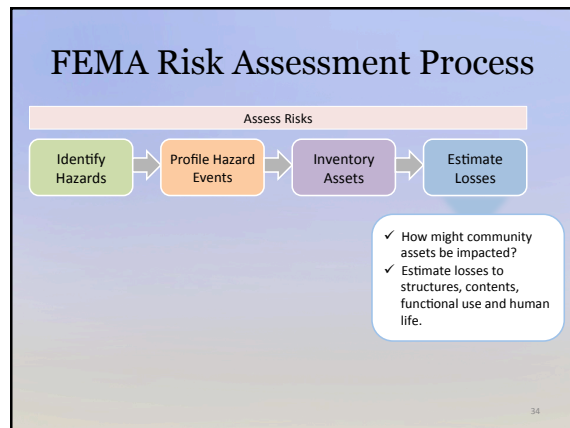
Causes

Module 5: Risk Assessment
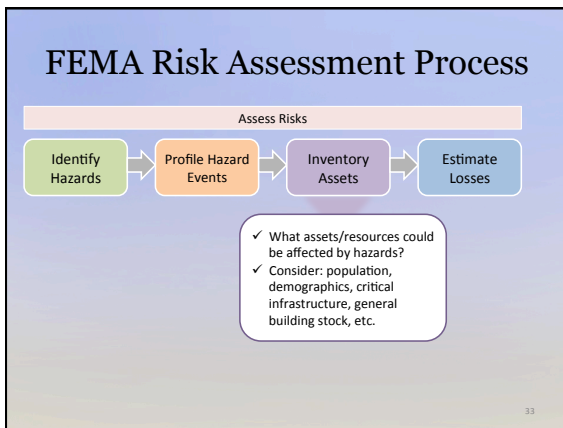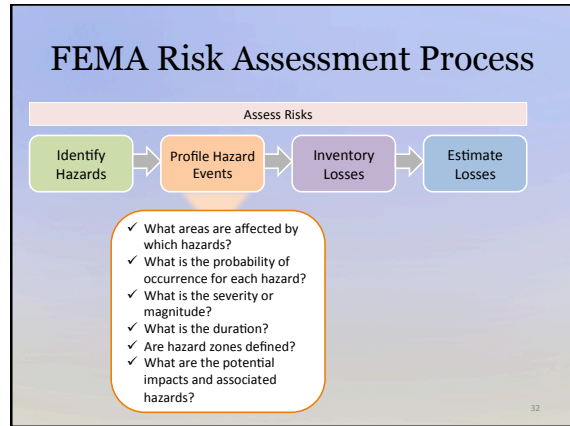
FEMA RISK ASSESSMENT

FEMA Risk Assessment

- Developed by the Federal Emergency Management Agency (FEMA).
- Offers step-by-step guidance documents to conduct a risk assessment, develop a mitigation plan, and engage community stakeholders in the process.
- Risk assessment is an integral step in the development of a Hazard Mitigation Plan.

FEMA Risk Assessment Process

Assess Risks

Identify Hazards → Profile Hazard Events → Inventory Losses → Estimate Losses

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FEMA Risk Assessment Process

Assess Risks

Identify Hazards → Profile Hazard Events → Inventory Losses → Estimate Losses

- ✓ What hazards affect the study area?
- ✓ What is the hazard history for your location?

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FEMA Risk Assessment Process

Assess Risks

Identify Hazards → Profile Hazard Events → Inventory Losses → Estimate Losses

- ✓ What areas are affected by which hazards?
- ✓ What is the probability of occurrence for each hazard?
- ✓ What is the severity or magnitude?
- ✓ What is the duration?
- ✓ Are hazard zones defined?
- ✓ What are the potential impacts and associated hazards?

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FEMA Risk Assessment Process

Assess Risks

Identify Hazards → Profile Hazard Events → Inventory Assets → Estimate Losses

- ✓ What assets/resources could be affected by hazards?
- ✓ Consider: population, demographics, critical infrastructure, general building stock, etc.

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FEMA Risk Assessment Process

Assess Risks

Identify Hazards → Profile Hazard Events → Inventory Assets → Estimate Losses

- ✓ How might community assets be impacted?
- ✓ Estimate losses to structures, contents, functional use and human life.

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FEMA Guidance Documents

- Understanding Your Risks – *Identifying Hazards and Estimating Losses*. FEMA publication 386-2. 2001. Available online: http://www.fema.gov/library/viewRecord.do?id=1880
- Getting Started – Building Support for Mitigation Planning. FEMA publication 386-1. 2002. Available online: http://www.fema.gov/library/viewRecord.do?id=1867

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Module 5: Risk Assessment

NOAA ROADMAP

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NOAA Roadmap for Adapting to Coastal Risk

- Developed by NOAA Coastal Services Center.
- A participatory assessment process designed to:
  - Engage stakeholders in a comprehensive, yet rapid, assessment of local vulnerabilities;
  - Use existing information resources to evaluate potential hazard and climate impacts;
  - Collaborate across disciplines to better understand and plan for impacts; and
  - Identify opportunities for improving resilience to current and future hazards risks.

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NOAA Roadmap for Adapting to Coastal Risk

- The approach emphasizes the value of collaboration, local knowledge, spatial data, and multimedia materials.
- Guidance documents, resources, examples and training opportunities available online at: http://www.csc.noaa.gov/digitalcoast/training/roadmap

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The Roadmap Approach

THE ROADMAP APPROACH
- ☑ Getting Started
- ☑ Hazards Profile
- ☑ Societal Profile
- ☑ Infrastructure Profile
- ☑ Ecosystem Profile
- ☑ Risk-Wise Strategies

- Getting Started
  - Define community goals, build the team, identify priority issues, and prepare for the assessment.
- Hazards Profile
  - Explore relevant hazards and climate trends as a starting point for community vulnerabilities.
- Societal Profile
  - Evaluate strengths and vulnerabilities of the local population

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The Roadmap Approach
(Continued)

THE ROADMAP APPROACH
- ☑ Getting Started
- ☑ Hazards Profile
- ☑ Societal Profile
- ☑ Infrastructure Profile
- ☑ Ecosystem Profile
- ☑ Risk-Wise Strategies

- Infrastructure Profiles
  - Identify the strengths and vulnerabilities of the built environment.
- Ecosystem Profile
  - Consider the strengths and vulnerabilities of important natural resources.
- Risk-Wise Strategies
  - Explore opportunities and challenges for risk reduction through education, planning, and regulatory processes.

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Summary

- There are numerous ways to foster community participation, collect and analyze data, and communicate the results of a risk assessment.
- The basic steps and considerations of a risk assessment, however, are straightforward.
- The ultimate goal of any risk assessment is to be able to better understand, represent and explain the impacts of disasters in order to effectively mitigate them and reduce suffering and loss.
- See *Module 8: Mitigating Your Risk* for more information about hazard mitigation.

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Discussion

1. Considering the methodologies summarized here, what tools and methods do you think would be effective for assessing risk in your community?

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HHARP Resources

- The following resources can help you get started with the risk assessment process:
  - **Module 5: Risk Assessment**
    - Worksheet 1: Hazard Identification
    - Worksheet 2: Hazard Profile
    - Worksheet 3: Developing a Community Profile
    - Reference Material

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Questions?

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MAHALO

The Hawaii Hazards Awareness & Resilience Program (HHARP) is the result of a collaborative partnership between Hawaii State Civil Defense and the Pacific Disaster Center.

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