

# *Toward a Vibrant, Prosperous and Sustainable Fresno County*

## **Introduction to Vulnerability-Adaptation Analysis**

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## **Overview and Goals**



- **Overview:** What is vulnerability and adaptation?
- **Selected Findings from the Fresno Report**
  - Vulnerable Populations and Communities
  - Vulnerable Economic Sectors and Activities
  - Vulnerable Services and Infrastructure



## What is Vulnerability & Adaptation?

## Managing Risks of Climate Change

- **We need two complementary approaches**
  - **MITIGATION** – human interventions to reduce the anthropogenic forcing of the climate system
    - Reducing greenhouse gas sources and emissions
  - **ADAPTATION** – maximizing the potential benefits and minimizing the potential negative impacts of changing climatic conditions
    - Reducing social vulnerabilities
    - Increasing our resilience (i.e., prepare, respond, bounce back, and recover after shocks, recessions, extreme events, etc., learn from them, and make necessary changes)

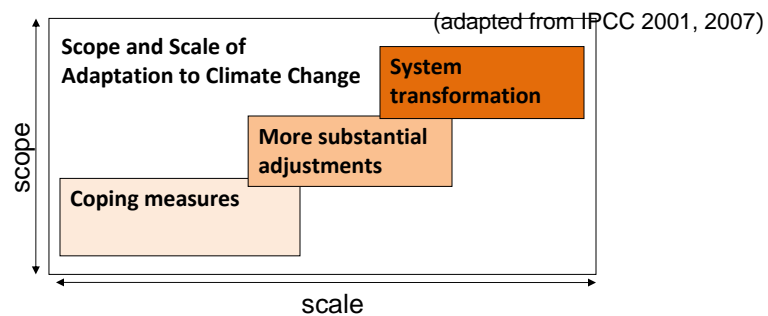
## Actually, we have a third choice: *Suffering... if we do nothing*

### *Negative Trends in Fresno County and SJV:*

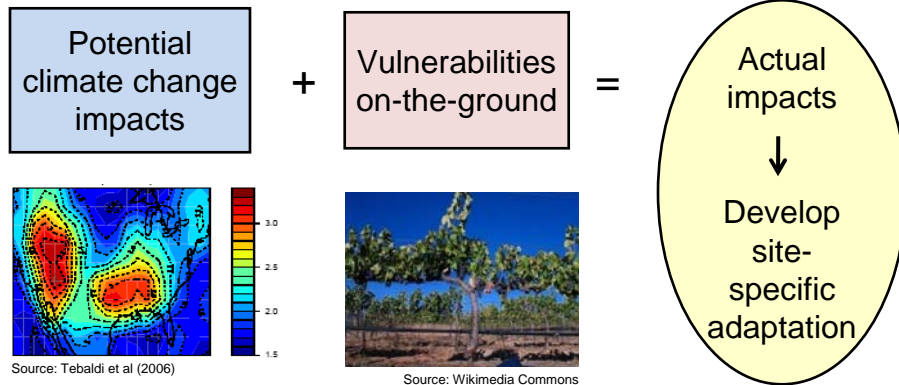
- Loss of high-quality agricultural land to urbanization, sprawl
- Increasing health problems due to poor air quality (pulmonary disease); obesity, heart disease, diabetes; growing health care costs
- Poor access to fresh, healthy food choices and spaces for physical activity
- Increased traffic congestion and traffic that travels through Fresno County along SR 99 and I-5
- Lack of affordable housing
- High unemployment rate
- Groundwater overdraft

## Adaptation to Climate Change – What is Involved??

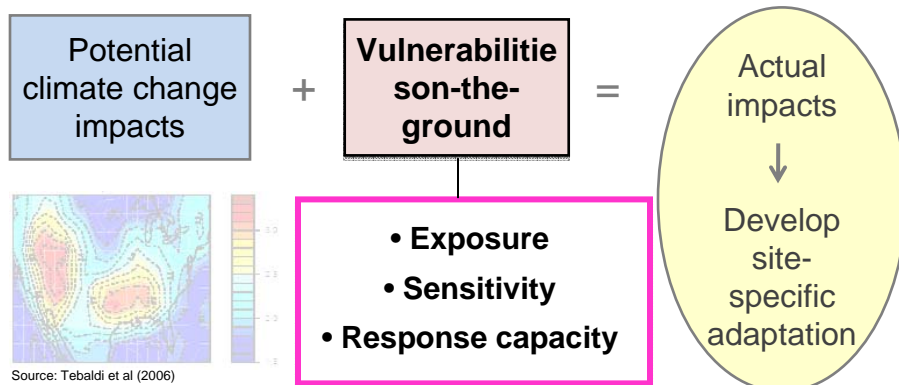
*The adjustments one makes in a system to prepare for and deal with the impacts of climate change*



## Actual Impacts of Climate Change are the Result of:



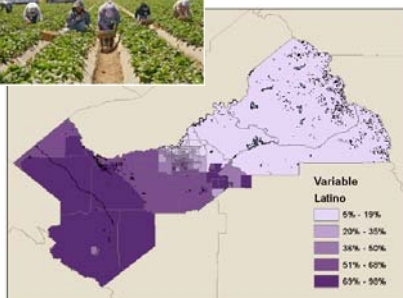
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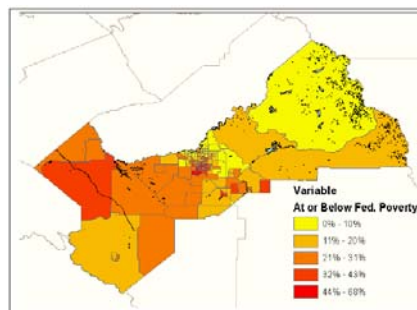
## Selected Findings from Fresno Social Systems Report

### Vulnerabilities to Extreme Heat & Air Pollution

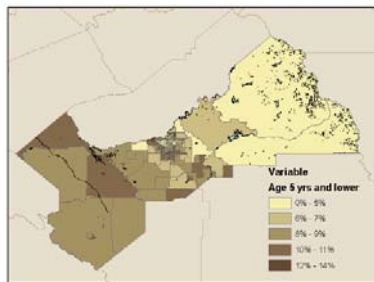
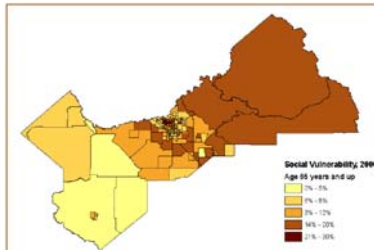


- Outdoor workers are highly exposed to extreme heat and the most air-polluted areas
- Hispanic/Latino population already has high rates of asthma, diabetes (sensitivity)

- Highest poverty, seasonal or low-wage employment, and low health care coverage (response capacity)



## Vulnerability to Extreme Heat (2)



- Exposure varies by age group
- Elderly and infants (and those with pre-existing health conditions) are most sensitive to extreme heat



## Vulnerabilities to Floods, Dam Failure



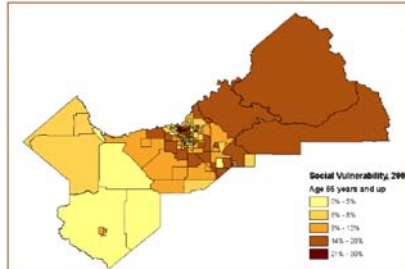
100 Year Flood Inundation Areas  
Fresno County General Plan  
Figure 9-7



Dam Failure Flood Inundation Areas  
Fresno County General Plan  
Figure 9-8

- Floodplain residents along Kings, San Joaquin Rivers, downstream of Millerton Lake (Friant Dam), Big Dry Creek Dam, Redbank-Fancher Creek Project Dams, and Pine Flat Dam
- Many privately owned flood control efforts (dams and levees on private property) do not meet the government-required flood protection standards
- Poverty makes it more difficult to buy/keep insurance or prepare

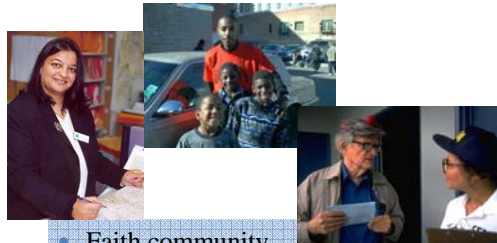
## Vulnerability to Wildfire



- Greatest elderly population in most fire-prone, least accessible areas (exposure)
- Elderly population also more sensitive to air pollutants (smoke from fire)
- Potentially most in need for public assistance to prepare for, prevent, and escape wildfires (response capacity)

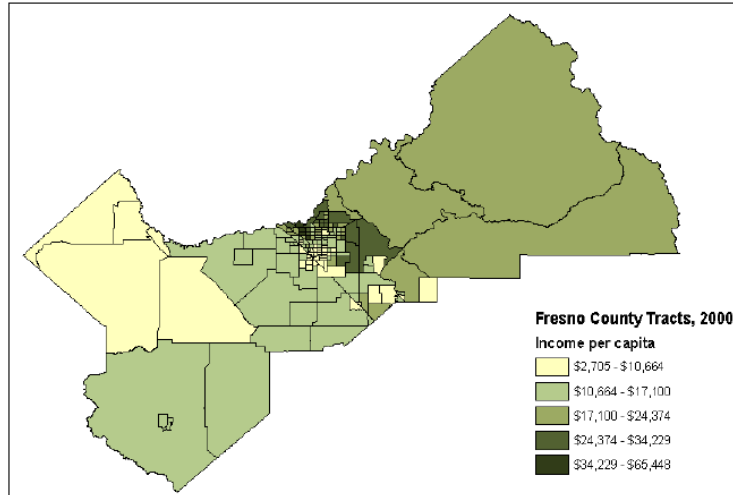
## Examples of Community Assets for Reducing Social Vulnerability

- Social groups that
  - educate about risks
  - assist in taking preventive measures
  - provide social support in case of emergency
  - reach into socially or linguistically isolated communities
  - provide (access to) social services
  - Work toward env. justice

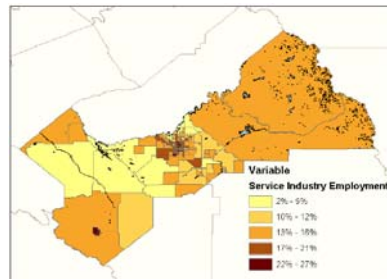


- Faith community
- Civic groups
- Representatives of under-served communities
- Government services
- Businesses that stabilize and strengthen the local economy
- Environmental groups
- Schools, etc.

## Social Vulnerability – All Economics? Integrated View

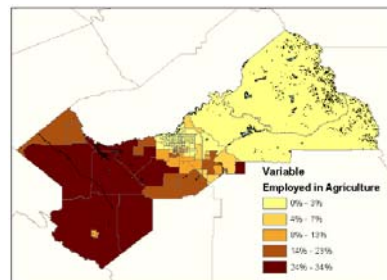


## Vulnerable Economic Sectors



Economic Sector	Employment (% of total)
Service Industry	21%
Agriculture Industry	21%
Trades	19%
State & Local Government	16%
Manufacturing	8%
Construction & Mining	5%
Finance, Insurance, Real Estate	4%
Transportation & Utilities	4%
Federal Government	3%

Source: California Department of Finance, California County Profiles, February 2001 (based on 2000 data)





## Climatic Threats to Agriculture

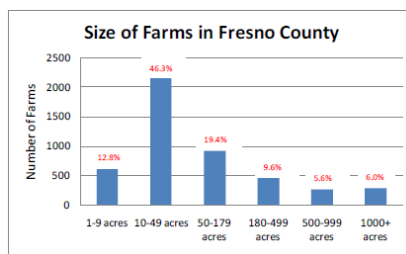
- Higher temperatures, incl. extreme temperatures
- Reduced water availability
- More intense downpours
- Water demand by plants and animals will increase
- Reduced number of chill hours
- Effects of changing climate on crop pollination
- Increased risk of pest infestations, spread of invasive plant species



## Vulnerabilities in Agriculture

### Factors Influencing Farmer's Vulnerability

- Location
- Types and diversity of crops and cattle
- Current farming practices
- Access to water resources, wells, and water rights
- Financial resources
- Diversity of income sources
- Access to flood and drought insurance
- Participation in farming cooperatives
- Access to and use of climate-related information
- Market-, policy-related, or legal constraints on farming



## Vulnerable Services: Water

- **Climate change threats**
  - Water supply reduction
  - Water quality changes
  - Flooding and runoff
- **Concurrent stressors**
  - Growing demand due to population growth (and higher temperatures)
  - Already overpumping
  - Infrastructure
  - Groundwater pumping, banking, desalinization is energy-intensive, costly
  - High water cost
  - Septic systems, wastewater treatment facilities

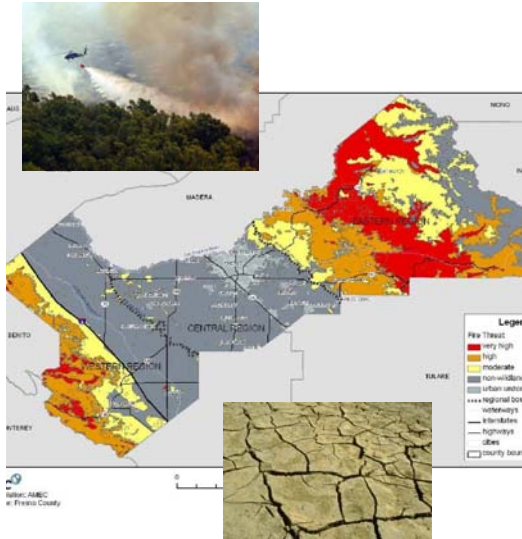


## Vulnerable Infrastructure

- Threats to infrastructure in and beyond the county:
  - Extreme heat
  - Flashfloods, high runoff
  - Wildfire
  - Landslides
  - Sea-level rise and coastal flooding/erosion
- Higher demands on infrastructure
  - Growth, extreme heat > increasing energy demand
  - Growth > traffic volume increasing
  - Aging levees



# Vulnerable Services: Emergency Response



- Growing demand, partly due to climate, partly due to growth in hazardous areas
  - Frequency
  - Extensiveness
- Strain on resources
- Dependence on state, feds
- Less time for recovery between events

## Thank you for being here!

Exec. Summary & full technical report are available at:  
<http://www.lgc.org/adaptation/fresno/>

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