

Integrating Drought Risk Management into Local Planning Framework

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Recent droughts in the USA

Drought is one of the most costly disasters.

2007: Southeast drought

2011-2012: Texas drought

2012: Midwest drought

2013-2014: California drought

What is drought?

Normal part of the climate

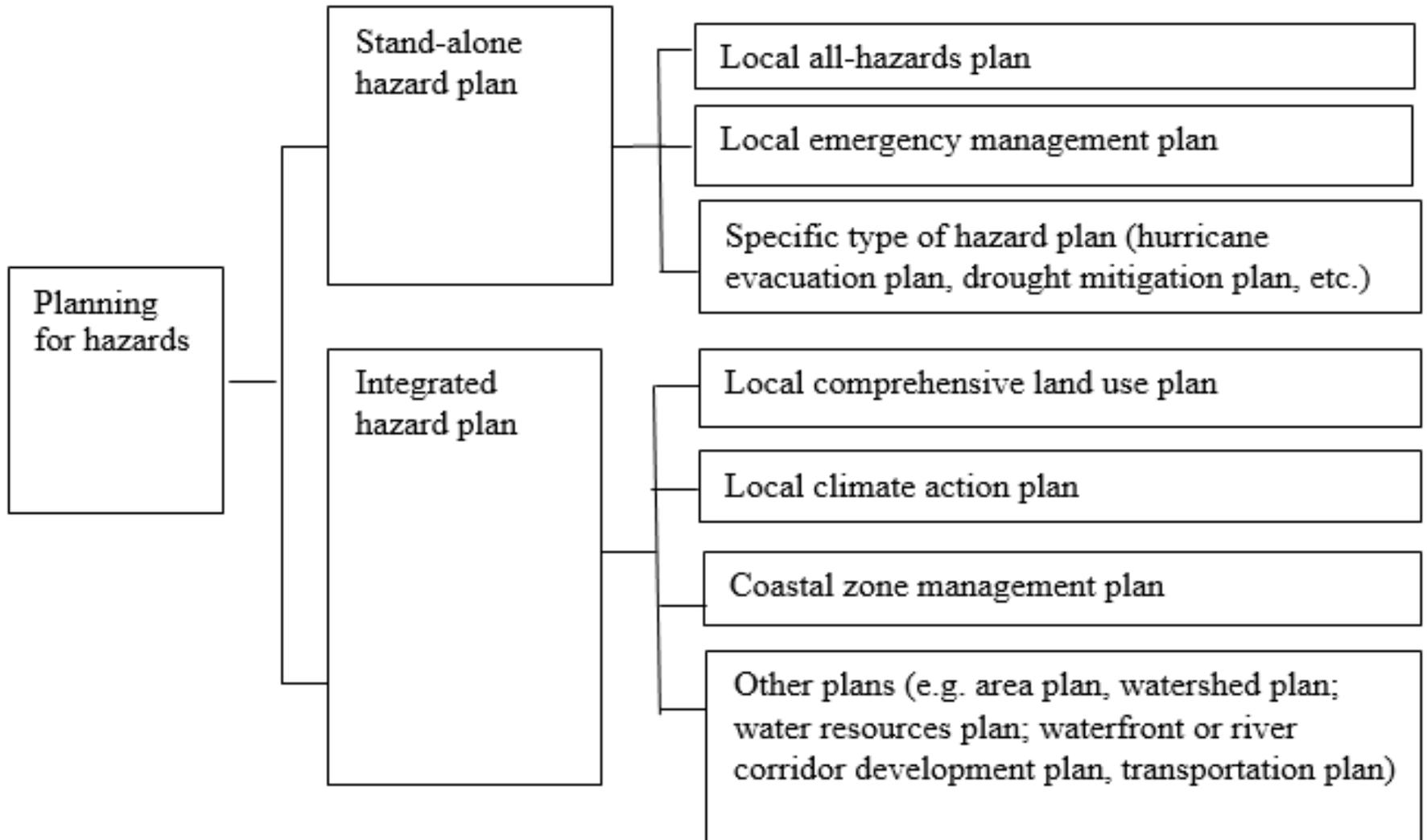
- Slow-onset, ‘creeping phenomenon’
- Lack of universal definition
- Nonstructural, long-lasting, wide-ranging impacts



Why plan for drought?

- Increasing frequency and severity of droughts
- Continuing and changing vulnerability
- Tremendous economic losses
- Significant social stress
- Environmental degradation

Stand-alone plan vs. Integrated plan



ZONING PRACTICE

OCTOBER 2009

AMERICAN PLANNING ASSOCIATION



ISSUE NUMBER 10

PRACTICE SAFE GROWTH AUDITS



BASIC SAFE GROWTH AUDIT QUESTIONS

COMPREHENSIVE PLAN

Land Use

- Does the future land-use map clearly identify natural hazard areas?
- Do the land-use policies discourage development or redevelopment within natural hazard areas?
- Does the plan provide adequate space for expected future growth in areas located outside natural hazard areas?

Transportation

- Does the transportation plan limit access to hazard areas?
- Is transportation policy used to guide growth to safe locations?
- Are movement systems designed to function under disaster conditions (e.g., evacuation)?

Environmental Management

- Are environmental systems that protect development from hazards identified and mapped?
- Do environmental policies maintain and restore protective ecosystems?
- Do environmental policies provide incentives to development that is located outside protective ecosystems?

Public Safety

- Are the goals and policies of the comprehensive plan related to those of the FEMA Local Hazard Mitigation Plan?
- Is safety explicitly included in the plan's growth and development policies?
- Does the monitoring and implementation section of the plan cover safe growth objectives?

ZONING ORDINANCE

- Does the zoning ordinance conform to the comprehensive plan in terms of discouraging development or redevelopment within natural hazard areas?
- Does the ordinance contain natural hazard overlay zones that set conditions for land use within such zones?
- Do rezoning procedures recognize natural hazard areas as limits on zoning changes that allow greater intensity or density of use?
- Does the ordinance prohibit development within, or filling of, wetlands, floodways, and floodplains?

SUBDIVISION REGULATIONS

- Do the subdivision regulations restrict the subdivision of land within or adjacent to natural hazard areas?
- Do the regulations provide for conservation subdivisions or cluster subdivisions in order to conserve environmental resources?
- Do the regulations allow density transfers where hazard areas exist?

CAPITAL IMPROVEMENT PROGRAM AND INFRASTRUCTURE POLICIES

- Does the capital improvement program limit expenditures on projects that would encourage development in areas vulnerable to natural hazards?
- Do infrastructure policies limit extension of existing facilities and services that would encourage development in areas vulnerable to natural hazards?
- Does the capital improvement program provide funding for hazard mitigation projects identified in the FEMA Mitigation Plan?

OTHER

- Do small area or corridor plans recognize the need to avoid or mitigate natural hazards?
- Does the building code contain provisions to strengthen or elevate construction to withstand hazard forces?
- Do economic development or redevelopment strategies include provisions for mitigating natural hazards?
- Is there an adopted evacuation and shelter plan to deal with emergencies from natural hazards?

Comprehensive Plan

Land Use

Transportation

Environmental Management

Public Safety

Zoning Ordinance

Subdivision Regulations

Capital Improvement Program and Infrastructure Policies

Scope of this study

Research question:

1. Are local planners aware of their vulnerability to water shortage and droughts?
2. To what extent are drought planning integrated into local comprehensive plans?
3. Are any of the nine jurisdictional variables directly correlating with the plan quality in drought preparedness?

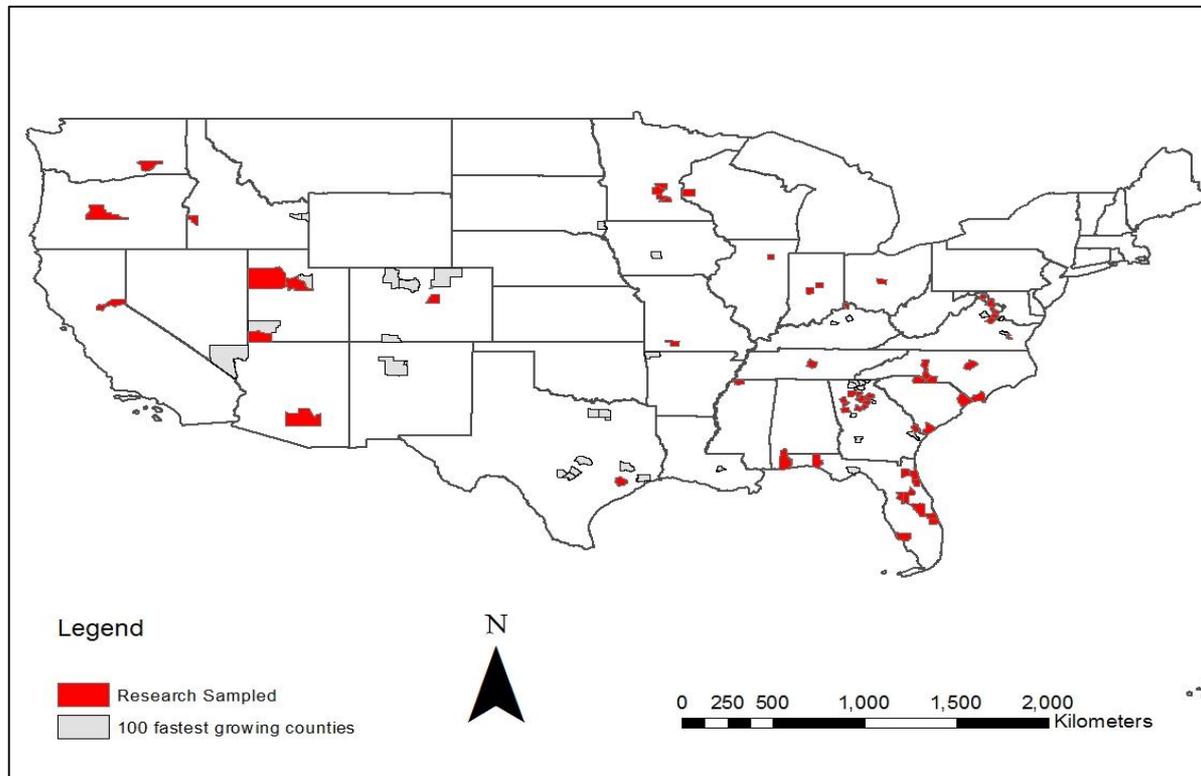
Research Method

- Content analysis (plan coding protocol)
- Sample (100 fastest growing counties)
- Evaluation criteria and procedure
- Calculation method

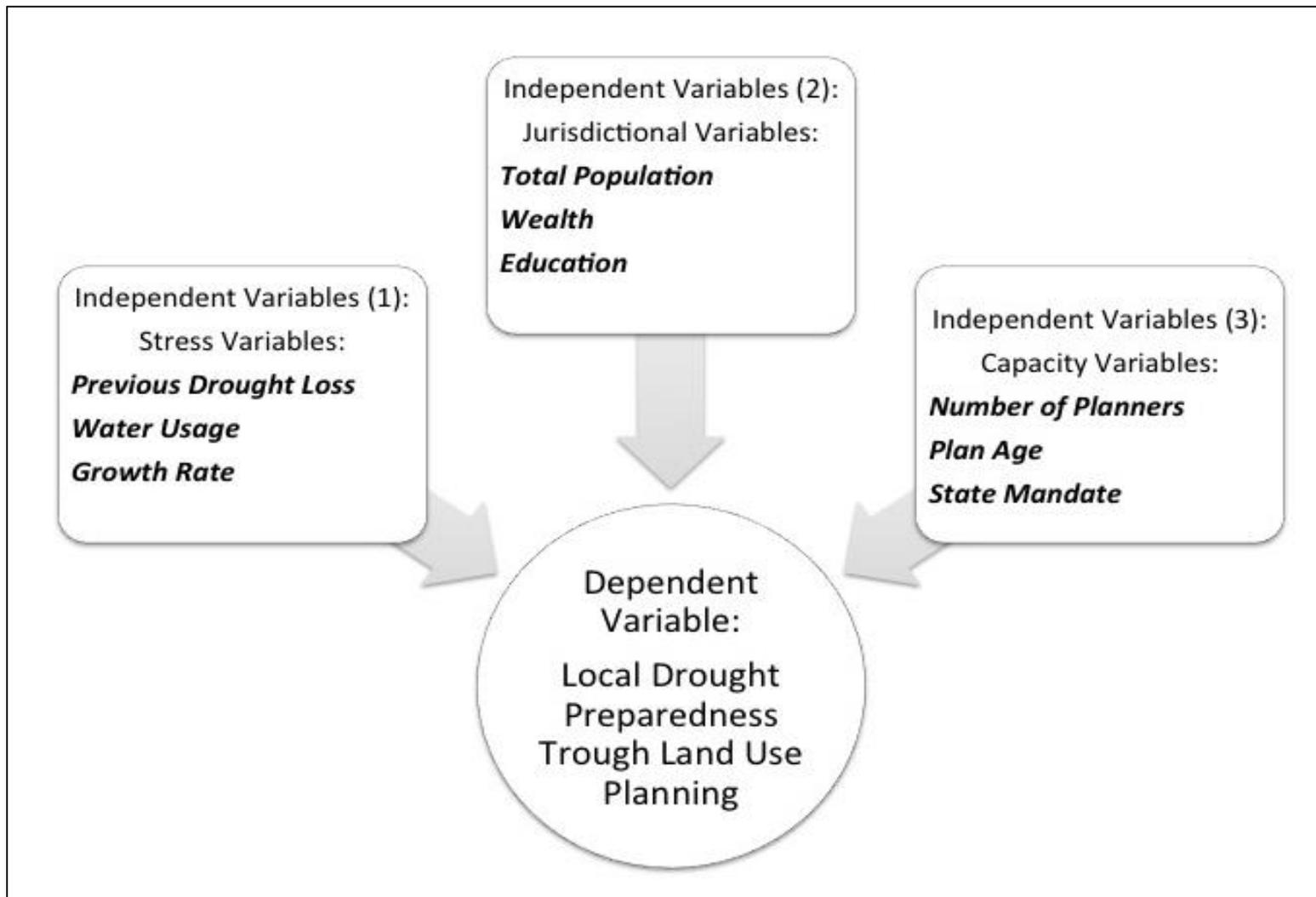
Research Sample

The 100 fastest growing counties in the U.S. defined by the housing units changes (2000-2009, U.S. Census Bureau)

- Represent a good cross-section of the U.S. counties
- High potential in sprawl and thus vulnerability to droughts
- Face with tremendous population growth



Measuring if Jurisdictional Factors Affect Local Planning Capacity in Drought Preparedness



Results

Local Performance

Components ^a	Number of indicators	Minimum	Maximum	Mean	Std. Dev.
1. Awareness	7	1.4	7.9	3.5	1.31
1. Analysis	8	0.0	6.3	2.2	1.31
1. Actions	18	1.1	7.2	3.7	1.44
Total ^b	33	3.2	20.1	9.4	3.35

(a: component score range: 0-10; b: total score range: 0-30)

1. Are local planners aware of their vulnerability to water shortage and droughts?

Generally, these plan sampled are weak in drought planning with a mean total score of 9.4 out of total possible score of 30 (31.3%).

2. To what extent are drought planning integrated into local comprehensive plans?

They were strongest in actions (37%), weaker in awareness (35%), and weakest in analysis (22%).

3. Are any of the jurisdictional variables directly correlating with the plan quality in drought preparedness?

These counties' plan quality in drought preparedness planning varied widely and none of the selected jurisdictional characteristics were found significantly correlated with their planning capacity for drought resilience.

Policy implications

- Local jurisdictions paid attentions to water resources, but they are not ready for water scarcity/shortage/drought disasters.
- Adaptive water conservation strategies/policies should be incorporated into local planning framework.
- The integrated model is an efficient approach to lead local jurisdictions towards “drought-ready-communities”.
- Local capacity in enhancing local drought resilience depends on both the crisis management and risk management.

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