2013

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Xinyu Fu
University of Nebraska-Lincoln

Zhenghong Tang
University of Nebraska - Lincoln, ztang2@unl.edu

Jianjun Wu
Beijing Normal University

Kevin McMillan
University of Nebraska-Lincoln

Int. J. Disaster Risk Sci. 2013, 4 (2): 51–58
doi:10.1007/s13753-013-0006-x

ARTICLE

Drought Planning Research in the United States: An Overview and Outlook

Xinyu Fu[1,*], Zhenghong Tang[1], Jianjun Wu[2], and Kevin McMillan[3]

[1]Community and Regional Planning Program, College of Architecture, University of Nebraska-Lincoln, Lincoln, NE 68588, USA
[2]Academy of Disaster Reduction and Emergency Management, Beijing Normal University, Beijing 100875, China
[3]School of Natural Resources, University of Nebraska-Lincoln, Lincoln, NE 68588, USA

Abstract Drought is widely known as an insidious hazard due to its complex and unique characteristics. Drought disasters have brought tremendous economic losses and significant social and environmental impacts to communities across the globe. To further understand the hazard drought poses and provide insights into planning for drought preparedness, this article conducts a thorough literature review of drought hazard and drought planning frameworks within the United States. Two main approaches and three major forms of drought planning are discussed and summarized. Based on this review, a preliminary overview of drought planning status in the United States is presented. This study provides insight into major drought planning literature and establishes a link with drought mitigation and adaptation. The article concludes with discussion and implication for future drought planning and a future research outlook.

Keywords adaptation, crisis response, drought, hazard planning, mitigation, risk management

1 Introduction

The recent consecutive drought events in the United States have reminded people of drought's catastrophic nature, especially since the 2012 drought broke the record and became the spatially most extensive drought since the 1930's (NCDC 2012). Usually known as a slow onset hazard, the drought of 2012 across the central plains has been referred to as a "flash drought" by a NOAA report due to its very fast onset. This drought has not only overturned our understanding of the hazard, but also further revealed the difficulty of drought prediction and the inability to fully understand the hazard itself, its evolving processes, and the underlying causes (NOAA 2013). In addition, the 2012 drought was believed to be one of the costliest in the U.S. history. By July 2012, before the central plains drought reached its peak severity, it was estimated to have caused an economic loss of USD 12 billion and the total loss estimate of the whole year exceeded USD 35 billion (Aon Benfield 2012; Henderson and Kauffman 2012; NOAA 2013). Since drought is highly unpredictable and our inability to fully understand the hazard itself and its root causes may hinder the progress of enhancing early prediction, warning, and timely response, various scholars and governmental officials have advocated devoting additional effort and resources to drought response and planning.

Drought is recognized as the most complex, most recurring, and costliest natural disaster in North America (Cook et al. 2007; Mishra and Singh 2010). It is also considered to affect the most people among all natural disasters and to impact nearly every region on Earth (Hagman 1984; Wilhite and Buchanan 2005). Drought is a normal part of climate that is the result of a lack of precipitation over a substantial period of time, and therefore no region on Earth can be immune (IPCC 2012). The hazard distinguishes itself from other natural hazards by its slow onset, as well as its long-lasting and wide-ranging characteristics. Also, there is no universal definition of drought, resulting in confusion about the onset and end of a drought as well as its degree of severity (Wilhite and Buchanan 2005).

Drought becomes a disaster once it produces social, economic, and/or environmental impacts (Wilhite and Buchanan 2005). Drought is widely known for its tremendous impact on the agricultural sector, but its impacts on other sectors (e.g. industrial, municipal water supply, tourism) are generally underestimated or even largely neglected. Impacts of drought can directly reduce cropland, rangeland, and forest productivity, increase wildfire occurrence, diminish water availability, kill livestock and wildlife, deteriorate wildlife and fish habitats, and cause other negative effects (Wilhite, Svoboda, and Hayes 2007). In addition to the consequences of direct impacts, drought can cause even more significant indirect losses. For example, reduction in crop productivity can bring significant economic impacts in terms of reduced income and government tax revenues, increased prices of food and food businesses, and increased budgets for disaster relief programs (Wilhite, Svoboda, and Hayes 2007). How one region is affected by drought may vary widely from another region due to spatial variations in the social, economic, and environmental contexts. Therefore, the risk of drought and

* Corresponding author. E-mail: scut.xinyufu@gmail.com

the vulnerability of the population to drought can be very different between regions.

The risk of drought in a region is dynamic in response to the drought hazard and the societal vulnerability at the time (Wilhite, Svoboda, and Hayes 2007). Drought hazard risk depends on the severity and frequency of drought occurrence in a region. Societal vulnerability can be explained by how a region's social, economic, and environmental characteristics can be affected (Hayes, Wilhelmi, and Knutson 2004). It was originally believed that risk was the sum of the hazard and vulnerability (risk = hazard + vulnerability), but the equation has been revised to be a product of the hazard and vulnerability (risk = hazard × vulnerability) due to the increasing intensity and duration of the impacts of drought (Knutson, Hayes, and Phillips 1998; Hayes, Wilhelmi, and Knutson 2004).

As the impacts of drought are both direct and indirect on various sectors and last for a substantial period of time, losses or impacts on other sectors (e.g. social stress, tourism, and environmental deterioration) are usually difficult to observe and report. As a result, the impacts and losses of each drought episode are believed to be more destructive and severe than what the estimated economic losses demonstrate. Climate change, changing land use patterns, population growth and many other factors are all believed to intensify and aggravate drought impacts in the near future (Wilhite 2011; IPCC 2012). Changing climate, along with the increased variation of precipitation, will undoubtedly increase the probability of drought in some regions. In addition, urbanization and land use developments rely heavily on water resources for construction. These developments can also disturb the integrity of watersheds, which results in reduced water quality and quantity. A growing population dramatically increases the demand for water, and makes it difficult to maintain a sufficient supply. Other driving factors include changing government policies, advancing technology, increasing environmental awareness, and improving resource management practices. Severe drought events increasingly demonstrate the urgent need to build up communities' resilience, sustainability, and preparedness planning at all levels of government.

2 Literature Review

The objective of this article is to conduct a literature review of drought planning in the United States. The goal of the review is to identify the different approaches and forms of drought planning in the United States, and to assess the strengths and weaknesses of two major types of drought planning. The following sections cover drought planning and identify the strengths and weaknesses of three planning forms.

2.1 Drought Planning

Hazard mitigation planning is widely applied by various levels and jurisdictions of government and is proven to be effective in reducing impacts and losses (Godschalk, Kaiser, and Berke 1998; Wilhite et al. 2000; Nelson and French 2002; Burby 2005, 2006; Schwab 2010; Wilhite 2011; Schmidt and Garland 2012). The preferred approaches towards hazard planning are generally referred to as mitigation and adaptation, resilience planning, and risk management, which are all intended to be proactive in nature. In reality, most existing hazard mitigation plans are largely reactive, mainly prepared by emergency managers and designed in response to emergencies (Schwab 2010). Because drought is not a mandated component by Federal Emergency Management Agency (FEMA), the existing generation of hazard mitigation plans is believed to address drought inadequately. In addition, the progress of drought planning, compared to other natural hazards such as floods and costal storms, is slow in the United States (Wilhite 2011).

Though drought planning has been slowly improving in practice, the progress of drought planning in the theoretical sphere has been impressive. Wilhite (1991) first published a 10-step drought planning process through which state governments could develop a drought plan. The number of state drought plans grew dramatically, but those plans were largely reactive and therefore a substantively revised 10-step process was later established to urge states to revise or to develop drought plans based on a risk management approach (Wilhite et al. 2000). Since relying on state government for drought planning is largely insufficient, guides for reducing drought risks as well as building resilience towards drought readiness have been established, aiming to enhance drought planning at multiple levels (Knutson, Hayes, and Phillips 1998; Hayes, Wilhelmi, and Knutson 2004; Svoboda et al. 2010). Most recently, integrating drought planning into local water resource plans and comprehensive plans are increasingly advocated to build communities' resilience to drought (Schmidt and Garland 2012; Fu and Tang 2013). No matter how drought is addressed at this level, all studies encourage planning officials to cope with the hazard through predisaster preparedness and postdisaster mitigation.

In general, the types of drought planning are classified into crisis management and risk management (Wilhite et al. 2000). The traditional approach to droughts, known as crisis management, responds to an ongoing drought and aims to maintain the status quo. It generally involves assessing ongoing impacts, responding to the impacts, recovering from the abnormal status, and reconstructing the damaged facilities and maintaining regular services (Wilhite et al. 2000). Relying heavily on such a reactive approach is not only largely ineffective and untimely, but also increases, to some extent, societal vulnerability due to the locales' growing dependence on governmental programs (Wilhite 2011). By increasingly recognizing the fallacy of crisis management, governments are placing more weight on risk management to reduce the root causes of societal vulnerability. Risk management is aimed at building drought resilience through predisaster preparedness planning, mitigation and adaptation, and early warning or monitoring (Wilhite et al. 2000). Preparedness

planning intends to enhance operational and institutional capabilities by clarifying responsibilities, identifying potential impacts and responding actions, and facilitating implementation. Mitigation and adaptation (e.g. water conservation techniques) refers to both short-term and long-term programs and policies that are implemented continuously to reduce drought risk. The prediction of future drought events is considered a key element of risk management, since effective, timely responses must rely on accurate drought early warning or monitoring programs. Even though risk management is highly preferred, it cannot eliminate all possible drought impacts and costs. For this reason, crisis management or emergency response will always be a part of drought planning.

Planning for drought is quite unique compared with other natural hazards such as floods, costal storms, and earthquakes. Protecting vulnerable populations residing in hazardous areas, which is significant in the management of floods, storms, and hurricanes, will hardly reduce hazard risk associated with drought as it occurs in both arid and humid areas and is spatially extensive. In addition, once largely affecting the agricultural sector, droughts today result in extreme social, economic, and environmental impacts on almost every social and economic sector of a region. Drought's lack of universal definition and nonstructural impacts also hinder the progress of drought planning since governments can hardly identify a drought's onset and end, measure its degree of severity, and therefore provide specific actions to address impact and mitigation issues (Wilhite 2011). Drought's complexity, in terms of various impacts by regions and sectors, render it even harder for governments to respond. Thus a close coordination among all levels of governments is essential in coping with such an insidious hazard.

2.2 Forms of Drought Planning

As drought directly and indirectly affects almost all aspects of a community, it appears there is not a holistic planning framework for droughts. Drought should be considered in every planning endeavor in order to produce a fully coordinated framework for mitigating drought impacts. This section identifies plans that previous studies in the U.S. context considered examples where hazard mitigation was integrated positively. These plans are discussed in terms of their suitability for drought planning, and weaknesses and strengths of each planning framework are identified. The three typical forms of drought planning are comprehensive plan, operational plan, and other separate plan (area plans and functional plans) (see Figure 1).

First, comprehensive land use planning is widely advocated for hazard mitigation and is increasingly recognized as an ideal place to begin building drought resilience (Godschalk, Kaiser, and Berke 1998; Burby et al. 2000; Schwab 2010; Tang et al. 2011; Schmidt and Garland 2012; Stevens 2012; Fu and Tang 2013). Integrating hazard mitigation into local comprehensive plans is preferable because

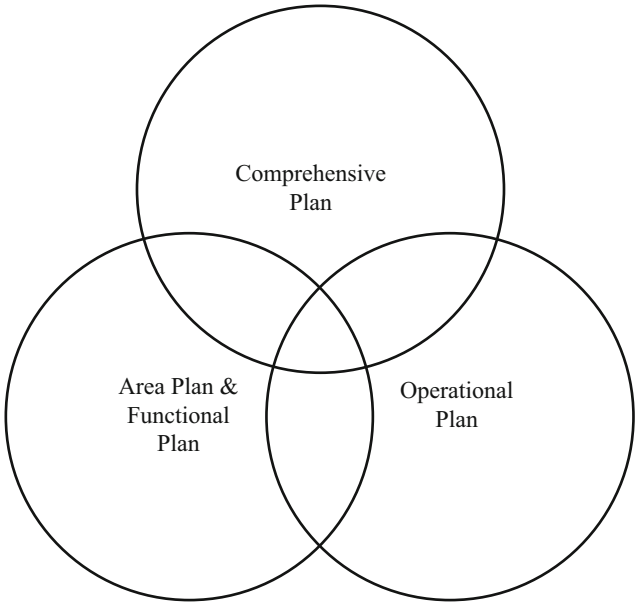

Figure 1. Forms of Drought Planning

mitigation and land use planning are both proactive in solving or preparing for anticipating future problems and local comprehensive plans always play a critical role at local levels (Burby et al. 2000; Godschalk, Kaiser, and Berke 1998). Also, comprehensive plans are particularly appropriate for identifying hazardous areas, retrofitting existing development, directing development towards less vulnerable areas, establishing development standards for hazards, and educating the population through public participation (Burby et al. 2000). Moreover, local land use plans mostly consider all significant sectors of their communities (e.g. land use, agriculture, economic development, and environmental quality) and therefore hazard can be addressed, if well established, through policies and actions in every possible affected sector. Although drought differs significantly from most other natural hazards (e.g. earthquake, flood, and coastal storm), local comprehensive plans are increasingly considered very beneficial for building drought resilience as well as reducing future drought losses (Schwab 2010; Schmidt and Garland 2012; Fu and Tang 2013). In addition to the benefits stated above, land use planning is especially suitable for drought mitigation because of its regular process of planning with continuous monitoring, adapted implementation, and regular updates. As drought is complex and less understood by most jurisdictions, such a continuous planning process enables communities to learn and adapt their plans after each drought event, gradually enhance the communities' ability to absorb and persist through drought impacts (resilience), and make wiser decisions with limited information and knowledge (Schmidt and Garland 2012). Although the integration of drought mitigation and land use planning seems to be ideal, limitations still exist. An apparent one is that local comprehensive plans may not address the hazard in depth and

therefore such integration may render the process of hazard mitigation weak and slow. In addition, as a standing document in envisioning the future to which communities aspire and in solving anticipated problems, local comprehensive plans can hardly facilitate responses to emergencies. Last but not least, not all localities are required to establish a comprehensive plan, although they are encouraged to do so: thus the theory of integrating drought planning into local land use planning may not be applicable to jurisdictions with no comprehensive plans.

The second category of plan is known as all-hazards emergency operations plans or classified into a category of operational plan that was published by Schwab (2010). These operational plans are developed by emergency managers in order to receive predisaster and postdisaster funding for hazard mitigation under the Disaster Mitigation Act (DMA) of 2000 (FEMA 2000). Such plans designate responsibilities of governmental agencies and private organizations as well as facilitate the coordination and implementation of mitigation actions in response to an emergency or disaster event. Operations plans remedy the lack of capability of many comprehensive plans to respond effectively to emergencies, and thus a well-established, closely-coordinated package of two plans can significantly enhance the coping capacity of a region, locality, and community. Although emergency managers and planners are encouraged to collaborate, their coordination appears to be weak at present (Schwab 2010). As drought is not a mandated element for funding by FEMA under the DMA of 2000, few localities, despite recent exposure to severe drought episodes, have specific drought plans: local operational plans are believed to address drought minimally but sufficiently despite drought's complexity and the absence of incentives for drought planning from the upper levels of government compounds the problem. Although to date almost all states have a drought plan, they are primarily operational plans since they typically address drought in a crisis management approach (Whilhite 2011; Fontaine, Steinemann, and Hayes 2012). Thus, the weakness of this type of drought planning is its evident lack of mitigation and adaptation needed for building drought resilience in long term.

Another type of drought plan is referred to as area plans or functional plans (Schwab 2010). "Area plans are meant to address issues unique or specific to parts of a jurisdiction," and "functional plans generally deal with the management and coordination of certain functions of local or regional government" (Schwab 2010). These two types of plans are discussed together because they are both limited to a smaller scope in terms of territory and issue. Both types of plans can further enhance drought preparedness at a smaller scale. These planning endeavors are expected to be more efficient to some extent, since they better understand how a specific area or sector has been affected by the hazard and grasp the need to cope with hazard impact, unlike other more comprehensive planning frameworks.

All the plans, if integrated with drought planning, have their strengths and weaknesses. Thus, a system that links complementary plans will enhance a state, region, locale, or community's drought preparedness from almost all perspectives. To achieve this utopian ideal, efforts must be made at all levels. But the lack of national drought policy, split responses and responsibilities, weak awareness of drought planning in localities, and other issues have resulted in difficulties in improving drought preparedness (Folger, Cody, and Carter 2012). There is still significant room for improvement and the process of enhancing drought preparedness planning has yet to achieve its goals.

3 A Review of Existing Drought Planning Status in the United States

Among the three main government levels in the United States, state drought planning has made the greatest progress in the last few decades compared to efforts for drought at federal and local levels. Each level is discussed respectively in the following sections to provide preliminary insights into U.S drought planning.

3.1 Drought Planning at the Federal Level

In response to the rising frequency and severity of natural disasters in the last few decades, the DMA of 2000 was passed by U.S. Congress to amend the Robert T. Stafford Disaster Relief and Emergency Assistance Act, which prioritized hazard mitigation efforts and facilitated coordination among state and local governments (FEMA 2000). The lack of national drought policy and clear designated responsibilities for drought hazard management has now become a major concern for the U.S. congress (Folger, Cody, and Carter 2012). The passing of the National Integrated Drought Information System (NIDIS) and the continued drought monitoring by the National Drought Mitigation Center (Drought Monitor), began impressive efforts at the national level to enhance observation networks, information sharing, and drought monitoring and prediction. The product of NIDIS, the U.S. Drought Portal, has not only become a key tool in providing timely information concerning emerging or anticipated drought impacts, official drought data and models, and methods of planning for drought, but has also served as a forum for stakeholders' interactive discussion on drought issues. As National Disaster Forum (NDF 2012) indicated, with the development of national drought endeavors by various Federal agencies, the data available in 2012 for drought improved significantly when compared to previous periods. Federal agencies also provide financial support to help vulnerable states and localities recover from drought disasters, and many agencies are now taking a step further to provide funding for predisaster drought preparedness and resilience building.

3.2 Drought Planning at the State Level

The most active level of drought planning in the United States is at the state level (Wilhite 2011). With only 3 state drought plans in 1982, now 47 states have a drought plan (Wilhite 2011). However, only 13 out of the 47 state drought plans are designated as mitigation- based plans by the National Drought Mitigation Center.[i] Consistent with a recent study, which finds drought plans vary widely in both their scope and depth in the Western states in the U.S. (Fontaine, Steinemann, and Hayes 2012), the 45 most recent available plans on the National Drought Mitigation Center website cover drought in many different ways. The responsible agencies for drought in these states also vary widely, from the Department of Natural Resources to a governor's designated drought task force. There are some well-organized plans (e.g. Colorado, Arizona) with their own regional drought monitoring system, detailed records of previous drought impacts and vulnerable sectors, ongoing and proposed mitigation actions, and well-established implementation frameworks with specific responsible agencies for actions, timelines, and continual updates. But other, earlier plans (e.g. Delaware, Washington) are less effective and outdated due to the changing nature of the drought hazard itself as well as the states' increased vulnerability to the drought hazard. Regularly updating plans enables communities to enhance their coping capabilities and planning capacity with advanced technologies, growing awareness, and improved understanding of droughts. As a preliminary review of state drought plans, this study only gives some insights into these planning efforts and this is not enough to understand fully the scope and depth of emerging drought management plans. Future studies must conduct comprehensive research on the existing generation of state drought plans.

3.3 Drought Planning at the Local Level

Despite the boost that the DMA has given to the quantity and quality of local hazard mitigation plans, drought is not a mandated component of comprehensive local plans and few local drought plans are available in the inventory of drought plans nationwide (Schwab 2010; Wilhite 2011; NDMC 2013). The progress of drought planning continues to be somewhat slow at the local level. Although scholars and practitioners increasingly advocate integrating hazard mitigation into local comprehensive plans (Schwab 2010; Schmidt and Garland 2012), such integration is generally weak in fastest growing counties of the United States (Fu and Tang 2013). Since drought is generally not a mandated issue on the local planning agenda across the nation, the hazard is inadequately addressed in most local jurisdictions. Localities tend to be where the greatest drought impacts and losses occur (FEMA 1995), so it is imperative for them to enhance local drought preparedness before the next disaster arrives. As a pilot program, Svoboda and colleagues (2010) have established a collaborative report to fill the gap in planning frameworks for drought preparedness at the community level. The report highlights the five steps that communities across the nation, or even around the world, should follow to enhance their drought preparedness. Those five steps are involving stakeholders, gathering information, establishing drought monitoring systems, establishing public awareness through education campaigns, and implementing concrete preparedness actions. Because the integration of drought preparedness planning into other forms of local planning is either weak or unclear, significant room remains for localities and communities to improve their planning capabilities and build drought readiness.

4 Discussion

Drought planning, preparedness, and mitigation are in a youthful stage in many parts of the United States. Much theory exists, but major efforts are needed to develop the integrated practical planning structures and experienced cadre of implementing personnel, both professional and volunteer, to make effective crisis management and hazard mitigation a reality. We conclude with a discussion of the implications of this situation for future drought planning and an outlook of future research.

4.1 Crisis versus Risk Management Approach for Drought Planning

There is always a heated debate between the practical and theoretical perspective in hazard mitigation. In theory, planning scholars have long advocated a risk management/resilience building approach for natural hazards. In practice, a crisis management/emergency response is the leading tool in reducing ongoing impacts induced by natural disasters. Thus, local emergency managers are generally the leaders in most communities, regions, and states in planning for drought response. These managers generally share little connection with land use planners, who are very capable at enhancing drought preparedness through land use planning for long-term risk management. Although scholars and officials have long advocated a closer relationship between emergency managers and land use planners, their connection remains minimal, at least in recent studies of a cross-section sample of the 81 fastest growing counties (Schwab 2010; Fu and Tang 2013). There are three main forms of planning for drought preparedness in the United States, and these planning endeavors need to place more weight on risk management. This does not necessarily indicate that crisis management is unworthy or that the efforts that have been made across the nation for emergency response are of little use. Although the response to drought was found ineffective, untimely, and poorly coordinated (Wilhite 1997; Wilhite et al. 2000), such a crisis management approach might be the best option for

reducing impacts when limited resources, technologies, and knowledge are taken into account. Undoubtedly with growing concerns, advanced technologies, and other factors, risk management is the direction plans may be heading, but its progress and effectiveness compared to emergency management is poorly understood.

4.2 Top-Down versus Bottom-Up Drought Planning

Drought planning is essentially a platform for sustainability that promotes drought-resilient communities (Fu and Tang 2013). It is important to transform the federal and state scientific datasets in drought monitoring and drought impact reports (e.g. National Integrated Drought Information System, U.S. Drought Monitor, Drought Impact Reporter, and others) to the local level. As localities generally react to financial and political incentives to plan, the lack of national drought policy and mandates of drought planning may be a key reason for insufficient planning efforts at the local level. This top-down model is widely used in the United States, such as in the case of the Disaster Mitigation Act of 2000 that required state, local, and tribal governments to prepare FEMA-approved hazard mitigation plans in order to receive funding. As a result, the number of local FEMA-approved hazard mitigation plans has grown dramatically from only 1141 in 2005 to 19,000 in 2009 (Schwab 2010). Nevertheless, Berke, Smith, and Lyles (2012) found that state mitigation plans were moderate to low in plan quality, partially due to the low minimal standards for plan approval. Since the top-down model may generally enhance the quantity of planning endeavors at various levels, but not necessarily improve their quality, the bottom-up planning model seems to be a better approach as the lower levels of government address the urgent issue voluntarily and, therefore, actively. Such a model may also draw the attention of the higher levels of governments to provide additional financial and technical support when necessary. Regarding drought planning, it appears the bottom-up model plays the dominant role in the United States with growing numbers of state drought plans across the nation that draw attention to the lack of national drought policy and leading task force. Localities and state government should play an active role in planning for droughts since their vulnerability to droughts varies widely from region to region. It is a much more sound approach to plan for droughts through a better understanding of regional drought impacts and vulnerability to effectively cope with the hazard. However, the presence of the bottom-up model does not eliminate the possibility of a top-down model, and, in fact, the models can function together to accelerate progress and quality of drought planning across the nation.

4.3 Drought Planning Research Outlook

Earlier research by Srivastava and Laurian (2006) examined the quality of the comprehensive plans of the six largest and fastest growing counties in Arizona and found that these plans addressed droughts better than flood and wildfire hazards. The Srivastava and Laurian study made a valuable comparison of local comprehensive planning capacity in multiple hazard mitigation. But their findings were based on a very small sample size in a single state, thus relatively little statistical power can be extended to their findings at the national scale.

Most recently, Fu and Tang (2013) analyzed the drought preparedness of comprehensive plans in the 81 fastest growing counties in the United States to better assess drought planning through land use planning at the national scale. They found that these plans generally failed to address drought hazard. Other plans at the local level, such as water resources plans, neighborhood plans, watershed plans, agricultural plans, and hazard mitigation plans, have not yet been analyzed. These potential places for local drought endeavors should be studied in the future to comprehensively understand local drought preparedness. At the state level, Fontaine, Steinemann, and Hayes (2012) examined state drought plans in the Midwest of the United States and found these current plans still emphasized crisis management rather than risk management. But only 11 plans were researched in the article and thus future research should conduct an analysis of all existing drought plans to address the lack of a national study that takes account of recent progress in the quality of state drought planning. The effectiveness of state drought plans should also be examined to verify the impacts of state drought planning efforts. The gap between plan quality and plan implementation should be further investigated. Temporal or geographical gaps could be analyzed at the state level to help state agencies improve their water policy decisions in future droughts.

Evaluating current planning products to determine how the quality of plan making compares against contemporary standards of good practices is an important first step in assessing improvement in risk management. Whether these plans have actually been implemented and are effective in reducing drought losses also requires in-depth study. From a planning perspective, it is an ideal fit for planners and scholars to explore a better understanding of the insidious drought hazard and find a better way to proactively plan for inevitable future drought disasters. It is our planners' responsibility to protect people from, or at least prevent them from unnecessary exposure to, drought risk. Factors that have led to better drought preparedness in different jurisdictions are also an interesting topic yet to be studied. For example, does the jurisdiction that has experienced more drought disasters than others tend to make better drought plans or take a stronger role in planning for droughts through multiple planning tools (e.g. land use planning, emergency management etc.)? Additionally, what has contributed to the growing number of drought plans at the state level in recent decades? Research into these questions can provide a better understanding of the dynamics of drought planning.

5 Conclusions

Drought, as a normal part of the climate, can never be avoided. Its many complex impacts on various sectors have already caused tremendous economic losses, significant social stress, and serious environmental degradation. By reviewing and reconsidering drought planning in the context of the United States, we advocate a combination of crisis and risk management toward drought preparedness and mitigation planning. A utopian theory of integrating drought planning into every aspect of planning to enhance overall drought readiness is also proposed. Through the review of drought planning at federal, state, and local government levels we provide improved understanding of drought endeavors in the United States. More efforts should be made at various levels of government to enhance the coping capacity of the country to droughts. Although this study provides insight into the drought planning literature and current drought planning progress in the United States, it is just the beginning and future studies should conduct in-depth surveys and analyze a variety of drought planning efforts to gain a full understanding of drought preparedness at various levels of government within the nation.

Acknowledgments

The authors gratefully appreciate the anonymous reviewers' constructive comments that greatly improved this article. This research was supported by the University of Nebraska Rural Futures Institute, Hyde Professorship Fund, and EPA Urban Water Grant. None of the conclusions expressed here necessarily reflects views other than those of the authors.

Note

i See more about drought plans at the NDMC website (NDMC 2013).

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