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Coping with Drought: Towards a Multilevel Understanding Based on Conservation of Resources Theory

Gh. H. Zamani
Marjan J. Gorgievski-Duijvesteijn
Kiumars Zarafshani

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Abstract There is substantial research on psychological consequences of disasters. However, most disaster studies to date have focused on acute disasters, ignoring slow-onset chronic hazards, such as extreme climate conditions and pollution. Using a multilevel theoretical framework based on the Conservation of Resources theory (S. E. Hobfoll, The Ecology of Stress, Hemisphere, New York, 1988; *Stress, Culture, and Community: The Psychology and Philosophy of Stress*, Plenum, New York, 1998) and the "ecological analogy" (see e.g., S. E. Hobfoll and R. S Lilly, Journal of Community Psychology, 21:128–148, 1993; E. J. Trickett, *Extreme Stress and Communities: Impact and Intervention*, Kluwer, Boston, 1995), this critical review of the current literature is aimed at increasing our understanding of personal and community impacts of drought as a classic example of a natural, slow-onset disaster affecting large numbers of people worldwide. A gap in the current literature was identified concerning appraisal and coping at the individual level. These include psychological coping strategies and the role of resources other than economic resources in explaining vulnerability to negative consequences of drought, such as personal resources (e.g., knowledge, skills, self-sufficiency, mastery, control) and social resources (e.g., social support). Important differences were identified with fast-onset disasters. Most importantly, dealing with drought is generally an integrated part of life for people in drought prone areas. Therefore, individuals may not recognize that their problems are part of a community wide stressor, and raising community awareness during severe and long droughts that deplete community resources needs special attention. Implications for studying drought and effective intervention strategies are given.

Key words Coping · drought · slow-onset disasters · resources · community.

G. H. Zamani · K. Zarafshani
Department of Agricultural Extension and Education,
College of Agriculture, Shiraz University,
Shiraz, Iran

M. J. Gorgievski-Duijvesteijn (✉)
Department of Industrial and Organizational Psychology,
Institute of Psychology, Erasmus University of Rotterdam,
The Netherlands
e-mail: gorgievski@fsw.eur.nl

Introduction

Each year, millions of people suffer the consequences of disasters. Whether natural or human-made, geographically localized or diffuse, acute or chronic, the extreme and overwhelming forces of disaster can have far reaching effects on individuals, local communities, and national stability. Though disastrous events may last from seconds to a few years, the effects on communities and individuals can be far reaching during the extended process of recovery, reconstruction, and restoration. On both the individual and community level, long-term recovery varies significantly due to the complex interaction of psychological, social, cultural, political, and economic factors.

Sociology and geography have a long-established tradition of disaster research with systematic empirical investigations since the early 1950s. Sociologists have traditionally focused on generating comprehensive patterns of human responses to different life events. The scope of the disasters under study ranged from large-scale tornadoes, explosions, and earthquakes, to plane crashes, industrial accidents, and train wrecks (Tonnessen *et al.*, 2002). In the geographical disciplines, research on disaster studies has focused on the range and intensity of disasters in different geographical locations (Siegel *et al.*, 2003). These disciplines have generated a substantial body of knowledge on the role of, for example, social capital at the level of families and communities, differences in coping capacity dependent on demographic characteristics such as age, gender, socioeconomic status, wealth, and experience in dealing with disaster, and the influence of the development context of society. However, the existing research tradition deals mostly with acute, collectively experienced events with a sudden onset, and the lack of recognition of the importance of slow-onset disasters has been an impediment to obtaining adequate understanding of these phenomena and their far-reaching impacts (Dynes, 2004). In addition, in many instances it has been an obstacle to building awareness among policymakers, leading to inadequate or insufficient aid to the victims (see e.g., Paul, 1998; Weisaeth, 1993).

In the past 20 years, psychological research on people's responses to disasters has grown substantially (see e.g., Belyea and Lobao, 1990; Krimson *et al.*, 1998; Rausch, 1999; Walker and Walker, 2001). Again, the emphasis has been on acute, collectively experienced events with a sudden onset. Using a cross-level approach, the aim of this article is to increase our understanding of personal and community impacts of slow-onset disasters. In our analyses, we will focus on drought as a classic example of a slow-onset disaster affecting large numbers of people. According to the World Disaster report (Walter, 2004), drought and famine have proven to be the deadliest disasters of the decade worldwide, accounting for at least 275,000 deaths since 1994. This was nearly half the total for all natural disasters. We want to contribute primarily from a psychological perspective. Using an integrated theoretical model of the Conservation of Resources (COR) theory (Hobfoll, 1988, 1998) and the "ecological analogy" (see e.g., Hobfoll and Lilly, 1993; Trickett, 1995), and based on a survey of the existing literature on drought, we will draw conclusions on how to study its psychological consequences and the implications for effective intervention strategies.

Defining Disasters

The term "disaster" derives from the latin *dis* "against," and *astrum* "star" (Norwood *et al.*, 1999). While there are many definitions of disaster, a common feature is that the event overwhelms local resources and threatens the function and safety of the community (Gist and Lubin, 1999). Some definitions limit disasters to events that are "concentrated in time

and space" (McCaughey, 1984, cited in Berren *et al.*, 1989), or that have a sudden manifestation, favoring "a typology of crises rather than a typology of stress" (Quarantelli, 1998). According to this definition, events that may have disastrous outcomes in the long term, such as famine, drought, covered up chemical and nuclear spills, social conflicts, and epidemics, would not be classified as disasters because their occurrence is not abrupt, and not concentrated in time and space. We favor a definition now widely used that defines disaster as "a severe disruption, ecological and psychological, which greatly exceeds the coping capacity of the affected community" (World Health Organisation, 1992, p.2). The way disaster is defined has important economical, emotional and political implications. For example, when an event is classified as a disaster, it is more likely to draw attention from relief agencies (Weisaeth, 1993).

Uncovering the complex reality of disasters is difficult. Disasters defy geographical, social, and cultural boundaries. Although, disasters share common consequences, there are important differences as well, depending on the features of a disaster. Disasters can be classified according to a number of criteria, such as type (natural or human induced), low-point versus no low-point (a specific time frame "worst moment" or not), scope (geographically localized or diffuse), size (community size and availability of community resources) and the degree of social impacts (Berren *et al.*, 1989).

This paper uses the example of drought. Drought is a complex physical and social process of widespread significance (American Meteorological Society, 2003; Owens *et al.*, 2003). The most commonly used drought definitions are based on meteorological, agricultural, hydrological, and socioeconomic effects (Wilhite and Glantz, 1985). Meteorological drought is often defined by a period of substantially diminished precipitation duration and/or intensity. Agricultural drought occurs when soil moisture is inadequate to meet the needs of a particular crop at a particular time. Hydrological drought refers to deficiencies in surface and subsurface water supplies. Socioeconomic drought occurs when physical water shortages start to affect the health, well-being, and quality of life of the people, or when drought starts to affect the supply and demand of an economic product. The socioeconomic definition of drought is particularly relevant for our analysis.

Comparing Slow-Onset Disasters to Fast-Onset Disasters

There are important features that distinguish slow-onset from fast-onset disasters, which have consequences for the generalizability of research outcomes. The first feature that clearly distinguishes slow-onset from fast-onset disasters is that the consequences of fast-onset are usually immediate, direct, and clearly visible. In contrast, the impacts of slow-onset disasters evolve slowly and are uncertain, not readily perceptible, and ambiguous. The second feature is the lack of a clearly identifiable low-point in slow-onset disasters, after which the worst is over. Finally, when a fast-onset disaster occurs, the first blow hits everyone in the area to some extent. In contrast, a slow-onset disaster, such as drought or pollution, typically reveals itself first in a small and particular area or subpopulation. In the case of drought (Paul, 1998), farmers are typically most directly affected by drought's first order consequences, which are defined as a decrease in food production via a decrease in cultivated area and crop yield, and the agricultural sector has been found to experience the largest variety of economic impacts (Wilhite and Glantz, 1985). On the other hand, non-farm rural residents may at a later point experience indirect, second-order consequences, such as a decrease in employment possibilities and income, caused by a delay in sowing and transplanting crops, a diminished need for weeding and harvesting, or farmers seeking off-farm

employment. People living in the city may notice a lack of agricultural products at the market, unemployment, or problems with diminished sewage flow and personal hygiene.

Even though slow-onset disasters generally do not result in sudden fatalities or casualties and acute property damage, they are economically costly and do create major social disruptions. From an economic perspective, slow-onset disasters, such as drought and technological accidents, have typically been found to be more extensive in their impact and more destructive in the long term than fast-onset disasters such as floods, hurricanes, and earthquakes (Pelling *et al.*, 2002). They may not cause acute damage to productive capital, including infrastructure, means of production and stocks, but they do erode rates of savings, investment, and domestic demands as well as productive capacity in the long run. Depending on their scope, duration, and extent, slow-onset disasters are more likely to affect long-term nutritional status by affecting one or more components of the food chain than fast-onset disasters. Calculations have shown that a slow-onset disaster may cost at least as much as fast-onset disasters. The U.S drought of 1987–1989 cost the government and private sector an estimated $39 billion and affected up to 70% of the country's population (Riebsame *et al.*, 1995). In comparison, the costs of the worst-case hurricane were estimated at $7 billion, and of the worst-case earthquake at $30 to $50 billion.

Psychological Consequences of Slow-Onset Disasters

Disasters have been found to threaten not only victims' economic situation and living environments, but also their physical and mental health. Hence, they often evoke a widespread need for clinical and community interventions, such as large-scale professional mental health services. A recent meta-analysis on disaster research (Norris *et al.*, 2002) reports on the psychological consequences of 102 sudden life events, showing that the responses range from a variety of non-specific stress responses—general somatic and mental health problems—followed by resilient recovery, to several types of enduring psychopathology that may interfere with life functions for a prolonged period of time. Post traumatic stress disorder has been assessed and reported most often. The question remains to what extent the results of these studies would generalize to slow-onset disasters. For example, given the differences between slow- and fast-onset disasters, one should expect them to have other psychological consequences, in particular long-term stress-outcomes related to chronic loss situations, such as depression (Lazarus, 1990). Indeed, a recent study among 204 people in Brazil showed that drought was not related to post traumatic stress disorder, whereas it did relate to emotional distress and anxiety (Coelho, 2000; Coelho *et al.*, 2004).

Studying peoples' reactions to slow-onset disasters from a stress-theoretical perspective, including their appraisal of the phenomenon and the way they cope, provides a deeper understanding of the consequences of slow-onset disasters and group differences in resilience. Psychological studies addressing the consequences of slow-onset disasters on an individual level are scarce. Sociological and anthropological studies have taken the household as the unit of analysis, but often did not explicitly examine what happened within the household, how decisions are reached, how resources are distributed among household members, etc. (Corbett, 1988; Davies, 2000). According to Erikson (1976, p. 154), "in most human disasters the two traumas [individual and collective] occur simultaneously and are experienced as two halves of a continuous whole." Hence it is important to include the individual experience in slow-onset disaster research.

In the following paragraphs we will apply Conservation of Resources (COR) theory (Hobfoll, 1988, 1998, 2001) and the "ecological analogy" (see e.g., Hobfoll and Lilly,

1993; Trickett, 1995) to analyze psychological issues during drought in more detail. COR-theory is very well suited for studying the psychological consequences of disasters. First, it gives a relatively prominent position to peoples' objective environment compared to other stress-theories, such as the transactional stress approach (Lazarus and Folkman, 1984), which have focused mainly on peoples' subjective interpretations of events. For this reason, COR-theory makes it easier to formulate hypotheses on the consequences of objective environmental events based on the characteristics of these events. Second, because of its ecological nature and the centrality of resources to the theory, it matches disaster research tradition in other disciplines. This makes it easier to use the results obtained in these disciplines as a starting point for studying psychological consequences of slow-onset disasters, and, to feed back psychological insights into these other disciplines. Third, COR-theory has been successfully applied in a large number of disaster studies.

Applying Conservation of Resources Theory and Ecological Analogy to Drought

COR-theory (Hobfoll, 1988, 2001) is a motivational stress theory, according to which individuals strive to obtain, retain, and protect that what they value. The basic tenet of COR-theory is that people have an innate as well as a learned desire to conserve the quality and quantity of their *resources* and to limit any state that may jeopardize the security of these resources. When 1) an individual's resources are threatened with loss, 2) resources are lost, or 3) individuals fail to gain resources following investments of other resources, this will lead to mental or physical stress-outcomes. In the short term, these may be negative emotions, such as anger, frustration or fear. These may also be more severe mental and physical consequences, such as burnout, depression, or coronary heart disease, which generally occur over the long term.

Resources can be objects (e.g., car, home, clothing); personal characteristics (e.g., occupational skills, sense of self-esteem); conditions (e.g., tenure or seniority at work, a good marriage); or energies (e.g., money, credit, insurance). Resources are important not merely for their face value but because they define who we are. It is the actual or potential loss of these resources that threatens our identity or that which we prize and in so doing initiates the stress process.

Following this basic tenet, Hobfoll and his colleagues (e.g., Hobfoll, 2001; Hobfoll and Lilly, 1993) have outlined a number of premises. First is the primacy of loss principle, according to which loss is central to the stress process. According to this principle it is the acute loss of resources, and not a stable, poor situation that would lead to all stress-outcomes. The primacy of resource loss principle has been proven among a variety of samples facing chronic stressors (e.g., Freedy *et al.*, 1994; Holahan *et al.*, 1999, 2000; Norris and Kaniasty, 1996). Recent evidence has, for instance, shown that the impact of chronic conditions of poverty on women's depression levels worked almost exclusively through secondary (material) loss (Ennis *et al.*, 2000; Hobfoll *et al.*, 2003). Disaster studies, too, have shown that resource loss resulting from fast-onset disasters appears to account for a significant amount of variance in psychological stress outcomes (Salzer and Bickman, 1999). Moreover, several studies have shown that resource loss was the most important factor in predicting stress outcomes, including post traumatic stress disorder, among victims of two types of disasters, namely earthquakes and hurricanes (Freedy *et al.*, 1992, 1994; Ironson *et al.*, 1997).

The second premise of COR-theory is resource investment. According to this principle, people must invest resources in order to protect themselves against resource loss, to recover from loss, and to gain resources. However, the investment of finite resources may cause their depletion, termed "secondary loss." People are expected to start by investing resources

that are easily replenished and promise the highest chance for recovery, before investing resources that are harder to replenish.

In the case of drought and famine, two types of coping have been well investigated. First are agricultural adjustments, most commonly the sale of livestock, early sowing of seeds, herds diversification, plant protection, purchasing of forage, investment in shallow or deep tube wells, and cultivating more water-efficient crops (e.g., Blench and Marriage, 1999; Keenan and Krannig, 1997; MacDonnel *et al.*, 1995; Mortimor, 1989; Mortimor and Adams, 2001; Owens *et al.*, 2003; Skoufias, 2003). Second are economic adjustments (e.g., Campbell, 1990; Corbett, 1988; Hanson and Weltzin, 2000; Kinsey *et al.*, 1998; MacDonnel *et al.*, 1995; Mortimor, 1989; Mortimor and Adams 2001; Owens *et al.*, 2003; Rockstrom, 2003; Young, 1995), which show evidence for resource loss cycles. A literature review of economic coping behavior of African and Asian rural households facing famine as a consequence of drought (Corbett, 1988) showed that risks to food security are frequently anticipated and carefully planned. Economic coping strategies relate to asset management. During non-crisis years, two sorts of assets are acquired. First are a form of saving and self-insurance, such as smallstock and jewelry, which can be liquidated in times of crisis. Second are assets that play key roles in production and income generation, such as oxen and land, which are more risky and less liquid.

Three stages can be identified in peoples' coping strategies during times of crisis. People will first try to preserve or even acquire production assets by investing in savings and self-insurance assets. During the second stage, they need to invest production assets. In the third stage, they are forced to make irreversible investments, leading to destitution, distress, and migration, a major consequence of drought (United Nations, 1997). Typically, rural residents migrate to urban areas outside the drought area (thus losing condition resources) and rarely return home when drought diminishes. Migration, also costs money and time (energy resources) and with them the chance for quick recovery. Moreover, Bosch (2003) found that the sense of status and belongingness, self-esteem and sense of invulnerability (personal resources) are also potentially shattered as a result of migration. The economic coping strategies of *other* populations during drought, and the resulting resource losses and gains, have not yet been studied in such detail. Future studies might investigate whether they follow a similar three-stage sequence, and identify what the typical saving and self-insurance, and production assets are in order to get an indication of the potential resilience of these populations.

Following COR-theory, coping strategies other than agricultural and economic also need to be incorporated in the sequence, and their effects in terms of preserving non-material resources need to be assessed. Social support seeking is one important strategy. Empirical studies have shown that many people rely on their social networks to moderate the effects of drought (Coelho, 2000; Coelho *et al.*, 2004; Fetsch, 2003). These are typically informal support networks consisting of family and friends (Bosch, 2003). Another interesting question concerns the effects of emotion-focused coping strategies, such as praying and ignoring the problem, versus problem-focused coping strategies. Aid agencies often view emotion-focused coping strategies as counterproductive, because they hamper both external as well as indigenous efforts to survive disasters. This is supported by results of some cross-sectional studies (e.g., Bower and Pace-Nichols, 1999), which showed that drought victims who experienced greater loss of material resources were more likely to use emotion-focused coping strategies, notably denial. However, as anthropological observations have shown (Schmuck-Widmann, 2000), emotion-focused coping strategies may play an important role in conserving *personal* resources, such as a sense of coherence and meaning in life, which are important prerequisites for mental health.

It seems plausible that stress-outcomes caused by losses resulting from slow-onset disasters will be more severe the further down people are in the economic coping sequence; the scale of their losses will be greater and they will be less likely to recover after drought. There is some empirical support for the hypothesis that resource loss is indeed the main cause of stress-outcomes during drought, although it does not make a very convincing case that it is more important than a lack of coping resources. For example, a recent study by Coelho (2000) and Coelho *et al.* (2004) found that the most important predictors of farmers' frustration during drought were crop failure impacts on the quantity and quality of food available for their family. In addition, Myers (1989) and Warheit (1985) found that individuals who perceived themselves as lacking personal, interpersonal, social, or material resources, and realized that they had *lost* these resources as the result of drought, were more at risk of severe levels of stress than individuals who were resource rich and whose resources remained intact and functioned well.

On the other hand, a recent study among 360 Iranian farmers revealed that a small percentage of farmers facing drought perceived more resource gains than losses (Zarafshani *et al.*, 2005). Almost all farmers had lost material resources; the gains mainly concerned personal and social resources, such as knowledge, patience, hope, and strengthened social ties. Another vulnerability assessment of drought showed that some people even welcomed drought as an event that supports societal values, such as group coherence, and because it suspended the necessity to undertake tiring fieldwork, whilst food provision was secured thanks to food aid programs (Kromker and Mosler, 1998). Consequently, they did not necessarily regard drought as a threat. This is in line with results of general stress research, which showed that stressful situations can lead to a strengthening of social ties and an increase in feelings of personal mastery (Aneshensel, 1996). Such results merit further investigation, but support the notion that key in understanding the psychological consequences of drought is how people cope, what the effects of these coping efforts are in terms of perceived net resource loss or gain, and hence whether people perceive drought as a loss or a gain situation.

The *third premise of COR-theory* states that those who lack resources are more vulnerable to resource loss, and hence that initial loss begets future loss, resulting in loss spirals. The fourth premise mirrors the third, stating that people who posses more resources are better protected against resource loss, and have a higher chance of resource gain, resulting in gain spirals. The reasoning is that people who possess few resources (either material, social, personal or energy) might be forced to invest resources that are not easily replenished and with a smaller chance of success. In addition, they may lack the resources to invest in active coping strategies and consequently are more likely to adopt a passive, defensive posture than resource-rich individuals (Hobfoll, 1988).

Loss and gain spirals have been carefully examined in a series of disaster studies (Hobfoll and Lilly, 1993; Kaniasty and Norris, 1993; Norris and Kaniasty, 1996) that have addressed social support networks in particular, because naturally occurring social support networks are vital resources for disaster victims. In several studies, social support has been found to protect fast-onset disaster victims from psychological distress (Hobfoll and Lilly, 1993; Kaniasty and Norris, 1993; Norris *et al.*, 2002). High demand circumstances, such as fast-onset disasters, resulted in a quick mobilization of social support that enabled the victims to cope better with the situation and limited psychological stress-outcomes. Poor, ethnic minority individuals (Kaniasty and Norris, 1993) were found to be less likely to derive benefit from support networks because their networks are less resource-endowed and less likely to be linked to larger, societal resource reserves. Other studies in different contexts showed similar results. For example, Tonnessen *et al.* (2002) found that during the

Chernobyl nuclear disaster, individuals were totally dependent upon others for information. As the potential support providers were in most cases other victims, those with fewer resources were less likely to obtain first-hand information about the potential threats due to the disaster.

Empirical drought studies have shown that social networks also play an important role in moderating the effects of slow-onset disasters. Coelho (2000) showed that individuals who had a higher socioeconomic status and larger social networks received more support during drought. Another drought study in Bangladesh (Hutton, 2000) showed that the poor, the elderly, the less educated, and some ethnic minorities received less help than other people comparably affected by drought.

In the case of drought, the three-stage cycle of economic coping strategies clearly illustrates the fourth premise for material resources. Poverty and a restricted asset base make people vulnerable to famine conditions. The poorest households have few options. They have fewer self-insurance assets to liquidate, have more problems obtaining loans, and have higher dependency ratios in labor migration (Corbett, 1988). Consequently, the poorer go further down the sequence of coping strategies, and their coping efforts are more irreversible in terms of investing domestic resources, selling essential production means and permanent out-migration. Those with diversified personal economies and diverse options fare better (Campbell, 1999). The rich seldom starve. On the contrary, during periods of drought, they are able to buy production means and livestock for very low prices and hire people at depressed wage rates. Consequently, the differences between poor and rich people tend to increase during times of drought.

Community Level Impacts of Slow-Onset Disasters

As like in COR-theory, resources are of central concern within community psychology. As a central tenet, community psychology is concerned with the fair distribution of and access to resources. The field arose in the 1960s as a reaction to the clinical psychological paradigm that was dominant at that time which decontextualized individual behavior, and focused on (psycho) pathology rather than on strengths. In contrast, community psychology focuses on the person–context interaction, where the context most generally refers to "the world outside the individual which provides both constraints and opportunities for development, healing and pain" (Trickett, 1995).

When the psychological impacts of disasters are explained in terms of community psychology, one important issue that emerges is the dynamic interplay of individual, group, and community level experiences. A community psychological perspective that is particularly relevant to disaster studies is the "ecological analogy," or "ecological metaphor" developed by James Kelly and his colleagues (see e.g., Hobfoll and Lilly, 1993; Trickett, 1995). Four basic principles of the ecological analogy can be outlined.

The *first principle* is that resources are generated and cycled within an ecological system. This can apply to energies and nutrients, as well as to latent resources available for problem solving and community development. At the community level, many characteristics could qualify as potential resources, such as interorganizational connections, a community's coping traditions, and social settings. One can look at the resources available within groups or societies, the way people adapt to their circumstances or shape their environments, and how that in turn affects group, and community resources. One can also look at the way individuals, groups, and societies react to opportunities and restrictions that are *external* to the group or society and the way resources are exchanged between these

entities. Concerning drought and famine, several resources have been found key for good economic and agricultural coping. However, more systematic research needs to be done to identify what characteristics are key resources under what circumstances, and how different resources interact across levels of analyses. One important issue that needs to be kept in mind is that certain characteristics can be assets under some circumstances but in others can become liabilities. For example, most agricultural businesses in the US and Europe are highly specialized, and exploit large economic advantages of scale. Yet agricultural businesses in drought prone agricultural communities in Africa and India are typically diversified, use mixed cropping, keep small livestock next to larger animals, and engage in other economic activities that do not depend on the availability of water, in order to spread the risk of crop failure during drought (Campbell, 1990; Corbett, 1988; Davies, 2000; Subbiah, 2000).

The *second principle* is adaptation. There are two important questions: (1) What is required to survive in this particular ecological environment? (2) How does this ecological environment particularize its meaning, its resources, and its outcomes? The environment is defined in terms of traditions, norms, processes, structures, and policies. Some conditions of survival prevail, partly because of resource acquisition, whereas others diminish.

Concerning drought and famine, social ecological studies that have formulated generalizations across different rural communities concerning the way people adjusted to their environment and changed the environment to promote their objectives have been criticized for neglecting the influences external to the direct person-environment system, such as national and international macroeconomic factors, which have caused differences in resource availability between societies or socioeconomic classes (Campbell, 1999). The ecological analogy views the environment as a nested hierarchy of many different systems. Based on this framework, research should assess the relevance of the direct and indirect effects of all these systems on the coping efforts of individuals, as well as the effect of individual coping efforts on these higher order systems.

In a 20-year follow-up study in a rural society in a drought-prone area of Africa, Campbell (1990) showed that economic coping strategies of individuals facing drought and famine are integrated components of the larger economic system in a country. Coping strategies, which also include trade with neighboring groups and long-distance trade, alter as a result of new opportunities caused by a complex interplay of economic (diversification, irrigation, tourism), political (government policy support, vaccination programs), social (population growth, declining age-set structures), and environmental conditions (desertification). For example, this study showed how globalization led to local diversification, because not all groups within the society had the resources to benefit from the opportunities that were created. Relevant to the study of drought and coping is also the question how seemingly counterproductive coping efforts develop and persist, for example, denial coping, praying, or downward comparison and gossiping.

When talking about how an ecological environment shapes the meaning of a disaster, one important issue is the role of authorities and the media. Because of the ambiguous nature of slow-onset disasters such as drought, authorities in charge of disaster management tend to provide ambiguous and conflicting information regarding the event (Kaniasty and Norris, 1999). This increases stress levels among drought victims, and can create or expose latent conflicts in the community or in specific social, political, ethnic, and economic groups. Victims in slow-onset disaster tend to suffer more than sudden-onset disaster victims, especially in drought situations. In such events, the environment may not be visibly altered, and the stressful aspects not restricted to the event itself. They may continue for a long period, even indefinitely, and entail many consequent added disruptions requiring further adjustment of individuals.

The *third principle* is interdependence, meaning that aspects of the community are interconnected, and that changes in resources on one ecological level (e.g., the community) influence changes in resources at other levels (e.g., the group or the individual). By definition, a disaster is more than an individual event. Loss and gain, breakdown and recovery, are individual as well as collective struggles. Stress caused by the impact of the disaster on the individual can be expected to transpose onto the community level, where it reaches collective consciousness and initiates collective coping and recovery (Jerusalem *et al.*, 1994). The interdependent character of disaster experience should not be ignored or taken for granted, as coping efforts of individuals and their communities are interwoven. Community reactions improve or worsen individual reactions, and vice versa, individual reactions become shared reactions and define the collective identity of a coping community (Erikson, 1976).

The emphasis on describing the stress process as an interdependence of individual and collective experience is not novel in the context of fast-onset disasters (see e.g., Freedy and Hobfoll, 1995; Hobfoll and Devries, 1995; Kaniasty and Norris, 1999; Quarantelli, 1998), where it has been strongly influenced by the social support literature (Freedy and Hobfoll, 1995; Kaniasty and Norris, 1999; Norris and Kaniasty, 1996; Quarantelli, 1998; Tobin and Ollenburger, 1996). Disasters affect large numbers of people simultaneously, many of whom are members of one another's coping networks. Connections between individual and collective recovery efforts can take on a compensatory form, as loss of resources at one level may be compensated by strengthening or gains of resources at the other level (Hobfoll and London, 1986). For example, material losses at the individual level may be counteracted or neutralized by community resources that are mobilized as a result of an urgent and unequivocal desire for unified communal coping and helping in response to the disaster, such as the provision of clothes, housing, and food by new cohesive helping collectives (Norris and Kaniasty, 1996). For example, evidence was found of the formation of an "altruistic community" in response to experiences of harm and loss (Kaniasty and Norris, 1999), in which assistance is allocated to those most in need.

On the other hand, the linkages can also take on a synergistic form, whereby losses (or gains) for one person can be linked to losses (or gains) for others. In the aftermath of fast-onset disasters, the losses typically surpass the individual's coping capacity, and cause losses for others in the community as well. This results in a depletion of communal coping resources and reduces the community's actual ability to help and protect its members. This may also apply to less tangible resources. Overexposure to emotional disclosures about trauma can be psychologically threatening and emotionally draining. People may become weary of unending exposure to news and testimonials about the experience. Consequently, residents in disaster-stricken communities may begin to downplay or reject the importance of revealed emotions and even escape interacting or "over sharing" the trauma (Pennebaker and Harber, 1993). For this reason fast-onset disasters have often been found to have destructive effects on interpersonal dynamics in the long run (Norris and Kaniasty, 1996), leading to increased vulnerability of a social system to hazardous impacts and collective strain (Kaniasty and Norris, 1999; Quarantelli, 1998).

In the context of slow-onset disasters the interdependence of individual and collective experience warrants special attention. First of all, community awareness may not arise, and it may take a long time before people realize that the problem may affect a large number of people and should concern everyone. Communities in drought-prone areas have developed numerous strategies to battle drought in a holistic manner integrated in their lives, and perceive drought as an integral part of climatic variations (Subbiah, 2000). Therefore, unlike fast-onset disasters, slow-onset disasters may not necessarily elicit an urgent and

unequivocal desire for unified communal coping and helping. Most importantly, it may not illicit external aid, which means that the community needs to rely to a large extent on local and often indigenous coping resources and strategies. After recurrent drought episodes, these have been proven insufficient (Davies, 2000). Consequently, drought victims may only experience deterioration of social support and erosion of their material assets and their sense of community (United Nations, 1997). Campbell (1990) showed how social strategies erode as disaster continues. Social strategies redistribute available resources in a community through institutions such as family, clan, and age set (Campbell, 1990). In general, the stronger help the weaker, by splitting herds, sharing seeds, etc. When disaster continues, social breakdown is displayed in behaviors such as theft, begging, and even selling family members as slaves.

The *fourth principle* is succession. This principle focuses on the time dimension and the importance of the history of a community. It deals with cultural history, prior attempts at dealing with crisis, and the evolution of local norms about service delivery. In the case of slow-onset disasters such as drought, coping is an integrated part of daily life, not a sudden and unexpected event as it is sometimes perceived by external parties providing emergency aid (Subbiah, 2000). People develop specific coping strategies to handle harsh conditions, identified as a "disaster subculture" (Wenger, as cited in Coelho, 2000; Hussain, 1997). Disaster subculture includes the beliefs, knowledge, technology, norms, values, and survival activities of the local community before, during, and after disaster periods. For the development of disaster subculture, three basic points are important (Hussain, 1997). The first is a communities' previous experience of the same disaster(s). The second is the beliefs and concepts around disaster forecasts (warnings). The third is concepts of damage to lives and property for disasters. These precursors are typically present for natural (slow-onset) disasters.

As empirical research has shown, when a community develops a disaster subculture for a typical disaster, it is better able to respond to the next occurrence. A growing familiarity with the recurring event and its consequences gradually changes the meaning of the event for the community at a conceptual level, which in turn, influences the individual's appraisal of threat. In a retrospective, cross-cultural study of a disaster subculture during cyclones in Island Village, Bangladesh, Hussain (1997) found that coastal people who had experienced small-scale cyclones in previous years took shelter at cyclone shelter centers and primary school buildings, while those who had not did not leave their houses and consequently died from the huge impact of the cyclone. Similar results have been found for other disasters, such as earthquakes, hurricanes and floods (Granot, 1996; Shaw, 1993). Similarly, a study of psychological responses to drought in Brazil comparing 102 individuals living in a city in a drought-prone area with the responses of 102 persons living in a drought-free control city (Coelho, 2000; Coelho *et al.*, 2004) showed that the individuals living in the drought-prone area had significantly *lower* levels of threat perception towards drought. Drought prone areas have been found better prepared for drought and hence less vulnerable, because some rural socioecological systems such as diversification of agricultural activities and development of non-agricultural activities that are less dependent on water availability are deliberately maintained to secure against shortages (Paul, 1998; Subbiah, 2000).

In sum, preparation, adjustment, and adaptation strategies towards drought have been studied on the household, the community, and the national level. Much is known concerning, for example, economic behavior on these different levels and its effect on material and energy resources. What is typically missing in the literature is insight into personal consequences, such as consequences for social and personal resources, and the interaction between individual reactions and other ecological systems. For example, the study by Campbell (1999) showed how macroeconomic developments created new opportunities. It also

showed how some people were able to profit from these opportunities, and others were not, based on specific structural characteristics. It would be interesting to investigate personal differences in a more psychological manner, for example, who recognizes new opportunities, and is motivated to seize them.

Conclusion and Implications

Using a cross-level approach, this theoretical investigation aims at increasing our understanding of the psychological impacts of drought. Using an integrated theoretical model of Conservation of Resources (COR) theory and the "ecological analogy," we analyzed what is currently known about individual, household, and community responses to drought from a psychological, sociological, and anthropological perspective. In addition, we explored to what extent results found for fast-onset disasters based on COR-theory and the ecological analogy might generalize to drought.

At the individual level, results showed that COR-theoretical principles (primacy of loss, the notion of primary and secondary losses, and vulnerability based on prior resourcefulness of the victims) might be as useful in explaining psychological responses to slow-onset disasters as they are in explaining fast-onset disasters. Previous empirical studies have provided valuable insights into resource loss and gain cycles and coping strategies on small group (family), community, and national level. However, more insight is needed concerning appraisal and coping at the individual level, psychological coping strategies in addition to economic and agricultural coping strategies, and the role of personal resources (knowledge, skills, self-efficacy, mastery, control) and social resources (social support).

The responses to slow-onset disasters may resemble long-term, chronic effects in the aftermath of fast-onset disasters. However, significant difference is that slow-onset disasters lack a clearly identifiable onset. This raises the important question of whether people realize that the trouble they are facing is not merely an individual problem, but part of a large-scale disaster.

At the community level, the difference between slow- and fast-onset disasters becomes even more salient. By definition, slow-onset disasters as community wide stressors severely deplete community resources. In terms of the "ecological analogy" this means that over time the community has fewer resources to recycle. In the case of fast-onset disasters, this problem is easily recognized community-wide, which allows community coping and external aid. The community organizes itself, and cohesion and mutual support prevent further loss of community resources. This, in turn, affects the amount of resources people have at the individual level to provide each other support. However, in the case of slow-onset disasters, this community awareness may not arise. The media and politics may play an important role providing accurate, timely, and unambiguous information. Interestingly, researchers see individual and household coping strategies as an early warning tool (Corbett, 1988), although from the standpoint of the individuals or households concerned, warnings based on these indicators may come too late.

More methodologically rigorous, empirical research needs to be done on the psychological impacts of slow-onset disasters, such as drought. In so doing, it is important that psychologists take an ecological approach. In this respect, much can be learned from studies on the consequences of fast-onset disasters. Several good reviews exist on methods of disaster research (e.g., Raphael *et al.*, 1989; Solomon, 1989; Stallings, 2002) which address considerations such as retrospective versus prospective design problems, the nature and adequacy of outcome measures, the types of psychological scales of measurement (e.g., diagnostic instruments, biological markers, behavioral measures, etc.), stressor measures,

appropriate cohort and control groups, sampling designs and pitfalls, and choice of statistical analyses, that are also important when studying the effects of slow-onset disasters. Especially in the context of slow-onset disasters it is important to conduct long-term longitudinal studies, and to address subcommunities in different areas that may be more or less prone to experiencing the disaster, and/or may differ in their resource levels, prior experience with other community stressors, etc. Additionally, as individuals within groups within communities are the objects of study, there is a need for multilevel analyses of the data, as well as a combination of qualitative and quantitative techniques to gain an understanding of the way individuals are affected by community stressors, and how individuals shape their community (Norris *et al.*, 1995).

Our analysis of the literature has implications for interventions aimed at coping with drought. If loss is the core ingredient explaining its adverse consequences, the first aim should be to prevent or counteract resource loss during hard times. To do so, people need resources they can draw upon. Resource depleted victims have been found to be at bigger risk and deserve special attention. They may choose defensive strategies, such as avoidance and distancing from the event, in order to minimize the investment of resources, but such strategies have also been related to increased anxiety and stress. Teaching them more effective, active coping seems warranted. However, such attempts may fail if the victims actually lack resources to engage in such coping strategies. Therefore, interventions would benefit from a need assessment and an assessment of the actual coping capacity of drought victims. There is not really a tradition of providing interventions aimed at improving health and well-being, and psychological resilience in the case of drought. It would go too far to suggest that there is a need to develop mental health care programs to provide relief and rehabilitation for drought victims. This makes more sense in the context of fast-onset disasters. In the context of slow-onset disasters, programs aimed at preparedness make more sense. Most drought prone areas have well-developed agricultural extension systems which could be improved if extension agents became familiar with stress reduction techniques (Zamani *et al.*, 2005).

Ideally, interventions should first act to prevent resource loss at the community level, in particular by raising community awareness and by developing community strategies. For example, by establishing cooperatives for efficient use of water, farmers can be encouraged to plant more resistant crops and make better use of their water resources. Farmers' cooperatives can pool resources from government or non-government agencies or even from private donors, such as farm elites. It is clearly most effective to foster community preparedness before community resources are under direct strain.

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