



# Sustainability and community resilience: the holy grail of hazards planning?

Graham A. Tobin\*

*Department of Geography, University of South Florida, Tampa, FL, USA*

## Abstract

Recent hazard literature frequently refers to sustainability and resilience as the guiding principles behind effective hazard planning. Certainly, structurally organizing communities to minimize effects of disasters and to recover quickly by restoring socio-economic vitality are laudable goals. However, while anticipating such outcomes is relatively easy from a theoretical standpoint, practical implementation of comprehensive plans is much more elusive. Indeed, relationships between community sustainability/resilience and hazards are complex involving many social, economic, political and physical factors. A conceptual framework for analysis of sustainability and resilience, then, is described based on three theoretical models, a mitigation model, a recovery model, and a structural-cognitive model. This framework is examined using data from Florida, USA, where local context, social and political activities, and economic concerns present difficulties in application. The question remains, therefore, to what extent can communities truly develop sustainable and resilient characteristics? © 1999 Elsevier Science Ltd. All rights reserved.

## 1. Introduction

In striving to comprehend the vicissitudes presented by natural and technological hazards, many researchers have recently incorporated new paradigms into their studies; paradigms that focus our attention on community sustainability and societal resilience to disasters. In this context, marginalized sectors of society have been the subject of much of our concern and we have gradually developed refined concepts of vulnerability and risk. Furthermore, we have seen this interest transferred through decision-makers and planners into some innovative policies that encompass broader planning goals and more sophisticated hazard mitigation programs than previously implemented. The ultimate goal has been to construct resilient communities that can survive and recover rapidly from effects of extreme geophysical events. All this, of course, has been undertaken in an era of globalization, as the interconnectedness of society, businesses, and industrial complexes has ushered in a different world order, and further complicated contextual issues in local planning. The questions that should be asked, therefore, are how successful are such initiatives, and is this the best way forward?

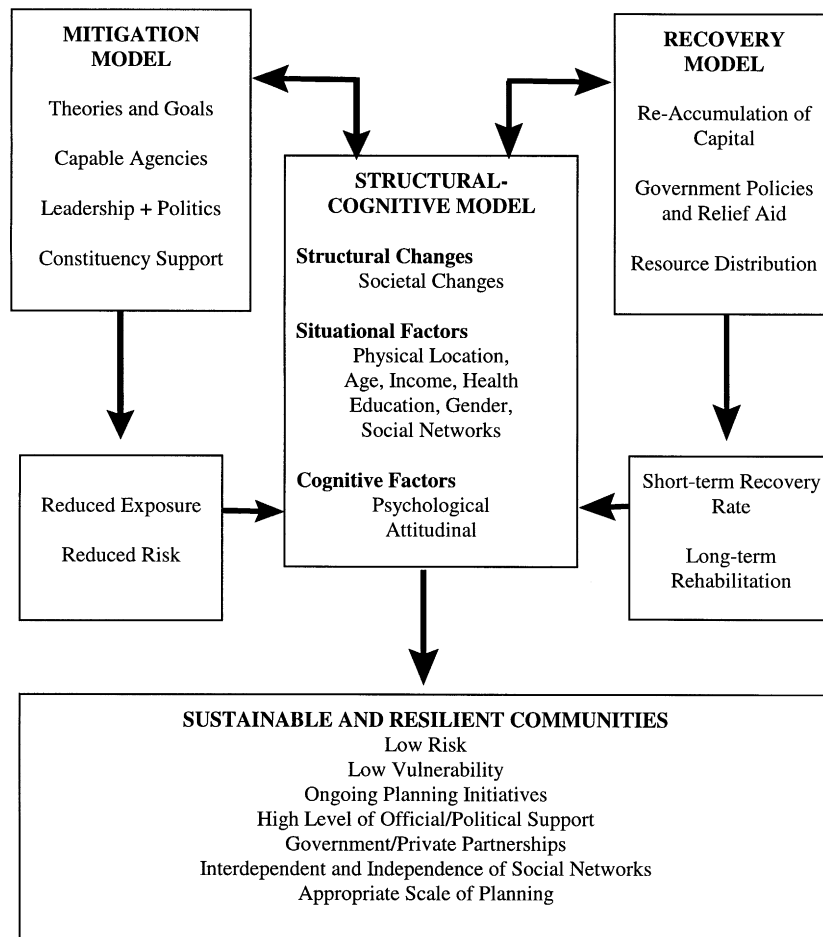
The focus of this paper is on the role of sustainability in hazard mitigation, emphasizing the interconnectedness of many issues at different spatial scales, including aspects of globalization as it pertains to local community resilience. Sustainable and resilient communities are defined as societies which are structurally organized to minimize the effects of disasters, and, at the same time, have the ability to recover quickly by restoring the socio-economic vitality of the community. However, the relationship between community sustainability and hazards is complex, and cannot be adequately addressed without consideration of social, economic, and political factors. Indeed, there may be ethical questions and moral arguments that actually challenge the viability or even desirability of sustainability as a planning principle in certain circumstances. To illustrate some of these arguments, the state of Florida, USA, is used as a microcosm of these global concerns. Florida typifies many of these global concerns, from its artificial nature, to its hazardous environment; from its created communities, to its social and economic inequities; from its bimodal demographic structure, to its ethnic and racial diversity.

## 2. Theoretical framework

The approach taken here is primarily an ecological one, utilizing aspects of the socio-political ideas put

\* Tel.: + 1-813-974-4932.

E-mail address: gtobin@chuma1.cas.usf.edu (G.A. Tobin)



See text for details; feedback loops not shown.

Adapted from Peacock and Ragsdale (1997); Tobin and Montz (1997) and Waugh (1996).

Fig. 1. Sustainable and resilient communities in hazardous environments: a framework for analysis

forward by Bates and Pelanda (1994), and the political-economy and human ecology approach outlined by Hewitt (1983). Understanding these issues through a theoretical framework is important if we are to apply concepts beyond the local arena. Thus, structural-functional views, conflict theory, competition for resources, and other geo-sociological and anthropological principles are raised here as possible frameworks in understanding community resilience (see, for example, Kreps and Bosworth, 1994). The flowchart, shown in Fig. 1, provides a framework for this analysis. Three separate models have been adapted to demonstrate how sustainable and resilient communities might be created; the mitigation model proposed by Waugh (1996), the recovery model described by Peacock and Ragsdale (1997), and a structural-cognitive model put forward by Tobin and Montz (1997). The figure depicts a dynamic system, not necessarily one that is in balance. The flows or arrows indicate important relationships between components of the system that must be understood from a structural context,

so that when one element changes, an appropriate response can be made to keep the system in some sort of dynamic equilibrium. It is suggested that through these three models, concepts of community sustainability can be explored more fully. Thus, the ultimate goal is to achieve community sustainability and resilience in the face of prevailing natural and technological hazards.

### 2.1. Mitigation model

In a broad context, it is through mitigation programs that exposure and risk are reduced. Flood embankments and levee systems, for instance, generally protect communities up to their design standards and hence reduce risk for those living in hazardous environments. However, not all projects are necessarily successful and can on occasions exacerbate problems, as seen with the levee effect. Thus, the implementation of mitigation policies requires that certain conditions be met if success is to be assured. Waugh (1996), utilizing the work of Mazmanian

and Sabatier (1983) proposed six conditions for effective implementation: (1) there must be sound theory with causal linkages to assure that goals are reasonable and appropriate; (2) the tasks or programs must be assigned to sympathetic and capable agencies with adequate resources; (3) there must be leaders with substantial managerial and political skill; (4) there must be clear policy objectives; (5) the commitment must be supported by an organized constituency; and (6) there must be no undermining of the policy over time. While hazard theories are generally well-founded (point (1)), it would seem that more attention needs to be devoted to causal linkages between elements if mitigation programs are to be successful. Similarly, goals must be clearly articulated, sufficient resources made available, and commitments made for the long term. Through such strategies, then, communities might reduce exposure and risk to their constituents.

### 2.2. *Recovery model*

Given the severity of many geophysical events, combined with limited resources, it is certainly not possible to eliminate all disasters, and many communities, because of their spatial location, will always remain hazard-prone. Therefore, a focus on recovery and those factors that are conducive to facilitating recovery is pertinent. Furthermore, recovery does not entail simple clean-up and restoration operations to get a community back on its feet, but requires long-term rehabilitation processes that are affected by prevailing socio-economic conditions and structural constraints (Tobin and Montz, 1994). In addition, local participation is extremely important to any success (Berke et al., 1993). In this respect, Peacock and Ragsdale (1997) suggested that to understand recovery, attention must be focused on (1) re-accumulation of capital and physical infrastructure; (2) policies and programs of government agencies, private organizations, and businesses among others; and (3) resource distribution. They indicated, for example, that the recovery of individual households is a reflection of societal recovery and capital re-accumulation efforts, and hence urged consideration of those networks that enhance this process. Indeed, to some, the very idea of disaster is indicative of a failed social system, since it is argued that efforts should have been made earlier to prevent such losses (Peacock and Ragsdale, 1997).

Relief policies and programs can significantly affect the rate and patterns of recovery and can aggravate vulnerability issues after the disaster. For instance, many relief programs strive to return communities to the *status quo*; indeed, a common refrain from victims and politicians alike following a disaster is “to get the community back to normal”. In other words, restoration wins out over issues of equity and development, and root causes of the hazard are never addressed. Hence, communities are

doomed to repeat the cycle of disaster–damage–repair–disaster. Issues of equity and development are further highlighted when we look at resource distribution. Social inequalities, community heterogeneity, program coordination, and competition for scarce resources all impose other constraints on the recovery process. It is quite clear that disasters do not impact all social groups to the same degree, and it is usually those marginalized sub-cultures that are more severely impacted and are less likely to recover than wealthier segments of society.

### 2.3. *Structural-cognitive model*

Comprehensive planning for sustainability requires a third filter, one that incorporates changes in the structure and thinking of society to accommodate hazards within the framework of day-to-day affairs. Without such modification of societal processes, many factors can act as constraints on mitigation policies. These constraints might be structural in nature, whereby situational conditions serve to deter development by preserving the old system, or cognitive, in which psychological and attitudinal perceptions create unfavorable environments. For instance, physical, social, cultural, and economic factors may all constrain (or promote) action. Therefore, age, family structure, wealth, gender, ethnicity, education, and neighborhood characteristics, among other situational traits, may lead to varied outcomes (Ollenburger and Tobin, 1998). For example, wealthier people generally have a greater variety of options when confronted with disaster and clean-up in comparison with economically marginalized individuals. Similarly, culturally imposed conditions can severely limit actions. In societies where women are oppressed, it seems that women suffer more than men, with higher numbers of deaths and reduced levels of hospital treatment. Even in countries with “equality”, it is not unusual to find women experiencing greater levels of stress and anxiety, possibly because of their culturally defined roles as caretakers. Such cognitive and structural factors, while interdependent, will affect attitudes towards mitigation and recovery efforts as shown in Fig. 1.

### 2.4. *Sustainable/resilient communities*

In theory, sustainable and resilient communities should be able to withstand extreme geophysical processes and recover rapidly from disasters whenever they occur. Sustainability and resilience, then, are contingent upon careful planning and organization of society, both to ameliorate the impacts of disasters and to facilitate the recovery processes. Such comprehensive planning must encompass mitigation strategies to reduce risk and exposure, post-disaster plans to promote short- and long-term recovery, and careful consideration of structural and cognitive factors that will influence program

effectiveness. The three models are interrelated and will have significant bearing on sustainability goals. In this sense, planning would be truly comprehensive, incorporating all the vagaries of the natural world with the needs of the human-use system. It should be added that this is not a new concept and there are other models or frameworks that could be used to “explain” strategies towards hazard mitigation. Furthermore, the linkages between the three models, shown in Fig. 1, are highly simplified and can operate in more than one direction.

It is suggested, therefore, that characteristics of sustainable and resilient communities must include:

- *Lowered levels of risk to all members through reduced exposure to the geophysical event.* This might be achieved through the implementation of structural or non-structural measures, but ultimately must result in a less hazard-prone community.
- *Reduced levels of vulnerability for all members of society.* Unless vulnerability issues are addressed, social inequities will persist and the community will merely perpetuate pre-disaster conditions. Hence, reduced vulnerability must include strategies to help those individuals who are politically and economically marginalized.
- *Planning for sustainability and resilience must be ongoing.* In other words, commitments must be for the long-term, recognizing that sustainability can only be attained if such goals remain at the forefront of all community planning efforts.
- *High level of support from responsible agencies and political leaders.* Unless the political will is present it is highly unlikely that sustainability can be achieved.
- *Incorporation of partnerships and cooperation at different governmental levels.* Partnerships between agencies and organizations at all levels must be developed to provide the appropriate leadership, skills, resources, and local knowledge for the implementation of mitigation projects. All constituencies must buy into the drive towards sustainability and this might be afforded through partnerships between different levels of government.
- *Strengthened networks for independent and interdependent segments of society.* Social networks must be sufficiently resilient to withstand changes in the vertical and horizontal relationships through which many decisions are made. Strengthening and maintaining social networks is not easy, although local community initiatives, including educational and hazard awareness programs, can help promote interaction and favorable responses.
- *Planning at the appropriate scale.* Scale is confounded in part because of increasing globalization of the economy. Vertical relationships of multi-national corporations, for example, are often heightened at the expense of horizontal relationships which means that deci-

sion-making is often divorced from the local level. Community resilience therefore, especially with regard to economic recovery, may not be in the hands of local business persons, but may be subject to the desires of “absentee” employers. The implications for small urban communities are disturbing as large multinational companies will make decisions based on shareholder profits rather than local concerns. Thus, balancing practical sustainability goals with economic stability may be a major challenge facing hazard managers.

Theoretical constructs, such as those outlined in the models above, and indeed in other hazard models, are useful in determining those factors that should be addressed in planning for sustainable communities. The frameworks are conceptually sound, but in practice there are many obstacles that must be overcome if the ultimate goal of sustainability is to be achieved. A brief examination of Florida, USA, is used here to illustrate some of these pragmatic concerns facing hazard managers over the long-term.

### 3. Florida – long-term legacies

The State of Florida illustrates many of the complex social, economic, and global issues that affect disaster preparation and mitigation worldwide. The inequalities and levels of marginalization among different racial, class, and ethnic groups are comparable in many respects with other parts of the world. The degree of hazardousness throughout the state is extreme and the situation is being exacerbated by rapid urban development, large scale business ventures, combined with the possibility of an increasingly hostile natural system from a growing hurricane threat. The wider community exists purely because of the historical legacy of the technological fix that has encouraged development, particularly in the southern part of the state. There are, therefore, many lessons we can learn from the Floridian experience, particularly in the aftermath of Hurricane Andrew.

#### 3.1. Historical context

The historical structural conditions associated with the development of Florida have created a highly hazard-prone society where communities are especially vulnerable to a host of disasters. Florida has grown rapidly in the last 100 years from approximately 530,000 people in 1900 to an estimated 14.9 million in 1998 with the greatest increases occurring in the central and southern parts of the state (U.S. Census, 1999a; Smith, 1990). Between 1970 and 1990, the population rose by 9 million, with about 85% now residing in urban communities (Shermyen et al., 1991). While some of this increase has been from periodically high birth rates, notably in the

post-WWII period, Florida still has one of the lowest birth rates in the USA. At the same time, the death rate is one of the highest due to a large elderly population. Thus, natural increase is generally small, approximately 12% for the 1980s, and the substantial increases in population have come from net in migration. Indeed, people have flocked to Florida both from within the USA and from other countries, and by 1990 only 3.94 million residents had been born in the state, while 1.66 million were foreign born (U.S. Census, 1999b). This has repercussions for hazard management and community planning, since many new-comers have little or no knowledge of the hazard potential and probably only limited experience of how to deal with such disasters.

This rapid population growth has drastically altered the physical environment, and, at the same time, created new social, political, and cultural lifestyles. The physical environment is of particular concern because of the prevailing geophysical processes that inevitably lead to severe consequences for people living in the area. Florida's location means that it is prone to many different natural events, including tropical storms, thunderstorms, lightning, hail, strong winds, heat waves, tornadoes, fog, frost, floods, drought, sinkholes, and wild fire. In addition, environmental degradation in Florida has been considerable. Wetlands have been destroyed, the integrity of the Everglades compromised, aquifers depleted, and the coastline damaged.

Tropical storms are a particular problem in Florida and Hurricane Andrew in 1992 was a stark reminder of the destruction that can occur from such events. Andrew was the third most intense storm to hit the USA mainland. The storm caused \$20–25 billion damage in Florida, killed 15 people, and another 50 died during the recovery process (Sheets, 1995). In addition, 108,000 private homes were damaged, 49,000 of which were declared uninhabitable, nearly 6600 mobile homes were destroyed, and 180,000 people were made homeless (Morrow, 1997a). The impacts of Andrew were still being felt in communities throughout southern Florida. It was fortunate that landfall was south of Miami, thus missing one of the most densely populated parts of the state. The socio-economic ramifications of a category 4 or 5 hurricane striking one of the major urban areas are considerable, and raise the question of the feasibility of creating and maintaining sustainable communities under such conditions.

To its credit, the state has undertaken a major review of its emergency management strategies since Andrew, and completely revamped its Emergency Management Centers. The huge databases, now integrated through a Geographical Information System (GIS), are quite sophisticated. However, this constitutes only an emergency response phase, which is certainly important, but long-term mitigation planning is also necessary. On top of this, the frequency of violent tropical storms may be

increasing. First, the pattern of hurricanes may be somewhat cyclical, and it is possible that we have been in a quiet period for the last 20 years. Herbert et al. (1995) pointed out that during the 1960s and 1970s both the number and intensity of hurricanes in the United States decreased sharply compared with previous decades. However, it is possible that we are entering a period of renewed activity. If this is the case, then considerably more people are now exposed to the problem given the large population increases since the 1970s. Second, any global climate change that leads to a warming of the Atlantic Ocean will precipitate even more severe tropical storms and further test the hazard mitigation practices of Florida communities. Mitigation models that seek to reduce exposure and risk, therefore, are facing an ever increasing problem.

Tornadoes are also a continuing problem in Florida. For instance, the state has more tornadoes per 25,000 km<sup>2</sup> than any other USA state and is ranked third in the nation in total number occurring (Grazulis, 1993). The outbreak of devastating tornadoes in the Orlando area in February 1998, that killed 40 people and caused over \$40 million in damage, was a reminder of the level of risk from such hazards in Florida. Similarly, floods and droughts are ongoing problems, as are frost, fog, sinkholes, and thunderstorms. Once again, community and individual vulnerability are exacerbated by social, cultural, and economic differences.

Popular wisdom in the state claims that Florida would be an uninhabitable place had it not been for DDT and air conditioning, which allowed the control of insects, especially mosquitoes, and modification of indoor climates. These certainly played an important role in attracting large numbers of migrants to the state and are classic examples of the technological fix. However, hazard planners must now face the legacy of these actions. Pest control and air conditioning, in bringing people to Florida, have exposed huge numbers to the extremes of the sub-tropical climate that eventually will take their toll. Indeed, global warming, if it occurs on any large scale, will mean a continual challenge to communities in Florida particularly those located along the coastline, and rising sea levels and greater storms will present ever more dangerous conditions. Thus, the hazard problem in Florida is evolving – dynamic environmental conditions combined with changing social, economic, and political realities make this a very hazardous environment.

### 3.2. *Sociological and cultural factors*

Not all Floridians face the challenge of the physical environment on equal terms. When we consider the community response to this hazardous place, we must look closely at the variety of socio-economic and cultural groups that make up the state's population.

### 3.2.1. Population

Florida's demographic structure must be addressed if we are to attain any level of sustainability in our communities. We have already seen the rapid growth of population in the state, with a 33% increase for the 1980s, and an annual growth rate of 3.3% (Shermyen et al., 1991). This trend alone means that large numbers of people are now hazard-prone and this will inevitably lead to increased disaster losses. These increases in population are similar to those in some of the poorest nations in the world. For example, Bangladesh had an average annual population increase of 2.7% between 1980 and 1985, although in actual numbers of people this is higher than Florida (World Resources Institute, 1994). The figure for the United States for the same period was 0.9%. With more people exposed to potential disaster, it is imperative that ideas of sustainability and long-term rehabilitation are incorporated into the planning process.

### 3.2.2. Spatial patterns

Many immigrants have been located in coastal areas, and the sprawl of communities along the coastline can be identified on maps of the state. In fact, Florida leads the nation in coastal development with over 3.2 million residential units constructed between 1970 and 1989 (World Resources Institute, 1994). All these dwellings are at risk from hurricanes and flooding. Thus, controlling development has become a major issue in the state. In the mid-1980s, Florida did adopt a state-wide land-use policy to manage growth, but this was tied more to providing needed infrastructure than addressing concerns of natural hazards. The Concurrency Act, as it became known, requires developers to anticipate water and sewage needs in planning development, although there is no reason the law could not be used to facilitate and enhance hazard mitigation planning. Similarly, the Land Development Act was designed to curtail urban sprawl by confining new urban tracts to contiguous urban areas (Smith, 1990). In 1990, the state committed \$300 million annually for 10 years to acquire land in environmentally sensitive areas with a focus on barrier islands. Whether all this has had an effect on growth patterns remains to be seen. The additional problem with this strategy, though, is that inland residents may become complacent about hurricanes believing that they are not vulnerable to such severe storms. Certainly, storm surge may be ruled out, but the threat of flooding and strong winds is ever present as witnessed at the town of Homestead during Hurricane Andrew.

### 3.2.3. Age/family structure

The age structure of Florida presents additional problems with regard to hazards and sustainability (Table 1). By 1998, nearly 20% of the population was estimated to be 65 years of age or older, and 24% 18 or under (U.S. Census, 1999a), which, in terms of developing sustainable

Table 1  
Florida age structure and gender (1990)

AGE	%	Male	Female
0–14	18.6	51.1	48.9
15–24	12.9	51.2	48.8
25–44	30.4	49.7	50.3
45–64	19.8	47.0	53.0
65 and over	18.3	42.6	57.4

Source: Shermyen et al. (1991)

communities, presents different problems. An aging population has specific demands and requires different services in the event of a disaster than a young population. Although stereotypes of Florida assume an affluent population of elderly retirees, Morrow (1997a) pointed out that the elderly were disproportionately poor in the area impacted by Hurricane Andrew, with 73% relying solely on social security. Furthermore, a number of studies has shown that elderly generally experience higher levels of stress following disasters (Cutrona et al., 1986; Krause, 1987; Phifer, 1990). This is particularly true for those elderly who have little income, a combination that could be important in developing sustainable communities.

Thus, planning must take into account demographic traits of the communities involved, and relief strategies, evacuation plans, and medical supplies must accommodate the needs of the large percentage of elderly. However, it should not be assumed that retirees constitute a homogeneous group, since there exists substantial differences among them. For instance, created communities, such as Sun City, may provide strong support networks among a relatively affluent, homogeneous population. But even in Florida, such communities do not constitute the norm, and most elderly live in more traditional, heterogeneous situations, where factors of wealth, and class may be more relevant than age.

Nevertheless, age is an important variable in the state, and the bimodal population distribution in Florida creates a need for attention not only to the elderly but also to the younger members of society, and single-parent families. Hurricane Andrew, for example, showed that planning must take into account family structures and characteristics within the community. Morrow (1997b) demonstrated that domestic violence increased in the months following the disaster, divorce rates climbed by 30%, and the number of deaths rose, compared to similar periods before the storm. Community resilience and long-term recovery efforts, therefore, must be questioned in the light of these data.

### 3.2.4. Gender

Natural hazards are not gender neutral, but have implications during both the event itself and the recovery

phase, and different consequences can be seen for men and women. However, the concept of gender cannot be treated in isolation, since there are close ties with race, ethnicity, culture and class. Female heads of households, for example, are often older, poorer, and members of minority groups in comparison with males, and the majority of single-parent families are headed by women. It is reasonable to assume, therefore, that under many conditions, women are more vulnerable than men in disasters and their ability to recover is less favorable, a characteristic demonstrated in various works (Enarson and Morrow, 1998).

In Florida, the ratio of females to males is not high compared to other national data, although the pattern changes significantly with increasing age, as shown in Table 1. This presents special needs with regard to sustainable communities, and strategies to strengthen community resilience must address the complex relationships that come from linkages of age and gender. Once again, research has shown that women suffer more severely during disasters than men, and usually exhibit higher levels of stress (Melick and Logue, 1985–86; Solomon et al., 1987). However, the relationship is confounded by other factors such as family structure, age, level of social involvement, socio-economic status, religious taboos, and other cultural values (Coyne and DeLongis, 1986; Madakasira and O'Brien, 1987; Ollenburger and Tobin, 1998). For instance, women in the middle age groups are invariably responsible for taking care of children and the elderly, which places even greater stress on them in emergency situations. Community resilience, therefore, may be compromised if long-term care and consideration of stress is not forthcoming. Morrow (1997a) states that 15% of households in the area directly impacted by Hurricane Andrew were headed by women. Thus, it is probable that women absorb the social costs of being excluded from disaster planning, response, and recovery efforts to a much greater extent than men. And yet, women play a pivotal role linking the household level with the community in the recovery process (Enarson and Morrow, 1997).

### 3.2.5. Education

Levels of education may be important with respect to access to knowledge, and many authors have stressed the need for sound education to enhance understanding of environmental issues and improve community planning (Pepper, 1990). While the State of Florida has a well-developed educational system, there are many criticisms of its practical functioning. Schools are overcrowded and there is a shortage of teachers – issues it seems that the state legislature has not taken very seriously for some time. Florida has one of the highest school drop-out rates in the nation (33%) and about 25% of adults are functionally illiterate (West, 1990). This not only reduces the quality of the labor force, but may also place structural

blocks on building sustainable communities. Opportunities for mitigation strategies and other planning may be curtailed if residents are not in position to participate. Therefore, better use could be made of schools as a focus for hazard awareness, and women, who are usually more involved in Parent–Teacher Associations than men, could help facilitate this education process. To what extent level of education is important, however, needs to be examined in community planning.

### 3.2.6. Social/racial/ethnic networks

In maintaining community, there is a question of the social, racial, and ethnic mix, and how different groups might interact. This is certainly nothing new, as noted by Form and Nosow (1958). Others have cautioned against assuming that even small rural communities are homogeneous in outlook (Hoggart and Buller, 1987). Thus, any mitigation strategy that ignores the significance of this social heterogeneity is probably going to fail, for many others have demonstrated the importance of social acceptability of mitigation projects (Tobin and Montz, 1997).

Most of the population of Florida is White, 10.4% is Black, and over 12% is Hispanic (Smith, 1990). However, it would be wrong to treat any of these groups as either entirely separate, or as internally cohesive units. Indeed, there are many differences among and within ethnic and racial groups. This is particularly evident in Dade County (see Table 2), where there is a large ethnic and racial mix. The significance of this mix to community resilience and recovery after disaster is significant. In a study of tent cities, set up for the homeless following Hurricane Andrew, Yelvington (1997) found that ethnic differences led to a considerable degree of hostility between groups and at times active racism. Officials had stated that assignments to multi-family tents had been made without regard to racial and ethnic make-up, and

Table 2  
Population of Dade County, 1990

Hispanic group	%	Ethnic groups	%
Cuba	59.2	Black	
Nicaragua	7.8	United States	70.6
Puerto Rica	7.6	Haiti	11.4
Colombia	5.6	Jamaica	6.8
Dominica	2.5	Bahamas	1.9
Mexico	2.4	Other	9.3
Honduras	1.9	% of Total Pop.	20.6
Peru	1.7		
Guatemala	0.9	Anglos (Non-Hisp)	
Ecuador	0.8	% of Total Pop.	30.2
Salvador	0.8		
Panama	0.7		
Other	8.1		
% of total pop.	49.2		

Source: Morrow, 1997a.

yet there was a tendency for Haitians to be segregated away from the center in at least one encampment. In addition, there were incidents of tension among groups, expressed fears of a “Latin” take-over, and concern that aid was going to “illegal” Mexicans. This is typical in the pursuit of limited resources. Requests to change tents were also not uncommon. Yelvington estimated that the tent cities comprised 50–69% Latino, 30% Black, and 10–20% Anglo dwellers. Even these broad categories of ethnicity do not really identify the many sub-groups within the community, for social divisions within Latino, Black, or White groups are often more significant than their similarities (Yelvington, 1997).

Structural issues connected with ethnicity also appeared to play a role in relocation strategies after Hurricane Andrew and hurt recovery strategies. Girard and Peacock (1997) found that Blacks’ relocation plans were impeded and that they had limited options compared to Whites and Hispanics. While Whites and Hispanics often moved to wealthier White areas, Blacks invariably relocated to poorer Black communities, thus sustaining the *status quo* and further marginalizing the Black community. Such trends were evident in Florida City, where the proportion of Blacks increased by more than 10 to 71.4% of the total population, and more Anglos relocated than Blacks (Dash et al., 1997). Similar trends were found in Homestead where the proportion of Blacks rose by 6.5%. However, both communities ultimately lost over 30% of their populations which further compromises the ability of the community to recover.

The role of ethnicity and race fits the classic conflict/competition structure. After a disaster different groups are competing for limited resources and perceive that others may be receiving greater benefits. This attitude is heightened by pre-existing conflicts that are often manifested through ethnic differences. However, it would be incorrect to say that the conflict ensues purely because of ethnic differences, as attention to the political economy demonstrates. These groups typically are marginalized and less wealthy members of the greater community. Often they have lost virtually everything and their ability to recover is seriously impaired by lack of resources. These represent social and economic traps from which many individuals find it difficult to escape. If resources are distributed based on given ways of life, what may be termed the “culture of ethnicity”, then differences between groups may be exaggerated in the post-disaster community. For example, the Federal Emergency Management Agency (FEMA) distributed money to heads of households without taking into account the great variation of household styles. The traditional two parent/children model was not necessarily the norm, and hence money did not always reach those who most needed it. In some cases, individuals even posed as head of households for a number of units within a dwell-

ing and then absconded with the money (Yelvington, 1997).

### 3.2.7. *Migrant workers and homeless people*

The Florida economy thrives in part because of a large migrant labor force from Mexico and Central America. These individuals are an important part of the agribusiness and yet have little access to wealth, education, social services, and other advantages associated with modern society. Migrant workers are often treated as a flexible, easily managed workforce that imposes little overhead on the employers. The temporary nature of the migrant workers as they move from one harvest/planting area to another only serves to heighten the problem. They are certainly not part of what constitutes the traditional sense of community, being more akin to nomadic groups found in other parts of the world. For instance, following Hurricane Andrew, it was reported that many migrant workers refused to enter the tent cities for fear of being arrested by the Immigration and Naturalization Service, and many had been living in trailers and low-income housing provided by the large agribusinesses in south Florida (Yelvington, 1997). What exactly would constitute a “return to a stable community” for such people? Disaster relief is much more likely to be channeled towards those who control the destinies of such groups rather than the individuals themselves. Indeed, some of the political aspects of the distribution of aid after Andrew raised additional questions about community sustainability and resilience. However, these political factors are not addressed here.

In addition to the migrant community, Florida also has a very high number of homeless people, in part, of course, because of its attractive warm climate. In 1998, there were reported to be at least 55,000 homeless in the state, more than a third of whom were families. Currently, the state has only 5800 beds and 146 shelters available for these people. In 1991, there were over 6000 homeless in Miami alone. The homeless present new challenges during disasters and certainly added to the difficulties following Hurricane Andrew. In fact, FEMA refused to deal with the issue and would not let the homeless enter the tent cities, so eventually a new state-run one had to be established. Thus, once again, any long-term mitigation plan that does not address the issue of the homeless, will have inherent weaknesses. The same goes for squatter settlements elsewhere.

### 3.2.8. *Cognitive factors – popular culture*

The popular culture of a community will also influence how it meets the challenges of hazards. All the evidence shows that it is through the perceived environment rather than reality that behavior and attitudes are organized. Thus, individual awareness and community action may, in part, be dependent upon media attention to the problem. For example, looting is frequently highlighted by the



media as a critical problem in disaster zones. In reality, most disasters reduce local crime and lead to enhanced community spirit at least for a short period following the event (Wenger, 1978). The immediate post-disaster period is typically represented by: (1) a decrease in internal conflict as all members concentrate their energies and efforts on the problem at hand; (2) a convergence of social values centering on clean-up and recovery efforts that override pre-disaster differences; and (3) the emergence of a new, but temporary, organizational structure, characterized by a high level of consensus in the community. In this way many organizational ties are strengthened and a new “synthetic community” is created (Quarantelli and Dynes, 1976). This phase of the disaster, however, may be short-lived once the realities of the new conditions set in, as demonstrated above.

Fisher (1994) pointed out that myths pervade public perception of human response to disaster and that the media play a role in perpetuating these myths. In most disasters, these patterns seem to emerge at some time, and it is not unusual to hear disaster victims state that the situation has brought the community together. On the other hand, as recovery gets underway, old values return, long-standing conflicts re-emerge, and the synthetic community structure disappears. The old power status also re-emerges and is another force operating to return conditions to what they were prior to the disaster. To some degree, therefore, communities are already resilient, in that they do survive and do tend to return to “normal” after a disaster (Wright et al., 1979). However, other structural factors will determine whether this has been a positive or negative experience over the long-term for the community (Haas et al., 1977), and as shown in the tent cities, internal conflicts between and within subcultures can quickly materialize. Again, more marginalized groups, for instance those hampered by lack of English skills or by legal uncertainty, are least likely to have been affected by official hazard education, and most likely to rely on word of mouth reports, many of which will be inaccurate.

### 3.3. *Economic factors*

The Florida economy is heavily dependent on two primary activities, agriculture and tourism. Gross sales from agriculture in 1987 were over \$16 billion (Mulkey and Clouser, 1990) and from tourism in 1990 \$32 billion (Shermyen et al., 1991). There are many other economic activities in Florida, such as phosphate mining, manufacturing, international trade, and other light industrial pursuits, but for the most part, they play a lesser role than the other two. This has repercussions for planning and disasters in at least two ways; first through globalization of the economy especially in large-scale agribusiness, and second because of the volatile nature of the tourist industry.

### 3.4. *Agriculture*

Agriculture, particularly citrus production and sugar cane growing, is controlled to all intents and purposes by international companies, and production decisions for sugar and citrus are often made in places spatially separated from the field areas. The globalization of business, therefore, is just as serious to the Florida economy and its people as anywhere else. This globalization was most apparent after Hurricane Andrew. The agribusinesses had been dependent upon migrant workers and had housed many in trailers, a large number of which were destroyed by the storm. As the winter harvest season approached, the agribusinesses lobbied hard to have permanent housing for the 7000 expected workers. Federal and state money was then used to erect a mobile home village and bids were solicited for more permanent structures (Yelvington, 1997). By providing financial resources to these agribusinesses, the government was in effect subsidizing agriculture. Money was not provided directly to migrant workers themselves to recover from the disaster.

### 3.5. *Tourism*

Similarly, tourism is a very important part of the economic base of Florida, although it takes two tourist jobs to make the money generated through one manufacturing job (West, 1990). Take for example, the Walt Disney Corporation, which operates several large theme parks in central Florida. In fact, DisneyWorld, at Orlando, is now one of the largest tourist attractions in the world and its influence is felt throughout the state. If the Disney operations were to fail, perhaps due to a major hurricane disaster, the whole state would be negatively affected. The question might be whether Disney would decide to return to Florida if the site was destroyed by a severe storm, and people died. Even the perception of an unsafe environment can affect tourist spending. This was evident in the early 1990s when tourism in many parts of the state suffered a severe setback because several tourists had been murdered. Hotel and flight bookings were down and the state responded by trying to ensure tourist safety. The multiplier effect meant that impacts were felt quite widely, thus demonstrating the tenuous nature of Florida’s economy. The synergistic effects resulting from the combination of the political-economy and the hazardousness of place will significantly affect the viability and sustainability of tourist-based communities.

Another consequence of disasters, of course, is the actual damage and loss incurred. After Hurricane Andrew, many business were completely destroyed. It was, however, the vertical integration that allowed some to recover more rapidly, and there were several national franchises that reopened and were serving customers

even before the rubble had been cleared (Dash et al., 1997). What actually happened to many of the smaller business is not known. Other parts of the economy, such as the construction industry, profited during the recovery period as Federal and other money was brought into the state for the purposes of reconstruction. This had significance for some of the poorer parts of the state where the average income is more than 39% below the state average (West, 1990).

### 3.6. *Insurance industry*

The insurance industry, lost extensively after Hurricane Andrew passed through the state. Losses were so high that many insurance companies pulled out of insuring dwellings in the state altogether, and the state had to write policies through its own initiatives to maintain the viability of Florida communities. Without this state support, it is doubtful whether development or construction could have continued at the current pace. The communities in southern Florida, therefore, would have been stymied, having suffered the damage from Andrew, but unable to rebuild due to the absence of insurance. In this context, the resilience of the communities must be questioned, for by stepping in, the state has essentially ensured that another disaster will prevail, since homes have been rebuilt in hazardous areas.

While several insurance companies are now returning to Florida there is still a feeling of unease. Again, this is the typical vertical structure of businesses where decisions are made at remote sites. Economically, it does not make sense to insure property in Florida because of the extremely high risk, hence company decisions to pull out. The state government has essentially subsidized the population living there, which may not be an inherently stable situation. Indeed, Florida has the second highest incidence of repeat claims under the National Flood Insurance Program (NFIP).

The issue of insurance is further complicated by race. Peacock and Girard (1997) found that many Black homeowners not only had inadequate insurance on their dwellings, but also had taken out policies with companies on the “periphery” of the insurance industry. They suggested that this situation had come about from a series of circumstances that resulted in Blacks being guided to homes in poorer areas. These poorer quality homes would then suffer greater damage, which, when combined with insufficient insurance and inadequate insurance settlements, would result in slower recovery for Black areas. As note, Peacock and Ragsdale “In policy decisions, profits, not field sustainability, nor the ability of the built environment to withstand potentially hazardous environmental impacts, typically take precedence.” (1997, p. 23).

## 4. Discussion

The Florida case-study shows that problems will be encountered at virtually every step if sustainability and resilience become accepted planning goals. Those characteristics indicative of sustainable and resilient communities, shown in Fig. 1, just do not exist in Florida. The risk from certain hazards remains high and is possibly increasing in the case of hurricanes. Furthermore, vulnerability has been exacerbated by rapidly changing demographics. Not only has the population increased significantly, exposing more people to the hazard risk, but so too has the proportion of those living at or below the poverty line, the number of elderly and young, and the proportion of newcomers. These groups are known to exhibit higher levels of vulnerability than others and unquestionably suffer more during disasters. A closer examination also reveals that planning has not kept pace with this population explosion and officials appear to have paid little attention to curtailing activities in hazardous environments. The urban sprawl along the coastline, the development of floodplains, and the draining of wetlands attest to this. Such rapid change also means that social networks have not evolved in traditional ways and may not be sufficiently sophisticated to withstand the rigors of a disaster.

Utilizing the framework proposed in Fig. 1, two features stand out in particular if we are to achieve the goal of sustainable and resilient communities; (1) mitigation and recovery models must work in cooperation; and (2) the roles of structural and cognitive factors must be fully understood. The issue is further complicated because the system is constantly changing as the networks of interactions among elements respond to different inputs. The system has an inherent instability within its dynamism. Planning for sustainability and resilience, therefore, requires a complete understanding of the interactions between the various elements of the system.

Mitigation and recovery models must work together if we are to create sustainable and resilient communities. Clearly, some elements of the model are locally controlled and initiated, while others are more appropriate at the national level. Therefore, questions might center around the appropriate level at which remedial action should be taken, and whether there is an acceptable level of government intervention. This issue has been debated for some time, and there are arguments in support of centralized and local government initiatives. Principally, it is argued that centralized governments have the resources and expertise and hence are more able to undertake major initiatives. This is particularly important when expensive projects are proposed. Furthermore, centralization can minimize unfair advantages amongst communities if one adopts strategies and another does not. Some form of national directive is usually necessary in all societies because disasters tend to transcend

administrative boundaries. On the other hand, local governments are more aware of local needs and the peculiarities of particular locations. Hence, we often see developments of partnerships between different levels of governments, such as FEMA sponsored projects and the NFIP in the U.S.A. Those residing in hazard-prone areas invariably support the notion of government intervention up to a point, but would prefer flexibility in how projects are implemented (Turner et al., 1986; Tobin, 1992).

One example of such partnerships is Project Impact, a country-wide initiative in the United States to help communities become disaster resistant (FEMA, 1997a). Deerfield Beach in Florida has become one of the pilot communities, and has received \$1 million as seed money from FEMA for implementing disaster resistant actions. Local and national businesses have joined a partnership of local and federal governments to enhance community resilience (FEMA, 1997b). However, to date only piecemeal efforts have been accomplished and it is questionable to what extent the whole fabric of any community can be modified through Project Impact, although the educational and awareness aspects of the project should not be underestimated.

It is abundantly clear that structural and cognitive factors act as important filters in the hazard planning system. The social, economic, and political elements that prevail at different levels in society will significantly influence the outcomes of hazard planning. Thus, there is an urgent need to understand how each element, presented in Fig. 1, plays out in terms of pre-disaster planning and in post-disaster studies. Indeed, it is doubtful that successful mitigation and recovery can be accomplished without due consideration of the contextual issues of place, whether these are of a physical nature or human-induced. In this case, Florida shows both promise and problems. The efforts already underway, such as the partnership at Deerfield, and the re-organization of the emergency response centers, are steps in the right direction. On the other hand, differences among ethnic groups, the seemingly large proportion of marginalized communities, and the significant spatial inequalities in the distribution of wealth, present major structural constraints on governments and planning initiatives.

In addition, the dynamic nature of society means that many communities are constantly in a state of flux, as new people move into the area and others move out or die, as businesses come and go, and as different issues spark the public debate. The speed of change in many places has been unprecedented and now these newly imposed conditions can have severe long-term consequences for local communities. Certainly, much could be done to ameliorate the effects of hazards in Florida; simple regulations raising building standards and restricting new development in storm surge zones would have reduced losses, but also would have cramped the

kind of wholesale “development” that has been Florida’s hallmark. However, this legacy including piecemeal adjustments will not significantly affect the Florida situation nor does it make it unique. Similar difficulties can be found in other communities throughout the USA.

## 5. Conclusions

Experience has shown that current hazard response and mitigation practices often sustain communities as they are, and merely perpetuate the disaster-damage cycle rather than addressing the root causes of the problems. For example, in Florida we are attempting to maintain communities that exist in a completely artificial environment, whereas in hazard planning we are trying to work *with* the natural environment. Do we want to do this? The practical application of these conceptual ideas may prove elusive at best, and “living with hazards” may be the only realistic option. This is not to say that efforts to minimize the effects of disasters are not important, only that truly sustainable and resilient communities are not feasible in the current socio-political-economic environment.

In other contexts, should we seek to protect or sustain societies in which there are significant social injustices? Is it ethically appropriate, for instance, to sustain marginalized, semi-permanent communities by subsidizing international agribusiness as they rebuild after a disaster? Sustainability and resilience, of course, mean much more than this, and planning with such goals in mind usually requires significant changes in the structure of society. Thus, to be truly sustainable, communities must develop comprehensive on-going planning strategies that encompass all aspects of the hazard problem, including socio-economic and political elements. Over the short-term this may be unrealistic, but the long-term goal is laudable. A change in political awareness and motivation is required to get the process going.

## Acknowledgements

I would like to thank the editors, S.E. Bird, B.E. Montz, and K.A. Yelvington for help and advice on this paper. However, any errors remain mine.

## References

- Bates, F.L., Pelanda, C., 1994. An ecological approach to disasters. In: Dynes, R.R., Tierney, K.J. (Eds.), *Disasters, Collective Behavior, and Social Organization*. University of Delaware Press, Newark, NJ, pp. 149–159.
- Berke, P.R., Kartez, J., Wenger, D., 1993. Recovery after disaster: achieving sustainable development, mitigation and equity. *Disasters* 17 (2), 93–109.

- Coyne, J.C., De Longis, A., 1986. Going beyond social support: the role of social relationships in adaptation. *Journal of Consulting and Clinical Psychology* 54 (4), 454–460.
- Cutrona, C., Russell, D., Rose, J., 1986. Social support and adaptation to stress by the elderly. *Journal of Psychology and Aging* 1 (1), 47–54.
- Dash, N., Peacock, W.G., Morrow, B.H., 1997. And the poor get poorer: a neglected black community. In: Peacock, W.G., Morrow, B.H., Gladwin, H. (Eds.), *Hurricane Andrew: Ethnicity, Gender and the Sociology of Disasters*. Routledge, London, pp. 1–19 (Chapter 1).
- Enarson, E., Morrow, B.H., 1997. A gendered perspective: the voices of women. In: Peacock, W.G., Morrow, B.H., Gladwin, H. (Eds.), *Hurricane Andrew: Ethnicity, Gender and the Sociology of Disasters*. Routledge, London, pp. 116–140 (Chapter 7).
- Enarson, E., Morrow, B.H. (Eds.), 1998. *The Gender Terrain of Disasters: Through Women's Eyes*. Greenwood Press, Westport, Connecticut.
- Federal Emergency Management Agency, 1997a. Project impact: building a disaster-resistant community. FEMA; Guidebook and Pilot Communities. [www.fema.gov/about/impact.html](http://www.fema.gov/about/impact.html).
- Federal Emergency Management Agency, 1997b. Deerfield Beach, Florida Signs Agreement to Become First Disaster-Resistant Community Under New FEMA Initiative. FEMA News Room: [www.fema.gov/nwz97/97283.html](http://www.fema.gov/nwz97/97283.html).
- Fisher, H.W., 1994. *Response to Disaster: Fact Versus Fiction and its Perpetuation: The Sociology of Disaster*. University Press of America, Lanham.
- Form, W.H., Nosow, S., 1958. *Community in Disaster*. Harper and Brothers, New York.
- Girard, C., Peacock, W.G., 1997. Ethnicity and segregation: post-hurricane relocation. In: Peacock, W.G., Morrow, B.H., Gladwin, H. (Eds.), *Hurricane Andrew: Ethnicity, Gender and the Sociology of Disasters*. Routledge, London, pp. 191–205 (Chapter 10).
- Grazulis, T.P., 1993. Significant Tornadoes, 1680–1991: A Chronology and Analysis of Events. The Tornado Project of Environmental Films; St. Johnsbury, Vermont.
- Haas, J.E., Kates, R.W., Bowden, M.J. (Eds.), 1977. *Reconstruction Following Disaster*. MIT Press, Cambridge, MA.
- Herbert, P.J., Jarrell, J.D., Mayfield, M., 1995. The deadliest, costliest, and most intense United States hurricanes of this century (and other frequently requested hurricane facts). In: Tait, L.S. (Ed.), *Hurricanes: Different Faces in Different Places*. The 17th Annual National Hurricane Conference; April 1995. National Hurricane Center, Coral Gables, FL, pp. 10–50.
- Hewitt, K., 1983. *Interpretations of Calamity: From the Viewpoint of Human Ecology*. Allen and Unwin, Boston.
- Hoggart, K., Buller, H., 1987. *Rural Development: A Geographical Perspective*. Croom Helm, London.
- Kreps, G.A., Bosworth, S.L., 1994. *Organizing, Role Enactment, and Disaster: A Structural Theory*. University of Delaware Press, Newark, NJ.
- Krause, N., 1987. Exploring the impact of a natural disaster on the health and psychological well-being of older adults. *Journal of Human Stress* 13, 61–69.
- Madakasira, S., O'Brien, K.F., 1987. Acute posttraumatic stress disorder in victims of a natural disaster. *The Journal of Nervous and Mental Disease* 175 (5), 22–29.
- Mazmanian, D.A., Sabatier, P.A., 1983. *Implementation and Public Policy*. Scott, Foresman and Company, Glenview, IL.
- Melick, M.E., Logue, J.N., 1985–86. The effect of disaster on the health and well-being of older women. *International Journal on Aging and Human Development* 21(1), 27–38.
- Morrow, B.H., 1997a. Disaster in the First Person. In: Peacock, W.G., Morrow, B.H., Gladwin, H. (Eds.), *Hurricane Andrew: Ethnicity, Gender and the Sociology of Disasters*. Routledge, London, pp. 1–19 (Chapter 1).
- Morrow, B.H., 1997b. Stretching the bonds: the families of Andrew. In: Peacock, W.G., Morrow, B.H., Gladwin, H. (Eds.), *Hurricane Andrew: Ethnicity, Gender and the Sociology of Disasters*. Routledge, London, pp. 141–170 (Chapter 8).
- Mulkey, D., Clouser, R.L., 1990. Agriculture. In: Denslow, D.A., Pierce, A.C., Shermyen, A.H. (Eds.), *The Economy of Florida*. Bureau of Business Research, College of Business Administration, University of Florida, Gainesville, pp. 129–151 (Chapter 7).
- Ollenburger, J.C., Tobin, G.A., 1998. Women in postdisaster stress. In: Enarson, E., Morrow, B.H. (Eds.), *The Gender Terrain of Disasters: Through Women's Eyes*. Greenwood Press, Westport, Connecticut, pp. 95–107.
- Peacock, W.G., Girard, C., 1997. Ethnic and racial inequalities in hurricane damage and insurance settlements. In: Peacock, W.G., Morrow, B.H., Gladwin, H. (Eds.), *Hurricane Andrew: Ethnicity, Gender and the Sociology of Disasters*. Routledge, London, pp. 171–190 (Chapter 9).
- Peacock, W.G., Ragsdale, A.K., 1997. Social systems, ecological networks and disasters: towards a socio-political ecology of disasters. In: Peacock, W.G., Morrow, B.H., Gladwin, H. (Eds.), *Hurricane Andrew: Ethnicity, Gender and the Sociology of Disasters*. Routledge, London, pp. 20–35 (Chapter 2).
- Pepper, D., 1990. *The Roots of Modern Environmentalism*. Routledge, London.
- Phifer, J.F., 1990. Psychological distress and somatic symptoms after natural disaster: differential vulnerability among older adults. *Journal of Psychology and Aging* 5 (3), 412–420.
- Quarantelli, E.L., Dynes, R.R., 1976. Community Conflict: Its Absence and its Presence in Natural Disasters. *Mass Emergencies* 1 (2), 139–152.
- Sheets, R.C., 1995. Stormy Weather. In: Tait, L.S. (Ed.), *Hurricanes: Different Faces in Different Places*. The 17th Annual National Hurricane Conference, April 1995. National Hurricane Center, Coral Gables, FL, pp. 52–62.
- Shermyen, A.H., Floyd, S.S., Thompson, G.H., Evans, D.A. (Eds.), 1991. *Florida Statistical Abstract*. Bureau of Business Research, College of Business Administration, University of Florida, Gainesville.
- Smith, S.K., 1990. Population. In: Denslow, D.A., Pierce, A.C., Shermyen, A.H. (Eds.), *The Economy of Florida*. Bureau of Business Research, College of Business Administration, University of Florida, Gainesville, pp. 19–35 (Chapter 1).
- Solomon, S.D., Smith, E.M., Robins, L.M., Fischbach, R.L., 1987. Social involvement as a mediator of disaster-induced stress. *Journal of Applied Social Psychology* 8 (4), 376–392.
- Tobin, G.A., 1992. Community response to floodplain relocation in Soldiers Grove, Wisconsin. *Transactions of the Wisconsin Academy of Sciences, Arts, and Letters* 80, 87–99.
- Tobin, G.A., Montz, B.E., 1994. The flood hazard and dynamics of the residential land market. *Water Resources Bulletin* 30 (4), 673–685.
- Tobin, G.A., Montz, B.E., 1997. *Natural Hazards: Explanation and Integration*. Guilford Press, New York.
- Turner, R.H., Nigg, J.M., Paz, D.H., 1986. *Waiting for Disaster: Earthquake Watch in California*. University of California Press, Berkeley.
- U.S.Census, 1999a. Florida. U.S. Bureau of Census.
- U.S.Census, 1999b. Florida 1990 US Census Data. U.S. Bureau of Census. <http://venus.census.gov/cdrom/lookup/921248784>.
- Waugh, W.L., 1996. Disaster management for the new millennium. In: Sylves, R.T., Waugh, W.L. (Eds.), *Disaster Management in the U.S. and Canada: The Politics, Policymaking, Administration and Analysis of Emergency Management*. Charles C. Thomas Publishers, Springfield, Illinois, pp. 344–359 (Chapter XVI).
- Wenger, D.E., 1978. Community response to disaster: functional and structural alterations. In: Quarantelli, E.L. (Ed.), *Disasters, Theory, and Research*. Sage, Beverly Hills, CA, pp. 17–47.

- West, C.T., 1990. State issues and regional economics. In: Denslow, D.A., Pierce, A.C., Shermeyen, A.H. (Eds.), *The Economy of Florida*. Bureau of Business Research, College of Business Administration, University of Florida, Gainesville, pp. 59–86 (Chapter 3).
- World Resources Institute. 1994. *World Resources 1994–95*. In association with United Nations Environment Programme and United Nations Development Programme: Oxford University Press, New York.
- Wright, J.D., Rossi, P.H., Wright, S.R., Weber-Burdin, E., 1979. *After the Clean-Up: Long-Range Effects of Natural Disasters*. Sage, Beverly Hills, CA.
- Yelvington, K.A., 1997. Coping in a temporary way: the tent cities. In: Peacock, W.G., Morrow, B.H., Gladwin, H. (Eds.), *Hurricane Andrew: Ethnicity, Gender and the Sociology of Disasters*. Routledge, London, pp. 92–115 (Chapter 6).