AFTER DISASTER . . . BUILDING A SUSTAINABLE COMMUNITY

by Jacquelyn L. Monday[1]

Out of this terrible disaster, beyond all imagination, comes our opportunity. And I beg you not to let Mississippi miss it.
—Governor Haley Barbour, speaking to the Mississippi Legislature, September 27, 2005

INTRODUCTION

Governor Barbour's insightful words in the aftermath of Hurricane Katrina's impact on his state reflect an awareness that people faced with the prospect of coming back after destruction on this scale do not have to be limited to *rebuilding* the former neighborhood, town, or state—instead, they can aspire to *reinvent* it. They can improve upon the status quo, go beyond what was feasible last year or the year before, and correct deficiencies that had been in place for whatever reason.

This opportunity is accompanied by a great challenge, which is to find a balance among the many desires, interests, and needs—some of them in competition with each other—to determine what is best for the community as a whole.

All too often in the past, for example, economic interests have prevailed in the aftermath of natural disasters, resulting in a badly stricken community's being rebuilt and "up on its feet" quickly but without much consideration of any alternatives besides a return to the status quo. This has been particularly vexing to hazards specialists in academia, all levels of government, and the private sector, who have witnessed time and time again a community's rapid return to the at-risk conditions that spawned the disaster in the first place—downtown areas abutting a waterway, unanchored mobile homes in the path of tornadoes, etc.

This single-mindedness is just as frustrating to experts from other disciplines who see mistakes of all sorts being repeated during rebuilding, simply because of lack of foresight during the recovery process.

It is a byword today that all things are connected, and community well-being is no exception. Any number of rebuilding measures may be ill-conceived or poorly executed. And there are those that begin well but stray from their early vision somewhere along the way. But we have begun to realize that even rebuilding that is flawlessly designed and executed with the best of intentions and the fondest hopes can, in and of itself, induce unintended losses, damage, and harm in another place or in the future.

For example, we now have the means to prevent or minimize storm surge damage to a house along the ocean coasts, by elevating the home above the expected flood level, using specified construction materials and techniques. This combination of mitigation measures is now fairly widespread in coastal construction, saving millions of dollars in flood damage, as well as preventing disruption and misery for those residents. But is it smart to make it feasible to build homes so close to the ocean, no matter how "safe" they are? With more of our population converging gradually on the coasts, the effect that such mitigation techniques could have must be considered at a much, much larger scale. Are we simply setting ourselves up for a bigger disaster when a really severe hurricane hits? Are we imposing the costs of this custom on future generations, in the form of lost natural resources, altered ecosystems, and an overburdened national economy?

A broad context is needed in which to couch the many factors that contribute to sensible, comprehensive rebuilding, reinvention, and recovery. The concept of "sustainability" can provide such an enlarged framework for examining community concerns such

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as disaster resilience, green building, or economic development—in a wider context.

This article outlines the concept of sustainability at the community scale, and presents a framework for conducting the recovery and reconstruction after disaster in a way that will contribute to the sustainability of that community. From the 2005 hurricanes many examples have arisen of how these ideas can be applied in a real situation.

PRINCIPLES OF SUSTAINABILITY

The concept of sustainability is based on the premise that people and their communities are made up of social, economic, and environmental systems that are in constant interaction with each other and that must be kept in harmony or balance if the community is to continue to function to the benefit of its inhabitants—now and in the future. A healthy, balanced society (or nation, or community, depending on the strength of one's magnifying glass) is one that can endure into the future, providing a decent way of life for all its members—it is a *sustainable* society. Sustainability is an ideal toward which to strive and against which to weigh proposed actions, plans, expenditures, and decisions. It is a way of looking at a community or a society or a planet in the broadest possible context, in both time and space.

Although it adopts a broad perspective, in practice the pursuit of sustainability is fundamentally a local endeavor because every community—whether it be a city, a small town, or a neighborhood—has different social, economic, and environmental needs and concerns. And in each community the quality, quantity, importance, and balance of those concerns is unique (and constantly changing). For this reason—and because the best mitigation efforts also tend to be locally based—we tend to speak of sustainability mostly in terms of local actions and decisions.

> In the late 1980s, the World Commission on Environment and Development (the Brundtland Commission) came up with a definition of global sustainable development that has become widely accepted:
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> > *Sustainable development is development "that meets the needs of the present without compromising the ability of future generations to meet their own needs" (1987, p. 188).*

There are six principles of sustainability that can help a community ensure that its social, economic, and environmental systems are well integrated and will endure. We should remember that, although the list of principles is useful, each of them has the potential to overlap and interrelate with some or all of the others, depending on the situation and issue.

A community or society that wants to be sustainable will try to:

1. Maintain and, if possible, enhance, its residents' quality of life. Quality of life—or "livability"—differs from community to community. It has many

components: income, education, health care, housing, employment, legal rights on the one hand; exposure to crime, pollution, disease, disaster, and other risks on the other. One town may be proud of its safe streets, high quality schools, and rural atmosphere, while another thinks that job opportunities and its historical heritage are what make it an appealing place in which to live. Each locality must define and plan for the quality of life it wants and believes it can achieve, for now and for future generations.

2. Enhance local economic vitality. A viable local economy is essential to sustainability. This includes job opportunities, sufficient tax base and revenue to support government and the provision of infrastructure and services, and a suitable business climate. A sustainable economy is also diversified, so that it is not easily disrupted by internal or external events (like natural disasters), and it does not simply shift the costs of maintaining its good health onto other regions or onto the oceans or atmosphere. Nor is a sustainable local economy reliant on unlimited population growth, high consumption, or nonrenewable resources.

3. Promote social and intergenerational equity. A sustainable community's resources and opportunities are available to everyone, regardless of ethnicity, age, gender, cultural background, religion, or other characteristics. Further, a sustainable community does not deplete its resources, destroy natural systems, or pass along unnecessary hazards to its great-great-grandchildren.

4. Maintain and, if possible, enhance, the quality of the environment. A sustainable community sees itself as existing within a physical environment and natural ecosystem and tries to find ways to co-exist with that environment. It does its part by avoiding unnecessary degradation of the air, oceans, fresh water, and other natural systems of the planet. It tries to replace detrimental practices with those that allow ecosystems to continuously renew themselves. In some cases, this means simply protecting what is already there by finding ways to redirect human activities and development into less sensitive areas. But a community may need to take action to reclaim, restore, or rehabilitate an already-damaged ecosystem such as a nearby wetland.

5. Incorporate disaster resilience and mitigation into its decisions and actions. A community is resilient in the face of inevitable natural disasters like tornadoes, hurricanes, earthquakes, floods, and drought, if it takes steps to be sure that such events cause as little physical damage as possible, that productivity is only minimally interrupted when they occur, and that quality of life remains at (or quickly returns to) high levels. A disaster-resilient community further takes responsibility for the risks it faces and, to the extent possible, is self-reliant; that is, it does not anticipate that outside entities (such as federal or state government) can or will mitigate its hazards or pay for its disasters.

6. Use a consensus-building, participatory process when making decisions. Participatory processes are vital to community sustainability. Such a process engages all the people who have a stake in the outcome of the decision being contemplated. It encourages the identification of concerns and issues, promotes the wide generation of ideas for dealing with those concerns, and helps those involved find a way to reach agreement about solutions. It results in the production and dissemination of important, relevant information, fosters a sense of community, pro-

> Coastal development in Tillamook County, Oregon, has gradually been adversely affecting the salmon population—a hallmark of the Pacific Northwest's culture, environment, and economy—as well as increasing the economic costs of seasonal flooding. By drawing on a wider range of information when making planning and development decisions, targeting their funds and expertise to areas of the greatest impact, and carefully coordinating the local, state, and federal agency activities over the past few years, local officials succeeded in dramatically reducing the flood damage in a recent flood. Tillamook County has discovered that what is best for the local environment can also be best for its residents and for the local economy—that is, integrating the sustainability principles of livability, disaster resilience, and environmental quality.
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> (Livable Communities Initiative, 2000)

duces ideas that may not have been considered otherwise, and engenders a sense of ownership on the part of the community for the final decision.

SUSTAINABILITY AND DISASTER RECOVERY

Applying the principles of sustainability when making decisions can help communities avoid the pitfalls of adopting a course of action that will have detrimental impacts in another place or time. Ideally, all communities would routinely adopt a long-term view and incorporate sustainability ideals into all aspects of their comprehensive planning process—whether making development decisions, preparing for a disaster, expanding its housing stock, restoring natural areas, or undertaking any other program. In reality, although it is being used more frequently, this approach is nowhere close to universal.

But occasionally—and unfortunately—catastrophic events such as the hurricanes of 2005 bring about a situation in which the wisdom of considering sustainability is made more obvious. Given the extensive media coverage and the scope of that calamity, it was impossible for anyone—participant or distant observer—not to think about how this at-risk situation came to be, ways in which it could be avoided in the future, why so many people appeared unable to cope with the disruption, whether the south Louisiana marshes really could have provided natural protection had they been in prime condition, and if the tourism along the Gulf Coast could make a comeback.

A disaster, even one more modest than those of 2005, brings temporary changes to a community. People think about problems that they normally do not think about—not just the risks they face from hazards, but also the quality of local housing, ways in which the community could be better planned and constructed, the local scenic and other natural resources, and livability. At the same time, public officials have the media attention that enables them to garner support for innovative ideas. A disaster forces a community to make a seemingly endless series of decisions—some large and some small, some easy and some quite difficult. Technical and expert advice becomes available from public and private sources. Financial assistance flows into the community, enabling it to tackle more ambitious projects than would normally be the case.

These changes can be viewed as opportunities to rebuild in a better way, instead of succumbing to the natural desire to put things back the way they were as soon as possible. This is a situation in which state and local decisionmakers have resources at their disposal, public opinion backing them up, and the impetus to take deliberate and speedy action, as Governor Barbour well knew. It can be a chance for a community to implement forward-looking activities that for one reason or another (usually financial or political) have not been undertaken before, including improvements in lifestyle, safety, economic opportunity, or the environment. After a disaster, a community must take action to recover, so incorporating principles of sustainability into that process often does not involve much additional effort. The challenge is in recognizing different solutions to problems and in combining them in ways that make for a holistic recovery.

AN OVERVIEW OF HOLISTIC RECOVERY

How can a community take advantage of the opportunity that disaster recovery brings?

As a foundation for this effort, a framework for sustainable—or "holistic"—recovery from disaster has been developed within which the principles of sustainability become decisionmaking criteria to be applied to each and every recovery decision. On the matrix on the next page, these principles (and some ways of implementing them) are shown on the vertical axis. A disaster presents a community with problem situations: utilities must be restored, infrastructure re-established, housing repaired, social services reinstituted, and commercial sectors rehabilitated. Across the top of the matrix are listed some of the problems that could confront a community in the aftermath of a disaster. At the intersection of the problem and the sustainability principle there are opportunities for a recovery decision and action that would be more sustainable than a return to the status quo (marked with an X on the matrix).

> A holistic recovery from a disaster is one in which the stricken locality systematically considers each of the principles of sustainability in every decision it makes about reconstruction and redevelopment.

The Principles of Sustainability and Some Options for Applying Them

	DAMAGED TRANSPORT			DAMAGED PUBLIC FACILITIES						DAMAGED UTILITIES				DAMAGED HOUSING			ECONOMIC DISRUPTION						ENVIRONMENTAL DAMAGE				DISRUPTION TO HEALTH/SAFETY				OTHER		
	Roads, bridges, and related infrastructure	Subway, rapid transit	Other	Schools	Downtown, CBD, historic district	Public spaces	Harbor, port, airport	Stormwater system, power plant	Other	Power lines	Phone lines	Water treatment plant	Other	Houses to be repaired	Houses damaged beyond repair	Other	Commercial buildings damaged/destroyed	Businesses disrupted	Unemployment	Loss of work force	Other	Riverine, beach, and dune erosion	Toxic air, water, soil, wellheads	Tree loss, habitat loss	Other	Medical facilities damaged	Social and family services, daycare disrupted	Victims, population traumatized	Other			
1 Use a Participatory Process Use a participatory process along with all the other principles of sustainability and in every disaster recovery situation in which it is appropriate.																																
2 Maintain and Enhance Quality of Life																																
Make housing available/affordable/better				x			x			x	x			x	x					x							x				
Provide education opportunities		x			x	x												x	x								x	x			
Ensure mobility	x	x		x	x	x	x								x		x		x	x					x						
Provide health and other services					x					x									x			x		x		x	x	x				
Provide employment opportunities			x														x	x	x	x				x		x						
Provide for recreation				x	x	x	x															x		x								
Maintain safe/healthy environs	x	x		x		x		x				x		x	x							x	x	x		x	x	x				
Have opportunities for civic engagement				x	x	x	x												x			x		x				x				
Others																																
3 Build Economic Vitality																																
Support redevelopment and revitalization		x		x	x	x	x	x		x	x	x		x	x		x	x		x		x				x					
Attract/retain businesses	x	x			x		x								x		x	x	x	x											
Attract/retain work force		x		x		x								x	x		x	x				x		x		x	x	x				
Enhance economic functionality	x	x		x	x	x	x	x				x					x									x	x					
Develop/redevelop recreational, historic, tourist attractions					x	x	x										x			x		x		x								
Others																																
4 Promote Social and Intergenerational Equity																																
Preserve/conserve natural, cultural, historical resources				x	x	x	x	x				x		x								x	x	x				x				
Adopt a long-term focus for all planning	x	x		x	x	x	x	x		x	x	x		x	x		x									x	x					
Avoid/remedy disproportionate impacts on groups	x	x		x	x	x						x		x	x		x	x	x	x		x	x			x	x	x				
Consider future generations' quality of life	x	x		x		x				x	x	x		x	x		x					x	x	x				x				
Value diversity				x	x	x	x							x	x					x							x	x				
Preserve social connections in and among groups				x	x	x								x	x				x					x			x	x				
Others																																
5 Protect Environmental Quality																																
Preserve/conserve/restore natural resources	x	x		x	x	x	x	x				x		x	x							x	x	x								
Protect open space						x	x					x			x		x					x	x	x								
Manage stormwater							x	x				x			x						x		x	x								
Prevent/remediate pollution	x			x	x	x	x	x		x	x	x		x	x								x					x				
Others																																
6 Incorporate Disaster Resilience/Mitigation																																
Make buildings and infrastructure damage-resistant	x	x		x	x	x	x	x		x	x	x		x	x		x						x			x	x					
Avoid development in hazardous areas	x	x		x	x	x	x			x	x	x			x		x					x		x		x						
Manage stormwater							x	x				x			x					x			x	x								
Protect natural areas	x				x	x	x								x		x					x		x								
Promote and obtain hazards and other insurance	x			x	x							x		x	x		x	x								x		x				
Others																																

This holistic framework for recovery can be used to ensure that people consider viable, sustainable options as decisions are made. The range of possibilities, alternatives (including returning to the status quo), and impacts of the proposed recovery actions are considered in light of the sustainability principles as decisions are made about recovery, so that sustainable options are considered in each and every disaster recovery opportunity. During this process, a community can tailor a unique set of sustainable recovery actions that satisfies its own particular concerns, takes advantage of its strengths, and uses the tools and techniques that are most appropriate to its situation.

This process can result in some unusual combinations of problems and solutions. For example, a stricken community with a damaged freeway overpass might well decide to incorporate seismic-resistant features into the repaired structure. However, a community striving for *sustainable* recovery would also consider demolishing or relocating the overpass to enhance livability in the surrounding neighborhood (sustainability principle #5), or rebuilding it to improve access to, and thus economic vitality for, a nearby commercial area that was previously difficult to reach from the highway (sustainability principle #2). This is just one of many possible outcomes of a systematic process of analyzing recovery in light of the six sustainability principles. The possibilities are endless, because each community has unique attributes, needs, and concerns, and each disaster superimposes a distinct set of impacts.

This can be more appealing to a community than simply trying to impose a single-minded recovery approach, even with financial and other incentives, because it gives the members of a community a way to examine their other day-to-day goals within a broader context. Hazard mitigation doesn't drive the process, nor does environmental protection, economic development, or green building. Instead, the impetus comes from community goals, buttressed by sustainability ideals. Concerns about economic development, local environmental quality, social equity, future generations, and other aspects of a sustainable community are considered in every decision about recovery.

A 10-STEP PROCESS FOR LOCAL SUSTAINABLE RECOVERY

The best way to ensure community sustainability after a future disaster is to have a thorough plan for a sustainable recovery. But even without such a plan, there are many common-sense things that can be done during recovery that will increase community sustainability, simply by using the holistic recovery framework as a guide and the disaster recovery process as the catalyst. A community must strive to fully coordinate available assistance and funding, while seeking ways to accomplish other community goals and priorities. Holistic disaster recovery does not differ from "normal" disaster recovery—it is part of what *should be* normal disaster recovery. A good recovery engenders a sustainable community.

A community does not need a new or separate planning or recovery process to build sustainability. The sustainability perspective can be accommodated in different ways and to varying degrees within most standard procedures used by localities for comprehensive planning, mitigation planning, disaster recovery, or other efforts.

A good, all-purpose planning process—the so-called 10-Step Planning Process—is one that is recommended for localities seeking funding, technical assistance, or recognition under such federal programs as the Community Rating System of the National Flood Insurance Program, several flood control programs of the U.S. Army Corps of Engineers, and the Hazard Mitigation Grant Program and the Flood Mitigation Assistance Program administered by the Federal Emergency Management Agency. It follows

After the disastrous 1997 floods on the Red River of the North, thousands of households in the Greater Grand Forks area had damage serious enough to necessitate the replacement of their furnaces and/or hot water heaters. The recovery decisionmakers realized that this was a chance to effect a massive upgrade of the heating systems in the area. Rebates of $200 were offered to each homeowner and small business owner who replaced his or her damaged furnace or water heater with an energy-efficient unit. About 5,500 households and businesses (about half of those flooded) took advantage of the rebates. These new furnaces consume less fuel and give off fewer pollutants, improving quality of life in the Red River Basin.

(International Red River Basin Task Force, 1999)

the basic procedures of gathering information, analyzing problems, setting goals, and finding ways to implement and fund agreed-upon activities. The section below shows how the principles of sustainability can be incorporated into that process during the recovery period after a disaster.* As always, a community needs to tailor this procedure to meet its own needs.

Step 1. Get organized. At this stage a community makes a commitment to sustainability by designating appropriate responsibility for the recovery, delegating it to an individual or entity—new or existing—and setting up measures for integrating sustainability into ongoing disaster recovery and other community processes, as necessary. One way to do this would be to appoint a "sustainability liaison" to the planning and decisionmaking body or the recovery team. The person in this role would be an advocate for considering the principles of sustainability at each step of the process, and knowledgeable about and supportive of all those principles: environment, social equity, consideration of the future, economic development, quality of life, and disaster resilience.

Step 2. Involve the public. Participatory processes are an essential aspect of sustainability involving the inclusion of all the stakeholders in recovery. A community that seeks sustainability must be committed to such involvement and, at this point, the community begins to design public participation into all phases of the coming recovery. There are many techniques from which to choose, from the traditional public hearings and town meetings to lectures, planning charettes, workshops, call-in radio, and community-based events like fairs and festivals. To fulfill the goal of social equity, communities should pay particular attention to reaching out to those people who may have been historically excluded from conventional "public notice" techniques because of language differences, cultural constraints, temporal or spatial barriers to attending meetings, or other factors. The opportunities for participation should be publicized through a variety of media, including flyers, posters, local newspaper(s), local television stations, and the Internet.

Step 3. Coordinate with other agencies, departments, and groups. To mastermind a sustainable recovery, a community must expand representation on the recovery team to include those who can contribute expertise regarding each of the principles of sustainability. They could be in-house staffers, local experts, representatives from state or federal agencies, or consultants. Depending on the situation, social services personnel, environmental specialists, engineers, economic development directors, parks or wildlife department personnel, the business community, or social services personnel all might be included. Formal and informal ties need to be developed with every conceivable private entity; non-profit group; neighborhood coalition; church; state, local, federal, and regional agency; and others. This will increase the diversity of ideas and potential solutions, provide a ready-made labor pool (which will be needed when implementation begins), and make problem-solving more imaginative. It also will strengthen local capacity within and across groups and areas of expertise.

Several months after Hurricanes Katrina and Rita struck Louisiana, more than 400 Louisiana residents, public officials, community leaders, and representatives from local and state organizations and religious and civic groups gathered at a Recovery and Rebuilding Conference sponsored by the American Planning Association and the American Institute of Architects. For two days the concerns and desires of these spokespersons were aired through a participatory process that yielded a long list of goals and guidelines for rebuilding the stricken areas. The discussions were given additional credibility by the presence of experts in pertinent disciplines, such as planning, engineering, community finance, and environmental protection (most from Louisiana itself) whose guidance helped ensure that ideas generated were feasible.

* More detail on how sustainability can be addressed during disaster recovery can be found in *Holistic Disaster Recovery: Ideas for Building Local Sustainability after a Natural Disaster,* by the Natural Hazards Research and Applications Information Center. The 10-Step Process is described in more detail, with an eye toward minimizing flood damage, in "Flood Mitigation Planning: The CRS Approach," by French Wetmore and Gil Jamieson. Both of these publications are in the reference list.

Step 4. Identify the post-disaster problem situations. During this step, the recovery team begins to systematically consider ways in which it can build sustainability as it plans for and manages the recovery. The team can start by simply listing all the disaster-caused situations that need to be remedied in the course of recovery. (Some possibilities are listed across the top of the matrix.)

For each problem situation, information should be gathered to gain a full picture. This is a broad exercise that likely will include many sub-steps spread over a wide array of issues, for example:

- Obtaining expert analysis of local economic trends, costs of rebuilding, and opportunities for economic growth, before and after the disaster;
- Mapping an environmentally sensitive area;
- Assessing the community's present and future vulnerability to hazards and disasters;
- Pinpointing social inequity and its impacts within the community, before and after the disaster;
- Determining what quality-of-life concerns are important to local residents, before and after the disaster.

Obviously it is preferable to have this information in hand before a disaster, rather than having to gather it afterward, when the situation is confused, and time and resources are at a premium.

This step will culminate in a list of problem situations, accompanied by supporting information.

When asked to imagine the changes they would like to see in their community, representatives of St. Tammany Parish, Louisiana, listed, among others, a wider range of housing choices, placement of the electric delivery system underground, and the establishment of urban growth boundaries to allow agriculture to continue to flourish. These quality-of-life concerns should underlie decisions the state and parish make about recovery from Hurricanes Katrina and Rita.

Step 5. Evaluate the problems and identify opportunities. During this step the implications of sustainability become clear. The recovery team evaluates each of the problems identified in Step 4 in light of the six principles of sustainability to see where there are opportunities during recovery to enhance community sustainability, rather than returning to the status quo. The list of options in the box (and listed on

Some Tools for Community Sustainability

- Local redevelopment authority
- Economic incentives
- Loans for businesses
- Housing authority
- Insurance
- Capital improvements
- Loan interest subsidy programs
- Revolving loan funds
- Public investment
- Redistricting
- Subdivision regulations
- Building codes
- Special ordinances
- Tax incentives
- Transfer of development rights
- Easements
- Land purchase
- Voluntary agreements
- Planning
- Habitat protection
- Filter strips and vegetative buffers
- Riparian buffers
- Soil conservation and management
- Ecosystem restoration
- Zoning and rezoning
- Public education and awareness campaigns and events
- Special protection of critical facilities, utilities, networks
- Preserve/create public spaces
- Limiting public investment in hazardous areas
- Relocation out of hazardous areas
- Preservation of natural floodplain, coastal, wetland, other functions
- Private-public partnerships and networks
- Ombudspersons
- Targeted workshops
- Community festivals and other activities

the left side of the matrix) can be used to stimulate thinking about sustainable approaches a locality can use to address each post-disaster problem. One or more approaches should be designated as possibilities for each problem, focusing on those that are applicable to the community's situation, needs, and concerns. Note that this is not an exhaustive list and also that some options apply to more than one principle.

This step results in a list of possible ways to combine remedying a disaster-caused problem and addressing an "unsustainable" situation. Each idea represents a way to further one or more aspects of sustainability, without regard (at this point) to cost or feasibility. The list is simply a series of specific things that, ideally, the community would like to do.

For example, suppose the community has experienced a flood that, among other impacts, has seriously damaged a neighborhood of low-income houses along a polluted stream. One item identified during this step might be: "Expand stormwater management system to better handle street drainage and reduce streambank erosion" (thereby repairing flood-damaged infrastructure, improving livability by reducing street flooding, minimizing future flood damage by enlarging the carrying capacity of the stormwater system, and improving environmental quality by preserving soil and riparian vegetation from erosion).

Another item might be "Incorporate seismic-resistant features and insulation into damaged housing during repair" (thereby improving livability by making the houses warmer (or cooler) and less expensive to heat or cool, improving disaster resilience by strengthening the housing against earthquakes, and protecting environmental quality by reducing energy consumption). The team tries to consolidate multiple sustainability principles into each possibility it lists.

Step 6. Set goals. During this step the recovery team agrees on what realistically can be done. The team pares down the list of possibilities identified in Step 5 to those measures preferred by most of the stakeholders and most consonant with local needs and situations, public support, cost-effectiveness, availability of technical expertise, other community goals, local regulations, and other factors. A range of possibilities is developed and prioritized in case some cannot be implemented. These final choices become the recovery goals—positive statements of what the community intends to accomplish. By this point it will become clear that the goals established for a holistic recovery are broader and have more far-reaching implications than those for simply returning to the status quo.

This step will result in an agreed-upon set of actions that have reasonable applicability to the community. (It should be noted that in practice, Steps 4, 5, and 6 likely will overlap.)

Step 7. Develop strategies for implementation. Working with the list of goals developed in Step 6, the recovery team reviews the tools, financial support, and expertise available to achieve each of them. For each goal, an implementation strategy is to be developed that describes:

- What is to be accomplished;
- The lead agency/entity and what it will provide or prepare;
- Partnerships that will make the action effective;
- Ways to obtain technical expertise and advice;
- Official local action needed (passage or amendment of zoning or subdivision ordinances, adoption of building codes, etc.);
- Funding methods.

After Hurricane Katrina, Congress approved supplemental housing funds for the Department of Housing and Urban Development, to be distributed to communities through the states' existing Community Development Block Grant mechanisms. The State of Mississippi determined that it was in its best interests to promote future disaster resilience and improve housing (sustainability principles #1 and #5). Therefore, it has stated that, in order to qualify for grants from these funds to repair and/or replace their damaged homes, property owners must agree to incorporate mitigation measures into the rebuilding by constructing their homes or businesses to a higher elevation or other appropriate means; purchasing flood insurance; and adhering to the International Building Code, which has higher construction and related standards than earlier codes.

This will produce a "package" associated with each community goal that outlines what is needed to achieve that goal. This step weeds out the possibilities that are not feasible for whatever reason and results in a set of strategies that realistically can be implemented.

Step 8. Plan for action. During this step the recovery team drafts a complete plan for holistic recovery activities that fits into the recovery plan or becomes part of the community's comprehensive plan. Like other plans, it should include:

- A budget;
- Details for obtaining funding;
- A schedule for team meetings, public participation, data collection, report writing, on-the-ground action;
- A monitoring and review process;
- Provision for public review and comment.

This plan should be coordinated with existing comprehensive development, capital improvement, drainage, transportation, housing, and recreation plans and programs. After public and agency/entity review, the plan should be revised and finalized.

Step 9. Get agreement on the plan for action. Depending on the circumstances, the state, county, and/or local government may formally adopt or approve a sustainable recovery plan or otherwise officially incorporate it into the recovery or comprehensive plan. During this stage, the local community should obtain agreement from federal and state agencies as appropriate. It might also enter into Memoranda of Understanding with other partners. The agreement of other stakeholders, especially historically excluded groups, should be obtained.

Step 10. Implement, evaluate, and revise. This final step ensures that the community maximizes the opportunities that began as a disaster. Having the persons and entities responsible for implementation of various aspects of the recovery actually involved in the decisionmaking during all the earlier steps helps ensure that the goals and activities agreed upon are actually carried out.

As recovery proceeds, it will be clear that some goals and strategies need to be modified. A formal monitoring process helps identify what changes are needed. It also can help keep certain initiatives from simply being abandoned when an unforeseen obstacle is reached. Wherever possible, stakeholders should participate in reviews (at least annually) and help develop indicators of progress.

A LONG-TERM OUTLOOK

Sustainable practices (and the awareness of the principles of sustainability) introduced during recovery planning or actual recovery can be institutionalized within the community's decision-making, budgeting, and planning processes to ensure that they endure over time. Ideally, a community would develop indicators and a schedule for monitoring and tracking change and needed improvements. Such institutionalization would help build awareness of the many aspects of sustainability, as local residents, public officials, city staff, and businesses come and go. The heightened awareness would in turn nurture an acceptance of sustainable practices as a local, public value and a way of life.

Using the holistic recovery framework, applying the sustainability principles, and employing a process like the 10-step procedure described above create additional benefits for a community. For one thing, they promote conceptual and operational links, among different community interests and the groups that seek to further them. For example, how many times have people discovered—inadvertently—that those responsible for local parks and recreation actually are interested in the same sort of open space improvements that the wildlife advocates want? This process makes such serendipitous convergence more likely, and helps solidify future collaboration, thus making it easier and more cost-effective for the community to accomplish its overall goals and to carry out routine activities.

Another benefit is that drawing on the broad range of sustainability principles instead of just thinking about one issue in isolation (affordable housing, for example) makes it more likely that the given approaches that are adopted and carried out will be successful over the long run. The new environmental protection measures, hazard mitigation techniques, advanced building codes, or other measures are more likely to become institutionalized and accepted because they are paired with other community desires, and long-lasting, because they do not detract from other aspects of overall sustainability.

Besides advancing ideals that improve the livability and appeal of a community, this holistic recovery approach can also help local residents to think and rethink their community goals and ponder the kind of place they want their grandchildren to inherit. It can encourage each locality to carefully balance risk vs. protection, cost vs. benefit, today vs. tomorrow.

It is far too early to discern the extent to which sustainability will actually be incorporated into the recovery of the Gulf Coast from the hurricanes of 2005. There have been numerous highly encouraging signs that consideration is being given to a wider range of issues and concerns than perhaps in any previous disaster. It will be many years before an assessment can be made about the long-term effects of the sustainability principles that are being applied or ignored in the course of the reconstruction taking place today.

The holistic recovery framework described here does not guarantee that every sustainability principle will actually be included in disaster recovery, but it does ensure that they will at least be considered. Holistic recovery is a common-sense approach to recovering from a disaster. It helps a community work toward fully coordinating available recovery assistance and funding with measures to accomplish broader community goals and priorities. At the same time, it widens the goals of the recovery to encompass many aspects of a community that may not have been considered before.

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MORE INFORMATION

The sources of information listed below are just a few of the many resources on sustainability and recovery listed in the annotated bibliography of the Natural Hazards Center's publication, *Holistic Disaster Recovery* (see below). This document can be accessed on the Center's website at http://www.colorado.edu/hazards.

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