On the Cross of Sant'Andrea: The Response to the Tragedy of San Giuliano di Puglia Following the 2002 Molise, Italy, Earthquake

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This paper reviews the recovery process in San Giuliano di Puglia, the one town in the Molise earthquake to suffer both extensive fatalities and widespread severe damage to its building stock. It focuses on three issues related to the recovery process: (1) the initial decision to close the central part of the town and to relocate most of the townspeople into temporary housing, (2) the location and design of the temporary "new village," (3) the demolition rather than repair of many damaged buildings, and (4) the ongoing planning for the permanent relocation of the town center to a new area away from what had been the town's "main street." The paper discusses the inspection, shoring and demolition process. Connecting all these issues is the question of how relief aid should be managed to best assist in recovery on all levels, including the psychological well-being of the people and the community. [DOI: 10.1193/1.1767162]

INTRODUCTION

A village is not made only of stones, bricks and streets. It is mainly made up of people, feelings, and emotions. This may seem obvious, but now I have experienced the evidence of this... You really do not have a precise idea of what you have until you lose it.

-A long-time resident of San Giuliano

(Interviewed by Alberto Dusi on 25 July 2003)

In Italy, an "X" shear crack caused by an earthquake is sometimes referred to as a "cross of Sant'Andrea." After the Molise earthquakes of October 31 and November 1, 2002, San Giuliano di Puglia, a hill town of about 1,100 people, had many such crosses. This one small town (Figure 1) had more casualties and buildings damaged beyond repair from this earthquake than any other town, and the collapse of one building, the elementary school, killed 27 students and one teacher.

At the time this paper was written, one year had passed since the earthquake that destroyed so much of San Giuliano, and recovery was proceeding slowly. In the year that has passed since the earthquake, a number of issues have emerged relative to (1) the

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Figure 1. The day of the first earthquake in the sequence, October 31, 2002, prior to the closure of the village (Dusi).

decisions to evacuate the town, (2) the location of the temporary village in a single location some distance from the town, (3) the demolition rather than repair of large numbers of the damaged buildings, and (4) the proposed redesign of the central section of the town on a new site. Related concerns are the role of the local townspeople in the decision-making process that affects their lives, and how the recovery process has affected the community.

Disaster relief can be described as a balancing act between a form of paternalistic direct aid and the provision of the kind of help that allows people to gain a renewed sense of control over their own lives and environment. This paper is based largely on the experiences of co-author Alberto Dusi, a structural engineer who worked as a consultant to the *comune* over the course of most of this first year following the disaster, and Randolph Langenbach, a building conservation consultant, from his experiences as a senior analyst at the Federal Emergency Management Agency (FEMA) and his personal experience after the Oakland/Berkeley Hills firestorm of 1991, which destroyed his home along with 3,000 others and killed 30 people. The suggestions in this paper reflect the personal opinions of the authors based on their observations of the recovery process in San Giuliano. The conclusions reached are intended to open discussion on certain issues in earthquake recovery that may frame a needed debate on optimal procedures in future earthquakes.



Figure 2. Views of the saddle area in the center of San Giuliano before (a) and after (b) the earthquake. (a: ENEA; b: Langenbach).

BACKGROUND

This area of Italy is marked by sylvan views of green rolling hills of cultivated land. It is a land of ancient settlements; each originally located on a hilltop for protection. Today, wheat fields, intermingled with olive groves, are spread across the rolling hills, but the people continue to live close together in the villages. The historic core of each village forms a tight-knit cluster of rough-hewn limestone houses. San Giuliano was originally a fortified medieval village dating from about 1,000 (Arato and Pellizzato 2003). The town is perched on a knoll at the end of a ridge that projects from an even higher hill. As one enters the town from the north, one can look down on the town stretched across the ridge toward the original citadel on the knoll. The historic core of San Giuliano survives as a walled town, with the houses located inside the citadel reached by passing through arches or climbing stairs. At the center of the citadel area is a church and a truncated medieval tower leading to a courtyard of houses known as the Palazzo Marchesale.

The town has expanded outside the citadel along the saddle-shaped ridge during the past 200 years. In recent years, larger buildings of reinforced concrete have begun to creep up the side of the taller hill at the entrance to the town (Figure 2). After the earth-quake, geologists determined that the saddle-shaped ridge had surface layers most prone to shaking, and the damage levels along the ridge bear this out. By comparison, the much older buildings in the historic core, with some exceptions, suffered little damage. The school where the children died was located at the end of the saddle opposite the citadel.

EVACUATION OF THE VILLAGE

After the November 1 temblor, the decision was made to close the village, remove all residents to temporary shelters, and establish a perimeter guard to stop potential looters and to keep people out of harm's way. This decision was made because many buildings were standing in a precarious state. The displaced townspeople were mainly placed in



Figure 3. Police barricades with members of police and fire brigades from other locales (Langenbach).

hotels normally used for summer seaside tourism near Termoli, a half-hour drive away. The costs for the relocation were borne by the national government. Ultimately, a cluster of temporary emergency housing, called the "new village," was constructed on the hillside opposite to San Giuliano.

While the police barricade was up, townspeople were only allowed to enter to inspect their houses and to pick up their belongings. The only area of the village allowed to remain open was the cluster of homes on the slope of the hill near the northern entrance to the town, and a smaller number of family residences with minimal damage on the outer perimeter of the historic citadel. Out of the original population of 1,100 people, approximately 120 people were allowed to remain living in their houses.

Shortly after the earthquake, public officials announced that the repair of the town would be completed in a year, but as the months have passed since the earthquake, it has become clear that this optimistic timetable would not be met. Because building repair and retrofitting are funded by the central or regional government, funding has to be found, technical rules established, administrative procedures set, microzonation studies performed, designs approved, and construction work done, and so the time span to complete is normally three to five years. One year after the earthquake no damaged buildings had yet been repaired or new construction begun. Approximately 15% of the buildings scheduled for demolition had not yet been demolished. Most of the village remained closed, but some perimeter portions had been reopened. The police barricade (Figure 3) was removed about 10 months after the earthquake and entry was henceforth no longer controlled, although police continued to patrol the area.



Figure 4. An inspection team meeting with the displaced owners of this dwelling prior to conducting a damage assessment of the interior (Langenbach).

INSPECTIONS, SHORING, AND DEMOLITION

Once the town of San Giuliano was closed, its repair and reconstruction became primarily a governmental activity. In all but a small section of town, the Fire Brigade provided access to all buildings regardless of the damage. In other damaged towns, governmental assistance in the repair was done building-by-building. Heavily damaged buildings were cordoned off, blocking sidewalks and parts of the streets, but life in the towns went on and most people were able to return to their homes to recover their belongings in their own time frame, rather than having to be ushered in by the authorities.

INSPECTIONS

Following the earthquake, teams of inspectors (Figure 4) assessed the damaged buildings to identify which buildings were safe to enter. The inspection teams are usually composed of both volunteers and government workers sent by different public agencies from around the country. In the first phase of the emergency, the teams were organized by and reported to the Department of Civil Protection. A typical team was composed of two technicians. This initial inspection was referred to as the first-level inspection. The more detailed, subsequent, or second-level inspections, necessary when significant damage or unknown conditions were reported, were carried out under the jurisdiction of the *Comune di Regione Molise*.

Property owners were contacted to accompany the inspectors into their homes, where in most cases, their furniture and belongings remained just as they were left the day of the earthquake. The inspectors often had to respond to many questions from the concerned owners, who usually had little knowledge of the nature of the damage or how to



Figure 5. (a) and (b). Much of the post-earthquake emergency shoring and triage work was carried out by the fire brigade (Langenbach).

fix their dwellings. Sometimes the subsequent teams of inspectors while conducting a more in-depth assessment delivered conflicting opinions from those of the first-level inspection teams on the condition and reparability of a structure.

This problem is not unique to the Molise earthquake. After recent earthquakes in the United States, the Federal Emergency Management Agency (FEMA) has had to deal with sometimes widely divergent reports on structures, with significant financial and safety implications.

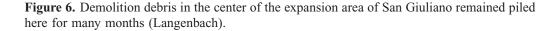
While the first-level inspections were carried out soon after the earthquake, the second-level and subsequent inspections were necessarily more time-consuming. Demolition decisions often required repeated evaluations, inasmuch as damaged houses affected the stability of adjacent homes still standing. As a result, the inspection phase continued over most of the first year following the disaster, and the demolition list constantly expanded as the analysis and decisions were made building by building.

DEMOLITION AND DEBRIS REMOVAL

In Italy, both shoring and demolition during the emergency phase are carried out by firefighters from around the country, who are organized by the central government as emergency responders. At first, only structures threatening collapse were demolished, and others were shored by fire department personnel with heavy timber shores. This shoring work was sometimes quite elaborate and extensive (Figure 5).

As the months passed, demolition activities began to overtake shoring and protection as the principal emergency undertaking. In some cases, the owners were in favor of in-





spection reports that recommended condemnation since they believed there would be more governmental assistance for replacement than for repairs, and also because there was fear that their existing houses could not be repaired to an acceptable safety level for future earthquakes. One year after the earthquake, approximately 170 buildings had been demolished and 35 were on the list to be demolished.

The demolition produced an enormous amount of debris, which at first remained piled where the buildings were demolished (Figure 6). Soon, the debris became an impediment. Eventually, the demolition had to be stopped until a dump location for the debris was selected. Seven months after the quake, the debris was finally removed to a "provisional storage site." In mid-June, the storage place was closed by order of a judge because it was considered a potential environmental danger. This closure interrupted the demolition again. By the end of July, the temporary dumpsite was reopened. As of December 2003, the permanent dumpsite had not been established, but most of the debris had been removed from the town to the provisional dumpsite.

THE NEW VILLAGE OF SAN GIULIANO

The new house is more than decent, but I do not really feel at home. I feel myself confused and lost... It is really sad to see the old village from here; and we have to stay here for three or four years at least...In these [summer] days I used to prepare a lot of tomato sauce for the winter. It was a sort of collective cooking operation. All the family was involved, but this year... I haven't started yet and, frankly speaking, I do not know if I'll prepare it.

-Long-time resident of San Giuliano, 25 July 2003

Because of national outpouring of sympathy and outrage from the loss of the school children in their public school building, the new village project became more than just ordinary emergency temporary housing. The news of San Giuliano brought world attention and the national political leadership, including Prime Minister Silvio Berlusconi, to



Figure 7. A view of San Giuliano di Puglia showing the damaged town on the right, and the new village on the left (Langenbach).

the town. These leaders promised the rapid construction of a model temporary settlement. The decision to proceed was made on about November 12, 12 days after the earthquake, and the *Dipartimento Nazionale della Protezione Civile*, the National Department of Civil Protection, began to make plans.

DESIGN

The site selected for the new settlement is on a hillside to the east of San Giuliano about a kilometer away across a small valley (Figure 7). Marcello Fiori, the head of the San Giuliano COM (*Centro Operativo Misto*, or the Combined-Operations Center established by Italian Civil Protection at the disaster site to handle all governmental activities), described to Alberto Dusi how the location was chosen. Civil Protection, with members of the Town Council, had determined that the area was the only location with adequate space for all of the houses. The idea of locating the houses in two or three different sites surrounding the old village had been rejected because this would have required new roads and services for each of the clusters, adding cost and time. A second motivation for the location was a concern about dangers arising from the demolition and reconstruction activities in the town. Vice Mayor Di Cera reinforced this point by saying that it was preferable to keep people not too close to the existing village.

The actual design of the new village was the responsibility of the Department of Civil Protection, with the funding provided by the Italian Government, but the local Town Council was involved. It was they who decided that the temporary village would have, in addition to the prefabricated houses, a school, a town meeting hall, a general store, a café-bar, a pharmacy, and a small park and playground. Construction started on November 20, and the new school and the first block of 30 houses were completed on December 1. The Prime Minister inaugurated the new village on December 23.



Figure 8. The new village nearing completion in March 2003 (Langenbach).

The main cluster of houses and the village center was completed in mid March 2003 (Figure 8), and an additional cluster of 70 houses was opened in July. The village in its completed size contains 267 houses with a population of 687 people. Of this population, there are 264 couples, 45 single adults, and 114 children.

The houses in the new village are a significant grade better than those used after previous earthquakes in other parts of Italy. After the 1997 Umbria–Marche earthquake, the temporary settlements consisted of small and unadorned manufactured sheds on bare ground with no public amenities (Figure 9). In Calitri, Campania, where emergency housing was constructed after the 1980 earthquake, the settlement was finally vacated completely around 2000, but the problems of disposal of the asbestos cladding has delayed the demolition of the now abandoned compound (Figure 10).

The new village houses are constructed and clad with timber, uncommon in Italy outside of the Alps. Manufactured construction allowed the rapid creation of the new village. The houses were bought from three different Italian companies, and were sent to the site disassembled. Each prefabricated structure contains two dwellings. With long parallel rows of identical one-story buildings (Figure 11), the settlement has a barrack-like shape and site plan, but there has been a significant effort to soften the monotony with some refined details, such as dressing the surface of the retaining walls at the entrance to the complex with cut-stone veneer, hiding the prefabricated industrial profile of the new village temporary school with a wood slat "false front" (Figure 12), building the construction of a park and playground, and the inclusion of a cluster of public buildings to serve as a village center.

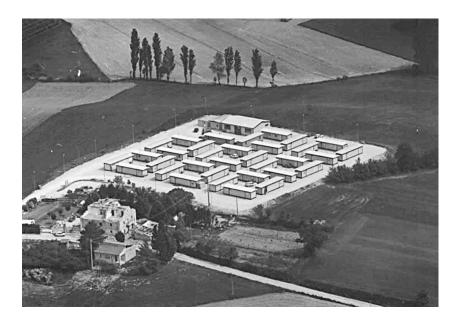


Figure 9. Temporary housing after the Umbria-Marche earthquake (Dusi).

The high-quality construction in San Giuliano is likely a unique case rather than a trend and may have been possible in this village because the earthquake damage outside of San Giuliano was neither severe nor widespread.



Figure 10. Calitri, in Campania. Demolition has been delayed because of the problem of safely removing and disposing of the asbestos cladding (Langenbach).



Figure 11. View of the regular parallel rows of the two-unit dwellings that make up the new village (Langenbach).

OPINIONS OF THE INHABITANTS

Despite the premium investment by the Department of Civil Protection, some of the long-time residents of San Giuliano interviewed by Alberto Dusi on July 25, 2003, approximately nine months after the earthquake, were critical.

We feel lost. Here all is the same... Living here is like being back to the time I was a soldier: I had to stay in the camp that was, for sure, better than the house I had at that time, but that place wasn't mine...



Figure 12. The new village temporary school has a simple wood slat "false front" to hide the prefabricated industrial profile of the building (Langenbach).

They [Civil Protection] for sure did their best, and we thank them because they built the wood houses in a very short time... But why did they build the village so far from ours? If it was not possible to find a space big enough, wasn't it possible to keep it closer, maybe by putting the new construction in two or three different places? And why can't we enter our [old] village? For how long will it be closed?...

Another resident illustrated the difference between outside experts and the local villagers:

Our village was like many others, even if you [the technicians working in San Giuliano] go around saying that the oldest part of the village is worth preserving and restoring. We do not know if what you say is true or not, but what we know for sure is that we are missing the village. The wood houses here are new and, in some cases, more comfortable than the houses we lived in before the earthquake, but this village has nothing to compare with ours. We cannot find the "signs" we were used to.

The following quote from another resident hints at the negative effects of relocation on the townspeople.

After the earthquake, we changed. Quarrels increased in numbers and contents. A sort of unexpressed and hidden jealousy has always been present in our life, but now it explodes suddenly on occasion for apparently unmotivated reasons. The cause is that we all live closer than before in our houses, not only in the physical sense. This is really a bad way of living.

The complaints about lack of privacy may have more to do with a lack of engagement on the part of the local population in the decision-making and design process than they do with the actual design of the settlement itself. The residents were lamenting the diminution in their communal life. In their surveys, which covered over 10% of the townspeople, an ENEA sociological team (Arato and Pellizzato 2003) confirmed a fairly widespread breakdown in communal civility:

Everybody expressed feelings of being discriminated against—and accused their neighbors of "working behind our back," "being selfish," and "only looking out for themselves."

The ENEA sociologists attributed these expressions of anger and mistrust to the loss of loved ones, uncertainty about the future, and the abandonment of their houses and loss of their personal belongings. They observed that the people "are looking for a way to vent their own anger from the losses, and during this process, they tend to retreat into themselves, with less communication with others."

Alberto Dusi also confirms that the sentiments in these quotes were not isolated phenomena. In the ten months he worked in the community, he witnessed rising tensions. He also observed that much of the former town's social life had disappeared. After returning from the coastal hotels, people tended to stay in their own houses in the new village with little social interaction.

THE RE-PLANNING OF SAN GIULIANO

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As the area marked for demolition expanded to include much of the central part of the town along the ridge, the planners responsible for the reconstruction in San Giuliano raised questions about whether the most affected area should remain clear of buildings. The concentration of damage appeared to indicate that the seismic amplification was greatest in the saddle area, particularly along Corso Vittorio Emanuele and in the area under the collapsed school. This was reinforced by analysis of the soil substrate by the "Working Group for San Giuliano Microzonation Assessment," established and funded by the Department of Civil Protection (Goretti and Di Pasquale 2004, this issue). Their studies showed that the underlying clay layers were significantly thicker, leading to a potential for greater seismic amplification in the area extending from the collapsed school across the saddle towards the historic citadel. Some areas were also subject to differential settlement. The citadel itself was found to be located on more stable layers of rock.

The planners proposed clearing a large part of the saddle and turning it into a memorial park, and then rebuilding the displaced buildings on the slopes of the hillside towards the community gymnasium. This idea was developed under the direction of the prime minister's office, with input from the president of the *Regione Molise* and the mayor of San Giuliano. The medieval part of the village would be restored, but the housing and commercial structures that had been in the saddle area would not be rebuilt there. This would leave a large open area in the functional center of the town.

The preliminary plan circulated around the time of the ENEA interviews (Arato and Pellizzato 2003) and clearly conflicted with the expressed wishes of a majority of the townspeople. The ENEA interviews were conducted in June 2003 and show that a majority (approximately 64%) of the 120 people interviewed (10% of the population) expressed a desire to reconstruct San Giuliano as it had been, while only 5% declared that they would prefer the proposed new layout. About 22% expressed no preference.

NATIONAL AND LOCAL CONTROL

The government is the only substantial resource for disaster recovery because there is no fully functioning mortgage and insurance market in rural Italy. The government recovery effort operates at three levels: national, regional *(regione)*, and municipal *(co-mune)*. At the national level, the leadership role is under the direction of the Department of Civil Protection. The *Regione Molise*, which lacks experience and expertise in disaster management, was less involved in the management of the operations than it could have been, with more leadership exercised by the central government. At the local level, mayors of Italian towns are invested with large responsibilities after disaster.

The mayor and the town council are charged with the responsibility of working with the relief workers who converge onto the town from all parts of the country. These relief workers, who include police, fire department, military personnel, and officials from the Department of Civil Protection, are under the jurisdiction of the central and regional governments, but the mayor has the responsibility for making the day-to-day decisions affecting the direction of the recovery process. This places a large expectation on the mayor and onto the entire town council to act in the best interests of all of the residents. The local leadership bears the brunt of any disagreements over the decisions that are made.

Over one year after the earthquake, the Mayor and Town Council finally convened a community meeting to discuss recovery issues with the entire community. This meeting proved to be so contentious that the police had to maintain order. It took two meetings before the situation began to calm down. The meetings were open to everyone, and new representatives were selected to represent different social groups within the town. This group of representatives included two former mayors, former town councilors, and others who were workers, technicians and farmers. As these meetings have been repeated, the conflicts and anger that characterized the first two have abated.

When the ENEA sociologists (Arato and Pellizzato 2003) reported on the current breakdown in civility and trust between the displaced townspeople, they documented their desire to "...reconstruct not only the habitations, but also the pre-existing social fabric with all of the residents reunited and living together as they did before."

INSIGHTS & RECOMMENDATIONS

It will take several more years in San Giuliano di Puglia before a full evaluation of the earthquake recovery process there can be made. However, it is instructive to review the process based on the first 12 months since the earthquake. The following observations and suggestions are offered by the authors based on their observations of the postearthquake recovery process in San Giuliano, with some comparisons to other towns. The recommendations made at this stage are intended to open discussion on certain issues in earthquake recovery that may be helpful in framing the debate on appropriate procedures in future earthquakes.

The deaths of the school children created an uncommon focus of national attention on San Giuliano (Figure 13). Because all of the school children were killed when a single building, the public school, collapsed, this became symbolic of local government failure to oversee construction to protect the public interest, and of failure at all levels of government to include earthquake provisions in the local district codes. Because there were very few other deaths in the earthquake, the town became the sole object of the central government's largesse. Nevertheless, the recovery process in San Giuliano does provide a good example of such efforts in general, because it is not inherently dissimilar to others carried out in recent years in Italy and in other parts of the world.

CLOSURE OF THE OLD TOWN

The watershed post-earthquake decision in San Giuliano di Puglia was to evacuate and cordon off the entire central part of the town. The recovery process in San Giuliano is following a course that was set primarily as a consequence of this decision (Figure 14). Evacuating the village did allow the rescue and body recovery operation to be completed without many onlookers or the distraction of dealing with collapsing buildings in the rest of the village. It also avoided the need for the installation of complicated safety

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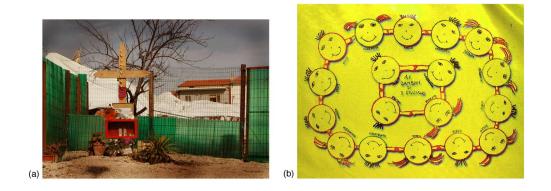


Figure 13. (a) A memorial cross in front of the site of the collapsed primary school, the ruins of which are covered with white plastic sheeting to protect them as they are investigated by the Department of Justice. (b) The banner, *"Al Bambini di S. Giuliano,"* was created for a community remembrance event (a and b: Langenbach).

barricades around the many severely damaged structures. Though this decision was predicated primarily on safety concerns, one necessarily must ask whether there was any reasonable alternative.

Closure significantly shifted the center of gravity to governmental control and away from a day-to-day citizen involvement. The interface between the townspeople and their own residences and businesses was through the government inspection teams overseen by the police and the fire department officials. And it shifted the timetable from the more



Figure 14. San Giuliano di Puglia in January 2004, showing the vacant central area (Dusi).



Figure 15. New housing in Calitri photographed twenty-three years after the devastating 1980 earthquake. While solving the problem of parking and access, this kind of planning forms an alien world on the edge of what had been a tight-knit historic rural hill town (Langenbach).

immediate one of clearing streets, removing dangerous walls and getting people back into less damaged dwellings, to the broader one of re-planning the entire town and repairing or replacing the buildings as a single large-scale construction activity.

Because the townspeople were less involved in the decision-making process, they had no opportunity to reassert their sense of control over their lives and their sense of security in the aftermath of the disaster. Their confidence was also eroded in their own town leadership and this contributed to their sense that they were not treated equally, which was manifested in their strained interpersonal relationships with each other as well as with the aid personnel. These kinds of problems may be inevitable to some degree in severely damaged towns, but closure of the damaged area helped to accentuate them.

The longer access to repairable buildings is denied, the more expensive the repair costs become. The reason is not that the damage has increased, but that the perceived size of the repair project tends to grow significantly (even to the extent of replacing buildings that could have been repaired) as soon as it is clear that there is no possibility of returning home in the near term. This cost growth phenomenon has frequently been experienced in the United States and other countries. As the overall recovery costs increase and the earthquake recedes into the past, the danger increases that government support will hit limits before reconstruction is complete.

PLANNING THE NEW TOWN

Like the area of Calitri, Campagnia, rebuilt after the 1980 earthquake (figure 15), preliminary plans for San Giuliano show a preponderance of isolated buildings, rather

than the compact urban fabric that made up the destroyed part of the town. Regardless of the ultimate configuration of relocated properties, a procedure that involves the forced trading of the land under the destroyed buildings has the potential for causing great social distress. For those who have lost their houses and businesses, the land is all that is left. And the intangible aspects of ownership and personal association with the land can be as powerful as for the encumbrances on the land. As one resident said when interviewed: "Let's hope that in the reconstruction of the village, the architects and the politicians take into account what San Giuliano was and who we are."

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ENGAGING THE TOWNSPEOPLE

Overall, the experiences in San Giuliano indicate that as the immediate emergency passes, priorities need to be shifted from protecting the citizenry from possible injury and acting in their best interest, to providing guidance and choices, and then empowering them to decide for themselves on a course of action in the months that follow. The contentious meetings in San Giuliano should not be seen as a failure of the process, but as a healthy process of taking control. Long-term observations of some post-disaster communities reveal that community groups often emerge in opposition to paternalistic governmental actions. Sometimes these have become valuable crucibles for community leadership, providing an important forum for social-political involvement by the victims of the disaster.

CONCLUSION: FROM GIFT TO EMPOWERMENT

While it may be seem initially that communities stressed by a disaster are ill equipped for decision-making, that very process, as difficult as it is, helps the community heal. Finding the right balance and the best way to empower residents after a disaster is one of the most challenging issues, but it should be an important part of recovery planning. Inevitably, there may be no such thing as a fully successful recovery.

Advocating the involvement of local people in the decision-making process does not diminish the vital role that the national government and non-governmental organization relief workers have to play. Disaster response and recovery is one of the central responsibilities of government at all levels, and there is need for professional and experienced emergency response and relief workers in all disciplines. However, once the rescue and emergency protection operations are over, recovery efforts must immediately involve the local population together with the town council. Then the people will become engaged not as victims, but as leaders in their own recovery.

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