PERCEPTION OF RISK BY THE RESIDENTS OF A FLOOD HAZARD AREA IN PUERTO RICO PHASE 1

Jaime Gutiérrez Sánchez, Ph.D.
Department of Social Sciences
University of Puerto Rico at Mayagüez

and

Olga N. Hernández, Ph.D.
Department of Social Sciences
University of Puerto Rico at Mayagüez

Project No. 3
Grant Agreement No. 14-08-0001-G2043

FINAL TECHNICAL REPORT
TO
U.S. DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

The work on which this report is based were financed in part by the Department of the Interior, U.S. Geological Survey, through the Puerto Rico Water Resources Research Institute.

June 1995

PERCEPTION OF RISK BY THE RESIDENTS OF A FLOOD HAZARD AREA IN PUERTO RICO PHASE I

Jaime Gutiérrez Sánchez, Ph.D.
Department of Social Sciences
University of Puerto Rico at Mayaguez

and

Olga N. Hernández, Ph.D.
Department of Social Sciences
University of Puerto Rico at Mayaguez

Student Research Assistants

José A. Rivera

and

Rachel Santiago

Project No. 03
Grant Agreement No. G2043

PROGRESS REPORT
TO
U.S. DEPARTMENT OF THE INTERIOR
WASHINGTON, D.C. 20240

June 1995

Table of Contents

Introduction

A large proportion of the territory of Puerto Rico is susceptible to floodings. As recent as January 5, 1992, (El Nuevo Día 15 de enero de 1992) torrential rains and fast floods contributed to twenty deaths and damages estimated in $72 millions in more than twelve Island municipalities.

There is no doubt for the need to focus on the technological and engineering aspects of floodings in Puerto Rico in order to protect lives and property. If we, however, cannot get people to rationally respond and participate in mitigation, prevention and other actions prior, during and after a flooding, little can be achieved to reduce loss of lives and property.

The goal of this study is to gain knowledge about people's awareness, preparedness, and social support systems regarding flooding emergencies or disasters in a flood prone municipality of Western Puerto Rico.

More specifically, the objectives of the study, for the first year (Phase I.) were the following:

1. To review articles, reports and recent literature concerning people perception, preparedness and response to flooding situations.

2. To make field observations in the geographical area under study and carry out unstructured interviews with residents and formal leaders in order to assess their perception, awareness and preparedness regarding flood emergencies and disasters.

3. To interview local organization director expected to deal with emergencies and disaster situations.

4. To test and develop a formal instrument to obtain information on head of household perception, knowledege, preparedness and experience with flood situations.

5. To prepare a first year progress report including tasks for Phase II of the study.

Review of Literature

I. Risk Perception

Risk perception is defined as the awareness of the elements in the environment or in the individual that are potential hazards (Academic American Encyclopedia, 1987). Besides, risk perception determines the adoption of preventive measures. Therefore, increasing the level of awareness can generate behavioral changes towards protection. Since cultural values determine the way in which an individual reacts to hazards, the identification of these cultural elements becomes a priority for the victim care system. Cultural factors determine the personal risk by influencing the perceived risk and the likelihood to engage in certain behaviors.

Several studies have analyzed the influence of the culture on risk perception (Blaylock,1985; Blomkvist, 1987, Brehmer, 1987 & Fitchen, Heath, Fressenden-Raden, 1987). These studies reveal that there are significant differences in knowledge and attitudes according to cultural backgrounds. Elements such as religion, sociocultural setting, values and morals, and family structure are described as the most important influence in perception.

Slovic (1987) affirmed that perception and acceptance of risk are affected by social and cultural factors. Johnson and Covello (1987) emphasized that the risks selected for attention are not necessarily chosen because the scientific evidence is

solid. Moreover, in some cases the risks that are selected have little relation to real danger and may be among the least likely to affect people.

Fitchen et. al. (1987) supported the idea that risk perception is modified by the context in which the decision is going to be made. He stated that "the collective perception acts as a filter through which individual members of the community perceive the risk. Actions undertaken to manage the risk may themselves alter the social interpretation of the risk."

Kasperson & Stallen (1988) stated that culture can influence risk perception in four principal ways: by filtering the signals, decoding the signals, attaching social values to the information, and validating the decision. He also states that risk response is influenced along four major pathways: values, social group relationships, informativeness, and negative imagery associated with undesirable social groups or individuals, also known as stigmatization.

Five components of perceived risk also were defined by Manning (1989) as follows:

(1) Perceived susceptibility: The individual's sense of vulnerability to hazards.

(2) Perceived seriousness: The individual's feelings about the seriousness of the occurrence of hazards.

(3) Perceived barriers: Limitations to implement behavioral changes.

(4) Perceived effectiveness: The individual's sense of whether a particular action and whether its benefits may outweigh its costs.

(5) Perceived likelihood: The individual's sense of whether he/she is likely to adhere to a recommended action.

Perception has an enormous impact in determining which messages will be accepted and rejected by any individual. Personal factors which influence perception are previous experiences or contact with the stimuli, which generates comparative judgments and specific patterns of perceptual organization. Also perception is influenced by sociocultural factors such as the group of values and beliefs of a particular culture or subculture influencing the initial contact with a stimulus and the level of awareness generated from this first encounter. Besides, perception affects the decision-making process. It determines how accurately and how quickly decisions are made.

Kerr (1982) stated that "perception involves the conscious organization of incoming information, and it is this perceptual organization that provides the basis for learning".

According to Blaylock (1985) the following three important questions should be answered when one talks about levels of risk:

1. "How much risk is there?
2. What is the decision maker's attitude toward risk?
3. How much risk does the decision maker perceive?".

Answers to these questions contribute to the clarification of

risk perception and its association with adoption of preventive behaviors.

In addition, Brehmer (1987) states that there is not a single definition of risk. He recalled the definition of risk developed by Ulek and Stallen. According to these authors, "risk is the probability of a loss; risk is the size of the possible loss". They declare that risk can be measured in terms of the expected value of a particular situation and the distribution of all their possible consequences.

Moreover, Brehmer (1987) discusses two kinds of risks: objective risks and psychological risks. Objective risks are those events that can be measured and that come from an expert judgment and general public acceptance. Psychological risk is defined as an emotional and motivational concept related to intuitive value judgments.

He also identified two basic dimensions in perceived risk. The first of these, called 'dread,' has to do with the extent to which the consequences of the event are catastrophic and uncontrollable. The second factor has to do with the extent to which the risk is known. He also states that the risk factor is the principal element in risk reduction behaviors.

Finally, Brehmer cited Tversky and Kahreman, who established a very interesting relation between familiarity with the event and perception of risk: "People base their judgments of probability upon the ease with which something comes to mind. Things that come to mind easily are judged to have a high probability and vice versa." Different elements are described by

Brehmer to determine familiarity with the threat. These elements are origin of danger (self-responsible/self not responsible), characteristics of the hazard (potential/present), threat (most dangerous/less dangerous), consequences (fatal/survival), human interventions (own control/out of control), and reactions (scaring/not scaring).

On the other hand, Fitchen (1987) defined risk perception as a dynamic process in which individuals identify and evaluate specific information either as risky or safe. He declares that "perceptions of a given risk are not fixed and permanent, but may undergo reinterpretation and change through time". Also, Blaylock (1985) described the following three factors determining the individual's perception of risk:

(1) Cognitive style: a decision maker's preferred mode of obtaining and evaluating information;

(2) Decision environment: the setting in which a decision is made;

(3) Traditional risk measures: numerical sources used to evaluate uncertainty.

Blaylock's point of view primarily is based on the statement that individuals differ in the style of perceiving, constructing, and organizing their environment. These individual differences affect the likelihood to adopt or reject particular behaviors since they are based on the perception of risks surrounding a decision. On this particular topic, Brehmer (1987) emphasizes that behaviors are adopted based on individual risk judgment rather than on facts.

Previous research on mass media's impact on people's risk perceptions demonstrates that when people are attentive to messages related to social and natural hazards, they tend to recognize the risk at a social level but not at the personal level (Tyler, 1980, 1984; Tyler & Cook, 1984). Despite that while people recognize that society is threatened by risk, they are still confident of their personal invulnerability.

There are also several researchers who demonstrate that people can not make accurate risk judgments at all (Fischhoff, 1985; Lichtenstein, Slovic, Fischhoff, Layman, & Combs, 1978). Slovic, Fischhoff, Layman, & Combs (1979) indicate that people tend to overestimate some risks such as car accidents, tornadoes, floods, fire, and homicide while they tend to underestimate other risks such as lightning, tuberculosis, asthma, and emphysema. Other researchers have observed that despite the poor estimations, people are still unrealistically confident of their judgments (Einhorn & Hogarth, 1978; Hoch, 1985). Lichtenstein et. al. (1978) also indicate that citizens must assess risks accurately in order to mobilize society's resources effectively for reducing hazards and treating their victims.

During the past two decades, many studies have shown that increasing people's knowledge of public affairs is one of the major effects of mass communication. DeFleur and Ball-Rokeach (1989) suggest that mass media's reports of a public issue can reduce people's ambiguity. Specially, when people become

heavily dependent upon the mass media for the information they need to resolve ambiguity, the defining or structuring effect of mass-mediated information is considerable.

In a review of the literature on the effects of mass communication, Roberts and Maccoby (1985) state that there is considerable evidence indicating that people perceive themselves as obtaining information from the media. Researchers also suggest that mass media play an important role in providing people with necessary information to survive risks. Wright (1986) maintains that one of the positive functions of mass communication is to provide warnings about imminent threats of danger. An early, warning allows people to protect themselves from destruction such as the ones that many times are produced by floods..

A very important issue is that when people are faced with a risk, interpersonal communication can play a crucial role in the diffusion of both precautions and coping behaviors. There is evidence indicating that people tend to seek help initially from their friends, relatives, and neighbors when bothered by some troubles (Gourash, 1978; Rogers, 1987). Other researchers point out that people tend to adopt self-precautionary strategies when relevant others consider the precautions are desirable and have decided to adopt them (Rogers, 1987; Sandman, Weinstein, & Klotz, 1987).

In general research findings have shown that intensive exposure to risk information in the media and talking about the risk with interpersonal communication partners may lead people

to believe that they have learned much about the impact of the risk and the necessary strategies to survive the risk. Therefore, risk information can enhance the individual's sense of mastery of the risk, because that is the information the person is looking for.

However, when people are faced with a severe disaster, some of them may deny the riskiness and exaggerate their personal invulnerability, while others may not be so confident of their chances of surviving the risk until they have been assured that there are some measures to protect themselves from being hurt by the risk. Therefore, precautions should be executed by both the residents and the public safety officials in the community. Since relative personal invulnerability is not necessarily an intuitive response to the risk; rather, it could result from the exposure to risk information concerning prudence strategies. In other words, people may believe that they are safer than most other persons because they think they have learned a lot about self-protection from the media (TV, radio, newspapers and informational booklets) and the interpersonal networks such as family, friends and neighbors. Specially, when the threat of a disaster is extremely serious and the recommendations of self-precautions can be easily acquired through the media and interpersonal channels, the belief in relative personal invulnerability may be a cognitive effect of risk communication. A very critical point is that when a person expresses his/her confidence in relative personal invulnerability, the researcher should always investigate whether he/she has

learned about the risk and the protective measures from the media and the interpersonal communication channels. If the answer is positive, his/her optimism about relative personal invulnerability should not be considered as a totally unrealistic bias.

Finally, according to some researchers' discussions, the most serious problem of people's risk judgments is that their beliefs in relative personal invulnerability may result in an ignorance or avoidance of the precautionary strategies suggested in public safety campaigns. For example, Tyler and Cook (1984) indicate that because people tend to perceive themselves as having greater abilities to avoid victimization, it is difficult for the media to increase individuals' recognitions of risks at the personal level. Based on these results, the belief in relative personal invulnerability is considered as an "unrealistic optimism" that could endanger individuals' personal safety and an interferes with the success of effective public safety campaigns. Also, Weinstein (1978) states that society's growing hazard awareness has contributed to an unprecedented interest in prevention. Many messages urging precautions become more and more frequent, nevertheless people often fail to take this advice.

In sum, several researchers have suggested that people's risk perceptions may be problematic in several aspects. For example, when individuals are faced with a risk, they tend to be apathetic to the risk warnings (Jackson & Mukerjee, 1974; Sandman et. al., 1987). People also tend to believe that they have fewer chances to be hurt than do most other individuals. This

optimistic comparative risk judgment may direct them to ignore or avoid precautionary measures suggested by public safety officials and campaign workers (Weinstein, 1984 & 1989;).

II. Floods

Since the beginning of civilization man has suffered from the effects of natural hazards. These create chaos in society, for they disrupt the order and routine of civilized life. Among these disasters we find floods, which have been more frequent and devastating as time has passed. It is because of this that their study is necessary.

The objective of this literature review is to emphasize Puerto Rico's susceptibility to floods and, at the same time, underline that flood response has a profound sociological component because it is based on actions that require guiding or managing individuals, groups, organizations and communities through legislative, regulatory and educational measures.

The justification for the sociological approach is the report of the U.S. National Committee for the Decade for Natural Disaster Reduction entitled Facing the Challenge, which recommends studies for further understanding of the physical and social mechanisms of natural disasters from the perspective of different disciplines. The report discusses the existing constraints for the dissemination of new knowledge such as the necessary coordination between specialists and organizations, the limited amount of funding available and the tendency of

individuals to deny that a disaster can strike home or to adopt a fatalistic view that disasters are inevitable.

The overflowing of rivers in the United States cause significant floods in at least half of the existing communities and over 7% of the nation's total land area. In recent decades, total property losses caused by floods increased **(White & Hass, 1975)**.

In terms of average, floods annually cause more losses than any other geophysical hazard. The total cost of losses caused by floods are in the range of 10 to 16 billion dollars. The federal government assigned a total of 5.4 billion dollars in 1994, and this amount continues to increase **(Interagency Floodplain Management Review Committee, 1994)**.

Floods can be defined as the abnormal increase in water levels which cause rivers' tides to rise and cover the terrain located on their shores **(Monge Bolaños, 1992)**. Floods are commonly caused by persistent rains above a certain zone or by heavy rains, regardless of their duration. Floods can also be caused by the sudden rise of tides due to storms or by the blocking of river beds due to landslides and sedimentation. A flood can occur due to events which are completely unrelated to rain, for example: the bursting of a dam caused by certain movements. Therefore, floods are natural and frequent events which are necessary in order to maintain the ecological balance in the valleys and plains and man has often converted these events into a serious problem by invading the flood-prone zone with urban development **(Puerto Rico Senate, 1988)**. Finally,

floods can be caused because of man's negligence, for example: when man-made buildings interfere with the natural pluvial drainage.

Floods can be classified into major and minor floods. Minor floods are the most frequent and are caused by drain deficiency or blockage in urban or rural areas. Though major floods are less frequent, they can cover entire valleys and cause damage to populations more than any minor flood can. These types of floods are predictable because they are preceded by dense rainstorms which occur on an annual basis. Major floods affect social services such as: water and electricity supply, transportation, hospital service, and others. Also major floods can be the direct or indirect cause of deaths. In Puerto Rico case, deaths caused by floods have decreased during the last years and the damages caused are mainly concentrated in a material nature.

Except drought periods, floods are the natural hazards which affect people most. According to the United States Office for Foreign Disaster Assistance (USOFDA), 18.5 million people were affected by drought periods annually during the 1960's, and 24.4 million in the 1970's. Floods also affected 5.2 million people in the 1960's, and 15.4 million in the 1970's. This is evidence of a higher increase of floods in comparison to drought periods. From 1964 to 1982 floods caused 80,000 deaths and affected at least 221 million people worldwide. Finally, nine million people have died in floods in the last century **(Lewis Aptekar, 1994)**.

The reason why floods increase with every coming year is the rapid deforestation of lands. According to a study realized in 1981 by the FAO/UNEP, the tropical forest is disappearing at a rate of 7.3 million acres per year: 4.2 million acres per year in Latin America; 1.8 million acres in Asia; and 1.3 million acres in Africa. According to Wijkman and Timberlake (1988), floods of the fastest growth in the Third World are caused by humans, which make their land more prone to floods and, at the same time, make the people there more vulnerable to the disaster.

The areas where man's action make the Earth more vulnerable to floods, drought periods, or both, are where:

-The population density and population growth exceeds the resources assigned for survival. Examples: China, India and Central America.

-The demand for food supply is high. Examples: Ethiopia, Central America and Iraq.

-Nature is too sensitive and, at the same time, possesses a temptation for exploitation. Examples: Brazil, Zaire and Indonesia.

-Places are in the stage of vegetable energy use. Examples: Nepal, Bolivia and Ethiopia.

-Rain is scarce, arid and semi-arid places. Examples: India, Chile and the Middle East.

-Terrain is easily removable by the flow of its waters, such as mountain areas and river beds.

Floods are the most widespread geophysical hazard in Puerto Rico and account for large annual property losses. This is

made clear in a report by the Department of Natural Resources planning office and consulting firm (1980), which mentions a previous study stating the following major facts regarding flooding in Puerto Rico:

1. About 200.000 acres in the coastal plain are subject to flooding.

2. Urbanization is increasing the area subject to flooding along with the number of people and value of properties subject to flooding.

3. Because of Puerto Rico's topography and climate, flooding will continue to be a problem.

4. Flooding and flood damage can be reduced by governmental action of several kinds:

- Flood control measures can be taken, including the construction of flood control works.
- Other measures __ such as reforestation of upland watersheds and the adoption of regulations to bar excessive grading and paving __ can help reduce the rate of storm water runoff.
- People who live in flood-prone areas can be assisted and trained in evacuation and/or other emergency measures.
- Policies and regulations can guide urban expansion toward non flood-prone areas.
- Regulations can prohibit new structures in floodable areas or require them to be flood-protected.

A report by a legislative commission on civil security and protection (1988), describes that rivers and creeks in Puerto Rico are narrow, short, and shallow. This helps them reach the coast rapidly. Most rivers are less than 30 miles long. The riverine flooding is then of a flash flood type __ developing quickly and also ending rapidly. These flash floods generally occur in a period of six hours. In the majority of cases, these flash floods occur during the first three hours of excessive rainfall. According to this report, Puerto Rico has more than 2,400.000 acres and 300,000 of them are susceptible to flash floods. In the urban areas floods are also caused by deficient drainage systems, sedimentation, garbage and lack of maintenance. It is estimated that 47 percent of the population of the Island lives in flood-prone areas. According to the bulletin "Alerta Huracán", from the Natural Resources Department, there are 14,500 families in Puerto Rico and a total of 55,000 inhabitants who live in areas of high risk of floods.

The following locations have been noted as suffering recurring flood problems from relative minor or small scale meteorological events:

- Aguadilla - Sector Parterre subject to frequent floods from heavy rains.
- Cabo Rojo - PR-301 in Cabo Rojo comprising Barrios Corozo, Pitahaya, El Combate, Pole Ojea, and other localities located along PR-301 are frequently flooded.

- Caguas - Increasing density and construction in the Caguas metropolitan area appears to have increased runoff potential and minor flood frequencies in Bairoa and several adjoining urbanizations in the Río Canóvanas basin.
- Canóvanas - Low lying areas near the sugar central and Barrio San Isidro have been used for construction of houses which flood with locally heavy rains over and near the Río Canóvanas basin.
- Carolina - PR-874 all along Fernández Juncos Avenue in Carolina is frequently flooded during heavy rains.
- Ceiba - Although cleaned cut after Hurricane Eloise, Río Daguao still floods whenever local high intensity rains occur.
- Fajardo - Communities near Fajardo Beach are frequently flooded.
- Guayama - Sector Puente Jobos in Guayama around Melanía Creek is frequently flooded.
- Hormigueros - Urbanization Buenaventura subject to floods during heavy rains.
- Manatí-Barceloneta - Increasing industrial development and associated local drainage have caused problems in the areas bordering Río Manatí.
- Naguabo - Cambíbora Street in Naguabo Beach.

- San Juan - Chardón Street in Hato Rey.
- San Juan - The Río Piedras-Puerto Nuevo basin contains a high population density and much construction including the De Diego and Las Americas Expressways. Usually several warehouse and homes are affected in the lower portion of Puerto Nuevo several times a year.
- Toa Alta and Toa Baja - Construction in the Río La Plata flood plain has resulted in minor problems due to local flooding from several small tributaries of Río La Plata.
- Vega Baja - Low lying access roads and streets with poor drainage cause local ponding problems along Río Cibuco.
- Yauco - Barrio Palomas in Yauco, flooded when sustained rains occur. Urbanization Luchetti is frequently flooded by Río Yauco.

According to the report Mitigation Plan About Natural Risks in the Commonwealth of Puerto Rico in 1991 the tropical cyclones another principal cause of floods in Puerto Rico. Tropical cyclones are atmospheric events that are developed in tropical oceans, with the exception of South Atlantic and the South Pacific. These cyclones begin in June 1 and end on November. However, the mayor incidence (66%) of the events occur during August and September.

Tropical cyclones are classified according to their intensity.

- Tropical Depression - Low pressure area with constant winds (1 minute) from 33 to 38 mph.
- Tropical Storm - Low pressure area with constant winds (1 minute) from 39 to 73 mph.
- Hurricane - Low pressure area with constant winds (1 minute) of more than 64 or 74 mph.

These tropical cyclones are caracterized by a low barometric pressure which stimulates the formation of a whirlwind of clouds and heavy winds. In addition to high winds, cyclones also bring rain because they are accompanied by such a severe reduction of atmospheric pressure which cause the seas to rise producing what is called a storm surge **(Lewis Aptekar, 1994)**. The storm surge produces a rise in sea level creating a dome of water which can reach various diameters in miles by various feet tall in the center. As the phenomenon approaches the earth, it combines with the waves produced by the winds thus producing a water wall of approximately 15 to 18 feet tall, which invades the coastal areas causing floods and destruction.

The last storm surge registered in Puerto Rico occurred in 1989 during Hurricane Hugo. Though the center of the hurricane did not touch the land, which is when the most severe storm

surge occur, storm surge up to 13.54 feet were registered that penetrated the land up to 300 meters.

The following lists some important flood-related events in Puerto Rico:

- August 8, 1899, Hurricane San Ciriaco, 3000 deaths, about 35 million dollars in losses.
- September 13, 1928, Hurricane San Felipe, 300 deaths, about 50 to 85 million dollars in losses.
- September 6, 1960, Hurricane Donna, 107 deaths, 7 million dollars in losses.
- October 5-10, 1970, Tropical Depression, 18 deaths, 68 million dollars in losses.
- September 23, 1975, Hurricane Eloísa, 34 deaths, 125 million dollars in losses.
- May 17-18, 1985, excessive rainfall, 1 death, 37 million dollars in losses.
- October 6-7, 1985, Tropical Storm, 170 deaths, 125 million dollars in losses.
- November 26, 1987, excessive rainfall, 5 deaths, 10 million dollars in losses.
- December 6-7, 1987, Cold Wave, 1 death, 5 million dollars in losses.
- January 5-6, 1992, Cold Wave and excessive rainfall, 23 deaths, 90 million dollars in losses.

A report from the Department of Natural Resources of Puerto Rico (1980) mentions that four aspects have been

addressed in flood hazard management, although the aspects have rarely been coordinated. These are:

* control of development within the flood plain

* measures (usually through construction) to control flooding

* emergency response to flooding

* post-flood recovery

The report adds that there are some potentially useful measures that are hardly used which include flood proofing, public education, and the location of infrastructure to reduce flood plain development. Moreover, this report also mentions that "no one agency ... has a clear legislative responsibility to oversee the range of responses to flood hazard problems and to coordinate the activities of other agencies related to flood hazard management".

The sociological component of flood hazard response appears in the measures presented in two of the three strategies given as possible responses to flood hazards:

1. Reduce susceptibility to flood damage and disruption

(policy development, flood plain regulations, information dissemination and public awareness, flood forecast and warnings, tax adjustments).

2. Minimize the impact of flooding on individuals (flood insurance, tax adjustments, disaster preparedness and response plans, post-flood recovery, hazard mitigation).

In a more recent study dealing with natural hazards in Puerto Rico, Palm and Hodgson (1993) found that knowledge of home location with respect to flood hazard zones was very low. They add that little effort has been made to educate homeowners in flood-prone zones about such risk. Moreover, they find that knowledge of the home location with respect to floods is not a predictor of insurance purchase. Puerto Rico is reaching the characteristics of developed societies where enhanced warning systems have reduced threats to human lives and personal injuries though, over time, there has been an increase in economic losses including damage to property and infrastructure. The researchers were surprised to find that Puerto Ricans are far more concerned with earthquakes than the more common occurrences of flooding or hurricane damage.

It is important to emphasize that in Puerto Rico most of the research done on floods has been concerned with the behavior of the flood waters such as the hydrology and the hydraulics of flood flows. Few studies, if any, have dealt with the human factors contributing to floods and the social impacts that floods have. Even studies of warning systems concentrate on technological components, disregarding the whole network from the forecast to response by individuals and social units.

Methodology

In this phase of the study we developed a 24-item questionnaire (see Appendix A). The instrument was tested with 45 subjects in order to receive suggestions and detect deficiencies. In phase II of the study, we expect to apply the final questionnaire to a sample of subjects in order to obtain empirical data that can be analyzed and discussed in the theoretical frame suggested by the literature review.

Based on the questionnaire, we have already developed a code book (see Appendix B) for computer data entry and quantitative analysis of the information using SPSS.

Bibliography

Academic American Encyclopedia. (1987). Westport, CT: Grolier Incorporated.

Aptekar, Lewis (1994). **Environmental Disaster in Global Perspective.** New York: G.K. Hall Co.

Army Corps of Engineers. (1993). How to Evaluate Your Options. **Flood Proofing.** National Flood Proofing Committee.

Army Corps of Engineers. (1994). Local Flood Proofing Programs. **Flood Proofing.** Park Forest, Illinois: French & Associates.

Association of State Floodplain Managers, I. (1994). Review Committee Releases Floodplain Management Policy Report. **News & Views.** (Special Ed. Vol. 7). Madison, WI: Association of State Floodplain Managers, Inc.

Barton, A. H. (1969). **Communities in Disaster: _ SociologicalAnalysis of Collective Stress Situations.** Garden City, NY: Doubleday & Company, Inc.

Becker, M. H., Haefner, D. P., Kasl, S. V., Kirscht, J. P., Maiman, L. A., & Rosenstock, I. M. (1977). Selected psychological models and correlates of individual health-related behaviors. **Medical Care,** Vol. 15 (Suppl.), pp. 27-46.

Blaylock, B. (1985). Risk perception: Evidence of an interactive process. **Journal of Business Research,** Vol. 13, pp. 207-211.

Blomkvist, A. (1987). Psychological aspects of values and risks. L. Sjoberg (Editor), **Risk and Society.** London: Allen & Unwin.

Brehmer, B. (1987). The psychology of risk. W. T. Jingleton (Editor), **Risks and Decisions.** Chiister and New York: John Wiley & Sons.

Burton I., Kates R., & White G. (1978). **The Environment as Hazard.** New York: Oxford University Press.

Covello, V. T., Winterfeldt, D. V., & Slovic, P. (1987). Risk communication: A review of the literature. **Risk Abstracts,** Vol. 3(Iss. 4), pp. 171-177.

DeFleur, M. L., & Ball-Rokeach, S. (1989). **Theories of Mass Communication.** (5th ed.) New York: Longman.

Departamento de Recursos Naturales. (1992). **Actualización del Plan de Mitigación de Riesqos Naturales del Estado Libre Asociado de Puerto Rico.** San Juan, Puerto Rico: Departamento de Recursos Naturales.

Departamento de Recursos Naturales. (1979). **Coastal Floods Hazards and Response.** San Juan, Puerto Rico: Departamento de Recursos Naturales.

Departamento de Recursos Naturales. (1991, June). **Conferencia de Huracanes.** San Juan, Puerto Rico: Departamento de Recursos Naturales.

Dewberry, C., Ing, M., James, S., Nixon, M., & Richardson, S. (1990). Anxiety and unrealistic optimism. **The Journal of Social Psycholoqy,** Vol. 130(Iss. 2), pp. 151-156.

Diggs, D. M. (1988). **Risk Communication, Lessons from Natural Hazards: An Annotated Biblioqraphy.** Boulder, Colorado: Natural Hazards Research and Applications Information Center.

Douglas, M., & Wildavsky, A. (1982). **Risk and Culture: An Essay on the Selection of Technical and Environmental Dangers.** Berkeley, Los Angeles, and London: University of California Press.

Drabek, T. E. (1986). **Human System Responses to Disaster: An Inventory of Sociological Findings.** New York, Berlin, Heidelberg: Springer-Verlag New York Inc.

Dynes, R. R., De Marchi, B., & Pelanca, C. (1987). **Sociology of Disasters: Contribution of Sociology to Disaster Research.** Milano, Italy: Franco Angeli Libri.

Einhorn, H. J., & Hogarth, R. M. (1978). Confidence in Judgment: Persistence of the illusion of validity. **Psychological Review,** Vol. 85 (Iss. 5), pp. 395-416.

Federal Emergency Management Association. (1993, July). **Hurricane Evacuation Study for the Southcoast of Puerto Rico.** U.S. Army Corps of Engineers.

Finegold, A. F., & Solyst, J. (1994). **Emergency Planning and Community Right-to-Know Act: _ Status of State Actions** (1993). Washington, D.C.: National Governors' Association.

Fischhoff, B. (1985). Managing risk perceptions. **Issues in Science and Technology,** Vol. 2 (Iss. 1), pp. 83-96.

Fitchen, J., Heath, J., & Fressenden-Raden, J. (1987). Risk Perception in community contexts: A case study. B. Johnson & V. Covello (Editors), **The social and cultural construction of risk.** Lancaster and Tokyo: D. Reide Publishing.

Floodplain Management Services - Special Studies Branch. (1994). In the Tug Fork Valley. **Flood Proofing. Huntington** District: U.S Army Corps of Engineers.

Gourash, N. (1978). Help-seeking: A review of the literature. **American Journal of Community Psychology,** Vol. 6 (Iss. 5), pp. 413-423.

Hale, A. R. (1987). Subjective risk. V. T. Singleton & J. Hoyden (Editors), **Risk and decisions.** Chiister and New York: John Wiley & Sons.

Heil, J. (1983). **Perception and cognition.** Berkeley, Los Angeles, and London: University of California Press.

Hoch, S. J. (1985). Counterfactual reasoning and accuracy in predicting personal events. **Journal of Experimental Psychology**: Learning, Memory, Cognition, Vol. II(Iss. 4), pp. 719-731.

Hovden, J., & Larsson, T. (1987). Risk: Culture and concepts. V. T. Singleton & J. Hovden (Editors), **Risk and Decisions.** Chiister and New York: John Wiley & Sons.

Interagency Floodplain Management Review Comittee. (1994, June). **Science for Floodplain Management into the 21st Century.** Washinton D.C.: U.S. Government Printing Office.

Interagency Floodplain Management Review Committee. (1994). **Sharing the Challenge: Floodplain Management into the Century.** Washington, D,C.: U.S Government Printing **Office.**

Jackson, E. L., & Mukerjee, T. (1974). Human adjustment to the earthquake hazard of San Francisco, California. G. F. White (Editor), **Natural Hazards: Local, National, Global.** New York: Oxford University Press.

Janis, I. L., & Mann, L. (1977). **Decision Making: _ Psychological Analysis of Conflict, Choice, a nd Commitment.** New York Free Press.

Janoff-Bulman, R., & Frieze, I. H. (1983). A theoretical perspective for understanding reactions to victimization. **Journal of Social Issues,** Vol. 39(Iss, 2), pp. 1-18.

Johnson, B. B., & Covello, V. T. (1987). **The Social and Cultural Construction Of Risk.** Dordrecht: D. Reidel.

Johnson, E. J., & Tversky, K. (1983). Affect, generalization, and the perception of risk. **Journal of Personality and Social Psychology,** Vol. 45(Iss. 1), pp. 20-31.

Junta de Planificación. (1992, February). **Reglamento Sobre Zonas Susceptibles a Inundaciones: Reglamento de Planificación #13.** Santurce, PR: Junta de Planificación.

Kasperson, R. E., & Stallen, P. J. M. (1991). **Communicating Risks to the Public.** Dordrecht, Boston, and London: Kluwer Academic Publishers.

Kasperson, R., Renn, O., Slovic, P., Brown, H., Emel, J., Goble, R., Kasperson, J., & Ratick, S. (1988). The social amplification of risk: A conceptual framework. **Risk Analysis,** Vol. 8, pp. 177-187.

Kerr, R. (1982). **Psychomotor learnig.** Philadelphia: Saunders College.

Lichtenstein, S., Slovic, P., Fischhoff, B., & Phillips, L.D. (1982). Calibration of probabilities: The state of the art to 1980. D. Kahneman, P.Slovic, & A. Tversky (Editors), **Judgment under Uncertainty: Heuristics and Biases.** New York: Cambridge University Press.

Mattson, B., & Juas, B. (1987). Evaluation of personal injuries: The problem. L. Sjoberg (Editor), **Risk and Society.** London: Allen & Unwin.

Mileti, D., Drabek, T., & Haas, J. (1975). **Human Systems Extreme Environments: Sociological Perspective.** Boulder, CO: University of Colorado, Institute of Behavioral Science, Monograph 2.

Mileti, D., & Sorensen, J. H. (1987). Natural hazards and precautionary behavior. N. D. Weinstein (Editor), **Taking Care: Understandinq and Encouraging Self-Protective Behavior.** New York: Cambridge University Press.

Monge Bolaños, G. (1992, May). **Compendio General Sobre Desastres.** San José, Costa Rica: Programa Educativo para Emergencias.

Myers, P. S. (1993, March). From the Library Shelf. **Journal of Risk and Insurance,** Vol. 60 (Iss. 1), US.

Natural Resources Department (no date). **Boletín Alerta Huracán.** San Juan, Puerto Rico: Natural Resources Department.

Natural Resources Department (1980). **Coastal Floods Hazards and Response.** San Juan, Puerto Rico: Natural Resources Department.

Natural Resources Department (1991). **Plan de Mitigación de Riesgos Naturales del Estado Libre Asociado de Puerto Rico.** San Juan, Puerto Rico: Natural Resources Department.

Palm, R. I., & Hodgson, M. E. (1993). **Natural Hazards in Puerto Rico.** Boulder, Colorado: Institute of Behavioral Science. University of Colorado.

Perry, R. W., Lindell, M. K., & Greene, M. R. (1982). Threat Perception and Public Response to Volcano Hazard. **Journal of Social Psychology**, Vol. 116, Seattle, Washington.

Puerto Rico Senate (1988). **Comisión Especial de Seguridad y Protección Civil.** San Juan, Puerto Rico: Puerto Rico Senate.

Rubin, C. B. (Consultant). (1994, May 23). World Conference for Natural Disaster Reduction. **Selected U.S. Resources on Hazards and Disasters.** International Decade for Natural Disaster Reduction.

Sandman, P. M., Weinstein, N. D., & Klotz, M. L. (1987). Public response to the risk from geological radon. **Journal of Communication,** Vol. 37(Iss. 3), pp. 93-108.

Senado de Puerto Rico. (1988, May). **Comisión Especial de Seguridad y Protección Civil.** San Juan, Puerto Rico: Senado de Puerto Rico.

Slovic, P. (1987). Perception of Risk. **Science,** Vol. 236, pp. 280-285.

Slovic, P., Fischhoff, B., & Lichtenstein, S. (1979). Rating the risks. **Environment,** Vol. 21(Iss. 3), pp. 14-20, 30 - 39.

Slovic, P., Kunreuther, H., & White, G. F. (1974). Decision processes, rationality, and adjustment to natural hazards. G. F. White (Editor), **Natural Hazards: Local, National, Global.** New York: Oxford University Press.

Tyler, T.R., & Cook, F.L. (1984) The Mass media and judgments of risk: Distinguishing impacts on personal and societal level judgments. **Journal of Personality and Social Psychology,** Vol. 47 (Iss. 4), pp. 693-708.

U.S. National Committee for the Decade for Natural Disaster Reduction. (1994). **Facing the Challenge.** Washington D.C.: National Academy Press.

Weinstein, N. D. (1984). Why it won't happen to me: Perceptions of risk factors and susceptibility. Health Psychology, Vol. 3(Iss. 5), pp. 431-457.

Weinstein, N. D. (1989). Effects of Personal Experience on Self-Protective Behavior. **Psychological Bulletin,** Vol 105(Iss. 1), New Jersey.

White, G. F., & Haas, J. E. (1975). **Assessment of Research on Natural Hazards.** Cambridge, Massachusetts: MIT Press.

Wijkman, A., & Lloyd Timberlake (1988). **Natural Disasters Acts of God or Acts of Man.** Santa Cruz, California: New Society Publishers.

White, G. F., & Haas, J. E. (1975). **Assessment of Research on Natural Hazards.** Cambridge, Massachusetts: MIT Press.

Williams Jr., C. A., & Heins, R. M. (1989). **Risk Management and Insurance.** New York: McGraw-Hill.

Willinger, M. (1989). Risk Aversion and the Value of Information. **The Journal of Risk and Insurance,** Vol. S6, France.

Zakay, D. (1984). The influence of perceived event's controllability on its subjective occurrence probability. Psychological Record, Vol. 34 (Iss. 2), pp. 233-240.

APPENDIX A

UNIVERSIDAD DE PUERTO RICO
RECINTO UNIVERSITARIO DE MAYAGUEZ
DEPARTAMENTO DE CIENCIAS SOCIALES
MAYAGUEZ, PUERTO RICO

Propósito: Este cuestionario tiene como propósito obtener su opinión en cuanto a los riesgos de inundaciones en Puerto Rico. Los datos recopilados servirán de complemento a un trabajo investigativo realizado por estudiantes de sociología del Recinto Universitario de Mayagüez. Agradecemos su cooperación- sus respuestas son importantes para los resultados del estudio.

Instrucciones: MARQUE CON UNA X LA RESPUESTA QUE MEJOR CORRESPONDA A SU PENSAR.

I. Riesgo de inundaciones.

1. ¿Considera usted que su residencia esta en una zona inundable?

___ Sí
___ No
___ No se

2. ¿Ha sido su residencia afectada por inundaciones?

___ Sí ___ No se
___No

Si contestó afirmativamente,
¿En que año? ___
¿Cuán afectada quedó su residencia y su contenido?
___daños muy ligeros
___daños ligeros
___daños considerables
___daños muy considerables
___daños severos

3. ¿Ha vivido usted en una residencia que haya sufrido daños por inundaciones?

___Sí ___No

4. ¿Tiene usted familiares o amigos cuyas residencias y pertenencias hayan sido afectadas por una inundación?

___Sí ___No

5. ¿Cuándo fue la última inundación que afectó su comunidad?

___ hace menos de 1 año
___1 a 2 años
___3 a 5 años
___6 años o más
___Nunca ha sido afectada

6. Sabe usted de alguna persona que haya pérdido la vida en esta comunidad durante una inundación.

___ Sí ___ No se
___ No
Si contestó afirmativamente, ¿cual era su relación con esa persona?
___ familiar ___ conocido
___ amigo ___ no lo conocía

7. Estime cuán distante de su hogar esta la casa más cercana que haya sido afectada por inundaciones. Marque una X al lado del número que más se aproxime a su respuesta.

___ a menos de 300 pies
___ entre 30 y 300 pies
___ entre 300 pies y media milla
___ entre media milla y 3 millas
___ más de 3 millas

8. ¿Está asegurada su propiedad contra inundaciones?

___ Sí
___ No
___ No se

9. ¿Conoce usted a alguien que tenga asegurada su propiedad contra inundaciones?

___ Sí
___ No

10. ¿Ha tomado usted alguna medida para reducir los daños que podrían causar las inundaciones a <u>su residencia</u>.
No incluya seguro.

___ Sí
___ No

Si contestó afirmativamente,
¿Que hizo?
_____

Si contestó negativamente,
Indique por qué no ha tomado medidas para proteger su casa. Haga una X al lado de la contestación que corresponda a su pensar.
(puede escoger más de 1 alternativa)

___ Es muy costoso
___ No es necesario
___ El seguro cubrirá los costos
___ Nunca me decidí a hacerlo
___ No tengo tiempo
___ Falta de recursos económicos
___ No se que medidas tomar
___ El gobierno me dará ayuda
___ Otra razón (explique)
_____
_____
_____

11. ¿Se siente usted seguro en su casa cuando ocurren lluvias fuertes?. Marque con una X la respuesta que exprese mejor su sentir.

___ Siempre
___ Casi siempre
___ A veces
___ Raras veces
___ Nunca

12. ¿Con qué frecuencia conversa usted con sus familiares o vecinos acerca de la posibilidad de una inundación en su comunidad?

___ Muy frecuentemente
___ Frecuentemente
___ En ocasiones
___ Nunca

13. ¿Cuál es la posibilidad de que su comunidad sufra serios daños por inundaciones en los próximos 10 años?

Haga una X al lado de la contestación que corresponda a su pensar.

___ Muy poco probable
___ Poco probable
___ Probable
___ Muy probable
___ Altamente probable

14. ¿Cual cree usted que es la posibilidad de que su residencia se vea afectada (por lo menos $1,000 en daños) por inundaciones en los próximos 10 años? **Haga una X al lado de la contestación que corresponda a su pensar.**

___ Muy poco probable
___ Poco probable
___ Probable
___ Muy probable
___ Altamente probable

15. Supongamos que una inundación mayor azote su comunidad.
¿A cuánto cree usted que ascenderían los daños causados, tanto a su residencia como a sus pertenencias?

$_____(valor en dólares de los daños a la residencia y pertenencias)
residencia y pertenencias)

16. En caso de inundaciones, ¿cuales agencias u organizaciones cree usted que vendrían en su ayuda?

_____

_____

_____

17. ¿Cuál es el medio de comunicación con el que usted se informa en caso de una inundación?

___ Televisión
___ Radio
___ Periódico
___ Por medio de otra persona
___ Otros (indique)

_____

II. Datos demográficos y estadísticos.

1. Indique su edad

___ Menor de 18 años
___ 18 a 29 años
___ 30 a 55 años
___ 56 a 65
___ 65 o más

2. Sexo

M___ F___

3. Estado civil

___ soltero(a)
___ casado(a)
___ divorciado(a)
___ viudo(a)
___ relación consensual(vive con su pareja pero no esta casado)

4. Marque una X al lado del grado escolar más alto completado:
   ___ Elemental
   ___ Intermedia
   ___ Superior
   ___ Grado Asociado
   ___ Universidad
   ___ No asistí a la escuela

5. Cuantas personas viven con usted en su hogar.
   ___ 2 personas
   ___ 3 a 5 personas
   ___ 6 o más
   ___ Vivo solo(a)

6. La casa o apartamento donde reside es:
   ___ propia
   ___ alquilada
   ___ con subsidio del gobierno
   ___ prestada
   ___ otro (explique) _____

7. ¿Como fue desarrollada su comunidad?

   ___ parcelas
   ___ por invasión
   ___ terreno privado
   ___ urbanización
   ___ cooperativa
   ___ otro(explique) _____

8. ¿Cuanto tiempo lleva viviendo en esta comunidad?

   ___ 5 años o menos
   ___ De 6 a 10 años
   ___ 10 años o más

Hasta aquí llega el cuestionario. Gracias por su cooperación.

ESTA SECCION SERA LLENADA POR EL ENTREVISTADOR

1. Nombre del sector donde reside el encuestado.
   _____

2. Tipo de residencia
   ___ Madera
   ___ Cemento
   ___ Madera y zinc
   ___ Cemento y zinc
   ___ Cemento y madera
   ___ Otro
   _____

3. ¿Quién es el informante?
   ___ Señor de la casa
   ___ Señora de la casa
   ___ Hijo(a)
   ___ Familiar (indique parentesco)
   _____
   ___ Otro

4. Según el encuestado, ¿por que se inunda esta comunidad?
   _____
   _____
   _____

APPENDIX B

```
Translate from 'b:datacues.dbf'/type db4.
Variable labels zonainun, 'zona de residencia'/
/resiafec, 'residencia afectada'
/enqueano, 'ano ultima inundacion'
/cuanafec, 'danos en hogar'
/hayasufr, 'inundacion en otro hogar'
/famiamig, 'fami y amigos que hayan sufrido inundacion'
/ultiinun, 'ultima inun que afec la comunidad'
/perdvida, 'persona que haya muerto en inundacion'
/relapers, 'relacion con persona'
/disthoga, 'casa mas cercana que sufriera inundaciones'
/algusegu, 'propiedad asegurada'
/seguprop, 'si la propiedad esta asegurada'
/medireda, 'medidas reducir danos'
/sdaplant, 'segunda planta'
/arreestr, 'arreglos estructurales'
/destalca, 'destapar alcantarillas'
/barrerai, 'barrera impedir entrada del agua'
/rellenar, 'rellenar terreno'
/subitodo, 'subir todo a la segunda planta'
/engancha, 'enganchar las cosas'
/pmudarse, 'piensa mudarse'
/ecostoso, 'es muy costoso'
/necesari, 'no es necesario'
/segurocu, 'seguro cubrira los costos'
/nodecidi, 'nunca me decidi a hacerlo'
/notiempo, 'no tengo tiempo'
/recursos, 'falta de recursos economicos'
/nosemedi, 'no se que medidas tomar'
/gobayuda, 'el gobierno me ayudara'
/asegurar, 'piensa asegurarla'
/segulluv, 'percepcion de seguridad en el hogar'
/convposi, 'frecuencia conversan posibilidad de inundacion'
/posicomu, 'posi de inundacion en prox 10 anos'
/posiresi, 'posi hogar se afec sobre $1,000'
/danoresi, 'danos a residencia'
/cruzroja, 'Cruz Roja'
/defcivil, 'Defensa Civil'
/rescate, 'rescate'
/gobierno, 'gobierno'
/policia, 'Policia'
/guarnaci, 'Guardia Nacional'
/uniemerg, 'Unidad 9 de emergencia'
/servsoci, 'Servicios Sociales'
/mevoycon, 'me voy con mis hijos'
/nose, 'no sabe'
/televisi, 'television'
/radio, 'radio'
/periodic, 'periodico'
/otrapers, 'por medio de otra persona'
/police, 'police'
/defensa, 'defensa civil'
/telefono, 'telefono'
/alcalde, 'comunican con alcalde'
```

```
/edad, 'edad'
/sexo, 'sexo'
/estcivil, 'estado civil'
/gradoesc, 'grado escolar mas alto completado'
/perhogar, 'numero de personas en hogar'
/lacasaes, 'tipo de casa donde vive'
/desarrol, 'como se desarrollo la comunidad'
/tiempovi, 'tiempo viviendo en la comunidad'
/nombsect, 'nombre del sector reside encuestado'
/construc, 'tipo de construccion'
/informan, 'informante'
/cercario, 'pasa cerca un rio'
/carreter, 'construcciones en las carreteras'
/masbajo, 'casas constr mas bajo que la carretera'
/playario, 'cerca playa y rio'
/quebrada, 'cerca quebrada'
/tapadas, 'alcantarillas tapadas'
/deficien, 'alcantarillado deficiente'
/laguna, 'laguna cercana'
/nopermit, 'no permiten dragado en quebrada'
/hicimall, 'quebrada despues que hicieron el mall'
/terrbajo, 'terreno bajo'

Value labels zonainun, 1 'si' 2 'no' 3 'no se' 9 'no respondio'
/resiafec, 1 'si' 2 'no' 3 'no se' 9 'no respondio'
/enqueano, 01 '1974' 02 '1975' 03 '1976' 04 '1981' 05 '1990'
  06 '1992' 07 '1993' 08 '1994' 09 '1995' 10 'constantemente'
  99 'no respondio'
/cuanafec, 1 'danos muy ligeros' 2 'danos ligeros'
  3 'danos considerables' 4 'danos muy considerables'
  5 'danos severos' 9 'no respondio'
/hayasufr, 1 'si' 2 'no' 3 'no se' 9 'no respondio'
/famiamig, 1 'si' 2 'no' 9 'no respondio'
/ultiinun, 1 'menos de 1 ano' 2 '1 a 2 anos' 3 '3 a 5 anos'
  4 '6 anos o mas' 5 'nunca ha sido afectada' 9 'no respondio'
/perdvida, 1 'si' 2 'no' 3 'no se' 9 'no respondio'
/relapers, 0 'no aplica' 1 'familiar' 2 'amigo' 3 'conocido'
  4 'no lo conocia' 9 'no respondio'
/disthoga, 1 'menos de 30 pies' 2 '30 a 300 pies'
  3 '300 pies a media milla' 4 'media milla a 3 millas'
  5 'mas de 3 millas' 9 'no respondio'
/algusegu, 1 'si' 2 'no' 3 'no se' 9 'no respondio'
/seguprop, 1 'si' 2 'no' 3 'no se' 9 'no respondio'
/medireda, 1 'si' 2 'no' 9 'no respondio'
/sdaplant, 0 'no aplica' 1 'si' 2 'no'
/arreestr, 0 'no aplica' 1 'si' 2 'no'
/destalca, 0 'no aplica' 1 'si' 2 'no'
/barrerai, 0 'no aplica' 1 'si' 2 'no'
/rellenar, 0 'no aplica' 1 'si' 2 'no'
/subitodo, 0 'no aplica' 1 'si' 2 'no'
/engancha, 0 'no aplica' 1 'si' 2 'no'
/pmudarse, 0 'no aplica' 1 'si' 2 'no'
/ecostoso, 0 'no aplica' 1 'si' 2 'no'
/necesari, 0 'no aplica' 1 'si' 2 'no'
```

```
/segurocu, 0 'no aplica' 1 'si' 2 'no'
/nodecidi, 0 'no aplica' 1 'si' 2 'no'
/notiempo, 0 'no aplica' 1 'si' 2 'no'
/recursos, 0 'no aplica' 1 'si' 2 'no'
/nosemedi, 0 'no aplica' 1 'si' 2 'no'
/gobayuda, 0 'no aplica' 1 'si' 2 'no'
/asegurar, 0 'no aplica' 1 'si' 2 'no'
/segulluv, 1 'siempre' 2 'casi siempre' 3 'a veces'
  4 'raras veces' 5 'nunca' 9 'no respondio'
/convposi, 1 'muy frecuentemente' 2 'frecuentemente'
  3 'en ocasiones' 4 'nunca' 9 'no respondio'
/posicomu, 1 'muy poco probable' 2 'poco probable' 3 'probable'
  4 'muy probable' 5 'altamente probable' 9 'no respondio'
/posiresi, 1 'muy poco probable' 2 'poco probable' 3 'probable'
  4 'muy probable' 5 'altamente probable' 9 'no respondio'
/danoresi, 01 '1,000 a 2,000' 02 '3,000 a 4,000'
  03 '5,000 a 8,000' 04 '9,000 a 15,000' 05 '16,000 a 22,000'
  06 '23,000 a 29.000' 07' 30,000 a 36,000' 08 '37,000 a 43,000'
  09 '44,000 a 50,000' 10 '51,000 o mas' 99 'no respondio'
/cruzroja, 1 'si' 2 'no'
/defcivil, 1 'si' 2 'no'
/rescate, 1 'si' 2 'no'
/gobierno, 1 'si' 2 'no'
/policia, 1 'si' 2 'no'
/guarnaci, 1 'si' 2 'no'
/uniemerg, 1 'si' 2 'no'
/servsoci, 1 'si' 2 'no'
/mevoycon, 1 'si' 2 'no'
/nose, 1 'si' 2 'no'
/televisi, 1 'si' 2 'no'
/radio, 1 'si' 2 'no'
/periodic, 1 'si' 2 'no'
/otrapers, 1 'si' 2 'no'
/police, 1 'si' 2 'no'
/defensa, 1 'si' 2 'no'
/telefono, 1 'si' 2 'no'
/alcalde, 1 'si' 2 'no'
/edad, 1 'menor de 18 anos' 2 '18 a 29 anos' 3 '30 a 59 anos'
  4 '60 anos o mas' 9 'no respondio'
/sexo, 1 'masculino' 2 'femenino'
/estcivil, 1 'soltero(a)' 2 'casado(a)' 3 'divorciado(a)'
  4 'viudo(a)' 5 'consensual' 9 'no respondio'
/gradoesc, 1 'elemental' 2 'intermadia' 3 'superior'
  4 'grado asociado' 5 'universidad' 6 'no asisti a la escuela'
  9 'no respondio'
/perhogar, 1 '2 personas' 2 '3 a 5 personas' 3 '6 o mas'
  4 'vivo solo(a)' 9 'no respondio'
/lacasaes, 1 'propia' 2 'alquilada' 3 'con subsidio del gob'
  4 'prestada' 9 'no respondio'
/desarrol, 1 'parcelas' 2 'invasion' 3 'privada' 4 'cooperativa'
  5 'compraron el terreno' 6 'no saben' 9 'no respondio'
/tiempovi, 1 '5 anos o menos' 2 '6 a 10 anos' 3 '10 anos o mas'
  9 'no respondio'
/nombsect, 01 'carr.301 sector El Cano Cabo Rojo'
```

CUESTIONARIO DE PERCEPCION DE RIESGO EN AREAS INUNDABLES
LIBRO DE CODIGOS

#Pregunta	Nombre de la variable	Columna	#de Col. que ocupa	Descripción de la variable	Codigo
1	ZONAINUN	5	1	ZONA DE RESIDENCIAL	1=SI 2=NO 3=NO SE 9=NO RESPONDIO
2	RESIAFEC	6	1	RESIDENCIA AFECTADA	1=SI 2=NO 3=NO SE 9=NO RESPONDIO
2	ENQUEANO	7,8	2	AÑO ULTIMA INUNDACION	01=1974 02=1975 03=1976 04=1981 05=1990 06=1992 07=1993 08=1994 09=1995 10=CONSTANTEMENTE 99=NO RESPONDIO
2	CUANAFEC	9	1	DAÑOS EN HOGAR	1=DAÑOS MUY LIGEROS 2=DAÑOS LIGEROS 3=DAÑOSCONSIDERABLES 4=DAÑOS MUY CONSIDERA. 5=DAÑOS SEVEROS 9=NO RESPONDIO

```
  02 'urb.Buenaventura' 03 'urb. Valle Hermoso'
  04 'bo.Buena Vista' 05 'Quebrada Grande' 06 'bo. Nadal'
  07 'Guanajibo Homes' 08 'urb.Esteves Aguadilla'
  09 'Villa Linda Aguadilla' 10 'El Cotto San German'
  11 'bo. Camaseyes Aguadilla' 12 'carr. 459 Aguadilla'
  13'parcelas Pole Ojea Cabo Rojo'
/construc, 1 'madera' 2 'cemento' 3 'madera y zinc'
  4 'cemento y cinc' 5 'cemento y madera' 9 'no respondio'
/informan, 1 'senor de la casa' 2 'senora de la casa' 3 'hijo(a)'
  4 'familiar' 9 'no respondio'
/cercario, 1 'si' 2 'no'
/carreter, 1 'si' 2 'no'
/masbajo, 1 'si' 2 'no'
/playario, 1 'si' 2 'no'
/quebrada, 1 'si' 2 'no'
/tapadas, 1 'si' 2 'no'
/deficien, 1 'si' 2 'no'
/laguna, 1 'si' 2 'no'
/nopermit, 1 'si' 2 'no'
/hicimall, 1 'si' 2 'no'
/terrbajo, 1 'si' 2 'no'
```

#Pregunta	Nombre de la variable	Columna	#de Col. que ocupa	Descripción de la variable	Codigo
3	HAYASUFR	10	1	SUFR. INUN. EN OTRO HOGAR	1=SI 2=NO 3=NO SE
4.	FAMIAMIG	11	1	FAMILIARES Y AMIG. QUE HAYAN SUFR. INUNDACION	1=SI 2=NO 9=NO RESPONDIO
5	ULTIINUN	12	1	ULTIMA INUN. QUE AFECTO LA COMUNIDAD	1=MENOS DE 1 Año 2=1 a 2 Años 3=3 a 5 Años 4=6 Años O MAS 5=NUNCA HA SIDO AFECT. 9=NO RESPONDIO
6	PERDVIDA	13	1	PERSONA QUE HAYA MUERTO EN INUNDACION	1=SI 2=NO 3=NO SE 9=NO RESPONDIO
6	RELAPERS	14	1	RELACION CON PERSONA	0=NO APLICA 1=FAMILIAR 2=AMIGO 3=CONOCIDO 4=NO LO CONOCIA 9=NO RESPONDIO

#Pregunta	Nombre de la variable	Columna	#de Col. que ocupa	Descripción de la variable	Codigo
7	DISTHOGA	15	1	CASA MAS CERCANA QUE SUFR. INUNDACIONES	1=MENOS DE 30 PIES 2=30 a 300 PIES 3=300 PIES a MEDIA MILLA 4=MEDIA MILLA a 3 MILLAS 5=MAS DE 3 MILLAS 9=NO RESPONDIO
8	SEGUPROP	16	1	SI LA PROPIEDAD ESTA ASEGURADA	1=SI 2=NO 3=NO SE 9=NO RESPONDIO
9	ALGUSEGU	17	1	CONOCIMIENTO DE ALGUIEN QUE TENGA SEGURO	1=SI 2=NO 9=NO RESPONDIO
10	MEDIREDA	18	1	MEDIDAS, REDUCIR DAÑOS EN RESUDENCIA	1=SI 2=NO 9=NO RESPONDIO
10	SDAPLANT	19	1	SEGUNDA PLANTA	0=NO APLICA 1=SI 2=NO
10	ARREESTR	20	1	ARREGLOS ESTRUCTURALES	0=NO APLICA 1=SI 2=NO

#Pregunta	Nombre de la variable	Columna	#de Col. que ocupa	Descripción de la variable	Codigo
10	DESTALCA	21	1	DESTAPAR ALCANTARILLAS	0=NO APLICA 1=SI 2=NO
10	BARRERAI	22	1	BARRERA, IMPEDIR ENTRADA DEL AGUA	0=NO APLICA 1=SI 2=NO
10	RELLENAR	23	1	RELLENAR TERRENO	0=NO APLICA 1=SI 2=NO
10	SUBITODO	24	1	SUBIR TODO A 2da PLANTA	0=NO APLICA 1=SI 2=NO
10	ENGACHAR	25	1	ENGANCHAR LAS COSAS	0=NO APLICA 1=SI 2=NO
10	PMUDARSE	26	1	PIENSA MUDARSE	0=NO APLICA 1=SI 2=NO
10	ECOSTOSO	27	1	ES MUY COSTOSO	0=NO APLICA 1=SI 2=NO

#Pregunta	Nombre de la variable	Columna	#de Col. que ocupa	Descripción de la variable	Codigo
10	NECESARI	28	1	NO ES NECESARIO	0=NO APLICA 1=SI 2=NO
10	SEGUROCU	29	1	SEGURO CUBRIRA LOS COSTOS	0=NO APLICA 1=SI 2=NO
10	NODECIDI	30	1	NUNCA ME DECIDI A HACERLO	0=NO APLICA 1=SI 2=NO
10	NOTIEMPO	31	1	NO TENGO TIEMPO	0=NO APLICA 1=SI 2=NO
10	RECURSOS	32	1	FALTA DE RECURSOS ECOCOMICOS	0=NO APLICA 1=SI 2=NO
10	NOSEMEDI	33	1	NO SE QUE MEDIDAS TOMAR	0=NO APLICA 1=SI 2=NO
10	GOBAYUDA	34	1	EL GOBIERNO ME AYUDARA	0=NO APLICA 1=SI 2=NO
10	ASEGURAR	35	1	PIENSA ASEGURALA	0=NO APLICA 1=SI 2=NO

#Pregunta	Nombre de la variable	Columna	#de Col. que ocupa	Descripción de la variable	Codigo
11	SEGULLUV	36	1	PERCEPCION DE SEGURIDAD EN EL HOGAR	1=SIEMPRE 2=CASI SIEMPRE 3=A VECES 4=RARAS VECES 5=NUNCA 9=NO RESPONDIO
12	CONVPOSI	37	1	FRECUENCIA, CONVERSAN POSIBILIDAD DE INUN.	1=MUY FRECUENTEMENTE 2=FRECUENTEMENTE 3=EN OCASIONES 4=NUNCA 9=NO RESPONDIO
13	POSICOMU	38	1	POSIBILIDAD DE INUN. EN PROX. 10 Años	1=MUY POCO PROBABLE 2=POCO PROBABLE 3=PROBABLE 4=MUY PROBABLE 5=ALTAMENTE PROBABLE 9=NO RESPONDIO
14	POSIRESI	39	1	POSIBILIDAD DE QUE LA RESIDENCIA SE AFECTE POR LO MENOS $1,000	1=MUY POCA PROBABLE 2=POCO PROBABLE 3=PROBABLE 4=MUY PROBABLE 5=ALTAMENTE PROBABLE 9=NO RESPONDIO

#Pregunta	Nombre de la variable	Columna	#de Col. que ocupa	Descripción de la variable	Codigo
15	DAñORESI	40,41	2	DAñOS A RESIDENCIA $	01=1,000 a 2,000 02=3,000 a 4,000 03=5,000 a 8,000 04=9,000 a 15,000 05=16,000 a 22,000 06=23,000 a 29,000 07=30.000 a 36,000 08=37,000 a 43,000 09=44,000 a 50,000 10=51,000 o MAS 99=NO RESPONDIO
16	CRUZROJA	42	1	CRUZ ROJA	1=SI 2=NO
16	DEFCIVIL	43	1	DEFENSA CIVIL	1=SI 2=NO
16	RESCATE	44	1	RESCATE	1=SI 2=NO
16	GOBIERNO	45	1	GOBIERNO	1=SI 2=NO
16	POLICIA	46	1	POLICIA	1=SI 2=NO
16	GUARNACI	47	1	GUARDIA NACIONAL	1=SI 2=NO
16	UNIEMERG	48	1	UNIDAD 9 DE EMERGENCIA	1=SI 2=NO

#Pregunta	Nombre de la variable	Columna	#de Col. que ocupa	Descripción de la variable	Codigo
16	SERVSOCI	49	1	SERVICIOS SOCIALES	1=SI 2=NO
16	MEVOYCON	50	1	ME VOY CON MIS HIJOS	1=SI 2=NO
16	NOSE	51	1	NO SABE	1=SI 2=NO
17	TELEVISI	52	1	TELEVISION	1=SI 2=NO
17	RADIO	53	1	RADIO	1=SI 2=NO
17	PERIODIC	54	1	PERIODICO	1=SI 2=NO
17	OTRAPERS	55	1	POR MEDIO DE OTRA PERSONA	1=SI 2=NO
17	POLICE	56	1	POLICE	1=SI 2=NO
17	DEFENSA	57	1	DEFENSA CIVIL	1=SI 2=NO
17	TELEFONO	58	1	TELEFONO	1=SI 2=NO
17	ALCALDE	59	1	COMUNICAN CON EL ALCALDE	1=SI 2=NO

#Pregunta	Nombre de la variable	Columna	#de Col. que ocupa	Descripción de la variable	Codigo
II PARTE					
18	EDAD	60	1	EDAd	1=MENOR DE 18 Años 2=18 a 29 Años 3=30 a 59 Años 4=60 o MAS 9=NO RESPONDIO
19	SEXO	61	1	SEXO	1=MASCULINO 2=FEMENINO
20	ESTCIVIL	62	1	ESTADO CIVIL	-SOLTERO(A) [illegible]O(A) [illegible]O(A)
21	GRADOESC	63	1	GRADO ESC ALTO COM'	
22	PERHOGAR	64	1	#PF	

#Pregunta	Nombre de la variable	Columna	#de Col. que ocupa	Descripción de la variable	Codigo
23	LACASAES	65	1	TIPO DE CASA DONDE VIVE	1=PROPIA 2=ALQUILADA 3=CON SUBSIDIO DEL GOBIERNO 4=PRESTADA 9=NO RESPONDIO
24	DESARROL	66	1	COMO SE DESARROLLO LA COMUNIDAD	1=PARCELAS 2=INVASION 3=PRIVADA 4=COOPERATIVA 5=COMPRARON TERRENO 6=NO SABEN
25	TIEMPOVI	67	1	TIEMPO VIVIENDO EN LA COMUNIDAD	1=5 AÑOS O MENOS 2=6 a 10 AÑOS 3=10 AÑOS O MAS 9=NO RESPONDIO

III PARTE

#Pregunta	Nombre de la variable	Columna	#de Col. que ocupa	Descripción de la variable	Codigo
26	NOMBSECT	68,69	2	NOMBE DEL SECTOR DONDE RECIDE EL ENCUESTADO	01=CARR.301 SECTOR EL CAñO, CABO ROJO 02=URBBUENAVENTURA 03=URB. VALLE HERMOSO 04=BO. BUENA VISTA 05=QUEBRADA GRANDE 06=BO. NADAL 07=GUANAJIBO HOMES 08=URB. ESTEVES, AGUADILLA 09=VILLA LINDA, AGUADILLA 10=EL COTTO, SAN GERMAN 11=BO. CAMASEYES, AGUADILLA 12=CARR. 459, AGUADILLA 13=PARCELAS POLE OJEA,CABO ROJO
27	CONSTRUC	70	1	TIPO DE CONSTRUCCION	1=MADERA 2=CEMENTO 3=MADERA Y ZINC 4=CEMENTO Y ZINC 9=NO RESPONDIO
28	INFORMAN	71	1	INFORMANTE	1=SEñOR DE LA CASA 2=SEñORA DE LA CASA 3=HIJO(A) 4=FAMILIAR 5=NO RESPONDIO

#Pregunta	Nombre de la variable	Columna	#de Col. que ocupa	Descripción de la variable	Codigo
29	CERCARIO	72	1	PASA CERCA UN RIO	1=SI 2=NO
29	CARRETER	73	1	CONSTRUCCIONES EN LAS CARRETERAS	1=SI 2=NO
29	MASBAJO	74	1	CASAS CONSTRUIDAS MAS BAJO QUE LA CARRETERA	1=SI 2=NO
29	PLAYARIO	75	1	CERCA PLAYA Y RIO	1=SI 2=NO
29	QUEBRADA	76	1	CERCA QUEBRADA	1=SI 2=NO
29	TAPADAS	77	1	ALCANTARILLAS TAPADAS	1=SI 2=NO
29	DEFICIEN	78	1	ALCANTARILLADO DEFICIENTE	1=SI 2=NO
29	LAGUNA	79	1	LAGUNA CERCA	1=SI 2=NO
29	NOPERMIT	80	1	NO PERMITEN DRAGADO EN DRENAJE PLUVIAL NATURAL	1=SI 2=NO
29	HICIMALL	81	1	QUEBRADA DESPUES QUE HICIERON EL MALL	1=SI 2=NO