

sents a small sub-set of organizations, they exercised a great deal of influence to obtain prompt action from the Costa Rican Government as well as substantial international monetary assistance and voluntary aid for the often overlooked region. These organizations included the United Fruit Company, Del Monte Company, Chiquita Brand, the Chiriqui Land Company, Standard Fruit Company, the Banana Development Corporation and others. These organizations reported their needs directly to the Ministry of Agriculture and Livestock and the Ministry of Public Works and Transport. They illustrate the interdependence of economic and engineering functions in disaster response. Engaged in agriculture, commerce, and industry, these corporations were directly affected economically by the damage to the infrastructure, and they, in turn, exerted an active influence to mobilize the engineering resources needed to restore operations.

#### Information Processes.

As already indicated, existing communication and information processes did not function well to serve the CNE's formal role of coordination of disaster operations following this disaster (see above, pp. 3-5). Although the CNE remained actively involved in disaster response and recovery activities, the information processes in this disaster appeared fragmented and operated largely within functional groups that reported directly to the President. Within each group, substantial experience and expertise was marshaled to address specific types of problems and to devise practical courses of action. Yet, among the separate

groups there appeared to be little exchange of information or coordination of action. This lack of overall coordination appeared to constrain the effective performance of participating organizations and to generate an unusual degree of distrust and animosity, especially among organizations with interdependent responsibilities. This pervasive distrust and barely concealed hostility among different groups participating in the common task of disaster operations inhibited frank, candid communication among them and diminished the willingness and capacity of the participating organizations to explore and execute the most appropriate, feasible, and efficient alternatives for action in response and recovery operations.

#### Content Analysis of Organizational Action in Disaster Response

One means of documenting the difference in actual organizational response in disaster operations in comparison to the formal response outlined in the National Emergency Plan is through a content analysis of the newspaper reports on this disaster. In Costa Rica, I obtained the daily editions from two national newspapers published in San Jose, La Nacion and La Republica, for the period, April 23, 1991 - May 8, 1991. From the news stories reported for this period, we identified the organizations engaged in disaster response by jurisdiction, source of support, and type of transaction.<sup>14</sup> We then counted the number of mentions for each organization for the total period. The

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<sup>14</sup>I acknowledge, with thanks and appreciation, the work of Leslie Mohr, who assisted me with this content analysis.

results provide a rough approximation of intensity of engagement of public, private, and nonprofit organizations in the disaster operations process, as reported in the newspapers.<sup>15</sup> Table 1 presents the public organizations named in disaster response operations by jurisdiction and frequency of mention. Table 2 presents the nonprofit organizations by the same measures, and Table 3 presents the private organizations by these measures.

The results show a remarkable discrepancy between the formal interjurisdictional structure of national, regional, and local emergency commissions described in the National Emergency Plan (National Emergency Committee, 1993:4.1-4.4) and actual organizational participation reported in the news stories. Table 1 shows that organizational response to the disaster was overwhelmingly national, with 52 national organizations receiving 59.1% of the mentions. International response was second, with 26 organizations receiving 31.8% of the mentions. Further, attention appeared to focus on a small number of organizations within these two categories. For example, five national organizations received over half (51.4%) of the mentions and four international actors received over half (50.1%) of the mentions in their respective groups. Municipal response ranked a distant third with 28 organizations receiving 6.4% of the mentions, and provincial response

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<sup>15</sup>In calculating the number of mentions, we found that there was considerable duplication in the stories reported by La Nacion and La Republica. To avoid double counting an organization's participation, we dropped the stories from La Republica in our analysis. Consequently, the frequencies reported all derive from news stories reported in La Nacion.

TABLE 1

Public Organizations Engaged in Disaster Response Operations  
by Jurisdiction and Frequency of Mentions in Newspaper Reports

International	N	%	National	N	%	Provincial	N	%	Municipal	N	%
United States	27	19.3%	Comision Nacional de Emergencia	51	20.6%	Comision Regional de Emergencia	3	25.0%	Tony Facio (Hosp.)	6	21.4%
Nicaragua	19	13.6%	Ministerio de Salud	22	8.9%	Guardia de			Comision de Emergencia Local	5	17.9%
Venezuela	13	9.3%	Ministerio de Obras Publicas y Transportes	21	8.5%	Asistencia Rural	2	16.7%	Mixico (Hosp.)	2	7.1%
Mexico	11	7.9%	Poder Ejecutivo	17	6.9%	Direccion Regional de Transito	2	16.7%	Calderon Guardia (Hosp.)	2	7.1%
Japan	8	5.7%	Instituto C.R. de Acueductos y Alcantarillados	16	6.5%	Junta de Adm. Portuaria y Desarrollo Econ. de la Vertiente Atlantica			San Jose (Hosp.)	2	7.1%
Colombia	7	5.0%	Caja C.R. de Seguro Social	11	4.5%	Sexto Proyecto Sectorial de Transportes	2	16.7%	Heredia (Hosp.)	2	7.1%
El Salvador	7	5.0%	Ministerio de Seguridad Publica	7	2.8%	Municipalidad de Turrialba			Nacional de Ninos (Hosp.)	2	7.1%
Honduras	7	5.0%	Consejo Nacional de Produccion	7	2.8%	Comision Indigena de Emergencia			Escuela Social San Juan XIII	1	3.6%
Argentina	4	2.9%	Ministerio de Comercio Exterior	6	2.4%				Instituto de Fomento y Asesoria	1	3.6%
European Community	4	2.9%	Ministerio de Agricultura y Ganaderia	6	2.4%				Municipal	1	3.6%
Panama	4	2.9%	Ministerio de Educacion	6	2.4%				Centro de Salud de Siquirres	1	3.6%
Germany	4	2.9%	Instituto C.R. de Electricidad	5	2.0%				Alajuela (Hosp.)	1	3.6%
Spain	3	2.1%	La Asamblea Legislativa	5	2.0%				Cartago (Hosp.)	1	3.6%
Great Britain	3	2.1%	Cuerpo de Bomberos	4	1.6%				Comision Cantonal de Emergencia de Turrialba	1	3.6%
Canada	3	2.1%							Comision de Emergencia de Limon	1	3.6%
China	3	2.1%									
USSR	2	1.4%									
Dominican Republic	2	1.4%									
Guatemala	2	1.4%									
Switzerland	2	1.4%									
Holland	1	0.7%									
Brazil	1	0.7%									
Italy	1	0.7%									
Finland	1	0.7%									
Denmark	1	0.7%									
Ministerio de Salud de Panama	1	0.7%									
Number of Mentions	140	100.0%	Number of Mentions cont.			Number of Mentions	12	100.0%	Number of Mentions	28	100.0%
Number of Cases	26		Number of Cases cont.			Number of Cases	7		Number of Cases	14	

**Table 1 Cont.**

International	N	%	National	N	%	Provincial	N	%	Municipal	N	%
Sistema Nacional de Proteccion Civil	4	1.6%									
Comision de Asuntos Hacendarios	4	1.6%									
Guardia Civil	4	1.6%									
Organismo de Investigacion Judicial	4	1.6%									
Ministerio de Agricultura y Agrolndustria	4	1.6%									
Ministerio de Economica	3	1.2%									
Ministerio de Vivienda y Asentamientos Humanos	3	1.2%									
Ministerio de Hacienda	3	1.2%									
Instituto Nacional de Vivienda y Urbanismo	3	1.2%									
Instituto C.R. de Ferrocarriles	2	0.8%									
Ministerio de Transportes	2	0.8%									
Radio RPC	2	0.8%									
Ministerio de Industria y Comercio	1	0.4%									
Ministerio de Relaciones Exteriores	1	0.4%									
Comision Nacional de Vivienda	1	0.4%									
Ministerio de Tourism	1	0.4%									
Comision de Asuntos Indigenas	1	0.4%									

**Table 1 Cont.**

International	N	%	National	N	%	Provincial	N	%	Municipal	N	%
			Instituto Mixto de Ayuda Social	1	0.4%						
			Servicio Nacional de Erradicación de la Malaria	1	0.4%						
			Los Servicios Sismológicos de C.f	1	0.4%						
			Ministerio de Recursos Naturales, Energía, y Minas	1	0.4%						
			Camara Nacional de Agricultura	1	0.4%						
			Instituto de Cafe de Costa Rica	1	0.4%						
			Sindicato de Empleados del Ministerio de Hacienda	1	0.4%						
			Ministerio de Energía	1	0.4%						
			Seguridad Industrial	1	0.4%						
			Ministerio de Trabajo	1	0.4%						
			Consejo Nacional de Pequeños y Medianos Productores	1	0.4%						
			Presupuesto Nacional de la Republica	1	0.4%						
			Administración Portuaria	1	0.4%						
			Oficina de la Primera Dama	1	0.4%						
			Camara Nacional de Radio	1	0.4%						
			Federación C.R. de Fútbol	1	0.4%						
			Centro Nacional de Control de Energía	1	0.4%						

**Table 1 Cont.**

Direccion de			
Aviacion Civil	1	0.4%	
Sistema Nacional de			
Radio y Television	1	0.4%	
Ministerio de			
Seguridad Social	1	0.4%	
Number of Mentions	247	100.0%	
Number of Cases	52		

**Summary, Public Organizations Engaged in Disaster Response Operations**

	Number of Mentions	%	Total Cases	%
Total mentions				
International	140	31.8%	26	26.3%
National	260	59.1%	52	52.5%
Provincial	12	2.7%	7	7.1%
Municipal	28	6.4%	14	14.1%
Total Mentions,				
All Jurisdictions	440	100.0%	99	100.0%

**Source: La Nacion, April 23-May 8, 1991**

TABLE 2

Nonprofit Institutions Engaged In Disaster Response Operations  
by Jurisdiction and Frequency of Mentions in Newspaper Reports

International	N	%	National	N	%	Provincial	N	%	Municipal	N	%
United Nations Organization of American States	15	30.0%	Costa Rica Red Cross	32	54.2%	Limon Federation of Workers	3	42.9%	St Vincent de Paul Clinnic	1	16.7%
Doctors Without Borders	6	12.0%	National Youth Movement	4	6.8%	Comite de Apoyo al Istmo	1	14.3%	Los Guias y Scouts	1	16.7%
Red Cross	4	8.0%	Students Federation of the Univ. of C.R.	3	5.1%	Liga Agricola	1	14.3%	Red Cross of Guapiles	1	16.7%
International	2	4.0%	Catholic Church	3	5.1%	Industrial de la Cana de Azucar	1	14.3%	Red Cross of Siquirres	1	16.7%
International Rescue Corps	2	4.0%	Lions Clubs	2	3.4%	Cooperguaria	1	14.3%	Red Cross of Alajuela	1	16.7%
World Food Program	2	4.0%	Rotary	2	3.4%	Assoc. de Desarrollo de Tayutic	1	14.3%	Red Cross of Limon	1	16.7%
Association of Israelai Women	2	4.0%	Kiwanis Clubs	1	1.7%						
Panamerican Development Foundation	2	4.0%	Media Luna Roja	1	1.7%						
Panamerican Health Organization	1	2.0%	Cipeb	1	1.7%						
Swiss Relief Team	1	2.0%	National Union of Baptist Churches	1	1.7%						
Interamerican Institute for Agricultural Cooperation	1	2.0%	The Workers' Association	1	1.7%						
Arias Foundation	1	2.0%	C.R. Cooperative Movement	1	1.7%						
Asociacion Casa Argentino-C.R.	1	2.0%	The Episcopal Conference	1	1.7%						
AmeriCares	1	2.0%	Omar Dengo Foundation	1	1.7%						
Sociedad Interamericana de Radioaficionados	1	2.0%	Consejo Permanente de Exportadores Asociados de la Camara de Exportadores	1	1.7%						
Solidarity Assoc.	1	2.0%	Asociacion de Profesores de Segunda Ensenanza	1	1.7%						
Argentinian Women	1	2.0%									



Table 2 Cont.

International	N	%	National	N	%	Provincial	N	%	Municipal	N	%
Conservacion			Sindicato de Empleados de Ministerio de Hacienda	1	1.7%						
Agencia Espanola de Cooperacion	1	2.0%	Confederacion Nacional de Trabajadores	1	1.7%						
International	1	2.0%									
Operation USA	1	2.0%									
Red Cross of Panama	1	2.0%									
Red Cross of Bocas del Toro	1	2.0%									
Costa Rica-Canada Rural Housing Foundation	1	2.0%									
Reserva de la Biosfera La Amistad	1	2.0%									
Number of Mentions	50	100.0%	Number of Mentions	59	100.0%	Number of Mentions	7	100.0%	Number of Mentions	6	100.0%
Number of Cases	24		Number of Cases	20		Number of Cases	5		Number of Cases	6	

Summary, Nonprofit Organizations

Total Mentions	%	Total Cases	%
International	50 41.0%	International	24 43.6%
National	59 48.4%	National	20 36.4%
Provincial	7 5.7%	Provincial	5 9.1%
Municipal	6 4.9%	Municipal	6 10.9%
Total Mentions, All Jurisdictions	122 100.0%	Total Cases, All Jurisdictions	55 100.0%

Source: La Nacion, San Jose, April 23 - May 8, 1991

TABLE 3

Private Institutions Engaged in Disaster Response Operations  
by Jurisdiction and Frequency of Mentions in Newspaper Reports

International	N	%	National	N	%	Provincial	N	%	Municipal	N	%
Citibank	5	18.5%	Republic Tobacco	2	15.4%	Cooperativa Dos Pinos	5	62.5%	San Juan de Dios (hosp.)	2	16.7%
Phillip Morris	3	11.1%	DEMASA	1	7.7%	Jugos del Campo	1	12.5%	San Vicente	1	8.3%
Scott Paper	2	7.4%	La Nacion	1	7.7%	music groups	1	12.5%	Cafe Dorado	1	8.3%
American Sanitary Corporation	2	7.4%	Chiriqui Land Co.	1	7.7%	artists	1	12.5%	Canice y Prica	1	8.3%
Banana Development Corporation	2	7.4%	Arrocera Costa Rica	1	7.7%				Mercado Burbon	1	8.3%
Irex	1	3.7%	Pastas Roma	1	7.7%				Panaderia	1	8.3%
Polymer	1	3.7%	3M of Costa Rica	1	7.7%				Musmanni	1	8.3%
Sea Land	1	3.7%	Coonaprosal R.L.	1	7.7%				Funeraria Polini	1	8.3%
United Fruit	1	3.7%	Canal 15	1	7.7%				Almacen Dragon de Oro	1	8.3%
Borden	1	3.7%	Compania Taca International	1	7.7%				Punto Rojo	1	8.3%
Wrangler	1	3.7%	Airlines	1	7.7%				Mas y Menos	1	8.3%
Del Monte	1	3.7%	Corporacion Superior	1	7.7%				Pali	1	8.3%
Nestle	1	3.7%	Tico Times	1	7.7%						
Procter&Gamble	1	3.7%									
Kimberly Clark	1	3.7%									
CNN	1	3.7%									
Chiquita Brand	1	3.7%									
Standard Fruit Co.	1	3.7%									
Number of Mentions	27	100.0%	Number of Mentions	13	100.0%	Number of Mentions	8	100.0%	Number of Mentions	12	100.0%
Number of Cases	18		Number of Cases	12		Number of Cases	4		Number of Cases	11	

Summary, Private Institutions

Total Mentions	%	Total Cases	%
International	27	18	40.0%
National	13	12	26.7%
Provincial	8	4	8.9%
Municipal	12	11	24.4%
Total Mentions,			
All Jurisdictions	60	45	100.0%

Source: La Nacion, San Jose, April 23 - May 8, 1991

Figure 1

# Public Organizations, Number of Mentions

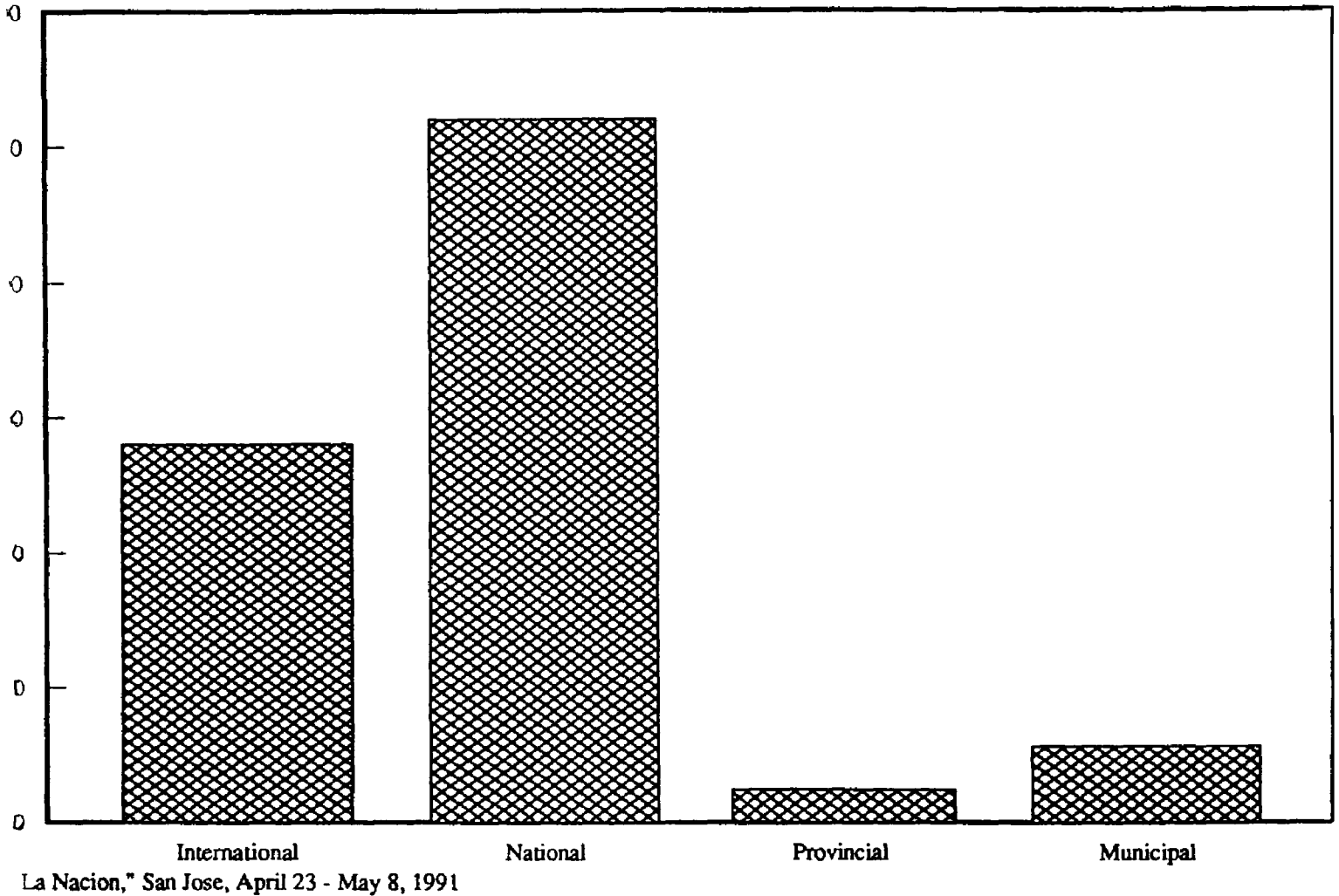
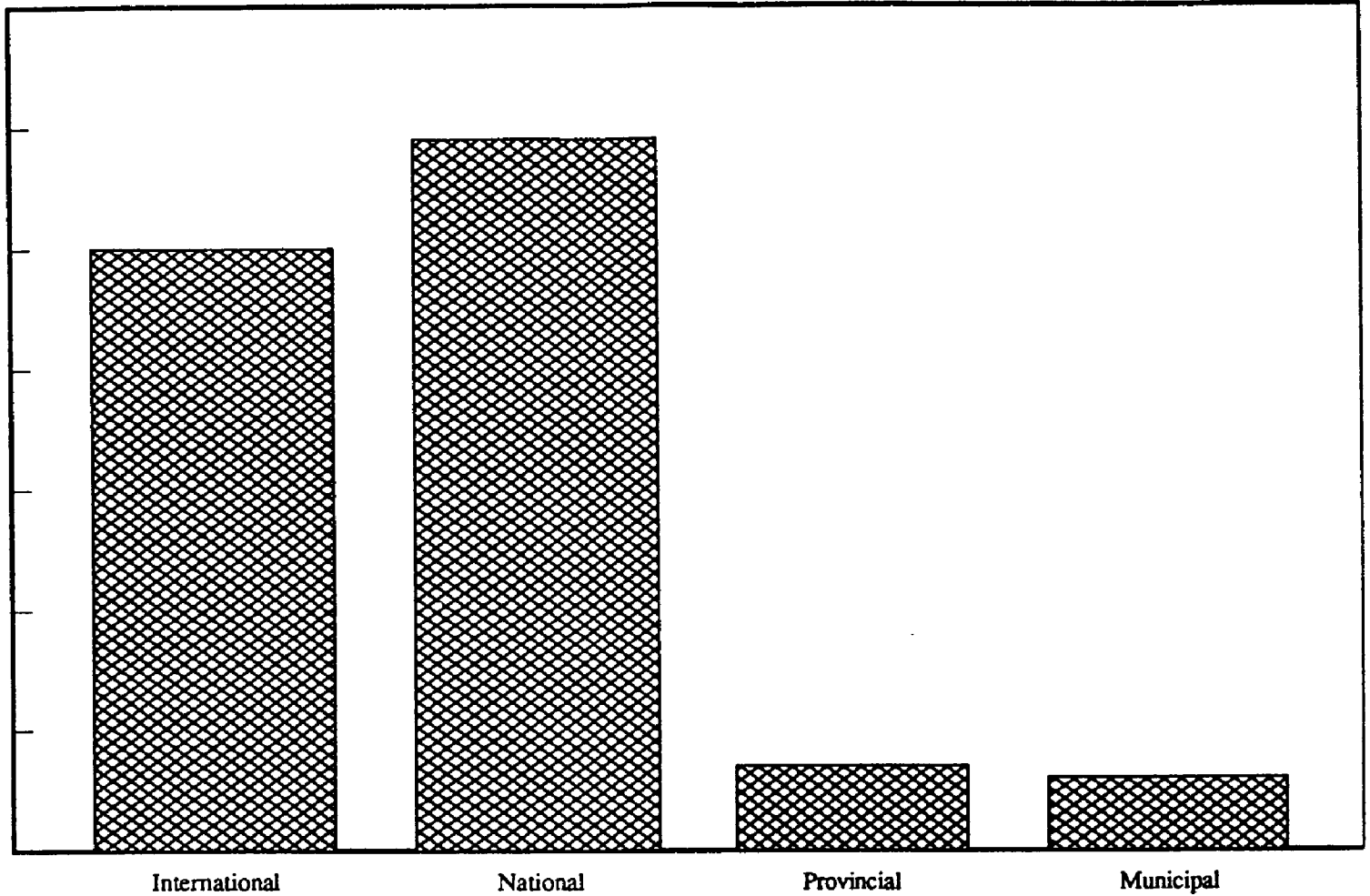


Figure 2

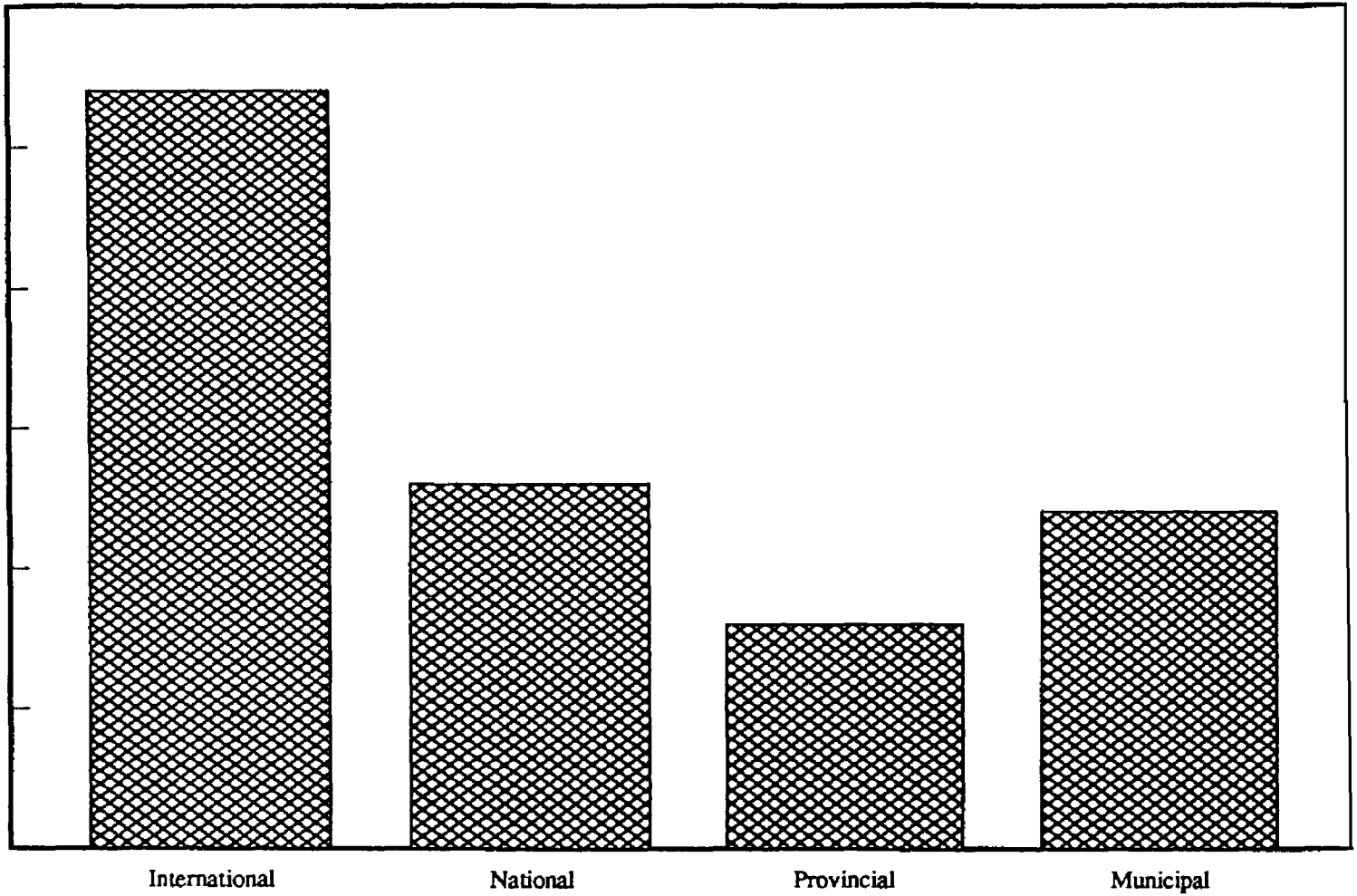
# Nonprofit Organizations, Number of Mentions



"La Nacion," San Jose, April 23-May 8, 1991

Figure 3

# Private Organizations, Number of Mentions



"La Nacion," San Jose, April 23-May 8, 1991

received the least coverage with 12 organizations named and 2.7% of the total mentions. The local structures for emergency response were clearly underdeveloped in this region.

Table 2 presents similar data for nonprofit organizations. Interestingly, the largest number of nonprofit organizations are international, with 24 receiving 41% of the total mentions. National nonprofit organizations were the second largest group, with 20 receiving 48.4% of the mentions. Five provincial nonprofit organizations were identified, with 5.7% of the mentions, and six municipal nonprofit organizations were named, receiving 4.9% of the total mentions.

Table 3 presents the data for private organizations. Again, the largest number reported are international organizations (18 cases; 45% of mentions), with national organizations second (12 cases, with 21.7% of mentions). Municipal organizations were third (11 cases; 20% of the mentions) and provincial organizations were last with 4 cases and 13.3% of the mentions. These same data are represented visually in Figures 1 - 3, which show dramatically the different rates of participation among the four jurisdictional levels and the overwhelming number of activities by national and international organizations reported in comparison to activities by municipal and provincial organizations.

Two other breakdowns provided interesting perspectives on the shape of the emergency response system as it evolved. Table 4 shows the number of public industries and financial institutions involved in disaster response and reconstruction, and Figure 4

TABLE 4

Public Industries and Financial Institutions Engaged in Disaster Response Operations  
by Jurisdiction and Frequency of Mentions in Newspaper Reports

International	N	%	National	N	%	Provincial	N	%	Municipal	N	%
World Bank	15	29.4%	Banco Nacional de Costa Rica	9	29.0%						
Interamerican Development Bank	13	25.5%	Banco de Costa Rica	7	22.6%						
Fondo de Inversiones de Venezuela	6	11.8%	Banco Centray y Hacienda	3	9.7%						
International Development Agency	6	11.8%	Refinadora C.R. de Petroleo	2	6.5%						
International Monetary Fund	5	9.8%	Banco Popular Corporacion	2	6.5%						
International Bank of Reconstruction and Development	3	5.9%	Bananera Nacional	2	6.5%						
USAID	2	3.9%	Banco Anglo C.R.	2	6.5%						
Central American Economic Integration Bank	1	2.0%	Dept. de Control Fiscal del Ministerio de Gobernacion	1	3.2%						
			Industria Cerveceria Nacional	1	3.2%						
			Guardia de Asistencia Rural	1	3.2%						
			Sistema Bancario Nacional	1	3.2%						
Number of Mentions	51	100.0%		31	100.0%						
Number of Cases	8										

**Table 4 Cont.**

**Summary, Public Industries and Financial Institutions**

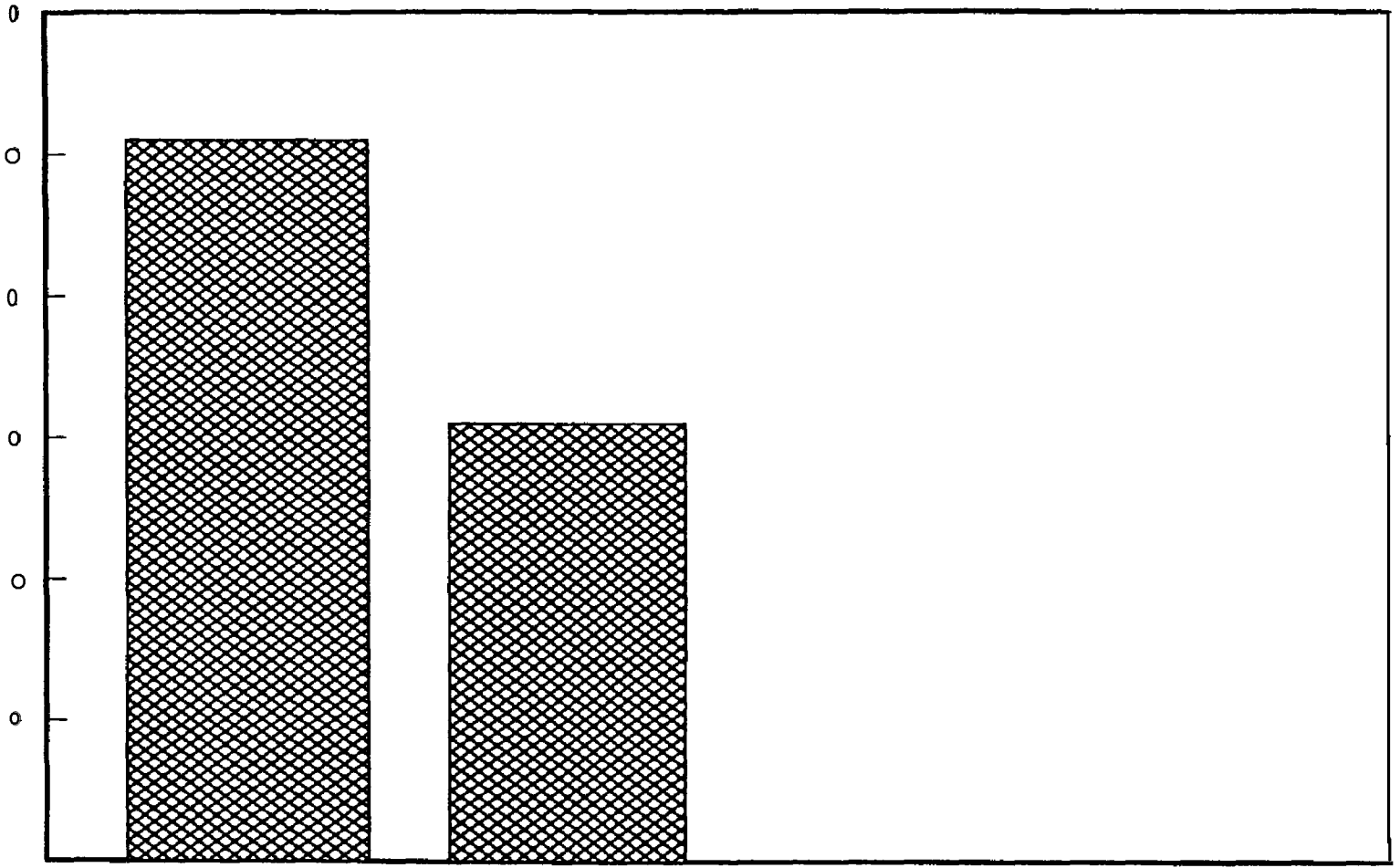
<b>Total Mentions</b>	<b>%</b>	<b>Total Cases</b>	<b>%</b>
International	51 62.2%	International 8	40.0%
National	31 37.8%	National 12	60.0%
Provincial	0	Provincial 0	
Municipal	0	Municipal 0	
<b>Total Mentions, All Jurisdiccions</b>	<b>82 100.0%</b>	<b>Total Cases, All Jurisdiccions</b>	<b>20 100.0%</b>

**Source:** La Nacion. San Jose. April 23 - May 8, 1991



Figure 4

# Financial Institutions, Number of Mentions



"La Nacion," San Jose, April 23-May 8, 1991

TABLE 5

Public Research and Educational Institutions Engaged in Disaster Response Operations by Jurisdiction and Frequency of Mentions in Newspaper Reports

International	N	%	National	N	%	Provincial	N	%	Municipal	N	%
NASA	3	27.3%	Observatorio Vulcanologico y Sismologico de C.R	18	38.3%	Gimnasio Nacional	1	100.0%			
Universidad Adventista de Centro America	2	18.2%	Red Sismologica Nacional	11	23.4%						
University of California	1	9.1%	Universidad de C.R.	7	14.9%						
National Earthquake Information Center (Golden, CO)	1	9.1%	Centro Nacional de Infraestructura Educativa	4	8.5%						
University of Panama	1	9.1%	Nacional University	1	2.1%						
Universidad Autonoma de Mexico	1	9.1%	National Geographic Institute	1	2.1%						
Instituto de Geociencias de la Univ. de Panama	1	9.1%	Colegio Agropecuario Nacional	1	2.1%						
US Geological Service	1	9.1%	Meteorologic Institute Univ. Estatal a Distancia	1	2.1%						
			Instituto Tecnolocal de C.R.	1	2.1%						
			Servicio Maregrafico de C.R.	1	2.1%						
Number of Mentions	11	100.0%	Number of Mentions	47	100.0%	Number of Mentions	1	100.0%			
Number of Cases	8		Number of Cases	11		Number of Cases	1				

**Table 5 Cont.**

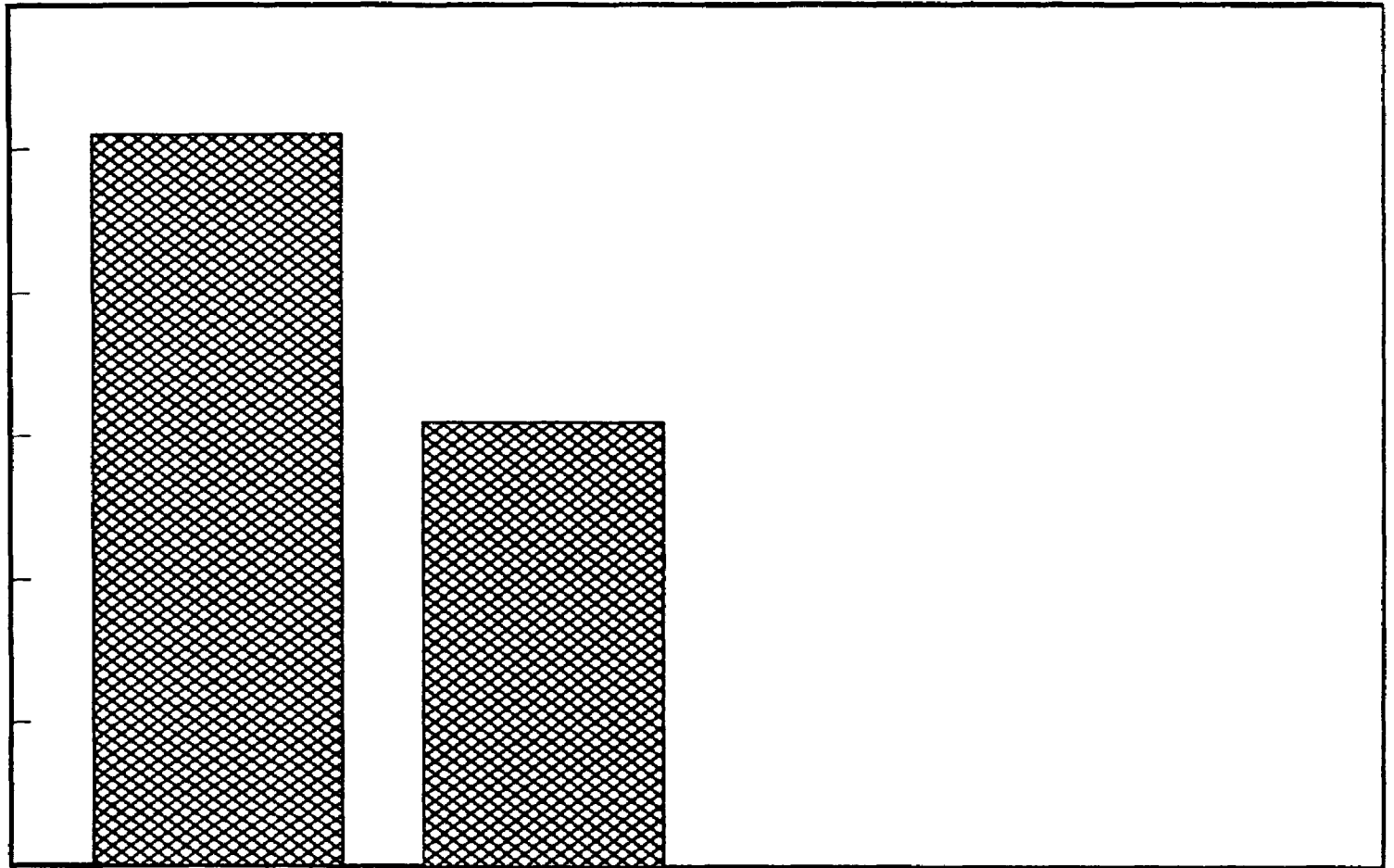
**Summary, Public Research and Educational Institutions**

<u>Total Mentions</u>	<u>%</u>	<u>Total Cases</u>	<u>%</u>
International	11 18.6%	International	8 40.0%
National	47 79.7%	National	11 55.0%
Provincial	1 1.7%	Provincial	1 5.0%
Municipal	0 0.0%	Municipal	0 0.0%
<b>Total Mentions,</b>		<b>Total Cases,</b>	
<b>All Jurisdictions</b>	<b>59 100.0%</b>	<b>All Jurisdictions</b>	<b>20 100.0%</b>

**Source: La Nación, San Jose, April 23 - May 8, 1991.**

Figure 5

# Public Educational Organizations, Number of Mentions



International  
National  
Provincial  
Municipal  
"La Nacion," San Jose, April 23-May 8, 1991

shows the corresponding bar graph for these data. The data show a dominant international response, accompanied by a strong national response, with no organizations named at the provincial and municipal levels. Table 5 shows the public research and educational institutions involved in this response, and Figure 5 presents the accompanying bar graph. The data show that the largest number of research and educational organizations involved in studying this disaster were national (11 cases, 79.7% of mentions) with the second largest group international organizations (8 cases; 18.6% of mentions). Only one provincial educational organization was named, with no municipal organizations reported.

These findings must be interpreted in the context of continuing economic and social development for Costa Rica (Lavell, 1991; Maskrey and Lavell, 1993). Although the design for emergency preparedness and response coordinating committees at the municipal and provincial levels of jurisdiction exists formally in the National Emergency Plan, these committees were not sufficiently developed in practice to play an active role in emergency response. Significant differences in organizational development, training, equipment, and investment of resources between the central government in San Jose and the provincial and municipal governments resulted in an underdeveloped organizational structure in the Atlantic Region with little capacity to mitigate or respond to disaster (Maskrey and Lavell, 1993). Local needs, under these conditions, could only be met by national and international action.

### Conclusions and Recommendations.

These findings document the serious lack of organizational development and response capacity at the provincial and municipal levels in Limon Province. While these findings illustrate a direct relationship between initial conditions at the local level and vulnerability to disaster, they also indicate productive directions for emergency management.

These findings suggest the importance of facilitating interaction among the organizational groups that addressed separate functions in common response to disaster. There appears to be no lack of professional capacity in Costa Rica, but rather a serious lack of trust among the diverse groups with responsibilities for disaster response and a perceived unwillingness on the part of many participating organizations to engage in an interorganizational approach to disaster response and recovery. Steps that facilitate information sharing and that support professional standards of interorganizational communication and coordination of actions are vital to increase the emergency response capacity for the entire country. An interdisciplinary quick assessment strategy, incorporated into emergency planning and training programs implemented at local jurisdictional levels, would strengthen the capacity for community action in continuing economic and social development, as well as increase efficiency in response to disaster.

## REFERENCES

Aguirre, B. E. 1991. "Social Aspects of the Costa Rica Earthquake of April 22, 1991." College Station, TX: Department of Sociology, Texas A&M University, Technical Report.

Bermudez, M. Ch. 1993. "The 1991 Telire-Limon, Costa Rica Earthquake: Management and its Implications." Department of Sociology, Universidad de Costa Rica, San Jose, Costa Rica.

Comfort, L. "Self Organization in Complex Systems." Journal of Public Administration Research and Theory, Vol. 4, No. 3 (July, 1994): 393-410.

Earthquake Engineering Research Institute. 1991. "Costa Rica Earthquake Reconnaissance Report." Earthquake Spectra. Supplement B to Volume 7, October, 1991.

EQE International. 1991. The April 22, 1991 Valle de la Estrella Costa Rica Earthquake: A Quick Look Report. (May). San Francisco, California: EQE International.

La Nacion, San Jose, Costa Rica. April 23-May 8, 1991.

La Republica, San Jose, Costa Rica. April 23-May 8, 1991.

Lavell, A. 1991. "Prevention and Mitigation of Disasters in Central America: Social and Political Vulnerability to Disasters at the Local Level." Paper presented to the Developing Areas Research Group, British Geographers and the Royal Geographical Society on Disasters Vulnerability and Response, London, 3-4 May 1991.

Lavell, A. 1993. "Estudio de Caso de los Desastres de Limon, Costa Rica de 1991." in A. Maskrey and A. Lavell. 1993. Manejo de Desastres y Mecanismos de Respuesta: Un Analisis Comparativo del Alto Mayo, Peru y Limon, Costa Rica. Manuscript in press, Lima, Peru: La Red.

Maskrey, A. and A. Lavell. 1993. Manejo de Desastres y Mecanismos de Respuesta: Un Analisis Comparativo del Alto Mayo, Peru y Limon, Costa Rica. Manuscript in press, Lima, Peru: La Red.

National Emergency Committee. 1993. National Emergency Plan. Translation prepared by the National Emergency Commission at the request of T. Sarkis. San Jose, Costa Rica.

Prigogine, I. and I. Stengers. 1984. Order out of Chaos: Man's New Dialogue with Nature. New York: Bantam Books.

Pretto, E. and D. Angus. 1991. "Costa Rica Earthquake Study: Scout Survey Report." Pittsburgh, PA: International Resuscitation Research Center and Disaster Reanimation Study Group, Technical Report.

Sarkis, T. 1993. "Limon Earthquake: April 22, 1991." Paper prepared for the United Nations Interregional Seminar on Disaster Management, Jakarta, Indonesia, December 13-18, 1993.