Hurricane Mitch and the Livelihoods of the Rural Poor in Honduras

Saul S. Morris, Oscar Neidecker-Gonzales, Calogero Carletto,

Marcial Munguía, and Quentin Wodon[1]

Summary. – This paper assesses the extent to which Hurricane Mitch affected the rural poor in Honduras and whether national and international aid efforts succeeded in providing relief. One of every two surveyed households incurred medical, housing, or other costs due to Mitch. One in three suffered from a loss in crops. One in five lost assets. One in ten lost wages or business income. Relief was most often provided by churches and NGOs. It consisted mainly of food, clothing, and medicine, and it amounted to less than one tenth of the losses incurred by households.

Keywords: Honduras, central America, disaster relief, poverty, Mitch

Corresponding author:

Saul S. Morris
IFPRI – FCN
2033 K St NW
Washington DC 20006

tel: 202 862 5691
fax: 202 467 4439
e-mail: s.morris@cgiar.org

---

1. INTRODUCTION

Hurricane Mitch, which hit Central America on 26-27 October 1998, was the fourth strongest storm in Atlantic Basin history. In Honduras, the worst affected nation, 5,657 people were killed and some 1.5 million are believed to have suffered significant damage (ECLAC, 1999). In addition to the massive losses of infrastructure (see, e.g., Government of Honduras, 1998 for an evaluation of these costs), food crops were devastated, including the staples maize and beans, which together account for more than one half of all dietary energy and two thirds of all protein consumed by the poorest 25 percent families in the country (Rogers et al., 1996). The Economic Commission for Latin America and the Caribbean estimates that 58 percent of the 1998 maize crop and 6 percent of the bean crop were destroyed (ECLAC, 1999). In addition, many producers lost a portion of their stored production due to flooding and landslides.

In spite of the magnitude of the event and the extensive media coverage that it generated, there is still remarkably little empirical evidence regarding the impact of Hurricane Mitch on the livelihoods of the rural poor in Honduras. Unlike many other Latin American countries, poverty is still a predominantly rural phenomenon in Honduras, with 49% of the total population, and a large majority of the poor, living in rural areas in 1998 (World Bank, 2001). Poverty estimates based on the March 1998 and 1999 EPHPM (*Encuesta Permanente de Hogares de Propósitos Múltiples*) labor force surveys suggest an increase in the share of rural households living in poverty following Mitch of about five percentage points, from 69.2% to 74.6% (Government of Honduras, 2001; see also World Bank, 2001). However, this increase is likely to be underestimated for a number of reasons. First, the EPHPM surveys do not capture very well the income of small farmers who are those who suffered the most from Mitch due to the loss of their crops. Second, while labor income (a flow) may have been sustained after Mitch, many households suffered from a loss in assets (a stock), which has implications for future poverty rather than current poverty. Third, a number of populations at risk are typically under-

represented in labor force surveys such as the EPHPM, so that the impact of Mitch on the income (and assets) of these populations is not likely to be adequately measured with the surveys.[1]

As a result of the absence of good data, there is still little consensus about how seriously these groups were affected. While one camp claims that "the main groups affected by the resulting devastation were the socially disadvantaged sections of the population … includ[ing] rural communities" (Duran, 1999), others have observed that "fortunately, in some of the poorest areas of the country, particularly in the western regions, there was little or no damage from the hurricane" (Food and Agriculture Organization, 1999).

This paper uses data from a household survey conducted in the poorest areas of Honduras seven to nine months after the Hurricane to answer two main questions. First, what has been the impact of Mitch on the livelihoods of the rural poor? Second, how effective have international aid efforts been in mitigating Mitch's impact? In answering both questions, special attention is devoted to the poorest of the poor. The second question is especially important for policy makers because the international response to the devastation caused by Hurricane Mitch has been substantial, with per capita aid jumping from U.S. $50 in 1997 and $52 in 1998 to $129 in 1999 (World Bank, 2001). In particular, global food aid shipments to Honduras increased from 21 thousand tons in 1997, to 39 thousand tons in 1998, and 169 thousand tons in 1999 (World Food Program, 2001).

2. DATA SOURCES AND METHODOLOGY

The results presented in the paper were obtained using data from an integrated household survey of 2,398 rural households designed and analyzed by the International Food Policy Research Institute for the Government agency PRAF (*Programa de Asignación Familiar)[2]* with funding from the Inter-American Development Bank. The households were interviewed between May and July of 1999. The survey sample was designed to represent the most socially and economically disadvantaged municipalities of Honduras as of March 1997, the last time point for

which disaggregated national data were available. Specifically, all the municipalities in the country were ordered from worst to best according to the results of the 1997 VIIth National Census of the Heights of First-Grade Students (Government of Honduras, 1997). The 180 municipalities with the worst nutritional profile (out of a national total of 297 municipalities) were included in the sampling frame. Systematic sampling, with implicit stratification on nutritional status, was then used to select 80 of these 180 municipalities for inclusion in the survey. In each selected municipality, 30 households were selected, 15 in the municipal seat (usually a very small town with minimal infrastructure), and 15 from the surrounding villages. The sampled households consisted of five sets (*clusters*) of three adjacent households starting from randomly selected start-points in the municipal seat, and three clusters of five adjacent households starting from randomly selected start-points in the villages.

Figure 1 shows the location of the survey municipalities in relation to the track taken by Hurricane Mitch and the areas of the country affected by severe flooding. It can be seen that many of the survey municipalities escaped the worst of the flooding and high winds associated with the Hurricane. This is because the most socially disadvantaged groups in Honduras as of 1997 were living in the mountainous interior, whereas Hurricane Mitch caused the greatest damage along the northern coast, where it made landfall, and in the low-lying river valleys.

FIGURE 1 HERE

The household questionnaire consisted of twelve different modules, of which four contained questions directly relating to the impact of Hurricane Mitch. The full questionnaire can be downloaded from the IFPRI Web-site at www.ifpri.org. Household residents were asked to estimate the magnitude of the losses they suffered as a result of the Hurricane in: damaged crops; salaries, business income and rents foregone, and the loss of financial aid from friends and family. They were also asked to estimate costs incurred due to medical emergencies,

reconstruction of the home or business, and donations sent to other affected households. A complete description of the state of the family's home both before and after the Hurricane was obtained, regardless of where they lived prior to the Hurricane, as well as a listing of their assets (over 60 different household items, tools, and animals) before and after the Hurricane. Finally, an inventory of aid received was also collected.

For the empirical analysis, the households were stratified into five groups of pre-Mitch wealth by summing – for each household – the values of all assets owned prior to the Hurricane, based on a list of 31 household implements/consumer durables, 13 different kinds of animals, and 18 agricultural implements. The analysis was based on assets rather than income lost in part because the pre-Mitch income of each household was not known. The proportions of households affected by Hurricane Mitch – due to loss of income, depletion of assets, or extraordinary costs incurred – were calculated separately for each quintile of pre-Mitch wealth. Logistic regression was used to determine whether the proportion of households affected was significantly greater among households from lower (or higher) quintiles of pre-Mitch wealth. The statistical significance of these associations (P-values) is reported in the findings (*see next section*). Among households affected, the actual magnitude of the impact was summarized using median values of – for example – crop losses, for each quintile of pre-Mitch wealth. Non-parametric median regression was used to determine whether the proportion of households affected was significantly greater among households from lower (or higher) quintiles of pre-Mitch wealth, and the statistical significance of these associations (P-values) is reported in the Findings.

The degree to which Mitch-related crop damage was localized was assessed using Alternating Logistic Regression, or ALR (Carey, Zeger & Diggle, 1993). This method has previously been used mostly to study the neighborhood clustering of drug-use (see, for example, Bobashev & Anthony, 2000). In this case, it provides an estimate of the increased risk (odds) of a given household suffering crop damage if another (randomly chosen) household in the same sample cluster has also been affected. This parameter is referred to as the Pairwise Odds Ratio.

The estimates were adjusted for pre-Mitch wealth as a proxy for farm size, as it was considered that larger farms were more likely to have suffered damage somewhere over their total area. The ALR algorithm iteratively recalculates the Pairwise Odds Ratio and the logistic regression of the outcome on the covariate. The Pairwise Odds Ratio can be expressed as a function of an indicator coded to represent whether households j and k in a randomly selected pair belong to the same cluster:

$$\log(\text{PairwiseOddsRatio}_{jk}) = \alpha Z_{jk}$$

where Z_{jk} takes a value of 1 or 0 depending on whether the pair (j,k) belongs to the same cluster. The pairwise odds ratio takes a null value of 1.0 when there is no clustering of the outcome of interest within the designated cluster structure, and exceeds 1.0 in the presence of clustering.

3. EMPIRICAL FINDINGS

Pre-Mitch conditions.

Table 1 shows some basic characteristics of the survey households, disaggregated by quintile of pre-Mitch wealth. The very poorest households lived mostly in the West of the country, and were somewhat more frequently found in the villages than in the municipal seats. They lived in homes with earth floors (almost always), with no car, minimal furnishings and few poultry. Compared to other groups, they had less labor assets, less access to salaried employment, and were less likely to participate in organized groups. The comparatively wealthier households in the sample (which, as mentioned in the previous section, consists exclusively of municipalities with a high degree of malnutrition) were more likely to live in the south-east of the country, in the municipal seats, and in houses with flooring made – in most cases – of tiles or cement, with six chairs on average, and ten fowl. Some of these households even owned a car. Two thirds had one member or more in salaried employment or employing others, and nearly one half participated in organized groups.

TABLE 1 HERE

Hurricane Mitch and direct loss of income

In 1998, agriculture employed 35% of the total labor force in Honduras (World Bank, 2001), with much higher levels – perhaps twice as high – in the isolated, rural municipalities participating in the Mitch survey reported here. In these areas, the major sources of income reported by community key informants were: cultivation of basic grains, coffee, and vegetables, and livestock ranching. Hurricane Mitch caused direct loss of income in these areas by destroying crops and disrupting normal business activities in agriculture, commerce, transportation, and banking (ECLAC, 1999).

Table 2 shows that crop damage was extensive in the survey area, with over one third of all surveyed households reporting a loss of income due to damaged crops. Both the proportion of households affected and the median estimated value of income lost among those reporting losses increased with (pre-Mitch) asset holdings, presumably because wealthier households had larger planted areas and therefore a greater exposure to the elements. Although the total estimated value of agricultural production was not determined in this survey, data previously collected in a similar population in Honduras in 1996 and again 1997 (Morris and Medina Banegas, 1999) suggest that households in the lowest quintile of wealth may have lost as much as 40 percent of their total crop value, whereas those in the higher quintiles (two through five) probably lost around 25-30 percent of their total crop value. Outside the municipal seats, households were at 2.4 times greater risk (95 percent Confidence Intervals, 1.8-3.1) of suffering crop damage if one of their immediate neighbors was also affected, suggesting an extremely localized pattern of damage. In the municipal seats, households were at a 2.0-fold increased risk (95 percent Confidence Interval, 1.4-2.7) if one of their immediate neighbors was also affected.

TABLE 2 HERE

Although wage labor accounts for 36% of the total of all labor income in rural Honduras (Government of Honduras 2001), only 7.7 percent of all survey households reported a loss of wage income due to Mitch, with no significant trend by quintile of wealth. The median value of wage income lost was, however, markedly higher among affected households from the upper wealth quintile. Loss of business income was widespread (more than five percent of all households) only among the wealthiest households, while loss of income from remittances was reported only very rarely, as was loss of rental income (two households only). Taking all sources together, approximately one third of households in the lowest wealth quintile reported some loss of income due to Mitch, rising to over one half in the upper quintile. Reported sums lost were considerably higher in the upper quintiles, but these sums lost represented approximately the same *proportion* (10 percent) of (post-Mitch) median household expenditures in each quintile.

Destruction of housing and other assets

Official estimates place the number of houses completely destroyed by the Hurricane at 35,000, with another 50,000 seriously damaged (ECLAC 1999). This damage affected some 662,000 people, or just over one tenth of the population nationally. Table 3 shows that slightly lower levels of damage were reported in the survey area, with 3.4 percent of all households in the sample forced to move house. Another 3.5 percent of households remained in their homes even though they suffered significant damage that caused them to alter their normal daily routines. Greater wealth was associated with significantly lower rates of moving or damage to the home. There was, however, little difference in the quality of the housing occupied before the Hurricane and at the time of the survey, even for those reporting damage. Several households were motivated to upgrade the quality of the roof of their house (14 upgrades vs. one downgrade; P=0.001, McNemar's chi-square test).

TABLE 3 HERE

Over one quarter of surveyed households in the highest quintile of wealth lost some assets (household implements, tools, or animals) as a result of Hurricane Mitch, compared to just 10 percent of the poorest households and around 20 percent of households in the intermediary groups. Among those affected, the magnitude (value) of the loss was over fifteen times greater among the wealthiest households compared to the poorest. However, because the poorest households had so few assets to start with, the impact of the Hurricane losses was much more significant for them: affected households in the lowest quintile of wealth lost nearly 18 percent of their pre-Mitch asset value, compared to just three percent for affected households in the highest quintile of pre-Mitch wealth. For the poorer households, loss of poultry was a major cause of asset depletion, whereas for the richest households, loss of cattle was much more significant.

Exceptional costs resulting from Hurricane Mitch

Table 4 shows that approximately 30 percent of all households in each quintile of pre-Mitch wealth incurred some sort of additional medical cost as a result of Hurricane Mitch. Among those incurring medical costs, richer households spent more than poorer households. Similarly, 10-13 percent of households in each wealth quintile spent money repairing their home, with affected richer households spending relatively more. This result should be interpreted in conjunction with the earlier finding that poorer households suffered more damage to their homes, suggesting that some poor families may have been unable to make necessary repairs because of financial constraints. Richer households were considerably more likely than poorer households to send money to other friends or relatives affected by the Hurricane, although the sums involved were small in all cases. Only 19 households reported incurring costs for the repair of the family business. In total, additional Mitch-related costs were incurred by 43-47 percent of all households, with little variation across quintiles of wealth. Sums involved were not large, representing just one to two percent of (post-Mitch) median household expenditures for each group.

TABLE 4 HERE

Aid for reconstruction

Table 5 shows the different kinds of direct aid received by the survey households in the months following Hurricane Mitch. Approximately one survey household in every ten received some food aid, generally in small amounts. Even fewer households (five percent) received clothes, shoes, sheets, or blankets. Very few households received other forms of aid. Taking all forms of aid together, 13-15 percent of households were direct beneficiaries, with median transfers ranging from 150-200 Lempiras. These transfers were equivalent to just 10 percent of the value of the immediate income losses suffered in the lowest quintile of wealth, and five percent or less of the value of income lost among wealthier households. The major sources of aid among this population were the churches and NGOs.

TABLE 5 HERE

The probability of receiving food aid appears to have been similar regardless of pre-Mitch wealth. On the other hand, the probability of receiving clothing and similar items is higher for poorer households. A more detailed econometric analysis, to be reported elsewhere, suggests that although the targeting of relief was far from perfect, the probability of receiving relief was actually negatively correlated with pre-Mitch assets levels, and positively correlated with asset losses due to Mitch. More precisely, ten thousand Lempiras in additional pre-Mitch assets reduced the probability of receiving relief by about 0.6 percentage point, while an additional ten thousand Lempiras in asset losses increased the probability of receiving relief by 7.5 percentage points. In the aggregate (though not at the level of individual households), these two effects cancel each other out, since wealthier families in general lost more. This explains why the proportion of aid beneficiaries does not appear to vary by pre-Mitch wealth. The same analysis

suggests that among those households that did benefit from relief aid, the amount of assistance received was independent of the pre-Mitch assets level and the asset loss due to Mitch. This is not particularly surprising given that the relief covered only the most basic of needs, and that households with different wealth do not necessarily differ in their absorptive capacity for basic needs relief. Clearly, one would hope that any subsequent *rehabilitation* aid would be proportional to losses and/or post-disaster poverty.

4. DISCUSSION

The survey used in this paper was not designed to capture the impact of Mitch in those areas where the destruction was greatest, the Atlantic coast and the southern watersheds. Nor was it designed to be nationally representative. It does, however, provide an excellent snapshot of the impact of the disaster on those communities that were already chronically underdeveloped and lacking in basic amenities before the advent of the disaster. We hypothesized that the population of these areas would have been especially vulnerable to income shocks because they had no savings to draw on, limited access to alternative employment, and lacked the means to draw on external resources. This appears to have been the case. Our findings provide conclusive evidence to show that the rural poor, and in particular the poorest of the poor, were seriously impacted by Hurricane Mitch in Honduras even in the areas which were not among those the most affected. The storm caused a reduction in current income, a depletion of assets, and a number of unanticipated costs. In spite of the massive international mobilization, short-term relief aid in the survey area was extremely limited relative to the losses that were suffered.

Unlike many studies of the impact of natural disasters, this study was able to differentiate between the moderately poor and those living in extreme poverty. In some respects, the poorest households are immune to natural disasters such as Mitch because they have so little to lose. In this study, households in the lowest quintile of pre-Mitch wealth were less likely to suffer crop damage because they were cropping such small areas, less likely to lose business income because

they had none to start with, and less likely to lose assets because their pre-Mitch asset base was so small. In addition, the value of income and assets lost was much less for poorer families. However, it is important to bear in mind that even minor losses can be devastating for a household that is already on the edge of destitution. Those households in the lowest wealth quintile who lost assets saw these assets reduced by a crippling 18 percent, compared to just three percent for households in the upper quintile of wealth. This suggests that the asset portfolios of the very poor are not only very limited, but also very risky. Two of the items that account for significant proportions of the total asset value of the poor – beds and poultry – are both clearly vulnerable to severe bad weather (the former because of leaky houses). Crop losses due to the Hurricane were probably also particularly devastating for the poorest households. Means of insuring very poor rural households against such natural disasters should be urgently investigated. It is possible, for example, that they might be willing to invest in area-based insurance contracts if the insurer's promise to honor its commitments could be made credible.

Our data on costs incurred for medical attention and reconstruction of the home suggest that similar proportions of households incurred costs across the different wealth groups. This is perhaps surprising, since we know that poor households were more likely to sustain damage to their housing, and may simply indicate unmet demand for repairs among the poorest households. We also found that the immediate relief aid response was limited in the survey areas. This is in spite of the fact that, in general, the international response to the hurricane emergency in Central America was both rapid and substantial. It has been stated that the Government of Honduras received U.S. $123.1 million of extraordinary official aid, both financial and in kind, in the aftermath of the Hurricane in 1998 and in the first quarter of 1999 (IADB, 2000). The U.S. Department of Defense alone delivered over 2 million pounds of food, over 115,000 pounds of medicine, 97,000 gallons of water, and 600,000 pounds of other supplies in the first 30 days after the storm (IADB, 2000). It seems likely, however, that these efforts were highly focused on the three departments where more than a quarter of the population had to abandon their homes: Colón

and Cortés in the North, and Choluteca in the South (ECLAC, 1999). The Joint Task Force Bravo, for example, operated a "hub-and-spoke" logistics system whereby food, medicine and clothes were delivered by truck and helicopter to operational hubs and were then sorted according to "spoke" villages' needs, as reported by Honduran officials (U.S. Department of Defense, 1999). Operational NGOs and church organizations with extensive local networks were probably better placed to undertake relief operations in the remote mountain communities sampled in our survey, where the damage was much more "selective". CARE, for example, operated from December 1998 through October 1999 a food-for-work program benefiting 36,000 families in 51 municipalities in 10 departments (CARE 2000). It should be borne in mind that remote mountain communities are very likely to benefit from the extensive amounts of rehabilitation aid that have subsequently been allocated to Honduras following the initial phase of the emergency. It is disappointing, however, that the immediate relief aid in these less dramatically affected – but very poor – areas fell so far short of compensating the damage suffered. Even within the limitations of a very restricted operation, one would have hoped to see some focusing of efforts on the most vulnerable or the most severely affected. Although there is some evidence of targeting of relief away from the richest households, this evidence remains weak.

Our study only covered the most direct impacts of the Hurricane on poor people's livelihoods. We are not able to say what further hardships were caused by the prolonged isolation of poor communities from their markets and from essential services, or by extended loss of income due to illness. Also, if any families left the region altogether, their experience would not have been captured in this survey. Nevertheless, with the evidence gathered, we can reject the notion that "in the western regions, there was little or no damage" from Hurricane Mitch (FAO 1999). The damage was clearly less than along the Atlantic coast or in low-lying areas of the south, but it was not insignificant, particularly for the very poor, who were already verging on destitution even before the Hurricane struck. For policy, our results suggest that mechanisms are needed to ensure that aid relief is well targeted within communities as well as between

communities when natural disasters strike. The poor should always be a priority group for disaster relief, since even a small amount of damage may be disastrous for families with few assets to start with. Effective monitoring of the impact of aid efforts is essential early on in order to ensure that corrective measures can be applied in a timely fashion.

NOTES

---

[1] As noted in World Bank (2001), several populations may especially be at risk during natural disasters such as Mitch. This may include the illiterate (unable to read early warnings and instructions in temporary shelters), small agricultural producers (located on eroded hillsides and losing insurance in the form of seeds), street children in main cities (flooded out of living space and not likely to go to temporary shelters), squatters (living in high risk flood planes and not likely to request assistance), banana plantation workers (dependant on private sector social services and not likely to be reached by public relief), female-headed households (likely to loose household possessions and slower to return to work), and indigenous populations (suffering from linguistic, cultural, and other obstacles for early warnings and access to relief).

[2] PRAF runs a number of programs in the areas of education, health, nutrition, and income support. The agency was created in 1990 in order to serve Honduras' poor within the context of the structural adjustment program that was put in place at that time. In 1998, the program had 318,000 beneficiaries. PRAF's seven sub-projects had a total budget allocation of 130 million Lempiras (slightly under US $10 million). This makes PRAF the second largest agency with targeted programs after the country's social investment fund.

5. BIBLIOGRAPHY

Bobashev, G. V. and Anthony, J. C. (2000) Use of Alternating Logistic Regression in studies of drug-use clustering. Substance Use and Misuse, 35, 1051-1073.

CARE (2000). CARE's response in Honduras. www.care.org/publications/mitch/honduras.htm.

Carey, V., Zeger, S. L. and Diggle, P. (1993) Modelling multivariate binary data with alternating logistic regressions. Biometrika 80: 517-26.

Duran, R. (1999) Mittelamerika nach dem Hurrikan Mitch – Risikomanagement und Katastrophenvorbeugung. Entwicklung und Ländlicher Raum 33(4): 27-29.

Economic Commission for Latin America and the Caribbean – ECLAC (1999) Honduras: Evaluation of the damage caused by Hurricane Mitch, 1998. Implications for economic and social development and the environment. Mexico City: ECLAC.

Food and Agriculture Organization/World Food Programme (1999) FAO/WFP crop and food supply assessment to Honduras. 29 January 1999. FAO, Rome.

Government of Honduras (1997) VIIth National Height Census, 1997 report. Secretariat for Education/Family Allowance Program (PRAF), Tegucigalpa, Honduras.

Government of Honduras (1998) Preliminary report estimating the damage caused to public infrastructure by Hurricane Mitch, and the costs of recovery. Tegucigalpa.

Government of Honduras (2001). Estrategia Para la Reduccion de la Pobreza: Un Compromiso de Todos por Honduras. Tegucigalpa.

Interamerican Development Bank (2000). Honduras: assistance and cooperation from the international development community. www.iadb.org/regions/re2/consultative_group/honduras_assist.htm.

Morris S. S., and Medina Banegas J. M. (1999) Desarrollo rural, seguridad alimentaria del hogar y nutrición en el oeste de Honduras. Archivos Latinoamericanos de Nutrición 49(3): 244-52.

Rogers B. L., Swindale A. J., and Ohri-Vachaspita P. (1996) Determinants of household food security in Honduras: a report on the National Household Consumption, Income, Expenditure and Nutrition Survey, 1993-94. Report for USAID. International Science and Technology Institute Inc., Arlington VA.

United States Department of Agriculture Foreign Agricultural Service (1999) Assessment of Hurricane Mitch on Honduran Agriculture. USDA, Washington D. C.

United States Department of Defense (1999). "Hubs and spokes" keep Honduras relief flowing. www.defenselink.mil/news/Jan1999/n01111999_9901112.html.

Wodon, Q. and Morris, S. S. (2001) The Allocation of Natural Disaster Relief Funds. Mimeo, World Bank, Washington, D. C.

World Bank (2001) Honduras: Poverty Diagnostic 2000, Report No. 20531-HO. World Bank, Washington, D. C.

World Food Programme (2001) WFP in statistics, 2000. WFP, Rome.

TABLE 1. Characteristics of survey households, by pre-Mitch quintile of wealth.

	Quintile of wealth (pre-Mitch assets)				
	I	II	III	IV	V
Number of households surveyed	480	480	479	480	479
Region where household interviewed:[a]					
South-west	47.5%	50.4%	48.4%	49.6%	41.8%
North-west	33.5%	26.9%	27.6%	25.6%	24.0%
South-east	19.0%	22.7%	24.0%	24.8%	34.2%
Municipal seat	41.7%	45.0%	49.3%	56.3%	57.8%
Surrounding villages	58.3%	55.0%	50.7%	43.8%	42.2%
Number of persons in household (median)	4	5	5	6	6
Construction of floor, pre-Mitch residence:					
Cement tiles	4.6%	4.0%	11.3%	21.7%	33.2%
Ceramic tiles	2.3%	2.9%	5.4%	4.8%	6.5%
Cement slab	15.4%	21.7%	31.7%	31.7%	32.2%
Wood	1.0%	1.0%	1.3%	1.3%	0.2%
Earth	76.7%	70.4%	50.3%	40.6%	28.0%
Number of chairs owned pre-Mitch (median)	1	3	4	5	6
Number of chickens owned pre-Mitch (median)	2	6	6	8	10
Ownership of car pre-Mitch	none	None	none	none	37.8%
At least one salaried employee or employer (12 mo prior to survey)	53.8%	56.9%	59.9%	59.0%	64.7%
Participation in organized group (12 mo prior to survey)	27.9%	40.6%	41.5%	53.1%	46.4%

a. Regions: South-west=Copán, Ocotepeque, Lempira, Intibucá, La Paz; North-west=Cortés, Santa Bárbara, Comayagua, Yoro; South-east=Choluteca, Francisco Morazán, El Paraíso, Olancho.

TABLE 2. Loss of income due to Hurricane Mitch, by source of income and pre-Mitch quintile of wealth.

Wealth quintile	No. of households	Crops		Wages		Business		Remittances	
		% affected	median value of loss (Lps.)	% affected	Median value of loss (Lps.)	% affected	median value of loss (Lps.)	% affected	median value of loss (Lps.)
1	480	27.1%	1,800	7.3%	500	0.4%	410	0.4%	650
2	480	35.0%	2,000	9.0%	900	2.5%	550	2.3%	800
3	479	35.7%	3,350	7.7%	800	3.8%	2,000	1.0%	500
4	480	38.1%	3,300	7.7%	720	4.8%	2,500	2.7%	500
5	479	47.6%	6,000	6.7%	2,125	11.7%	5,000	1.9%	500
TOTAL	2,398	36.7%	3,025	7.7%	800	4.6%	3,000	1.7%	500
P-value, test for trend		<.001	<.001	.52	.009	<.001	.035	.073	1.00

cont.

Wealth quintile	No. of households	TOTAL[a]		
		% affected	median value of loss (Lps.)	losses as prop. of median hh expenditures
1	480	32.5%	1,400	9.7%
2	480	44.0%	2,000	9.1%
3	479	43.8%	3,000	10.4%
4	480	46.5%	3,000	8.5%
5	479	57.8%	6,000	10.2%
TOTAL	2,398	44.9%	3,000	10.8%
P-value, test for trend		<.001	<.001	-

a. Includes crop losses, losses of wage, business, and rental income, and loss of remittances.

TABLE 3. Assets depleted as a result of Hurricane Mitch, by type of asset and pre-Mitch quintile of wealth.

Wealth quintile	No. of households	Housing		Household implements, tools, and animals			
		% forced to move	% remained, but suffered substantial damage	% affected	median value assets lost (Lps.)	assets lost as proportion of total pre-Mitch asset value	principal sources of value lost (% of total value of assets lost by all households)
1	480	3.5%	3.5%	9.8%	330	17.6%	Poultry (56%), beds (16%)
2	480	5.2%	6.5%	21.7%	525	12.3%	Poultry (70%), beds (6%)
3	479	2.9%	4.2%	19.8%	808	8.8%	Poultry (50%), swine (18%)
4	480	3.5%	1.5%	20.6%	2,168	7.2%	Poultry (28%), music systems (13%)
5	479	1.7%	2.1%	26.3%	5,261	2.9%	Cattle (46%), swine (7%)
TOTAL	2,398	3.4%	3.5%	19.6%	2,175	8.5%	Cattle (32%), poultry (19%)
P-value, test for trend		.039	.003	<.001	<.001	<.001	

TABLE 4. Costs incurred as a result of Hurricane Mitch, by type of expenditure and pre-Mitch quintile of wealth.

Wealth quintile	No. of households	Medical costs		Reconstruction of the home		Remittances sent		TOTAL[a]		
		% affected	median value (Lps.)	% affected	median value (Lps.)	% affected	median value (Lps.)	% affected	median value (Lps.)	costs as proportion of median hh expenditures
1	480	30.6%	300	11.7%	300	8.7%	50	42.5%	300	2.1%
2	480	28.7%	400	12.9%	500	12.5%	96	43.8%	438	2.0%
3	479	29.2%	500	10.0%	800	15.7%	100	44.1%	500	1.7%
4	480	29.8%	500	11.2%	600	18.8%	100	46.0%	500	1.4%
5	479	29.0%	700	10.4%	1000	20.5%	200	47.2%	700	1.2%
TOTAL	2,398	29.5%	500	11.3%	600	15.2%	100	44.7%	500	1.8%
P-value, test for trend		.74	<.001	.37	.001	<.001	<.001	.087	<.001	-

a. Includes medical costs, reconstruction of the home, reconstruction of the family business, and remittances sent.

TABLE 5. Aid received after Hurricane Mitch, by type of aid and pre-Mitch quintile of wealth.

Wealth quintile	No. of households	Food aid		Clothes, bedding		Drugs, medical care		Other	
		beneficiaries (%)	median value (Lps.)	beneficiaries (%)	median value (Lps.)	beneficiaries (%)	median value (Lps.)	beneficiaries (%)	median value (Lps.)
1	480	9.2%	150	5.2%	100	2.7%	150	1.3%	500
2	480	10.6%	200	6.9%	200	2.5%	100	0.6%	1000
3	479	12.7%	200	5.4%	150	2.7%	200	1.3%	300
4	480	9.4%	153	4.2%	100	2.3%	100	1.3%	425
5	479	9.4%	150	3.3%	115	2.5%	200	1.0%	150
TOTAL	2,398	10.3%	156	5.0%	100	2.5%	100	1.1%	425
P-value, test for trend		.86	.94	.041	1.00	.79	1.00	.89	.009

cont.

Wealth quintile	No. of households	TOTAL			
		beneficiaries (%)	median value (Lps.)	median aid: income loss ratio, aid recipients only	Principal sources of aid (% of total value of aid received)
1	480	12.5%	150	10.0%	Church (32%), NGOs (22%)
2	480	15.0%	200	7.5%	Church (34%), municipal auth. (22%)
3	479	15.7%	200	4.6%	Church (40%), NGOs (21%)
4	480	12.7%	160	4.8%	NGOs (26%), Church (19%)
5	479	12.7%	140	5.0%	Church (48%), NGOs (20%)
TOTAL	2,398	13.7%	170	7.0%	Church (36%), NGOs (20%)
P-value, test for trend		.71	.52	.23	-

FIGURE 1. Map of Honduras showing path of Hurricane Mitch, flooded areas, and municipalities surveyed.

Legend
- Areas flooded by Hurricane Mitch
- Municipalities surveyed by IFPRI/ESA/PRAF
- Departmental boundaries

Sources: United States Geological Survey 1999, US National Weather Service. Mitch every 1 hour from October 28 to November 1st