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# Building Assessments and Rubble Removal in Quake-Affected Neighborhoods in Haiti

**BARR Survey  
Final Report**

by

**Timothy T Schwartz**

with

**Yves-François Pierre  
Eric Calpas**

**May 13, 2011**

This final report was produced for review by the  
United States Agency for International Development

It was prepared by **LTL Strategies** ([www.ltlstrategies.com](http://www.ltlstrategies.com))

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*LTL Strategies*  
4545 42<sup>nd</sup> Street, NW – Suite 306  
Washington, D.C. 20016  
Tel: (202) 362 6800 - Fax: (202) 362 6881  
[www.ltlstrategies.com](http://www.ltlstrategies.com)

**DISCLAIMER**

The authors' views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

## A note regarding the sample and techniques used for estimating population parameters

Estimates given in this report are derived from sampling one part of the Port-au-Prince population (population ~ 2 million) and extrapolating the statistics to the total population of earthquake impacted region (population ~ 3 million).

To accomplish this, the estimates are conditioned by the proportion of red, yellow and green houses in the sampled versus the total region. In effect, statistics such as household absentees, are calculated per color coded house category. The proportion in the sample is then adjusted for the proportion of red houses in the total population to arrive at an estimation of, using the example cited, total number of absentees; in the entire strike region.

However, because the entire region was not sampled the estimates cannot, in a strict theoretical sense, be considered a statistically representative application of the data. Some areas were omitted from the sample frame: specifically, outlying areas (Carrefour, Gressier, Leogane, Ti Goave, Mirgoanes, Jacmel) and areas of low impact and low levels of destruction (Cite Soley, Kenskoff, and upper Petion Ville).

## Summary of Significant Findings

- Rubble Removal programs made it possible for an estimated 179,197 to 290,394 people ( comprising 34,461 to 55,845 resident units) to return to their green and yellow color coded homes ( $p < .01$ )
- MTPTC Green, Yellow, and Red building structural evaluations had no detectable impact on home returns
- An estimated 54,314 (64%) of greater Port-au-Prince's 84,866 buildings marked red-- indicating they should be demolished— have been re-inhabited
- Unless the GOH is going to move people out of Red buildings and then demolish the buildings, the amount of rubble that must be cleared, based on Miyamoto and Gilani's (2011) estimate using red houses, can be modified from 8.8 to 3.68 million cubic meters, 15% of the original 20 to 25 million cubic meters that the US Army Corps of Engineers estimated in February 2010
- The number of fatalities that resulted from the earthquake is estimated at 46,190 to 84,961 (  $p < .01$ ), approximately 2.2% of the population
- Estimated number of people who went to camps in January 2010 is 866,412 to 894,588 ( $p < .01$ )
- By April approximately half of those people who had gone to camps or the countryside had returned home; today, accounting for the dead (~2.2%), all but an estimated 13.8% of the pre January 12th 2010 population have returned to their homes
- The current number of IDPs, meaning people who have not returned to their earthquake impacted home, is estimated to be 141,158 to 375,031 ( $p < .01$ )
- The estimate for those IDPs who are currently living in camps and who are indeed from earthquake impacted homes is 15% of total IDPs or 18,690 to 66,62 people ( $p < .01\%$ )

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# 1 Introduction

On January 12, 2010, Haiti was struck by a magnitude 7.3 earthquake. An estimated 3 million people were impacted, and original estimates were that 50 to 80% percent of all residential and commercial buildings in the capital and surrounding areas were destroyed or severely damaged, 217,000 to 300,000 people killed, 300,000 injured, and 1.5 million people homeless.

Despite a massive international response with an emphasis on housing and shelter, OCHA and OIM estimated that as of January 12<sup>th</sup> 2011, one year after the earthquake, 810,000 people--30% of the metropolitan population--still remained displaced and living in Camps, Findings in this report as well as findings of the MTPTC color coded building program suggest this as well as most of the other estimates cited are improbable figures.

- 3 million people in impacted area (USGS; OCHA; Red Cross)<sup>1</sup>
- 217,000-316,000 killed (PADF, GOH, OCHA)
- 300,000 injured (GOH)
- 1,500,000 Internally displaced (without homes)
- 1,000,000 in camps (OCHA; IOM)
- 810,000 in camps as of Jan 12<sup>th</sup> 2011 (OCHA; IOM)
- 510,000 to 570,000 go to countryside (OCHA; Colombia University and Karolinska Institute)

To assist and encourage people to return to their homes, USAID funded Rubble Removal Programs including demolition of condemned buildings and the removal of rubble from streets and drainage canals. Between February 2010 and February of this year USAID also supported the Ministry of Public Works Transport and Communications (MTPTC) habitability assessments program in which buildings were structurally evaluated and color-coded green (for safe to return), yellow (unsafe to inhabit but reparable), and red (for unsafe to enter/damaged beyond repair). The precise impact of rubble removal and the assessments on IDP returns was, prior to the current study, unknown.

To determine the contribution the programs made, USAID contracted LTL Strategies to conduct the Building Assessments and Rubble Removal surveys (here on referred to as BARR). The principal objective was to calculate, to a relatively high degree of accuracy and with a reasonably high degree of statistical probability, the impact on rate of re-occupancy of MTPTC assessments and rubble removal on IDP returns.

Hypotheses,

1. The program of habitability assessment encouraged the return home of IDPs
2. The rubble removal program encouraged the return home of IDPs

The survey also presented an opportunity to resolve issues important to the reconstruction and housing effort as discussed and highlighted by participants in the October 4th IHRC Meeting on Housing Reconstruction and Transitional Shelter. Specifically, obstacles to home return; re-occupancy rates of yellow and red buildings; occupant knowledge of damages and capacity to repair homes; and tenure issues (ownership of house and land, confidence in land tenure security).

BARR included,

- A pilot study in Ravine Pentad: a comprehensive survey of MTPTC color coded buildings versus home occupancy for all Ravine Pentad residential buildings; an application of the BARR residential building questionnaire to all of those that were color coded green and yellow (prior to the survey the number was thought to be 221 buildings)
- a 55 cluster and 3,784 residential building survey of Port-au-Prince neighborhoods severely impacted by the earthquake; application of the BARR residential building questionnaire to one owner or renter in approximately half of those buildings (1,928)

This report focuses on the Port-au-Prince Cluster sample.



## Text Box A: MTPTC

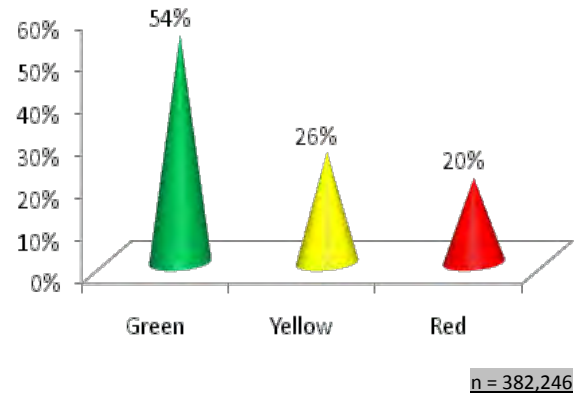


In collaboration with Ministry of Public Works, Transport, Communication (MTPTC), UN's Office for Project Services (UNOPS) and the Pan American Development Foundation (PADF), Miyamoto International trained 270 Haitian engineers in building assessment techniques. The engineers evaluated and then "tagged" buildings using a color-coded system

Green = safe  
Yellow = inhabit after repairs  
Red = unsafe for occupancy

Source: PADF Website

Figure 1: MTPTC Coded Houses in P-au-P



Over the period of February 2010 to January 2011 the engineers evaluated 382,256 Port-au-Prince buildings. They marked 205,539 green (54%), 99,043 yellow (26%), and 77,674 red (20%).



The project is generally considered among the best managed post earthquake undertakings. Dr. Kit Miyamoto, President of Miyamoto International, summed up the associated enthusiasm when he concluded that, "These assessments will shape the future of Port-au-Prince's rebuilding efforts. We now know with certainty the condition of homes, where they are and what repairs are needed—(PADF Webpage).

The BARR survey found that people indeed appreciated the assessments. Many respondents said that they were encouraged to return home because of them (MTPTC section). However, when we broke responses down and compared them to behavior there was no evidence that people in fact did return home because of the surveys. More ominously, the vast majority of the sixty-four percent of buildings marked red—for condemned—and on the property of which people are once again living have, in fact, been re-inhabited (see Section 4.3: Re-occupancy Rate).

## 2 Methodology: Port-au-Prince Cluster Sample Survey

The original BARR survey was designed to be a 3,600 building survey of Port-au-Prince neighborhoods stratified to compare sites of intensive rubble removal to those where rubble removal had not yet occurred. This 'treatment vs. control' strategy was dropped during analysis because there were little to no significant differences between the two groups (see Annex). In adapting to deadlines (data was originally intended to be collected before the January 12<sup>th</sup> 2011 anniversary of the tragedy), violence surrounding the elections (the survey overlapped with the presidential campaign and elections), and limited sampling frame (sites selected from the Rubble Removal lists were limited and often overlapped), the actual size of the survey was larger than planned. Specifically, BARR sampled 55 clusters, 3,784 buildings, 5,158 residences.

Significant components of the research design were the following,

- treatment sites (clusters) were selected randomly from lists provided by organizations that have been part of the USAID funded rubble removal program (34 sites/cluster with 50 buildings per site, n = 1,700)
- control sites (clusters) were selected randomly and systematically using a grid pattern laid over a map of the principal contiguous urban portion of Port-au-Prince (21 sites/clusters with 100 buildings per site, n=2,084)
- a cluster was defined as the 50 (or 100) houses closest to a selected geographical point (located by latitudinal and longitudinal coordinates; see Methodology section in Annex for complete explanation)
- basic demographic data was collected for all 5,158 residences (missing = 23; note that there were often multiple residences per building; specifically, 1.36 residences per building)
- a questionnaire focusing on rubble removal, MTPTC house evaluations, attitudes toward repairs, and other variables of interest was applied to one resident in approximately every second building (a total of 1,928 questionnaires)

The survey design, preparation, training, execution, data entry and analysis spanned a period of 6 months, from September 2010 to February 2011. The actual data gathering took 29 days, involved 1 team leader, 1 qualitative specialist who oversaw field work and key informant interviews, 2 supervisors who managed two teams of 5 interviewers per team (10 interviewers), four vehicles and drivers, and 3 fulltime data entry personnel.

- 1 Survey Expert and Team Leader
- 1 Local Quantitative & Qualitative Expert
- 2 Supervisors
- 10 Junior Investigators
- 3 Data entry personnel

- 3,784 buildings red, yellow and green
- 5,158 residences (1.36 residences per bldg)
- 1,928 in depth questionnaires 55 clusters
- 29 days collecting data

[for more information on the Methodology section in Appendix]

## Text Box B: Survey Teams, Field Work, and Data Entry

The selected points were located on the ground using maps and hand held GPS devices. Once located, we selected the designated number of buildings closest to the selected GIS point. Under the guidance of the 2 supervisors, two teams of 5 surveyors each (total = 10). They visited two clusters each per day, 4 clusters total, for a total of 100 to 200 buildings per day. Data Entry was entered daily and we entered it twice to control for errors. The survey field work spanned 29 days; complete with data entry and data re-entry the survey spanned 37 days.

Figure 2: Survey

Team A

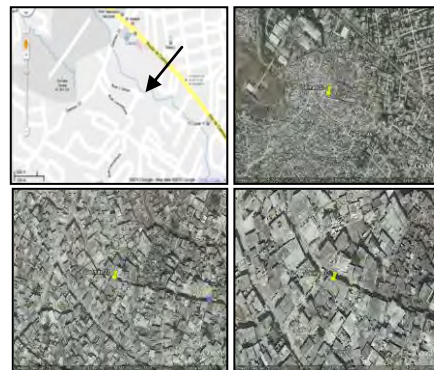
Team B



Surveyors (left to right): Guy Emmanuel Pavilus, Sherley Paul, Fertil Schneider, Gustave Jean Luquel, Daniel Marie Genite, Hedelle Etienne, Olibrice Carmel, Karl-Edouard Joseph, Deborah Etienne, Bruno Jean Thony, Paul Andre Rene, Vena Decelui Mogene, Jacob Michel

Figure 3: Delmas 32 (T7)

18°32'41.80"N 72°18'23.57"W



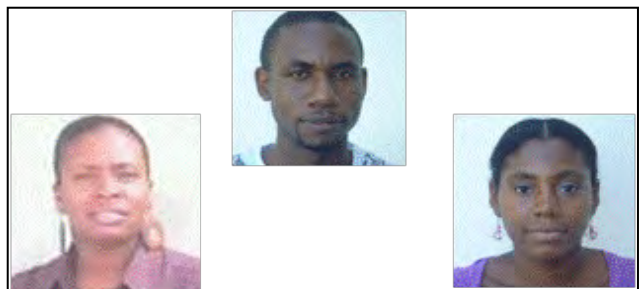
Surveyors used maps, photos, and handheld GPS devices to locate sample points.

Figure 4: Planning



Team Co-Leader and qualitative data analysis Yves Francois Pierre reviews maps and GPS points with surveyors.

Figure 5: Data Entry Team

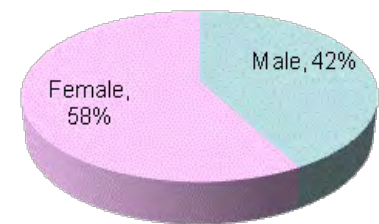


Gertude Gilles, left, Kendy Pierre, center, Martine Delisca, right,

### 3 Respondents and Community

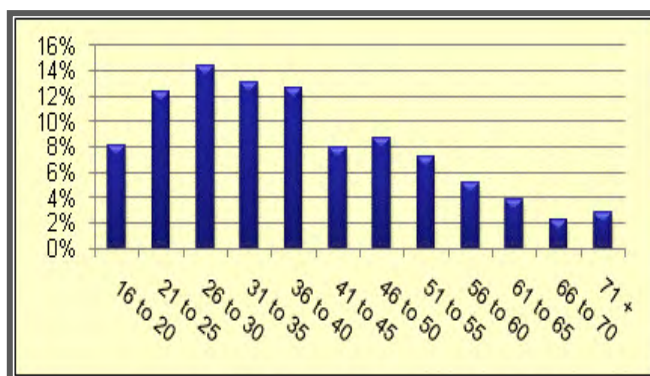
Respondent profiles reflected the target respondent being owner-residents of the household: Sixty-eight percent were building owners (note that this does not necessarily mean that a equal proportion of the population are owners). Fifty-eight percent of respondents were female, 42% were male; and the median age of respondents was 35 years old.

Figure 6: Respondents by Gender



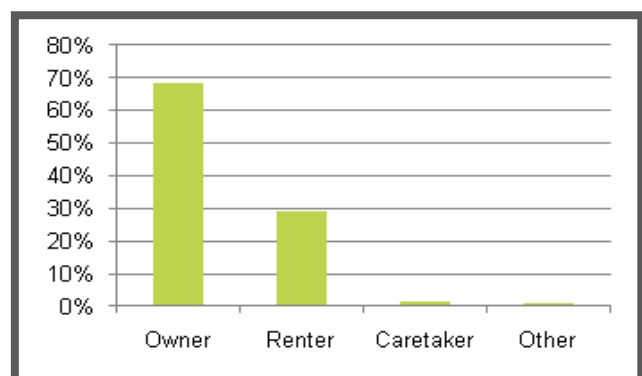
n = 1,928, Missing = 0

Figure 7: Age of Respondents



n = 1,928, n = 34

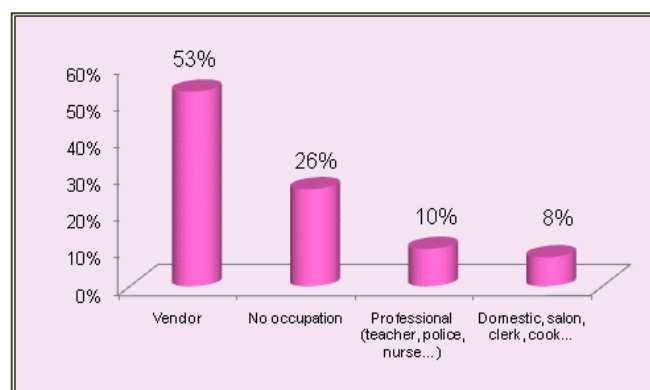
Figure 8: Land Tenure Status of Respondents



n = 1,928, n = 1

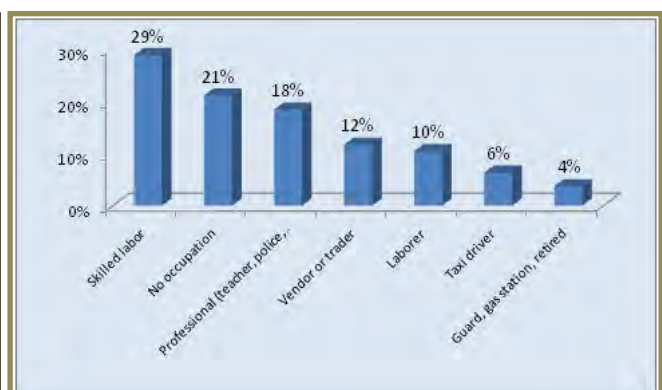
Employment and economic endeavors were typical of popular Haitian neighborhoods: More than half of all female household heads were engaged in selling; 26% said that they had no economic occupation; 18% were domestics, cooks, clerks or professions. Males were overwhelmingly skilled and unskilled laborers and taxi drivers (45%); teachers, policemen, or government officials (18%), with 21% reporting no occupation.

Figure 9: Occupation Female Household Head



n = 1,928, Missing = 390

Figure 10: Occupation Male Household Head

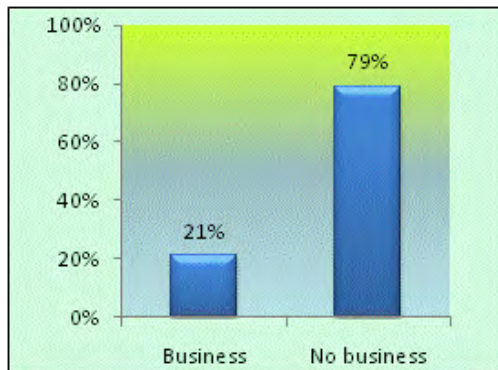


n = 1,928, Missing = 564



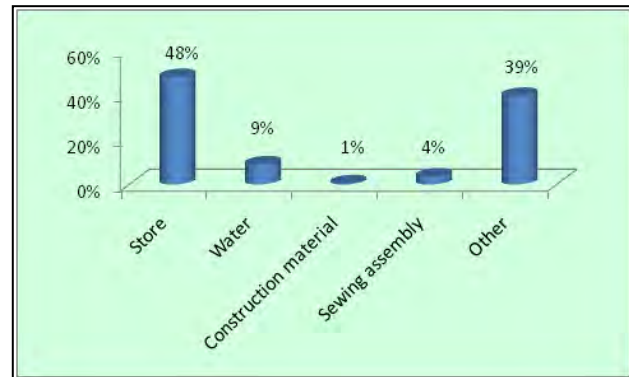
Significant with respect to occupation and economic livelihood strategies is that 20% of all residences reported selling or producing something out of the home (Figure 12). Of these 48% were small convenience stores with food staples, rum, and hygienic products; 9% were sale of potable water, 39% fell into the category of other which typically indicated specialization in one or a few commodities; four percent were seamstresses (Figure 13).

Figure 12: Residences with Business



n =1,928, Missing = 0

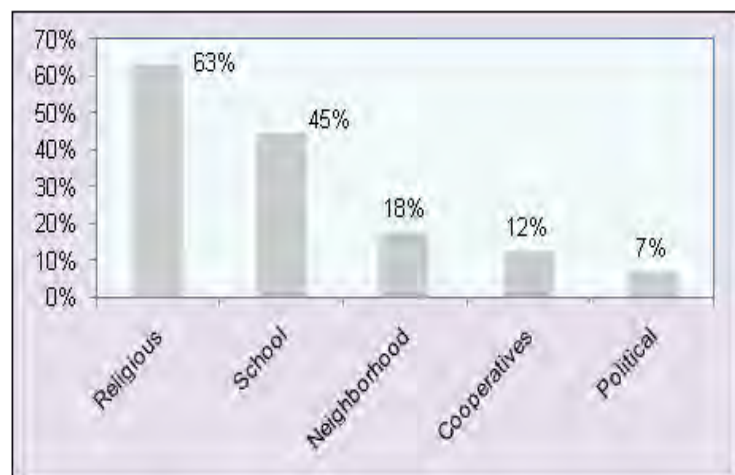
Figure 13: Types of Business in the Residence



n = 404, Missing = 0

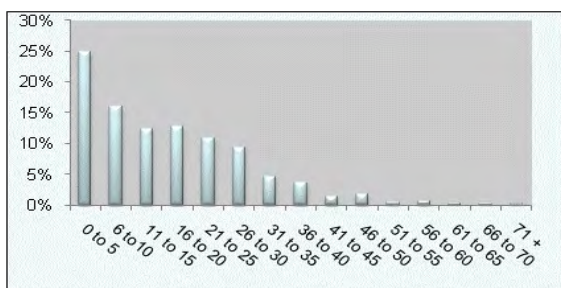
Although clearly business minded, people living in the popular neighborhoods are overwhelmingly oriented not toward trade unions and political organizations, but to religions and educational institutions: 63% of respondents reported attending religious meetings and 45% attend meetings associated with schools compared to 18% with community groups, 12% with cooperatives, and a mere 7% who attend political meetings.

Figure 14: Organizational Affiliation



n =1,928, Missing = 17

Figure 15: Years Living in the Neighborhood



n =1,928, Missing = 34

The length of time that respondents have lived in the neighborhood reveals a notable degree of stability. Port-au-Prince is young. Today a city of 2 million, in 1950 it had a population of less than 150,000 residents. At that time the sprawling neighborhoods of cement and tin that we see today were mostly sugar cane fields and thickets. But despite its youth, residential stability in the city is remarkable. The average respondent reported having lived in the same neighborhood for 17 years--twice the 8 year

average for United States citizens (Figure 15). Moreover, the fact that we know, apart from the survey, that many residences are newly arrived in-migrants from the countryside suggests that urban residential stability is even greater than it appears. This observation offers insight not just with respect to geographic mobility, it also tells us something about social mobility in Port-au-Prince. There has long been a trend in the city for people to move up the hill toward Petion Ville, and in the past two decades even higher still to La Boule, Thomassin and Kenskoff. Yet, among those left behind residential stability is high and by corollary social and economic mobility low.<sup>1</sup>

Reflecting geographic stability, people in the neighborhoods make investments in permanent cement housing and they seek to own the homes: 100% have cement floors (Figure 17), 99% have cement walls (Figure 16), and 62% have cement roofs (Figure 18). The typical building is one story (Figure 20) has two to four rooms (Figure 19). Fully 70% of those interviewed believe they own the house and 60% believe they own the land (see Figure 21 on the following page).

Figure 16: Wall Construction

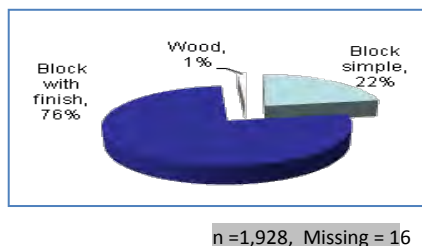


Figure 19: Number of Rooms

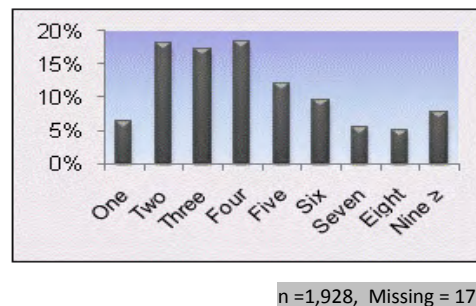


Figure 17: Floor Construction

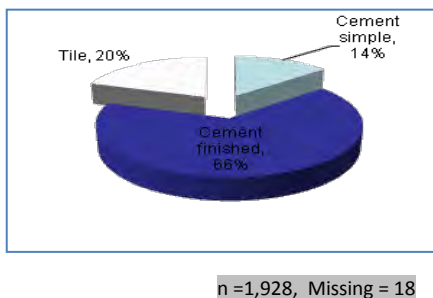


Figure 20: Number of Stories

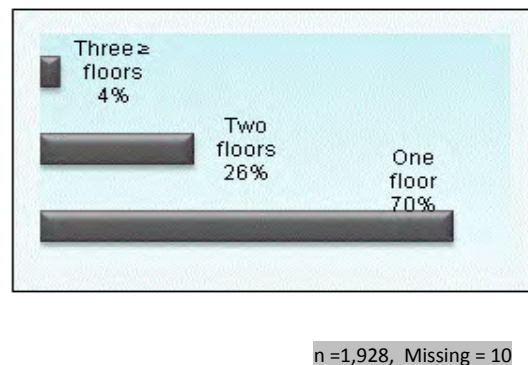
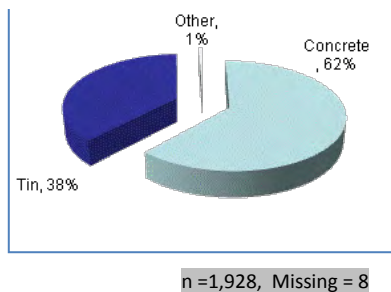


Figure 18: Roof Construction



## Text Box C: Land Insecurity?

"Formality/informality is often confused with security/insecurity."  
Laksa and El-Mikawy 2009

Haitian history is marked by what can be conceptualized as a long class war of attrition with the battle lines drawn at the trench between formal and informal land tenure systems. It began with thirteen years of bloody struggle for independence during rich white planters, rich black and mulatto planters, poor whites and a large block of miserable and fed-up rebelling slaves fought one another and occasionally joined forces to defeat armies from all three of Europe's major colonial powers (France, Britain, and Spain). But for many them it was not, as has often been portrayed, a unidirectional charge for the light of freedom at the end of a dark tunnel of repression. For most of the revolutionary years, most of the slaves stayed on the plantations. Somewhat bewildered, they tended crops and waited to see what would come of it all. They watched as planters fled, came back, fled again, and eventually didn't return at all. In the end they gained far more than the original rebels had ever dreamed they could obtain: Freedom and access to agricultural land to produce food crops (the original rebel leaders had offered to surrender in exchange for an extra day of freedom to tend their food plots and trade in markets). This is not to downplay the military role of the ex-slaves. It was an unquestionable victory fought and won in no small part by them. But, it was not, so to speak, black and white. It was the victory of not one but two revolutions: Two revolutions intrinsically opposed to one another. On the one hand were the masses of ex slaves who wanted nothing more than to be free to work small garden plots and to sell their foodstuffs and handcrafted goods in open the air markets. On the other hand were the mulattoes and black elite who had been free before the revolution and who wanted nothing more than be free and equal to the white planters so to pursue prosperity, including forcing the masses back to the plantations, if not as slaves, then as serfs (as set down in the Rural Code of 1825). But after independence the former slaves were loath to return to being workers on someone else's property. Ernest and bloody attempts to take land away from them and force them to work ultimately failed. To generate tax revenue for the ailing State, Haitian leaders were increasingly compelled to give land to soldiers and eventually to those peons who had not already seized land. By 1842 there was no turning back. The world's greatest plantation economy was becoming a country dominated by small peasant plots, a country that was to come to have as equitable a distribution of land as any on earth. Struggles and frequent warfare between the peasants—who had informal title to the land—and the foreign governments and elites—who used the formal legal system to make timber and mining concessions to multinational corporations—punctuated the next 100 years of history. The informal system prevailed. A thriving land market of small parcels evolved. The 1971 census found that there were 616,700 farms in Haiti (pop 4.1 million). Average holding was 1.4 hectares. Holdings typically consisted of several plots. The largest farms made up only 3 percent of the total number and comprised less than 20 percent of the total land. The 1950 census found that 85 percent of farmers owned their land (see Haggerty 1989). As urbanization took hold and rural immigrants increasingly moved into Port-au-Prince the process was repeated. Like their revolutionary forbearers, custodians of land owned by people who had fled into political asylum or gone to work overseas soon began to sell access to the land to rural in-migrants. Places like Ravine Pentad and Martisant—subjects of the BARR survey—began this way. With political turmoil that followed the fall of the 1986 Duvalier dictatorship, the process accelerated. A striking feature of the process is the large number of people who were able to own their own home and the permanence and sense of security with which the informal system is imbued. The BARR surveyors found that 70% of respondents claimed to own the house, 60% claimed to own the land, 93% of these had some kind of paper (see Figure 21). Only 28% of owners felt insecure about their property rights (see Figure 22).<sup>ii</sup>

Figure 21 House & Land Ownership

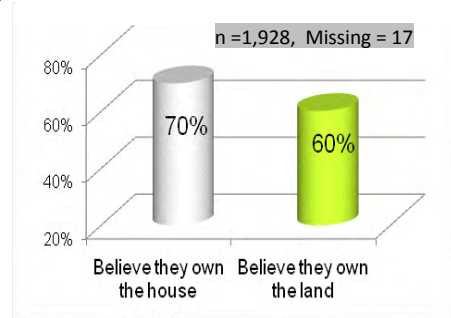
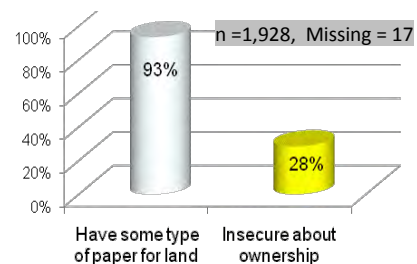


Figure 22: Land tenure Security

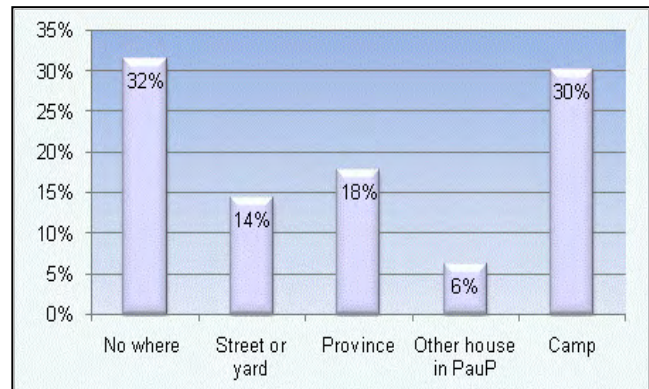


## 4 The earthquake

### 4.1 Where People Fled

When the earthquake struck, much of the Port-au-Prince population evacuated their cement homes. Spontaneous tent cities appeared throughout the metropolitan areas. Many of those who did not move to camps slept in the street, yards, or left the city altogether, returning to rural homesteads of origin.

Figure 23: Where People Fled (BARR)

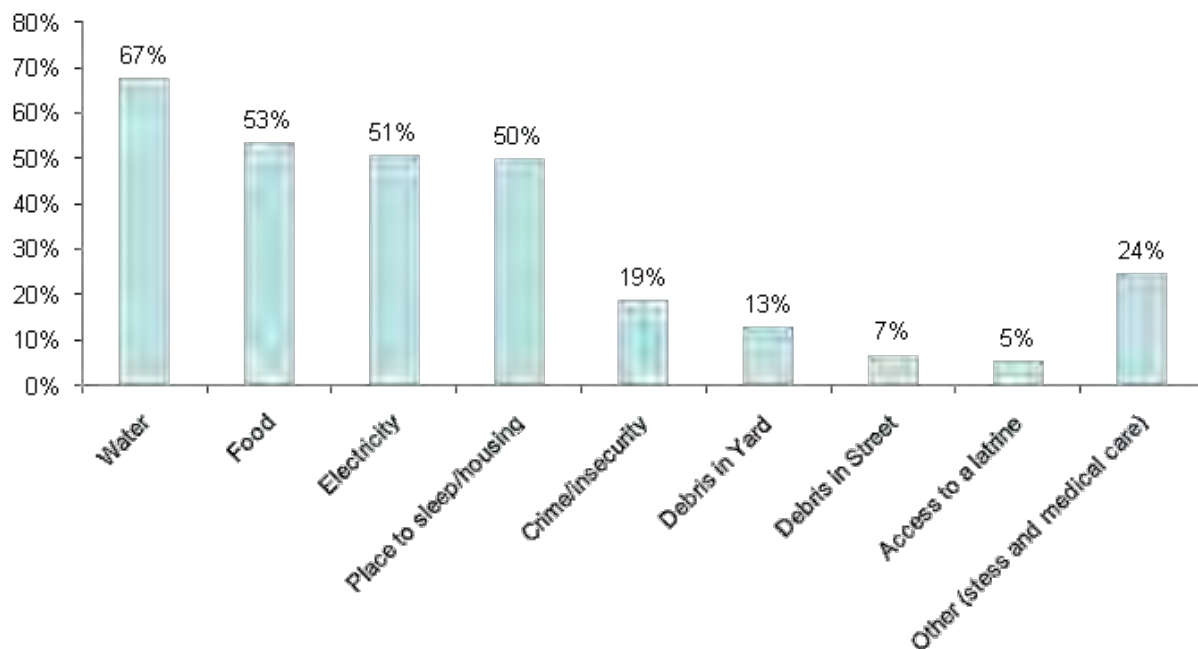


n =1,928, Missing = 26

### 4.2 Needs in the Weeks following the Earthquake

BARR respondents reported their most immediate problems in the weeks that followed the earthquake were water, food, electricity, and a place to sleep. Twenty-four percent also mentioned "other" by which almost all meant stress and medical care. Crime, debris in the streets and yards, and latrines were cited much less frequently (Figure 24)

Figure 24: Most Acute Problems after the Earthquake



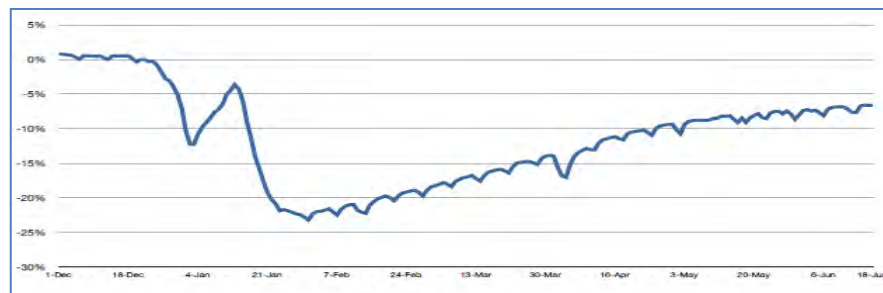
n =1,928, Missing = 2



### 4.3 Re-occupancy Rate

Knowledge regarding the precise number of people who stayed home, went to the province, to the camps or to the street as well when they returned home was, before the BARR survey, almost entirely speculative. The best, and for the most part only estimates for any movements came from United Nations OCHA, which estimated migration from Port-au-Prince to the provinces in the month following the earthquake; and Colombia University and Karolinska Institute's analysis of Digicel cellular phone data for the 1<sup>st</sup> of December 2009 until June 11<sup>th</sup> 2011 (Figure 25). OCHA reported 511,405 people migrating to the provinces; the Digicel data indicated 570,000 people had fled to the provinces. Both figures support the BARR estimate of 525,000 extrapolated from the total sample (the range of the BARR estimate is 465,246 to 584,754 at  $p < .01$ ). The Digicel data also corroborates the reverse flow as migrants began returning to Port-au-Prince at the beginning of February 2011 (Figure 26).<sup>iii</sup>

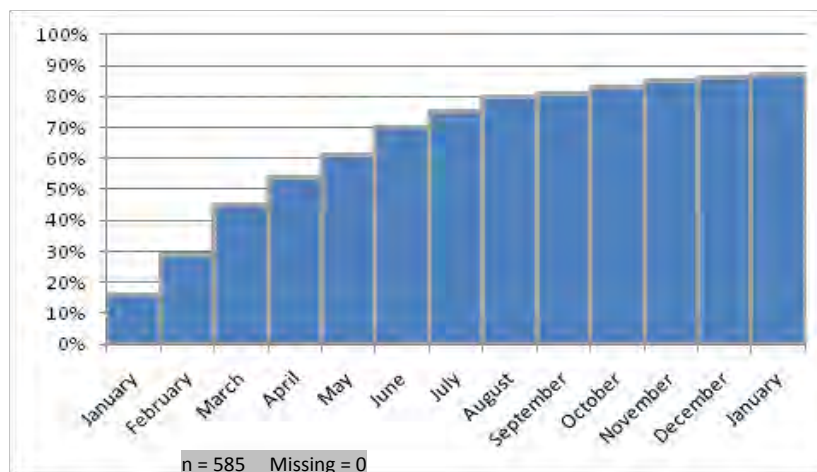
Figure 25: Digicel Data: Port-au-Prince to the Provinces Migration Dec 2010 to June 2011



Source: Colombia University and Karolinska Institute, May and June 2010

BARR data shows people returning to their homes—from all destinations—as early as January. And echoing the Digicel findings; by June more than half were back home.

Figure 26: Returns by Month (BARR)



[Note: Based on 2nd half of BARR: N = 925; of which 585 reported were returnees who had left home]

## Text Box D: Why People Went to Camps; and Why they Left?

When the earthquake struck 68% of people living in popular neighborhoods left their homes: 6% went to the homes of others, 14% moved into the yard or the street in front of their home, 18% went to the provinces, and 30% concentrated in camps with dozens, hundreds and sometimes thousands of other people. Perhaps for the workers in relief organizations that were delivering food, water, tarps, tents, setting up latrines, and giving medical care, it may have been obvious why so many people went to camps: they were in desperate need of help. But to get a sense of the order of priorities, the BARR survey asked people to give us the top three reasons why they went to camps: 88% said that they went because they were afraid of another earthquake. Less than half mentioned services, rubble, or crime, and 16% or less specifically mentioned water, food, electricity or access to latrines.

Figure 27: The Top Three Reasons People Gave for Going to Camps

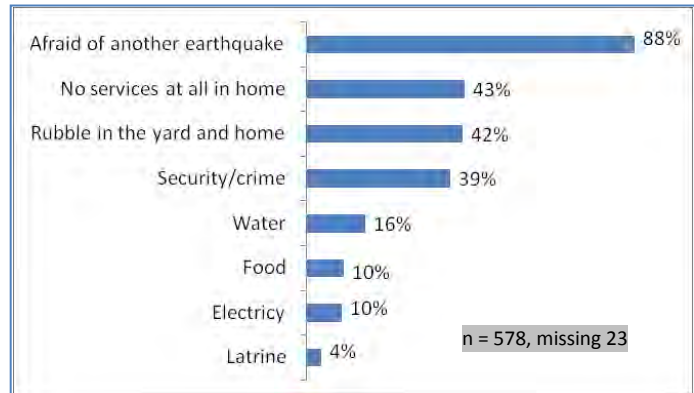
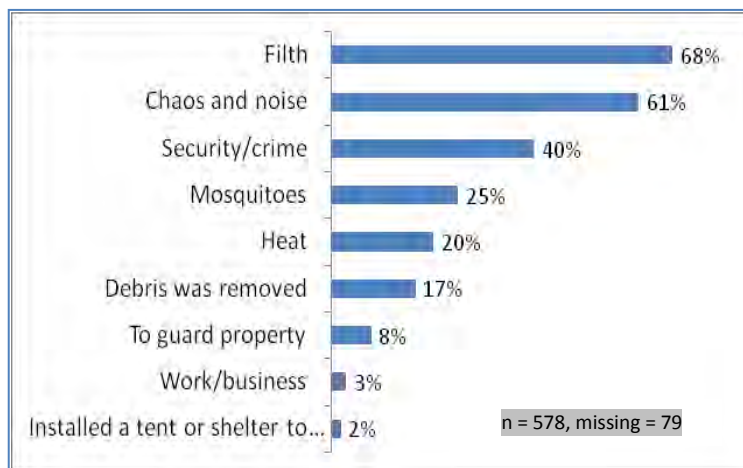


Figure 28: The Top Three Reasons that People gave for Leaving Camps

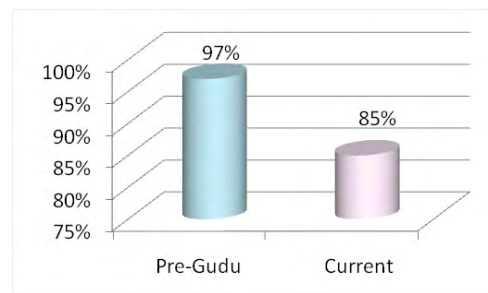


We also asked people *why* they left the camps. Over 60% mentioned filth, chaos and noise. Crime and insecurity--by which many people meant not so much crime as conflict with neighbors--was third. Mosquitoes were an issue as was heat. As Kit Miyamoto said, "People don't want to live in these tents."

#### 4.4 Current Occupancy Levels

By the time of the BARR survey (December 17<sup>th</sup> 2010 until January 29<sup>th</sup> 2011), home occupancy rates approached those of pre-earthquake levels. The way BARR surveyors measured home occupancy was if the family was sleeping on the property at nights. This could mean that they did not sleep in the house but rather in a tent or improvised shelter erected on the property. It is, however, clear from the scarcity of tents and improvised shelters in yards that the vast bulk of these people are in fact living in the homes. Figure 29 shows a total occupancy rate of 85% compared to a residence occupancy rate of 97% before the earthquake.

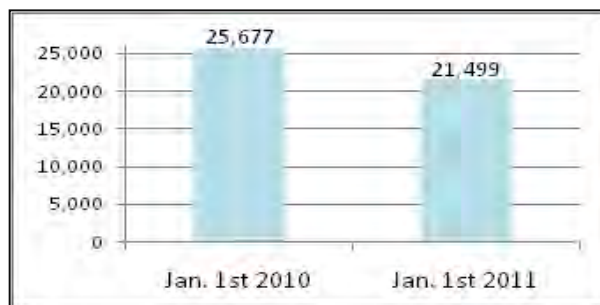
Figure 29:  
Pre-Earthquake vs Current Occupancy Levels



n = 5,158 Missing = 19

Figure 30:

Pre The earthquake vs Current BARR

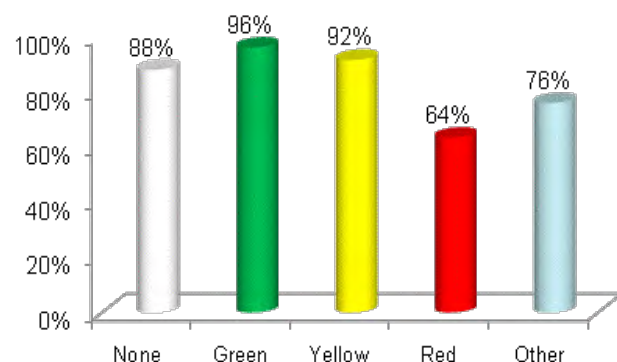


n = 5,110 Missing = 48

The inverse of the re-occupancy rate is that 16% of the total residents in the BARR sample have not returned home (Figure 30 left). Subtracting those that died as a result of the earthquake (2.2%: see section on Demography), 13.8% of people have not returned.

The most useful way to summarize and understand re-occupancy rates in light of the destruction of buildings is residences occupied per color coded buildings. Figure 31 on the right illustrates that at 96% occupation rate; Green houses are only one percent short of pre-earthquake occupation level of 97%; Yellow houses are 5% sort of pre-occupation levels; and striking revelation that should cause decision makers to pause and reconsider the direction and priorities of the reconstruction effort is that 64% of Red buildings have been re-occupied.

Figure 31:  
Current Occupancy Levels per Residence per  
MTPTC Color Code

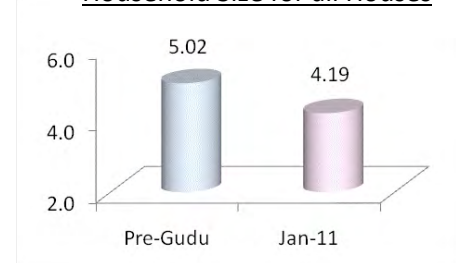


n = 5,158 Missing = 23

## Text Box E: Changes in Household Size

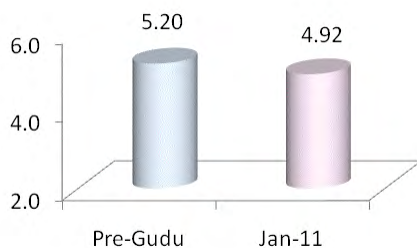
BARR found that the average household size before the earthquake was 5.2 persons per household for all homes—including those not occupied—and 5.02 excluding the 3% of homes that were empty. This is typical for what social researchers find throughout the island—in both Haiti and the Dominican Republic, and in both rural and urban areas. Average household size for all homes—including those that had no residents living in them—fell from pre-quake level of 5.02 to a January 2011 level of 4.19 persons per residence (Figure 32).

Figure 32:  
Household Size for all Houses



n = 5158 Missing = 23

Figure 33: Household Size with  
Unoccupied and Destroyed  
Houses Excluded



n = 5158 Missing = 23

The above calculation includes unoccupied residences. But if we look at the issue in terms of real persons per household, meaning eliminating all unoccupied households—both before the earthquake and in the BARR sample—the number of persons per occupied household went from was 5.2 to 4.9 at the time of the BARR survey (Figure 33).

Another way to think about this is in terms of decline in household size. Figure 34 shows the overall decline of .83 persons per household, or 16.5%, for all houses totaled; and .28 persons or 5.4%, per household for occupied houses. These absentees can be thought of as those members who have not returned home or who died in the earthquake (Figure 35).

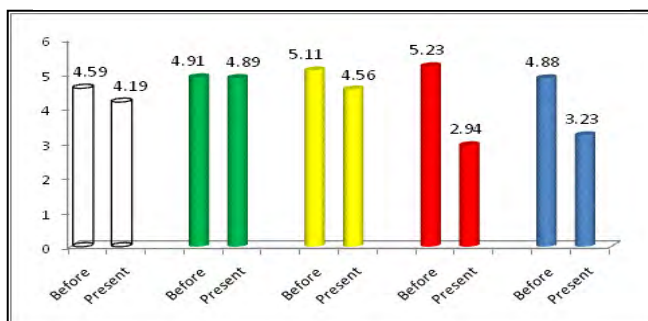
Figure 34: Change in Household Size



n = 5158 Missing = 23

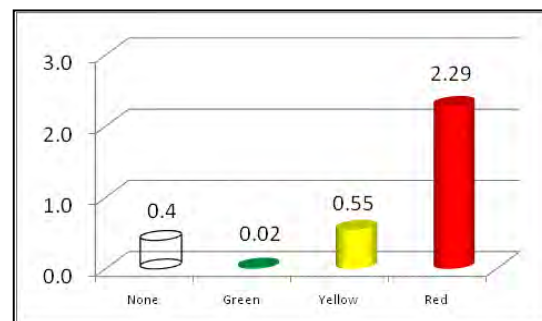
With the preceding in mind, a tool that we use later in this report to gain insight into demographic trends that came with and after the earthquake is to examine changes in household sizes for color coded categories (or more specifically, categorized degrees of earthquake impacted homes).

Figure 35: Pre-The earthquake vs. Present  
Household Size per Household Color Category



n = 5158 Missing = 23

Figure 36: Difference in Pre-The earthquake  
vs. Present Household Size



n = 5158 Missing = 23

## 5 Rubble

Among the most significant contributions the international community has made to home returns is removing rubble from the street, making it possible for many residents to remove rubble from their yards. Put another way, many people could remove rubble from their yards and dispose of it in the street only if someone was carting the rubble away for them. In testing this hypothesis, BARR focused only on returns to habitable buildings—Green and Yellow buildings. Red buildings were omitted from the study because, under MTPTC guidelines, they are unsafe for habitation (see Text Box A).

BARR found that for many residents rubble was indeed an obstacle to returning home. Figure 37 illustrates that 39% of all the Green and Yellow buildings had or still have at least some rubble in their yard. Over half of those respondents who had already removed rubble (63%) qualified the amount as having been ~~very significant~~ to ~~severe~~ (Figure 38 below). For those cases where rubble remained in the yard, surveyors described 59% of cases as ~~very significant~~ to ~~severe~~ (Figure 39 below). Corroborating the importance of removing Rubble, 55% of those respondents who had Rubble in their yards said that they could not have returned home if the rubble was not first removed (Figure 40 below); 58% of respondents reported that they could only remove the rubble from the yard if someone was removing it from the street (ibid).

Figure 37: Percentage of Residences that Had or Still Have Rubble in the Yard

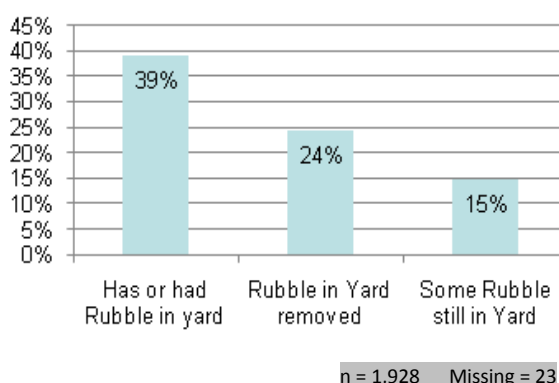


Figure 38: Residences that Had Rubble in the Yard

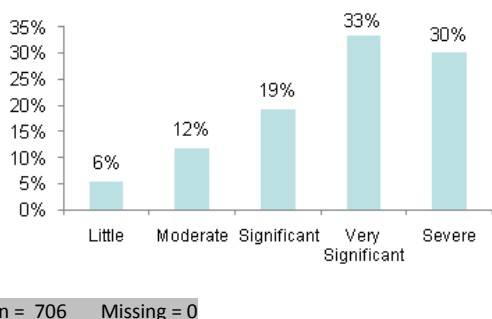


Figure 39: Residences that Still Have Rubble in the Yard

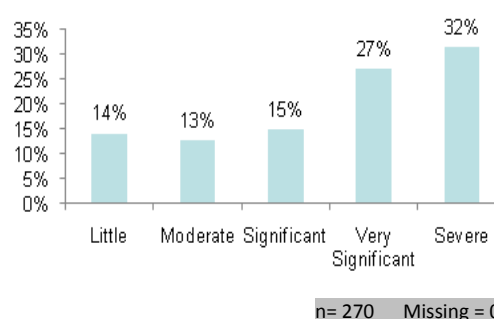
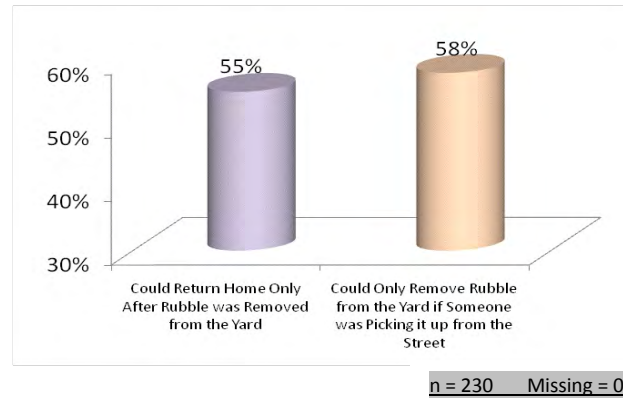


Figure 40: Rubble as an Obstacle

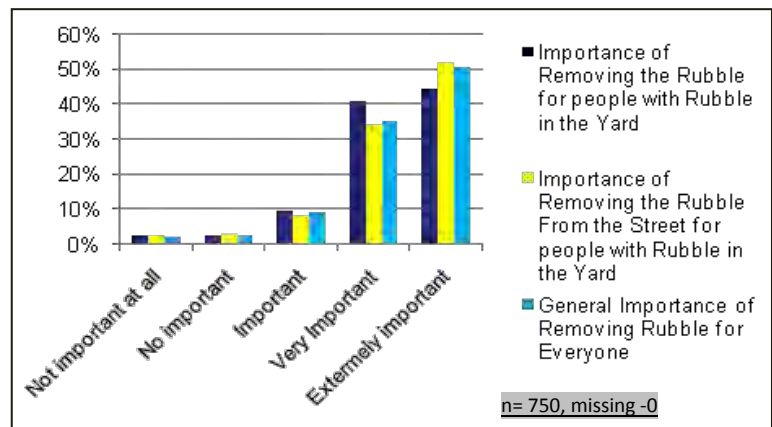


[Note: Based on 2nd half of BARR: N = 925, of which 230 have or had rubble in the yard]

## 5.1 Importance of Removal

Congruent with Rubble being an obstacle to home returns, respondents did indeed see rubble removal as an important endeavor. On a scale of one to five, approximately one half of all respondents qualified Rubble Removal from the yard, and from the street as “very important” to “extremely important” to them and to the other residents of the household; an equivalent proportion of respondents said the same regarding the importance of Rubble removal to the general population.

Figure 41: Opinions on the Importance of Rubble Removal

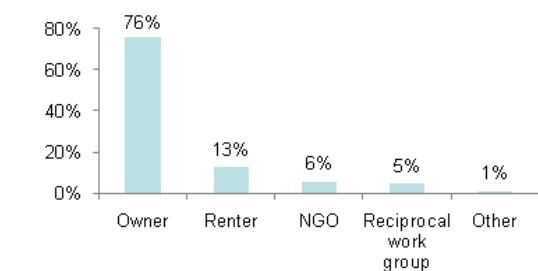




## 5.2 Who Removed the Rubble

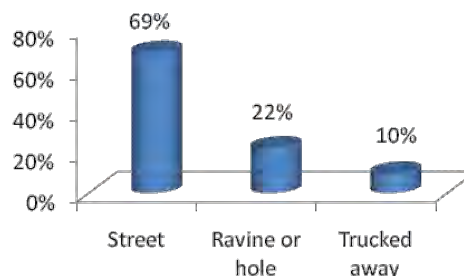
In 76% of the cases it was the owner who principally took on the task of removing rubble from the yards (Figure 42); for the 452 (23% of the total respondents) who removed rubble from their yard, the average cost was US \$323.59. The importance of removing Rubble from the street is echoed in Figure 43 in which it can be seen that 69% of all respondents who had to remove rubble from their yard disposed of it in the street.

Figure 42: Who Cleared Rubble from Yard



n = 750 Missing = 52

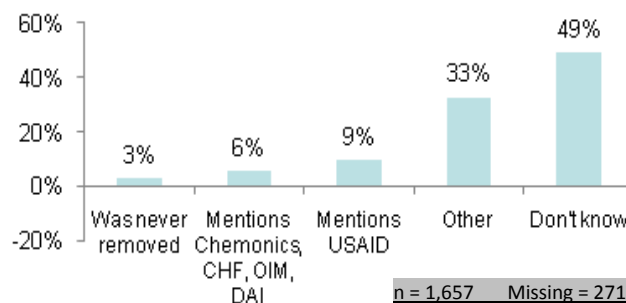
Figure 43: Where Rubble was Disposed



n = 750 Missing = 34

Regarding who people *thought* removed rubble from the street: Figure 44 illustrates that half (49%) did not know; 33% chose “other,” by which they meant other NGOs that have had a significant presence in rubble removal—such as J/P—or the government’s CNE. Only 15% mentioned USAID or one of the USAID partners in rubble clearing programs (Chemonics, CHF, OIM, and DAI).

Figure 44: What Organization People Believed Cleared Street Rubble



n = 1,657 Missing = 271

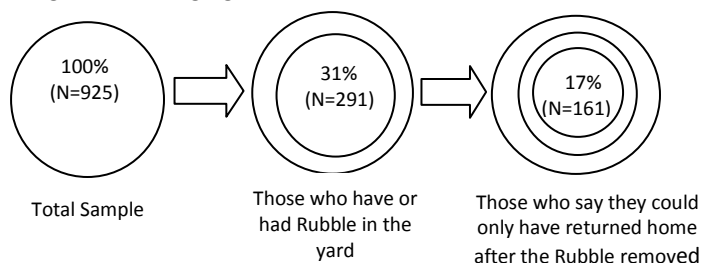
## 5.3 The Measurable Impact of Rubble Removal on Rate of Home Returns

To what degree did USAID and other Rubble Removal programs aid residents of Green and Yellow houses return home?

The answer comes down to this: USAID and agencies engaged in Rubble Removal can take credit for having made home return possible only for those residents who meet the following criteria,

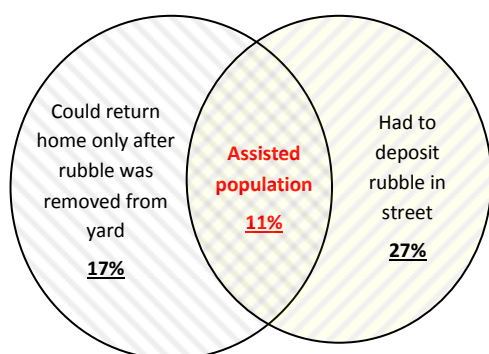
(A) Could only return home after the rubble and debris in the yard had been removed: 17% of respondents fell into this

(A) Figure 45: Proportion of Residents who Could only Return After Rubble had been Removed



category (see Figure 45).<sup>iv</sup>

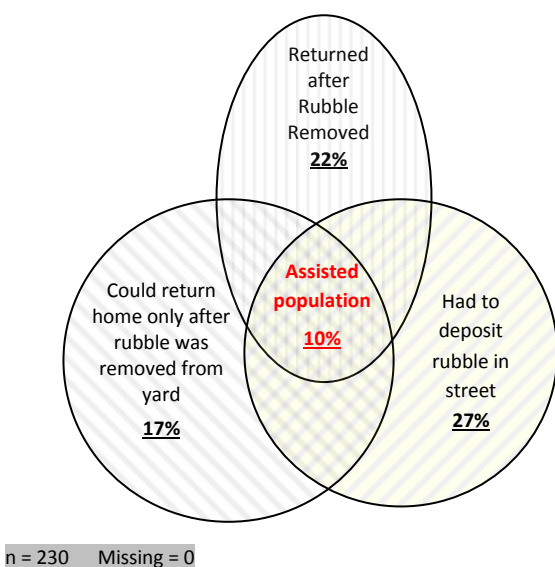
**(B) Figure 46: Elimination of People who Did Not Dispose of Rubble in the Street**  
(percentages are for total N=1,928)



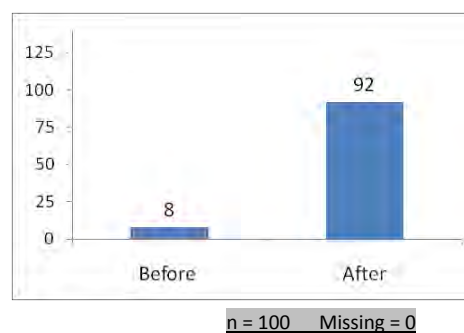
B) Did not cart Rubble off by truck or dispose of it in ravines, holes, and river beds (69% of 750 respondents who had to dispose of rubble). When we remove these people from the pool of “assisted population,” the proportion of people who could not otherwise have returned home, falls to 11 percent of total respondents. Figure 46 illustrates the relationship with a Ven Diagram.

(C) Those people who said that Rubble had to be removed before they could return home but in fact returned home before the rubble was removed must be eliminated from the yard. Put another way, no matter what people said, we can only take credit for people who did in fact return home only after Rubble was removed from their yard. In Figure 47 we see that 90% of those in Figure 46 qualify (see also Figure 48). Of total respondents, 10% qualify. Using proportional probability we can extrapolate this to the larger population and calculate the c.i. for this estimate (see following page).

**(C) Figure 47: Elimination of People Who Really came Home Before Rubble was Removed**



**Figure 48: Those Who Meet all Criteria of being “Assisted”: Came Home After vs Before Rubble Removed**



Proportion of people who meet all criteria

$$\frac{92}{925} = 10\%$$



## 5.4 Summary

- People see Rubble Removal as an Important activity
- USAID and organizations that removed rubble from the streets can claim to have aided those people who meet the following criteria,
  - could not return home if the rubble was not removed,
  - could not have removed rubble from the yard if it was not removed from the street,
  - in fact did not return home until after the rubble was removed
- Using the BARR data to calculate the estimated Population  $92/925 =$  (Red houses were subtracted from the estimated total residences) =

10%  $\pm$  2.1%

= 34,461 to 55,845 resident units

( $p < .01$ )

## Text Box F: How Much Rubble is out there?

In February 2010 the US Army Corps of Engineers (USACE) used satellite imagery to estimate that there was 20 to 25 million cubic yards of rubble in Port-au-Prince. More recently UNOPS estimated that there was less than half that figure: 10.7 million cubic meters of rubble. Even more recently Miyamoto and Gilani brought the estimate of total rubble down to 8.8 million cubic meters. The way they did this was by calculating total rubble based on red houses: Because red houses are the rubble.

It is assumed that all red-tagged buildings, regardless of the damage level, would need to be demolished, because currently there is no technical platform by MTPTC to repair red-tagged structures”.

Now, unless someone is going to remove people from the 64% of Red buildings that have been re-occupied, we can cut that figure by two thirds, to 3.168 million cubic meters.

(Unoccupied Red Buildings) x (Total Rubble from all Red buildings) = Real Amount of Rubble

$$(.36 \text{ occupied buildings}) \times (8.8 \text{ million M}^3) = 3.168 \text{ million M}^3$$

### How Miyamoto and Gilani calculated Total Rubble

The researchers calculated the average amount of rubble produced per building floor; and taking the upper bound of their estimate ( $p < .025$ ) came up with a liberal figure of  $0.805 \text{ m}^3$  per  $\text{m}^2$  of building footprint per floor

They then calculated the percentage of red buildings that MTPTC had found in their evaluations; the number of floors that red buildings had; the average square meters per floor; and finally generalized these calculations to the estimated population of 410,000 affected buildings to come up with a maximum amount of rubble (note that BARR used the population estimate for earthquake effected area to calculate a total of 424,328 houses, slightly more than Miyamota calculated).

Table 1: Damage intensity red-tagged buildings used to make calculations

<u>Damage intensity</u>	<u>No. of buildings</u>
Null data	5,488
0%	109
0%–1%	5,635
1%–10%	209
10%–30%	743
30%–60%	4,931
60%–100%	18,381
100%	20,650
Total	56,146

Table 2: Stories red-tagged buildings used to make calculations

<u>Stories</u>	<u>Buildings</u>	<u>No. of floors</u>
1	42,242	42,242
2	10,765	21,530
3	2,573	7,719
4+	518	2,590
Total	56,098	74,081

Source: H. Kit Miyamoto, Ph.D., S.E., and Amir Gilani, Ph.D.,

S.E. Miyamoto International

## 6 MTPTC Structural Evaluations

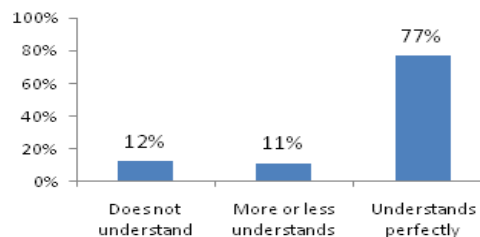
Most observers consider MTPTC structural evaluations of buildings in greater Port-au-Prince among the most successful post earthquake endeavors contributing to home returns. Structural evaluations were thought to have reassured people that their homes were safe and encouraged them to return. BARR collected data to test this hypothesis. We found no evidence to support it.

### 6.1 Opinions and Understanding of the Evaluations

BARR found that respondents overwhelmingly understood what the evaluation color codes meant (77%: Figure 49); they understood the repairs that needed to be done (74% Figure 50); they thought the evaluations were well done (74% no figure); more than half said that the evaluations did encourage them to return home (53% no figure) and, indeed, MTPTC evaluations were occurring precisely during that period when people were returning home (Figure 51).

But as seen on the following pages, the image of MTPTC encouraging people to return home is difficult to corroborate. Residents who said the evaluations encouraged them to return home did not in fact return home after the evaluations any more frequently than before; more ominously, people who live in condemned houses appear to have ignored the evaluations: we found 85% of yellow and 64% of red buildings re-occupied.

Figure 49: Respondents who Understood what Color Codes Meant



n = 1,928 Missing = 482

Figure 50: Respondents who Understood what Repairs were Needed

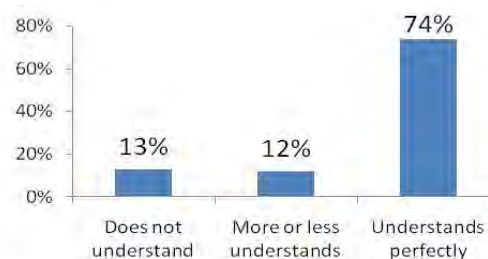
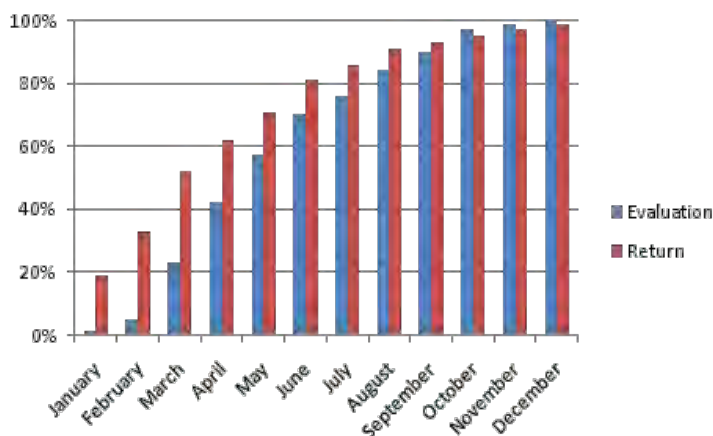


Figure 51: Months that Evaluations were Being Conducted Compared with Months when People were Returning Home

n = 1,928 Missing = 183



n = 1,928 Missing = 560  
(for evaluations)

## 6.2 Timing of Home Return vs Evaluations

When we examined whether people returned home before or after their residential building was evaluated, we found that overall there was no significant difference; indeed more people returned home before rather than after the evaluations (Figure 52).

When we took it further and compared those who said that evaluations did or did not encourage them to return home with those who actually came home before versus after the evaluations, the only significance was that the majority of people who said that the evaluations did not encourage them to turn home in fact returned home before the evaluations. In other words, most people who said the evaluations did not encourage them to return home were telling the truth, i.e. they in fact tended not to have returned home before hand. The same cannot be said for those who said that evaluations did encourage them to return home (see Figures 53 and 54).

Figure 52: Percent of People who Return Home Before vs. After Evaluations

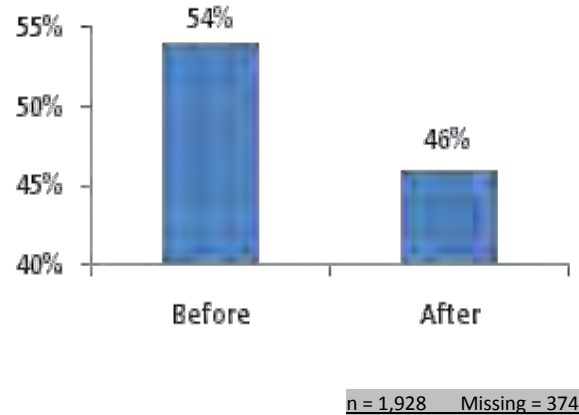
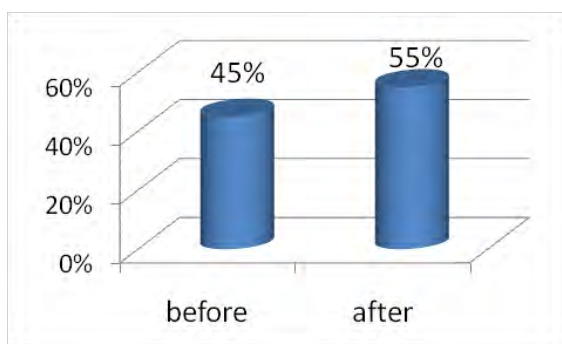
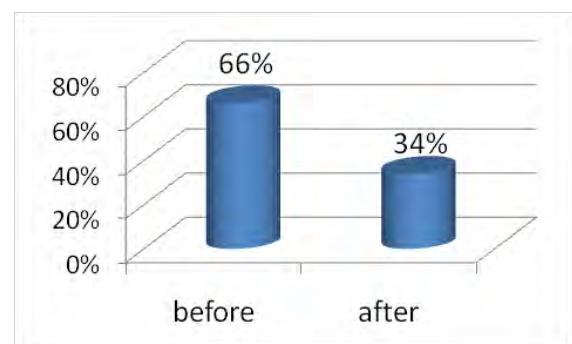


Figure 53: Residents who say that Evaluations Did Encourage them to Return Home



n = 1,389 Missing = 539

Figure 54: Residents who say that Evaluations Did Not Encourage them to Return Home

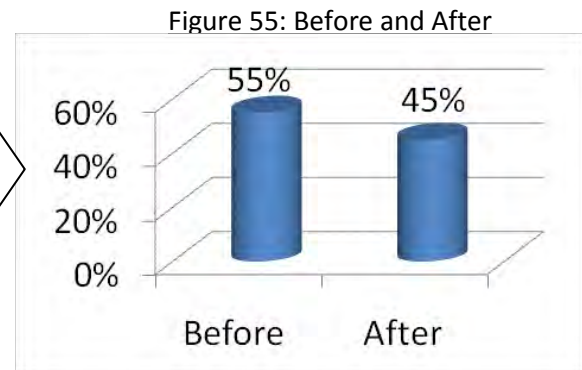
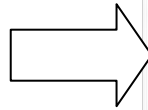


[note that most of the 539 respondents who are "missing" were indifferent]

To make the point unequivocal, we controlled for whether people were accurately reporting on their behavior by introducing the question, “would you have returned home when you did if the house had *not* been evaluated.” What we found was that respondent behavior was essentially random, meaning there was no relationship between people saying that they were encouraged to return home and when they returned. Indeed, although not statistically significant, more people who said they would not have returned at that time in fact returned before the house was evaluated (Figure 55).

Before and After Evaluation Returns  
For Respondents who said,

- a) evaluations encouraged them to return home,
- b) they say they would not otherwise have returned at that time (from 2<sup>nd</sup> round of BARR)



n = 1,925, Missing = 374; Note that most of those “missing” did not know

## Text Box G: Red House Danger

As of the writing of this report, the Webpage for PADF--USAID's partner in the structural evaluations—includes a quote from Dr Miyamoto speaking on October 27th to the Organization of American States about prospects for yellow house repairs.

"The math adds up... 800,000 people could leave the camps and go to repaired homes."

We now know that most people already had returned home, whether the homes were repaired or not: 85% of Yellow buildings are occupied; 64% of

Red buildings are occupied.

What does that mean? It means that as many as 629,280 people (138,000 residential groups or families) are living in 101,499 homes that may collapse in foul weather or in the event of another tremor. That's yellow buildings. For Red buildings it means that 217,107,000 people (73,846 residential groups) are living in 54,314 buildings that might collapse at any moment.\* Discussing the growing problem of people returning to unsafe yellow and red buildings, Dr. Miyamoto emphasized the gravity of the situation,

Occupied yellow and red houses are extremely dangerous since many are a collapse hazard. People occupy these houses despite communications and warnings from MTPTC engineers since they have nowhere to go but the camps. People do not want to stay in these tents. Security is poor and they are exposed to diseases. I see little children sleeping next to the heavily cracked walls every day."

-Kit Miyamoto, PhD, February 28<sup>th</sup>, 2011, personal communication

One thing that the figures should not mean is that MTPTC- UN-PADF- Miyamoto undertaking has been a failure. A better way to look at it is that we haven't devoted enough resources to fixing the yellow house and dealing with the Red house problem. Of the 99,043 or more yellow houses, funding to fix only 4,000 has been allocated. The Solutions according to Dr. Miyamoto,

1. Repair yellow houses as soon and as many as possible before next hurricane season. USAID/OFDA Repair Pilot Program has proved the efficiency of this strategy. The program can be executed in 24 months for all yellow houses.
2. Develop Red house demolition and reconstruction program. Majority of red houses are located inside of the block where power equipments cannot be reached. Manual demolition with engineering supervision is required. We are developing new small residential house plans using locally available materials with MTPTC. Construction cost and schedule is very effective. People are not in favor of T shelters because of lack of security.

\* The calculation is: (total number of buildings in color category) x (percentage of buildings in color category that are occupied) x (average residents per unit for that occupied color category) x (average residences per building) = population for color code,  
e.g. Red building population: (84,866)(.64)(2.94)( 1.36) =217,107]

	MTPTC		Total for pop= 3 million			% Occupied	Total Occupied (for 3 million)			
	Buildings	% of total	Buildings	Residence	Population		Buildings	Residences	Residents/unit	Population
Green	205,539	54%	229,137	311,538	1,620,000	96%	219,972	299,077	4.89	1,462,886
Yellow	99,043	26%	110,325	150,000	780,000	92%	101,499	138,000	4.56	629,280
Red	77,674	20%	84,866	115,385	600,000	64%	54,314	73,846	2.94	217,107
Total	382,256	100%	424,328	576,923	3,000,000	85%	375,785	510,923		

Figure 56: Red House Ravine Pentad

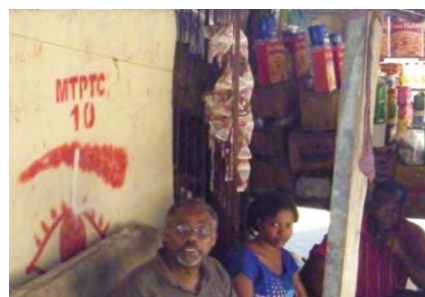
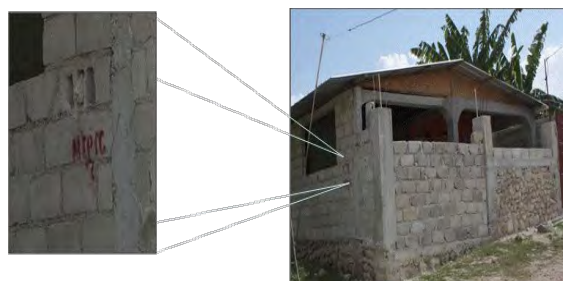


Figure 57: Red house being repaired  
Mayi Gate



# 7 Demographics

In analyzing re-occupancy rates there remains the question, where are 16% of people who have not returned home? There are several possibilities, the important of which were: a) they could be dead, b) they could be in the countryside, c) they could be in camps, or d) they could be in other houses. BARR survey data allows us to answer the question as well as reconstruct demographic events beginning with the earthquake.

Specifically, we asked people asked how many residents in the building died, where people went after the earthquake (as mention in Section 3), and the current location of living people. In cases where the entire residence or building was absent, we asked neighbors. With these data we are able to calculate the total people killed as a result of the earthquake, the total people who went to camps after the earthquake, and the current total living absentees from earthquake impacted houses as well as the whereabouts of these absentees. We got confidence interval midpoints of 65,575 killed; 258,085 IDPs from earthquake impacted houses and 42,608 of the later in Camps (Figure 58 and Figure 59; and take note that these figures, while they appear exact, are midpoints in an estimated range). The data is a far cry from that of GOH and OIM.

## 7.1 Estimating the Death Toll

The best place to begin illustrating how we arrived at the calculations is with the number of people killed in the earthquake, a figure necessary in order to arrive at the other absentee estimates (i.e. deaths must be subtracted from the overall absentees). First, we cannot simply multiply the percentage deaths we found in BARR by the total Port-au-Prince population because the sample was selected from lower Port-au-Prince and hence we have More Red and Yellow color coded buildings and fewer Green than MTPTC found (for example,

Figure 58: Estimates for Death Toll, IDPs, and Legitimate IDPs in Camps

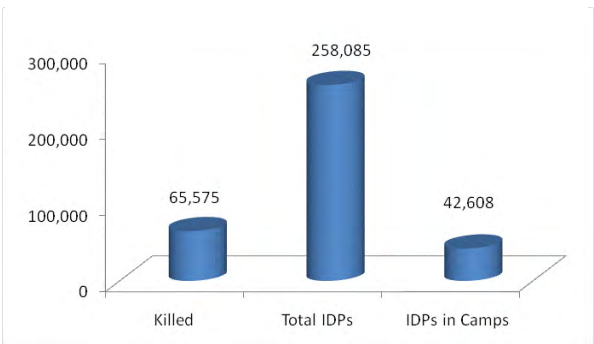


Figure 59: Comparison of BARR Estimates to GOH and UN Estimates

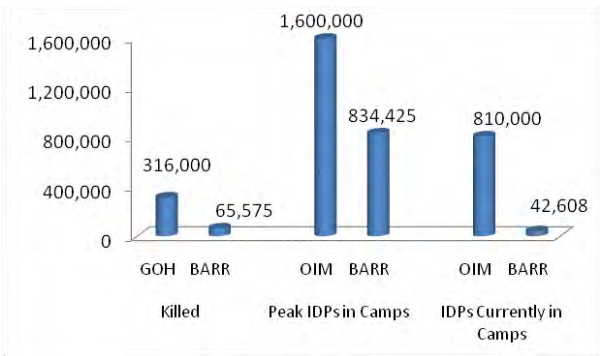
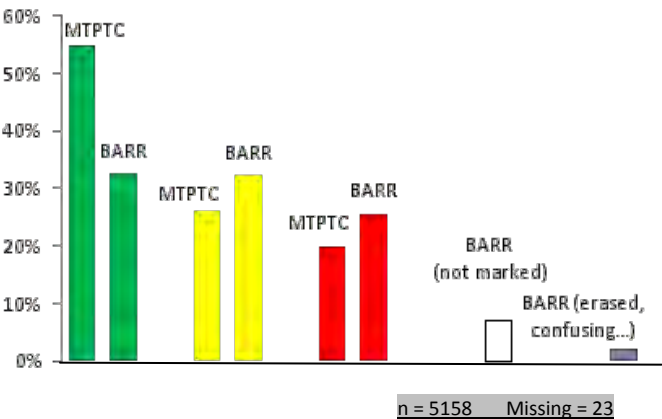
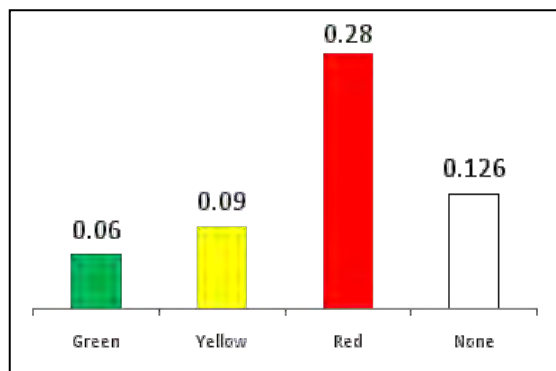


Figure 60: Comparison of BARR and MTPTC Percentages of Color Coded Buildings



accounting for 7% missed houses, MTPTC yielded 18% Red buildings for the entire Port-au-Prince region while BARR had 26% red buildings; see Figure 60)

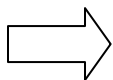
Figure 61: Average Deaths  
per Residence and per Color Code



What we can do is calculate the deaths per residence for color coded categories (Figure 61). We can then use this figure to multiply by the MTPTC findings for greater Port-au-Prince (qualifying it by the high death rate we found for buildings that MTPTC did not evaluate) and then adopting the UN conclusion that the area impacted by the earthquake had a population of 3 million (UN/Miyamota); all using the 5.2 person average residence size found in BARR and consistently found in large surveys throughout the island (something so consistent as to arguably be considered a law).

**Assumptions:**

- 5.2 people per household
- 3 million impacted



**Number People killed in the earthquake**

**46,190 to 84,961**

**(p < .01%)**



## **Text Box H: Death Toll of 46,109 – 84,961**

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On the 14th of January, two days after the earthquake, President Preval estimated the number of people killed from 30,000 to 50,000 dead. –But,” he added, “it’s too early to give a number.”

On the 15th of January, three days after the earthquake, the Red Cross estimated 50,000 dead. The Government of Haiti (GOH) gave the same estimate until January 23 when it issued a death count of 111,481. On January 24 the GOH raised the count to 150,000; on January 31st to 212,000; on February 6th it was still at 212,000; three days later, on February 9th, the GOH raised the count to 230,000.

On February 9, when AP investigators went to the government burial sites to verify the increases, workers told them that the inflow of bodies had dropped off 10 days earlier, at the end of January. In the preceding week only a single truck carrying two bodies had arrived.

The only news agency to question the issue again was Netherlands Radio Worldwide. They checked all Government sources and concluded that as of February 23, 52,000 people had been buried. The Central government reported 20,000 to 30,000 deaths in Leogane; but Leogane authorities claimed to have buried 3,364. Similarly, the Central government claimed 4,000 dead in Jacmel. The French NGO ACTED, whose workers were involved in burying the Jacmel deceased, reported 145 bodies. Jacmel authorities settled on 300 to 400 dead. On February 21, the GOH raised the total body count to 300,000.

In June 2010, Oxfam and Catholic Relief Services (CRS) homepage’s were citing the government figure of 230,000. World Vision implied there were more, saying –at least 230,000 dead.” Medecins Sans Frontieres (MSF) said that the earthquake –killed hundreds of thousands of people.” In the next year, most journalists referred to the numbers as –the government estimates,” often qualifying them as questionable. Other agencies lapsed into citing, without question, the latest government figure of 300,000. On the January 12, 2011 anniversary of the quake, the government figures on the death toll rose to 316,000.

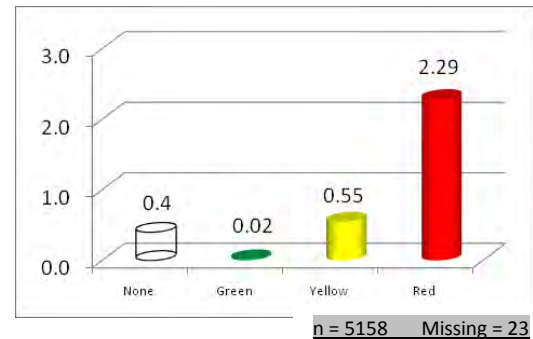
The BARR survey specifically asked people how many of the residents in the building died, where the survivors went after the earthquake and the current location of the survivors. The survey focused on the hard hit area of lower Port-au-Prince, with a high concentration of yellow and red houses. With this data, they were able to make some inferences about the number of people killed, the total number of people who went to camps and the total living absentees from earthquake impacted houses, as well as the whereabouts of the absentees. Deaths per residence were calculated by using average occupancy per house and average death rate by yellow, green and red houses. The area impacted by the earthquake had an estimated population of 3 million people. An estimate based on the findings suggests that the number of people killed in the earthquake ranges between 46,190 and 84,961, much lower than commonly accepted estimates.

[Sources: AP, CNN, Washington Post, Miami Herald, Radio Netherland World (see bibliography)]

## 7.2 Estimating IDPs

To calculate the current number of IDPs we did the same thing as with the death rates. We calculated the absentees per house per color category (Figure 62). We then used MTPTC findings of percent red, yellow, and green buildings for the entire region. In this case however, we also subtracted those killed (it is interesting to note that if the high government figure of 300,000 people killed were accurate there would currently be only 23,085 IDPs)

Figure 62: Absentees  
per Residence and per Color Code



**Estimated Total IDPs  
(people not returned to Earthquake impacted homes)**  
**141,158 to 375,031**  
**(p < .01%)**

## 7.3 Estimating IDPs in Camps Immediately Following The earthquake

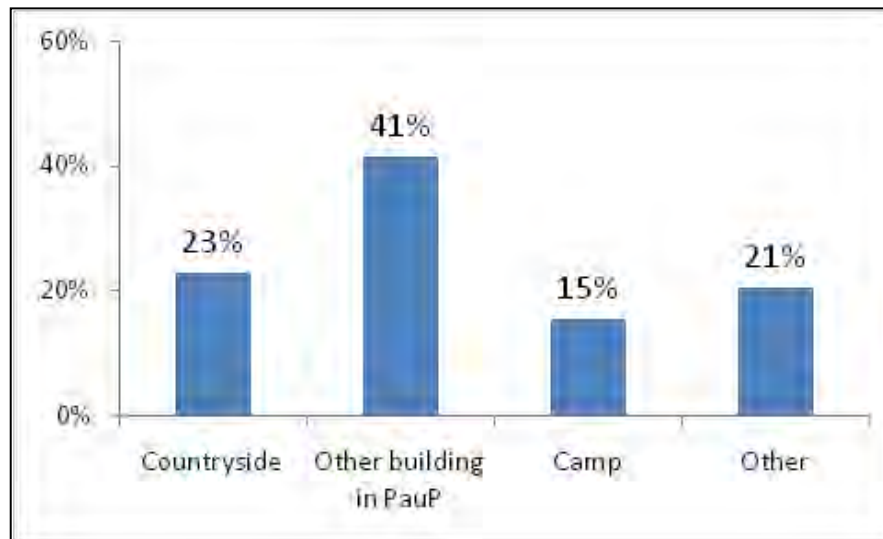
In calculating the number IDPs who occupied camps immediately after the earthquake in January 2010, we simply multiplied the percent of respondents who reported having gone to camps (30%) by the total impacted population (less the death toll). To calculate the confidence interval, we then used proportional probability (i.e. yes/no, meaning either went to the camps or did not).

**Estimated number of people who went to  
camps in January 2010**  
**866,412 to 894,588**  
**( p<.01)**

## 7.4 Estimating the Number of IDPs Currently in Camps

In coming up with the current number of *IDPs in camps*, we multiplied the figure of Total Current IDPs times the proportion of absentees who were reported to be in camps (15%). Specifically, of the 1,356 residences with absentee members, 15% of respondents (family or neighbors) report those absentees as principally located in camps (see Figure 63)

Figure 63: Location of Absentees



### Estimated number of IDPs in camps

18,690 to 66,625

(p < .01%)

## Text Box I: So who is in the Camps?

We know that immediately following the earthquake 30% of the BARR population went to camps. That translates to a population estimate of 880,500. We also know from BARR that people didn't like the camps on every score—crime, electricity, water, work, general sense of protection and availability of food—respondents preferred their neighborhood to the camps (Figure 64). And we know that by the end of March more than 40% of people who went to camps were back home (Figure 65). But according to many aid organizations, such as J/P HRO at the Petion Ville Club Camp, in March the camps were still growing. So who was going to the camps?

Figure 64: Camps vs. Neighborhoods

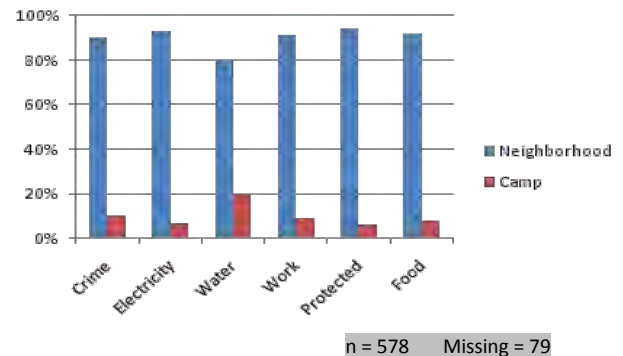
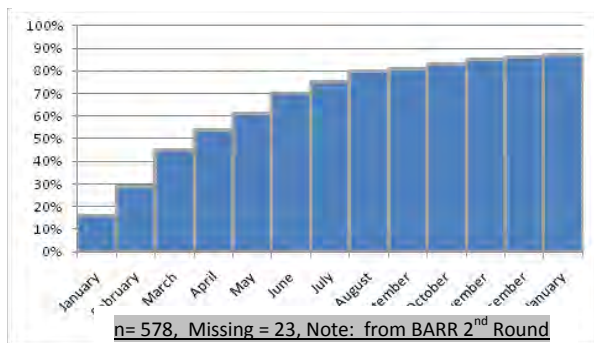


Figure 65: Rate of Home Return from Camps



As the aid began to flow, some people erected ghost tents, shelters made of wispy sheets too small to accommodate people sleeping. There were unofficial reports of the US military using infrared cameras to verify that many tents were empty. And we know from NGO workers that many the tent cities sprang up as a reaction to aid distribution; that when aid workers arrived people would literally come running from nearby houses to occupy their tents.

There were byproducts of jockeying for aid that even the recipients may not have anticipated. One local leader who participated in setting up camp committees for distribution explained,

“Where there was a food distribution, it's by tent that they did it. So a single family would come to have several tents.... every daughter took one. In that way each daughter became an adult. That's what made so many of the young women get pregnant... they don't live with their families, no one is watching over them. You see this in all the camps. You find it in every single camp.”<sup>v</sup>

Even as MTPTC fixed yellow houses, most people tried to preserve their places in camps. Kit Miyamota who designed and oversaw the MTPTC/UNUPS/PADF house assessment program and the repairs of 2,000 houses recounted that,

“When we repair yellow houses, we get know the owners and renters very well since we stay there for an average of three days. Our Haitian engineers know their living status. After we repair yellow houses, approximately 100% of people return for 24 hours a day. But about 90% of them keep the unoccupied tents in the IDP camps since they hope to receive services and money to remove them.”

But we also know that some tent cities are real, very real. Camps such as Jean Marie Vincent and the former Petion Ville golf course have become veritable towns. They have evolved into legitimate communities where people live fulltime, where they cook, sleep, bath, where stores and internet services have been installed. So who's in those camps?

## 8 Building Back for Better or Worse

BARR survey included a series of question meant to clarify people's outlook, hopes and fears, and to understand what impact agencies are having on targeted needs. Coupled with the other observations seen in the report these findings give us an overview of the direction that recovery and rebuilding is taking-- for better or worse, and with or without the international community.

A summary of the findings:

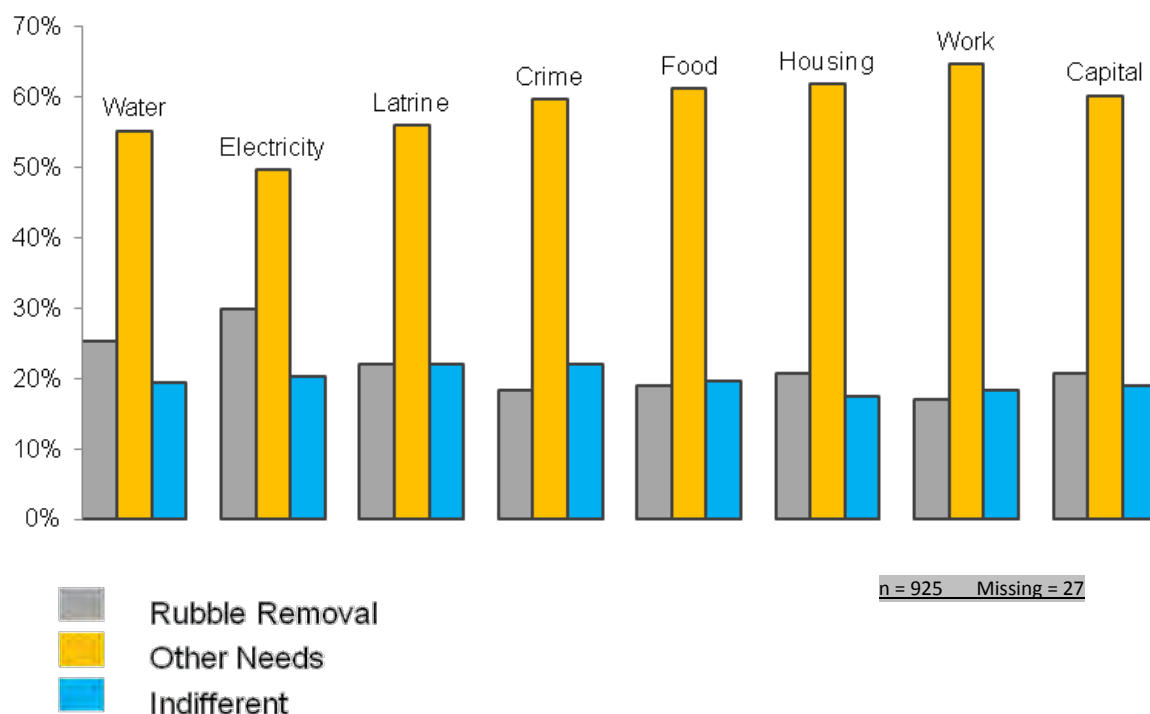
- 51% of respondents believe an earthquake will happen again; 39% think that it is a near certainty
- 66% have no intention of building another house with a cement roof
- 16% Intend to build another structure soon; 16% already have, spending an average of US \$501.32; of this figure 11% have a cement roof
- 41% of respondents (59% of homeowners) intend to repair or improve their home; 17% already have, spending an average of US \$2,011.70 in the process
- 63% have heard of methods to build back better—36% have not; of that 90% was via radio, television or *teledjol* (word of mouth)
- 40% of all respondents felt like they knew how to build a stronger house
- the primary impediment to rebuilding was access to money; 86% said so, compared to 8% citing no land, 2% impeded by state regulations, 3% who fear another earthquake, and 2% content with what they have
- less than 1% had t-shelters in their yard, 1.5% had an improvised shelter they built themselves; 8% had one or more tents, 20% of which had no one sleeping in them, 50% had owners sleeping in them, 20% renters, and the remaining 10% friends or guest
- Only 10% of residences reported anyone in the house having participated in CFW

The above figures and what we have learned from the BARR tell us much about what has happened when the earthquake struck, what has happened in the year since, and the direction that recovery and reconstruction is taking. What we now know is that not as many people were killed, most people began returning home much faster than thought and 86% of people have now returned; they paid to remove rubble and removed it themselves; although they fear another earthquake more than half intend or have fixed their home, less than half know how to make it stronger. We know that, yes, people from earthquake impacted homes went to camps; but few stayed. They began to come home in the first month and then streamed home in the ensuing 7 months. While they were leaving less fortunate people appear to have been moving in.

So people have started building back, they did not wait for the international community. Most did so on their own. And there is also good reason to believe that most do not share the State, NGO, or international community's priorities. There is good reason to believe we are not on the same track of reconstruction as the vast bulk of the population. Popular neighborhoods benefited from rubble cleanup, particularly in the streets and they hailed the MTPTC evaluations as a great thing. But coming home had little to nothing to do with the evaluations and many re-occupied their condemned houses. Even Rubble removal, something that BARR found

contributed to 10% of home returns and that the international community has identified as among the populations most pressing needs, does not rank high on the list of needs that people themselves identify. When we asked people to compare the importance of rubble to other needs in the months following the earthquake, they consistently put rubble removal second. Indeed, we can infer that most people in Port-au-Prince would live in, on, and around the rubble if it meant resolving more basic problems of access to water, food, electricity, latrines, housing, capital and jobs (see Figure 66).

Figure 66: Rubble vs. Other Needs



## 9 Conclusions and Recommendations

So what does it all mean?

It means that faced with staying in the camps or repairs that were beyond the means of most people, the MTPTC evaluations had no statistical impact on timing of home returns

It means that many more people than thought have a home that they are living in; for better or worse, they didn't wait for international community to fix them

It means that we may be facing a massive second crisis if we do not help people with the 54,314 inhabited red tagged buildings that may collapse at any moment or the 101,499 inhabited yellow tagged buildings that may collapse in heavy wind or foul weather

It means that the 8.8 million tons of debris estimated by Miyamota using red tagged houses, needs to be revised to consider 64% of those houses are now at least partially occupied, and an unknown but probably large proportion of those will never be destroyed

It means that most of the people in the camps are people hoping to take advantage of the aid; not necessarily renters but people who see an opportunity and who are so desperate that they are willing to forgo their normal lives, split their families, and maintain a tent in hopes of getting paid or receiving a plot of land

It means that if our objective is to house people and make the best uses of our resources in meeting the needs that Haitians themselves identify, we may be misdirecting resources.

We suggest that donors and NGOs drop notions of utopian neighborhoods and consider reinforcing popular reconstruction processes that are occurring or have been occurring. Two issues and avenues of recourse are most conspicuous and urgent,

- 1) Accept the land tenure system that exists: Contrary to the formal system, 90% of Haitian citizens rely on what can be called a folk system; 70% of the people we interviewed in the BARR survey believe they own the house they live in, 60% believe they own the land it sits on, and only 23% of those people feel insecure about their property rights. Rather than creating a new titular system based on cadastral surveys—something associated, a) with costs that many people cannot afford, b) that the state is incapable of implementing, and c) that if it were implemented would give unscrupulous lawyers and con artists a mechanism to swindle and evict people from property (see Text Box C)—we should accept the system that exists and search for ways to reinforce and legitimize that system, as CHF is currently doing in Ravine Pentad. Ann Young Lee, CHF field director, says that a primary lesson her and colleagues at CHF and IOM have learned since the earthquake is to work with the prevailing land tenure system,

~~We realized that if we have to wait until there is a formal land tenure system in place we aren't going to get anywhere at all.... And why would these people invest all their~~

money in concrete houses if they didn't have any confidence in the system that does exist. We have to work with the culture. We have to accept the system."

To assure that tenants have no ownership conflicts with property that CHF improves, they ask for three neighbors to "witness" that the person owns the house and they procure a Memorandum of Understanding from the mayor's office. In this way CHF is strengthening the system that exists and increasing security associated with it without incurring costs that many people in popular neighborhoods could not afford to meet.

- 2) The most urgent message that comes from the BARR study is the need for a massive program of yellow house fixing and red house demolition for those that cannot be repaired and red house fixing for those that can be repaired. Such an undertaking also provides an opportunity, what is perhaps the most useful lesson of the first year of reconstruction. The lesson comes from the MTPTC house repair effort. It would behoove the donors to take note of it. In the words of Dr. Kit Miyamoto,

It is truly team work ... Haitian engineers, masons and people in the community are the ones who do it all. They are the ones who make this work. I see everyday people giving support to our engineers and masons. This ranges from gang control to giving them water and snacks. This program and the structural evaluations made MTPTC popular among the population. Our 250 engineers and 500 masons have touched 3 million people. I feel we have the support of the people. This momentum can be used in the right strategy to rebuild this place much better than before.

This could be a great opportunity for the Haitian masses to capture not only technology but money for investment, money that stimulates the local economy. Eighty percent unemployment comes from over reliance on imports and too many free services and goods from the international community. How can a Haitian laborer who wants to make \$5 per day compete against smart college students from abroad ... Wherever possibly local materials and people should be used for reconstruction. We should focus on capacity building rather than doing it for Haiti. ....

People want to be assisted with financial, training, strategic development and leadership from internationals. But the objective should be that we work ourselves out of jobs in Haiti. It is possible to do this through the massive reconstruction effort we have in front of us. This may be the best opportunity for Haiti. <sup>vi</sup>

Kit Miyamota, personal communication



## End Notes

<sup>i</sup> Table 3: Descriptive Statistics for How Much Time Residents Have Lived in Neighborhood

	N	Min	Max	Mean	SE	SD
Time residents have lived in the neighborhood	1911	.1	84	16.8	.3036	13.3

<sup>ii</sup> With this in mind it is useful to note that Payne and Associates in a 2000 presentation to the World Bank, described private land tenure as largely a concept that was foisted on developing countries in service of colonial interests. Moreover, Payne and Associates argue that the legal costs associated with registration, taxes, and building codes discriminates against lower income groups forcing them into unauthorized settlements. They conclude that forcing a titular system on the poor only exacerbate evictions of the most vulnerable social groups.

<sup>iii</sup> OCHA. Haiti Earthquake - Population Movements out of Port-au-Prince - 8 February 2010. <http://www.reliefweb.int/rw/rwb.nsf/db900sid/MNIN-82GQYS?OpenDocument&query=population%20movement&emid=EQ-2010-000009-HTI>. Retrieved 11 May 2010.

<sup>iv</sup> Critical data in Charts 45 thru 48 comes from the second half of the survey only; these questions were added during the mid survey evaluation. The findings are consistent with what we know from the first half regarding percentage of residents with rubble in the yard. Probabilities are calculated accordingly.

<sup>v</sup> *Nan yon fanmi chak pitit fi pran yon tant, chak moun vinn gran moun. Si gen distribisyon, se pa tant yap fèl. Yon sèl fanmi vinn gen [plizyè] tant...Se sak fè jenn fi yo vinn ansent...Yo pa abite ak fanmi yo, vinn pa gen siveyans...Bagay sa ou respektè lan tout kan nèt [ou jwenn li nan tout kan nèt]*

<sup>vi</sup> Institutions for social action, specifically the religious and educational institutions that Haitians in popular communities devote their time and attention to are the most logical loci of action. As foreign aid workers we tend to eschew religious institutions, but they are the most popular institutions in Port-au-Prince. Nothing comes close. 63% attend religious meetings compared to 7 percent who attend political meetings. If you wanted to get a message out, where would you go?