

Economic Impact of Emergency Shelter

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Evaluating the economic impact of emergency shelter provision may strike some observers and policy makers as asking the wrong question. When a disaster, whether of natural or human origin, strikes and leaves people homeless, it is natural to intervene and attempt to provide shelter for those who need it. The motivation for this activity is then argued to be ethical in nature, not economic.

Yet for more than 30 years the emergency relief and assistance community has been reflecting on the impact of emergency relief programs on the societies that these programs were ostensibly helping. *The Economics of Natural Disasters* (1969), by Douglas Dacy and Howard Kunreuther, considered alternative federal government policies and their impact on economic recovery in affected communities. In the context of developing economies, the examination began in earnest with the publication of Fred Cuny's *Disasters and Development* (1983), followed by Anderson and Woodrow's *Rising from the Ashes: Development Strategies in Times of Disaster* (1989) both of which clearly showed how relief assistance, inappropriately programmed, would actually increase suffering for vulnerable populations taken over the long term. In the years since, the examination has brought into sharper focus the distinction between the assistance required to save lives and relieve suffering, and the type of assistance required to effectively prevent societies from cycling back into disaster, and to assist these societies in their struggle to develop sufficient economic and social growth. An additional and important goal of the immediate assistance is the development of a society that can resist the impact of subsequent disastrous shocks.¹

¹ While most practitioners now agree that concern regarding the economic impact of humanitarian interventions is warranted, a few words on the role of humanitarian motives is appropriate. We might view the impact on economic activity, as part of the reason there is an ethical mandate to provide assistance in an emergency. Part of our natural concern is the impact of the emergency on the society's

Both Cuny, and Anderson and Woodrow pointed out that in most cases there is no reason that relief assistance can not also assist the developmental processes and goals described in the paragraph above. Both social and economic processes that will strengthen the society can be served through the artful use of relief assistance. These authors, and many subsequent, have also argued that developmental phase can not be separated from the relief phase, and that failure to address early in the process the goals of stronger social and economic systems will usually leave the society less able to grow sufficiently to resist the next shock. This idea is now generally accepted in the relief and development community and most relief organizations now attempt to program relief assistance with the goal of also addressing development goals where possible. The term now most often used to describe this is *developmental relief*.

ability to produce goods and services, and offer livelihoods for its members. Evaluating the ability of an intervention to meet what we regard as an ethical mandate requires that we consider the effectiveness of the intervention in revitalizing the local economy. Finally, if there are currently insufficient resources available for providing assistance in all emergency situations, this is not because there are simply insufficient resources among all the developed countries of the world for meeting the basic needs of people who find themselves without basic necessities in emergency situations. It is, rather, because these countries have chosen not to devote the required resources to group or agencies that provide the required aid. It is at least possible that providing an evaluation of the economic impacts of providing emergency shelter will persuade donor countries to increase the resources they commit to providing assistance.

Developmental relief programs attempt to build both social capacity and economic strength, and the best programs realize that the two are connected, can be addressed together, and should be addressed together. Among the most pernicious dynamics that can occur when relief is delivered is the removal of energy from economic development. Development of dependency mentalities among beneficiaries of relief, undercutting of normal markets and economic activities by large infusion of “free” supplies and food, and failure to address some of the key obstacles to recovery of important economic processes are frequently cited as the most common and most damaging effects of poorly programmed relief.

Relief programs typically focus on basic needs - urgent health issues, food, and shelter. All are services that, in developed societies, would be addressed by people affected by the disaster with their own resources (money) and through the mechanisms that society has developed to support recovery. In the societies in which relief organizations work, the target population does not have sufficient incomes or savings to address basic needs in an emergency. In most cases the ability to produce income was destroyed or severely curtailed by the disastrous event.

The relief programs provide a range of economic inputs as well as providing for basic needs, sometimes as interventions focused on economic needs and sometimes as a by product of the relief activity that is focused on relieving immediate suffering. For instance, in most economies addressed by relief there are jobs provided to local population by the relief agencies. The construction of relief agency facilities, the food and living requirements of agency personnel, and sometime the local purchase of large quantities of relief goods all can help support local economies.

Most of this input goes away, however, when the relief operation is declared over and the agencies leave. Increasingly cognizant of the role that relief can play in the economy, and appreciative as well of the shock that can occur when a relief-agency economy is developed then suddenly ends, many agencies develop programs intended to rebuild an economy that will carry on after the relief phase. Most often these programs focus on inputs that will create job and income strategies for the affected population. The strategies will not be dependant on relief-agencies and will typically be similar to the strategies that existed before the disaster. Occasionally these programs help build incomes based on new opportunities that become part of the economy once the relief phase is over.

Shelter programs represent a large portion of relief programs that are implemented in post disaster settings and are subject to all the issues described above. Understanding the economic dynamics of shelter and shelter programs role in the development process is imperative to understanding both whether to invest limited relief funds in shelter as well as how to approach program design in any given context. This report addresses the impact of emergency shelter programs in the development of post-relief economies and in the income development of affected populations. It (1) reviews and analyzes the available literature relevant to understanding the economic impact of emergency shelter programs, (2) presents additional research conducted by CHF International on income development in beneficiaries of emergency shelter programs, and (3) takes the first steps toward measuring economic impact of these program in a way that could be useful to future programmers of relief assistance.

This study faces two issues of scope and approach at the onset:

Emergency Shelter - definition. Shelter responses in emergencies run the gamut. Over the past ten years responses have been as light as the provision of plastic sheeting for repair of or waterproofing existing structures or assistance with rudimentary mud construction. In some cases “emergency” assistance has helped to repair and reconstruct significant masonry structures costing tens of thousands US dollars.

Most literature providing significant evidence on economic impact will refer to structures that involve a reasonably durable roof and that the occupants intend to occupy for an extended tenure. The studies on economic impact that focus on emergency shelter (CHF international (2004) as well as the Saunders study of emergency shelter response to the Goma lava flow in 1999) examine economic impact of the provision of shelter constructed with walls from heavy woven plastic sheeting and corrugated iron roofs.² The CHF International study (2004) also includes transition shelters that utilize clay bricks for walls and wooden frames (Sri Lanka).

² The use of a heavy woven plastic sheeting as a standard response in emergency shelter assistance has accelerated in the past 15 years. This sheeting is typically engineered for strength, UV resistance, and resistance to flame. A preliminary survey by the authors

Measuring Economic Impact.

Both practitioners and those who study emergency relief practices use a range of approaches and definitions in their attempt to address economic impact of relief and development programs. This report addresses impact on incomes of beneficiaries and impact on the economic development of the affected area. The first, being more discrete can be measured with some accuracy using household surveys and close monitoring of economic activity. The second is considerably more difficult given the data poor environments in which relief activities take place. Measuring the economic development of the affected area requires adequate baseline data on *local* economic output (local GDP), a uniform definition of what constitutes the local economy, accurate measurement of loss as a result of the disaster as well as intense tracking of all external inputs into the economy (by sector) as a result of the disaster. Furthermore, similar data is required at regular time intervals following the disaster period.

Literature and Evidence to Date

Few analysts have addressed the issue of economic impact of emergency shelter. The most relevant and significant quantitative analysis addresses economic dynamics around the construction of and use of housing by low income populations in the developing world and usually does not focus on shelter provided in response to a disaster. While poorer populations recovering from disasters will be affected by dynamics that often are not present in communities unaffected by a calamitous event. These populations will typically utilize economic strategies that are similar to those of unaffected populations of a similar economic level. The critical economic dynamics are similar. Thus, much can be learned about the relationship between shelter and economic development of low-income populations, even if the study does not address a population recently affected by disaster.

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a g e n c i e s d i s t r i b u t e d o v e r 5.5 m i l l i o n s q u a r e
m e t e r s p l a s t i c s h e e t i n g i n 2003.

The economic impacts of emergency shelter can be categorized into two broad categories. The first is the direct economic stimulus that occurs from the production of the shelter itself and the purchase of inputs for its production. The magnitude of these impacts (or the size of the “multiplier”) depends on the patterns of trade in the economy and its geographic distribution, the propensity (or necessity) to import labor or construction materials, and the consumption decisions of those who receive the income from producing these inputs. The impacts in this first category are sometimes referred to as those deriving from “backward linkages”.

The second category of impacts derives from the effects that shelter provision has on factor productivity in the economy, on the consumption patterns of the receiving households, and as productive capital in its own right (as a workplace). Because these impacts emerge after provision of the shelter they are sometimes referred to as “forward linkages.” Whether through enhancing labor productivity through provision of a safer environment satisfying basic needs, or through provision of a workplace, or simply through greater household purchases of goods and services these impacts can be estimated in principle as increases in the incomes (and thus expenditures) of recipient households relative to households who do not receive the assistance.

Backward linkages.

In addressing the impacts that home construction can have, analysts have focused on three areas of impact: (1) The incomes (jobs) created by the construction of the house; (2) The incomes and/or economic activity created in the production of materials used in the shelter construction and the transport of these materials, and (3) overall measurements of economic growth attributed to building.

Employment and Income. The most relevant studies that document the direct relationship between housing and employment generation as a direct result of the home construction come from two recent studies by NGOs. A CHF International study of its 1992 to 1999 Cooperative Housing Program in Poland³ indicated that construction of

³ CHF International : “Assessing Economic Development Impact of a Housing Program (On the

condominium units at a total cost of approximately 20,000 USD/unit created 21.55 person months of employment representing 11,162 USD in income per each unit. This figure represents labor directly applied to construction of the unit. This study did not measure incomes and labor in secondary and tertiary industries such as manufacture of materials and transport of materials. Graham Saunders' analysis of a Catholic Relief Services (CRS) emergency shelter program in Goma, Democratic Republic of Congo shows the creation of 14,000 person/days of labor in the creation of 11,307 units. Each unit was 4X4 meters, wood frame, plastic sheeting, and corrugated iron roof that cost \$180.⁴

The construction of shelter has an economic impact beyond the employment generated in the construction of the shelter itself. Several analysts have looked at income production through the construction sector in the developing world. Conclusions vary. Two studies provide conclusions on rough multipliers of employment and income. One suggests that a general rule of thumb for secondary job creation is one job in the construction sector supports one additional job in supporting sectors (transport, supplies etc.⁵ This suggests a multiplier of two. A study of housing construction in Costa Rica from 1982 indicated 400 units of output in related sector in the country for every 1000 units expended in construction. These issues will be discussed in more depth below.

Clearly construction programs support a range of other economic activities – primarily construction materials manufacture and transport. Two analysts provide a more detailed examination of the dynamics between various economic activities and income generation in the developing world – most focusing on the relationship between processes that utilize locally produced materials and those that do not.

Piet Rietveld, in his 1992 study of the Indonesian housing sector, examines the relationship between the housing sector and employment generation, and relates

example of the CHF-Poland Project 1992 to 1999 and Beyond)". CHF Internal Document, February 2000

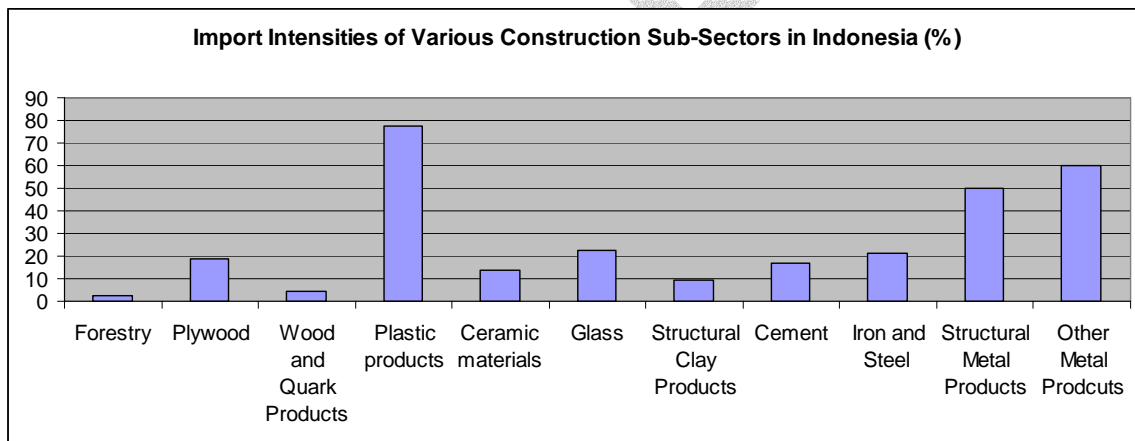
⁴ Saunders, Graham: "Housing, Lives & Livelihoods: Lessons in Post-Disaster Assistance from Goma." Catholic Relief Services Emergency Response Team Report. Catholic Relief Services, Baltimore, 2002

⁵ UNCHS (Habitat) - ILO: *Shelter Provision and Employment Generation*, UNCHS: Nairobi (1995)

this to technology and material selection.⁶ Rietveld identifies two key factors: the percentage of imports of the goods used in constructing the house and second, and the output per worker and substitution elasticity for workers in home construction.

Rietveld demonstrates that economic activity that acquires components from construction sub-sectors that exist locally will have a greater impact on employment generation. For example, in the Indonesian case, wood products have an import intensity of 2.5% as opposed to structural metal products, which have an import intensity of 49.7% (see Figure 1). As a result, housing construction that takes place utilizing those materials with low import intensities (local products), will result in significantly greater support for the local industry and translate into increased domestic sub-sector growth.

FIGURE 1



Propensity to import materials is not the only factor in employment generation in a given sub-sector, however. Rietveld cites Poot (1988) in a separate study in 1988 that examines employment elasticity, defined as “the relative change in employment as a consequence of a relative change in output”. The higher the output per worker (in terms of cash value), the lower the employment effect (Figure 2). Thus investment in housing

⁶ R i e t v e l d , P i e t . “H o u s i n g a n d E m p l o y m e n t i n I n d o n e s i a : P r o s p e c t s f o r E m p l o y m e n t G e n e r a t i o n i n t h e c o n s t r u c t i o n M a t e r i a l s S e c t o r ” *B u l l e t i n o f I n d o n e s i a n E c o n o m i c s S t u d i e s* , v o l 28 N o 2 A u g u s t 1992

that utilizes capital intensive technologies has a less positive effect on aggregate employment than the same investment that utilizes labor intensive methods. Rietveld illustrates that “the direct employment effect of a certain amount spent on bricks or tiles is about 40 to 50 times as large as when the same amount is spent on cement.”⁷

FIGURE 2⁸

| <i>Value Added and Employment in the Indonesian Construction Materials Market Sector 19</i> | | | | |
|---|-----------------------------|---------------------------|---------------------------|--------------------------|
| Sector | Value Added (Rp billion) | Employment (thousands) | Value Added per Worker | Employment Elasticity |
| Forestry | 1380 | 357 | 3.86 | 0.5 |
| Other Quarrying | 720 | 280 | 2.58 | 0.5 |
| Sawmills | 430 | 280 | 1.53 | 0.5 |
| Plywood | 460 | 82 | 5.53 | 0.4 |
| Wood and cork products | 140 | 590 | 0.24 | 0.7 |
| Paint | 50 | 13 | 4.21 | 0.35 |
| Plastic Products | 110 | 60 | 1.8 | 0.5 |
| Ceramic materials | 60 | 11 | 4.82 | 0.6 |
| Glass | 90 | 12 | 7.5 | 0.35 |
| Structural clay products | 150 | 330 | 0.46 | 0.65 |
| Cement (and lime) | 300 | 30 | 10.13 | 0.35 |
| Other non-metallic building materials | 90 | 104 | 0.84 | 0.5 |
| Iron and steel | 500 | 20 | 24.98 | 0.15 |
| Structural metal products | 310 | 67 | 4.7 | 0.5 |
| Other metal products | 140 | 83 | 1.63 | 0.6 |

When dealing with disaster situations that primarily affect rural areas, the secondary effects of a shelter program can be even more limited if significant amounts of the construction materials used are manufactured in distant urban centers. Rietveld also points out, however, that the labor-intensive sectors are often dominated by small-scale industries that are prevalent in rural areas, further emphasizing the potential for secondary economic impacts of shelters that utilize local technology.⁹

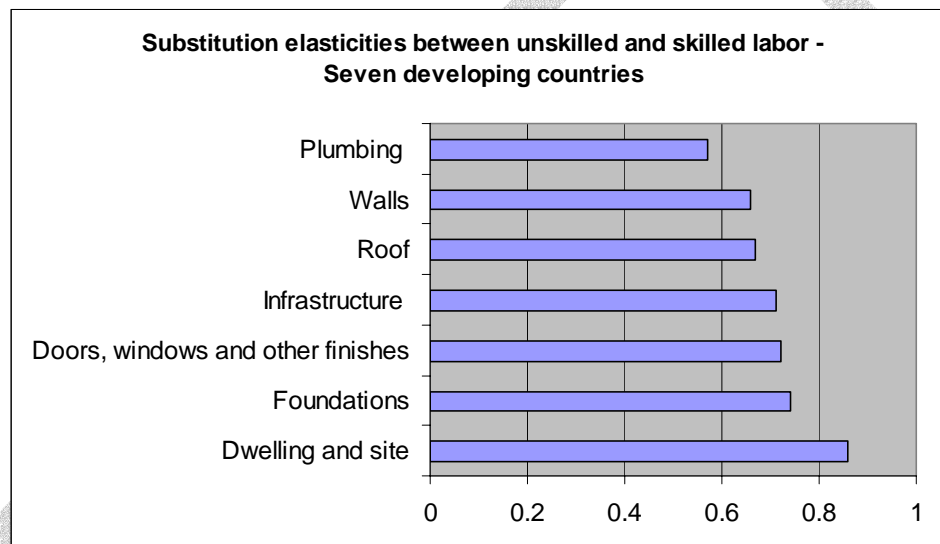
⁷ Rietveld p 68

⁸ Rietveld p 68

⁹There is no standard for determination of the geographic area that is measured to determine economic impact, and the studies discussed here vary in their definition of this. Strassman and Bulmer-Thomas both try to address *regional* impact, and both conclude that reliable measurement is complex and difficult.

In another relevant analysis, Paul Strassman ¹⁰ analyzed the construction of a 24.9 m² dwelling among 77 different firms across seven different developing countries, examining the relationship between skills, income, and levels of employment. Strassman looked at the substitution elasticities for both skilled and unskilled labor inputs. Skills with higher elasticity have a higher ratio of hours worked per unit of pay than skills with low elasticity. As Figure 3 demonstrates, there is a clear relationship between the level of skill required in the process and its effect on employment generation during the construction of the shelter itself. Thus construction that utilizes a greater percentage of high elasticity trades will produce more employment.

Figure 3:



Strassman also contends that increases in worker productivity, however, do not necessarily need to translate into decreased levels of employment. He argues that small increases in worker productivity through worker training can spur housing demand through the translated lower cost of housing. Lower cost of housing will increase

¹⁰ Strassman, W. Paul: "Employment in Construction: Multi-country Estimates of Costs and Substitution Elasticities for Small Dwellings". *Economic Development & Cultural Change* Vol. 33, No. 2 (p. 396-414), 1985

demand sufficiently to maintain high levels of employment, even when the construction process shifts to use of more low elasticity skills. In other words, the utilization of skilled labor did not translate into significantly less employment.

In the context of emergency shelter, demand generated by the market of potential shelter consumers may be moot, as demand for emergency shelter is driven primarily by donors and motivated by urgent needs of populations who do not have the means to participate in a market. The decision-maker (if not the consumer) is the donor.

Strassman's contention - that skilled labor can reduce the per unit cost of shelter while not necessarily reducing the levels of employment - must be taken into account in another context, that of emergency shelter response. Where there is a significant pool of skilled labor among affected populations, utilization of a process requiring higher skill levels must be balanced against short-term gain of providing greater employment through focus on labor-intensive building processes. This does suggest, however, that the inclusion of training into emergency shelter programs can translate into both increased amount of shelter per unit of expenditure, and support reduced costs of housing in the post-emergency phase, as well as long term employment benefits with relatively low short term sacrifice. Therefore the potential to have a significant impact on the local economy through backward linkages exists.¹¹

This programmatic choice should contrast significantly with the choice to utilize capital intensive technologies that both have low employment effects and are often imported, and therefore translate into less employment generation per unit expenditure in the shelter program.

Growth. Relatively little research has been done on the relationship between the economic inputs of housing construction and other aspects of growth in developing economies, and none that addresses impacts of emergency shelter construction. Studies that provide some insight into this relationship have been conducted in the

¹¹ Emergency Shelter interventions that take place in the developing world generally serve communities that could be characterized as normally utilizing low-income housing (as the impacts of disasters normally affect more vulnerable populations (see Bertrand, Cuny)

developed world, where data is more accessible and reliable. A reasonably complete model and attempt to measure the economic impact of housing was completed by the National Association of Home Builders (1997)¹². The NAHB model uses an interindustry¹³ approach to calculation of multiplier impacts of new home construction. This approach provides a superior method for calculation of the “backward linkages” of housing construction, accounting for the output and employment impacts in a range of industries that supply inputs to housing construction, or compete with housing construction for those inputs.

Since the goal of the NAHB model is to identify the local employment and income impacts from housing construction in a typical US urban area, the analysis restricts attention to a “conservative” subset of industries that are judged to be potentially directly affected by new construction. The analysis tracks 61 industries and 90 commodities (to define the “local economy”), and in addition accounts for impacts on local tax revenues. The study measures the impacts, both direct and indirect of the construction of 100 single family units in a prototypical US city. The study concludes that the construction of 100 units yields \$10 million in local income, \$854,000 in local taxes and other government revenue and 250 local jobs for the 12 month period during which construction occurs. This level of impact seems completely plausible in a typical urban area where new homes have construction costs ranging between \$120 and \$150 thousand. The analysis suggests that in a typical US urban area, 65 to 85 percent of the construction costs accrue as local income, with the remaining share accruing as income outside of the region.

Once construction is complete, there are no further impacts from the home construction process itself. However the 100 households who occupy the homes

¹² National Association of Home-Builders: “NAHB’s Local Impact of Homebuilding Model: Technical Documentation”. NAHB, Washington, DC, November, 1997

¹³ For a discussion on the use of input output tables to calculate such multipliers, and the techniques for inferring local or regional interindustry matrices from national tables, see Chapter 4 in “Urban and Regional Economics” by Philip McCann, Oxford University Press, 2001.

generate continued economic activity and income, supporting 65 local jobs and, given a median family income between \$25 and \$30 thousand per year, local income of \$2,780,000.

The interindustry approach used in the NAHB model provides a more precise and comprehensive method for estimating local impacts of house building. It is important to be aware of the difficulties in applying these results in other settings. The analysis assumes a fixed factor coefficients production technology that does not allow substitution between inputs in response to changes in prices. The approach requires estimation of a regional input-output matrix that is difficult even in “data rich” environments such as U.S. metropolitan areas, because of the requirement to estimate the level of trade between producers in each and every industry with those in every other industry and with consumers. Assuming that the interindustry structure is stable and similar to that estimated for the NAHB model, it is necessary to make adjustments for the geographic scale of the analysis. In smaller cities or villages the multiplier due to interindustry linkages will be much less because of the propensity to import discussed above. Thus in small regions we should probably expect less than 65 percent of the construction costs to accrue as local income.

The Association of Oregon Community Development Organizations (AOCDO) in 2003 adapted the NAHB model to assess the impact of affordable housing on the local economy.¹⁴ But, by focusing on affordable housing, the study’s model places a greater emphasis on rental savings over time.¹⁵ The study examined impact of construction of a

¹⁴ Blatt, John; Rogers, Molly: “Economic Impact of Affordable Housing Development.” *The Association of Oregon Community Development Organizations (AOCDO)*, April 2003

¹⁵ Attention to rent savings (an important component of income management among poor populations) provides increased relevance to the impact of emergency shelter programs. One of the primary advantages of shelter provision for affected populations can be reduced cost of renting accommodation. This is an undocumented aspect of the stress on displaced

subset of low-income houses initially subsidized by the State of Oregon, and found that local employment and multiplied incomes were slightly less than in the NAHB study. Taxes from increased incomes and property produced for the State a 25.5% annual return on an investment in low income housing of \$94 million.

Forward Linkages

Housing is not only effective in generating employment and income through the demand created by the construction sector and by other sectors contributing to the building operation, but it can also provide a series of intermediate inputs to other economic activities, referred to as forward linkages as explained above.

Much of the discussion below focuses on the use of the home as platform for economic production. In these cases, investment is tied closely to tenure. Tenants of a shelter are unlikely to invest scarce resources in the construction or improvement of a home unless they believe that they will be able to remain in the home long enough to make the return on investment worthwhile. Thus title and reliability of long term tenancy are key issues that affect the economic impact that shelter provides. Title (clear ownership) does not appear to exclude investment, as reliable long-term tenancy elicits investment in nearly the same way as ownership. Poorer populations also develop strategies contingent on the possibility that they would be forced to leave a shelter. In these populations the investment in income generating resources and home improvements are likely to be removable (e.g. furniture, looms and other small scale manufacturing equipment) that can be carried away when tenancy is terminated. Thus, this report considers shelter that is on property to which the tenants have title, as well as shelter that has unclear title¹⁶.

There are six primary categories of economic impacts through forward linkages. Housing construction causes (1) an increase in the output of textiles, furniture and

populations, but most relief professionals would consider it significant.

¹⁶ In the author's experience, emergency shelter is most often provided on land not owned by the beneficiaries. These settlements often remain for years and a significant percentage will become permanent.

household fixtures, the demand of which will increase as people turn their houses into homes. It is important to note that these industries often need small amounts of capital and limited imports and will therefore benefit mostly the local economy. Second the increased residential area densities sometimes produced by the house construction will have a multiplier effect through their (2) inducement to an array of service trades. These services include repairs, maintenance, roads, water supplies, drainage and sewerage, sanitation, waste-management, transport etc. The role of (3) training in construction skills¹⁷ is another forward multiplier often identified by analysts, but relatively little quantified analysis exists examining the effect of training on recovering or developing economies.

In addition, shelter nearly always (4) provides a rent saving mechanism, which becomes increasing important as a way to build savings, wealth, and capital for further economic investment in inflationary conditions, which are typical in post-disaster conditions when demand for goods and services almost always is greater than supply. Another forward linkage that is difficult to quantify is the (5) increased productivity of workers that takes place as a result of improved living environments. Burns and Grebler¹⁸ point out the consequences of better health, more stable families, improved social climate, less absenteeism from school etc., all of which explain why improved shelter increases productivity.

Finally, but perhaps most importantly, shelter (6) supports direct incomes for the inhabitants through a platform for home based enterprises (HBEs). It is this area that is among the easiest to measure, which has received the most attention of researchers and analysts, and which is often considered the most important way that shelter can support economic development in post-disaster societies. Also related to this is evidence that suggests that HBEs assist in redistribution, and are an important part of the

¹⁷ The potentially important role of training vis a vis skilled labor elasticities and their effect on the cost of construction of shelter was discussed above.

¹⁸ Klaassen, Leo H, Hoogland Jan D., Van Pelt, Michiel: "Economic impact and implications of shelter investments", pp. 35-59 in Rodwin, L. (ed.), *Shelter, Settlement and Development*, Boston, Massachusetts, Allen and Unwin, 1987

indefinable but critical role of motivation as an energizer in economic growth. In Strassman (1986) the author finds that in low-income neighborhoods HBE operators were the elite, whereas in conventional neighborhoods, HBE operators were the poor households.

Of the six areas that provision of shelter can affect growth of a recovering economy, the area mostly heavily documented by far is the impact of HBEs. The role of a shelter as a platform for economic activity is often overlooked. While only one study documents the role of the HBE in income coping strategies in emergency shelter, practice and experience has shown that these strategies (almost always stuck squarely in the informal economy) typically vary little between low income populations in the developing world and these same populations struggling to regain lives and income post disaster. Shelter along with infrastructure can be regarded as part of the economic production process, as the environment within which economic activity takes place¹⁹. Given the size of the informal economy²⁰ in most developing countries, the house as a platform for production is an essential part of overall economic output.²¹ Housing provides opportunities for commercial activity, storage, small-scale manufacturing, service industries and retailing.²² Traditionally, housing is considered consumer spending, however, because of the demonstrated role of shelter in the developing world as a platform for production, investments in shelter can be viewed as productive capital expenditures.

The role of the HBE in developing economies – especially the low-income sectors - is well demonstrated. Strassman (1986) asserts that in the cities of developing

¹⁹ UN Habitat and ILO

²⁰ The size of the informal economy exceeds 50% of the labor force and produces 40-60% GDP according to Chickering L. and Salahdine M., in "The Silent Revolution: the informal sector in five Asian and Near eastern countries", Ed. By Chickering L. and Salahdine M., (1991), pg 188

²⁷ Hammock, John C.; Lubell, Harold; Sethuraman, S.V.; Rafsky, William L.: "Low-Income Settlement Improvement through Income and Employment Generation and Integrated Housing Programs." 257-271;

²² Ibid. pg 125

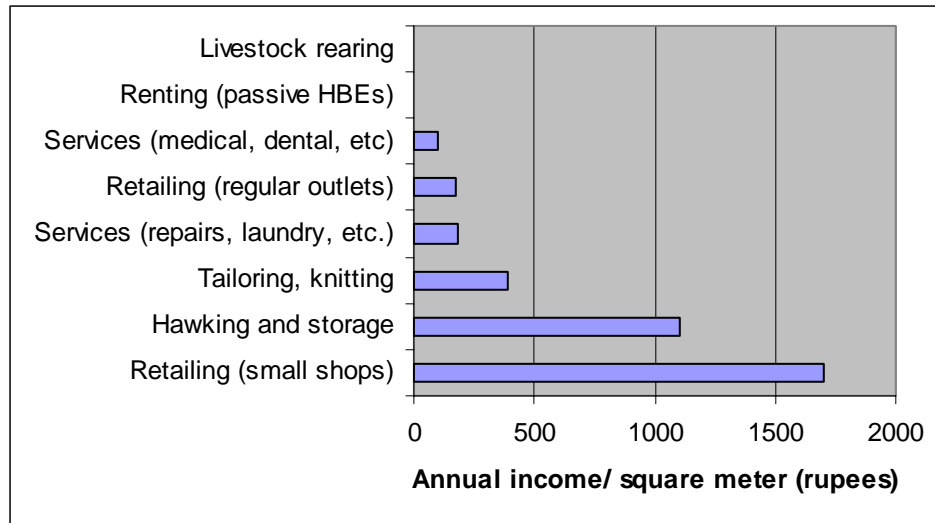
countries somewhere between 10 and 25% of dwellings has an enterprise on their premises. Moreover, in Strassman's study (1986), 68% of respondents replied that they needed HBEs in order to afford the dwelling and 70% of enterprises could not exist without the available dwelling spaces.

Two studies also provide evidence of an important role for HBEs in shelter provided to populations affected by disaster. Saunders (2002) surveys a post-disaster shelter project that provided wood frame and plastic-sheeting shelter for those affected in the town of Goma (study described above). Twenty seven per cent of families assisted in this program used their homes as a base for their income generating activities.

Two studies recently conducted by CHF International also provide data on the role of HBEs. In the Colombia case, the population affected was a displaced agricultural population struggling to devise strategies for developing livelihoods in an urban environment. It is significant that of this population, 13 percent use their new shelters for HBEs. Between 10 and 11 percent of households have established a business taking advantage of the process of constructing the shelters themselves, and 5.5 percent of households are in both categories – having established a business involved in shelter construction and also using their own shelters for production of goods and services.

Raj and Mitra (1990) examined the extent of the role of HBEs in poor areas of Delhi, India, and analyzed the types of HBEs and their role in the economic development of the city. One of their conclusions is that the more sophisticated the service provided the more income the economic activity generates. The following chart shows the profitability of different types of HBEs related to the size of the shelter (Raj & Mitra 1990).

FIGURE 4 : Profitability of HBEs, the case of Delhi - Raj & Mitra (1990)



Looking at neighborhoods in the same city in the years before 2000, Kellet and Tipple²³ found that the median of the sampled households drew 75% of their income from HBEs, 60% had no other income, and the contribution from HBEs was often as high as 56% of total income. More importantly, they concluded that the rate of return on total capital invested in HBEs is as high as 20 to 50 times of investment made.

Strassman²⁴ also provides evidence on the role of HBEs as a contributor to household incomes and Figure 5 compares findings from four studies on percentage of household income coming from HBEs in low income neighborhoods in three countries and at four different times since the early 1980s.

| FIGURE 5: Percentage of households' income coming from operating an HBE | |
|---|-----|
| Strassman – Lima (1986) | 40% |
| Strassman – Sri Lanka (1987) | 45% |
| Raj & Mitra- Delhi (1990) | 56% |
| Kellet & Tipple- Delhi (2000) | 75% |

²³ Kellet, P. & Tipple, G., "The home as a workplace: a study of income-generating activities within the domestic setting", *Environment & Urbanization* Vol. 12, No 1, April 2000

²⁴ Strassman P., (1986)

Raj and Mitra also provide data on the timing of the development of HBEs. The average HBE in this survey had been started with a 7.3 year delay after the household had moved in. Clearly the transition from simple house to household with an HBE is not automatic. Contrasting this with evidence from the Saunders study and CHF International studies suggests a pattern where many families use the HBE as a income strategy in the weeks immediately following a disaster, with HBEs becoming an more important part - in some cases the most important part - of the growth of the economy and in household income over the next several years.

Strassman's analysis also examines their relationship between HBEs, their markets, and their profitability. He concludes that activities addressing only neighborhood sales yielded the lowest incomes as opposed to ones that operate city-wide and earned the highest incomes (1986). In his 1987 analysis, Strassman concludes that earnings per HBE worker were about one half of what they would have earned had these people worked outside. He also suggests that the location and the clientele of an HBE are very important. HBEs with markets in low income neighborhoods almost always produced lower incomes²⁵. In these cases, retail earnings fell to a third and if HBEs operated by women earnings fell by half. If both factors were present, earnings fell to a sixth²⁶. Clearly ability to access markets affects profitability of HBEs, and could figure importantly in plans for the siting of emergency shelter programs in order to increase impact on household incomes.

Importantly for shelter planners, the role of subsidized or donor stimulated shelter is examined by Strassman, who analyzes the relationships between the character of the neighborhood, the proportion of households with HBEs, the type of HBEs, and their respective profitability (Strassman, 1986). Popular urbanizations (half- finished dwellings

²⁵ Strassmann, W. Paul : "Home -Based Enterprises in Cities of Developing Countries ." *Economic Development and Cultural Change* Vol . 36, No . 1 (p . 121-144), 1987 p 135

²⁶ Strassman also suggests that HBEs that produce only for local neighborhoods are usually run by members of households that experience twice as much unemployment as the average household with HBEs .

provided by private developers or government agencies) had the highest percentage of HBEs²⁷.

Further evidence on the importance of HBEs in household income growth is provided by a recent study by Graham Tipple²⁸. Based on case studies conducted in four countries (Bolivia, India, Indonesia, and South Africa) the author examined the employment and income of HBEs, and contrasts this income with households without HBEs. Data indicated that HBEs increased employment opportunities for low-income households, especially for women (see Figure 6). At least 50% more women work in households with an HBE than in households without.

FIGURE 6 : Household Monthly income (means, PPP£)*

| In PPP pounds | Bolivia | India | Indonesia | South Africa |
|----------------------------------|---------|-------|-----------|--------------|
| Mean | 1,067 | 254 | 417 | 464 |
| Median | 739 | 211 | 277 | 343 |
| NON-HBEs | | | | |
| Mean | 401 | 200 | 307 | 345 |
| Median | 321 | 171 | 248 | 290 |
| Percentage Improvement from HBEs | | | | |
| Mean | 166 | 27 | 34 | 34 |
| Median | 130 | 23 | 12 | 18 |

*PPP stands for Purchasing Power Parity and removes differences in purchasing power among different currencies.

While the evidence indicates that no two developing economies are the same, and thus suggests caution in applying these finding to all developing economies, the evidence is clearly that HBEs play a significant role in economic development in these communities, and in some cases represent the majority of income strategies in an informal economy.

Employment both Forward and Backward Linkages

In the section above on backward linkages we examined the role of shelter construction in employment creation. The relationship between shelter construction that

²⁷ I b i d . p 487

²⁸ T i p p l e , G r a h a m , “ S e t t l e m e n t U p g r a d i n g a n d H o m e B a s e d E n t e r p r i s e : S o m e E m p i r i c a l D a t a ”

can use large amounts of unskilled labor and creating jobs is well established. In a study by Bulmer-Thomas (1983)²⁹ the author identifies the activities that have the greatest forward and backward linkages to employment generation using an interindustry input-output model, referencing as well work by Diamond, in which 36 sectors were ranked according to the value of their forward and backward linkages. In the Diamond study the more industrialized sectors performed the worst in terms of employment generation. Building construction and non-building construction are ranked in the middle of the activities studied. It is important to note that emergency shelter is not part of the modern construction sector that the author analyzes in his study. Where it is possible to use local (and therefore cheaper and simpler) materials as well as employ unskilled or semi skilled labor, both forward and backward employment generation would increase³⁰. Figure 7 indicates the relation between employment and unit value (cost, or price) of the product.

FIGURE 7: Employment linkage indices for Turkey (1967)

| Sector | Forward linkages | | | Backward linkages | | |
|---------------------------|------------------|------|--------|-------------------|------|--------|
| | Z'_i | Rank | V'_i | Y'_j | Rank | V'_j |
| Agriculture | 7.857 | 1 | 2.482 | 3.037 | 2 | 5.496 |
| Forestry | 1.788 | 4 | 3.684 | 1.294 | 6 | 4.870 |
| Animal husbandry, fishing | 3.893 | 2 | 3.654 | 3.609 | 1 | 4.300 |

²⁹ Bulmer-Thomas, V.: "Input - Output Analysis in Developing Countries", John Wiley & Sons Ltd., 1983

³⁰ Although we note that here, and in examples mentioned above where employment generation is identified as a goal, public policy should be formed with an understanding of the tradeoff between worker quality and employment goals, and in particular of the fact that heavy emphasis on employment goals can work to the detriment of the overall economy. For an explanation and theoretical evidence, see 'Fiscal Austerity and Public Servant Quality', by Nadeemul Haque, Peter Montiel, and Stephen Sheppard, *Economic Inquiry*, **38**, July 2000, 487-500.

| | | | | | | |
|----------------------------------|--------------|-----------|--------------|--------------|-----------|--------------|
| Textiles | 0.612 | 20 | 4.972 | 1.121 | 9 | 3.217 |
| Wood products | 0.669 | 16 | 4.606 | 1.138 | 8 | 3.310 |
| Non building construction | 0.651 | 18 | 5.999 | 1.139 | 7 | 3.444 |
| Building construction | 0.652 | 17 | 5.999 | 0.936 | 15 | 4.147 |
| Cement | 0.439 | 25 | 5.091 | 0.663 | 28 | 3.387 |
| Petroleum refinery | 0.057 | 36 | 2.399 | 0.207 | 36 | 1.877 |

Source: Diamond (1975) Cited in Bulmer- Thomas (1983)

Finally, the role of training for low-income populations in developing countries as a means to improving levels of employment and levels of income is often mentioned in the literature, but with relatively little quantifiable data in support. UNDRO (1992) points to two types of training that could be available: teaching new building methods, and management of post-disaster housing programs³¹. Petronella Kigochle (2001) also supports the value of training in that it creates opportunities for construction workers to be employed after the rehabilitation process if the formal sector is encouraged to hire them. Unfortunately, neither source provides data to support these contentions.

Support and Service Sectors

Relatively little quantified evidence exists on the forward linking relationships between shelter construction and the stimulus to growth of service and other support sectors in developing economies beyond the NAHB study. In modeling the economic impact of housing construction, the NAHB study does take into account direct forward linkages in support and service sectors, and finds them to be extremely significant. For example, the construction of 100 single family homes in an average city in the United States generates a ripple effect of \$156,000 in added income to eating and drinking places, \$139,000 in automobile repair and service and \$283,000 in business and

³¹ An interesting differentiation is made between development and relief organizations. Apparently the former will have on-going programs in the country and could therefore reallocate the trained personnel in other programs. Office of the United Nations Disaster Relief Coordinator, "Shelter after Disaster", New York, 1982

professional services.³² Once, again, however, the NAHB study only serves as a limited reference point due to the extremely different context in which it was conducted.

Nonetheless, there are a few authors that do address these important linkages in the developing country context. In the study previously referenced³³ Rietveld shows that an important part of construction activity has been directed towards upgrading and enlarging existing housing and that improvement programs often have a significant impact on private sector housing initiatives. Rietveld found that for every Rp 1 million invested in infrastructure, home owners invested another Rp 1.8 million in housing extensions and improvements, suggesting that home improvement could cause the demand for construction materials to increase, starting a new circle of forward linkages.

Strassman (1986) however showed that dwelling expansion and improvement depended on total household income. According to his findings in Lima, it was owner-occupants of dwellings in conventional neighborhoods that improved their houses the most³⁴.

The provision and maintenance of service infrastructure and maintenance can also have a real, positive impact on employment. According to UNCHS and ILO (1997) the construction of 5 meter wide earth roads in rural areas can generate 2,000 work-days work per kilometer using labor-intensive methods.³⁵ Considerable potential for employment also lies in the waste management arena. UNCHS (1989) indicates that city authorities in developing countries spend 30 to 50% of their budgets on solid waste management, but typically addressing needs only in more formal settlements.

Two studies examine the relationship between HBEs and the demand for shelter related service. Mehta and Mehta, (1990), and Strassman³⁶ show that households which operate an HBE in a poor neighborhood are not only more likely to have a sewage system, but will have a higher resale value. According to the UN, premises with HBEs are also more likely to have piped water and electricity, thus contributing to owner's

³² NAHB p 3

³³ Rietveld 1992

³⁴ Strassman, P. "Types of Neighborhood and Home-Based Enterprises: Evidence from Lima, Peru, Urban Studies 1986, pg 497

³⁵ Ibid. p 72

³⁶ Pg 496, Strassman (1986)

better health and higher productivity³⁷ as well as the level of economic impact of the overall shelter construction.

Capital Formation as a Forward Linkage – The Role of Shelter in Economic Growth

In all economies, shelter constitutes a very significant asset and for most households is by far the largest single component of their wealth. For a household to have access to shelter, and the potential to invest in, improve, and ultimately sell that shelter to another is an important mechanism for savings and investment in the economy. This is particularly true in developing economies, where poor access to capital markets and poorly developed or regulated savings and investment institutions make it difficult for households with limited incomes to save and invest.

There has been considerable discussion on the role of construction as a driver of economic growth, builder of economic confidence, and creation of a key source of inflation-resistant capital (playing a key role in development of wealth and investment capital) particularly in developed economies. [SHEPPARD].

Complex vs. Natural Disasters and the Economic Impact of Emergency Shelter

In designing an intervention, one must weigh the demonstrated employment benefits of backward linkages with the potential returns of the forward linkages that will result from faster, more capital intensive strategies. Where this difference is most clearly seen is when comparing the strategies necessary to respond to complex versus natural disasters.³⁸ Normally, complex emergencies will require the employment and multiplier benefits of strong backward linkages, whereas during sudden natural disasters, the

³⁷ United Nations, "Housing and Economic Adjustment", 1988

³⁸ For a complete discussion of the differences between complex and natural disasters see "Albala-Bertrand · *Responses to complex humanitarian emergencies and natural disasters: an analytical comparison*, in Third World Quarterly and Albala-Bertrand · The Political Economy of Large Natural Disasters ·

forward linkages associated with return to preexisting market structures and employment may necessitate faster construction techniques with smaller backward linkages.

Following a complex disaster, societal economic structures have often been completely worn down, or in many cases no longer exist as a result of years of conflict or displacement. In comparison, natural disasters represent a “shock” to the local economy and society, but do not normally cause a complete breakdown of either. Rather, disaster impacts usually occur in “pockets,” with some sectors and locations remaining intact while others are disrupted. For example, an earthquake might have a significant impact on local industrial production yet have very little effect on agricultural production, (or vice versa in the case of a hurricane). Just as important, the society’s endogenous structures (both social and economic) will be mostly intact following the short, natural disaster. These can include trade groups, business associations, church groups and regulatory authorities. In contrast, a complex emergency will often exhibit a breakdown of most of those structures. Additionally, years of war, conflict or displacement may have completely destroyed particular industries.

As a result of these significant differences, the design of any given shelter program must take into account these different contexts in order to maximize economic benefit. For example, in responding to the earthquake in El-Salvador in 2001, CHF International utilized an “Emergency Transitional Shelter” (ETS) that was relatively capital intensive (imported plastic sheeting was used for the walls) and could be constructed in 4-6 hours. The backward linkages of the construction of these units therefore were minimal. However, there were significant positive economic impacts that resulted from forward linkages and the ability of the population to return to work (as suppose to search for shelter). [Sheppard]

In contrast, an emergency shelter program that CHF International implanted in Sri Lanka for displaced people in 2003-2004 utilized more labor intensive technologies. The program, while also having significant impacts through forward linkages (initial estimates demonstrate a multiplier of 3.57), also had demonstrated backward linkage impacts. The shelter units, while designed as “transitional” (core components could be broken down and reconstructed in the households future permanent location), utilized labor intensive technologies such as clay bricks and wooden frames. The program provided vocational training to young men and women working on the shelter units. Also, the program assisted in the creation of local brick making facilities that have helped spur further growth in the construction sector. Similar effects were seen in Kosovo following a

CHF International winterization program there in 1998. There, the utilization of local materials and skills helped create business associations and spur growth of the local construction materials sector which had been previously destroyed by years of conflict.

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The Impact of Shelter Provision on Household Welfare

Many of the studies cited above lack direct empirical evidence of the economic impacts of emergency shelter provision. Others do have empirical evidence but it is drawn from economic situations that differ in important and significant ways from the context of provision of emergency shelter to households in developing economies.

This is problematic for assessing both forward and backward linkages associated with shelter provision, but is particularly problematic in assessing forward linkages. The studies cited above suggest that the combined impact of backward linkages (growth in local economic activity resulting from the construction of housing, purchase of inputs for construction, etc.) is likely to be relatively modest in the context of small to medium sized communities in developing countries. As noted above, the NAHB model developed for application in the context of typical U.S. metropolitan areas suggests that between 65% and 85% of expenditures for house construction accrue as an increase in local income during the first year. It is likely that much of the impact of backward linkages would be manifest during this period. While emphasis on use of local inputs and local labor can help generate as large an impact as possible on the local economy, the small size of many settlements where emergency housing must be provided implies that it is likely that the aggregate increase in local incomes is likely to be considerably less than construction costs.

The generalized impacts of housing provision on the economy via forward linkages, however, are a different story. The sources of such impacts have been discussed above, and include *inter alia* the improved health and productivity of employed members of the household when adequate shelter is provided, Also the availability of the shelter as a productive input to be used as part of a HBE. There will also be increases in local incomes from sales of goods and services (whether of a durable nature for use in the home or of a non-durable nature for consumption) to local households whose purchasing power and economic functionality is enhanced due to provision of the shelter.

The flow of these benefits may be quite persistent, lasting even after the basic components of the initial emergency shelter have been disassembled, moved, or incorporated into some new structure. The initial increase in worker productivity may provide the opportunity for the workers in the household to gain early employment and

early reintegration into the local economy. This translates into an increase in earnings potential that may last for the remainder of their working lives. In providing physical capital inputs for establishing an HBE, the shelter might provide the household with an advantaged position to become established in an emerging marketplace, and this improved competitive position for the household's business enterprise may provide returns that last for years.

Assessing the precise magnitude of these types of impacts is difficult, however, because data are scarce and rarely collected in a way that permits comparison and evaluation of the impacts of emergency shelter provision. While there are many variables that could be measured to provide an indication of the benefits derived from shelter, a reasonable starting point is to examine the impact on household earnings.

What information would be required? Two features are critical: first, the data must include information on incomes before AND after the emergency that has necessitated the provision of shelter. Second, the data must include information on BOTH households who have received shelter assistance AND households who have not. These data are required because over the time period spanning the emergency household incomes in the community will be changing, some going up and some going down³⁹. If housing assistance is effective in generating benefits for households who receive it, then those households who are aid recipients should exhibit larger increases in income or smaller decreases in income over the time period when compared with households who did not receive emergency shelter assistance.

In addition to these basic data, it is desirable to collect information concerning basic household characteristics that could affect the income earning capacity of the household or the likelihood that the household is identified for receipt of emergency

³⁹ It might seem that in a disaster or emergency setting household incomes would in general be falling, but as Albala-Bertrand has comprehensively documented in *The Political Economy of Large Natural Disasters* (1993, Clarendon Press, Oxford), natural disasters are often associated with increases in national income due to the increased effort and expenditures involved in coping with the emergency.

shelter. Consider, for example, if households with young children are systematically favored in allocation of scarce resources for emergency shelter. If the presence of young children also limits the household's ability to take advantage of work opportunities that arise due to improved worker productivity associated with having access to the shelter, then analysis of the data might underestimate the impact on income of shelter provision because the ability of the shelter to enhance earnings is being limited by the competing goal of the aid agency to provide shelter to households with children. These interactions can be at least partially corrected for using statistical analysis if the data are available.

For the present study CHF has conducted household surveys at three sites where some form of emergency shelter has been provided to households during the past 3 years. The sites studied are in Sri Lanka, El Salvador, and Columbia, and are all locations where CHF was involved in shelter provision and administration. Interviews were conducted in the field during the time period of February through April of 2004. The surveys varied slightly between locations, but all followed the basic structure of the Sri Lanka survey that is reproduced in an appendix below. Field administrators were asked to randomly select at least 150 households, at least 100 of whom were recipients of housing assistance and 50 of whom received no housing assistance. As seen in the survey, information was collected on the demographic structure of each household, household earnings from various sources before and after the emergency, household assets for consumption and for earning income, and other relevant variables.

For the data samples collected in each country, two models were estimated. One was a simple linear model that related the percentage increase in household income to housing assistance, household size, the age of the head of household, and an assessment of household vulnerability.

$$\frac{Y_{after} - Y_{before}}{Y_{before}} = \beta_0 + \beta_1 \cdot \text{AidRecipient} + \beta_2 \cdot \text{PersonsInHousehold} + \beta_3 \cdot \text{AgeOfHeadOfHousehold} + \beta_4 \cdot \text{Vulnerable} \quad (1.1)$$

This model results in estimates of the parameter β_1 , whose magnitude indicates the additional percentage increase in income associated with receipt of emergency shelter.

Often relations of this sort are not linear in nature, and in such cases it is helpful to explore alternative functional forms. One type of relationship that is often useful is to relate the logarithm of the increase in income to the dichotomous variables (like shelter and vulnerability status) and the logarithm of other variables (like household size or age

of household head). Since some households experience a decline in income during the period, a “base” is added to all changes in income, so that essentially the dependent variable is the logarithm of the amount by which the household's income increased above and beyond the increase (or decrease) experienced by the most disadvantaged household. The model estimated is given by the equation 1.2 below.

$$\ln(Y_{after} - Y_{before} + base) = \beta_0 + \beta_1 \cdot AidRecipient + \beta_2 \cdot \ln(PersonsInHousehold) + \beta_3 \cdot \ln(AgeOfHeadOfHousehold) + \beta_4 \cdot Vulnerable \quad (1.2)$$

Being non-linear, the calculation of the increase in income attributable to receipt of emergency shelter is more complex, and depends in particular on the values of the other variables included in the model. Comparing values of equation 1.2 when shelter aid status is alternatively set to 0 (no assistance) and 1 (receives assistance) provides the formula for the increase in income associated with emergency shelter:

$$Y_{after} - Y_{before} = (e^{\beta_1} - 1) \cdot e^{\beta_0 + \beta_4 \cdot Vulnerable} AgeOfHeadOfHousehold^{\beta_3} \cdot PersonsInHousehold^{\beta_2} \quad (1.3)$$

In evaluations of the impacts on household income presented below, the sample mean values are used for Vulnerability status, age of head of household and household size.

There are other variables that are available in the data and might be included in a modeling exercise such as this. The variables chosen for inclusion are selected on the basis of producing a consistent set of results across all three locations, and (at least in some cases) statistically significant results.

Changes in income in situations of severe dislocation are of course naturally subject to extreme variation. This “noisy” high-variance process of household income variation can be expected to produce relatively low proportions of total variation explained by the models, and does. In most estimates, however, the parameter β_1 associated with shelter assistance is statistically significant at levels generally used for such tests. In all cases, the parameter is correctly signed.

Estimates for the logarithmic model 1.2, applied in each of the three countries are presented in Figure 8 below. The estimates for the linear model 1.1 are presented in Figure 9. Following these tables we present some descriptive statistics and calculate the income multipliers implied by each model.

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Figure 8: Impact of Housing Assistance on Income: Logarithmic Model

| El Salvador | | | | |
|------------------------------|---------------------|-----------------------|---------------|---------------------------|
| <i>Regression Statistics</i> | | | | |
| R Square | 0.0267 | | | |
| Adjusted R Square | 0.0078 | | | |
| Standard Error | 0.5107 | | | |
| Observations | 210 | | | |
| | <i>Coefficients</i> | <i>Standard Error</i> | <i>t Stat</i> | <i>P-value</i> |
| Intercept | 6.3821 | 0.4788 | 13.3290 | 0.00 |
| Recipient | 0.0380 | 0.0804 | 0.4725 | 0.64 |
| Persons in household | -0.1579 | 0.0835 | -1.8905 | 0.06 |
| Age of head of household | -0.1574 | 0.1145 | -1.3743 | 0.17 |
| Vulnerable | 0.0565 | 0.0793 | 0.7120 | 0.48 |
| Colombia | | | | |
| <i>Regression Statistics</i> | | | | |
| R Square | 0.0341 | | | |
| Adjusted R Square | 0.0157 | | | |
| Standard Error | 0.9447 | | | |
| Observations | 215 | | | (Exclude 7 outlier cases) |
| | <i>Coefficients</i> | <i>Standard Error</i> | <i>t Stat</i> | <i>P-value</i> |
| Intercept | 11.3203 | 0.7451 | 15.1932 | 0.00 |
| Recipient | 0.3063 | 0.1551 | 1.9751 | 0.05 |
| Persons in household | -0.1264 | 0.1978 | -0.6390 | 0.52 |
| Age of head of household | 0.3891 | 0.1944 | 2.0015 | 0.05 |
| Displaced | -0.2777 | 0.1808 | -1.5362 | 0.13 |
| Sri Lanka | | | | |
| <i>Regression Statistics</i> | | | | |
| R Square | 0.0962 | | | |
| Adjusted R Square | 0.0713 | | | |
| Standard Error | 0.7085 | | | |
| Observations | 150 | | | |
| | <i>Coefficients</i> | <i>Standard Error</i> | <i>t Stat</i> | <i>P-value</i> |
| Intercept | 5.7453 | 0.9416 | 6.1014 | 0.00 |
| Recipient | 0.3030 | 0.1283 | 2.3627 | 0.02 |
| Persons in household | -0.0726 | 0.1740 | -0.4170 | 0.68 |
| Age of head of household | -0.2480 | 0.2594 | -0.9561 | 0.34 |
| Vulnerable | -0.2985 | 0.1640 | -1.8196 | 0.07 |

Figure 9: Impact of Housing Assistance on Income: Linear Model

El Salvador

| <i>Regression Statistics</i> | | | | |
|------------------------------|---------------------|-----------------------|---------------|----------------|
| R Square | 0.0330 | | | |
| Adjusted R Square | 0.0141 | | | |
| Standard Error | 30.4194 | | | |
| Observations | 210 | | | |
| | <i>Coefficients</i> | <i>Standard Error</i> | <i>t Stat</i> | <i>P-value</i> |
| Intercept | 23.9349 | 10.4758 | 2.2848 | 0.02 |
| Recipient | 5.4971 | 4.7782 | 1.1504 | 0.25 |
| Persons in household | -2.1657 | 1.3738 | -1.5765 | 0.12 |
| Age of head of household | -0.2207 | 0.1660 | -1.3297 | 0.19 |
| Vulnerable | 6.5127 | 4.8034 | 1.3559 | 0.18 |

Colombia

| <i>Regression Statistics</i> | | | | |
|------------------------------|---------------------|-----------------------|---------------|----------------|
| R Square | 0.0315 | | | |
| Adjusted R Square | 0.0137 | | | |
| Standard Error | 24.9188 | | | |
| Observations | 222 | | | |
| | <i>Coefficients</i> | <i>Standard Error</i> | <i>t Stat</i> | <i>P-value</i> |
| Intercept | -0.4298 | 8.2435 | -0.0521 | 0.96 |
| Recipient | 8.5109 | 4.0358 | 2.1089 | 0.04 |
| Persons in household | -0.4496 | 1.1748 | -0.3827 | 0.70 |
| Age of head of household | 0.0815 | 0.1322 | 0.6167 | 0.54 |
| Displaced | 1.1145 | 4.6982 | 0.2372 | 0.81 |

Sri Lanka

| <i>Regression Statistics</i> | | | | |
|------------------------------|---------------------|-----------------------|---------------|----------------|
| R Square | 0.0655 | | | |
| Adjusted R Square | 0.0397 | | | |
| Standard Error | 13.7569 | | | |
| Observations | 150 | | | |
| | <i>Coefficients</i> | <i>Standard Error</i> | <i>t Stat</i> | <i>P-value</i> |
| Intercept | 17.0817 | 6.3739 | 2.6799 | 0.01 |
| Recipient | 1.9518 | 2.4885 | 0.7843 | 0.43 |
| Persons in household | -0.5884 | 0.7877 | -0.7470 | 0.46 |
| Age of head of household | -0.3255 | 0.1284 | -2.5360 | 0.01 |
| Vulnerable | 0.1848 | 3.2100 | 0.0576 | 0.95 |

El Salvador

In early 2001, two earthquakes struck El Salvador, destroying many houses and damaging many others. CHF worked in response to provide a variety of types of assistance, both direct and indirect via NGOs in the country. In particular, CHF was asked to construct over 9000 shelters for emergency use by households. These shelters were delivered to and occupied by households during 2001, and our sample of recipients first occupied their shelters between February and October of that year. The sample was identified and interviewed in March of 2004, so as much as three years had elapsed between first receipt of the shelter and the present. This affords an opportunity to observe a local economy in which considerable time has passed since the aid was given, and therefore provides a reasonable test of the persistence of the income benefits of housing assistance.

Figure 10 presents the average over all shelter recipients of weekly income before and earthquake and afterwards (that is at the present time). During this time period El Salvador has been in the process of adopting the U.S. dollar as the official currency, and all incomes have been converted where required and are reported in dollars.

Figure 10: Income and Assets of Shelter Recipients in El Salvador

| Recipients | Local Currency Weekly Income | | PPP USD Annual Income | |
|----------------------|---------------------------------|--------|--------------------------|---------|
| | Before | After | Before | After |
| Wages | 33.57 | 46.37 | 1745.52 | 2411.20 |
| Other Sources | 44.24 | 50.00 | 2300.27 | 2599.84 |
| Total | 77.80 | 96.37 | 4045.79 | 5011.04 |
| Assets of Recipients | | | | |
| Household | 298.64 | 444.76 | 298.64 | 444.76 |
| Income | 187.60 | 349.74 | 187.60 | 349.74 |
| Total | 486.24 | 794.49 | 486.24 | 794.49 |

Clearly, there is an increase in recipient income over the time period. These changes are due to a variety of factors. We use the models estimated for income change to isolate the portion of change in household income that is attributable to the receipt of shelter assistance.

Having estimates of the change in household income associated with housing assistance, how do we calculate the “multiplier” associated with emergency shelter provision? An increase in household income is a flow that occurs over time, and the investment in emergency shelter is a change in the stock of capital available to the household. To compare the two, one must convert the flow into a present value to compare with the cost of the shelter. Two possible discount rates for calculating the present value of the income flow are considered: 5 percent and 10 percent. Each results in different levels of the multiplier. In addition, multipliers are calculated using both the logarithmic model and the linear model. Finally, the average of the multipliers calculated using each model is presented as a reasonable “central value” that might be taken as an estimate of the income multiplier associated with emergency shelter provision. The results of the calculations are presented in Figure 11.

Figure 11: Multiplier Calculations for El Salvador

| Income Multiplier | | Annual Income Increase | Multiplier r=0.1 | Multiplier r=0.05 |
|-----------------------|----------|------------------------|---------------------|----------------------|
| Cost in \$ of shelter | \$600.00 | | | |
| Log Model | | \$525.54 | 8.7589 | 17.5178 |
| Linear Model | | \$222.40 | 3.7067 | 7.4133 |
| Mid-range estimate | | | 6.2328 | 12.4656 |

The calculations indicate that with a discount rate of 10%, long run multipliers are on the order of 8.7 to 3.7, with 6.2 a reasonable mid-range estimate. Put in straightforward terms, an investment of \$1 million in provision of emergency shelter results in increased income flows that are equivalent to an immediate payback of \$6.2 million. If we are willing to value future income flows more highly and use a discount rate of 5 percent, the multiplier doubles.

These calculations are encouraging for investment in shelter assistance. First, because they indicate that the returns to such assistance are economically significant. Second, they are derived from data collected 3 years after the initial assistance was provided. The long time lag is likely to be the explanation for the imprecision of the model estimates which, though correctly signed, are not statistically significant at levels generally used. Our confidence in these values may be enhanced by comparison with those derived from the other settings.

Columbia

Columbia continues to be affected by internal conflict and forcible expulsion of households from particular areas. In the second half of 2002 and the first half of 2003 the number of persons forced from their homes and communities reached a level not seen in more than 15 years. More than 400 thousand persons are estimated to have been affected, having once resided in over 900 different communities. CHF has been involved in providing a range of relief services, including provision of temporary shelters made available to 2671 families. These families occupied their shelters beginning at times ranging from May 2002 to March 2004.

A sample of these households, and also of households in the regions who have not received shelter assistance was identified and interviewed in April. Figure 12 presents a summary of average levels of income, earnings before and after the dislocation. The value of household assets at present (after the dislocation) is also presented.

Figure 12: Income and Assets of Shelter Recipients in Columbia

| | Local Currency | | PPP USD | | 0.001197 |
|---------------|----------------------|-----------|------------------|-------|----------|
| | Income of Recipients | | Annual HH Income | | |
| | Before | After | Before | After | |
| Wages | 64529.55 | 84354.61 | 4017.23 | | 5251.42 |
| Other Sources | 116262.41 | 85588.65 | 7237.81 | | 5328.25 |
| Total | 180791.96 | 169943.26 | 11255.04 | | 10579.67 |
| | Assets of Recipients | | | | |
| Household | NA | 167757.45 | | NA | 200.84 |
| Income | NA | 17730.50 | | NA | 21.23 |
| Total | NA | 185487.94 | | NA | 222.07 |

The estimated models presented in Figures 8 and 9 above indicate that the impact of receiving shelter assistance has a statistically significant impact on change in household income. This is true whether we use the logarithmic model or the linear model. Figure 13 below presents the multiplier values that are implied by these estimates. Documents summarizing program activities suggest that the expenditure per shelter constructed was considerably higher than in the other two locations. This does not, however, seem to have reduced the payoff. The implied multipliers are even larger than those calculated for El Salvador.

Figure 13: Multiplier Calculations for Columbia

| Income Multiplier | Income Increase | Multiplier | Multiplier |
|----------------------------------|-----------------|------------|------------|
| Cost in \$ of shelter \$3,043.00 | | r=0.1 | r=0.05 |
| Log Model | \$5,218.60 | 17.1495 | 34.2990 |
| Linear Model | \$957.91 | 3.1479 | 6.2958 |
| Mid-range estimate | | 10.1487 | 20.2974 |

Even with the range of occupation times for shelter recipients, the estimated model indicates a clear, statistically significant impact of shelter assistance on household income. This translates into multipliers that are surprisingly large, indicating that an investment of \$1 million in shelter assistance provides a payoff in excess of \$10 million.

As with any estimation exercise, caution should always be used in interpretation of the analysis. Different model specifications will give different estimates, and while no models were found that performed significantly better than the one used, such models may exist. Nevertheless, these results are consistent with those estimated using data collected in El Salvador, and serve to increase confidence in the general magnitudes of estimated impacts.

Sri Lanka

The final example uses data collected from Sri Lanka, where a ceasefire agreement in 2002 between the government and Tamil rebels permitted the beginning of a process of resettlement of more than 500,000 persons in the Jaffna district. The poorest of these households continue to have difficulty in resettlement, and in response a program involving CHF was begun to provide shelter assistance to 532 households. The program began providing the assistance in October of 2003. A range of shelter assistance was offered depending upon the family size and the presence of vulnerable persons in the family (as defined by UNHCR).

Because of the relatively recent provision of assistance (most households had been in their shelters for only a couple months at the time of the survey) this setting permits us to examine the early stages of economic impact of shelter assistance. In general we expect to see somewhat more modest impacts because time has not permitted full manifestation of forward linkage based effects.

Figure 14 below presents the average income levels before and after relocation, along with indicators of the average assets of households.

Figure 14: Income and Assets of Shelter Recipients in Sri Lanka

| | Local Currency | | PPP USD | | 0.041096 |
|---------------|----------------------|---------|------------------|---------|----------|
| | Income of Recipients | | Annual HH Income | | |
| | Before | After | Before | After | |
| Wages | 606.50 | 686.75 | 1296.08 | 1467.57 | |
| Other Sources | 6.50 | 41.83 | 13.89 | 89.39 | |
| Total | 613.00 | 728.58 | 1309.97 | 1556.96 | |
| | Assets of Recipients | | | | |
| Household | 4017.80 | 2803.80 | 165.11 | 115.22 | |
| Income | 62.25 | 1206.75 | 2.56 | 49.59 | |
| Total | 4080.05 | 4010.55 | 167.67 | 164.82 | |

The estimated models for Sri Lanka indicate positive impacts of housing assistance on household income for both models, with the shelter parameter from the logarithmic model being comfortably statistically significant. Figure 15 shows the calculated multipliers for housing assistance.

Figure 15: Multiplier Calculations for Sri Lanka

| Income Multiplier | Income Increase | Multiplier | Multiplier |
|------------------------------|-----------------|------------|------------|
| MC in \$ of shelter \$320.00 | | r=0.1 | r=0.05 |
| Log Model | \$79.33 | 2.4792 | 4.9584 |
| Linear Model | \$25.57 | 0.7990 | 1.5980 |
| Mid-range estimate | | 1.6391 | 3.2782 |

As expected, the multipliers in the Sri Lanka case are considerably smaller, about one fifth the magnitude of those estimated in Columbia and El Salvador where 2 or 3 years had elapsed between provision of assistance and the survey. Nevertheless, the multipliers estimated from the logarithmic model are greater than one and even the conservative midrange estimates suggest a \$1 million investment in emergency shelter assistance eventually returns at least \$1.64 million in increased household income.

Comparing these results with those presented above suggests it is reasonable to expect an increase in the income impact of this assistance, although there are other potential explanations for the relatively modest multipliers estimated for the Sri Lanka project. The households that were the target of this program were among the poorest of

the displaced persons, lacking human capital and other assets that might assist their return and integration into a recovering economy. Careful monitoring and perhaps subsequent study of this population might be warranted and could help to clarify this results.

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Concluding Remarks

This report has presented a review of the range of studies concerning the economic impact of provision of emergency housing. This impact is understood to derive from both backward and forward linkages. The former are generally better understood and more frequently modeled than the latter. The impacts resulting from backward linkages are likely to be enhanced by reliance on locally produced and procured materials, and local labor for construction. Even with such strategies in place, the impacts themselves seem likely to be relatively modest at the local level, although potentially important to the national economy.

The impacts from forward linkages have been less comprehensively studied, but new understanding is beginning to emerge from a variety of sources. For example, recent research on the importance of home based enterprises suggests that these can be important sources of income for households.

This report has devised a data collection instrument capable of collecting the information required to produce empirical estimates of the overall returns from emergency shelter provision that can be attributed largely to forward linkages. The survey instrument has been applied in three different settings, and statistical models have been estimated to provide an understanding of the link between changes in household income and the provision of shelter assistance.

Calculations based on the estimated models suggest several clear findings:

- The benefits from emergency shelter provision appear to be persistent, lasting well past the immediate emergency that necessitated the assistance.
- The benefits from shelter provision appear to be larger after a period of a year or two has passed to enable forward linkages in the economy to emerge
- Investments in emergency shelter provision provide significant returns, generating a payback conservatively valued at 3 to 8 times the amount of the initial investment.
- Even for the programs serving the poorest and most vulnerable, and given only a short time for benefits to emerge, shelter provision appears to return considerably more than the initial investment.

Survey for CHF Recipients

Household Composition

Mark appropriate box for each of up to seven persons in the household

| | Persons in Household | | | | | | |
|---------------------------------|----------------------|---|---|------------|---|---|---|
| | A | B | C | D | E | F | G |
| 1. Relationship | | | | | | | |
| Head of HH | | | | | | | |
| Spouse | | | | | | | |
| Son | | | | | | | |
| Daughter | | | | | | | |
| Mother /Father | | | | | | | |
| Brother /Sister | | | | | | | |
| Other | | | | | | | |
| 2. Gender | | | | | | | |
| M | | | | | | | |
| F | | | | | | | |
| 3. Age | | | | | | | |
| Under 10 | | | | | | | |
| 10-18 | | | | | | | |
| 19-30 | | | | | | | |
| 30-40 | | | | | | | |
| 40-50 | | | | | | | |
| 50-60 | | | | | | | |
| Over 60 | | | | | | | |
| | | | | | | | |
| 4. Vulnerable Household? | | | | Yes | | | |
| | | | | No | | | |

Income

Enter appropriate amount for up to seven members of the household

| For each member of your household identified at the beginning of the survey: | A | B | C | D | E | F | G |
|---|-----------|---|---|-------------|---|---|---|
| 5. What is the current weekly income from wage earnings? | | | | | | | |
| 6. What were the weekly wage earnings last August? | | | | | | | |
| 7. What is the weekly income of these people from non-wage/private projects? | | | | | | | |
| 8. What was the weekly income of these people from non/wage independent projects last August? | | | | | | | |
| | | | | | | | |
| | Currently | | | Last August | | | |
| 9. List of private activities undertaken for income by persons | | | | | | | |

| | | |
|--|--|--|
| in your household. | | |
| 10. How much weekly income does your household receive from "remittances" (financial support from outside of the household, i.e. Family or friends)? | | |
| 11. Please list any other weekly income you may receive (military pension, government aid etc.). | | |

Housing Information (CHF Recipients)

Please enter response or circle appropriate response

| | | |
|--|-----------|----------|
| 12. Approximately what date was the CHF home completed? | | |
| 13. Were you involved in construction of the home? | Yes | No |
| 14. Were you, or others in your household, paid to work on this home? If so, how much money was your household paid? | Yes No | Amount : |

| | |
|--|--|
| 15. How many days total did people in your household work (paid or unpaid) on construction of your home? | |
| 16. Since the completion of the CHF unit, how many days have household members spent working on the home? | |
| 17. How much money have you spent on the home since the completion of the CHF unit? (This includes furniture, utensils and any item primarily kept in the home) | |
| 18. Rate the overall quality of your current home | (10 being the highest) |
| <div>1 2 3 4 5 6 7 8</div> <div>9 10</div> | |
| 19. Rate the quality of your home in August | (10 being the highest) |
| <div>1 2 3 4 5 6 7 8</div> <div>9 10</div> | |
| 20. Est. # of sq. meters in current home | |
| 21. Est. # of sq meters of home in August | |
| 22. Did you, or other members of your household, receive any training from CHF during the last 6 months? | <div>No Yes</div> |

Asset Information

Please list items and provide estimated value or replacement cost

23. What are the 5 most expensive possessions of your household?

| Owned Today | | Owned in August | |
|-------------|------------|-----------------|------------|
| Item | Est. Price | Item | Est. Price |
| 1. | | 1. | |
| 2. | | 2. | |
| 3. | | 3. | |
| 4. | | 4. | |
| 5. | | 5. | |

24. Please list 5 items in your home that help you earn money, starting with the most valuable (they can be the same as before, include livestock)

| Owned Today | | Owned in August | |
|-------------|------------|-----------------|------------|
| Item | Est. Price | Item | Est. Price |
| 1. | | 1. | |
| 2. | | 2. | |
| 3. | | 3. | |
| 4. | | 4. | |
| 5. | | 5. | |

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Survey for Non-Recipients

Household Composition

Mark appropriate box for each of up to seven persons in the household

| | Persons in Household | | | | | | |
|------------------------|----------------------|---|---|---|---|---|---|
| | A | B | C | D | E | F | G |
| 1. Relationship | | | | | | | |
| Head of HH | | | | | | | |
| Spouse | | | | | | | |
| Son | | | | | | | |
| Daughter | | | | | | | |
| Other | | | | | | | |
| 2. Gender | | | | | | | |
| M | | | | | | | |
| F | | | | | | | |
| 3. Age | | | | | | | |
| Under 10 | | | | | | | |
| 10-18 | | | | | | | |
| 19-30 | | | | | | | |
| 30-40 | | | | | | | |
| 40-50 | | | | | | | |
| 50-60 | | | | | | | |
| Over 60 | | | | | | | |

Income

Enter appropriate amount for up to seven members of the household

| For each member of your household identified at the beginning of the survey: | A | B | C | D | E | F | G |
|---|-----------|---|---|-------------|---|---|---|
| 4. What is the current weekly income from wage earnings? | | | | | | | |
| 5. What were the weekly wage earnings last August? | | | | | | | |
| 6. What is the weekly income of these people from non-wage/private projects? | | | | | | | |
| 7. What was the weekly income of these people from non/wage independent projects last August? | | | | | | | |
| | | | | | | | |
| | Currently | | | Last August | | | |
| 8. List of private activities undertaken for income by persons | | | | | | | |

| | | |
|--------------------|--|--|
| in your household. | | |
|--------------------|--|--|

Housing Information (non CHF Recipients)

Please enter response or circle appropriate response

| | |
|---|------------------------|
| 9. Approximately what date did you move into your current house? | |
| 10. Over the past 6 months, how many days have people in your household worked on improving/construction of your home? | |
| 11. How much money has your household spent on your home or items for your home over the past 6 months? (This includes furniture, utensils and any item primarily kept in the home) | |
| 12. Please rate the overall quality of your current home | (10 being the highest) |
| 1 2 3 4 5 6 7 8 9 10 | |

| | |
|--|------------------------|
| 13. Please rate the quality of your home/living conditions in August | (10 being the highest) |
| <div>1 2 3 4 5 6 7 8</div> <div>9 10</div> | |
| 14. Est. # of sq. meters in current home | |
| 15. Est. # of sq meters of home in August | |

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Asset Information

Please list items and provide estimated value or replacement cost

| | | | |
|---|------------|-----------------|------------|
| 16. What are the 5 most expensive possessions of your household? | | | |
| Owned Today | | Owned in August | |
| Item | Est. Price | Item | Est. Price |
| 1. | | 1. | |
| 2. | | 2. | |
| 3. | | 3. | |
| 4. | | 4. | |
| 5. | | 5. | |
| 17. Please list 5 items in your home that help you earn money, starting with the most valuable (they can be the same as before, include livestock) | | | |
| Owned Today | | Owned in August | |
| Item | Est. Price | Item | Est. Price |
| 1. | | 1. | |
| 2. | | 2. | |
| 3. | | 3. | |
| 4. | | 4. | |
| 5. | | 5. | |