

Assessing the impact of microfinance programming on children: An evaluation from post-tsunami Aceh

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### **Abstract**

*The tsunami on December 24<sup>th</sup>, 2004 devastated the region of Aceh, Indonesia. This article presents an evaluation of the long-term impact of microfinance programs on Acehnese children organized by Save the Children as part of the post tsunami economic recovery effort. The intervention group for the evaluation consisted of 185 microfinance participants, and the comparison group consisted of 192 individuals who did not participate in microfinance programs. All study participants were interviewed through a structured survey instrument, and 155 participants were re-interviewed as part of a sub-study to validate the initial survey results. The study utilized four child protection indicators: diet, health, childcare, and education in contrast to traditional repayment rate indicators. The primary results were insignificant with respect to all four-child protection indicators, suggesting that with respect to these indicators, there was little to no long-term difference between the impact of microfinance on beneficiaries' children and non-beneficiaries' children. These findings signify a need for microfinance actors to move beyond traditional indicators of economic success to evaluate the social changes microfinance programs are presumed to effect.*



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## **Background**

### *Impact of the Conflict and Tsunami on Acehnese Society*

Even before the devastating Asian Tsunami of 2004, the province of Aceh, a region on the island of Sumatra in Indonesia, was suffering both politically and economically. For decades, Aceh served as the battleground for a protracted civil conflict that began in 1976, with The Free Aceh Movement (GAM) fighting for independence against the Indonesian government. This 30-year conflict resulted in an estimated 10,000 deaths and ravaged the social and economic fabric of Acehnese society (Roper & Utz, 2006). Many individuals and families were forced to shift from urban lifestyles and jobs to rural livelihoods, such as fishing and agriculture. Food production and distribution often proved insufficient, leaving 30% of the population living below the poverty line (United Nations, 2005). Due to the imposition of martial law in Aceh, few international NGOs were in Aceh prior to the tsunami to offer services to conflict-affected communities, thus leaving the Acehnese with very little support or aid (Boothby et al., 2010).

In addition to the hardships imposed by poverty and a long-lasting civil war, on the morning of December 26<sup>th</sup>, 2004, Northern Sumatra was hit by a 9.0 earthquake, which triggered a massive tsunami and flooded 11 countries around the Indian Ocean Rim. Aceh was hit the hardest, with an estimated 226,000 dead or missing and approximately 500,000 displaced or left homeless (Brennan & Rimba, 2005).

The economic impact was vast, with an estimated \$4.45 billion in damages to property, 75% of which occurred in rural areas. This damage was particularly devastating due to the fact that a significant number of Acehnese had moved to rural areas during the conflict in an attempt to create livelihoods opportunities in areas less affected by the conflict (Alexander, Chan-

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Halbrendt, & Salim, 2006). The massive waves demolished 63% of fisheries, agriculture, and commerce, the three largest livelihoods in the Aceh region. Additionally, much of the natural environment was destroyed, further diminishing the livelihoods of rural villagers. The environmental damage led to decreased arable land, destroyed coral reefs and rare mangrove swamps, and devastated the coastal zone (Alexander et al., 2006). Not only did it affect the livelihoods of villagers, it permanently damaged much of Aceh's infrastructure. About one third of schools, road networks and hospitals were destroyed. An estimated 115,000 houses were completely demolished while approximately 150,000 were left in poor condition. Overall, the total loss in damages was roughly equal to Aceh's GDP in 2003 (Athukorala & Resosudarmo, 2006).

Of the hundreds of thousands of people who were killed during the tsunami, it can be estimated that 100,000 of these deaths were children (Penrose & Takaki, 2006). Devastation continued after the tsunami, as well. In a rapid health assessment conducted by the World Health Organization (Doocy et al., 2007), young children had one of the highest mortality rates following the tsunami, along with adults aged 70 and older. This may be attributed to a lack of adequate nutrition post tsunami, which had been shown in other post-natural disaster contexts to lead to up to 50% of childhood deaths (Pee et al., 2007). With respect to schooling, while most schools were running two weeks after the tsunami, only 50-60% of children actually attended them out of fear of another tsunami (Pairojkul, Siripul, Prateepchaikul, Kusol, & Puytrakul, 2010). Thus, children in post tsunami affected areas were severely affected and were a vulnerable part of the post-tsunami population.

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In Tsunami-affected regions, including Aceh, many economic recovery programs were implemented to assist in creating jobs in order to rebuild a functioning economy. One model frequently utilized for economic recovery in tsunami-affected areas was microfinance. The Grameen Bank model, first employed in Bangladesh, focuses on market-based institutions that offer credit to poor families who do not usually have access to credit, in order to increase their income and consumption levels through self-employment (Morduch, 1999b). For the past 20 years microfinance has been utilized throughout the world and has been regarded as a successful method to alleviate poverty, thus increasing quality of life (Canadian International Development Agency (CIDA), 2007).

### *Indicators and Challenges of Successful Microfinance Programs*

Grameen Bank has traditionally used, as its main indicator for success, the rate of loan repayment from the borrower. After 35 years of administering microfinance loan programs in Bangladesh, Grameen reported a success rate of up to 98% repayment (Morduch, 1999b). However, the suitability of this indicator to measure program impact has been questioned in recent years. Critics argued that the indicator of repayment rate does not measure the social benefits these programs are meant to foster, nor the negative repercussions that may occur from receiving microfinance loans. Woolcock (1999) noted that there was little research on the wider benefits that microfinance programming is meant to support, in addition to increasing accounts of conflicting social consequences of these programs. He provided an example of how, in order to pay a microfinance debt, a participant may take another loan from a neighbor, thus perpetuating the debt cycle. A study in Bolivia found that there were potentially negative effects on increases in child labor demand because of a microfinance program (Maldonado & Gonzalez-

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Vega, 2008). Additionally, Leatherman and Dunford (2010) discussed how microfinance loans alone did not serve the social needs of the community. However, when a health component was added to their microfinance program, the program had significant success in improving both health and livelihoods within the focused region.

### *Impact of Microfinance With Respect to Children and Families*

With respect to the impact of microfinance on children specifically, some programs seem to have demonstrated positive outcomes. Holvoet (2004) evaluated the impact of microfinance programs in South India and discovered that if a woman was a part of a women's group microfinance program versus a direct bank loan, her children were significantly more likely to be in school or even to attend private school. In fact, Holvoet (2004) found that the children of microfinance recipients in women's groups were 3.2 to 3.9 more likely to be enrolled in private school, and about 2.7 to 3.5 times more likely to be capable of reading and writing.

Other programs, however, seem to have shown mixed results for the children of microfinance borrowers. CIDA (2007), for example, implemented a multi country evaluation in India, Egypt, Tanzania, and Bolivia, all of which have histories of implementing active microfinance programs. The purpose of the evaluation was to examine the participation of children in their parent's microfinance programs, and understand the overall benefit to children among family members who were actively involved in microfinance. The study concluded that when family income levels improved, so did their spending on their children's welfare.

Education was a main focus when income was improved, followed by health care, housing and nutrition (Canadian International Development Agency (CIDA), 2007). Additionally, CIDA found a significant amount of increased involvement of children in the businesses their parents

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have adopted because of the microfinance loan. The positive implications appeared to be that the children received practical and entrepreneurial skills that could be useful to their future careers. However CIDA (2007) also discovered that since 80-85% of microfinance recipients were women, their children were forced to pick up extra roles in the house, increase their time spent on business-related activities and household chores, and decrease their time spent on schooling. In some cases, children were forced to quit school completely, suggesting a negative influence on their future (Canadian International Development Agency (CIDA), 2007).

### *Description of Save the Children's Microfinance Program in Aceh*

Following the tsunami, the international organization Save the Children implemented a host of programs aimed at different areas of recovery. One of these programs, the Economic Recovery Program (ERA), provided cash grants and microcredit loans to tsunami-affected families. Following the perceived success of the ERA program, Save the Children supported two additional microfinance programs intended to improve the economic security to families affected by both the tsunami and the Acehese conflict. One of these programs, the Group-Guarantee Lending and Savings (GGLS), was developed in collaboration with a local service provider, AFDHAL, to provide loans to women, with the hypothesis that mothers would utilize the extra-earned income for the family unit. AFDHAL utilized a "group collateral" approach whereby participants were composed of groups of at least ten women. The hypothesized strength of this method was that if one person was unable to make her loan payment, the entire group would be held accountable for that payment, increasing the likelihood of repayment. The individual defaulter was also expected to repay the group, creating a local form of social accountability (Save the Children, 2008).

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In order to increase beneficiaries' knowledge about managing finances, AFDHAL also implemented a savings program for the borrowers. Save the Children's records indicated that as of October 2008, the program in Aceh reached 2,583 active borrowers and distributed approximately \$108,000 in loans. The savings program also recorded approximately \$53,000 in individual savings (Save the Children, 2008).

### *Save the Children's Evaluation of Microfinance Program*

In 2008, Save the Children implemented a program evaluation of the Group-Guarantee Lending and Savings program. The results of the evaluation indicated the program outcomes were positive. As of October 2008, Save the Children's records stated that the repayment rate of loans was 99%. The other indicators included, but were not limited to total outstanding loan per month; average net income per month of microfinance clients earned from their micro enterprise or business; and percentage of microfinance borrowers who were able to support their children more than before as a result of income earned from microfinance activities

The evaluation produced numerous positive conclusions, one of the most significant of which was that most microfinance borrowers were food secure. Another was that AFDHAL was able to offer microfinance assistance to individuals and families who had no access to any form of loans beforehand. AFDHAL loan recipients utilized 97% of their loans to improve their business and were successful in increasing their savings and assets. Finally, the microfinance program was able to increase the regular income of the borrowers (Save the Children, 2008).

The microfinance evaluation suggested that Save the Children and AFDHAL's program had a positive impact on the intervention communities, at least in terms of indicators traditionally used to evaluate microfinance programs (for more on traditional indicators of microfinance, see

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Morduch, 1999). Save the Children, however, is an organization devoted to the well being of children. Save the Children did include one indicator of child impact related to economic improvement; however, like the other indicators, this was based primarily on financial metrics such as increased ability to buy school books for children, as opposed to whether a child actually attends school. In other words, although Save the Children did evaluate child well being from microfinance loans through repayment rate indicators, it was still a financial metric that lacked any social or protective indicators. As such, it is reasonable to conclude that an evaluation examining the program's social impact on children would be beneficial.

### **The Study**

#### *Purpose of The Study*

In June of 2010, Columbia University, the Women's Refugee Commission and the University of Indonesia were invited by Save the Children to undertake an evaluation to examine the impact of the Group-Guarantee Lending and Savings program on the well being of children in order to fill the knowledge gap described above. A team of global advisors supported the development and oversight of the study. Fieldwork was led by one University of Indonesia faculty member, three Acehnese local researchers and two Columbia University masters candidates. A Columbia University faculty member visited the team at the beginning of the fieldwork to provide technical support.

The study aimed to measure the long-term social impacts of Save's post-tsunami microfinance program on children by analyzing the effects on health, childcare, diet, and education. As mentioned in the sections above, in the context of livelihoods research, it is

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commonly assumed that microfinance interventions will be beneficial to low-income families (Morduch, 1999a). The hypothesis of this study was that microfinance programs would positively influence the children of the beneficiaries with respect to the four child protection indicators: diet, health, childcare and education.

### *Indicators of the Study*

The four child protection indicators selected for the evaluation were specifically chosen because they are widely recognized global indicators of the status of children (UNICEF, 2009). Additionally, it was agreed that these indicators would allow for the evaluation of social and child protection outcomes, moving beyond the monetary influence on children. Diet was measured through evaluation of the number of daily meals and what those meals consisted of with respect to normative foods to that region. Health was measured by how often and under what circumstances people were able to access clinics when needed. Childcare was measured by identifying who was caring for younger children, whether parents had time to take care of their children if they were working, and how much responsibility older siblings had for childcare. Finally, schooling was evaluated by drop out and school attendance rates.

### **Methods**

#### *Tools*

A structured survey was the main instrument used to evaluate the four child protection indicators in this study. The survey consisted of 35 questions that covered general demographic information, specific information about family composition and economic status and key questions targeting the four child protection indicators of interest.

#### *Sample*

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The evaluation targeted populations on the northern coast of Aceh Province -Aceh Utara, Bireuen, and Lhokseumawe- that participated in the AFDHAL micro lending program. The complete list of recipients, which numbered 10,000, was culled to include only those who lived in areas impacted by the tsunami. Recipients from regions that were conflict-affected but had not been affected by the tsunami were excluded, thus leaving a sampling frame of 688 individuals.

Sample size was determined based on an assumed group size of ten, a desired power of 80%, a confidence level of 95%, an effect size between 0.2 and 0.3, and a design effect of 2. The effect size estimation was determined to be representative of the level of change that psychological and social interventions generally aim to produce (Ager et. al, 2011). A design effect of two was determined because of the ‘clustering’ of program recipients into micro lending groups of ten or more to utilize the “group collateral approach” (Save the Children, 2008). As a result, the original desired sample size of 75 was doubled, and a sample size of 150 was targeted for the intervention group. This number was increased to 285 based on the already established groups, and the anticipation of large loss to follow up and some refusals to participate in the study.

The comparison group was selected from neighboring villages. Villages were matched as closely as possible to the villages of the intervention group according to specific criteria. The matching criteria included: (1) being in the same district, (2) being similarly affected by the tsunami, (3) having a similar geographic make-up (rural vs. urban), and (4) having a similar population size. Matched communities were also reviewed to ensure similar socio economic status before the tsunami. The national research team worked with the village leaders from the intervention villages to identify the best matches to be selected as comparison villages. A total

of six communities were matched with the nine intervention communities. For a list of matched communities and their characteristics, see Table 1.

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INSERT TABLE 1 ABOUT HERE

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Because comparison villages did not have clustered groups in the same way that the intervention communities did, the research team employed systematic sampling in each comparison village. A sampling interval was determined by dividing the total population of the village by the number of desired interviews – to match the number of interviews obtained in the corresponding intervention village. If the person selected was not home, refused an interview or had participated in a microfinance program, a neighbor was approached for an interview. As women were the primary targets for microfinance loans, the women who took the microfinance loan were the preferred respondents. To accommodate cultural standards, however, if the husband wanted to contribute to the responses, his feedback was also accepted.

A total of 377 individuals participated in the survey with a total response rate of 67%. This included 185 intervention respondents from 19 groups (65% response rate) and 192 comparison group respondents (68% response rate). The primary reasons selected individuals did not participate in the study included not having children (thus making them ineligible). Additionally, in the intervention group, there was a small additional loss to the primary sample due to selected participants having moved from the area since borrowing and ‘fictitious borrowers’. The ‘fictitious borrowers’ came largely from a small number of AFDHAL

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borrowing groups. It was assumed that these unknown people were made up in order to borrow loans for someone else.

### *Secondary Data on School Absenteeism*

An examination of secondary data on school absenteeism was undertaken halfway through the research study in order to validate a portion of the findings from the initial survey. Gaining permission from parents to examine school records also allowed the team to collect a subset of more detailed information on absenteeism, childcare, and child labor.

A sub-sample of the original survey sample was selected and those participants were re-interviewed for two reasons. First, the household survey tool was new and developed specifically for this study, and while it was preliminarily tested prior to field use, the team wanted to ascertain the validity of certain measures. Primarily, the research team desired to test whether there was a bias from mothers reporting their children's enrollment at school. The team sensed that there could be a recall bias, or the desire to appear favorably in light of foreign researchers where there might be something to gain. Second, during the course of research, the research team realized that some of the measures might not capture complete data on the original indicators, and the team wanted the opportunity to clarify some trends. For example, in the original survey, the research team hypothesized that dropping out of school before age 18 would be a common outcome for these families. In an initial analysis, the team came to learn that absenteeism might be more indicative of child well-being in this context, since attrition was fairly low.

In each district, one intervention and one comparison village were selected to further validate the survey by accessing school attendance records of study participants' children. The

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research team returned to the same villages and found the respondents from both intervention and comparison groups, and requested consent to access their children's school records. These participants were also asked where their children went to school, how many days of school their children missed in May of 2010 and in the past year, and the reasons they missed school. The information collected was then compared to the information attained in the school records.

A total of 155 respondents from both groups were visited a second time, found to be home, and agreed to participate (79 respondents from the intervention group and 76 respondents from the control group). Fifty-nine schools were visited, and 315 children's school records were verified from the families that were re-interviewed.

### *Data Analysis*

All data were entered and cleaned in Excel then analyzed in SAS 9.2. All tests were run with a 95% confidence level and all appropriate tests controlled for age, gender and level of tsunami impact.

## **Results**

### *Primary Outcomes*

The multiple logistic regression model was designed to evaluate whether receipt of a microloan ( $X_{\text{prime}}$ ) had an impact on the four primary child well-being indicators, described above. The univariate analysis of the primary outcome measures ( $Y_1, Y_2, Y_3, Y_4$  = enrollment at school until age 18, child attendance at health clinics, primary care-taking responsibilities for children, and diversity of available foods and number of meals per day), were all null at the 5% alpha level, controlling for age, gender, and the degree to which families self-reported the impact of the tsunami on their household (see Table 2).

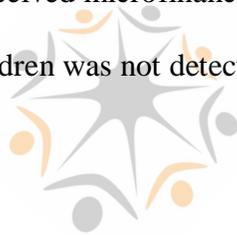


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Health care was measured by whether a child was able to attend a clinic when in need, and if economic circumstances prevented parents from taking the child to a clinic. Both the intervention and comparison groups reported adequate health care for their children. Similarly, no significant difference was found between average number of meals a child ate per day or what types foods they general ate (i.e. rice, meat, fish/egg, vegetables, and dairy). Additionally, no difference was found in terms of the primary caretaker, (i.e. the mother, father, siblings, neighbor, and nanny). Finally, there was no significant difference in parental reports of children's school attendance and drop out rates. The research team found no difference between the households that received microfinance and comparable households, indicating that the impact of the program on children was not detectible in this context, or that there was no salient benefit for child well-being.



### *Secondary Outcomes*

To expand on these primary results, the research team analyzed underlying differences or ecological variation between the groups with varying loan sizes, using secondary indicators. In these bivariate analyses, the team tested the following secondary indicators: self-reported income change before the tsunami ( $T_1$ ), immediately after the tsunami ( $T_2$ ), and at the time of the

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survey (T<sub>3</sub>); usage of assets for business activity; participation of other economic assistance programs, such as cash for work, or asset replacement; and amount of livelihood training received

For the next set of bivariate analysis, the research team tested child enrollment in school and absenteeism on parents' income level "now" (T<sub>3</sub>). The results of these tests were overall not statistically significant at a 95% confidence level (see Table 3). There was one statistically relevant finding, however. Using a two-sample t-test, the average loan amount predicted whether recipients were still engaged in that particular business ( $p = .012$ ), which provisionally suggests that a higher loan amount could make businesses more sustainable over time. Since this was not part of our primary hypothesis, the finding is purely suggestive and should be explored further.

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### *Survey Validation Outcomes With Absenteeism*

Paired t-tests were used to compare the average number of reported absences from the mother with the average number of reported absences from school records. The difference between the average absences reported in May was not statistically significant, suggesting that mothers could generally estimate accurately within a month. When running the same test using the average absences during the school year, there was a statistically significant difference in

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average absences ( $t = 2.174$ ,  $p = .032$ ). This suggests that recall bias was too great to rely on schooling information remembered for an entire year.

Using the survey validation data, the team tested whether there was a difference between group statuses in annual average absenteeism. Since the data came from a smaller sample ( $n = 155$ ), the results of these tests were less robust. However, there were on average 2.5 more days missed per year in the comparison group ( $9.07$  v  $6.4$  days per year,  $p = .0216$ ) compared with the intervention group.

In the survey, school absence was categorized as ‘unexcused’ or ‘excused’, which included illness and family affairs. The difference in total absenteeism between groups was consistent with the results of testing ‘unexcused’ vs. ‘excused’. The comparison group, on average, missed 5.7 days without parental excuse annually, compared to the intervention group missing 3.5 days. However, the difference in absences, whether they were excused or unexcused did not suggest significantly relevant issues in this situation, since two extra days of school is unlikely to have a significant impact on child well-being (see Table 4).

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INSERT TABLE 4 ABOUT HERE

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### Discussion

The findings of this study indicate that there was no apparent long-term difference when comparing the intervention and comparison group, with respect to the four child protection

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indicators. As mentioned above, health care was measured by whether a child was able to attend a clinic when in need, and if economic circumstances prevented parents from taking the child to a clinic. The lack of a statistical difference between the two groups was attributed to the free government health care system (JPS) in both groups, and was reported to adequately address health needs in both study populations.

Both groups appeared to have similar access to food. Meat was reported to be prohibitively expensive for many of the families, with the main protein source reported to be dried fish. There was some variation in the number of meals per week that included meat, vegetables and dairy, but these trends seemed to follow the poverty level of each family, and were not different based on intervention or comparison status.

Although there was no notable differences between intervention and comparison groups, findings indicate that primary care-taking of younger children is undertaken by mostly by older siblings, raising questions about the burden of responsibility that is placed on young people in this context.

Certain findings of this study contradict previous evaluations of microfinance programs. For example, unlike the CIDA report (2007), this research found there was no increase in school drop out rates associated with participation in a microfinance program. In another study, Holvoet (2004) found that children of mothers who participated in group microfinance programs were more likely to stay in school, while this study found that children were just as likely to be in school, regardless of mother's participation in microfinance programming. This suggests that more studies fusing economic indicators and child protection indicators such as schooling need to occur in order to find consistency.

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These findings do not imply that economic rehabilitation programs are unnecessary or unproductive. However, this evaluation suggests that it might be necessary to include other social indicators that match an organization's mission, such as child protection indicators in the case of Save the Children. Those indicators would allow program implementers to better understand social outcomes, in addition to financial ones. With more complete information, organizations can better adapt their microfinance programs to accommodate the financial and social needs of program participants. In their program evaluation, for example, Leatherman and Dunford (2010) identified a significant problem in health within the region they were working, and built in a health-training component to their microfinance program. The program was then shown to be successful in improving the livelihood *and* health of the participants. For example, with respect to diarrheal diseases, in the Dominican Republic when microcredit alone was given, there was no change in diarrheal disease. When health education was provided alone, the incidence of diarrheal diseases decreased 29%; however when health education was coupled with microcredit, incidence decreased by 43%.

Our study suggests that more research is needed to establish a positive association between microfinance and child well being, possibly at earlier stages in a program cycle in order to maximize desired impact.

### **Limitations**

There are several limitations that need to be considered when evaluating the study. First, the study design was retrospective, which results in disadvantages such as respondents potentially over-exaggerating or minimizing the events, or recall bias. Additionally, a time

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analysis was not incorporated into the survey, meaning that while no statistically significant difference between the intervention and comparison group was found with respect to the microfinance program's influence on child protection indicators, the research team is unaware whether the intervention group was better off than the comparison group anytime before the evaluation was done. This means the intervention group could have risen out of poverty faster because of the microloans, and leveled out a few years later. Unfortunately, the study design did not allow for this measurement.

An important limitation was that some of the case definitions for this study were found to be 'muddy' and could have used further clarification. For example, for the education indicator, the term "dropped out" was not fully defined. "Dropped out" could have implied a child who had not gone to school in months but intended to return (recidivism), or a child who never intended to return to school (attrition).

Two different sampling methods were employed to survey the intervention group and comparison group. This was done because the research team utilized the AFDHAL list of lending groups for the intervention group; however, there was no comparable group list for the comparison villages. This might have lead to undetected differences in the groups, either created or concealed by the different sampling methods. Finally, the tsunami response was ubiquitous. Although the research team attempted to identify 'matched' communities that did not receive microfinance as the comparison group, it is possible there could have been a "spill-over" affect of the benefits from the intervention area to the communities that did not receive those programs.

### **Conclusion**

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There are significant questions that arise from this study on microfinance programs and how “success” is currently determined. Although microfinance programs may appear to be successful economic programs when evaluated by repayment rate indicators, they might not be highly successful when considering other important factors, such child well being or even the social impact on the primary borrower.

If the larger scope of a program is to aid beneficiaries to lift themselves out of poverty, then other determinants of economic and social mobility, such as education and health care accessibility, must also be taken into account when assessing program efficacy.

There are currently no standardized or validated approaches for measuring the impact of microfinance on children beyond economic indicators, such as repayment rates. This evaluation offers one attempt to fill this gap in the existing literature, and attempts to demonstrate that relying on traditional evaluation indicators alone is not enough to understand how livelihood programs are affecting children. These efforts have larger implications within the field of microfinance, in terms of measuring efficacy of programs and true social changes in the lives of the children of borrowers. The subject warrants further study to continue to build the evidence base for linkages between livelihoods and child protection.

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**TABLES**

*Table 1: Sample Selection for Matched Communities*

| <b>Intervention Community</b>   | <b>Matched Comparison Community</b>  | <b>Intervention Community</b>   | <b>Matched Comparison Community</b>  |
|---|--|---|--|
| 1. Gampong Pande<br><i>District:</i> Aceh Utara<br><i>Tsunami Impact:</i> Slight<br><i>Location:</i> Rural<br><i>Population:</i> 1013     | Meucat<br><i>District:</i> Aceh Utara<br><i>Tsunami Impact:</i> Slight<br><i>Location:</i> Rural<br><i>Population:</i> 987               | 6. Meunasah Tengoh<br><i>District:</i> Lhokseumawe<br><i>Tsunami Impact:</i> Slight<br><i>Location:</i> Rural<br><i>Population:</i> 650 | Baloy<br><i>District:</i> Lhokseumawe<br><i>Tsunami Impact:</i> Slight<br><i>Location:</i> Rural<br><i>Population:</i> 650 |
| 2. Keude Aceh<br><i>District:</i> Lhokseumawe<br><i>Tsunami Impact:</i> Slight<br><i>Location:</i> Urban<br><i>Population:</i> 2530       | Kuala Meuraksa<br><i>District:</i> Lhokseumawe<br><i>Tsunami Impact:</i> Moderate<br><i>Location:</i> Rural<br><i>Population:</i> 987    | 7. Aleu Mangki<br><i>District:</i> Bireun<br><i>Tsunami Impact:</i> Moderate<br><i>Location:</i> Rural<br><i>Population:</i> 780        | Linggong<br><i>District:</i> Bireun<br><i>Tsunami Impact:</i> Moderate<br><i>Location:</i> Rural<br><i>Population:</i> 753 |
| 3. Mon Geudong<br><i>District:</i> Lhokseumawe<br><i>Tsunami Impact:</i> Slight<br><i>Location:</i> Peri-urban<br><i>Population:</i> 5400 | Kuala Meuraksa<br><i>District:</i> Lhokseumawe<br><i>Tsunami Impact:</i> Moderate<br><i>Location:</i> Urban<br><i>Population:</i> 2530   | 8. Gp Melinteung<br><i>District:</i> Bireun<br><i>Tsunami Impact:</i> Moderate<br><i>Location:</i> Rural<br><i>Population:</i> 311      | Linggong<br><i>District:</i> Bireun<br><i>Tsunami Impact:</i> Moderate<br><i>Location:</i> Rural<br><i>Population:</i> 753 |
| 4. Pusong Baru<br><i>District:</i> Lhokseumawe<br><i>Tsunami Impact:</i> Severe<br><i>Location:</i> Peri-urban<br><i>Population:</i> 5700 | Pusong Lama<br><i>District:</i> Lhokseumawe<br><i>Tsunami Impact:</i> Severe<br><i>Location:</i> Peri-urban<br><i>Population:</i> 4980   | 9. Alue Bie<br><i>District:</i> Bireun<br><i>Tsunami Impact:</i> Moderate<br><i>Location:</i> Rural<br><i>Population:</i> 300           | Linggong<br><i>District:</i> Bireun<br><i>Tsunami Impact:</i> Moderate<br><i>Location:</i> Rural<br><i>Population:</i> 753 |
| 5. Cot Mamplam<br><i>District:</i> Lhokseumawe<br><i>Tsunami Impact:</i> Slight<br><i>Location:</i> Rural<br><i>Population:</i> 2800      | Meunasah Manyang<br><i>District:</i> Lhokseumawe<br><i>Tsunami Impact:</i> Moderate<br><i>Location:</i> Rural<br><i>Population:</i> 1382 |   |  |

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Table 2: Primary Outcomes

| INDICATOR   | TEST  | Adjusted OR | P-Value |
|---|---|-------------|---------|
| <b>Primary Outcomes: N= 377</b>                               |   |             |         |
| - School Enrollment (≤18 enrolled in school = yes vs. no)     | Log procedure controlling for age, gender and tsunami impact level                                | .889        | .75     |
| Clinic Access (No money to take child to clinic = yes vs. no) | Log procedure controlling for age, gender and tsunami impact level                                | 1.614       | .17     |
| Diet (number of meals per day = 3 vs. 2)                      | Log procedure controlling for age, gender and tsunami impact level                                | 1.14        | .77     |
| Child Care (No one vs. someone)                               | Incidence of 'no one' available to take care of the child unobserved or too low to be predictive. | --          | --      |

Table 3. Secondary Outcomes and Demographic Analysis

| INDICATOR   | TEST STATISTIC  | P-VALUE  |
|---|---|--|
| <b>Demographic/Secondary Outcomes:</b>  |   |  |
| o Overall Income Change: (Income fluctuation before, after and now from tsunami between groups)   | - Income before tsunami vs income now t-test=-0.1505;<br>- Income before tsunami vs income after the tsunami t-test=6.4845;<br>- Income now vs income after tsunami t-test=7.1072 | P = 0.8805<br><br>P < 0.0001**<br><br>P < 0.0001** |
| o Size of loan & still engaged in business: (dose X still having original business, Y v. N)   | t = 0.6734  | P = 0.5016   |
| o Amount of Loan and still being engaged in the business: (Y v. N)  | t = -2.5376   | P = 0.012 **                                       |
| o Poverty and School Enrollment (poor now and no school)  | $\chi^2 = .3408$  | P = 0.5590   |
| o Other economic assistance: (Did groups differ on amount of assistance?) N= <ul style="list-style-type: none"> <li>▪ Cash for Work</li> <li>▪ Asset replacement</li> <li>▪ Training</li> <li>▪ All forms combined</li> </ul> | $\chi^2 = 0.1092$<br>$\chi^2 = 2.9175$<br>$\chi^2 = 7.3090$<br>$\chi^2 = 3.1828$  | P = 0.741<br>P = 0.088<br>P = 0.007**<br>P = 0.315 |
| o Poverty & School Absence  | t = -1.7277   | P = 0.0864   |

\*\* = Significance at the p < .05 level

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Table 4. Absenteeism and Survey Validation

| INDICATOR  | TEST STATISTIC                   | P-VALUE            |
|--|----------------------------------|--------------------|
| <b>Validation of Survey Tool: N= 155</b>   |                                  |                    |
| <ul style="list-style-type: none"> <li>• Annual Days Missed (Average between groups)</li> </ul>  | t = 2.3243                       | P=0.02**           |
| <ul style="list-style-type: none"> <li>• Unexcused Absence (Average between groups)</li> </ul>   | t = 2.0753                       | P=0.04**           |
| <ul style="list-style-type: none"> <li>• Mother-Reported vs. School Record Reported (Comparing average # reported)                             <ul style="list-style-type: none"> <li>○ May average</li> <li>○ Annual average</li> </ul> </li> </ul> | t = 1.23<br>t = 2.1737           | P=0.22<br>P=0.03** |
| <ul style="list-style-type: none"> <li>• Child participation after school in:                             <ul style="list-style-type: none"> <li>○ Business (Y vs. N)</li> <li>○ Child Care (Y vs. N)</li> </ul> </li> </ul>                         | $x^2 = 0.0995$<br>$x^2 = 0.4636$ | P=0.75<br>P=0.496  |

\*\* = Significance at the p < .05 level



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