

# ANALYSIS OF EFFECT OF 4 KEY BEHAVIORS ON DIARRHEA PREVENTION



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**Photo Credit: ESP NAD**

Hand washing with soap activity in 2007 by school children at Lampuuk Mukim (hamlet) in Aceh. The event was a collaboration between Field School participants, ESP and Oxfam.

# ANALYSIS OF EFFECT OF 4 KEY BEHAVIORS ON DIARRHEA PREVENTION

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# LIST OF ACRONYMS

ESP	Environmental Services Program
GOI	Government of Indonesia
HH	Health and Hygiene
HW	Hand Washing
HWWS	Hand Washing with Soap
JHU	Johns Hopkins University
MOH	Ministry of Health
MSC	Most Significant Change
SOW	Scope of Work
STMB	National Strategy for Community-Based Total Sanitation in Indonesia



# I. INTRODUCTION

From February 18-27, 2009, Dr. Maria Elena Figueroa, a Johns Hopkins University (JHU) consultant, worked with the ESP Jakarta team, namely the Health and Hygiene Coordinator and Monitoring and Evaluation Specialist, to analyze two waves of data that have been collected using the '10 Minute Monitoring' instrument.

This initial analysis of currently available information will identify factors related to changes in health among survey respondents. The analysis is also intended to provide a framework to rank the four key behaviors regarding their significant impact on reducing the prevalence of diarrhea.

The four key behaviors under assessment include:

1. Hand Washing with Soap (HWWS)
  - 1a. Hand Washing at 5 Critical Times
  - 1b. Hand Washing Technique
2. Improved Sanitation
3. Improved Solid Waste Management
4. Increased Access to Safe Water

The HWWS behavior is divided into two factors to separately assess their individual effects on diarrhea. Hand Washing at 5 Critical Times includes 1) Before eating; 2) After using the restroom; 3) Before feeding the child; 4) After cleaning a child's bottom; and 5) Before preparing food. The Hand Washing Technique refers to the proper way in which one cleans hands with soap. This technique includes the following three steps: 1) Use running water and rub hands and fingers with soap; 2) Rinse hands with running water; and 3) Dry hands with a clean towel. [NOTE: The 10-minute monitoring questionnaire's five steps were used in the data analysis. This specifies the use of soap and running water as separate additional steps.]

The outputs of the assignment are contained in this report and include the following:

1. Quantifying the effect of four key behaviors associated with reduced prevalence of diarrhea based on analysis of existing data from ESP's '10 Minute Monitoring' tool.
2. Recommending changes and/or additional questions to strengthen the '10 Minute Monitoring Tool' in correlating cause to reduced prevalence of diarrhea, while keeping the tool within 10 minutes.
3. Recommendations for strengthening ESP's monitoring and evaluation work, especially as it relates to end-of-project Best Practices and Lessons Learned materials.

## 2. OBJECTIVE/BACKGROUND

This research will help ESP understand what interventions and practices most significantly drive changes in the reduction of diarrhea. The objective is aligned with the Ministry of Health's (MOH) "National Strategy for Community-Based Total Sanitation in Indonesia", or STBM. This strategy was stated by MOH to include the following Five Pillars for Hygiene Behavior Change:

1. Stopping open defecation
2. Hand Washing with Soap (HWWS)
3. Managing safe drinking water and food
4. Proper hygienic management of domestic waste
5. Proper hygienic management of domestic solid waste

This National Strategy stresses the importance of integrating total sanitation behaviors to improve overall sanitation development in Indonesia and to reduce the rate of child mortality as a result of diarrhea. These five hygienic behaviors are promoted by ESP's Health and Hygiene (HH) team in an integrated manner to support the MOH's goals. Research geared towards assessing the causal links between behavior and reduced rates of diarrhea will lay the foundation for effective implementation of the STMB Strategy envisioned by the Government of Indonesia's MOH.

### 3. ANALYSIS METHODOLOGY

To ascertain the effect of each of the key behaviors on diarrhea prevalence the technical consultant (Dr. Maria Elena Figueroa/JHU) conducted a comprehensive statistical data analysis of two of the available four surveys. A statistical analysis of Survey-1 baseline data (implemented in February 2007) and Survey-4 (implemented in December 2008) was conducted to assess the effect of each of the four key behaviors.

This analysis includes three phases:

1. Analysis of descriptive statistics to assess the prevalence of each variable including the outcome variable (diarrhea prevalence), each of the key behaviors, and variables included as controls to account for potential confounders when assessing the independent effect of the key behaviors in diarrhea prevalence.
2. Bivariate analysis between the outcome variable (diarrhea prevalence) and each of the key behaviors to assess statistical correlations.
3. Multivariate regression analysis to assess the independent effect of each of the key behaviors on diarrhea prevalence once potential available confounders are controlled for.

In addition to these analyses, Dr. Figueroa also conducted factor analyses to assess the statistical relevance of a cluster of hygiene behaviors. This analysis rendered significant results about the effect of waste management practices on hand washing with soap at the 5 critical times. Given time limitations for this consultancy, the analysis of the hygiene cluster needs to be continued. The findings thus far of this analysis are included in this report.

A similar analysis using this framework will be conducted by an in-country consultant for Surveys-2 (implemented Oct 2007) and Survey-3 (implemented April 2008). Dr. Figueroa and the in-country consultant will also use this framework to analyze the final survey-5 that is planned to be fielded in May 2009. The analyses of these surveys will be compared to the findings described in this report to further explain the effect of the key behaviors on diarrhea prevention.

## 4. RESULTS

### 4.1. ANALYSIS OF SURVEY-I (BASELINE; DATA COLLECTED IN FEBRUARY 2007)

Results of the analysis of Survey-I data are presented in Table I at the end of this report. Given that this survey was collected in February of 2007, shortly after program activities had started in some areas but not all, we consider this survey a baseline that can be used to assess changes over time on the 4 key behaviors on interest.

At baseline, results in Table I indicate that diarrhea was more likely to happen in households that had the following characteristics: 1) had children older than one year of age; disposed child feces in an unsafely manner; their water source was a public tap; and had unsafe disposal of trash. Results also indicate that diarrhea was less likely to happen in households that had the following characteristics: 1) wash their hands with soap always at the 5 critical times, and 2) had used safe drinking water (in this case water was boiled). Waste management was rarely done at baseline and proper storage of drinking water was also rare. Hand washing techniques were not done either and the only component of hand washing technique that was marginally relevant in preventing diarrhea was the use of running water for hand washing. These results at baseline suggest that hand washing with soap and boiling drinking water were the most significant behaviors contributing to diarrhea prevention. On the other hand, lack of proper disposal of children's feces was also the most significant behavior contributing to diarrhea prevalence at baseline. It was not possible to assess the existence of a hygiene cluster given the lack of some key behaviors at this point in time. We found that for the 5 critical hand washing moments, HWWS after defecation, after cleaning the child's bottom, and before preparing food had a stronger correlation, creating a cluster, than when the other two were included. Findings from Survey-4 (two years later) this cluster of three behaviors seemed to shift to HWWS after defecation, after cleaning the child's bottom and before feeding the child.

### 4.2. ANALYSIS OF SURVEY-4 (DATA COLLECTED IN NOV-DEC 2008)

Table 2 presents seven models of the effect of key behaviors on diarrhea in ESP program areas almost two years after the program started (at Nov-Dec 2008). To appreciate the contribution of the 4 key behaviors on diarrhea prevalence, Model 1 presents the regression of diarrhea prevalence on only control variables such as general characteristics of the household (age of child, age of mother, etc), type of water source and trash disposal available for respondents in the survey. All these variables are consistent across all 7 models and they account for the potential contribution they may have on diarrhea prevention. Failure to include these variables in the regression analysis will overestimate the effect of the 4 key behaviors on diarrhea, which may be due to these other (confounding) factors. Models 2 to 6 include each of the 4 key behaviors separately to assess the "crude" effect of each of them on diarrhea. Model 7 presents the most comprehensive model of this analysis. This model estimates the independent effect of each of these key behaviors on diarrhea when all available potential confounders or controls have been included.

### 4.3. MODEL'S RESULTS

A brief description of each model's results are provided below.

1. Data in Table 2 show that in all 7 models, households who have their trash collected at the neighborhood box, compared to having it collected at home, were more likely to report diarrhea in their youngest child. This is a peculiar finding given that in the analysis of Survey-1 (at the start of the program), the inverse happened, households that had their trash collected at home, compared to those who had it collected at the neighborhood box, were more likely to report child diarrhea. This shift in the effect may suggest different scenarios: 1) trash collection at home two years after the program started may be happening in a cleaner way than when it is just dropped in the neighborhood box; 2) some characteristics of these households' communities (not measured in the survey) make home trash handling safer for children; or 3) program activities have emphasized better waste management practices at home, which have a positive effect on diarrhea prevention. If scenario 3 is a feasible explanation, this variable may be reflecting a programmatic contribution that we cannot totally separate from trash collection services, given the available data. Therefore, taking this variable as a "control" may be underestimating the effect of the "waste management" program efforts on diarrhea prevention in these models.
2. **Model without key behaviors:** From all 7 models in Table 2, Model 1 that only includes control variables and no behaviors is by far the one that explains the least of the variance in diarrhea in the program areas. This model only explains about 5% of the variance as indicated at the bottom of the column and is not statistically significant, indicative of the lack of relevant variables in the model that are associated with diarrhea. This model will become our reference model to compare the added contribution of the key behaviors that follow.
3. **Hand Washing with Soap:** Model 2 adds "hand washing with soap at 5 critical times" to Model 1. The HWWS variable included in this model is a three category variable as shown in the following table:

**Frequency of hand washing with soap (HWWS) at 5 critical times.**

<b>HWWS 5c/times</b>	<b>Freq.</b>	<b>Percent</b>	<b>Cum.</b>
Never	30	3.70	3.70
Irregularly	439	54.13	57.83
Always	342	42.17	100.00
<b>Total</b>	<b>811</b>	<b>100.00</b>	

Results in this model show that respondents who washed their hands with soap "irregularly" and "always" were less likely to have a child with diarrhea compared with those that never HWWS at any of the 5 critical times (about 4% of the sample). The chances of diarrhea prevention are higher among those that always HWWS at the 5 critical times as shown by the high significance level ( $p < .001$ ).

4. **Hand Washing Technique:** Model 3 adds "hand washing technique" to Model 2. Results show that respondents who followed the 5 steps from the 10 minute monitoring tool of proper hand washing, have much lower odds (0.65) of having a child with

diarrhea than those that don't follow all steps. The effect of proper hand washing is protective and statistically significant ( $p < .05$ ). The explanatory power of this model is almost twice (9.0) of that of Model 1 (5.2) and is also statistically significant ( $p < .01$ ).

- Improved Sanitation:** Model 4 shows the results of improved sanitation, measured as safe disposal of children's feces (see table below).

**Safety of child defecation practices and feces disposal**

Def & disposal	Freq.	Percent	Cum.
Very unsafe	113	13.93	13.93
Somewhat unsafe	149	18.37	32.31
Somewhat Safe	76	9.37	41.68
Very safe	473	58.32	100.00
<b>Total</b>	<b>811</b>	<b>100.00</b>	

Results indicate that households where children have safe defecation practices (using the toilet or diapers) and safe feces disposal, have lower odds (0.36) of experiencing diarrhea compared to households that don't have any of these practices (about 14% of the sample). These safe practices are statistically significant and protective against diarrhea in children. Results also suggest that households that follow one of these two practices (safe defecation place and/or safe disposal) also have lower odds but these results are not significant at the 95% confidence level suggesting that the positive effect on diarrhea is gained when both behaviors are in place. Note that the explanatory power of this model (6.3) is not as high as the hand washing models and is also not significant (ns), suggesting that safe defecation practices alone do not contribute significantly to explaining the difference between those who had diarrhea and those who had not (the variance) in the program areas.

- Improved Waste Management:** Model 5 presents the results of improved waste management on diarrhea. This behavioral variable was measured by combining responses on whether households separated their trash and whether they recycled trash (composting, handicraft, selling, etc). The distribution of the resulting behavioral variable shows that about 40% of respondents said that they did not separate or recycle any of their trash, while 3% engaged in separation of all types of trash (organic, metal, etc) and in recycling activities (see below).

**Number of trash separation and recycling activity**

Num actions	Freq.	Percent	Cum.
None 0	322	39.70	39.70
1	24	2.96	42.66
2	91	11.22	53.88
3	65	8.01	61.90
4	118	14.55	76.45
5	84	10.36	86.81
6	80	9.86	96.67
7	27	3.33	100.00
<b>Total</b>	<b>811</b>	<b>100.00</b>	



Results in this model suggest that this variable (waste management practices) does not directly contribute to diarrhea prevention. The odds ratio is negative (0.98), indicative of a negative correlation with diarrhea, but not significant, suggesting that waste management practices alone do not have a direct impact on diarrhea.

**Indirect Effects:** Exploratory analysis of the association between the 4 key behaviors found an “indirect effect” of waste management behavior on diarrhea through its effect on HWWS at the critical times. Table 3 shows the regression models that confirm the positive and significant effect of waste management practices on HWWS. These findings are consistent with results obtained in the formative research that showed that waste management was the “entry” or “gateway” behavior to HWWS at the critical times. The quantitative analysis of Survey-4 confirms these initial findings from the formative research. The results are also very encouraging for HWWS programs in Indonesia as they suggest that waste management can be an entry point to render HWWS sustainable. These findings may also be relevant for HWWS programs elsewhere as they suggest the need to “anchor” or connect this behavior to “context-specific” practices and norms to make it meaningful and sustainable. Going back to the results in Model 5, the only variable that is significant on diarrhea prevention is “trash collection at home” versus collection at the neighborhood box. As described above for Model 1, this variable may also be capturing some program-related activities that we are unable to separate given the available data.

- 7. Access to Safe Water:** Model 6 presents the effect on diarrhea prevention of access to safe water, measured as water covered with lid. Other variables that could be useful in measuring access to safe water such as water treatment practices and treatment technologies did not have useful data for this analysis. All respondents reported boiling their drinking water and almost none of them reported using any other technology such as Air RahMat, Aquatabs, as these technologies are not promoted in these specific project sites. The lack of variance in these water-treatment variables limited the available data that we could use to measure access to safe water. Despite this limitation, the results are very encouraging and make sense given the context and current boiling practices in Indonesia. The table below shows that about 62% reported having all their containers covered with a lid, and a third had some or none of the containers uncovered.

**Drinking water containers covered with lid**

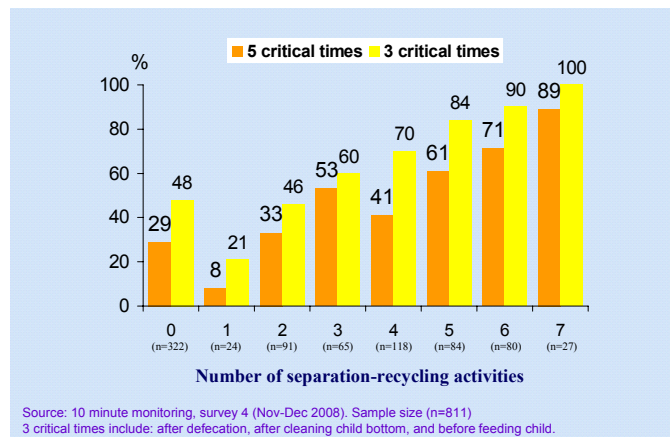
<i>all water containers are covered w/lid</i>	Freq.	Percent	Cum.
NO 0	307	38.38	38.38
YES 1	493	61.63	100.00
<b>Total</b>	<b>800</b>	<b>100.00</b>	

Regression results in this model show that access to safe water alone has a protective and very significant effect on diarrhea prevention. Households that had all their containers covered were significantly less likely (0.37;  $p < .001$ ) to have a child with diarrhea than households who had none or some covered. The explanatory power of this model is as high as that for HWWS and HWW technique and statistically significant.

8. **All 4 key behaviors:** Model 7 is the most comprehensive of all models and shows the independent contribution (effect) of each of the 4 key behaviors on diarrhea when all available controls and all 4 behaviors are included. The results indicate that from the 4 key behaviors, it is HWWS at the 5 critical times, hand washing technique, and access to safe water that contribute the most to diarrhea prevention in households. Safe disposal of child feces loses significance when all other behaviors are included but its effect continues to be protective against diarrhea (negative odds 0.43). Waste management practices were not included in this final model as they have an indirect effect on HWWS as explained before. It is important to note that HW technique following the 5 steps became less significant when all other key behaviors were included (model not shown), but HW technique following 2 steps (excluding drying with towel) remained significant. This finding suggests that using a towel or cloth after HWWS may contribute to hand recontamination given that towels/clothes are generally dirty. Other data can be collected to confirm this hypothesis in the next survey. Data collection for Survey 5 is scheduled for May and June 2009. The explanatory power of this model is the highest of all (11.8), indicative of the significance of these behaviors in diarrhea prevention.

#### 4.4. TESTING THE INDIRECT EFFECT OF WASTE MANAGEMENT ON HAND WASHING WITH SOAP

Exploratory analysis about the association of the four key behaviors identified an indirect effect of waste management practices (trash separation and recycling) on HWWS at the critical times to prevent diarrhea. This positive effect on hand washing with soap at the 5 critical times was tested in regression models that controlled for other household variables available in the data (see Table 3). These variables are the same as those used in the diarrhea models. Time limitations for this analysis prevented the development of a complete path model where this indirect effect can be further tested. The significant effect found in all models shown in Table 3 however suggest that this indirect effect will hold even after other controls have been included in the path model. Results in the five models included in Table 3 clearly show the positive and significant effect of trash separation and trash recycling activities on HWWS at the 5 critical times. Models 2 and 3 show the contribution of each of these variables separately and models 4 and 5 show the effect of these variables combined. The results of these two models suggest that people who engage in more activities are more likely to always wash their hands with soap. This positive and monotonic association between level of waste management activity (number of separation and recycling activities) and hand washing with soap is presented graphically in Graph 1 below. The explanatory power in all models is also statistically significant. Adding waste management and recycling variables to Model 1 almost doubles the explanatory power of each model, indicative of the significant contribution of these behaviors on HWWS at the 5 critical times.

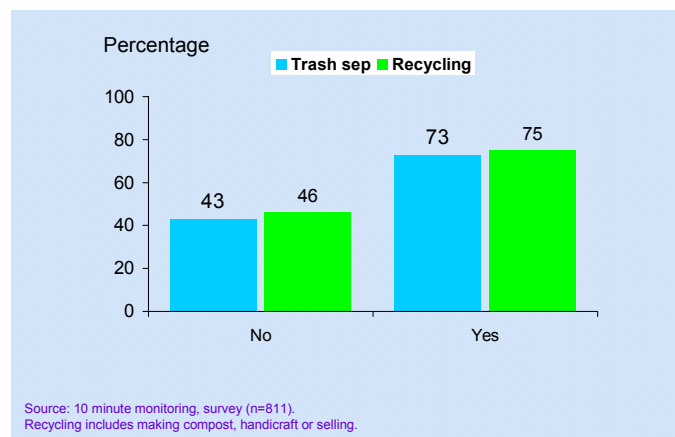


**Graph 1: Percentage of HWWS at 5 and 3 critical times by trash separation & recycling activity**

## 4.5. CLUSTERING OF KEY BEHAVIORS

Initial exploratory analysis of the key behaviors in Survey-4 suggests that behaviors related to use of soap reinforce each other. Besides the association found between waste management and recycling with HWWS, the exploratory analysis also identified an association between waste management and recycling with the use of soap at other 6 non-critical times. Non critical times include the following: 1) Doing laundry; 2) Washing kitchen utensils and appliances; 3) Bathing; 4) Bathing a child or washing a child's hands; 5) Working outside the house; and 6) Cleaning the house.

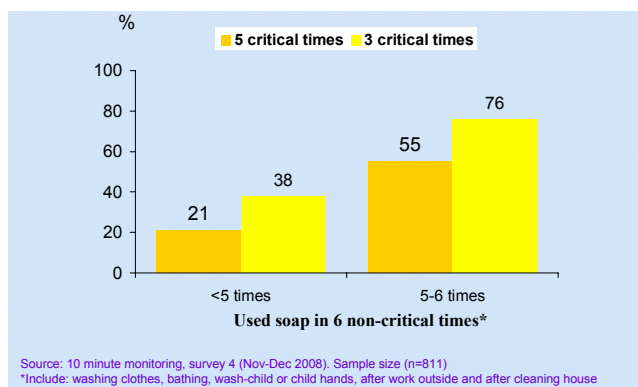
Graph 2 below shows that people who engage in trash separation or in trash recycling are more likely to use soap at 6 of the non-critical times.



**Graph 2: Percentage of use of soap at 6 non-critical times by trash separation & recycling activity**

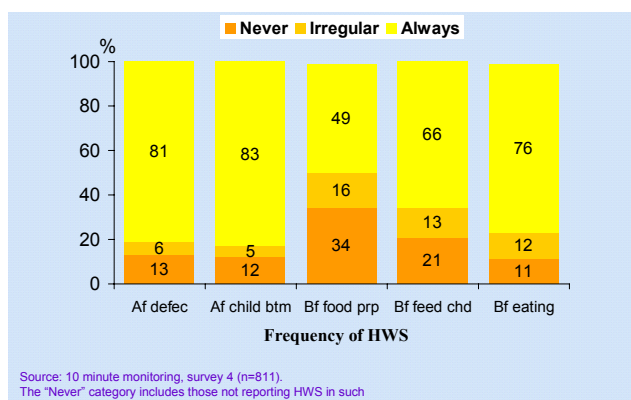
Graph 3 below shows that people who use soap at 5 or 6 of the non-critical times are more likely to wash their hands with soap at the 5 critical times.

**ANALYSIS OF EFFECT OF 4 KEY BEHAVIORS ON DIARRHEA PREVENTION**



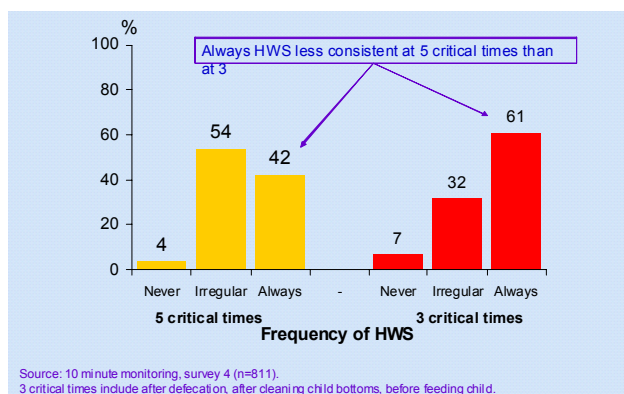
**Graph 3: Percentage of use of soap at 5 or 6 of the non-critical times**

The exploratory analysis of cluster behaviors also found that three of the 5 critical times happen more often. These include HWWS after defecation, after cleaning the child’s bottoms and before feeding the child. Graph 4 below shows how frequent each of the 5 critical HWWS behaviors occurs.



**Graph 4: Percentage of HWWS frequency at 5 critical times. Mini survey 4, all sites**

Graph 5 below shows that HWWS happens more consistently at the three times mentioned above.



**Graph 5: Percentage of HWWS frequency at 5 and 3 critical times. Mini survey 4, all sites**

These findings suggest that analysis of other existing data (Survey-2 and Survey-3) as well as future data (Survey-5) should continue to explore this clustering of the 4 key behaviors.

## 5. CONCLUSIONS AND RECOMMENDATIONS

Overall, we conclude that the models' results provide evidence of the positive effect of the 4 key behaviors on diarrhea prevention. While the data were limited as to the number of controls that we could add to the analysis, we were able to include proxy measures for variables that are known to be associated with diarrhea such as the age of the child, which is significant in the analysis of Survey-1, age of the mother, household socio-economic status (septic toilet was used as proxy), urban-rural residence, adult defecation practices, water source used by the household, and whether it rained in the last weeks prior to the survey. The addition of mother's education and number of children to the final monitoring survey will provide additional control variables that have been shown to have an effect on diarrhea. Likewise, the addition of control communities to the final 10-minute monitoring survey will allow for a stronger claim of effect as we expect that in these communities, the key behaviors will be less frequent than in program areas. The analytical framework used in this analysis suggests that from the 4 key behaviors, HWWS at the 5 critical times, as well as the hand washing technique are the most important behaviors for diarrhea prevention (based on data for Survey-4), followed by access to safe water. Improved sanitation, measured as safe child defecation practices and safe disposal of child feces are less important when the other two are included. Improved waste management does not directly contribute to diarrhea prevalence but contributes "indirectly" through its significant effect on HWWS at the critical times. Therefore, this behavior should be considered as relevant as HWWS for diarrhea prevention.

A similar analysis using this framework will be conducted by an in country consultant for Survey-2 and Survey-3. Dr. Figueroa and the in-country consultant will also use this framework to analyze the final Survey-5 that is planned to be fielded in May 2009. The analyses of these surveys will be compared to the findings described in this report to further explain the effect of the key behaviors on diarrhea prevention. It will also further assess the observation that improved waste management indirectly affects HWWS at the five critical times. ESP will continue linking existing and future findings to support the Ministry of Health's National "Community-Led Total Sanitation" strategy (STBM).

### 5.1. RECOMMENDATIONS TO STRENGTHEN THE 10-MINUTE MONITORING TOOL

To further strengthen the claim regarding effect of the key behaviors on diarrhea prevalence and the effect of program activities on the key behaviors, the following suggestions were discussed and agreed upon with the ESP team Alifah Lestari, Nona Utomo, and Risang Rambatmaja. Team members responsible for these activities and timeline were also identified.

1. Revise and pretest the program exposure module for survey-5: The module will be restructured to start by asking respondents 1) if they have heard of activities about HWWS, waste management, recycling, etc, in the last year. For those with a positive response, the questions to follow will be 2) who in your community/area has been doing these activities (to capture the name of the project ESP or organizations leading them, 3)

ask respondents to indicate what activities of this type have they heard of, and 4) in which of these activities or events have they participated. Within these questions, aided responses need to be included to assist respondents that do not spontaneously mention some of the activities that have been implemented during the last year in program communities. The team will send the module before pretesting to Maria Elena for comments. They will keep Maria Elena in the loop via email as of the results of the pretest and final version of the module. The team agreed that the development of the module and its pretesting, as well as revisions to other questions to the tool, listed below, will be included in the SOW for Risang.

2. Additional revisions to the tool: The analysis of the data for Survey-1 and Survey-4 revealed that some questions need revision to improve the quality of the data and a few others need to be added to better assess program actions and effect and differentiate from structural conditions in the survey areas. For this purpose, the team discussed and agreed on the following revisions to the current tool for Survey-5:
  - a. Ask how many children under 5 years of age live in the household, and how many of these are under one. These variables will provide a proxy for mother's time and learning regarding diarrhea prevention.
  - b. Add the level of education of the mother which will be used as an additional control in the analysis of Survey-5.
  - c. Keep asking if it rained in the last 2 weeks prior to the survey. It seems that this question was asked this way in Survey-1 but differently in later surveys.
  - d. The storage question will be improved by asking "how regularly/often is the drinking water storage container cleaned." We need to provide options for the response such as: 1) daily, 2) 2-3 times a week, 3) once a week, 4) every two weeks, 5) once a month or more. The question as is now, is not useful for analysis because it doesn't provide any information about water safety.
  - e. Add an observation in the hand washing technique section about how clean is the towel used for drying the hands. Options will be: 1) very clean, 2) somewhat clean, 3) not clean. The results of the data analysis from Survey-4 suggest that people who dried their hands with a towel or cloth may have re-contaminated their hands. With this additional question we'll try to better understand the role of towel drying.
  - f. At the end of the survey add an observation for the overall cleanliness inside the house, around the house, and in the neighborhood. Analysis results from survey-1 and survey-4 suggests that the question about trash disposal may be also capturing some program effect that the available data cannot disentangle. By adding this brief observation at the end of the interview, we may be able to separate "cleanliness in the house and its surroundings" from structural trash collection services and cleanliness in the neighborhood.
3. Add control communities for survey-5: One evaluation design that can help strengthen the claim regarding program effectiveness on the 4 key behaviors and of these on diarrhea prevalence is to compare program areas to non-program areas, or controls. To become appropriate controls, the selected areas need to be similar in diarrhea prevalence, hygiene and waste conditions to those in program areas. The team discussed the selection of one area/kecamatan in each of the kecamatans/kabupaten currently in the survey. In the case where the kecamatan is big enough the control group can be taken from the same kecamatan; and if the kecamatan size is too small to allow for this option, an area will be selected within the same sub-district. The team agreed to have completed the selection of these control areas or communities by the end of March, and

to conduct the training of data collectors in April so that data collection is done in May, and data cleaning and analysis in June. The team proposed that the selection of the control areas and training will fall within the responsibility of Alifah and Nona. Data analysis will fall under the responsibility Risang in close collaboration with Alifah.

4. Compile MOH data on diarrhea prevalence: Based on an initial assessment of the diarrhea data obtained from some of the regions and the need to have standard data across regions for comparison purposes, the team agreed to gather the following data for all regions:
  - a. Number of diarrhea cases among children under 5 per month for each of the kecamatan in the program areas.
  - b. Total number of cases per month at the district level.
  - c. Data will be collected at the kecamatan level for each month starting from 2003 or 2004 depending on availability, and up to 2008 for each of the program communities.
5. Conduct trend-analysis of survey merged data: The analysis conducted for surveys 1 and 4 represent an assessment of changes in the key behaviors and their effect on diarrhea between the start of the program and two years after. To supplement this analysis of effect and assess changes over time, a trend analysis of the 5 data points is proposed. To prepare this analysis the following activities need to be undertaken:
  - a. Identify and clean up duplicated cases in Survey-1 and Survey-2, whereby some data entries are doubled. Keep a record of these cases (their “no” number) so they can be deleted in Survey-1 that has been already analyzed.
  - b. Obtain specific responses for the codes “other” in the different questions included in the surveys so they can be assigned a valid code. The “other” category is like a “black box” that needs to be opened by recoding responses to codes that have a specific meaning. Some of the “other” responses have a high frequency and they cannot be analyzed properly as they are. Keep a record of the recoding by identifying the “no” number for each recoding case. These “no” will be needed to recode data in Survey-1 and Survey-4 that have been already analyzed.
  - c. Check for questions with high frequencies of “no data” and when possible, try to recover the data directly from the questionnaires. High frequency includes variables with at least 5% or more of responses having “no data.”
  - d. Once the data have been cleaned as specified in a), b) and c) above, use the same analytical framework developed for the analysis of surveys 1 and 4, and conduct a similar analysis of Survey-2 and Survey-3. It was agreed that this analysis will be conducted by Risang Rambatmaja. For this purpose, Maria Elena gave Risang the log file that contains the variable construction followed for each of the analytical variables included in the analysis of surveys 1 and 4. Risang needs to revise his time given that this process requires focused attention to check the results of each variable, so they compare to those created for Survey-1 and Survey-4.
  - e. Once the regression analyses of Survey-2 and Survey-3 are completed the 4 data sets will be merged so that a trend analysis can be conducted. Data from Survey-5 will also be added to the merged data. Maria Elena and Risang will work together to produce the merged data. The merged data will include all analytical variables used for the regression analysis and the unique identifier for each respondent. Survey-1 will be the reference survey to merge the data. Missing cases in following surveys will be kept as missing in the merged data.

Additional cases that have been included in surveys after Survey-1 will also be included. After including all these cases, it is expected that the merged data will have more than the 914 cases that were included in Survey-1. To merge the file horizontally, variables in each data set will be renamed by adding the number of the survey they belong to. In addition, a dummy variable for each data set will be created to identify each point in time when data collection was conducted.

## 5.2. RECOMMENDATIONS FOR STRENGTHENING ESP'S MONITORING AND EVALUATION WORK

Based on the analysis results from Survey-1 and Survey-4, the following suggestions are proposed to strengthen the last phases of the ESP monitoring and evaluation work

1. Relate some of the cases identified for the end-of-project Best Practices and Lessons Learned to the analysis results obtained for Survey-4. This will provide more in-depth qualitative information that will further explain the quantitative results regarding the 4 key behaviors and their effect on diarrhea.
2. Given the participatory approach of the program, it is suggested to conduct a participatory evaluation in selected communities. These communities could be those identified for the Best Practices and Lessons Learned. One method that can be used for this purpose is the Most Significant Change (MSC) approach. This method seeks to identify the change that the communities regard as the most significant and the reasons for considering it the most significant. Several domains of change can be identified as communities will express what the program meant to them. The purpose of the MSC approach is to have communities reflect on changes brought up by the program and identify those that have been more meaningful "to them." Other approaches that could be added include time analysis to assess changes over time as perceived by the communities. Each community can identify issues of relevance they think have changed and reflect back in time to assess how much progress has been accomplished, and how those changes yield significant benefits.
3. Consider linking other existing data in ESP monitoring (such as the longitudinal study) that can be tied to the monitoring surveys and the MSC approach. More likely these data can be organized in a way that may provide a more in-depth and powerful picture of what the program has accomplished over time and its legacy.
4. Significant data findings regarding interventions and practices that most significantly drive changes in the reduction of diarrhea should be linked to other organizations and agencies with similar initiatives. An evaluation of these results should also suggest how ESP's uniquely integrated approach towards improved sanitation can further support the National STBM strategy put forward by the Ministry of Health.



## 6. APPENDICES

- Appendix I: Logistics Regression Model for diarrhea prevention and 4 key behaviors.  
Ten Minute Monitoring Survey I
- Appendix II: Logistic Regression Models for diarrhea prevention and 4 key behaviors.  
Ten Minute Monitoring Survey 4
- Appendix III: Linear Regression Models for Hand Washing with Soap.
- Appendix IV: Revised 10 Min Monitoring Questions
- Appendix V: Scope of Work for Maria Elena



# APPENDIX I: LOGISTICS REGRESSION MODEL FOR DIARRHEA PREVENTION AND 4 KEY BEHAVIORS. TEN MINUTE MONITORING SURVEY I

**Table 1. Logistic Regression Models for diarrhea prevention and 4 key behaviors. 10-minute monitoring survey-I. Figures are odd ratios.**

Variable	Model I All 4 key behaviors
<b>General characteristics</b>	
Urban residence	1.05
Rained last 2 weeks	2.5**
Child age (6-11 months)	1.36
Child age (12+ months)	2.2**
Mother age (increasing)	1.0
HH has septic tank toilet (SES)	0.84
Adult defecates in HH toilet	1.18
<b>Water Source</b>	
Public tap	2.5*
Unprotected well/spring	1.5
Protected well/spring	0.78
Refill vendor	0.77
Cart/drum	1.89
Refill sealed	1.93
<b>Trash disposal</b>	
At neighborhood box	0.27*
Canal, river	1.67
Left in the open	1.02
Burned or buried	0.97
Other	3.8**
<b>Behaviors</b>	
HWS 5-key times irregularly	1.19
HWS 5-key times always	0.40*
HWS technique –use running water to wash	0.61 ^
Child defecates somewhat safely	0.65
Child defecates safely	0.93
Unsafe disposal of child feces	5.2**
Separates trash	1.1
Water boiled	0.23***
Some water containers covered w/lid	0.53 ^
All water containers covered w/lid	0.69
<b>Sample size</b>	864
<b>Variance explained</b>	12.3
<b>Chi-2 statistic</b>	101.52***

Source: 10-Monitoring survey-4 (Nov-Dec, 2008). All sample (n=811). Variable province was also included in the models but was not statistically significant to decrease or eliminate the effect of the behaviors of interest and therefore is not included in the final models presented in this table. (p<.05); \*\* (p<.01), \*\*\* (p<.001). Absence of (\*) or (ns) indicates value is not significant. ^ Indicates significance at the 10% level (p<.10)

## APPENDIX II: LOGISTIC REGRESSION MODELS FOR DIARRHEA PREVENTION AND 4 KEY BEHAVIORS. TEN MINUTE MONITORING SURVEY 4

**Table 2. Logistic Regression Models for diarrhea prevention and 4 key behaviors. 10-minute monitoring survey-4. Figures are odd ratios.**

Variable	Model 1 No key behaviors	Model 2 Reported HWS	Model 3 Reported HWS & HW Tech.	Model 4 Improved sanitation	Model 5 Improved Waste mgmt	Model 6 Access to Safe water	Model 7 All 4 key behaviors
<b>General characteristics</b>							
Urban residence	0.89	0.67	0.7	0.93	0.88	0.94	0.75
Rained last 2 weeks	0.49	0.44**	0.36*	0.45	0.48	0.34*	0.29**
Child age (increased age/months)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Mother age (increasing)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
HH has septic tank toilet (SES)	0.71	0.72	0.71	0.84	0.71	0.58 ^	0.72
Adult defecates in HH toilet	1.18	1.17	1.17	1.75	1.19	1.31	1.76
<b>Water Source</b>							
Public tap	0.72	0.6	0.6	0.8	0.71	0.86	0.78
Unprotected well/spring	1.60	1.27	1.22	1.58	1.6	1.33	1.13
Protected well/spring	0.83	0.71	0.74	0.80	0.84	0.73	0.68
Refill vendor	1.91	1.89	1.73	2.01	1.87	2.95	2.33
Cart/drum	2.11	2.86	2.54	1.7	2.12	2.01	2.09
Refill sealed	1.91	2.02	2.15	1.85	1.9	2.63	3.07
<b>Trash disposal</b>							
At neighborhood box	4.8***	6.17***	6.61***	4.9***	4.8***	5.75***	7.3***
Canal, river	1.79	2.15	2.29 ^	1.73	1.78	1.93	2.2
Left in the open	2.47 ^	2.72*	2.79*	2.32 ^	2.5 ^	2.78 ^	2.6 ^
Burned or buried	1.42	1.75	1.89	1.4	1.4	1.5	1.7
Other	1.30	1.46	1.53	1.1	1.3	1.1	1.1
<b>Behaviors</b>							
HWS 5-key times irregularly	-	0.30*	0.35*	-	-	-	0.38 ^
HWS 5-key times always	-	0.14***	0.18**	-	-	-	0.22**
HWS technique (1-5 steps)	-	-	0.65*	-	-	-	-
HWS technique (1-4 steps)	-	-	-	-	-	-	0.55*
Dispose child feces somewhat unsafely	-	-	-	0.47 ^	-	-	0.62
Dispose child somewhat safely	-	-	-	0.36 ^	-	-	0.42
Dispose child feces very safely	-	-	-	0.36*	-	-	0.43 ^
Separates and recycles trash	-	-	-	-	0.98	-	-
Water containers all covered w/lid	-	-	-	-	-	0.37***	0.52*
<b>Sample size</b>	786	786	786	786	786	786	775
<b>Variance explained</b>	5.2	8.14	9.0	6.3	5.3	8.0	11.8
<b>Chi-2 statistic</b>	24.4 (ns)	38.1***	41.9**	29.5 (ns)	24.6 (ns)	37.0 **	54.5 ***

Source: 10-Monitoring survey-4 (Nov-Dec, 2008). All sample (n=811).

Variable province was also included in the models but was not statistically significant to decrease or eliminate the effect of the behaviors of interest and therefore is not included in the final models presented in this table.

(p<.05); \*\* (p<.01), \*\*\* (p<.001). Absence of (\*) or (ns) indicates value is not significant.

^ Indicates significance at the 10% level (p<.10)

## APPENDIX III: LINEAR REGRESSION MODELS FOR HAND WASHING WITH SOAP

**Table 3. Linear Regression Models for Hand Washing with Soap.**  
Figures are standardized beta coefficients.

Variable	Model 1 Only control variables	Model 2 Trash Separation	Model 3 Recycling	Model 4 Separation and Recycling	Model 5 Level of Activity (Sep+Recyc)
<b>General characteristics</b>					
Urban residence	-.33***	-.25***	-.23***	-.28***	-.28***
Rained last 2 weeks	.02	.07 ^	.06 ^	.09**	.09**
Child age (increased age/months)	-.03	-.05	-.06 ^	-.05 ^	-.05 ^
Mother age (increasing)	-.01	-.02	-.02	-.03	-.03
HH has septic tank toilet (SES)	.05	.04	.05	.05	.05
Adult defecates in HH toilet	.04	.03	.03	.03	.03
<b>Water Source</b>					
Public tap	.007	.002	-.01	-.02	-.02
Unprotected well/spring	-.17***	-.17***	-.17***	-.18***	-.18***
Protected well/spring	-.11*	-.11*	-.10 ^	-.14**	-.14**
Refill vendor	.01	.03	.03	.05	.05
Cart/drum	.06	.06 ^	.06	.06 ^	.06 ^
Refill sealed	.03	.03	.03	.04	.04
<b>Trash disposal</b>					
At neighborhood box	.08*	.08*	.08*	.08 ^	.08 ^
Canal, river	.03	.04	.04	.05	.05
Left in the open	.05	.03	.04	.01	.01
Burned or buried	.08	.08 ^	.08	.06	.06
Recycled (few cases in this qes)	.06 ^	.04	.03	.003	.003
Other	.01	.001	.03	.02	.02
<b>Waste Management Behaviors</b>					
Trash separation	-	.26***	-	-	-
Recycling trash	-	-	.32***	-	-
Separates & recycles (combined)	-	-	-	.40***	-
<b>Level of separation and recycling</b>					
One activity	-	-	-	-	-.07*
Two	-	-	-	-	.02
Three	-	-	-	-	.12***
Four	-	-	-	-	.16***
Five	-	-	-	-	.27***
Six	-	-	-	-	.28***
Seven	-	-	-	-	.24***
<b>Sample size</b>	807	807	807	807	807
<b>Variance explained (AdjR-2)</b>	0.08	0.14	0.17	0.22	0.23
<b>F-statistic</b>	5.02***	7.8***	9.75***	12.64***	10.59***

## APPENDIX IV: REVISED 10 MIN MONITORING QUESTIONS

Keterpaparan terhadap aktifitas/kegiatan dan materi komunikasi ESP		
E1	Setahu Ibu/ Bapak, pernahkah ada organisasi atau kelompok atau orang yang bekerja di kampung ini untuk menangani masalah air, kebersihan lingkungan, sampah atau kesehatan?	YA ..... TIDAK ..... → E3 TIDAK TAHU ..... → E3
E2	Kalau boleh kami tahu, apa nama organisasi/ kelompok/ orang itu?	ESP ..... A → E6 PROGRAM JASA LINGKUNGAN ..... B → E6 NAMA ORANG (STAF ESP): ..... C → E6 NAMA ORGANISASI (MITRA ESP): ..... D → E6 NAMA ORANG (NON STAF ESP): ..... E NAMA ORGANISASI (NON MITRA ESP): ..... F TIDAK TAHU ..... G
E3	Apakah Ibu/ Bapak pernah melihat ini? TUNJUKKAN SIMBOL ESP	YA ..... 1 → E6 TIDAK ..... 2 TIDAK TAHU ..... 3
E4	Apakah Ibu/ Bapak pernah melihat poster ini? TUNJUKKAN POSTER ESP	YA ..... 1 → E6 TIDAK ..... 2 TIDAK TAHU ..... 3
E5	Apakah Ibu/ Bapak pernah melihat atau mendengar kegiatan berikut...	SOSIALISASI/ PENYULUHAN CUCI TANGAN PAKAI SABUN.. A → E8 MEMBUAT TEMPAT CUCI TANGAN PAKAI SABUN..... B → E8 PENYEDIAAN BERSIH..... C → E8 CARA MEMBUAT AIR SIAP MINUM YANG TEPAT ..... D → E8 DIARE ..... E → E8 ORALIT ..... F → E8 AIR RAHMAT ..... G → E8  PENANGANAN SAMPAH..... H → E8 MEMBUAT KOMPOS DARI SAMPAH DAPUR ..... I → E8 MENGUMPULKAN SAMPAH PLASTIK (BOTOL DLL) ..... J → E8 BERSIH-BERSIH KAMPUNG ..... K → E8 LOMBA KAMPUNG BERSIH..... L → E8  MENANAM POHON ..... M → E8  BUANG AIR BESAR DI TEMPAT YANG BENAR ..... N → E8  LOMBA BALITA ..... O → E8 GERAK JALAN SANTAI..... P → E8 CERDAS CERMAT IBU BALITA ..... Q → E8 LOMBA OLAHRAGA..... R → E8 LOMBA KALIGRAFI ..... S → E8

**ANALYSIS OF EFFECT OF 4 KEY BEHAVIORS ON DIARRHEA PREVENTION**

		KEBERSIHAN SEKOLAH..... T PENGHIJAUAN SEKOLAH..... U LOMBA KEBERSIHAN SEKOLAH ..... V LAINNYA (SEBUTKAN) ..... X TIDAK TAHU SAMA SEKALI ..... Y	→ E8 → E8 → E8 → E8 → STOP
E6	Setahu Ibu/ Bapak, apa kegiatan-kegiatan yang mereka buat? Boleh disebutkan yang Ibu/ Bapak ketahui?	SOSIALISASI/ PENYULUHAN CUCI TANGAN PAKAI SABUN ..... A MEMBUAT TEMPAT CUCI TANGAN PAKIAI SABUN ..... B PENYEDIAAN BERSIH..... C CARA MEMBUAT AIR SIAP MINUM YANG TEPAT ..... D DIARE ..... E ORALIT ..... F AIR RAHMAT ..... G  PENANGANAN SAMPAH..... H MEMBUAT KOMPOS DARI SAMPAH DAPUR..... I MENGUMPULKAN SAMPAH PLASTIK (BOTOL DLL)..... J BERSIH-BERSIH KAMPUNG..... K LOMBA KAMPUNG BERSIH..... L  MENANAM POHON ..... M  BUANG AIR BESAR DI TEMPAT YANG BENAR ..... N  LOMBA BALITA..... O GERAK JALAN SANTAI ..... P CERDAS CERMAT IBU BALITA..... Q LOMBA OLAHRAGA..... R LOMBA KALIGRAFI ..... S  KEBERSIHAN SEKOLAH..... T PENGHIJAUAN SEKOLAH..... U LOMBA KEBERSIHAN SEKOLAH ..... V LAINNYA (SEBUTKAN)..... X	
E7	Apakah Ibu/ Bapak pernah melihat atau mendengar kegiatan berikut...  JANGAN SEBUTKAN YANG SUDAH DISEBUT RESPONDEN DI NOMOR E6	SOSIALISASI/ PENYULUHAN CUCI TANGAN PAKAI SABUN ..... A MEMBUAT TEMPAT CUCI TANGAN PAKIAI SABUN ..... B PENYEDIAAN BERSIH..... C CARA MEMBUAT AIR SIAP MINUM YANG TEPAT ..... D DIARE ..... E ORALIT ..... F AIR RAHMAT ..... G  PENANGANAN SAMPAH..... H MEMBUAT KOMPOS DARI SAMPAH DAPUR..... I MENGUMPULKAN SAMPAH PLASTIK (BOTOL DLL)..... J BERSIH-BERSIH KAMPUNG..... K LOMBA KAMPUNG BERSIH..... L  MENANAM POHON ..... M	

**ANALYSIS OF EFFECT OF 4 KEY BEHAVIORS ON DIARRHEA PREVENTION**

		<p>BUANG AIR BESAR DI TEMPAT YANG BENAR ..... N</p> <p>LOMBA BALITA..... O</p> <p>GERAK JALAN SANTAI ..... P</p> <p>CERDAS CERMAT IBU BALITA..... Q</p> <p>LOMBA OLAHRAGA..... R</p> <p>LOMBA KALIGRAFI ..... S</p> <p>KEBERSIHAN SEKOLAH..... T</p> <p>PENHIJAUAN SEKOLAH..... U</p> <p>LOMBA KEBERSIHAN SEKOLAH ..... V</p> <p>LAINNYA (SEBUTKAN)..... X</p>	
E8	<p>Di antara kegiatan-kegiatan yang Ibu/ Bapak sebutkan tadi, mana yang Ibu/ Bapak ikut berpartisipasi? Apakah..</p> <p>JELASKAN BAHWA MENGIKUTI KEGIATAN BISA BERARTI IKUT DALAM KEPANITIAAN, JADI PESERTA ATAUPUN JADI PENONTON</p> <p>SEBUTKAN KEMBALI JAWABAN NO E5 ATAU E6 DAN E7</p>	<p>SOSIALISASI/ PENYULUHAN CUCI TANGAN PAKAI SABUN ..... A</p> <p>MEMBUAT TEMPAT CUCI TANGAN PAKAI SABUN ..... B</p> <p>PENYEDIAAN BERSIH..... C</p> <p>CARA MEMBUAT AIR SIAP MINUM YANG TEPAT ..... D</p> <p>DIARE ..... E</p> <p>ORALIT ..... F</p> <p>AIR RAHMAT ..... G</p> <p>PENANGANAN SAMPAH..... H</p> <p>MEMBUAT KOMPOS DARI SAMPAH DAPUR..... I</p> <p>MENGUMPULKAN SAMPAH PLASTIK (BOTOL DLL)..... J</p> <p>BERSIH-BERSIH KAMPUNG..... K</p> <p>LOMBA KAMPUNG BERSIH..... L</p> <p>MENANAM POHON ..... M</p> <p>BUANG AIR BESAR DI TEMPAT YANG BENAR ..... N</p> <p>LOMBA BALITA..... O</p> <p>GERAK JALAN SANTAI ..... P</p> <p>CERDAS CERMAT IBU BALITA..... Q</p> <p>LOMBA OLAHRAGA..... R</p> <p>LOMBA KALIGRAFI ..... S</p> <p>KEBERSIHAN SEKOLAH..... T</p> <p>PENHIJAUAN SEKOLAH..... U</p> <p>LOMBA KEBERSIHAN SEKOLAH ..... V</p> <p>LAINNYA (SEBUTKAN)..... X</p>	
E9	<p>Menurut Ibu/ Bapak sendiri, pelajaran-pelajaran apa saja yang Ibu/ Bapak dapatkan dari kegiatan-kegiatan itu?</p>	<p>CUCI TANGAN PAKAI SABUN MENCEGAH DIARE..... A</p> <p>HARUS CUCI TANGAN PAKAI SABUN DI WAKTU-WAKTU TERTENTU..... B</p> <p>CUCI TANGAN PAKAI SABUN MEMBUAT SEHAT..... C</p> <p>AIR HARUS DIREBUS AGAR KELUARGA SEHAT..... D</p> <p>AIR HARUS DIREBUS AGAR TIDAK KENA DIARE..... E</p> <p>DIARE BERBAHAYA BAGI BALITA/ BISA MEMATIKAN ..... F</p> <p>BILA DIARE ANAK DIBERI ORALIT ..... G</p>	



**ANALYSIS OF EFFECT OF 4 KEY BEHAVIORS ON DIARRHEA PREVENTION**

		AIR RAHMAT MEMBUNUH KUMAN DALAM AIR..... H  SAMPAH BISA DIGUNAKAN ULANG.....I SAMPAH BISA BERGUNA UNTUK DIBUAT KOMPOS.....J SAMPAH BISA MENGHASILKAN UANG.....K LINGKUNGAN YANG BERSIH ITU INDAH.....L LINGKUNGAN YANG BERSIH ITU SEHAT.....M LINGKUNGAN YANG BERSIH ITU NYAMAN.....N  BAB SEMBARANGAN BISA MENYEBARKAN PENYAKIT ...O BAB SEMBARANGAN BISA MENCEMARI AIR.....P LAINNYA, SEBUTKAN .....Q LAINNYA, SEBUTKAN .....R																																																							
E10	Darimana Ibu/ Bapak mengetahui tentang kegiatan-kegiatan itu?	KADER POSYANDU.....A GURU.....B PEMANDU LAPANGAN DARI ESP/ ORANG ESP.....C KETUA RT/RW.....D ANAK-ANAK SEKOLAH.....E LAINNYA (SEBUTKAN).....F LAINNYA (SEBUTKAN).....G																																																							
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E11	Apakah Ibu/ Bapak pernah melihat ini?  Apakah Ibu/ Bapak pernah menerimanya?  PERLIHATKAN SATU PER SATU KARTU YANG BERISI MATERI MATERI KUNCI	<table border="1"> <thead> <tr> <th rowspan="2">MATERI KOMUNIKASI ESP</th> <th colspan="2">LIHAT</th> <th colspan="2">MENERIMA</th> </tr> <tr> <th>YA</th> <th>TDK</th> <th>YA</th> <th>TDK</th> </tr> </thead> <tbody> <tr> <td>POSTER 5-3</td> <td>1</td> <td>2</td> <td>1</td> <td>2</td> </tr> <tr> <td>POSTER TANGAN BERSIH MANTAP</td> <td>1</td> <td>2</td> <td>1</td> <td>2</td> </tr> <tr> <td>POSTER MANDA</td> <td>1</td> <td>2</td> <td>1</td> <td></td> </tr> <tr> <td>GAMBAR FECAL ORAL</td> <td>1</td> <td>2</td> <td>1</td> <td>2</td> </tr> <tr> <td>PAMFLET DIARE-CTS</td> <td>1</td> <td>2</td> <td>1</td> <td>2</td> </tr> <tr> <td>BROSUR CGH</td> <td>1</td> <td>2</td> <td>1</td> <td>2</td> </tr> <tr> <td>PERMAINAN ULAR TANGGA</td> <td>1</td> <td>2</td> <td>1</td> <td>2</td> </tr> <tr> <td>MEDIA (TV)</td> <td>1</td> <td>2</td> <td>1</td> <td>2</td> </tr> <tr> <td>TAK PERNAH MELIHAT / MENERIMA MATERI ESP</td> <td>1</td> <td></td> <td>1</td> <td></td> </tr> </tbody> </table>	MATERI KOMUNIKASI ESP	LIHAT		MENERIMA		YA	TDK	YA	TDK	POSTER 5-3	1	2	1	2	POSTER TANGAN BERSIH MANTAP	1	2	1	2	POSTER MANDA	1	2	1		GAMBAR FECAL ORAL	1	2	1	2	PAMFLET DIARE-CTS	1	2	1	2	BROSUR CGH	1	2	1	2	PERMAINAN ULAR TANGGA	1	2	1	2	MEDIA (TV)	1	2	1	2	TAK PERNAH MELIHAT / MENERIMA MATERI ESP	1		1		
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## APPENDIX V: SCOPE OF WORK FOR MARIA ELENA

### SCOPE OF WORK Research & Evaluation Advisor

<b>Consultant Name:</b> (Last, First)	FIGUEROA, MARIA ELENA	<b>Position Title:</b>	Research & Evaluation Advisor
	ENVIRONMENTAL SERVICES PROGRAM (ESP)		
<b>Billing Code:</b>	5300201-101	<b>Contract No:</b>	497-M-00-05-00005-00
<b>Period of Performance:</b>	<b>February 18 through March 13, 2009</b>		
<b>LOE in Indonesia</b>	Up to 10 days, based on 6-day work-week, February 18-28, 2009		
<b>LOE in Home Office</b>	Up to 6 days, over the period of March 2-13, 2009		
<b>Total Level of Effort:</b>	Up to 16 days, over the period of February 18 through March 13,		
<b>Evaluator:</b>	Bill Parente, COP		

### BACKGROUND

The Environmental Services Program (ESP) is a sixty-four month program funded by the United States Agency for International Development (USAID) and implemented under the leadership of Development Alternatives, Inc. (DAI). ESP works with government, private sector, NGOs, community groups and other stakeholders to *promote better health through improved water resources management and expanded access to clean water and sanitation services*. The period of the project is from December 2004 through March 2010. ESP activities are focused on the High Priority Provinces (HPPs) of Nanggroe Aceh Darussalam, North Sumatra, West Java, Central Java/Yogyakarta, East Java, DKI Jakarta and Papua. ESP also works in the eastern Indonesian cities of Ambon, Jayapura and Manado. ESP is part of USAID/Indonesia's Basic Human Services (BHS) Strategic Objective (SO), which focuses on the interdependence of health and the environment, and their effect on health outcomes. USAID/BHS activities strive to improve the quality of three basic human services, water, food/nutrition and health, to improve the lives of Indonesians.

ESP takes a 'Ridge to Reef' approach to link water resources management with improved health. Integrated technical components include Watershed Management and Biodiversity Conservation, focusing on raw water resource conservation and rehabilitation as well as biodiversity conservation; Environmental Services Delivery, ensuring increased access to clean water and sanitation services; Environmental Services Finance, leveraging necessary investment in infrastructure and environmental service rewards; and Strategic Communications for Behavior Change, to stimulate awareness and action on ESP issues from the individual and household level all the way up to the general public and national-level decision makers. ESP also manages cross-cutting technical support including GIS; gender; and small grants. All of ESP's work is implemented in an integrated manner, where links are made among various technical components as well as with other USAID/BHS partners. As ESP field activities mature, ESP has growing networks of community groups, NGOs, government agencies, universities and the media.

## **OBJECTIVES (SCOPE)**

The objective of this SOW is to provide technical assistance to adapt the existing '10 Minute Monitoring' instrument and provide initial analysis of currently available information in order to attribute cause to changes in health among survey respondents. ESP recognizes that '10 Minute Monitoring Tool' results indicate a significant improvement in health among survey respondents to date. This SOW will help ESP understand what interventions and practices most significantly drive these changes. In implementing this SOW, the consultant is expected to work very closely with the Health and Hygiene Coordinator, the Monitoring and Evaluation Specialist, and on-going STTA that provides analysis of '10 Minute Monitoring' work.

## **TASKS (PERFORMANCE REQUIREMENTS)**

Tasks associated with this SOW include the following:

1. Using '10 Minute Monitoring' data quantify the association of each of four key behaviors -- hand washing with soap, improved sanitation, improved solid waste management, and increased access to clean water -- with regard to impact on reduced prevalence of diarrhea.
2. Using '10 Minute Monitoring' data, and by adding additional questions to the survey instrument, determine what action most significantly correlate with reduced prevalence of diarrhea.
3. Provide a framework for ranking the importance of the four key behaviors -- hand washing with soap, improved sanitation, improved solid waste management, and increased access to clean water -- with regard to impact on reduced prevalence of diarrhea.

## **DELIVERABLES**

Deliverables for this SOW include the following:

1. Brief report quantifying the impact of four key behaviors -- hand washing with soap, improved sanitation, improved solid waste management, and increased access to clean water -- associated with reduced prevalence of diarrhea based on analysis of existing data from ESP's '10 Minute Monitoring' tool.
2. Brief report recommending changes and/or additional questions to strengthen the '10 Minute Monitoring Tool' in correlating cause to reduced prevalence of diarrhea.
3. Brief final report with recommendations for strengthening ESP's monitoring and evaluation work, especially as it relates to end-of-project Best Practices and Lessons Learned materials.

## **LOCATION & REPORTING REQUIREMENTS**

Work in-country will be conducted in the ESP office, in Jakarta, with a possible field trip to ground-truth information to be determined during the consultancy. The Consultant will report to the Chief of Party, while working on a day-to-day basis with the Health and Hygiene Coordinator and Monitoring and Evaluation Specialist.

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## **ENVIRONMENTAL SERVICES PROGRAM**

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