

**Evaluation Toolkit and:
Feasibility study to enable Freedom Fone
with voice-based Emergency Data
Exchange
(FF4EDXL)**

~ working document ~

Version 1.0

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1 Purpose

The document assumes that the reader has read the *project report*¹ to gather an in-depth understanding of the the research objectives, design, and outcomes. This document sets the evaluation methodology, formulation of the controlled exercises², and the results. The exercises are for evaluating the technology-enabled processes in issuing alerts, receiving field observation reports, and compiling situational reports. These activities are designed as verification exercises to determine the complexities (interaction techniques, operational efficiency and data quality), usability (human action cycle, gulf of evaluation/execution), and utility (perceived ease of use, usefulness, attitude towards using) of the technologies and procedures. The exercises are to be completed by Sarvodaya Hazard Information Hub Operators (HIHOs) and Community Emergency Response Team (CERT) members.

2 Technologies

The *feasibility study to enable Freedom Fone with voice-based Emergency Data Exchange*³ (FF4EDXL) research introduced the following technologies:

- 1) Freedom Fone⁴ (FF) - an interactive voice enabled interface for exchanging information between HIHO and CERT members. The Interactive Voice Response (IVR) system removes the language and literacy difficulties that are usually observed in, especially, text-based applications.
- 2) Sahana Alerting Broker⁵ (SABRO) - Emergency Data Exchange Language (EDXL) Common Alerting Protocol (CAP) -enabled messaging tool is capable of disseminating a single input of a message through SMS, Email, Web, and RSS. It was enhanced to produce voice-text messages that can be transformed in to audio alerts. Those voice recorded alerts can be received by intended audiences through the FF system.
- 3) Sahana Eden⁶ Situational Reporting Module (Eden-SitRep) – it uses the EDXL-SITREP content standard for managing incident reports. FF4EDXL developed this application comprising components for managing Field Observation Reports (FORs), Casualty and Illness Reports (CasuIll), Situational Information (SitInfo), Response Resource Reports (3Rs), and Management Summary Reports (MngSumm).

3 Research Design

The end users belong to Sri Lanka's largest community-based organization: Lanka Jathika Sarvodaya Shramadana Sangamaya⁷ (abbreviated as Sarvodaya). They are the HIHO and CERT members. The

¹Final Technical Report: <http://lirneasia.net/projects/ff4edxl>

² Meaning of controlled exercises: <http://www.materials.ac.uk/guides/labclasses.asp>

³ FF4EDXL project page: <http://lirneasia.net/projects/2010-12-research-program/ff4edxl/>

⁴ Freedom Fone home page: <http://www.freedomfone.org/>

⁵ Sahana Alerting Broker wiki: <http://www.scdmc.lk/dokuwiki/>

⁶ Sahana Eden wiki: <http://eden.sahanafoundation.org/wiki/>

⁷ Sarvodaya home page: <http://www.sarvodaya.org/>

HIHO are incident command center volunteers at the Sarvodaya Hazard Information Hub (HIH) situated at the Sarvodaya head quarters in Moratuwa. The CERT members are District, Divisional, and Village staff belonging to the Sarvodaya movement. They have a certain level of administrative autonomy at the District level including managing local disasters.

3.1 Actors

The FF4EDXL project selected four districts: Colombo (CO), Matara (MH), Nuwara-eliya (NW), and Ratnapura (RN). These districts had experienced major disaster such as the 2004 tsunami, 2009/2011 floods, and 2010 landslides. Between 11 - 13 CERT members from each district participated in the evaluation process. They were exposed to the FF technology and given training in operating the interactive voice system for receiving Alerts and submitting FORs.

The HIHO underwent a training and certification course. The training involved knowledge on hazards, the technologies (FF, SABRO, and Eden-SitRep), and the standard operating procedures. Those members participated in the controlled-exercises to help evaluate the FF4EDXL technologies and procedures.

3.2 Sequence of activities

The sequence of activities, in Figure 1, are discussed in detail in the sections below. The evaluation tried to understand whether the incident reports received from the field through FF can be used to estimate the required response resources.



Figure 1: sequence of controlled-exercise processes

3.3 Identify a disaster from the past

The exercises first identified a hazard event that all participating members were familiar with and have responded to in the past. They range from natural hazards like tsunami, landslides, floods, cyclone, or human-instigated hazards like war, train derailment, so on and so forth. The researchers guided the participants through this process of determining a specific hazard event. The material to guide the Researchers and the questions to ask the users are described in [Appendix A - Submitting FORs](#).

3.4 Activate CERT & HIHO

Prior to or following a disaster the respective CERT and HIHO members would be notified. Each one of them would have specific responsibilities. In all cases, their response should be to report to their duty stations. HIHO would report to the HIH. Some of the CERT members assemble at the District of Divisional office, while other CERT members may go to the affected areas to send observation reports. All of them would be aware of their duties. They were activated through the alerting process. The main alerting functions, illustrated in [Figure 2](#), are described below.

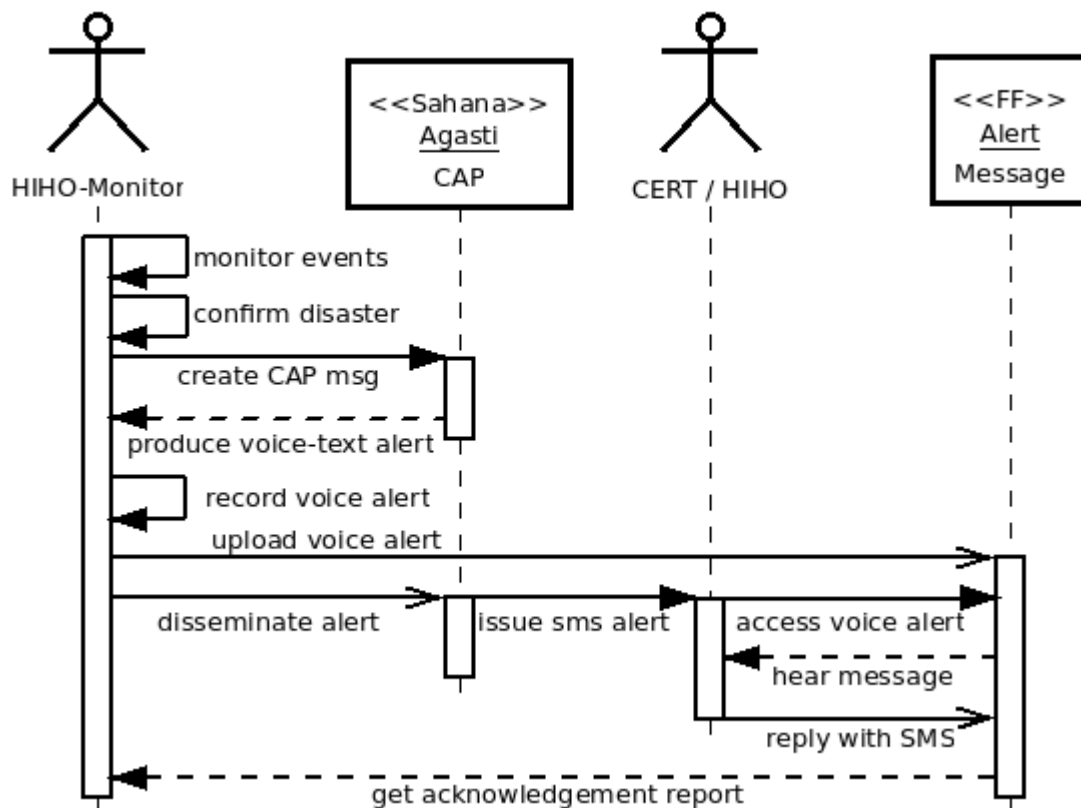


Figure 2: Sequence of functions to activate HIHO and CERT members

1. HIH-Monitor (i.e. HIHO on duty) checks hazard information on the web and reads email and SMS alerts
2. When a disaster is confirmed, the HIH-Monitor will create a CAP message, using SABRO, indicating the nature of the hazard event, location, onset, and other details; intended to notify the CERT and HIHO.
3. That message will generate a voice-text-message.
4. The HIHO-Monitor will use the voice-text message to record a voice audio file and then upload that file to the “new alert” menu item of FF.
5. The CAP message created in step 2, is reused to send an SMS alert to the CERT and HIHO. This alert is intended as a wake-up function and the message will carry minimal information.
6. The CERT and HIHO call FF to listen to the audio alert message created in step 3.
7. Once the message is heard the CERT and HIHO will send a SMS to the same phone number as “ack yes” or “ack no” based on their choice.

3.5 Identify the incidents and response requirements

Prior to the exercises a survey was conducted with the CERT members in the Districts to determine the type of hazard events they had responded in the past (see [APPENDIX A](#)). Based on those events a set

of incidents were suggested by the CERT members. Therefore, the incidents are familiar to them and removes some of the uncertainties. Those incidents were used as the basis to discuss the kind of information that they communicated; namely the content of FORs and 3Rs.

The exercise discussed the operating procedures for communicating the various situational reports such as who would prepare the report and who would authorize the submission of the report.

If we choose “floods” as the hypothetical hazard event, then Table 1 describes several incidents in relation to the flood event. Those incidents require some level of rescue and response to either temporarily or permanently solve those solution. All these require resources such as humans capacity, equipment, services, etc.

Table 1: example set of incidents and response actions required

<i>Incidents</i>	<i>Response required</i>
1) Inundated bridge	Boats to transport goods and people until a temporary bridge is in place
2) Trapped families	Rescue teams and equipment to bring them to a safe area
3) Damaged power lines	Secured power lines and provide temporary sources of lighting
4) Contaminated open wells	Provide temporary water and initiate well cleaning operations
5) Diarrhea cases in Camps	Treat the sick and prevent from spreading

3.6 Submit FOR and complete SITREP

The CERT in the field would send FORs to the HIH. These reports are essential for deriving the response resource requirement. The FOR is the initial report that triggers all incident response activities. The sequence of functions are illustrated in [Figure 2](#).

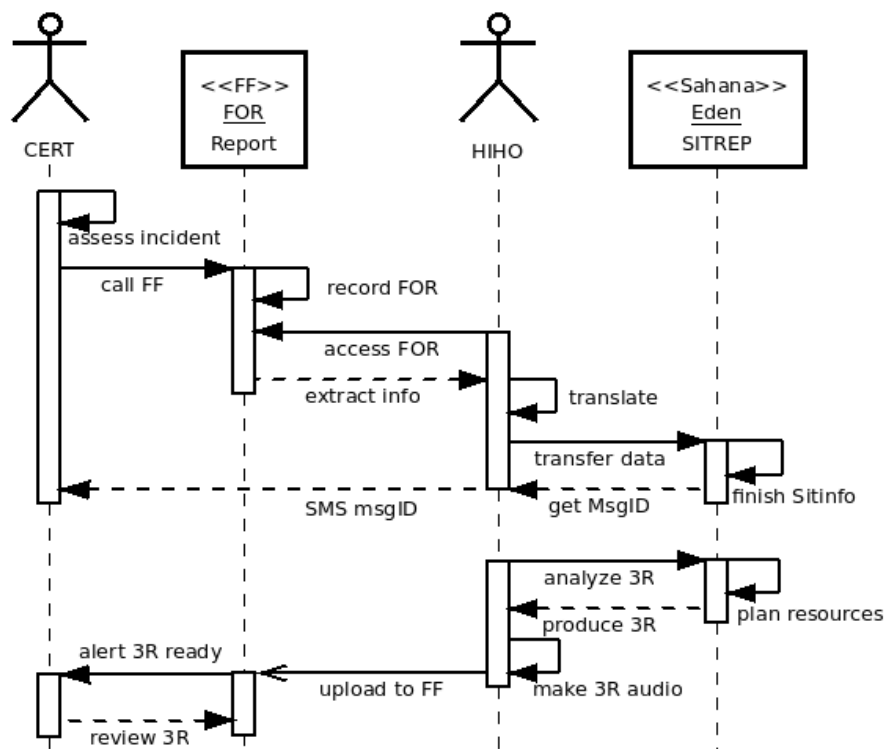


Figure 3: sequence of functions to submit observations, store in SITREP, and plan resources

1. CERT member in the field observe the incidents, then calls FF to record a FOR voice message. CERT members describe the nature of the incident and immediate needs.
2. HIHO will frequently monitor the FF inbox for new messages. Any newly received FOR audio message is played to extract the information.
3. The extracted local language FOR information is translated to English. The translated information is then entered in to the Eden-SitRep forms.
4. If there are missing pieces of information, the the HIHO may call the CERT to obtain those. Thereafter, complete the SITREP information and save that new record in the system.
5. The SITREP message identifier (msgID) is sent in the form of a SMS-text to the CERT member who originally submitted the FOR. The SMS-text with msgID is confirmation that the message was successfully documented and the CERT can use that msgID as a reference to update that FOR information.

3.7 HIHO derive resource response details

Once the SITREP information is completed with the FOR information, the HIHO incident manager estimated the required resources to respond to each of the reported incidents. These actions produced the 3R component of the SITREP. Once the 3R is completed in Eden-SitRep a summary of the 3R is recorded in the form of an audio message, then uploaded to FF for CERT members to retrieve. Once the 3R is ready for review, the HIHO will send a SMS quick-text to the respective CERT member(s) indicating the message is ready for review.

4 Controlled Exercises

The exercises applied a three step holistic approach, recommended by Ambaye (2003), to the system design: orientation, exploration and evaluation, and exploitation. The technologies are designed for collaborative team work; i.e. information exchange between CERT and HIHO members. The collaborative technologies are aimed at enriching emergency management activities within the context.

The evaluation activities, namely the controlled-exercises, followed a format similar to a Table-Top-Exercise. The activities were divided in to *three parts*:

- 1) discussion of the operating procedures
- 2) actual execution of those procedures
- 3) evaluating the outcomes

4.1 Discussion of the operating procedures

The participating HIHO and CERT, first, identified several emergency scenarios based on their past experience and future expectations. They engaged in a short discussion to outline the required information formats and operating procedures for exchanging the information between the central emergency information managers (HIHO) and field level emergency responders (CERT).

4.2 Actual execution of those procedures

The participating HIHO and CERT used the FF and Sahana technologies to communicate those information and practice the operating procedures. The procedures involved:

- 1) HIHO-Monitor alerting other HIHO and CERT members to report to their duty stations
- 2) CERT assessing the incidents and communicating Field Observation Reports (FORs)
- 3) HIHO processing the FORs to create SITREPs and filling in the SitInfo
- 4) Hazard Information Hub (HIH) emergency managers deriving 3Rs

4.3 Evaluating the outcomes

The execution of the procedures followed by another discussion to evaluate the outcome. The final evaluation component of the controlled-exercise is for the participants to express their opinion on the outcome of the controlled-exercise in relation to the use of FF4EDXL technologies for their emergency business practices.

5 Measuring Tools

5.1 Complexities

The complexities of the implemented FF and Sahana combined system was two fold: 1) CERT complexities interacting with FF to receive and supply information and 2) the HIHO reliabilities in issuing alerts and managing the received situational reports.

5.1.1 Interaction Techniques

The CERT interaction with the FF telephony system involves navigating through menu tree and making a phone call to: 1) listen to the Alert (Alerting) and 2) recording a FOR (reporting). The observations documented the ability of the users to select the appropriate menu item for the desired action. The method involves calculating the number of steps taken by the user to access the correct FF menu item. If the user had to repeat the call or had to navigate back to the previous menu options to relocate the path to the correct menu item, then the number of steps take during the return path are added to the overall number of steps.

Appert et al (2004) introduced the length of the sequence, validation actions, and the time taken to attain the desired state. These are key measures in determining Complexity of the Interaction Sequence (CIS). The complexity would be expressed as a function of two measures: 1) the cost of the actions relative to the length of the sequence; 2) the number of actions to solve a problem (or attain a desired outcome). The cost of the action can be related to the number of lives saved or the amount of risk that is reduced. However, this project did not estimate the outcomes in that sense. Instead, simply analyzed the length of the sequence.

5.1.2 Reliability

The reliability factor takes in to account the timeliness and precision of exchanging information. The two measures are:

- 1) Efficiency (mean time to completion)
- 2) Data quality (information completeness)

5.1.2.1 Efficiencies

Sarvodaya CERT members had to develop ad-hoc reports, then send that information across to the HIH via fax or by a voice call. The FF4EDXL introduces standardized reports for submitting incident information. Ideally we would calculate the Mean Time To Completion (MTTC), then assess that against the pre intervention practices to determine the efficiency gains, both qualitatively and quantitatively. Given the resource limitations it was not incorporated in the evaluation scheme.

If such a comparative evaluation scheme were applied, the FF4EDXL intervention may show evidence of compromising the timeliness but may point to benefits in adopting a standardized information exchange practices. However, given the scope of the FF4EDXL research, which was not a comparative study but a feasibility study, it was adequate to determine the MTTC. Then future researchers could leverage these finds as a basis or benchmark for their comparative studies.

The motivation for the MTTC computation is from the technique derived by Strikwerda and Mansharamani (1993). Essentially, our objective is to calculate the mean service time. For the alerting and situational reporting operating procedures, defined in **section 3.2 – sequence of activities**, there are twelve main tasks:

- (1) create SABRO CAP msg
- (2) translate voice-text on paper
- (3) record MP3 voice alert Audacity
- (4) upload new voice alert to FF
- (5) record MP3 for FF alert select menu
- (6) upload new menu select MP3 to FF
- (7) add MP3 to CAP <resource> SABRO
- (8) issue SMS alert from SABRO
- (9) waiting for acknowledgements
- (10) review acknowledgements
- (11) translate FF audio incident reports
- (12) create new SITREP in Eden

The controlled-exercises did not taken in to consideration the mean response time; thus, the response time taken for a CERT member to arrive at the incident location or duty station from the time of receiving the alert or the time taken for HIHO to begin processing FORs from the time the FOR was submitted.

If the phone lines are busy and the CERT cannot connect to the FF system, that would be considered as a dilemma in the response by the FF system, which once again is not taken in to consideration.

5.1.2.2 Quality

Quality of the data received or disseminated will depend on the comprehensibility of that information. The CERT members listened to the alert voice recording in the local language and then determined the required response actions. The HIHO had to transform all the information to the Eden-SitRep. Thereafter, the incident managers (can be the HIHO or other) derived the necessary response resources.

Noise interference and absence of information are key elements that will compromise the quality of the information. The evaluation scheme took in to consideration missing information and the number of communication iterations between the CERT and the HIHO to complete the SITREP.

International Telecommunications Union (ITU) recommends several method to test transmission quality in one's own laboratory (ITU-T, 1996). This study selected the Mean Opinion Score (MOS), Difficulty Score (DS), and Comparison Category Rating (CCR).

Kajackas et al (2011) discuss the speech quality impairing factors limiting the Quality of Service (QoS). These degradation factors are time variant caused by to changing communication conditions such as the weaker QoS immediately following a disaster that may bring down the physical cellular infrastructure.

Mean Opinion Score

Listening MOS is a prediction of the audio stream that is played to the user. This value takes into consideration the audio fidelity and distortion and speech and noise levels, and from this data predicts how a large group of users would rate the quality of the audio they hear. The Listening MOS varies depending on: codec used (wideband or narrowband codec), characteristics of the audio capture device, transcoding or mixing that occurred, defects from packet loss or packet loss concealment, speech level, and background noise. Due to the large number of factors that influence this value, it is most useful to view the Listening MOS statistically rather than by using a single call (Microsoft, 2011).

The research carried out a MOS rating. Drawing from the ITU (1996) MOS recommendation, each researcher listened to the individual messages to rate them on a Likert scale: 1=Bad, 2=Poor, 3=Fair, 4=Good, 5=Excellent. The researchers took into consideration the clarity of the answers as to whether the information provided was comprehensible as well as any circuit noise (mechanical noises), environmental noise (background noise), sidetone (feedback loop caused by the mouth piece), talker echo, and harmful effects of voice-operated devices (Unuth, 2011).

Difficulty score

Difficulty score is an extension of the ITU (1996) percent difficult evaluation method. For the same sample of audio messages used in the MOS exercise, the researchers evaluated each of the audio messages on the ability to listen and transform that information to categorical text-based information.

If the response was *clear* then the respective answer was labeled, else noted as *unclear*. An intermediate category: *partial* was used when the information was incomplete. The number of unresponsive answers were also noted (i.e. *null*). The perception of the difficulty was also recorded by the researchers as remarks.

The reason to include the extra element: null response besides the clear and unclear elements was because missing information (or incomplete information) can lead to false predictions that would subsequently affect the emergency coordination efforts.

Comparison Category Rating

The comparison category rating is also from the ITU (1996) P.800 recommendation. Researchers were presented with a pair of speech samples. First was the reference (or unprocessed) speech sample that was captured on-site with the digital audio recorder. Second was the speech sample transmitted through the telephones and captured by the FF system (or processed). The subjects would rate the processed speech sample relative to the unprocessed one. They used a Likert scale: 3=much better, 2=better, 1=slightly better, 0=absolutely the same, -1=slightly worse, -2=worse, -3=much worse.

5.2 Usability

5.2.1 Human action cycle

This model, based on Psychology of Everyday Things (POET) proposed by Donald Norman but revised in the book: “Design of Everyday Thing” (Norman, 2002). Human action cycle is used to analyze efficiency of a User Interface (UI). The model sets out to describe the steps humans take when they interact with computer systems; i.e., it describes phenomena that have been observed. In this sense, the model is used to predict future outcomes.

The controlled-exercise participants underwent successive iterations of the activities: 1) forming the goal, 2) forming the intention, 3) specifying an action, 4) executing the action, 5) perceiving the state of the world, 6) interpreting the state of the world, and 7) evaluating the outcome. Activities 1) – 3) were formulated during the discussion of the operating procedures, activities 4) – 6) were formulated during the actual execution of those procedures, and activity 7) was formulated during the outcome evaluation stages of the controlled-exercise (see section 4).

Explanation of the activities

1. **Goal** of the HIH-Monitor is to transfer the large volume of field observation reports, arriving at the HIH over FF, in to the Eden-SitRep module for the Sarvodaya emergency coordinators to determine the response resource requirements without delay.
2. **Intent** of the HIHO-Monitor is to expedite the transfer of information from FF to Eden-SitRep by delegating the tasks to other HIHOs.
3. HIHO-Monitor would **specify an action** that requires summoning all HIHO to the SCDMC.
4. To **execute this action** requires the use of the SABRO software to issue an alert to all HIHO in the area.
5. Following the alerting action, the HIHO-Monitor **perception of the state of the world** is what all targeted HIHO did receive the message and would acknowledge the alert soon.
6. The **state of the world is interpreted** through the alert acknowledgement report and assumes that all HIHO who acknowledged would report to duty within the next hour.
7. **Evaluation of the outcome** is determined whether all targeted HIHO received the alert, accurately interpreted the message, acknowledged receiving the alert, and reported for duty on time.

The researchers used CamStudio for documenting the HIHOs' use of the FF, Audacity, and Sahana software. CamStudio is a software that can document a video of the GUI usage over the time duration. The evaluators can review the video to observe the sequence of operations. Some aspects for evaluating the interaction techniques would involve determining the behavior of the user in searching and executing a certain control.

5.2.2 Gulf of Execution/Evaluation

The *gulf of execution* refers to the difference between a user's intentions and the actions that are allowed or permitted by the system. As described in Example 1, the HIH-Monitor intends to summon all other HIHO to resume their duties at the HIH. This action would be permitted. However, if the intent of the HIHO-Monitor is to summon all citizens ready volunteer for resuming duties at the HIH, then this is a restricted action because SABRO does not allow issuing of public alerts. Even if it was possible for the HIHO to send out a multicast of SMS text to all members in his or her phone-book, SABRO short-text template would not provide the flexibility to send details such as the SCDMC

address, instructions to get there, describe the expected duties/skill-set, etc. The evaluators would compare the goals, intentions, and specified actions with that of the system's ability to provide those.

The *gulf of evaluation* refers to the difference between a person's understanding of the state of the system and the actual state of the system. Once again, referring to Example 1, the HIHO-Monitor issuing the alert may think that the contact group: All-HIHO is current and that all HIHO have updated their contact details with the active phone numbers. However, there may be some cases where it is not true. Therefore, the HIHO-Monitor would presume the message was delivered and may attempt to redeliver if an acknowledgment was not received but little does he or she know that the phone number(s) were incorrect.

5.3 Utility

Utility plays a role in the adaptability of the system by Sarvodaya. Specifically, in terms of the benefits that it would provide to their disaster management activities. Consequently utility is included in the evaluation framework to provide insight into the user perceived value of the FF4EDXL proposed system and procedures. In this context, utility measures the satisfaction that arises from use of the ICTs. The Sarvodaya users and decision-makers must see value and investments must show positive outcomes. Here the expected acceptability of the FF4EDXL system is evaluated by adopting components of the Technology Acceptance Model (TAM) proposed by Malhotra and Galletta (1999).

5.3.1 Perceived ease-of-use, usefulness, and attitude

One aspect that the TAM measures is the users' perceived ease-of-use, usefulness, and attitude towards using the ICT. This is a subjective measure comprising a set of question intended for the users to indicate their opinion. The questionnaire was repeated for each component: CERT to receive alerts and submit FOR through FF and HIHO to issue alerts with SABRO, upload the voice-alerts to FF, extract FORs from FF, and use the Eden-SitRep to document the situational reports. CERT members, who were users and decision-makers, were presented with the three TAM components: ease-of-use, usefulness, and attitude towards using. HIHO, who were only users but not decision-makers, were presented with only the ease-of-use component.

The scale from 1 – 5 (5-strongly-agree, 4-agree, 3-moderate, 2-disagree, and 1-strongly-disagree) was used to determine the probability of each technologies ease-of-use and usefulness. The attitude towards using the system was measured such that all things considered the system was perceived to be bad/good, harmful/beneficial, foolish/wise, and negative/positive. These four factors were further distributed along a scale 1 – 7 (e.g. 1-extremely-harmful, 2-quite-harmful, 3-slightly-harmful, 4-Neither-harmful-nor-beneficial, 5-slightly-beneficial, 6-quite-beneficial, 7-extremely-beneficial). Refer to [Appendix A section x.x.x](#) TAM questionnaire.

6 Results and Discussion

6.1 Interaction Techniques

Interaction technique was applied to CERT members only. It was more appropriate to apply the human action cycle evaluation scheme for the HIHO. The two actions: alerting and reporting outcomes are discussed in this section. The data presented is subjective to the Observer evaluating each of the CERT member's interactions with FF through their mobile phone. The observers recorded their perceived complexity, the number of attempts made by CERT, and the duration of completing the action.

6.1.1 Alerting

Observations reveal that it was easy or extremely easy for 68.93% of the CERT member to interact with FF system for receiving alerts. (Table 6). There were three steps (or menu selections) to navigate through to receive the alert. First select the preferred language and second the option to enter the menu with list of alerts. Then, thirdly, in relation to the SMS-text received select the alert from the list (e.g. FF would say press #1 for “floods in Batticaloa 9 November 2011”).

The 31.07% CERT members who found the action of receiving alerts to be between moderately difficult and extremely difficult, were either not listening to the FF voiced instructions correctly or had not understood the instructions provided in the quick reference guide.

Table 1: Distribution of Alerting Complexities

<u>District code</u>	<u>Extremely Difficult</u>	<u>Difficult</u>	<u>Moderate</u>	<u>Easy</u>	<u>Extremely Easy</u>
CO	0.00%	0.00%	14.29%	57.14%	28.57%
MH	10.00%	10.00%	10.00%	30.00%	40.00%
NW	0.00%	0.00%	20.00%	70.00%	10.00%
RN	0.00%	20.00%	40.00%	30.00%	10.00%
Average	2.50%	7.50%	21.07%	46.79%	22.14%

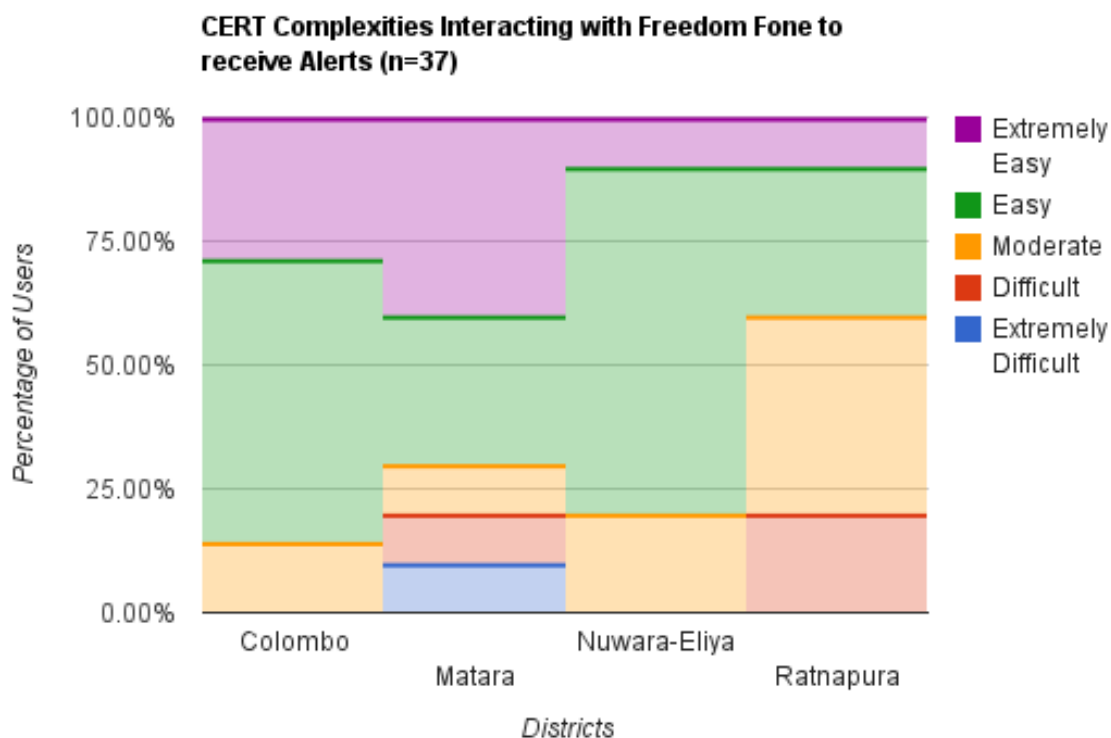


Figure 3: CERT complexities interacting with Freedom Fone to receive voice alerts

There were three steps (or menu selections) to navigate through to record a FOR. First select the preferred language and second the option to navigate in to the “leave a message” reporting option. Then, thirdly, begin recording the message, according to the given format and required information elements, following the beep.

Besides the training exercises conducted with the CERT members, the controlled-exercise where their first experience interacting with the FF system on their own. Therefore, 42.16% of the CERT members made two or more attempts in this action (Table 7). This, once again, was due to not properly hearing and comprehending the menu navigation instructions provided by the system.

Those who made three or more attempts needed some assistance with completing the action. It can be anticipated that those CERT members who made two attempts would eventually be competent in using the system, thereby, approximately 86% of the users to be efficient in interacting with the FF system to receive alerts.

Table 2: Distribution of Alert reception attempts

District code	One Attempt	Two Attempts	Three Attempts	Over Three Attempts
CO	60.00%	10.00%	20.00%	10.00%

MH	80.00%	20.00%	0.00%	0.00%
NW	40.00%	50.00%	10.00%	0.00%
RN	51.35%	32.43%	10.81%	5.41%
Average	57.84%	28.11%	10.20%	3.85%

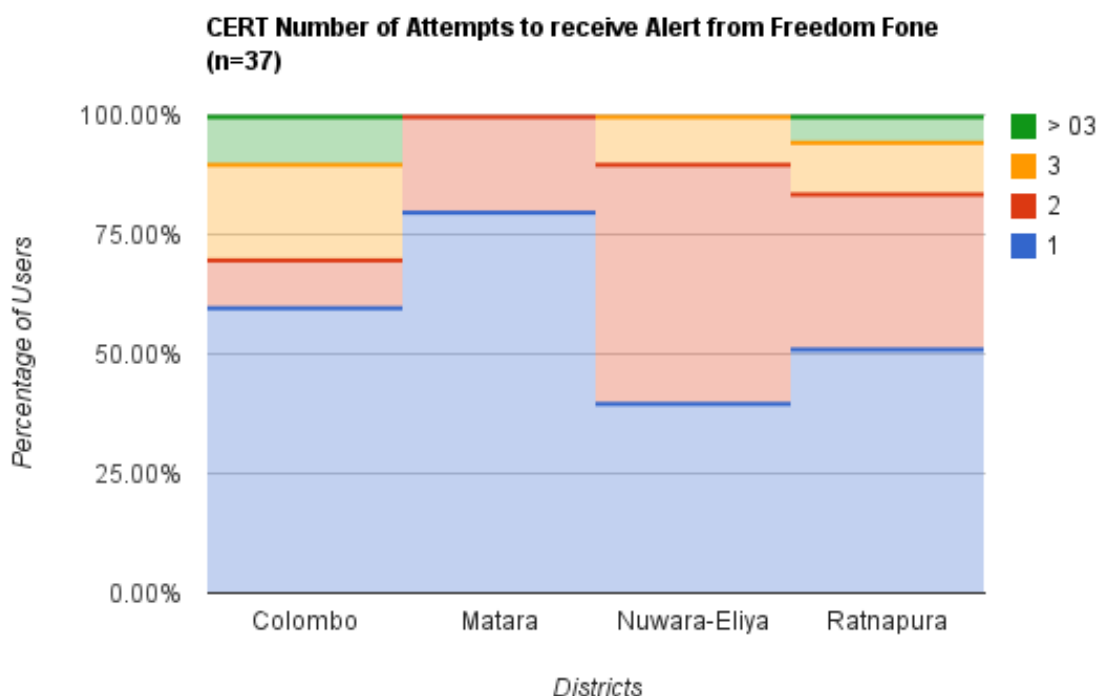


Figure 4: CERT attempts to receive Alerts from FF

6.1.2 Reporting

At this stage of the exercise, the CERT members had already experienced the FF system with the alerting action. Therefore, 92.50% of them found them were observed to easily (moderate, easy, and extremely easy) interact with FF in submitting the FORs (Table 9). This is a substantial improvement relative to their first experience with the alerting action during the controlled-exercises. Therefore, the hypothesis that with continued use over time would improve their interactions with the FF system.

Table 3: Distribution of Reporting Complexities

District code	Extremely Difficult	Difficult	Moderate	Easy	Extremely Easy
CO	0.00%	0.00%	85.71%	0.00%	14.29%
MH	0.00%	10.00%	30.00%	40.00%	20.00%

NW	0.00%	0.00%	50.00%	10.00%	40.00%
RN	0.00%	20.00%	30.00%	0.00%	50.00%
Average	0.00%	7.50%	48.93%	12.50%	31.07%

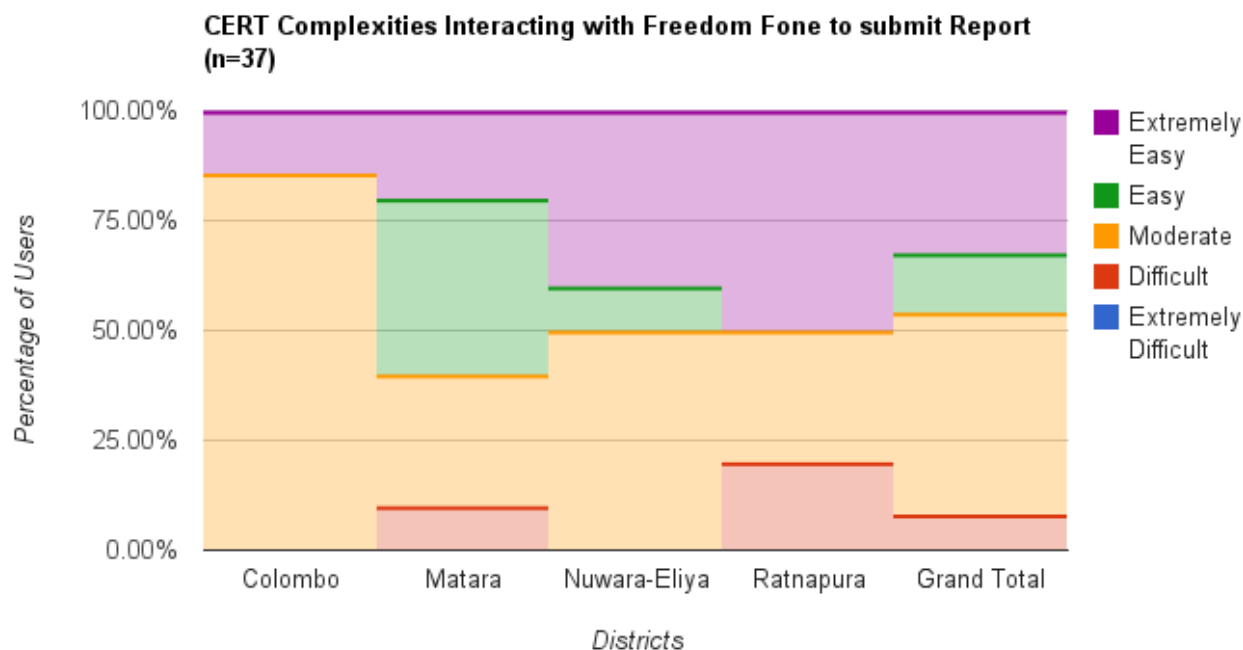


Figure 5: CERT complexities interacting with Freedom Fone to submit situational reports

Although the complexities of interacting with the FF system had reduced during the second part of the exercise, , similar number to that of alerting, 43.21% CERT members had to make two or more attempts to navigate through the FF menu for submitting the FOR. Therefore, instructions and steps to navigate through the menu structure should be better planned by the implementors, if this complexity is to be mitigated.

Table 4: Distribution of Reporting Attempts

District code	One Attempt	Two Attempts	Three Attempts	Over Three Attempts
CO	57.14%	28.57%	0.00%	14.29%
MH	70.00%	10.00%	20.00%	0.00%
NW	50.00%	40.00%	0.00%	10.00%
RN	50.00%	40.00%	0.00%	10.00%
Average	56.79%	29.64%	5.00%	8.57%

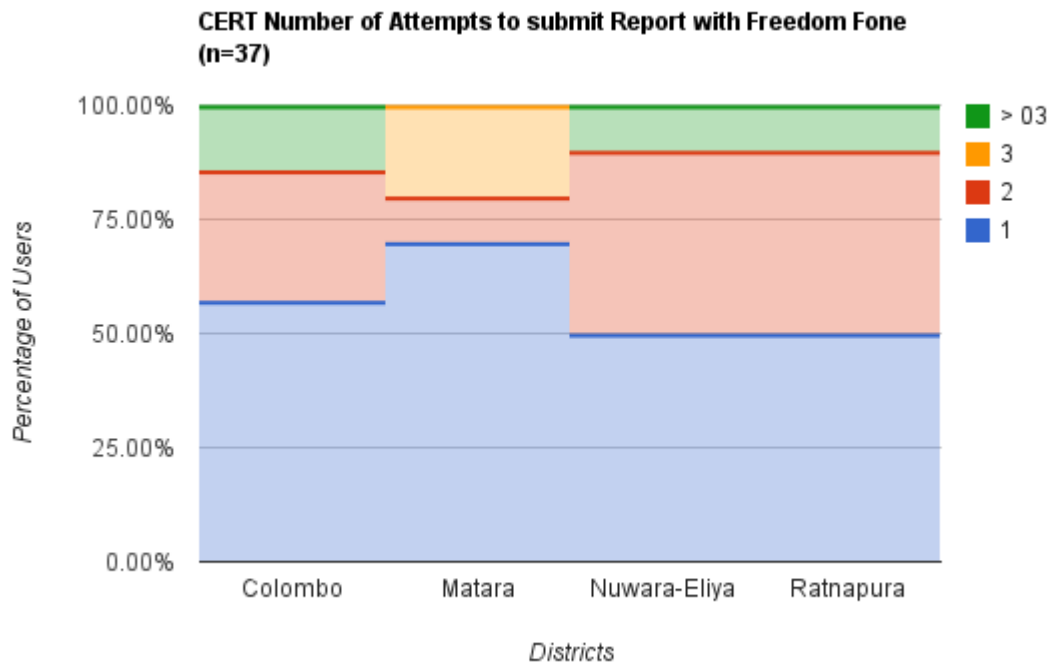


Figure 6: CERT attempts to submit situational reports with FF

General observations: Some of the users who claimed the system to be difficult to interact with and took several attempts were not quite competent using a mobile phone beyond its calling capabilities; i.e. keypad based interaction with a system, such as the one introduced in this project, was their first experience. There were also frustrations caused by cheap unbranded mobiles phones not interacting well with the FF in terms of the keypad entries, to navigate through the menu, not being recognized by the system.

6.1.3 Average durations of actions

Table 7 shows that it takes 2.29 minutes on average for a CERT member to interact with FF to receive an alert. The time to completion was obtained from the CERT members' mobile phone 'call duration' feature.

At any given time four CERT members can interact with FF through the four channels to receive the alert. Given that the researchers wanted to observe the individual interaction, they performed this task sequentially. Therefore, it can be assumed for the ten CERT members to take 22.9 minutes to complete the alert receiving process. This number corresponds with the average 21.57 minutes of waiting time for HIHO to receive all the acknowledgements (Figure 7 and Figure 8).

Table 5: Average time taken to complete the Alerting and Reporting interactions

District code	Alerting	Reporting	Mean
CO	2.00	2.53	2.27
MH	2.62	2.98	2.80
NW	1.68	1.88	1.78
RN	2.57	2.82	2.69
Mean	2.29	2.56	

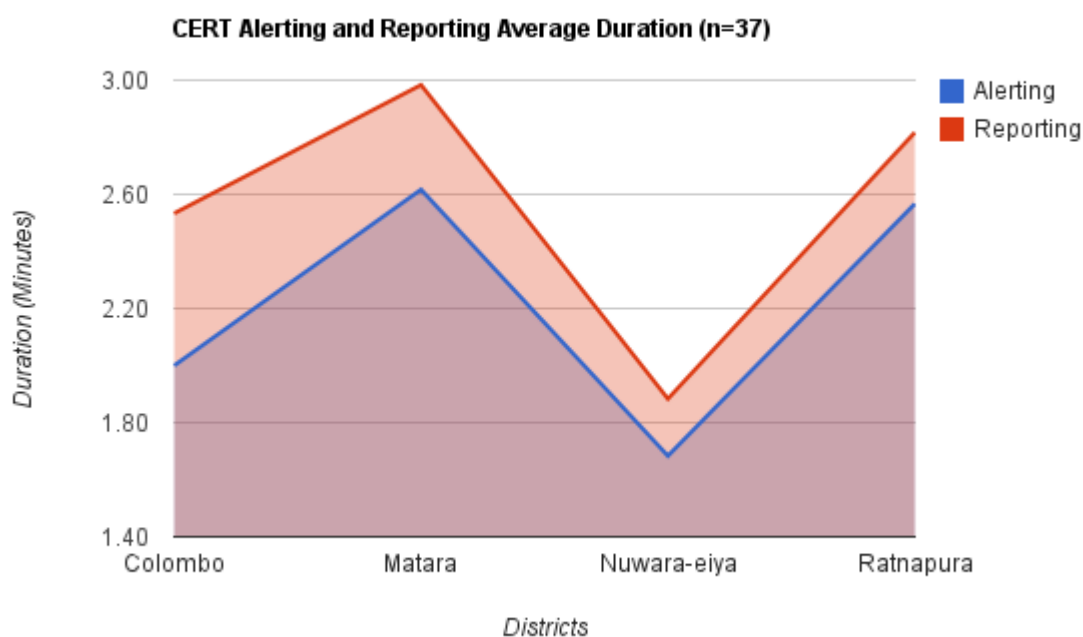


Figure 7: CERT average time taken to complete alerting and reporting interactions

6.2 Reliabilities

6.2.1 Efficiencies

Table X derives the MTTC for completing the respective processes. Figure 1 shows that Sahana Alerting and Sahana Reporting to take most of the time, while the FF audio hosting and retrieving related operations to take, relatively, less time. However, the total MTTC for creating an alert with SABRO and issuing through FF takes 28.5 minutes. The time take to receive the acknowledgements is 12.5 minutes, which amounts to each of the CERT members to listen to the alert and then send and acknowledgment.

The HIHO difficulties in listening to a FOR and then translating it to English from the local language (Sinhala or Tamil), in order to enter that information in to Eden-SitRep amounts to, almost, 9 minutes. Then entering that information in Eden-SitRep takes another 23.5 minutes, including creating a new FOR and completing the SitInfo.

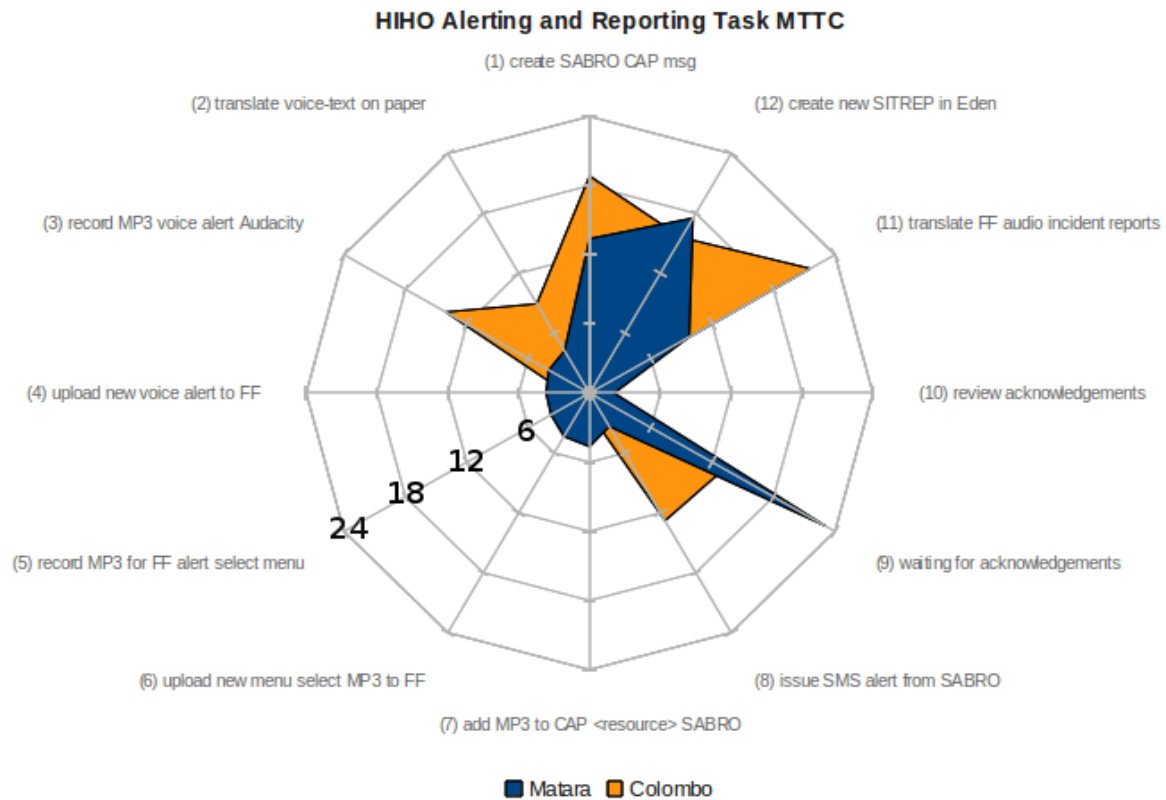


Figure 8: HIHO MTTC the twelve Tasks

Table 6: Expected time taken to complete the processes (columns blue=Sahana & yellow=FF)

Process	SABRO CAP Alerting	FF Voice Alerting	FF Acknowledgement	FF FOR translation	Eden-SitRep create record
Time (mm:ss)	19:25	09:06	12:21	08:57	23:38

6.2.2 Quality

Forty one (41) voice samples were evaluated by seven (7) people. The quality ratings are based on the mean value derived from scores given by all evaluators.

6.2.2.1 Mean Opinion Score

Only 51.84% of the voice recordings were scored as good and excellent; while the remaining (48.16%) were fair, poor, and bad. The less than good scores were mainly due to circuit noise that was overlaying

the caller's voice with a mechanical tone. Background noise was persistent and was expected but did not affect the noise levels as such to hinder with deciphering the information.

RN District experienced a diverse range of opinion scores (Figure 2). This was mainly due to the weak signal in the mobile telecommunications service at the location where the controlled-exercises were conducted. Other Districts also experienced weak signal levels but not as much as in RN.

Table 7: District wise MOS and overall category wise averages

District	Bad	Poor	Fair	Good	Excellent
CO	5.71%	5.71%	25.71%	42.86%	20.00%
MH	4.35%	8.70%	33.33%	27.54%	26.09%
NW	4.17%	8.33%	22.92%	27.08%	37.50%
RN	14.47%	25.00%	34.21%	21.05%	5.26%
Average	7.18%	11.94%	29.04%	29.63%	22.21%

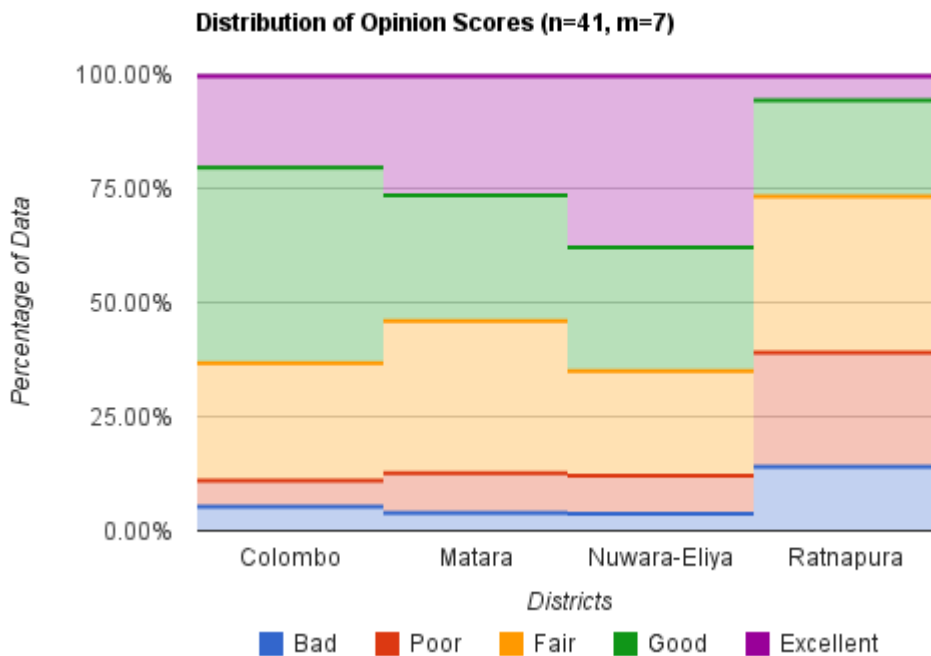


Figure 9: District wise MOS

6.2.2.2 Difficulty Score

Of all the voice recordings, only 70.56% of the pieces of information were completely clear (Figure 3). Mostly peoples' names and the observation details presented difficulties in deciphering accurate information. Elements such as mentioning of dates were quite clear. The difficulty in deciphering the information were a result of the poor quality of the recordings discussed in section 6.1.2.1.

Typically, the HIHO would need to call back the CERT to confirm the 29.44% partial, unclear, and missing information. This would affect the efficiency in completing the situational reports and in turn affect the efficiencies in responding to those incidents. Moreover, partial, unclear, or missing information can lead to false predictions and response actions.

Missing information was mainly due to the CERT members forgetting to supply those information elements. Additional training and using of the system over time may resolve this discrepancy.

Table 8: District wise DS and the overall average for each score category

<u>District</u>	<u>Clear</u>	<u>Partial</u>	<u>Unclear</u>	<u>Missing</u>
CO	83.81%	12.06%	0.63%	3.49%
MH	73.71%	16.61%	3.39%	6.29%
NW	79.86%	15.97%	1.39%	2.78%
RN	44.87%	26.83%	9.53%	18.77%
Average	70.56%	17.87%	3.74%	7.83%

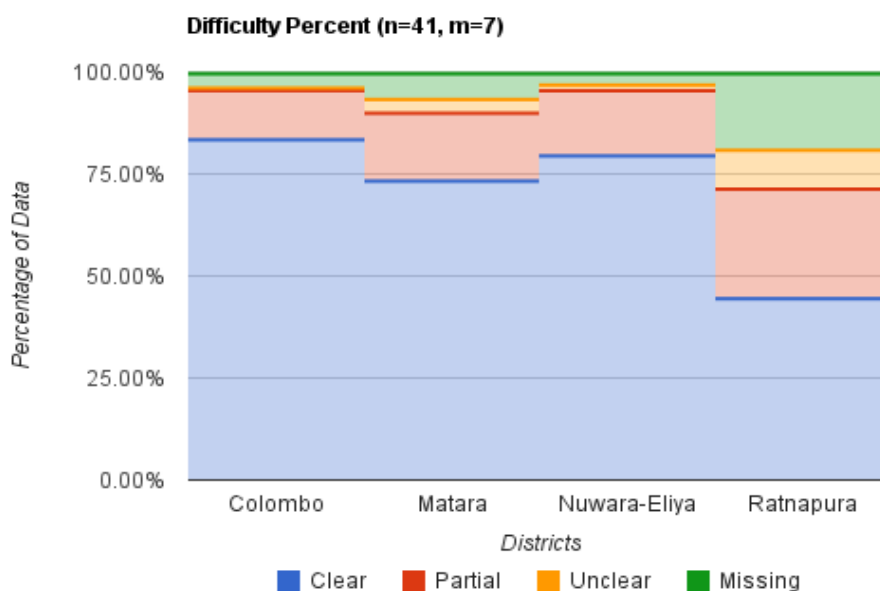


Figure 10: District wise DS

6.2.2.3 Comparison Categorical Rating

The CCR voice quality testing was carried out in two districts: CO and MH. There are no data for the other two Districts. Figure 4 shows the rating to be worse or slightly worse than the benchmark voice recordings obtained from a high quality voice data recorder at the site. Of that, more than 50% of the voice data was worse (i.e. a score of -2 relative to the benchmark). This insinuates that the voice quality would need a substantial improvement if, any kind of TTS/STT software is to be included for automating the transformations between FF voice and Sahana text.

Table 9: District-wise CCR

District code	Worse (-2)	Slightly Worse (-1)
CO	40.00%	60.00%
MH	66.67%	33.33%
Average	53.33%	46.67%

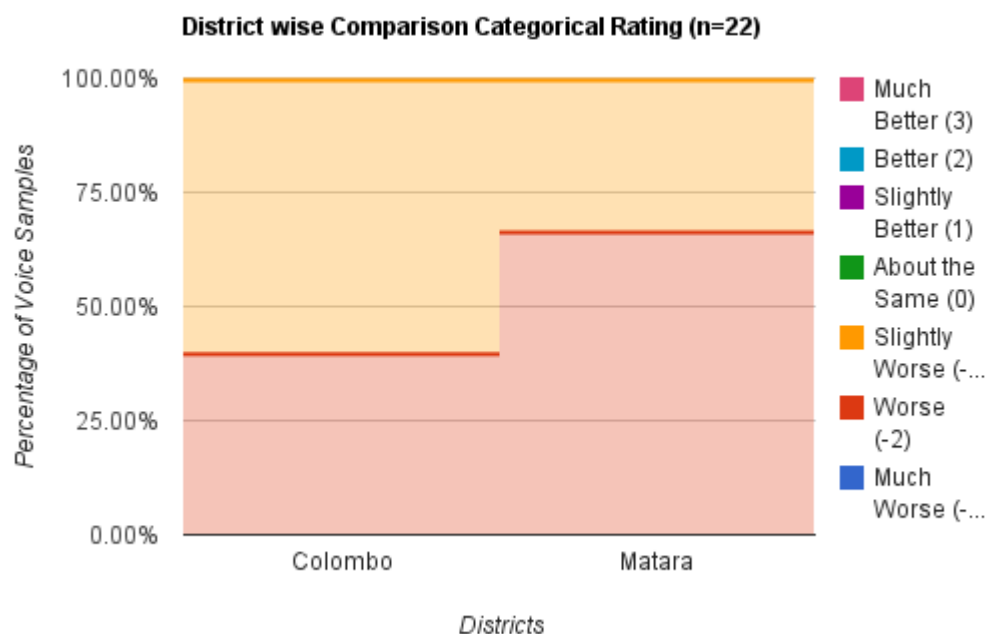


Figure 11: District wise CCR

General observations - When the voice recordings were played, directly, off the FF server, the quality was much better. However, the implementation requires that the voice data be accessed from any location and not directly from the server, which only HIHO have access to at the Sarvodaya hub.

6.3 Usability

6.3.1 Human Action Cycle

The HIHO have sufficient understanding of the goal and intent of the FF4EDXL (Figure 10). There was a minor doubt in the actions required to achieve the expected goal and intent (Table 11). Figure 12 shows that they have a sufficient but closer to being partial understanding of the alerting and reporting actions.

Table 10: HIHO gulf of evaluation response counts in each scale

<u>Rank</u>	<u>Goal</u>	<u>Intent</u>	<u>Action</u>
(0) None	0	0	0
(1) Insufficient	0	0	0
(2) Partial	0	0	1
(3) Sufficient	4	4	3
(4) All	0	0	0

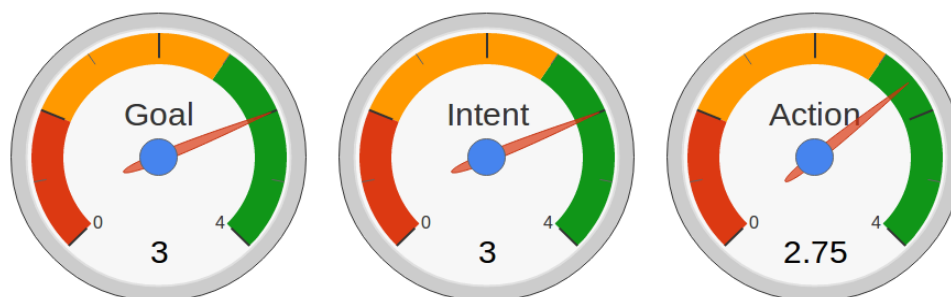


Figure 12: HIHO understanding of the goal, intent, and action

The exercises in CO (Figure 4) took a lot longer to complete. There were a couple reasons: 1) the particular HIHO (user) had not fully completed the training and the silent exercises prior to the controlled-exercise, 2) the computer they were using was not previously tested by the developers as to whether all software elements were in working condition (e.g. Audacity was not working properly; i.e. after recording the system was not allowing user to save the file). The also did not properly review the acknowledgements. However, were able to execute the expected task sequence.

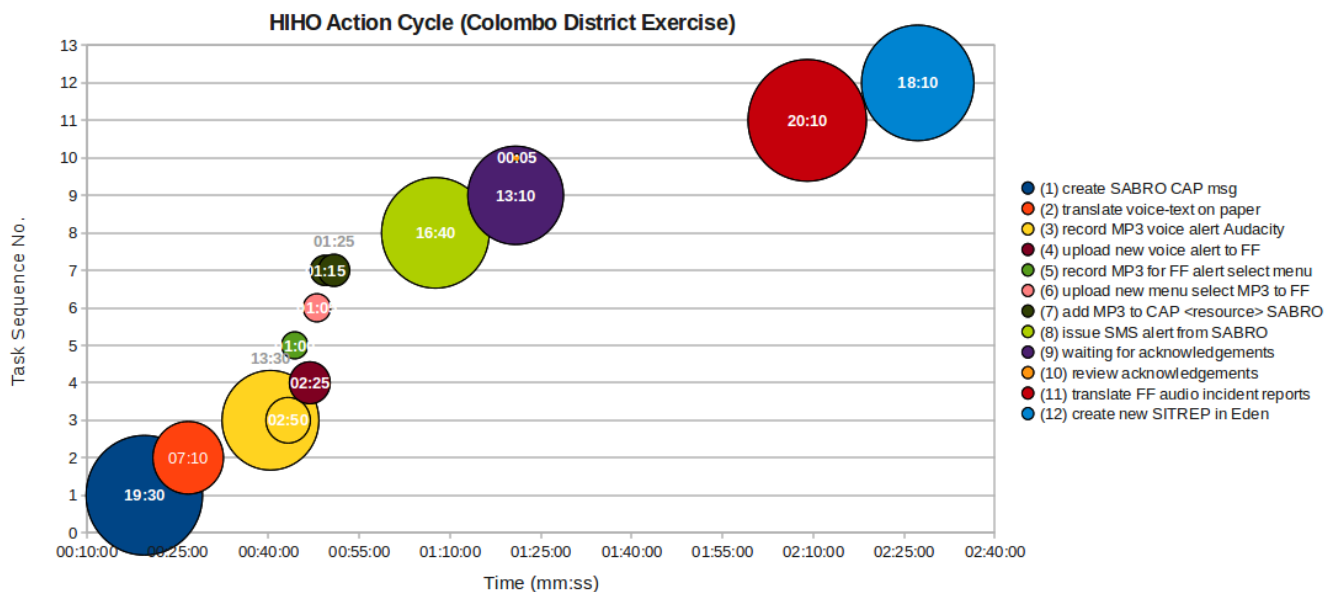


Figure 13: HIHO action cycle from Colombo District exercises

The MH controlled-exercises (Figure 5) proved to be the one that was most efficient relative to the other three. However, the task sequence was not consistently executed. Figure 5 shows the HIHO jumping to the issue SMS alert task (8), then realizing that other prerequisite tasks needed to be executed first. Moreover, the user did not follow the expected task sequence. Tasks (7) – (8) – (5) – (8) were executed, immediately after task (3), before executing tasks (4).

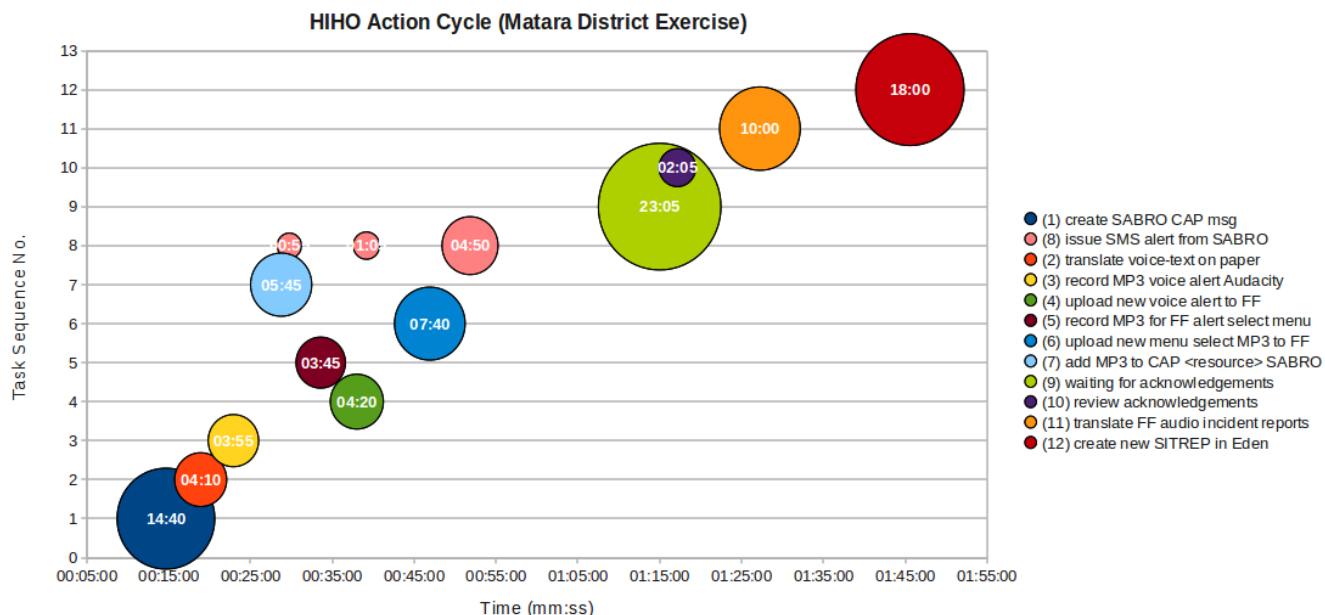


Figure 14: HIHO action cycle from Matara District exercises

General observation – during all exercises the users (HIHO) were constantly referring to the quick reference guide to determine the next steps as well as naming conventions or default

values to use. Such steps should be automated when possible and the processes should be streamlined with button actions that takes the user directly to the next step.

6.3.2 Gulf of Execution

HIHO deviating from the expected tasks execution sequence was a result of using several software applications. Had they been integrated in to a single application, then software controls would have better streamlined those actions. The HIHO and other software services in FF were found to permanently delete records from the database. This is a bad practice since there is accountability associated with disaster information. For example, if someone asks how did a particular record get created in Eden-SitRep, the system should be able to trace that to the FF recorded FOR. Records should never purged from the database. Instead they should be deactivated, thereby, giving the option reactivate or restore them in the event of a mishap.

6.3.3 Gulf of Evaluation

Users who claimed difficulty interacting with the FF system and made several attempts had not been exposed to IVR systems prior this project. Their usual experience with a mobile phone was dialing a number to make a phone call or typing an occasional SMS.

Unlike computer or mobile applications that display the transition state on the screen, IVRs do not provide a visual of the transition states. Therefore, determining the application's transition history was not intuitive. Moreover, the CERT members had forgotten how to reverse their actions to traverse back to the previous menu. Instead, they terminated the call to make another one.

There were frustrations caused by cheap unbranded mobile phones not interacting well with FF. The keypad entries, to navigate through the menu, were not recognized by the system. As a result, ignorant of the technical fault, they kept repeating the call.

To commit a FOR voice recording, the CERT had to press the # key on the phone keypad. This action was mentioned during the instructions but they had forgotten this by the time they finished recording the FOR and were terminating the call. Therefore, the report was not committed to FF and had to repeat the process.

6.4 Utility

6.4.1 HIHO Perceived Ease-Of-Use

The GUIs of SABRO for issuing alerts, FF for administering alerts, and Eden-SitRep for managing reports simply required data entry with filling in text boxes and selecting values from drop downs. Therefore, it is intuitively easy on the HIHO. However, deciphering the FOR audio messages in FF and then translating them from Sinhala or Tamil in to English is, relatively, not a simple task. It requires a good working knowledge of English as well as a knowledge of disaster related terminology. This is evident from the results in [Figure 13](#).

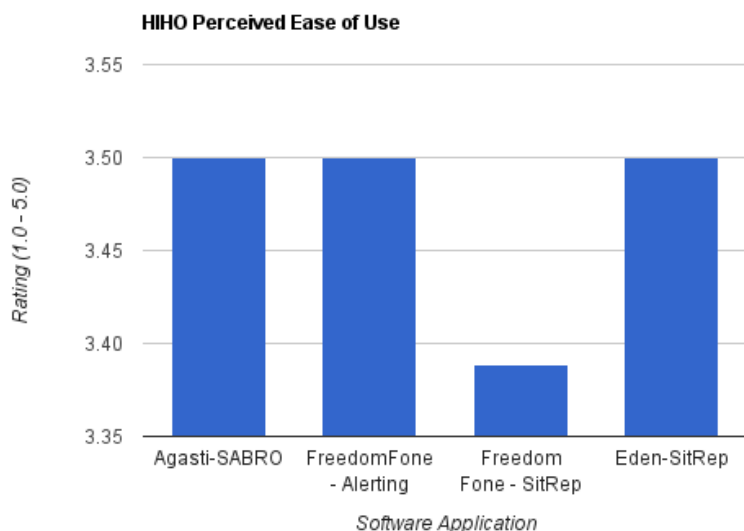


Figure 15: Freedom Fone and Sahana perceived ease of use by HIHO

6.4.2 CERT Perceived Ease-Of-Use and Usefulness

On a scale of 1 to 5, the average ease-of-use and usefulness are 3.94 (~4) and 4.12 (~4), respectively. Therefore, we may infer that the CERT agree the FF system to be one that is easy to use and is useful for their disaster information communication.

Table 11: District wise perceived ease-of-use and usefulness

District code	Ease-Of-Use	Usefulness
CO	4.25	4.40
MH	4.03	4.10
NW	3.68	3.90
RN	3.82	4.07
Average	3.95	4.12

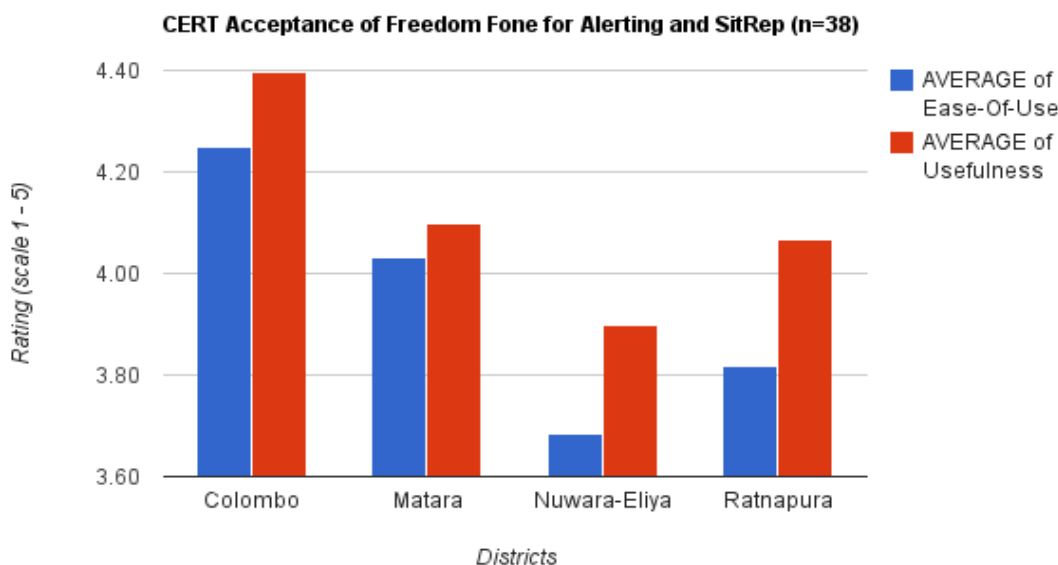


Figure 16: CERT perceived ease of use and usefulness of FF for alerting and reporting

6.4.3 CERT Attitude Towards Using

Overall the CERT have a positive and good attitude towards using FF for alerting and reporting. The perceive it to be beneficial and a wise choice. Figure 14 shows all attitude related characteristic to be in the green zone of the gauges. Thereby, we can construct the following sentences:

- 1) All things considered, CERT members using Freedom Fone for submitting reports is a *slightly good* idea.
- 2) All things considered, CERT members using Freedom Fone for submitting reports is a *quite beneficial* idea.
- 3) All things considered, CERT members using Freedom Fone for submitting reports is a *slightly wise* idea.
- 4) All things considered, CERT members using Freedom Fone for submitting reports is a *quite positive* idea.

Table 12: CERT attitude towards using Freedom Fone, average scores

<u>District</u>	<u>Bad/Good</u>	<u>Harm/Benefit</u>	<u>Foolish/Wise</u>	<u>Negative/Positive</u>
CO	5.88	6.50	5.88	6.13
MH	5.70	6.40	5.80	6.10
NW	5.30	5.80	5.30	6.40
RN	5.00	6.40	5.00	6.50

Average	5.45	6.26	5.47	6.29
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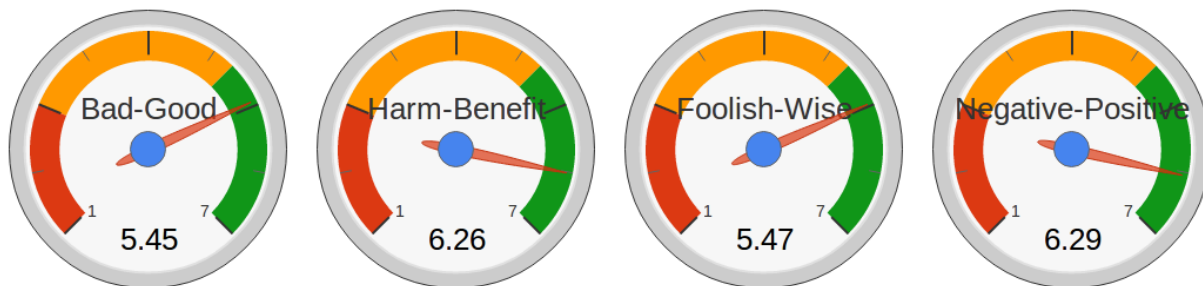


Figure 17: CERT attitude towards using FF for Alerting and Reporting

7 Conclusion

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9 APPENDIX A – Glossary of Terms

3R	Response Resource Report
Agasti	Sahana “Agasti” Disaster Management Software System
CAP	Common Alerting Protocol
CasuIll	Casualty and Illness Report
CCR	Characteristics Categorical Rating
CERT	Community Emergency Response Team
CIS	Complexity of the Interaction Sequence
CO	Colombo (District ISO Code)
DS	Difficulty Score
Eden-SitRep	Sahana Eden Situational reporting Module
EDXL	Emergency Data Exchange Language
FF	Freedom Fone
FF4EDXL	Freedom Fone for Emergency Data Exchange Language
FOR	Field Observation Report
GSM	Global System for Mobile
GUI	Graphic User Interface
HazInfo	Hazard Information
HCI	Human Computer Interaction
HIH	Hazard Information Hub
HIHO	Hazard Information Hub Operator
IDP	Internally Displaced Person
ITU	International Telecommunications Union
IVR	Interactive Voice Response
MngSumm	Management Summary Report
MH	Matara (District ISO Code)
MOS	Mean Opinion Score
MP3	Moving Picture Expert Group (MPEG) Audio Layer III
MTTC	Mean Tim To Completion
NW	Nuwara-eliya (District ISO Code)
QoS	Quality of Service

RN	Ratnapura (District ISO Code)
SABRO	Sahana (CAP-enabled) Alerting Broker
Sarvodaya	Lanka Jathika Sarvodaya Shramadana Society
SCDMC	Sarvodaya Community Disaster Management Center
SitInfo	Situation Information
SITREP	Situational Reporting
SMS	Short Message Service
STT	Speech To Text
TAM	Technology Acceptance Model
TTS	Text To Speech
UI	User Interface
Msg	Message
ICT	Information and Telecommunication Technology
HH:MM:SS	Hours Minutes Seconds

10 APPENDIX B – Business study survey

Questionnaire to determine Sarvodaya's Situational Reporting Needs

Objective: This exercise is to gather information from Sarvodaya's past rescue, relief, and recovery operations. Then use that evidence to determine the information needs for those rescue, relief, and recovery operations to develop a telephone system for sending and receiving disaster related report.

Information requested: Tell us the types of reports, the types of information, and the method of reporting you used following the most recent disaster you engaged in. This can be information you supplied to Sarvodaya or information Sarvodaya sent to you.

The questions below will guide you in submitting the required information. Instructions for dialing and recording the information is given below.

Two step process:

Step 1: write a short answer to the questions 1 – 10 in section A

Step 2: Follow the dialing/recording instructions in section B to record the answers

SECTION A: Questions

8. What is the name of the Sarvodaya village and district you belong to?

[Example: “Walasmulla, Hambanthota District”]

ANSWER:

9. What is your association with Sarvodaya?

- | | |
|--|-----------------------------|
| 1. Head Office employee | 4. Village committee member |
| 2. Provincial, district, or divisional coordinator | 5. Village volunteer |
| 3. District office employee | 6. Other |

[Example: “Divisional Coordinator”]

ANSWER:

10. What is the last disaster that you participated? Tell us the type of the disaster, the affected location(s), and the time period.

[Example: “Floods in Batticaloa and Ampara Districts January 2011”]

ANSWER:

11. What were your responsibilities during the rescue, relief, and recovery operations during the disaster mentioned in 3 above?

[Example 1: “supplying drinking water to the IDP camps every day”,
Example 2: “provide medical assistance to the sick IDP”,
Example 3: “Cooking food for the IDP in camp”]

ANSWER:

12. How did you communicate rescue, relief, and recovery operations information to Sarvodaya?

[Example: “by phone and fax only”]

ANSWER:

13. What information did you send to Sarvodaya? Give the name of the report or form, if applicable, and the information that was supplied.

[Example 1: “food relief request report indicating the number of IDPs in camp and cooking equipment required”
Example 2: “damage report with details of the effected Sarvodaya villages”]

ANSWER:

14. How often did you send that information to Sarvodaya?

[Example 1: “food relief request report - once a week”
Example 2: “once a day”
Example 3: “damage report - only when requested”]

ANSWER:

15. What reports or information did you receive from Sarvodaya? Give the name of the report or form and the type of information you received.

[Example 1: “food relief dispatch report - type of food items and the quantity, Dispatch date and expected delivery date

Example 2: “relief expenses report – relief items, quantity, and cost”

ANSWER:

16. In what form or methods did you receive those information or reports from Sarvodaya?

[*Example 1: “mobile phone and fax”*]

ANSWER:

17. How often did you receive the information or reports from Sarvodaya?

[*Example 1: “food relief dispatch report – once a week”*

Example 2: “relief expenses report – once a month”]

ANSWER:

SECTION B: Dialing/Recording instructions

write the date and time you made the recording (write the time after completing the recording)

Date:

Time:

After you have written the answers to the questions 1-10, follow the instructions below to record the answers through the telephone system as a voice message

Step B.1: Dial the telephone number **0770593117**

Step B.2: Select the language {Sinhala, Tamil, English}

Step B.3: Follow the voice instructions to record your answers to the questions below. You will need to record the answers to all questions in a single message. Mention the question number before each answer.

Example: 1. Walasmulla, Hambanthota District ... 2. District office employee ... 3. Floods Batticaloa 2011 ... (continue)

11 APPENDIX C – Perceived Usability Questionnaires

11.1 Activating HIHO and CERT

11.1.1 Observations

Form is for expert(s) to record their observations from the controlled-exercise. Observations recorded in this assessment covers the alerting procedures to activate the Hazard Information Hub Operator (HIHO) and Community Emergency Response Team (CERT) members in responding to the hazard event, receiving Field Observation Reports (FORs) on incidents, and completing the Situational Information (SitInfo) reports for processing Response Resource Reports (3Rs).

SECTION (A): to be completed at the beginning of the exercise by the observer

Exercise	Observer's
Date:	Name:
Start Time:	Affiliation:
Location:	

Confirmation that the following HIHOs participated in the excises (to be filled and signed by HIHO)

Name(s)	Roles	Signature(s)
1)		
2)		
3)		

SECTION (B): to be recorded by the observer when discussing the event of interest

B.1. What was the hazard type used in this exercise? (Check (✓) one; specify the type if 'other')

Flood Landslide War Tsunami Cyclone Other: _____

B.2. What is the hazard event (e.g. Landslid on Kahawatte-Wattapola road, 10 houses affected)?

B.3. Did the HIHO understand their goal, intent, and actions? Ask the following questions.

Goal – Overall, what do you need to achieve?

Intent - How will you achieve it?

Action - What are your next steps?

Example answers:

Goal :: Responding to the hazard event

Intent :: Provide IT assistance to the HIH for managing disaster information

Action :: Alert first-responders and manage situational reports

Check (✓) the appropriate answer based on the HIHOs’ response to the questions.

Understanding of **Goal** : None Insufficient Partial Sufficient All

Understanding of **Intent** : None Insufficient Partial Sufficient All

Understanding of **Action**: None Insufficient Partial Sufficient All

The Following sections are to be filled by the observer, when executing the specified actions

NOTE: Use **Cam Studio** software to record the screen activities when interacting with: **SABRO**, **Audacity**, **Freedom Fone**, and **SITREP** Create a CamStudio video file for each step

- i) create an alert with the Sahana Alerting Broker (SABRO) [C1, C2]
- ii) translate, record with Audacity, and upload the voice alert to Freedom Fone [C3, C4]
- iii) upload the audio file in the resource element and issue SMS alert [C5, C6]
- iv) obtain alert acknowledgement report from Freedom Fone [C7, C8]
- v) retrieve field observation report from Freedom Fone [D1, D2]
- vi) translate the audio content and create a situational report with SITREP [D3, D4]

SECTION (C): ALERTING

C.1. How **complex** was it for the HIHO to interact with the SABRO to **create the text alert**?

(Answer can be decided on the number of steps performed or any confusions encounter.)

Complexity: extremely difficult difficult moderate easy extremely easy

Tell us what worked well or badly:

C.2. How **efficient** was it for the HIHO to interact with the **SABRO to create the text alert?**

(Answer can be decided on the speed tasks were completed relative to methods used in the past.)

Timeliness: extremely slow slow moderate fast extremely fast

Tell us what worked well or badly:

C.3. How **complex** was it for the HIHO to translate the SABRO produced voice-text alert, record the voice alert, and interact with **Freedom Fone to post the voice alert?**

(Answer can be decided on the number of steps performed or any confusions encounter.)

Complexity: extremely difficult difficult moderate easy extremely easy

Tell us what worked well or badly:

C.4. How **efficient** was it for the HIHO to translate the SABRO produced voice-text alert, record a voice alert, and interact with **Freedom Fone to post the voice alert?**

(Answer can be decided on the speed tasks were completed relative to methods used in the past.)

Timeliness: extremely slow slow moderate fast extremely fast

Tell us what worked well or badly:

C.5. How **complex** was it for the HIHO to upload the audio file(s) to the “resource” tab in SABRO and use **SABRO to issue a SMS short-text** to the targeted recipients?

(Answer can be decided on the number of steps performed or any confusions encounter.)

Complexity: extremely difficult difficult moderate easy extremely easy

Tell us what worked well or badly:

C.6. How **efficient** was it for the HIHO to upload the audio file(s) to the “resource” tab in SABRO and use **SABRO to issue a SMS short-text** to the targeted recipients?

(Answer can be decided on the speed tasks were completed relative to methods used in the past.)

Timeliness: extremely slow slow moderate fast extremely fast

Tell us what worked well or badly:

C.7. How **complex** was it for the HIHO to interact with the polling feature to determine the list of **acknowledgements in Freedom Fone**?

(Answer can be decided on the number of steps performed or any confusions encounter.)

Complexity: extremely difficult difficult moderate easy extremely easy

Tell us what worked well or badly:

C.8. How **efficient** was it for the HIHO to interact with the polling feature to determine the list of **acknowledgements in Freedom Fone** ?

(Answer can be decided on the speed tasks were completed relative to methods used in the past.)

Timeliness: extremely slow slow moderate fast extremely fast

Tell us what worked well or badly:

SECTION (D): SITUATIONAL REPORTING

D.1. How **complex** was it for the HIHO to **retrieve voice reports from Freedom Fone**?

(Answer can be decided on the number of steps performed or any confusions encounter.)

Complexity: extremely difficult difficult moderate easy extremely easy

Tell us what worked well or badly:

D.2. How **efficient** was it for the HIHO to **retrieve voice reports from Freedom Fone?**

(Answer can be decided on the speed tasks were completed relative to methods used in the past.)

Timeliness: extremely slow slow moderate fast extremely fast

Tell us what worked well or badly:

D.3. How **complex** was it for the HIHO to translate the voice report and interact with **SITREP to create the situation report?**

[User should complete the “Observation” and “Information” tab fields]

(Answer can be decided on the number of steps performed or any confusions encounter.)

Complexity: extremely difficult difficult moderate easy extremely easy

Tell us what worked well or badly:

D.4. How **efficient** was it for the HIHO to translate the voice report and interact with **SITREP to create the situation report?**

[User should complete the “Observation” and “Information” tab fields]

(Answer can be decided on the speed tasks were completed relative to methods used in the past.)

Timeliness: extremely slow slow moderate fast extremely fast

Tell us what worked well or badly:

Observer's Signature:	Exercise End Time:
--------------------------	-----------------------

11.1.2 HIHO perception of using SABRO, Audacity and FF

These Technology Acceptance Model questions are intended for the Hazard Information Hub Operator (HIHO) to express their perceived ease of use in operating Sahana Alerting Broker (SABRO), Freedom Fone, and Sahana Situational Reporting (SITREP) software. The HIHO should complete the ALERTING related questions after completing that task; then the SITUATIONAL REPORTING related questions at the end of that task.

If you wish to remain anonymous (confidential) then do not indicate your name, affiliation, and email.

If you do not object to confidentiality and would like the FF4EDXL research team to contact you to verify certain responses to the question, then indicate your name, affiliation, and email.

Date:	Name (optional):
Location:	Affiliation (optional):
	Email (optional):

6. These set of questions are to assess the degree to which you believes that using the SABRO, Freedom Fone, and SITREP would be free of effort
7. **[Mandatory]** Answer all the questions by circling (○) one of the number 1 – 5 that indicates the weight of your perception.
 - 1 = Strongly Disagree
 - 2 = Disagree
 - 3 = Impartial
 - 4 = Agree
 - 5 = Strongly Disagree
8. **[Optional]** You have the option of providing a short **reason** to your answer with respect to any of the questions
9. After completing the **alerting** part of the exercise complete questions 1.1 – 2.6
10. After completing the **situational reporting** part of the exercise compete questions 3.1 – 4.6

Complete 1.0 and 2.0 immediately after completing the alerting exercise

1.0 SABRO ALERTING Perceived Ease of Use

		Strongly Agree	Agree	Impartial	Disagree	Strongly disagree
1.1	Learning to operate SABRO for alerting is easy for me	5	4	3	2	1
<i>Reasons:</i>						
1.2	I find it easy to get SABRO to do what I want to do	5	4	3	2	1
<i>Reasons:</i>						
1.3	My interaction with SABRO for alerting is clear and understandable (i.e. functions are well explained)	5	4	3	2	1
<i>Reasons:</i>						
1.4	I find SABRO to be flexible to interact with	5	4	3	2	1
<i>Reasons:</i>						
1.5	It is easy for me to become skillful at using SABRO for alerting	5	4	3	2	1
<i>Reasons:</i>						
1.6	I find SABRO alerting easy to use	5	4	3	2	1
<i>Reasons:</i>						

2.0 Freedom Fone ALERTING Perceived Ease of Use

		Strongly Agree	Agree	Impartial	Disagree	Strongly disagree
2.1	Learning to operate Freedom Fone for posting voice alerts is easy for me	5	4	3	2	1

<i>Reasons:</i>						
2.2	I find it easy to get Freedom Fone to do what I want to do	5	4	3	2	1
<i>Reasons:</i>						
2.3	My interaction with Freedom Fone for posting voice alerts is clear and understandable (i.e. functions are well explained)	5	4	3	2	1
<i>Reasons:</i>						
2.4	I find Freedom Fone to be flexible to interact with	5	4	3	2	1
<i>Reasons:</i>						
2.5	It is easy for me to become skillful at using Freedom Fone for issuing alerts	5	4	3	2	1
<i>Reasons:</i>						
2.6	I find Freedom Fone easy to use	5	4	3	2	1
<i>Reasons:</i>						

Complete 3.0 and 4.0 immediately after completing the Situational Reporting exercise

3.0 Freedom Fone SITUATIONAL REPORTING Perceived Ease of Use

		Strongly Agree	Agree	Impartial	Disagree	Strongly disagree
3.1	Learning to operate Freedom Fone for receiving field observation reports is easy for me	5	4	3	2	1
<i>Reasons:</i>						
3.2	I find it easy to get Freedom Fone to do what I want to do	5	4	3	2	1

<i>Reasons:</i>						
3.3	My interaction with Freedom Fone for receiving field observation reports is clear and understandable (i.e. functions are well explained)	5	4	3	2	1
<i>Reasons:</i>						
3.4	I find Freedom Fone to be flexible to interact with	5	4	3	2	1
<i>Reasons:</i>						
3.5	It is easy for me to become skillful at using Freedom Fone for receiving field observation reports	5	4	3	2	1
<i>Reasons:</i>						
3.6	I find Freedom Fone easy to use	5	4	3	2	1
<i>Reasons:</i>						

4.0 Sahana SITUATIONAL REPORTING Perceived Ease of Use

		Strongly Agree	Agree	Impartial	Disagree	Strongly disagree
4.1	Learning to operate SITREP for incident reporting is easy for me	5	4	3	2	1
<i>Reasons:</i>						
4.2	I find it easy to get SITREP to do what I want to do	5	4	3	2	1
<i>Reasons:</i>						
4.3	My interaction with SITREP for incident reporting is clear and understandable (i.e. functions are well explained)	5	4	3	2	1

<i>Reasons:</i>						
4.4	I find SITREP to be flexible to interact with	5	4	3	2	1
<i>Reasons:</i>						
4.5	It is easy for me to become skillful at using SITREP for incident reporting	5	4	3	2	1
<i>Reasons:</i>						
4.6	I find SITREP alerting easy to use	5	4	3	2	1
<i>Reasons:</i>						

11.2 Submitting Field Observation Reports

11.2.1 Observation

Form is for expert(s) to record observations from the controlled-exercise. It is intended for the observer to assess the ability of the Community Emergency Response Team (CERT) members to interpret voice alerts received from the HIH, acknowledge them, and supply field observation reports to the Hazard Information Hub (using Freedom Fone and SMS-text).

SECTION (A): to be completed at the beginning of the exercise, by the observer

Exercise	Observer's
Date:	Name:
Start Time:	Affiliation:
Location:	

Confirmation that the following CERT members participated in the excises

Name(s)	Phone number	Signature(s)
01)		
02)		
03)		
04)		
05)		

SECTION (B): to be recorded by the observer when discussing the event of interest

B.1. What was the hazard type used in this exercise? (Check (✓) one; specify the type if 'other')

- Flood Landslide War Tsunami Cyclone Other: _____

B.2. What is the hazard event (e.g. Landslid on Kahawatte-Wattapola road, 10 houses affected)?

--

B.3. Identify the goal, intent, and actions for at least two different scenarios (e.g. reporting health status of IDP and IDP Food related information)?

To complete scenarios (I) and (II) ask the following questions:

Goal - What do you need to achieve? (e.g. help the injured / provide shelter)

Intent - How will you achieve it? (e.g. get medical assistance / setup a IDP camp)

Action - What is your next step(s)? (e.g. request for EMT / request for camp equipment)

Scenario (I)

Goal:
Intent:
Action:

Scenario (II)

Goal:
Intent:
Action:

For activities in section (C) and (D)

- a) Rate the complexity and timeliness for each individual.
- b) Comment on any complexities that may arise such as the participant having to try more than once because they navigated to the wrong menu item in Freedom Fone or pressing the wrong button because instructions were unclear.
- c) After they finish recoding the report, note the call duration taken from their mobile phone.

SECTION (C): observations from the ALERTING exercise

11. CERT members will receive an SMS alert from the HIH
12. They should access the Freedom Fone interactive voice system receive the voice alert.

For each participating CERT member 01 - 10, the observer should respond to the three questions in C1. The user number corresponds with the number in section (A) CERT confirmation list

C.1. How *complex* and *timely* was it for the CERT member to interact with the **Freedom Fone to receive the voice alert?**

User 01	(a) Complexity: <input type="checkbox"/> extremely difficult <input type="checkbox"/> difficult <input type="checkbox"/> moderate <input type="checkbox"/> easy <input type="checkbox"/> extremely easy (b) Number of attempts: <input type="checkbox"/> 01 <input type="checkbox"/> 02 <input type="checkbox"/> 03 <input type="checkbox"/> more than 03 (c) Call duration (mm:ss):
Tell us what worked well or badly for this user: <hr style="border: 0; border-top: 1px solid black; margin-top: 5px;"/>	

User 02	(a) Complexity: <input type="checkbox"/> extremely difficult <input type="checkbox"/> difficult <input type="checkbox"/> moderate <input type="checkbox"/> easy <input type="checkbox"/> extremely easy (b) Number of attempts: <input type="checkbox"/> 01 <input type="checkbox"/> 02 <input type="checkbox"/> 03 <input type="checkbox"/> more than 03 (c) Call duration (mm:ss):
Tell us what worked well or badly for this user: <hr style="border: 0; border-top: 1px solid black; margin-top: 5px;"/>	

User 03	(a) Complexity: <input type="checkbox"/> extremely difficult <input type="checkbox"/> difficult <input type="checkbox"/> moderate <input type="checkbox"/> easy <input type="checkbox"/> extremely easy (b) Number of attempts: <input type="checkbox"/> 01 <input type="checkbox"/> 02 <input type="checkbox"/> 03 <input type="checkbox"/> more than 03 (c) Call duration (mm:ss):
Tell us what worked well or badly for this user: <hr style="border: 0; border-top: 1px solid black; margin-top: 5px;"/>	

User 04	(a) Complexity: <input type="checkbox"/> extremely difficult <input type="checkbox"/> difficult <input type="checkbox"/> moderate <input type="checkbox"/> easy <input type="checkbox"/> extremely easy (b) Number of attempts: <input type="checkbox"/> 01 <input type="checkbox"/> 02 <input type="checkbox"/> 03 <input type="checkbox"/> more than 03
--------------------	---

	(c) Call duration (mm:ss):
<i>Tell us what worked well or badly for this user:</i>	

User 05	(a) Complexity: <input type="checkbox"/> extremely difficult <input type="checkbox"/> difficult <input type="checkbox"/> moderate <input type="checkbox"/> easy <input type="checkbox"/> extremely easy (b) Number of attempts: <input type="checkbox"/> 01 <input type="checkbox"/> 02 <input type="checkbox"/> 03 <input type="checkbox"/> more than 03 (c) Call duration (mm:ss):
<i>Tell us what worked well or badly for this user:</i>	

SECTION (D): observations from the SITUATIONAL REPORTING exercise

- Make two teams Team-(I) and Team-(II)
- Team-(I) communicate Field Observation Report for Scenario (I)
- Team-(II) communicate Field Observation Report for Scenario (II)

The observer should respond to the questions in D1. The user number corresponds with the number in section (A) CERT confirmation list.

D.1. How **complex** and **timely** was it for the CERT member to interact with the Freedom Fone to submit the field observation report?

User 01	(a) Complexity: <input type="checkbox"/> extremely difficult <input type="checkbox"/> difficult <input type="checkbox"/> moderate <input type="checkbox"/> easy <input type="checkbox"/> extremely easy (b) Number of attempts: <input type="checkbox"/> 01 <input type="checkbox"/> 02 <input type="checkbox"/> 03 <input type="checkbox"/> more than 03 (c) Call duration (mm:ss):
<i>Tell us what worked well or badly for this user:</i>	

User 02	(a) Complexity: <input type="checkbox"/> extremely difficult <input type="checkbox"/> difficult <input type="checkbox"/> moderate <input type="checkbox"/> easy <input type="checkbox"/> extremely easy (b) Number of attempts: <input type="checkbox"/> 01 <input type="checkbox"/> 02 <input type="checkbox"/> 03 <input type="checkbox"/> more than 03
-------------------	---

	(c) Call duration (mm:ss):
<i>Tell us what worked well or badly for this user:</i>	

User 03	(a) Complexity: <input type="checkbox"/> extremely difficult <input type="checkbox"/> difficult <input type="checkbox"/> moderate <input type="checkbox"/> easy <input type="checkbox"/> extremely easy (b) Number of attempts: <input type="checkbox"/> 01 <input type="checkbox"/> 02 <input type="checkbox"/> 03 <input type="checkbox"/> more than 03 (c) Call duration (mm:ss):
<i>Tell us what worked well or badly for this user:</i>	

User 04	(a) Complexity: <input type="checkbox"/> extremely difficult <input type="checkbox"/> difficult <input type="checkbox"/> moderate <input type="checkbox"/> easy <input type="checkbox"/> extremely easy (b) Number of attempts: <input type="checkbox"/> 01 <input type="checkbox"/> 02 <input type="checkbox"/> 03 <input type="checkbox"/> more than 03 (c) Call duration (mm:ss):
<i>Tell us what worked well or badly for this user:</i>	

User 05	(a) Complexity: <input type="checkbox"/> extremely difficult <input type="checkbox"/> difficult <input type="checkbox"/> moderate <input type="checkbox"/> easy <input type="checkbox"/> extremely easy (b) Number of attempts: <input type="checkbox"/> 01 <input type="checkbox"/> 02 <input type="checkbox"/> 03 <input type="checkbox"/> more than 03 (c) Call duration (mm:ss):
<i>Tell us what worked well or badly for this user:</i>	

Observer's Signature:	Exercise End Time:
-----------------------	--------------------

11.2.2 CERT perception of using Freedom Fone

This form is intended for the Community Emergency Response Team (CERT) members. Each CERT member should complete this form expressing their opinion on the use of Freedom Fone. It captures your experience using Freedom Fone for receiving Alerts and submitting Field Observation Reports. The questionnaire should be completed immediately following the exercise using the technology.

If you wish to remain anonymous (confidential) then do not indicate your name, affiliation, and email.

If you do not object to confidentiality and would like the FF4EDXL research team to contact you to verify certain responses to the question, then indicate your name, affiliation, and email.

Date:	Name (optional):
Location:	Affiliation (optional):
	Email (optional):

13. These set of questions are to assess the degree to which you believes that using the Freedom Fone would be free of effort
14. **[Mandatory]** Answer all the questions by circling '○' one of the number's 1 – 5 that indicates the weight of your perception.
 - 1 = Strongly Disagree
 - 2 = Disagree
 - 3 = Impartial
 - 4 = Agree
 - 5 = Strongly Agree
15. **[Optional]** You have the option of providing a short **reason** to your answer for any of the questions. This would further justify your opinion.
16. After receiving the **Alert** and completing the **Field Observation Report** using Freedom Fone complete questions 1.1 – 3.4

1.0 Freedom Fone EASE OF USE

		Strongly Agree	Agree	Impartial	Disagree	Strongly disagree
1.1	Learning to operate Freedom Fone is easy for me	5	4	3	2	1
<i>Reasons:</i>						
1.2	I find it easy to get Freedom Fone to do what I want to do in disaster work	5	4	3	2	1
<i>Reasons:</i>						
1.3	My interaction with Freedom Fone is clear and understandable (i.e. functions are well explained)	5	4	3	2	1
<i>Reasons:</i>						
1.4	I find Freedom to be flexible to interact with	5	4	3	2	1
<i>Reasons:</i>						
1.5	It is easy for me to become skillful at using Freedom Fone in disaster work	5	4	3	2	1
<i>Reasons:</i>						
1.6	I find Freedom Fone easy to use in disaster work	5	4	3	2	1
<i>Reasons:</i>						

2.0 Freedom Fone PERCEIVED USEFULNESS

		Strongly Agree	Agree	Impartial	Disagree	Strongly disagree
2.1	Using Freedom Fone in disaster work will enable me to accomplish tasks more quickly	5	4	3	2	1
<i>Reasons:</i>						
2.2	Using Freedom Fone would improve my disaster related work performance	5	4	3	2	1
<i>Reasons:</i>						
2.3	Using Freedom Fone in disaster work would increase my productivity	5	4	3	2	1
<i>Reasons:</i>						

2.4	Using Freedom Fone would enhance my effectiveness on my disaster related work	5	4	3	2	1
<i>Reasons:</i>						
2.5	Using Freedom Fone would make it easier to do my disaster related work	5	4	3	2	1
<i>Reasons:</i>						
2.6	I would find Freedom Fone useful in my disaster work	5	4	3	2	1
<i>Reasons:</i>						

3.0 Attitude towards using

- 4) These set of questions are to assess the user's negative and positive feeling (evaluative effects) about performing the target behaviors.
- 5) Check (✓) your response about using Freedom Fone on the four following scales based upon what you think to be the most appropriate response for filling in the blank

All things considered, my using Freedom Fone for submitting FIELD OBSERVATION reports is a(n) _____ idea.

		Extremely	Quite	Slightly	Neither	Slightly	Quite	Extremely	
3.1	Good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Bad
3.2	Harmful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Beneficial
3.3	Wise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Foolish
3.4	Negative	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Positive

[e.g. 3.2 All things considered, my using Freedom Fone in my job is a *slightly beneficial* idea.]

12 APPENDIX D – Research Data

12.1 Business study survey data

Table 13: Demographic information and past disasters responded

[1b] District	[1a] Sarvodaya village or department name	[2] Association	[3a] Disaster Type	[3b] Year	[4] Responsibilities
--	District Office	Divisional Coordinator	Floods	2010	Health Facilities and Food related
CO	District-Office	District Coordinator	Floods	[NO-RESPONSE]	Food Related
CO	District-Office	[UNCLEAR]	Floods	[NO-RESPONSE]	Food Related
CO	District-Office	District office employee	Floods	[NO-RESPONSE]	Food Related
CO	District-Office	District office employee	Floods	[NO-RESPONSE]	Food Related
CO	District-Office	District office employee	Floods	2010	Food Related
CO	District-Office	District office employee	Floods	[UNCLEAR]	Food Related
CO	District-Office	District office employee	Floods	2011	Food and Water Related
CO	District-Office	District office employee	Floods	2011	Food Related
CO	District-Office	District office employee	Floods	2011	Food Related
CO	District-Office	District office employee	Floods	[NO-RESPONSE]	Food Related
CO	District Office	Divisional Coordinator	Floods	[NO-RESPONSE]	Food elated
MH	District-Office	District office employee	Tsunami	2004	Health Facilities and Advice
MH	District-Office	District office employee	Tsunami	2004	Health Facilities and Food Related

MH	District Office	District office employee	Tsunami	2004	Food Related
MH	District Office	District office employee	Floods	2010	Health Facilities and Food Related
MH	District Office	District office employee	Tsunami	2004	Food related
MH	District Office	Divisional Coordinator	Landslide	[NO-RESPONSE]	Food related
MH	District-Office	District office employee	Tsunami	[UNCLEAR]	Infrastructure supplier
MH	Divisional-Office-Hakmana	Divisional Coordinator	Tsunami	2003	Water and clothes related
MH	Divisional-Office-Akuressa	Divisional Coordinator	Tsunami	[UNCLEAR]	Food Related
MH	District-Office	Divisional Coordinator	Tsunami	2004	Food and Water Related
MH	District-Office	Divisional Coordinator	Floods	2010	Food and Water Related, Advice
Matara	District-Office	Divisional Coordinator	Tsunami	2004	Health Facilities and IDP information
NW	District Office	[NO-RESPONSE]	Landslide	2011	Health facilities
NW	District Office	[NO-RESPONSE]	Landslide	2011	Health facilities
NW	District office	District office employee	Landslide	2011	Health Facilities and Food Related
NW	District office	District office employee	Landslide	2011	Health Facilities and Food Related
NW	District Office	[UNCLEAR]	[NO-RESPONSE]	2001	Health Facilities and Food Related
NW	District Office	District office employee	Landslide	2011	Health Facilities and Food Related
NW	District Office	District office employee	Landslide	[UNCLEAR]	Food related
NW	District-Office	District office	Floods	2011	Food related

		employee			
NW	District Office	District office employee	[NO-RESPONSE]	2011	Food related
NW	District Office	District office employee	Landslide	2011	Health Facilities and Food Related
NW	District Office	District office employee	Landslide	2011	Health Facilities and Food Related
NW	District-Office	District office employee	Landslide	2009	Health Facilities and Food Related
RN	District Office	District office employee	Floods	2003	Health Facilities and Food Related
RN	District-Office	District office employee	Floods	2003	Rescue affected community
RN	District-Office	District office employee	Floods	2003	Food Related
RN	District-Office	District office employee	[UNCLEAR]	[UNCLEAR]	Food and Water Related
RN	District-Office	Divisional Coordinator	Cyclone	2005	Shelter related
RN	District-Office	District office employee	Landslide	2006	Food Related
RN	District-Office	District office employee	Landslide	2003	Food Related
RN	District-Office	Divisional Coordinator	Floods	2005	Food Related
RN	District-Office	Divisional Coordinator	Floods	[NO-RESPONSE]	Food Related
RN	District-Office	District office employee	Floods	2010	Food Related
RN	District-Office	Divisional Coordinator	Floods	2003	Rescue affected community
RN	District-Office	District office employee	Landslide	2003	Food Related
RN	District-Office	Divisional Coordinator	Floods	2005	Food Related
RN	District-Office	Divisional	Cyclone	2005	Shelter related

		Coordinator			
RN	District-Office	District office employee	Floods	2010	Food Related

Table 14: CERT methods, frequency, and content communicated during past disasters

[1b] District	[5] SEND Communication method	[6] Information SENT	[7] Frequency of SENDING	[8] Information RECEIVED	[9] RECEIVE Communication method	[10] Frequency of RECEIVING
--	Telephone	IDP Information	Daily	food related	Telephone	Daily
CO	Telephone	IDP information	Daily	Food Related	Telephone	Weekly
CO	Telephone	IDP information, List of needed items	[UNCLEAR]	Food Related	Telephone	Weekly
CO	Telephone	IDP information	[UNCLEAR]	Food Related	Telephone	Weekly
CO	Telephone	Water Related	Several time a Week	Advice	Telephone	Daily
CO	Telephone	IDP information	Daily	Food Related	Telephone	Daily
CO	Telephone	IDP information	Daily	Food Related	Telephone	More than once a day
CO	Telephone	IDP information	Daily	Advice	Telephone	Daily
CO	Telephone	IDP information	More than once a day	Food Related	Telephone	Daily
CO	Telephone	IDP information	More than once a day	Food Related	Telephone	Daily

CO	Telephone	IDP information	More than once a day	UNCLEAR	Telephone	Several time a Week
CO	Telephone	IDP Information	Daily	Heath Facilities and Food related	Telephone	Daily
MH	Telephone	IDP Information	Daily	Advice	Telephone, Hand-deliver	Daily
MH	Telephone, Fax	IDP Information	Weekly	after tow days	Telephone	Daily
MH	Telephone	IDP Information	More than once a day	Furniture And Food Related	Telephone	Weekly
MH	Telephone	IDP Information	Weekly	Food INFROMATI ON	Telephone, Post	Weekly
MH	Telephone	IDP Information	Daily	Food related	Telephone	Daily
MH	Telephone	IDP Information	Weekly	Food related	Telephone	Daily
MH	Telephone, Hand-deliver	IDP information	Daily	Food Related and health facility	Telephone, Fax	Daily
MH	Telephone, Hand-deliver	IDP information	Weekly	Water related	Telephone, Hand-deliver	Weekly
MH	Telephone	IDP information	Weekly	Food Related and health facility, clothes	Telephone, Hand-deliver	Daily

MH	Telephone	IDP information	Weekly	Food Related and Furniture	Telephone	Weekly
MH	Telephone	IDP information	Several time a Week	Food Related and Advice	Telephone	Daily
MH	Telephone	IDP information	Daily	Food Related and Furniture	Telephone, Hand-deliver	Daily
NW	Telephone	[UNCLEAR]	Daily	[UNCLEAR]	Telephone	Daily
NW	Telephone	IDP information	Daily	Advise	Telephone	Daily
NW	Telephone	IDP information	Daily	Advice	Telephone	Daily
NW	Telephone	IDP information	Daily	Advice	Telephone	Daily
NW	Telephone	IDP information	Daily	Advice	Telephone	Daily
NW	Telephone, Fax	IDP information	Daily	Advice	Telephone, Fax	Daily
NW	Telephone	IDP information	Daily	Advice	Telephone	Daily
NW	Telephone	IDP information	Daily	Advice	Telephone	Daily
NW	Telephone	IDP Information	[UNCLEAR]	Advice	Telephone	Daily
NW	Telephone	IDP Information	Daily	From District	Telephone	Daily
NW	Telephone	IDP Information	Daily	Answer is not match	Telephone	Daily
NW	Telephone	IDP Information	Daily	NO RESPONSE	[NO-RESPONSE]	[NO-RESPONSE]
NW	Telephone	IDP information	More than once a day	Advice	Telephone	Daily
RN	Telephone	According to information	Daily	food information	Telephone	Daily

		plan				
RN	Telephone	IDP Information	On request	NO-RESPONSE	Telephone	Daily
RN	Telephone	IDP Information	Daily	Food Information	Telephone	Daily
RN	Telephone	IDP information	Weekly	Food Related	Telephone	Weekly
RN	Telephone	UNCLEAR	Weekly	NO-RESPONSE	Telephone	Monthly
RN	Telephone, Fax	IDP information	Weekly	UNCLEAR	Telephone	Weekly
RN	Telephone	IDP information	Weekly	Food Related	Telephone	Weekly
RN	Telephone	NONRESPONSE	Weekly	NO-RESPONSE	Telephone	Bi-weekly
RN	Telephone, Fax	IDP information	Daily	NO-RESPONSE	Telephone, Fax	Several time a Week
RN	Telephone, Fax	IDP information	Weekly	NO-RESPONSE	Fax	Weekly

RN	Telephone	IDP information	On request	NO-RESPONSE	Telephone	Daily
RN	Telephone	UNCLEAR	Weekly	Food Related	Telephone	Weekly
RN	Telephone	IDP information	Weekly	NO-RESPONSE	Telephone	Bi-weekly
RN	Telephone	IDP information	Weekly	NO-RESPONSE	Telephone	Monthly
RN	Telephone, Fax	IDP information	Weekly	NO-RESPONSE	Fax	Monthly

12.2 Mean Time to Completion Data

Table 15: SABRO CAP Alerting task time durations (HH:MM:SS)

District Code	(1) create SABRO CAP msg	(2) translate voice-text on paper	(7) add MP3 to CAP <resource> SABRO	(8) issue SMS alert from SABRO
MH	00:13:24	00:04:14	00:04:39	00:03:21
CO	00:18:50	00:08:56	00:01:43	00:12:48

Table 16: FF voice alerting task time durations (HH:MM:SS)

District Code	(3) record MP3 voice alert Audacity	(4) upload new voice alert to FF	(5) record MP3 for FF alert select menu	(6) upload new menu select MP3 to FF
MH	00:03:59	00:03:41	00:03:46	00:04:21
CO	00:14:04	00:01:57	00:01:55	00:00:58

Table 17: FF Acknowledgments task time durations (HH:MM:SS)

District Code	(9) waiting for acknowledgements	(10) review acknowledgements

MH	00:23:05	00:02:05
CO	00:13:10	00:00:05

Table 18: FF FOR and Eden SITREP (two demands) task time durations (HH:MM:SS)

	FF FOR	Eden SITREP
District Code	(11) translate FF audio incident reports	(12) create new SITREP in Eden
MH	00:09:46	00:17:32
CO	00:21:36	00:15:35

12.3 Voice Quality Data

Table 19: Difficulty Scores and Mean Opinion Scores

District code	Evaluator	1 Prepared By	2 Authorized by	3 Report Purpose	4 Reporting Location	5 Observation Location	6. Incident Onset	7 Observation text	8 Action Plan	9 Immediate Needs	What is the overall MOS?
MH	KP	Partial	Partial	Clear	Clear	Partial	Partial	Partial	Partial	Partial	3
MH	IA	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	4
MH	IA	Partial	Clear	Partial	Clear	Clear	Partial	Partial	Clear	Clear	3
MH	IA	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
MH	IA	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	4
MH	IA	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	4
MH	IA	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
MH	IA	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	4
MH	IA	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Partial	3
RN	IA	Clear	Clear	Clear	Partial	Clear	Clear	Clear	Clear	Clear	3
RN	IA	Partial	Partial	Clear	Partial	Clear	Unclear	Unclear	Unclear	Partial	3
RN	IA	Partial	Partial	Clear	Partial	Partial	Clear	Clear	Partial	Partial	3
RN	IA	Clear	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Missing	2
RN	IA	Clear	Clear	Clear	--	Clear	Clear	Clear	Clear	Clear	5
RN	IA	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	4
RN	IA	Partial	Partial	Clear	Partial	Partial	Clear	Clear	Partial	Clear	4

RN	IA	Partial	Clear	Clear	Unclear	Clear	Clear	Clear	Clear	Missing	3
RN	IA	Clear	Clear	Clear	Clear	Clear	Partial	Partial	Clear	Partial	3
RN	KP	Clear	Partial	Clear	Clear	Clear	Clear	Missing	Partial	Clear	3
MH	KP	Unclear	Partial	Partial	Partial	Unclear	Partial	Unclear	Partial	Partial	3
MH	KP	Unclear	Clear	Clear	Partial	Partial	Clear	Clear	Partial	Clear	3
MH	KP	Partial	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Partial	4
MH	KP	Clear	Partial	Partial	Clear	Clear	Clear	Unclear	Clear	Partial	3
MH	KP	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Missing	1
MH	KP	Clear	Clear	Clear	Partial	Clear	Clear	Clear	Clear	Clear	4
MH	KP	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	4
MH	KP	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
MH	KP	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
MH	KP	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	4
MH	KP	Clear	Clear	Clear	Clear	Clear	Clear	Partial	Partial	Clear	3
RN	KP	Unclear	Partial	Clear	Clear	Partial	Clear	Clear	Clear	Clear	3
RN	KP	Unclear	Partial	Unclear	Unclear	Partial	Unclear	Partial	Unclear	Clear	2
RN	KP	Partial	Missing	Partial	Partial	Partial	Partial	Partial	Unclear	Missing	2
RN	KP	Partial	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Missing	1
RN	KP	Clear	Partial	Clear	Clear	Partial	Clear	Clear	Clear	Clear	4
RN	KP	Partial	Partial	Clear	Clear	Clear	Clear	Clear	Clear	Clear	3

RN	KP	Partial	Partial	Clear	Partial	Clear	Clear	Clear	Clear	Clear	3
RN	KP	Partial	Clear	Clear	Unclear	Clear	Clear	Clear	Clear	Missing	3
RN	KP	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Missing	2
RN	KP	Clear	Clear	Clear	Unclear	Unclear	Missing	Unclear	Clear	Unclear	3
RN	NW	Clear	Partial	Clear	Partial	Clear	Partial	Clear	Clear	Clear	3
RN	NW	Clear	Partial	Partial	Clear	Clear	Clear	Missing	Partial	--	3
MH	NW	Unclear	Partial	Partial	Unclear	Unclear	Clear	Partial	Missing	Clear	2
MH	NW	Partial	Partial	Unclear	Clear	Clear	Clear	Clear	Clear	Clear	3
RN	NW	Clear	Clear	Clear	Missing	Missing	Missing	Clear	Clear	Clear	4
RN	NW	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Missing	3
RN	NW	Partial	Partial	Clear	Unclear	Clear	Clear	Clear	Clear	Missing	4
RN	NW	Clear	Partial	Partial	Clear	Clear	Clear	Partial	Partial	Clear	3
RN	NW	Partial	Partial	Clear	Clear	Partial	Clear	Clear	Clear	Clear	3
RN	NW	Clear	Partial	Partial	Clear	Clear	Clear	Partial	Clear	Clear	4
RN	NW	Clear	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Missing	4
RN	NW	Clear	Missing	Clear	Partial	Partial	Clear	Partial	Partial	Missing	4
RN	NW	Unclear	Clear	Clear	Partial	Clear	Partial	Clear	Unclear	Partial	4
RN	NW	Unclear	Partial	Partial	Unclear	Partial	Partial	Unclear	Partial	Partial	2
MH	NW	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Partial	Clear	4
MH	NW	Clear	Clear	Clear	Partial	Clear	Clear	Clear	Partial	Clear	4

MH	NW	Clear	Clear	Partial	Clear	Clear	Clear	Clear	Clear	Clear	4
MH	NW	Partial	Clear	Partial	Clear	Clear	Clear	Clear	Partial	Clear	4
MH	NW	Clear	Clear	Partial	Clear	Clear	Clear	Clear	Clear	Clear	4
RN	TF	Partial	Partial	Clear	Unclear	Unclear	Unclear	Partial	Clear	Clear	3
RN	TF	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Missing	1
RN	TF	Partial	Partial	Clear	Unclear	Partial	Clear	Clear	Clear	Missing	3
RN	TF	Clear	Clear	Partial	Partial	Clear	Clear	Clear	Clear	Clear	4
RN	TF	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
RN	TF	Clear	Clear	Clear	Clear	Partial	Clear	Clear	Clear	Clear	5
RN	TF	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Missing	1
RN	TF	Clear	Missing	Clear	Clear	Partial	Clear	Clear	Partial	Missing	3
RN	TF	Clear	Clear	Clear	Clear	Clear	Unclear	Clear	Clear	Clear	4
RN	TF	Clear	Clear	Clear	Unclear	Clear	Clear	Clear	Clear	Clear	3
MH	TF	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
MH	TF	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
MH	TF	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
MH	TF	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	4
MH	TF	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
MH	TF	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
MH	TF	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Missing	1
MH	TF	Clear	Partial	Clear	Clear	Clear	Clear	Partial	Clear	Partial	3

MH	TF	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
NW	IA	Clear	Clear	Clear	Clear	Clear	Clear	Missing	Missin g	Missing	3
NW	IA	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	4
NW	IA	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	3
NW	IA	Missi ng	Missin g	Missin g	Missing	Missin g	Missin g	Missing	Missin g	Missing	1
NW	IA	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
NW	IA	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
NW	RS	Clear	Clear	Partial	Clear	Clear	Clear	Clear	Partial	Clear	3
NW	IA	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	4
CO	RS	Clear	Clear	Partial	Clear	Clear	Partial	Clear	Clear	Clear	4
CO	RS	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	4
CO	RS	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	4
CO	RS	Clear	Clear	Partial	Clear	Clear	Clear	Clear	Clear	Clear	4
CO	RS	Clear	Partial	Clear	Clear	Clear	Clear	Clear	Clear	Clear	4
CO	RS	Clear	Clear	Partial	Partial	Clear	Clear	Clear	Clear	Clear	4
CO	RS	Clear	Clear	Clear	Partial	Partial	Clear	Partial	Partial	Unclear	4
NW	TF	Uncle ar	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	4
NW	TF	Partial	Clear	Clear	Clear	Clear	Clear	Partial	Partial	Clear	3
NW	TF	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Partial	4
NW	TF	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
NW	TF	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5

NW	TF	Clear	Clear	Clear	Clear	Partial	Clear	Clear	Clear	Partial	3
NW	TF	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	4
NW	TF	Partial	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	4
CO	TF	Clear	Missin g	Clear	Clear	Clear	Missin g	Clear	Clear	Clear	2
CO	TF	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
CO	TF	Clear	Clear	Clear	Clear	Missin g	Clear	Clear	Clear	Clear	3
CO	TF	Clear	Clear	Clear	Partial	Clear	Clear	Clear	Clear	Clear	4
CO	TF	Clear	Clear	Partial	Clear	Clear	Partial	Clear	Clear	Clear	4
CO	TF	Clear	Clear	Partial	Clear	Clear	Clear	Partial	Clear	Clear	3
CO	TF	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
NW	MS	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
NW	MS	Partial	Clear	Clear	Clear	Clear	Clear	Clear	Partial	Clear	4
NW	MS	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
NW	MS	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
NW	MS	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
NW	MS	Clear	Clear	Clear	Partial	Partial	Clear	Clear	Clear	Partial	3
NW	MS	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	4
NW	MS	Partial	Partial	Clear	Clear	Clear	Partial	Clear	Clear	Clear	3
CO	MS	Clear	Missin g	Clear	Clear	Partial	Missin g	Clear	Clear	Clear	2
CO	MS	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
CO	MS	Clear	Clear	Partial	Clear	Missin g	Clear	Clear	Clear	Clear	3

CO	MS	Clear	Partial	Clear	Partial	Clear	Clear	Clear	Clear	Clear	4
CO	MS	Clear	Clear	Partial	Clear	Clear	Clear	Clear	Clear	Clear	4
CO	MS	Clear	Clear	Partial	Clear	Clear	Clear	Partial	Clear	Clear	3
CO	MS	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
CO	ES	Clear	Missin g	Clear	Clear	Clear	Missin g	Clear	Clear	Clear	1
CO	ES	Clear	Clear	Clear	Clear	Clear	Clear	Partial	Clear	Clear	4
CO	ES	Partial	Clear	Clear	Clear	Missin g	Clear	Clear	Partial	Partial	1
CO	ES	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
CO	ES	Partial	Clear	Clear	Partial	Partial	Partial	Partial	Clear	Clear	3
CO	ES	Clear	Partial	Clear	Clear	Clear	Clear	Partial	Partial	Clear	4
CO	ES	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
RN	TF	Clear	Partial	Clear	Partial	Clear	Partial	Clear	Clear	Clear	3
RN	TF	Clear	Partial	Clear	Clear	Clear	Clear	Missing	Clear	Missing	2
MH	TF	Clear	Clear	Clear	Unclear	Clear	Clear	Partial	Missin g	Clear	2
MH	TF	Clear	Clear	Unclea r	Clear	Partial	Clear	Clear	Partial	Missing	3
NW	ES	Partial	Partial	Clear	Partial	Clear	Clear	Clear	Clear	Clear	4
NW	ES	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
NW	ES	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
NW	ES	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
NW	ES	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
NW	ES	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5

NW	ES	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
NW	ES	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
NW	RS	Partial	Unclear	Partial	Partial	Partial	Unclear	Unclear	Partial	Unclear	Unclear	1
NW	RS	Partial	Partial	Clear	Partial	Partial	Clear	Partial	Partial	Clear	Clear	2
NW	RS	Partial	Clear	Partial	Clear	Clear	Clear	Clear	Partial	Clear	Clear	3
NW	RS	Partial	Partial	Partial	Clear	Partial	Partial	Partial	Partial	Partial	Partial	2
NW	RS	Partial	Partial	Clear	Partial	Partial	Clear	Clear	Clear	Clear	Partial	2
NW	RS	Partial	Clear	Partial	Partial	Clear	Partial	Partial	Partial	Partial	Partial	2
NW	RS	Clear	Clear	Partial	Clear	Clear	Partial	Partial	Clear	Clear	Clear	3
NW	RS	Clear	Clear	Partial	Clear	Clear	Partial	Clear	Clear	Clear	Clear	3
MH	RS	Partial	Clear	Clear	Partial	Clear	Partial	Partial	Clear	Clear	Clear	3
MH	RS	Clear	Clear	Clear	Partial	Partial	Clear	Partial	Partial	Partial	Partial	3
MH	RS	Clear	Partial	Clear	Clear	Clear	Partial	Clear	Partial	Partial	Partial	3
MH	MS	Unclear	Clear	Partial	Partial	Unclear	Partial	Unclear	Partial	Partial	Partial	2
MH	RS	Clear	Partial	Partial	Partial	Partial	Clear	Clear	Clear	Clear	Clear	3
MH	RS	Partial	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	3
MH	MS	Unclear	Partial	Clear	Partial	Partial	Clear	Clear	Partial	Clear	Clear	3
MH	RS	Partial	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	3
MH	MS	Partial	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Partial	4
MH	RS	Partial	Clear	Partial	Partial	Clear	Clear	Clear	Partial	Clear	Clear	3
MH	MS	Clear	Partial	Partial	Clear	Clear	Clear	Unclear	Clear	Partial	Partial	3

MH	RS	Clear	Clear	Clear	Partial	Clear	Partial	Clear	Clear	Clear	3
MH	MS	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Missing	2
MH	MS	Clear	Clear	Clear	Partial	Clear	Clear	Clear	Clear	Clear	4
MH	RS	Partial	Clear	Partial	Clear	Clear	Clear	Clear	Clear	Clear	3
MH	MS	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	4
MH	MS	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
RN	RS	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Partial	3
MH	MS	Clear	Clear	Clear	Clear	Clear	--	Clear	Clear	Clear	5
RN	RS	Unclear	Unclear	Missing	Missing	Missing	Missing	Missing	Missing	Missing	3
MH	MS	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	4
MH	MS	Clear	Clear	Clear	Clear	Clear	Clear	Partial	Partial	Clear	3
RN	RS	Unclear	Unclear	Partial	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear	1
RN	MS	Unclear	Clear	Clear	Clear	Partial	Clear	Clear	Clear	Clear	3
RN	RS	Clear	Partial	Partial	Partial	Partial	Unclear	Partial	Partial	Partial	2
RN	RS	Clear	Partial	Partial	Clear	Clear	Clear	Partial	Partial	Partial	2
RN	RS	Clear	Partial	Partial	Clear	Partial	Partial	Partial	Partial	Partial	2
RN	MS	Unclear	Unclear	Unclear	Partial	Partial	Unclear	Partial	Unclear	Clear	2
RN	RS	Clear	Partial	Partial	Partial	Partial	Partial	Partial	Partial	Partial	2
RN	RS	Partial	Partial	Clear	Partial	Clear	Partial	Partial	Partial	Partial	1
RN	MS	Partial	Missing	Partial	Partial	Partial	Partial	Partial	Unclear	Missing	2

RN	MS	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Missing	1
RN	RS	Partial	Unclear	Partial	Partial	Partial	Partial	Partial	Partial	Partial	2
RN	MS	Clear	Partial	Clear	Partial	Partial	Clear	Clear	Clear	Clear	4
RN	RS	Partial	Partial	Partial	Clear	Partial	Partial	Partial	Partial	Clear	2
RN	MS	Partial	Partial	Partial	Clear	Clear	Clear	Clear	Clear	Clear	4
RN	MS	Partial	Partial	Partial	Clear	Clear	Clear	Clear	Clear	Clear	4
RN	MS	Clear	Clear	Clear	Unclear	Partial	Partial	Clear	Clear	Missing	2
RN	MS	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Missing	1
RN	MS	Clear	Clear	Clear	Unclear	Unclear	Missing	Unclear	Clear	Unclear	2
RN	MS	Clear	Partial	Partial	Clear	Clear	Partial	Partial	Clear	Clear	3
RN	MS	Clear	Partial	Partial	Clear	Clear	Clear	Missing	Partial	Missing	2
MH	ES	Unclear	Clear	Partial	Partial	Unclear	Partial	Unclear	Partial	Partial	2
MH	ES	Unclear	Clear	Partial	Partial	Clear	Clear	Clear	Clear	Clear	2
MH	ES	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
MH	ES	Partial	Partial	Clear	Clear	Clear	Clear	Unclear	Clear	Partial	3
MH	ES	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Missing	1
MH	ES	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
MH	ES	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
MH	ES	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
MH	ES	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5

MH	ES	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
MH	ES	Clear	Clear	Clear	Clear	Clear	Clear	Partial	Clear	Clear	Clear	4
RN	ES	Unclear	Clear	Partial	Clear	Partial	Clear	Clear	Clear	Clear	Clear	3
RN	ES	Unclear	Partial	Unclear	Unclear	Partial	Unclear	Partial	Clear	Clear	Clear	1
RN	ES	Partial	Unclear	Partial	Partial	Partial	Partial	Partial	Partial	Unclear	Unclear	1
RN	ES	Partial	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Missing	1
RN	ES	Clear	Partial	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	4
RN	ES	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	5
RN	ES	Partial	Partial	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	4
RN	ES	Partial	Clear	Clear	Unclear	Clear	Clear	Clear	Clear	Clear	Missing	2
RN	ES	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Missing	1
RN	ES	Clear	Clear	Clear	Unclear	Unclear	Missing	Unclear	Clear	Unclear	Unclear	2

Table 20: Categorical Characteristic Scores

District Code	Voice sample ID	Rating	Enumerated Rating
CO	9/8/2011 12:34:29	Slightly Worse	-1
CO	9/9/2011 11:54:34	Slightly Worse	-1
CO	9/9/2011 11:50:45	Worse	-2
CO	9/9/2011 11:44:50	Slightly Worse	-1
CO	9/9/2011 11:40:06		
CO	9/9/2011 11:33:00	Worse	-2
CO	9/9/2011 11:30:53	Slightly Worse	-1
CO	9/9/2011 11:28:30	Worse	-2
CO	9/9/2011 11:26:28	Slightly Worse	-1

CO	9/9/2011 11:24:20	Worse	-2
CO	9/9/2011 11:21:19		
CO	9/9/2011 11:18:19	Slightly Worse	-1
MH	9/8/2011 12:12:20	Slightly Worse	-1
MH	9/8/2011 12:42:18	Worse	-2
MH	9/8/2011 12:39:41	Slightly Worse	-1
MH	9/8/2011 12:31:55	Worse	-2
MH	9/8/2011 12:29:27	Worse	-2
MH	9/8/2011 12:27:36	Worse	-2
MH	9/8/2011 12:25:45	Worse	-2
MH	9/8/2011 12:23:48	Worse	-2
MH	9/8/2011 12:21:18	Worse	-2
MH	9/8/2011 12:19:33	Worse	-2
MH	9/8/2011 12:17:43	Slightly Worse	-1
MH	9/8/2011 12:14:15	Slightly Worse	-1

12.4 Interaction Techniques

12.4.1 CERT Interaction Techniques

District	Hazard		Alerting				Reporting			
	Type	Event	Complexity	Attempts	Duration	Comments	Complexity	Attempts	Duration	Comments
RN	Flood	Flood in Ratnapura, Nearly 21000 people to be affected	3	2	0:01:37	Asked the path for a voice menu	3	1	0:02:17	Asked the path for a voice menu

RN	Flood	Flood in Ratnapura, Nearly 21000 people to be affected	3	2	0:01:34		3	1	0:02:13	
RN	Flood	Flood in Ratnapura, Nearly 21000 people to be affected	4	1	0:02:37	But remember the numbers for the voice menu that she want to enter the next one	3	2	0:02:28	
RN	Flood	Flood in Ratnapura, Nearly 21000 people to be affected	2	3	0:03:50	Couldn't understand to choose a voice menu path	3	1	0:02:37	Asked the path for a voice menu
RN	Flood	Flood in Ratnapura, Nearly 21000 people to be affected	2	2	0:04:13	Take more time to listen to voice menu.	2	> 03	0:03:47	Couldn't hear clearly to voice menu, Couldn't see the card instructions clearly

RN	Flood	Flood in Ratnapura, Nearly 21000 people to be affected	3	1	0:02:30		3	2	0:04:36	Take more time to record the report then refuse by system and repeat it again
RN	Flood	Flood in Ratnapura, Nearly 21000 people to be affected	4	2	0:03:20		4	2	0:02:48	Mean time disconnect the mobile phone line
RN	Flood	Flood in Ratnapura, Nearly 21000 people to be affected	5	1	0:02:00		4	1	0:02:15	Take more time to press the save button to save.
RN	Flood	Flood in Ratnapura, Nearly 21000 people to be affected	3	2	0:02:10	Don't know how to send the SMS	2	2	0:02:50	Don't care listening voice menu but consider card's details only

RN	Flood	Flood in Ratnapura, Nearly 21000 people to be affected	4	1	0:01:45		4	1	0:02:18	
MH	Tsunami	Tsunami in Matara, Affected more than 70,000 people	4	1	0:02:08	Easy to communicate with the system	5	1	0:01:46	Easy to communicate with the system
MH	Tsunami	Tsunami in Matara, Affected more than 70,000 people	5	1	0:02:01	There is no any doubt	5	1	0:06:22	First round didn't care the question number giving report and give report thinking not use any paper. So time is over before completing report then repeat again.
MH	Tsunami	Tsunami in Matara, Affected more than 70,000 people	2	3	0:03:04	First round selected wrong voice menu and phone off twice then use my phone, don't know send the SMS	3	1	0:02:00	Asked for voice menu

MH	Tsunami	Tsunami in Matara, Affected more than 70,000 people	1	> 03	0:05:20	Don't know how to operate the phone and send the SMS	2	3	0:04:48	Difficult to communicate with the system
MH	Tsunami	Tsunami in Matara, Affected more than 70,000 people	3	1	0:02:42	Don't know send the SMS	3	1	0:04:18	Asked for a voice menu, couldn't understand the real path clearly.
MH	Tsunami	Tsunami in Matara, Affected more than 70,000 people	5	1	0:03:05	Easy to communicate with the system because good listen.	4	2	0:02:25	
MH	Tsunami	Tsunami in Matara, Affected more than 70,000 people	4	3	0:01:26		4	1	0:01:42	
MH	Tsunami	Tsunami in Matara, Affected more than 70,000 people	5	2	0:02:30		4	3	0:01:52	

MH	Tsunami	Tsunami in Matara, Affected more than 70,000 people	5	1	0:02:05		5	1	0:02:26	
MH	Tsunami	Tsunami in Matara, Affected more than 70,000 people	4	1	0:01:53	Well understanding of the system	5	1	0:02:10	
CO	Flood	Flood in Erugodawatta, Colombo; 40 houses damaged	3	3	0:03:03	listen the record several time	4	1	0:02:48	
CO	Flood	Flood in Erugodawatta, Colombo; 40 houses damaged	4	2	0:03:08		3	> 03	0:03:14	Started recording while menu was reading, she ran on off credits then used my phone and friend's phone; key lock was a phone, she was repeating the questions.

CO	Flood	Flood in Erugodawatta, Colombo; 40 houses damaged	5	1	0:01:29		4	1	0:02:32	
CO	Flood	Flood in Erugodawatta, Colombo; 40 houses damaged	5	> 03	0:01:37	Had issues with key pad when press #1 it repeats menu not message. Mode LG with my phone worked first time	4	1	0:02:01	Clearly announces. Failed with Etisalat
CO	Flood	Flood in Erugodawatta, Colombo; 40 houses damaged	4	2	0:01:32	First time couldn't hear	4	2	0:03:52	May want to increase the recording time to give FOR
CO	Flood	Flood in Erugodawatta, Colombo; 40 houses damaged	4	2	0:01:30	Mobitel and Etisalat sim not worked	4	1	0:01:39	Repeat the voice menu twice
CO	Flood	Flood in Erugodawatta, Colombo	4	2	0:01:40	Credit was loss.	4	2	0:01:40	Mobitel not worked

		bo;40 houses damaged								
NW	Landslide	landslide in Kandapola that have affected 2,846 people in Nuwara-eliya District	4	1	0:01:46		4	1	0:02:28	
NW	Landslide	landslide in Kandapola that have affected 2,846 people in Nuwara-eliya District	3	2	0:01:19		3	2	0:02:30	
NW	Landslide	landslide in Kandapola that have affected 2,846 people in Nuwar	4	1	0:01:33		4	> 03	0:01:10	

		a-eliya District !								
NW	Landslide	landslide in Kandapola that have affected 2,846 people in Nuwara-eliya District !	3	2	0:02:45		3	2	0:02:07	
NW	Landslide	landslide in Kandapola that have affected 2,846 people in Nuwara-eliya District !	4	1	0:01:25		3	1	0:02:02	
NW	Landslide	landslide in Kandapola that have affected 2,846 people in	4	1	0:01:43		3	2	0:01:16	

		Nuwar a-eliya District !								
NW	Landsli de	landsli de in Kanda pola that have affecte d 2,846 people in Nuwar a-eliya District !	4	1	0:01:5 1		4	2	0:01:4 2	
NW	Landsli de	landsli de in Kanda pola that have affecte d 2,846 people in Nuwar a-eliya District !	4	1	0:01:4 2		4	1	0:02:0 0	
NW	Landsli de	landsli de in Kanda pola that have affecte d 2,846 people in	5	1	0:01:1 3		4	1	0:01:3 5	

		Nuwar a-eliya District !								
NW	Landsli de	landsli de in Kanda pola that have affecte d 2,846 people in Nuwar a-eliya District !	4	1	0:01:2 8		5	1	0:01:5 9	

12.5 Usability Data

12.5.1 Human Action Cycle data

Table 21: HIHO Interactions

		B.3. (a) Did the HIHO understand the	B.3. (b) Did the HIHO understand the	B.3. (c) Did the HIHO understand the
B.1. What was the hazard type	B.2. What is the hazard event	Goal	Intent	Action
Flood	Floods in Rathnapura, 21000 people affected	Sufficient	Sufficient	Sufficient
Tsunami	Tsunami in Matara	Sufficient	Sufficient	Sufficient
Landslide	Landslide in Kadapola Nuwara-eliya	Sufficient	Sufficient	Partial
Flood	Floods in Colombo	Sufficient	Sufficient	Sufficient

Table 22: HIHO Alerting complexities and efficiencies

C.1. How COMPLEX was it to create the text alert?	C.2. How EFFICIENT was it to create the text alert?	C.3. How COMPLEX was it to post the voice alert?	C.4. How EFFICIENT was it to post the voice alert?	C.5. How COMPLEX was it to issue a SMS short-text	C.6. How EFFICIENT was it to issue a SMS short-text	C7. How COMPLEX was it get acknowledgments	C8. How EFFICIENT was it get acknowledgments
Moderate	Slow	Easy	Fast	Easy	Fast	Moderate	Moderate
Moderate	Moderate	Easy	Moderate	Easy	Moderate	Easy	Moderate
Moderate	Slow	Difficult	Slow	Moderate	Moderate	Moderate	Fast
			Moderate	Easy	Fast	Moderate	Fast

Table 23: HIHO Situational Reporting complexities and efficiencies

D.1. How COMPLEX was it to retrieve voice reports	D.2. How EFFICIENT was it to retrieve voice reports	D.3. How COMPLEX was it to create the situation report	D.4. How EFFICIENT was it to create the situation report
Extremely Easy	Fast	Moderate	Moderate
Easy	Fast		Moderate
Moderate	Fast	Easy	Fast

12.5.2 HIHO TAM Results

Table 24: HIHOs' Sahana Agassiz Alerting perceived ease of use

1.1 Learning to operate SABRO is easy for me	1.2 I find it easy to get SABRO to do what I want to do in disaster work	1.3 My interaction with SABRO for alerting is clear and understandable (i.e. functions are well explained)	1.4 I find SABRO to be flexible to interact with	1.5 It is easy for me to become skillful at using SABRO for alerting	1.6 I find SABRO alerting easy to use
4	4	4	4	4	4
4	4	5	5	5	4
4	4	3	4	4	4

4	4	4	4	4	4
4	4	4	5	4	4
3	4	3	4	4	4
3	4	3	3	3	4
4	4	3	4	4	4
4	3	3	3	3	4
3	2	3	4	3	4
4	4	4	4	4	4

Table 25: HIHOs' Freedom Fone Alerting perceived ease of use

2.1 Learning to operate Freedom Fone for posting voice alerts is easy for me	2.2 I find it easy to get Freedom Fone to do what I want to do	2.3 My interaction with Freedom Fone for posting voice alerts is clear and understandable (i.e. functions are well explained)	2.4 I find Freedom Fone to be flexible to interact with	2.5 It is easy for me to become skillful at using Freedom Fone for issuing alerts	2.6 I find Freedom Fone easy to use
4	4	3	3	3	4
4	4	5	4	4	5
4	4	3	5	5	4
4	3	4	4	3	3
4	4	5	4	4	4
4	4	3	4	4	4
4	3	3	4	4	4
4	4	4	4	4	4
3	4	3	3	3	4
4	3	3	3	3	3
4	4	4	4	4	4

Table 26: HIHOs' Freedom Fone SITREP perceived ease of use

3.1 Learning to operate Freedom Fone for receiving field observation reports is easy for me	3.2 I find it easy to get Freedom Fone to do what I want to do	3.3 My interaction with Freedom Fone for receiving field observation reports is clear and understandable (i.e. functions are well explained)	3.4 I find Freedom Fone to be flexible to interact with	3.5 It is easy for me to become skillful at using Freedom Fone for receiving field observation reports	3.6 I find Freedom Fone easy to use
4	3	4	4	4	4
4	4	3	5	4	4
4	3	4	4	4	4
2	3	3	3	3	4
3	4	3	4	4	4
4	4	3	4	4	4
3	3	3	4	4	4
4	4	4	4	4	4
4	3	3	3	3	3
3	3	3	3	3	3
4	4	4	4	4	4

Table 27: HIHOs' Sahana Eden Sit Rep perceived ease of use

4.1 Learning to operate SITREP for incident reporting is easy for me	4.2 I find it easy to get SITREP to do what I want to do	4.3 My interaction with SITREP for incident reporting is clear and understandable (i.e. functions are well explained)	4.4 I find SITREP to be flexible to interact with	4.5 It is easy for me to become skillful at using SITREP for incident reporting	4.6 I find SITREP easy to use
3	4	4	4	4	4
3	3	4	3	4	4
3	4	4	4	3	4
3	3	4	3	3	3
4	4	4	4	3	3
4	4	3	4	3	4

4	4	3	4	3	4
4	4	4	4	4	4
4	4	3	4	3	3
3	3	3	3	3	3
4	4	4	4	4	4

12.6 CERT TAM Results

Table 28: CERT perceived usefulness and ease of use of Freedom Fone for alerting and reporting

District	Question Number						Average	Question Number						Average
	1.1	1.2	1.3	1.4	1.5	1.6	Ease-Of-Use	2.1	2.2	2.3	2.4	2.5	2.6	Usefulness
RN	4	4	4	4	4	4	4.00	4	4	4	4	4	4	4.00
RN	3	4	4	3	2	4	3.33	3	4	4	4	4	3	3.67
RN	5	4	4	4	4	3	4.00	5	4	5	4	4	4	4.33
RN	4	3	4	3	5	4	3.83	3	5	4	4	5	4	4.17
RN	4	3	3	3	3	2	3.00	3	4	3	4	4	4	3.67
RN	4	4	3	4	4	4	3.83	4	4	4	4	5	4	4.17
RN	5	5	4	4	5	4	4.50	4	4	5	4	5	4	4.33
RN	4	5	4	4	4	5	4.33	5	5	5	5	5	4	4.83
RN	4	4	4	4	4	4	4.00	4	4	4	4	4	4	4.00
RN	4	3	3	2	4	4	3.33	4	4	3	3	4	3	3.50
MH	4	4	4	4	4	4	4.00	4	4	4	4	4	4	4.00
MH	4	4	4	3	3	3	3.50	4	4	4	4	4	4	4.00
MH	5	5	5	5	5	5	5.00	5	5	5	5	5	5	5.00
MH	4	4	4	4	4	4	4.00	4	4	3	4	4	4	3.83
MH	4	4	4	4	4	4	4.00	4	4	4	4	4	4	4.00
MH	4	4	4	4	5	5	4.33	4	3	4	4	4	4	3.83
MH	3	4	3	4	4	4	3.67	4	3	4	4	3	4	3.67
MH	5	5	5	3	4	4	4.33	4	5	5	4	5	5	4.67
MH	4	4	3	3	4	4	3.67	4	4	3	4	4	4	3.83
MH	4	4	4	4	4	3	3.83	4	4	4	4	4	5	4.17
NW	4	3	4	4	4	4	3.83	4	4	4	4	4	4	4.00

District	Question Number						Average	Question Number						Average
	1.1	1.2	1.3	1.4	1.5	1.6	Ease-Of-Use	2.1	2.2	2.3	2.4	2.5	2.6	Usefulness
NW	4	4	4	4	4	4	4.00	4	4	4	4	4	4	4.00
NW	4	3	4	3	4	4	3.67	4	4	4	4	4	4	4.00
NW	4	4	4	3	4	4	3.83	4	4	4	4	4	4	4.00
NW	4	4	4	4	3	4	3.83	4	4	4	4	4	4	4.00
NW	3	3	4	3	3	4	3.33	4	4	3	4	3	4	3.67
NW	3	3	3	3	3	3	3.00	4	4	4	4	4	4	4.00
NW	3	3	4	3	4	4	3.50	4	4	3	4	4	4	3.83
NW	4	4	4	4	4	4	4.00	4	4	4	4	4	4	4.00
NW	4	3	4	4	4	4	3.83	3	4	3	3	4	4	3.50
CO	4	4	5	4	4	4	4.17	4	5	5	4	5	5	4.67
CO	4	4	5	5	4	5	4.50	5	5	5	5	5	5	5.00
CO	4	5	5	4	5	5	4.67	4	4	4	4	4	4	4.00
CO	4	4	5	5	5	5	4.67	5	5	5	5	5	5	5.00
CO	4	4	4	4	4	4	4.00	4	4	4	4	4	4	4.00
CO	5	5	5	5	5	5	5.00	5	4	4	4	4	4	4.17
CO	3	3	2	3	3	4	3.00	4	4	4	4	4	4	4.00
CO	4	4	4	4	4	4	4.00	4	4	4	5	5	4	4.33

Table 29: Corresponding reasons for the quantified answer in Table 3

1.1 Reason	1.2 Reason	1.3 Reason	1.4 Reason	1.5 Reason	1.6 Reason	2.1 Reason	2.2 Reason	2.3 Reason	2.4 Reason	2.5 Reason	2.6 Reason
To learn more about FF	Quickly exchange accurate information		This is restricted for some people(CERT)	we can't use FF publicly	Flexibility to connect with FF						

can choose native language	disaster will increase because changing with whether ,geographical					We can get quick response and confirmation after reporting the details					
Easy											
Because telephony system					FF, Mobile phones will be damaged by incident						
		It will be difficult to understand and the FF for village level people									
I like to learn this	Quickly exchange information					to quick working activities					
					Sometimes mobile connection failed						
					0						
Because telephony system											
simplicity											
Because telephony system	Quickly exchange information	Giving all instructions by system				to quick working activities					

simplicity	Quickly exchange information	Giving all instructions by system	System consistency for all of them	Relevant for field tasks	to quick working activities	can choose native language	simplicity	Because Telephony system	System help my any other works	Simplicity	Lot of old information in this system has about incidents
simplicity	Reduce the time for work, flexibility	Quickly exchange information	System consistency for all of them	Relevant for field tasks	Flexibility to connect with FF	Quick exchange information	Quick exchange information	Because Telephony system	Easy to handle incident because flexible system	can work with accurate data	Quick exchange information
simplicity	0	Giving all instructions by system									
					Flexibility to connect with FF						
simplicity	Quickly exchange information										
simplicity	Quickly exchange information						Sometimes difficult to connect with the system				
If dialing number is short; it is good (like 1919)	Because no charges to connect with system										

Table 30: CERT attitude towards using Freedom Fone for Alerting and Reporting

District	Good/Bad	Harm/Benefit	Wise/Foolish	-Ve/+Ve
RN	2	6	2	6

RN	2	7	2	7
RN	1	7	1	7
RN	1	7	1	7
RN	2	6	2	6
RN	4	4	4	4
RN	1	7	1	7
RN	1	7	1	7
RN	4	7	4	7
RN	2	6	2	7
MH	1	4	1	4
MH	1	7	1	7
MH	1	7	1	7
MH	1	7	1	7
MH	1	7	1	7
MH	1	7	1	7
MH	2	6	2	6
MH	1	6	2	7
MH	2	6	1	2
MH	2	7	1	7
NW	1	6	3	6
NW	2	6	2	7
NW	2	7	2	6
NW	2	6	2	7
NW	1	4	2	6
NW	1	6	1	7
NW	2	5	1	7
NW	2	6	1	6
NW	2	6	1	6
NW	2	6	2	6
CO	1	7	1	7
CO	1	4	1	1
CO	1	7	1	7

CO	1	7	1	7
CO	2	6	2	6
CO	1	7	1	7
CO	1	7	1	7
CO	1	7	1	7