Ethiopian Conflict Early Warning and Rapid Response (CEWRR) System

High-level Software Requirement Specification

(SRS V1.0)

Contents

Introduction

Purpose

The objectives of this document are to:

- Provide all necessary information to enable the CEWRR users and stakeholders understand and approve the High Level Requirements.

- Provide enough information to enable the designer/developer to complete the High-Level Solution Design.

- This specification **does not**:

  - Provide all necessary information for the recipients of the document to design and develop a solution to the CEWRR problem. The information will be provided in sufficient detail in the Detailed Requirements Specification to be developed during the Requirements analysis phase of the development project.

  - Provide all necessary information for the tester to develop a test plan for verifying that the requirements have been met

This document will be a live document for the CEWRR software and will keep on updating throughout the life of the software making sure any changes/additions and refinements on the requirements be updated on the document. This document is the Considered Version 1.0 and subsequent versions will be modified making sure the first Content of the new document being the changes on the latest version.

Scope of the system

In Scope

a. The System to be developed is going to be called Eth-CEWRR System.
b. The system will be able to Collect Conflict Early warning data (alerts and incidents), organize them to be able to plan and implement rapid response while tracking the Entire Conflict early warning and Rapid Response process including successes and failures for learning. The system enables to collate regular indicator-based conflict situations including their severity level that show the trend and Situation of certain geographic area to allow decision makers to learn from positive and negative results for higher level actions.
c. The system allows to share conflict related information quickly for rapid response making sure accountability is ensured at different level using appropriate work flow management. It also allows to track the degree of responsiveness and learning for improvement of CEWRR in the Ethiopian context. The system will also show graphical and on map.

Out of Scope

a. The system cannot be used in individual locations Ethiopia without being linked to the entire vertical federal CEWRR structure.
b. The system is not meant for use outside FDRE as a generic CEWRR system.

Document Audience

This Specification document is intended for use by:
- The CEWRR stakeholders
- Solution architects
- IT Professionals
- Possible Donors
- Other project team members including the Framework design team

Document References

The following documents have been developed to present the CEWRR framework, benchmarks, learning or have been used as references to improve the design of the system. The developer is expected to refer these and other related documents which are relevant for accurate design.

No	Title	Author
1	Study tour of CEWRR System in Ethiopia, Kenya and Uganda	Team from the Ethiopian Ministry of Federal and Pastoralist Development Affairs, (MoFPDA), Pact, Inc. and the Peace and Development Center.
2	Ethiopian CEWRR System Reforms and Upgrades Technical and Financial Proposal	Steven Smith, Thomas Yewhalawork
3	Function and Decision making, Technical framework, ICT framework diagrams,	Steven Smith, Thomas Yewhalawork
4	CEWARN CEWRR system documentations	IGAD CEWARN

Glossary of Terms

This table contains a list of any terms that have been used throughout the document.

Term	Description
Users	Anyone using the system
Administrators	Anyone who is administering the system
SitRoom	SitRoom
CEW	Conflict Early Warning
CRR	Conflict Rapid Response
CEWRR	Conflict early warning and Rapid Response
WoredaNet	WAN connectivity Infrastructure implemented by GOE to interconnect all woredas under Ethio-Telecom network
SMS	Cell phone based Short message system

Overview

The remainder of this document includes second, third and fourth chapters and appendixes. The second one provides an overview of the system functionality and system interaction with other systems. This section also introduces different types of stakeholders and their interaction with the system. Further, the chapter also mentions the system constraints and assumptions about the product. The third chapter provides the requirements specification in detailed terms and a description of the different system interfaces. Different specification techniques are used to specify the requirements more precisely for different audiences. The fourth chapter deals with the prioritization of the requirements. It includes a motivation for the chosen prioritization methods and discusses why other alternatives were not chosen. The Appendixes in the end of the document include the all results of the requirement prioritization and

a release plan based on them.

Overall description

This section will give an overview of the entire system. The system will be explained in its context to show how the system interacts with other systems and introduce the basic functionality of it. It will also describe what type of stakeholders that will use the system and what functionality is available for each type. At last, the constraints and assumptions for the system will be presented.

Product perspective

The system will consist of a web portal which is used by users at different levels where they can enter conflict early warning and rapid response data, communications, notifications and reports, as well as periodic situation reports for each of area of reporting, i.e. National, Region, Zone and Woreda. The web portal will allow administrators to monitor the system functionality from audit perspective and manage user security at different levels. On the system dashboard, CEWRR and situation information will be displayed on live geographic maps and on graphs and statistical tables.

Since this is a data-centric product it will require somewhere to store the data. For that, database will be used for each regional administration while the data being regularly synchronized with a central database at MoFPDA. The Web portal will communicate with the database, allowing the addition and modification of data. All database communications will go over the Internet or dedicated WAN infrastructure for data exchange such as the Government of Ethiopia's WoredaNet.

CEWRR data will be also received by each of the regional state databases from:
- The public through SMS using regional toll free numbers and the system will be equipped with SMS gateway that transfers the received data into the database providing web interface for editing and visualizing received messages. The system may be equipped with a parser that automatically converts the unstructured SMS data into a relational database which will be updated after being verified by users.
- Traditional and social media websites.
- The system may also interface with third party apps including Africa Union Media monitoring tool, for extending the conflict early warning reporting data sources. The following are few of the expected external apps to be interfaced/integrated
  - Africa Union Media monitoring App: Available upon request
  - Africa Brief : http://cews.africa-union.org/AfricaBrief
  - Africa Union Field Report app: Available based on request
  - Armed Conflict Location & Event Data Project: https://www.acleddata.com/
  - Africa News Desk: https://cews.africa-union.org/NewsDesk/ (requires Credential)

Product Functions

Data collected through different mechanisms is expected to be displayed on SitRoom screens located at different levels flagging if possible critical or emerging events (based on agreed criterion) on different colors and icons to enable SitRoom experts to interact and respond to them accordingly. The system will have an interface for users to create cases in which interrelated CEWRR reports possibly will be grouped as single actionable items. The system should be able to show these events both in maps and lists so that the user at SitRoom can select, open and see the detail about each event. The system should also show actionable items separate from information ones for the appropriate level to act (respond/comment/recommend) specific action coming from lower levels. The system will also show

open cases which for different reasons may be still open or requiring attention for their closeout showing the accountable level to complete the case based on agreed work flow.

User Characteristics

There are three types of users that interact with the system. Each of these types of users has different use of the system so each of them has their own requirements. Users will be limited to see/add/edit information of the level they are member of.

Type of users	System usage
Early warning Report users	Will have access to the early warning Reporting interface of the system and will be able to see only add/edit permission to part of the system within limited period of time.
Rapid Response Users	Will have access to the early warning Reporting interface of the system and will be able to only see and add/edit permission to this part of the system within limited period of time. for adding response planning, implementation and approval disapprovals of response intents
SMS Taggers	These users have access to the SMS parsing module of the system by structuring the received SMS into meaningful database format and/or tagging the SMS message to the pertinent Woreda for verification
Analyzers	The analyzers have read only access of the entire system allowing them to give meaning and prepare reports
Situation analysis Experts	This are experts who have access to the situation report interface, recording information related to periodic
Database Administrators	The administrators also interact with system with full access. They are managing the overall system to ensure there is no incorrect information within the system and to fine tuning the database server for performance. Provide first level troubleshooting support to system users.
System Administrators	The administrators are responsible for ensuring connectivity is available 99% of the time by troubleshooting on client-side problems or liaison with service provider for quick resolution of problems. They are also responsible for the whole functionality of the server and its peripherals.

Interfaces

User Interface

Interface Name	Interface Description
Login	User interface that allows registered users to login into the system
Case Search	User interface that allows users to search cases and show the list. Will have a link for adding a new case or editing an existing case, adding response to a case. The case also shows the status of a case under the workflow.
Case Edit	User interface that shows users details about a case or an empty one for adding new including list of CEW reports under a case for editing the case. Users can open a specific CEW report from here.
Edit CEW Report	User interface that allows users to add a new CEW report or edit an existing CEW report after selecting it from the list of CEW reports on the case edit Interface
SMS Interface	Interface that shows the list of received SMSs so that users can tag them for the Woreda. The interface may contain structure show version of the SMS if parsing is used to structure the plain text SMS.
Conflict Rapid Response	Interface that allows users to add intent notification to a case, Register CRR planning, CRR Implementation and CRR Report and change status of the case.
Situation	User interface that allows users to register periodic indicator-based situation reports
Dashboard	Interface that shows users CEW statistics, CRR statuses, critical events, warnings, including situations of selected geographic area on tabular or map interface.
Timeline	A timeline that shows the events happened from start to finish of a case including success/failures on each phase of the case management workflow
Reports	User interface that allows to generate various standard reports including tools for exporting data on various formats for further analysis

The above list shows just the main user parts of the user interface. Detail user interface and mockup is to be presented in detail during detail requirement analysis phase of the actual development of the project.

Hardware interface

No hardware interface is required for the system to function.

Software Interface

The following software interfaces are required for the functionality of the system

NO	Interface Software	Interface Description
1	Database Server	An open source or proprietary database Server software used for storing and managing data
2	Map Application	An open source or proprietary database Server interfaced with the system to map information on dashboards
3	SMS gateway	An open source or proprietary SMS gateway interfaced with the system receive SMS application and present on web interface.
4	Third party apps Interface	The system may also interface with third party apps including Africa Union Media monitoring tool, for extending the conflict early warning reporting data sources. The following are few of the expected external apps to be interfaced/integrated
		Africa Union Media monitoring App:Available upon request
		Africa Brief :http://cews.africa-union.org/AfricaBrief
		Africa Union Field Report app: Available based on request
		Armed Conflict Location & Event Data Project: https://www.acleddata.com/
		Africa News Desk: https://cews.africa-union.org/NewsDesk/ (requires Credential)

Communication Interface

There is no communication interface to this system as any network and related interfaces are going to be managed by the operating system.

Constraints

The following constraints have been identified in relation to the high-level requirements:

No	Constraint
1	Internet connection could be a constraint as the web portal requires stable internet connectivity for accessing the database. It is crucial that there is an Internet connection for the application to function 99% of the time considering the application is time critical.
2	Stable mobile network availability is a constraint as this may affect the receiving of SMS messages from the public
3	Receiving large amount of SMS data from public in critical moments makes it difficult to control hoax messages being a constraint as it consumes considerable processing resources for the server
4	The web portal will be constrained by the capacity of the database. Since the database is shared between the web portal and the SMS portal it may be forced to queue incoming requests and therefor increase the time it takes to fetch data.
5	Regional databases needing to replicate to central database at MoFPDA will be a constraint as it requires data being updated back and forth through two-way replication affecting the performance of the system.

Assumptions

The following assumptions have been made in relation to the high-level requirements:

No	Assumption	Possible impact
1	The client avails network functionality at all levels (from Woreda to Federal structure	Communication between different levels will be affected as will the system functionality.
2	There will be available toll-free number for sending conflict related information announced to the general public	Data collected from the public through SMS could be unreliable
3	There are trained staff at all level that carry over the type of users specified above	The system will be seriously impacted on decision making process due to data quality issues
4	The deployment modality can only be proved to be correct if piloting is done and fine tuning is made for scale-up	Not well-planned piloting can impact the scaling-up of the system
5	There is sufficient fund to back the actual system design and implementation of the system	The system may not be realized if sufficient fund is not secured

Business Rules

The following business rules have been identified in relation to the high-level requirements:

No	Rule Definition	Static/Dynamic
1	Early warning reports are created only at Woreda level	Static
3	CEW information coming through SMS become part of EWR if and only after verification at the kebele level for alerts and incidents. They will remain as information otherwise and will not be part of a case	Dynamic
4	CRR planning starts when sufficient information has been gathered about the cases and its EWRs and summary is done for the CEW case	Dynamic
5	There will be a predetermined time for higher levels to respond to intent notifications from lower levels with comments and recommendations. The lack of a response within the allowed time will be considered as consent to proceed as planned.	Dynamic
6	There will be a predetermined time for levels to acknowledge comments and recommendations on intent notifications. The lack of an acknowledgement within the allowed time will be followed up by phone calls to confirm receipt.	Dynamic
7	There will be a predetermined time for high levels to acknowledge receipt of assistance request. The lack of an acknowledgement within the allowed time will be followed up by phone calls to confirm receipt.	Dynamic
8	The working language of each region will take place and translation may be required for exchanging data across different levels working on different languages.	Static
9	An early warning report can only be registered into non-closed case	Dynamic

High Level Business Requirements

This table describes the business requirements for Eth-CEWRR System. Use case reference, source and priority are defined during detail requirement analysis phase of the project

No	UC Ref	Title	Description
1		User Login	A user logs in on into the system through a web portal supplying credentials for the registered location
2		Create Case	The system gives authorized user for the selected level an interface for creating new case
3		Search Case	The system shows an interface for searching cases which can be filtered by closed cases/open cases.
4		Open a case	The system shows user list of cases for editing the case info or adding or moving CEW reports to the open case
5		Add CEW Report to case	The system gives authorized user for the selected level to add new CEW report for an opened case
6		Search for Specific CEW report	The system shows an interface for searching specific CEW report within an open case
7		Move CEW report to other case	The system shows an interface for moving an CEW reports from one case to other
9		Open CEW Report	The system shows user list of CEW reports within a case for opening the CEW report.
10		Edit CEW report	The system shows authorized user to an interface for editing selected CEW reports from list of searched ones.
11		Summarize CASE	The system shows authorized user to an interface for summarizing a case
12		Send an CRR intent	The system shows an interface to an authorized user so that he can register an intent and submit into the system.
13		Send Alert	The system sends alerts to all levels whenever there are critical changes in the system (New Alert Reports, Intent Notifications, Disapprovals, and Acknowledgements etc.)
14		Send CRR Comments and Recommendations	The system Shows an interface so that authorized users can register approvals/disapprovals to RR intents
15		Send CRR intent acknowledgment	The system Shows an interface so that authorized users can register acknowledgments to approvals/disapprovals of RR intents
15		Send CRR assistant Request	The system Shows an interface so that authorized users can send assistance request
16		Send CRR assistance Request acknowledgment	The system Shows an interface so that authorized users can send acknowledgment to assistance request
17		Add CRR Planning status	The system Shows an interface so that authorized users can register CRR planning completed
18		Add CRR implementation status	The system Shows an interface so that authorized users can register CRR implementation completed
19		Add CRR Result	The system Shows an interface so that authorized users can register CRR results

No	UC Ref	Title	Description
20		Add CRR Report	The system Shows an interface where it shows the process undergone so far and authorized users can register CRR Reports
21		Link Cases	The system Shows an interface so that authorized users can link Cases to create macro cases which creates cases out of cases rather than cases out of CEW reports
22		Add Situation Report	The system Shows an interface so that authorized users can register Situation reports
23		Create users	The system Shows an interface so that authorized users can create users
24		Create Roles	The system Shows an interface so that authorized users can create roles
25		Add permission	The system Shows an interface so that Administrators can add permissions to users
26		Add levels	The system Shows an interface so that Administrators can define users levels
27		Assign roles to users	The system Shows an interface so that Administrators can assign permissions/roles to users
28		Assign level to users	The system Shows an interface so that Administrators can assign user levels to users

Expected System outputs

The following Outputs are expected from the system:

1. **On screen information**
   a. List of Cases by categories-Active, Closed
   b. Dashboards showing Statistics, graphs of Alerts, Alerts, situations for selected geographical location
   c. CEW reports submitted by geographic location and time
   d. List of cases with high number of CEW reports
   e. List of reports received through SMS
   f. List of reports received through traditional media
   g. List of reports received through social media
   h. List of reports received through various other e-sources and applications
   i. List of CEW reports received through field monitors
   j. List of active cases long overdue for closing
   k. List of pending cases and status waiting for decision by specific level
   l. List of active cases on each level
   m. Daily Highlights
   n. Daily reports

o. Flash Reports
p. Situational updates
q. Weekly Wrap-up

2. **Printable statistical and analytical reports**
   a. Number of incidents/Alerts reported by Alarm level and Escalation potential
   b. Number of Incidents by Nature of events
   c. Number of Incidents/Alerts by Nature of Dispute
   d. Number of cases by location, time period
   e. Number of Incidents by locations and associated loss
   f. Number of Alerts by Indicators
   g. Number of Alerts by Category of Indicators
   h. Number of CRR reports by location and effectiveness
   i. Average EW reports per Case
   j. Number of active cases by location, time period
   k. Number of cases with effective Responses (effective need to be defined for computing consumption)
   l. CEW responsiveness rate by time and geographic locations
   m. Trend on CEW reporting using different reporting mechanisms
   n. Trend on Situations on different Domains by geographic location
   o. Comparative reports of CEW reporting across time and specific geographic location
   p. CEW Incident to Alert Ratio
   q. Number of CEW reports by Actors by time frame and categories
   r. Updates on potential Conflict Situations

3. **Maps and Alerts**
   a. Live display on maps of new CEW alerts and incidents and CRR reports emphasizing the rapid increase on the number of cases being reported
   b. Map Display of Situation and alert levels based on values of recent assessments shown on different colors
   c. Map of conflict prone areas

4. **Exportable Data**
   a. Exportable data of all CEW incidents and alerts and CRR reports into standard formats
   b. Exportable Data of all cases including statuses using standard formats

5. **General**
   a. All reports should have parameter and filtering tools
   b. Statistical reports should have tabular and charts options
   c. Reports should have Screen preview, Printing and export options to CSV and other formats
   d. Maps should have adequate zooming capabilities
   e. Maps information should use as much as possible aligned with the most recent version of GIS information approved by National Geo-Spatial Agency/CSA

Non-functional requirements

The following general non-functional requirements will apply and detail non-functional requirement per use case will be defined for each use case.
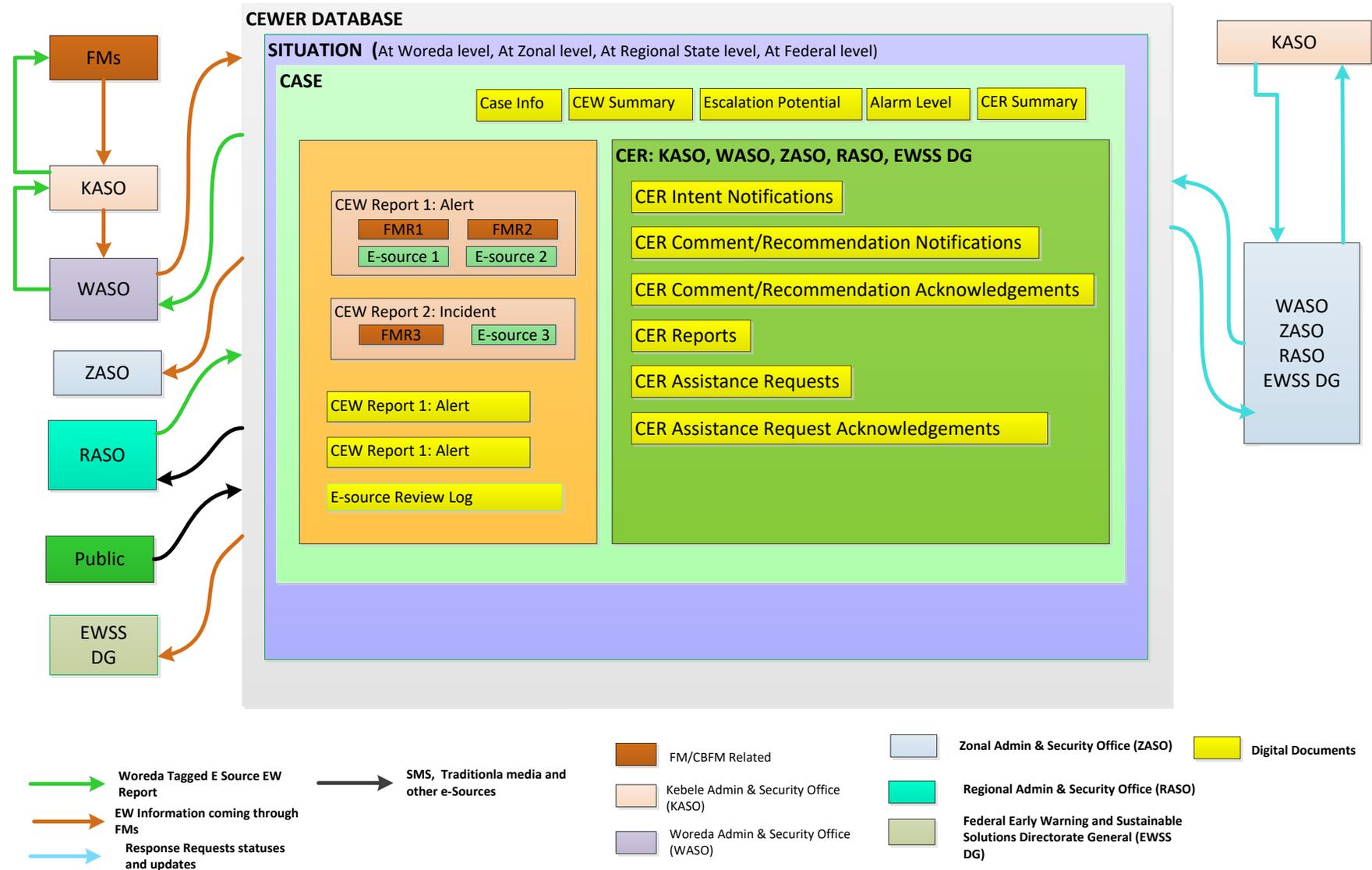
No	Rule Definition	Description	Consequences	Acceptable Level

1	Security	The system needs to be secured from every angle
		- Authentication: system needing to authenticate users for accessing the system.
		   - Users need to be registered, reset, deleted by the database administrator
		   - Users need to change their password on first login and whenever they feel required
		   - Federal level Admins manage users for users at federal level
		   - Regional level Admins manage users for users at regional level
		   - Zonal level Admins manage users for users at zonal and woredas under that zone
		   -
		- Authorization: users should work only on areas and levels of the system they have authorized to work
		   - Authenticated users can only be able to add/edit/delete on based on assigned role for the users
		   - Authenticated users can only see CEWRR information within the administrative boundary they are assigned to.
		- Audit: the system should be Auditable in such a way changes made by any user at any level can be traced back.
		   - System should have the ability to keep logs for any transactions end to end
		- Secured: the system should be secured from any type of malicious attack, in transition or on storage this should ensure through
		   - Antivirus
		   - Encryption
			- Affect system performance and disruption of operations
			- Affect unauthorized change of data which affects decision making
			- Tampered data may have effect in operation and decision making
			- Sensitive information may go into the hands of malicious people which may result adverse effect for the intended purpose.
			- Disclosure of Government secrets
			- Disclosure of individuals information	

2	Data Currency	All CEW and RR related data needs to be current and time bound for each level. • CEW reports and CRR requests, acknowledgements, approvals should be seen to all levels within **TBD** seconds of submission	- Delayed data may result unsuccessful result especially for rapid response. - not having multiple CEW reports timely may result in undermining the gravity of the issue	
3	Reliability	All information registered into the database need to be stored and transmitted to different levels with high level of reliability. All registered data need to be consistent at any point in time across all servers - Redundancy should be considered	- Failure of the system is critical to the extent of risking human life. - Complete or partial loss of the ability to perform a mission-critical function - Data on different server may vary at same specific time	The system cannot go down for no more than 1 day per year
4	Recoverability	The system should be able to restore to normal operation having a properly implanted disaster recovery plan in the case of system failure, database corruption, hardware failure etc.	Failure to recover promptly from any kind of failure will result in delay in responding to CEW reports and will result on the same risk as the one mentioned on reliability	Acceptable time of Recoverability on each type of failure: 6hrs
5	System Availability	The system needs to be available 24/7 considering the nature of conflict is not time bound and standby operation is required.	Availability of system may have impact on emerging early warning report and associated response and assistance request have attention on time and appropriate action	
6	Fault Tolerance	The system needs to have alternative mechanisms for users to operate when the system fails for one reason or the other	Not having a fault tolerant system will have delayed actions and information exchange which result in late response to early warning and associated consequences.	6hrs
7	Portability	The system needs to be portable enough and needs to operate in any environment with the minimal technical intervention. The system should work in multiple languages (Amharic, English, Afaan Oromo and have the capacity for two additional Ethiopian languages) The system should work on various types of devices and platforms	Change in the system should not require time for all levels to have the system updated timely	

8	Capacity	System should have capacity to manage large number of transactions per unit time	Critical time information exchange affected by capacity may affect the response time.	TBD (bandwidth)
9	Data Retention	No data is considered as obsolete Data needs to be retained permanently. Archiving policy may apply	Lacking to retain data may result in not being able to use information for conflict management and learn from similar experiences	
10	Maintainability	The system should be maintainable allowing changes on the system does not affect functionality		
11	Compatibility	The system must be compatible with all most recent versions of operating systems and browsers		Detail compatibility list is to be determined
12	Supportability Requirements	The system should be quickly supportable to all levels considering the large number of sites the system is expected to be deployed - The system should have FAQs, troubleshooting tools, online help. - Support from consultant will be determined based on SLA	Failure to be able to support on time may result in not being able to get any report to/from the specific point and associated consequences.	

CEWER System Information Flow, Communication and Reporting Framework

CEWER DATABASE

SITUATION (At Woreda level, At Zonal level, At Regional State level, At Federal level)

CASE

FMs · KASO · WASO · ZASO · RASO · Public · EWSS DG

Case Info | CEW Summary | Escalation Potential | Alarm Level | CER Summary

CEW Report 1: Alert
- FMR1 · FMR2
- E-source 1 · E-source 2

CEW Report 2: Incident
- FMR3 · E-source 3

CEW Report 1: Alert

CEW Report 1: Alert

E-source Review Log

CER: KASO, WASO, ZASO, RASO, EWSS DG
- CER Intent Notifications
- CER Comment/Recommendation Notifications
- CER Comment/Recommendation Acknowledgements
- CER Reports
- CER Assistance Requests
- CER Assistance Request Acknowledgements

KASO

WASO ZASO RASO EWSS DG

Legend:

→ Woreda Tagged E Source EW Report

→ EW Information coming through FMs

→ Response Requests statuses and updates

→ SMS, Traditionla media and other e-Sources

FM/CBFM Related

Kebele Admin & Security Office (KASO)

Woreda Admin & Security Office (WASO)

Zonal Admin & Security Office (ZASO)

Regional Admin & Security Office (RASO)

Federal Early Warning and Sustainable Solutions Directorate General (EWSS DG)

Digital Documents

Annex-B – Flow Chart

CEWRR System Higher and Lower Level Administration and Security Office Interactions
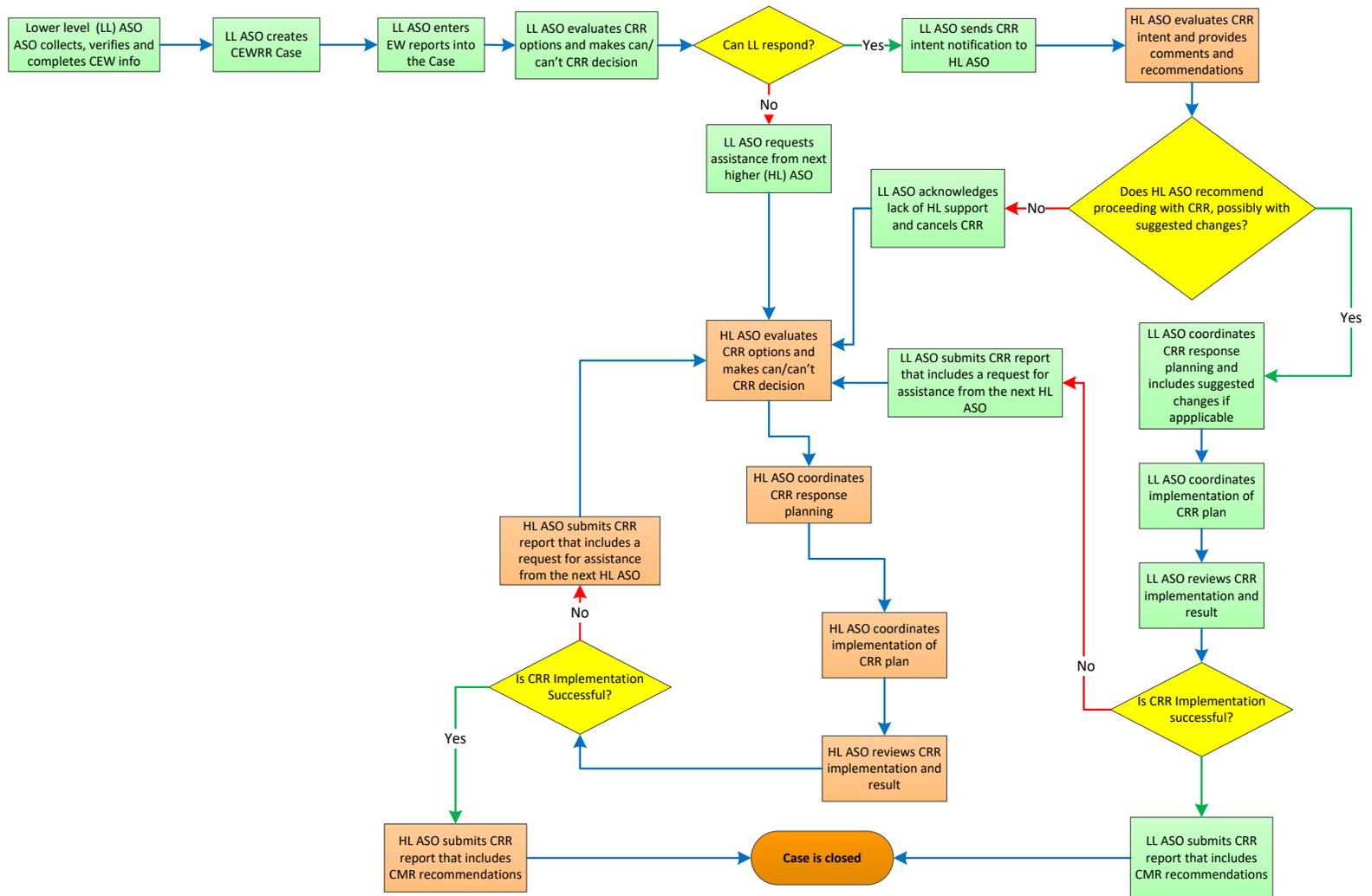
Annex-C – High level Technology Framework

CEWRR System Higher Level IT Design

Situation Room +Main Server with National Data	MoFPDA
	Data Replication
Situation Room +Regional Server with Regionla Database	Region X — LAN
	Region Y — LAN
Situation Room+Data Access from Regional Server	RXZ1 LAN, RXZ2 LAN
	RYZ1 LAN, RYZ2 LAN
Paper based Data	RXZ1W1 LAN, RXZ1W2 LAN, RXZ2W1 LAN, RXZ2W1 LAN
	RYZ1W1 LAN, RYZ1W2 LAN, RYZ2W1 LAN, RYZ2W2 LAN
	RXZ1W1K1, RXZ1W1K2, RXZ1W2K1, RXZ1W2K2, RXZ2W1K1, RXZ2W1K2, RXZ2W2K1, RXZ2W2K2
	RYZ1W1K1, RYZ1W1K2, RYZ1W2K1, RYZ1W2K2, RYZ2W1K1, RYZ2W1K2, RYZ2W2K1, RYZ2W2K2
Calls	**Kebele Level FMs**
Information Source	**Community Level Informants**

WAN

SMS Short Code X

SMS Short Code Y

Public from Region Y

Public from Region Y

Traditional media

Internet

Social media Info

EW info Database Entry

Woreda Tagged SMS and Social and Traditional media Info

Call to Kebele SMS Received from Region

Call/Fax EW info to Woreda

Call EW info to Kebele

Legend:
- ── Network Boundary/Data Sources
- ── EW Information
- ── RR Requests and Updates
- ── System Notification Status Alerts
- ── Call Notification/Status Alerts