



Nile Basin Initiative (NBI)
Eastern Nile Subsidiary Action Program (ENSAP)
Eastern Nile Technical Regional Office (ENTRO)



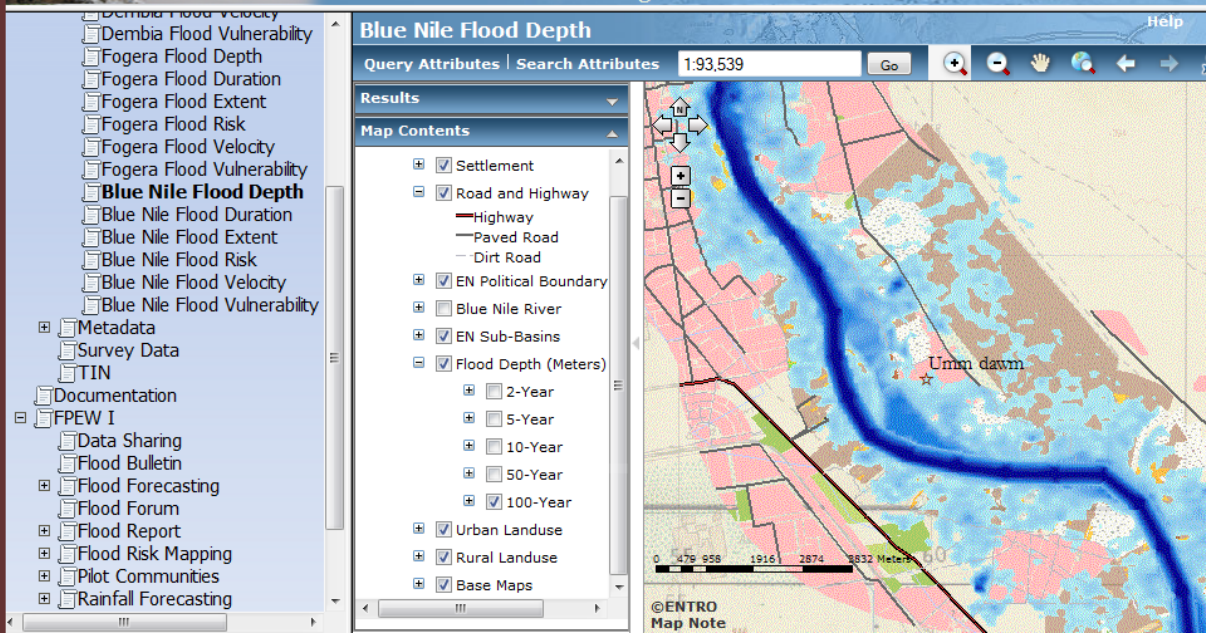
Flood Preparedness and Early Warning (FPEW I) Project
Development of Knowledge Base
Volume II - Knowledge Base Documentation
September 2011, Addis Ababa



Regional Flood Coordination Unit



Eastern Nile Technical Regional Office
Flood Preparedness and Early Warning Project
Knowledge Base Documentation



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Introduction

Flood Preparedness and Early Warning (FPEW I) Project Knowledge Base Development is supported by German Development Cooperation (GIZ) and its implementation is closely supervised by ENTRO's Water Resources Planning Unit head. As part of the knowledge base development, this document provides documentation to information and knowledge resources collected, generated and compiled during the course of project implementation.

The document provides complete documentation and reference to FPEW knowledge base that presents the structure of knowledge resources which are organized into directory structures; brief description of documents and document containing folders; Geodatabase and metadata; tools and models. This document has been prepared in three formats: MS Word document, PDF, and HTML format that help users navigate the documentation as well as navigate to physical locations of the documents, metadata and tools.

The metadata for geographic data layers and map documents has been exported from ArcGIS 10.0 Desktop metadata editor to HTML format document. For complete reference, users need to access the metadata for the spatial data in ArcGIS.

Folder Structure and File Naming Convention

Folders and Subfolders descriptive and physical names are written together. The descriptive name (Ex. FPEW Knowledge Base) is used for document navigation and physical name (Ex. [FPEW_KBase](#) as it is stored on storage media) is used to link to the location where the actual folder is stored. The physical names are hyperlinked and used to navigate to the storage location if this document is residing on the same media with the resources they are pointing to. Note that the hyperlinks can be lost if the documentation (PDF, MS Word and HTML version) is moved to other locations than they were originally created in. If the HTML version of this documentation is hosted on Microsoft Internet Information Service (IIS) server, directoryBrowse element in the web configuration file should be enabled to navigate the directory locations.

Documents produced by ENTRO and during FPEW I project implementation are prefixed with two level of codes and all the words making up the document names are separated by underscore and are described below.

First prefix could be

- FPEW – regional level document
- EGY – document is developed for Egypt
- ETH – document is developed for Ethiopia
- SDN – document developed for Sudan

Example:

- i) [FPEW_Bulletin_2010_Release_No_1.pdf](#) – Flood bulletin release no. 1 is named by prefixing FPEW indicating that the document content covers the EN region.

- ii) EGY_ToR_Enhancing_Nile_Forecasting_System.doc – Enhancement to Nile Forecasting System document is produced for Egypt.

To avoid confusion, note that some documents which are part of the final reports but in separate file are not renamed to maintain integrity of the document as they may be referred to by name in the main document.

Second prefix could be any of the following

- CON – Contract
- FIN – Final Report
- INC – Inception Report
- INT – Interim Report
- MoN – Minutes of Negotiation
- PRF – Financial Proposal
- PRT – Technical Proposal
- PRO – Proposal (combined financial and technical proposal)
- RFP – Request for Proposal
- ToR – Terms of Reference
- TRN – Training Report

Example:

EGY_ToR_Enhancing_Nile_Forecasting_System.doc

EGY – is first prefix

ToR – is second prefix, meaning the document is terms of reference.

The use of prefixes enables content management tools to easily search the documents by region/country or type of document or both. The name after the two prefixes is made as much as possible self explanatory – basically, the name refers to document title.

FPEW Knowledge Base

[FPEW_KBase:](#)

The knowledge base products collected and generated by the Flood Preparedness and Early Warning (FPEW I) Project of the Eastern Nile Technical Regional Office (ENTRO) are organized under master folder called FPEW_KBASE. The types of products maintained include project implementation and study reports, spatial databases, workshop materials, scripts, software tools and models. All products have been thematically organized into folders. In the case of Enterprise databases, connection property files have been maintained in a folder along with brief metadata descriptor files.

The master folder has Documentation.html file that redirects to and opens the default.htm that provides single interface to Knowledge Base Documentation and navigation to physical directory locations. This helps users easily identify the content of the Knowledge Base.

Databases and Maps

[Databases_Maps:](#)

Spatial database, map documents and catalogs, and links to Enterprise Geodatabase connections are organized under this folder. Note that the Geodatabase of the project is maintained on ENTROKBASE server along with SQL Server and ArcSDE. The database files under the Databases folder are either database connection file or backup of the master Geodatabase itself.

Maps

[Maps:](#)

Maps authored for printing and publishing online on ArcGIS Server are maintained under this folder. The list below provides all the printable maps that were prepared during the pilot flood risk mapping studies in Ethiopia and Sudan. The maps were prepared for printing as well as for online publishing. Print ready versions of the maps in PDF format are located under [FPEW_KBase/FPEW_I/Flood_Risk_Mapping/ETH_PDF_Maps](#) for Ethiopia and [FPEW_KBase/FPEW_I/Flood_Risk_Mapping/SDN_PDF_Maps](#) for Sudan.

All the map documents have associated metadata created in ArcGIS 10.0 Desktop version using ISO 19139 Metadata Implementation Specification. Refer the HTML version of this document to view the metadata or use ArcCatalog to view the metadata in its native environments.

The XML version of the metadata for the map documents is also stored under the same folder with the maps. To avoid unexpected damages to the XML files, users may work on the copies of the files when editing the metadata outside of the ArcGIS environment.

List of printable Map Documents:

	Physical Map Name	Descriptive Map Name
Ethiopia Maps		
1	FPEW_ETH_Dembia_Flood_Depth.mxd	Dembia Flood Depth
2	FPEW_ETH_Dembia_Flood_Duration.mxd	Dembia Flood Duration
3	FPEW_ETH_Dembia_Flood_Extent.mxd	Dembia Flood Extent
4	FPEW_ETH_Dembia_Flood_Risk.mxd	Dembia Flood Risk
5	FPEW_ETH_Dembia_Flood_Velocity.mxd	Dembia flood Velocity
6	FPEW_ETH_Dembia_Flood_Vulnerability.mxd	Dembia Flood Vulnerability
7	FPEW_ETH_Fogera_Flood_Depth.mxd	Fogera Flood Depth
8	FPEW_ETH_Fogera_Flood_Duration.mxd	Fogera Flood Duration
9	FPEW_ETH_Fogera_Flood_Extent.mxd	Fogera Flood Extent
10	FPEW_ETH_Fogera_Flood_Risk.mxd	Fogera Flood Risk
11	FPEW_ETH_Fogera_Flood_Velocity.mxd	Fogera flood Velocity
12	FPEW_ETH_Fogera_Flood_Vulnerability.mxd	Fogera Flood Vulnerability
Sudan Maps		
13	FPEW_SDN_Blue_Nile_Flood_Depth.mxd	Blue Nile Flood Depth
14	FPEW_SDN_Blue_Nile_Flood_Duration.mxd	Blue Nile Flood Duration
15	FPEW_SDN_Blue_Nile_Flood_Extent.mxd	Blue Nile Flood Extent
16	FPEW_SDN_Blue_Nile_Flood_Risk.mxd	Blue Nile Flood Risk
17	FPEW_SDN_Blue_Nile_Flood_Velocity.mxd	Blue Nile flood Velocity
18	FPEW_SDN_Blue_Nile_Flood_Vulnerability.mxd	Blue Nile Flood Vulnerability

Metadata

Metadata:

Metadata for datasets maintained in the Geodatabases was created in ArcGIS 10.0 Desktop using ISO 19139 Metadata Implementation Specification. The metadata for all the datasets included in the Geodatabase is available in [HTML version](#) of this documentation or users can view the metadata in its native environment using ArcCatalog application of ArcGIS 10.0 Desktop. A sample metadata for FPEW Geodatabase as it is viewed in ArcGIS is provided below.

FPEW Geodatabase



Tags

Flood Risk, Flood Vulnerability, Flood Damage, Flood Plain Survey, Pilot Communities, Terrain, Vulnerable Assets, Elevation, Flood Depth, Flood Velocity, Flood Duration, Base Map, River Channel, River Cross-Section, Hydrography, Infrastructure Damage, Crop Damage, Settlement, Channel Geometry, Sub-Catchment, Hydro-Meteorology

Summary

The Geodatabase is created to organize datasets collected and generated during the Flood Preparedness and Early Warning (FPEW I) Project implementation.

Description

This Geodatabase organizes datasets primarily collected to carry out flood risk mapping and results of the flood risk mapping analysis. The major datasets include flood depth, duration, extent, vulnerability, risk and velocities; scanned topographic data used as base-maps; Agricultural, road, and inventory of structural assets prone to flooding events; flood plain topographic and river cross-section survey; settlements; and other relevant hydrographic datasets.

Credits

The Geodatabase and related metadata are created for ENTRO by Mulugeta Tadesse, GIS/IT Specialist (Consultant). The contained major datasets are generated by the survey and mapping agencies of Ethiopia and Sudan; dataset generated related to flood disk mapping analysis are produced by Riverside Technology, Inc. and local partners (Sheble Consult PLC, Tropics Consulting Engineers PLC of Ethiopia, and UNESCO Chair in Water Resources of Sudan).

Access and use limitations

The datasets maintained in the Geodatabase require permission from ENTRO to access and use. Refer to the metadata corresponding to each of the dataset in the Geodatabase for any use limitations.

ArcGIS Metadata ►

Resource Identification ►

CITATION

TITLE FPEW Geodatabase

THEMES OR CATEGORIES OF THE RESOURCE biota; boundaries; economy; elevation; environment; imagery, Base Maps ,Earth Cover; inland, Waters; location; structure; transportation

TAGS FOR SEARCHING Flood Risk, Flood Vulnerability, Flood Damage, Flood Plain Survey, Pilot Communities, Terrain, Vulnerable Assets, Elevation, Flood Depth, Flood Velocity, Flood Duration, Base Map, River Channel, River Cross-Section, Hydrography, Infrastructure Damage, Crop Damage, Settlement, Channel Geometry, Sub-Catchment, Hydro-Meteorology

ABSTRACT (DESCRIPTION)

This Geodatabase organizes datasets primarily collected to carry out flood risk mapping and results of the flood risk mapping analysis. The major datasets include flood depth, duration, extent, vulnerability, risk and velocities; scanned topographic data used as base-maps; Agricultural, road, and inventory of structural assets prone to flooding events; flood plain topographic and river cross-section survey; settlements; and other relevant hydrographic datasets.

PURPOSE (SUMMARY)

The Geodatabase is created to organize datasets collected and generated during the Flood Preparedness and Early Warning (FPEW I) Project implementation.

DATASET LANGUAGES English

DATASET CHARACTER SET utf8 - 8 bit UCS Transfer Format

RESOURCE CONSTRAINTS

CONSTRAINTS

LIMITATIONS OF USE

The datasets maintained in the Geodatabase require permission from ENTRO to access and use. Refer to the metadata corresponding to each of the dataset in the Geodatabase for any use limitations.

SPATIAL REPRESENTATION TYPE vector

SPATIAL REPRESENTATION TYPE grid

SPATIAL REPRESENTATION TYPE text table

SPATIAL REPRESENTATION TYPE tin

OTHER EXTENT INFORMATION

EXTENT DESCRIPTION

The datasets are mainly covering the Blue Nile Reaches in Sudan and Lake Tana area.

CREDITS

The Geodatabase and related metadata are created for ENTRO by Mulugeta Tadesse, GIS/IT Specialist (Consultant). The contained major datasets are generated by the survey and mapping agencies of Ethiopia and Sudan; dataset generated related to flood disk mapping analysis are produced by Riverside Technology, Inc. and local partners (Sheble Consult PLC, Tropics Consulting Engineers PLC of Ethiopia, and UNESCO Chair in Water Resources of Sudan).

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ORGANIZATION'S NAME ENTRO
 CONTACT'S POSITION GIS Specialist/Water Resources Engineer
 CONTACT'S ROLE point of contact

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Hide ▲

Metadata Details ►

METADATA LANGUAGE English
 METADATA CHARACTER SET utf8 - 8 bit UCS Transfer Format

METADATA CONTACT

INDIVIDUAL'S NAME Mulugeta Tadesse
 ORGANIZATION'S NAME Eastern Nile Technical Regional Office (ENTRO)

	<p>CONTACT'S POSITION GIS/IT Specialist (Consultant) CONTACT'S ROLE author</p> <p>CONTACT INFORMATION PHONE VOICE 00251-911-477-636</p> <p>ADDRESS CITY Addis Ababa ADMINISTRATIVE AREA Addis Ababa POSTAL CODE P. O. Box 27173-1000 COUNTRY Ethiopia E-MAIL ADDRESS mtadesse@nilebasin.org E-MAIL ADDRESS mulugetat@aim.com</p> <p>HOURS OF SERVICE 9:00 - 17:00 Addis Ababa local time, Monday to Friday</p> <p>LAST UPDATE 2011-09-04 MAINTENANCE UPDATE FREQUENCY as needed SCOPE OF THE UPDATES dataset Hide ▲</p> <p>ESRI Metadata and Item Properties ►</p> <p>METADATA PROPERTIES ARCGIS ArcGIS1.0 METADATA STYLE INSPIRE Metadata Directive METADATA STANDARD OR PROFILE ISO19139 CREATED IN ARCGIS 2011-08-02T16:30:39 LAST MODIFIED IN ARCGIS 2011-09-04T11:06:28 AUTOMATIC UPDATES HAVE BEEN PERFORMED No</p>
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Survey Data

[Survey_Data:](#)

Original field survey data of Dembia and Fogera floodplains in Ethiopia and the Blue Nile floodplain in Sudan are maintained in MS Excel format for future reference. The survey data primarily contains Longitude, Latitude and Elevation fields. All the tables were converted to point feature class/GIS data layers and stored under the FPEW Geodatabase.

Triangular Irregular Network (TIN)

TIN:

The TIN datasets represent elevation model/surface morphology of the floodplains (Dembia and Fogera floodplain in Ethiopia and Blue Nile floodplain in Sudan). The TIN surfaces for the floodplains were created from field survey data and SRTM 90 meters digital elevation model and used for hydraulic modeling of the floodplains.

As the TIN data model can't be integrated into Geodatabase data model, the original version created during flood risk mapping studies are maintained in a directory structure for future reference.

All the datasets/survey data and river bank and river center breaklines used in the construction of TIN were exported to Geodatabase. Instead of TIN, users can use the Terrain datasets, which is a TIN-based dataset that reside in Geodatabase and uses Geodatabase feature classes as data sources. The Terrain dataset is already created and maintained in the Geodatabase.

Documentation

Documentation:

The documentation folder contains all the files related to documentation of the FPEW Knowledge Base: the HTM ([FPEW_KBase_Documentation.html](#)), PDF ([FPEW_KBase_Documentation.pdf](#)) and MS Word ([FPEW_KBase_Documentation.docx](#)) version.

The HTML version has multiple files organized to form an integral part of the documentation which uses JavaScript to link and aid navigation through individual file/document in a tree structure. The HTML document can be accessed from the root folder of the Knowledge Base ([FPEW_Kbase](#)) either by double clicking [Documentation.html](#) or from [FPEW_KBase/Documentation](#) by double clicking [FPEW_KBase_Documentation.html](#) file. Both files contain automatic redirecting codes to [Default.htm](#).

Flood Bulletin

Flood_Bulletin:

The folder is intended to organize bulletins and newsletters produced by ENTRO as well as external sources which are relevant to ENTRO activities.

The list of bulletins produced since 2010 flood season along with meta-document is presented in the table below.

List of Bulletins

Documents	<p>FPEW_Bulletin_2010_Release_No_1.pdf, FPEW_Bulletin_2010_Release_No_2.pdf, FPEW_Bulletin_2010_Release_No_3.pdf, FPEW_Bulletin_2010_Release_No_4.pdf, FPEW_Bulletin_2010_Release_No_5.pdf, FPEW_Bulletin_2011_Release_No_1.pdf, FPEW_Bulletin_2011_Release_No_2.pdf, FPEW_Bulletin_2011_Release_No_3.pdf, FPEW_Bulletin_2011_Release_No_4.pdf, FPEW_Bulletin_2011_Release_No_5.pdf</p>
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Meta-document for the above list of bulletins

Category	Element	Comment
Document	Title	Flood Preparedness and Early Warning Bulletin
	Custodian	ENTRO
Description	Abstract	<p>The FPEW bulletin was started during the 2010 flood season to circulate on a weekly basis for all relevant agencies as a compilation of daily real time forecast results of the Flood Forecasting models under operation during the flood season for both Ethiopia and Sudan. The bulletins usually provide:</p> <ul style="list-style-type: none"> ➤ Rainfall forecast using numerical weather prediction models on 3 days lead time; ➤ Rainfall-runoff forecast using HEC-HMS model for the tributaries of Lake Tana (Gumara, Ribb, Megech and Dirma Rivers); ➤ Flood forecast for the Blue Nile, Main Nile and Fogera and Dembia flood plains (HEC-RAS, HEC-GeoRAS, and LPM used); and ➤ Flood inundation mapping.
	Key Words	Bulletin, Rainfall Forecast, Flood Forecast, Inundation Mapping
	Originator	ENTRO
	Credit	The bulletins were produced by ENTRO in collaboration with national flood forecasting centers of Ethiopia and Sudan
Document	Beginning date	August 2, 2010

Category	Element	Comment
Currency		
	Ending date	September 3, 2010
Access	Access Constraints	The documents are in a public domain.
	Document Format	All are in PDF format except the release no. 5 which is in both PDF and MS Publisher (PUB) format.
	Location/Link	The document is located under FPEW KBase/FPEW I/Flood Bulletin Click the following links to open the document: FPEW Bulletin 2010 Release No 1 FPEW Bulletin 2010 Release No 2 FPEW Bulletin 2010 Release No 3 FPEW Bulletin 2010 Release No 4 FPEW Bulletin 2010 Release No 5 FPEW Bulletin 2011 Release No 1 FPEW Bulletin 2011 Release No 2 FPEW Bulletin 2011 Release No 3 FPEW Bulletin 2011 Release No 4 FPEW Bulletin 2011 Release No 5
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	E-Mail	entrolibrary@nilebasin.org
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FPEW I

[FPEW_I:](#)

Major folder used to organize most of the reports and other documents produced or collected during the implementation of Flood Preparedness and Early Warning (FPEW I) project.

The Project: FPEW I Project is one of the fast-track projects identified for priority actions under Eastern Nile Subsidiary Action Program (ENSAP). The project focuses on floodplain management and flood mitigation planning; flood forecasting and warning; and emergency response and preparedness at regional, national, local and community levels.

Project Goal: The goal of FPEW project is to reduce human suffering and damages from, and captures the benefits of, flooding in the Eastern Nile Region.

Project Objectives: The specific objectives of FPEW I project are:

- To establish a regional institutional basis;
- To strengthen the existing capacities of the EN countries in flood forecasting, mitigation and management;
- To promote regional cooperation; and
- To enhance the readiness of the EN countries for the subsequent implementation of the subsequent phases of FPEW projects.

Project Achievements: The project achieved measureable outputs that include:

- Creation of regional flood coordination unit;
- Enhancement of the capacity of professionals in the region through annual flood forums, and experience and knowledge sharing study tour to India and Bangladesh;
- Establishment, enhancement and institutional capacity building of forecasting centers of the EN countries;
- Development, calibration, implementation, and testing of rainfall and flood forecasting systems;
- Flood risk mapping; and
- Community flood preparedness and response action plans preparation and implementation.

The effectiveness of flood forecasting, early warning and communication system that has been put in place, particularly in Ethiopia and Sudan, was tested during the 2010 flood season. The warning messages that were based on forecast results were checked at the pilot communities. Though requires further refinements and continues support, the system at this stage is satisfactory.

The lessons learned from FPEW I project implementation can be carried over to the subsequent implementation of FPEW projects and can also be replicated to other basins in Ethiopia and Sudan.

Data Sharing

[Data_Sharing:](#)

This folder contains FIN_EN_Data_Sharing_Arrangement.doc file document that was drafted by the project for the EN countries to avail real time data for the flood forecasting models that were developed through the Flood Preparedness and Early Warning Project at the three EN flood forecasting centers, during the flood season i.e. during June to October of each calendar year. The complete meta-document is provided below.

List of Document

Documents	FPEW_FIN_EN_Data_Sharing_Arrangement.doc
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Meta-document for the above Document

Category	Element	Comment
Document	Title	Data Sharing Arrangements for flood management in the Eastern Nile
	Custodian	ENTRO, EN Countries (Egypt, Ethiopia and Sudan ministry of water affairs and meteorological agencies)
Description	Abstract	The need for real time hydro-meteorological data sharing in the Eastern Nile region necessitated data sharing arrangements for effectively implementing the flood forecasting models in Egypt, Ethiopia and Sudan during the flood seasons, from June to October. This document was presented to the Eastern Nile Subsidiary Action Program Team (ENSAPT) for approval. The main contents of the document include guidelines to avail data for flood management, period of data availability, and list and location of hydro-meteorological gauging station in Ethiopia and Sudan.
	Key Words	Data Sharing, Gauging Station, Hydro-Meteorology
	Originator	ENTRO
	Credit	This data sharing arrangement document was created by ENTRO and further enhanced by the World Bank
Document Currency	Beginning date	October 2009
	Ending date	January 2010
Access	Access Constraints	The documents require permission from ENTRO to use.
	Document Format	MS Word 97-2003 format
	Location/Link	The document is located under FPEW KBase/FPEW I/Data Sharing Click the following links to open the document: Data Sharing Arrangement Document
Contact Information	Organization	Eastern Nile Technical Regional Office (ENTRO)
	Contact Name	Tirsit Endeshaw

Category	Element	Comment
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Flood Forecasting

[Flood_Forecasting:](#)

Flood Forecasting, Warning and Communication Systems is one of the three components of the FPEW I Project. This component is aimed at improving flood forecasting institutions and developing a detailed design for EN flood forecasting, warning and communication system. The communications element of flood forecast and warning system is essential to its operation and the reduction of flood damages.

Under this component, various activities had been carried out over the course of the project life. In Ethiopia, new flood forecasting center was established and the forecasting centers in Egypt and Sudan had been strengthened. Information and knowledge resources produced at each centers and at regional level have been organized under the respective country and regional folders.

Egypt

[Egypt:](#)

After commissioning of High Aswan Dam (HAD) in 1968, the flooding situation in Egypt has completely changed. Therefore, the FPEW I had limited intervention in Egypt. The main area of concern was enhancement of the existing Nile Forecasting System Satellite Precipitation Estimation and Hydrological Models to forecast short term and medium term inflows to the High Aswan Dam for planning as well as regulation purposes. The meta-document for the study report that outlines the implementation of enhanced NFS is presented below.

List of Documents

Documents	<p>Terms of Reference: EGY_ToR_Enhancing_Nile_Forecasting_System.doc</p> <p>Technical and Financial proposals: EGY_PRT_Enhancing_Nile_Forecasting_System.doc EGY_PRT_Enhancing_Nile_Forecasting_System.pdf</p>
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	<p>EGY_PRF_Enhancing_Nile_Forecasting_System.pdf</p> <p>Minutes of Negotiation:</p> <p>EGY_MoN_Enhancing_Nile_Forecasting_System.doc</p> <p>Signed, unsigned contract and addendum to main contract:</p> <p>EGY_CON_Enhancing_Nile_Forecasting_System.pdf</p> <p>EGY_CON_Enhancing_Nile_Forecasting_System_Addendum_I.pdf</p> <p>EGY_CON_Enhancing_Nile_Forecasting_System_Unsigned.doc</p> <p>Final Report:</p> <p>EGY_FIN_Enhancing_Nile_Forecasting_System.pdf</p>
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Meta-document for the above list of Documents

Category	Element	Comment
Document	Title	Enhancement to Nile Forecasting System Satellite Precipitation Estimation and Hydrological Models in National Forecast Centre of Egypt
	Custodian	ENTRO, Ministry of Water Resources and Irrigation of Egypt
Description	Abstract	<p>The Enhancement to Nile Forecasting System Satellite Precipitation Estimation and Hydrological Models in National Forecast Centre in Egypt aims to improve the capabilities of the existing Nile Forecasting System (NFS) used by the Nile Forecasting Centre (NFC) of the Ministry of Water Resources and Irrigation (MWRI), Egypt.</p> <p>The NFS uses a gridded distributed hydrological model to monitor, simulate and forecast the entire Nile Basin and to determine flows particularly at Dongala, the inflow to Lake Nasser. The model is driven using satellite-derived precipitation estimates. An Extended Stream flow Prediction (ESP) procedure uses historical years as proxies for possible future precipitation to provide hydrological forecasts with an effective window of up to three months.</p> <p>The major outcomes this effort include:</p> <ul style="list-style-type: none"> ➤ Satellite precipitation monitoring: an enhanced rainfall estimation algorithm to take advantage of new satellite data. ➤ Hydro-meteorological database: enhanced import-export and data display and manipulation facilities. ➤ Hydrological models: automatic calibration tool and enhanced model configuration capabilities. ➤ Hydrological forecasting: an improved model of

Category	Element	Comment
		hydrological forecast.
	Key Words	Satellite Rainfall, Rainfall Estimation, Forecasting System, Hydrological Model, Hydrological Forecasting
	Originator	ENTRO
	Credit	The University of Hull, UK, enhanced the NFS, produced proposal and the final report for ENTRO.
Document Currency	Beginning date	January, 2009
	Ending date	December 22, 2009
Access	Access Constraints	The use of these documents is subjected to permission from ENTRO and Ministry of Water Resources and Irrigation of Egypt.
	Document Format	PDF and MS Word Document
	Location/Link	The document is located under FPEW I/Flood Forecasting/Egypt Click the following links to open the document: Terms of Reference Technical Proposal (doc) Technical Proposal (pdf) Financial Proposal Contract Minutes of Negotiation Addendum to Contract Unsigned Contract Final Report
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Ethiopia

Ethiopia:

The flood forecasting exercise in Ethiopia is the first of its kind in the country. There are many areas which are prone to flooding in different basins. The FPEW I implementation considered flood forecasting model development for the pilot areas around Lake Tana in the Fogera and Dembia flood plains. The documents organized under this folder are those produced as part of consultancy assignments to develop the flood forecasting model in Ethiopia and operationalization of the flood forecasting model during the 2010 flood season.

List of Documents for flood forecasting model development

Documents	<p>Terms of Reference: ETH_ToR_Flood_Forecasting_Model_Development.doc</p> <p>Technical and Financial proposal: ETH_PRO_Flood_Forecasting_Model_Development.doc</p> <p>Signed and unsigned contract and addendum to main contract: ETH_CON_Flood_Forecasting_Model_Development.pdf ETH_CON_Flood_Forecasting_Model_Development_Addendum_I.pdf ETH_CON_Flood_Forecasting_Model_Development_Unsigned.doc</p> <p>Inception Report: ETH_INC_Flood_Forecasting_Model_Development.doc</p> <p>Interim Report: ETH_INT_Flood_Forecasting_Model_Development.doc</p> <p>Final Report: ETH_FIN_Flood_Forecasting_Model_Development.doc ETH_FIN_Flood_Forecasting_Model_Development_Annex_I.doc</p>
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Meta-document for the above list of Documents

Category	Element	Comment
Document	Title	Calibration, Implementation and Training for Flood Forecasting Model and Development of Early Warning System in Ethiopia
	Custodian	ENTRO, Ministry of Water Resources and Energy of Ethiopia
Description	Abstract	The primary intent of the flood forecasting model development was to assist the Flood Forecasting Center (FFC) established under the Ministry of Water Resources of Energy of Ethiopia to select/develop, install, calibrate, and validate a flood forecasting and an early warning system based on rainfall runoff modeling and flood routing methodologies in the Lake Tana catchment, as well as conducting training within the

Category	Element	Comment
		<p>National flood Forecasting Center in the Ministry.</p> <p>All the documents listed above are created in the course of the flood forecasting model development undertakings. The flood forecasting modeling development includes:</p> <ul style="list-style-type: none"> ➤ Required input variables and parameters to the hydrological models set for Gummara, Rib, Megech and Dirma catchments ➤ Easy to use integrated flood forecasting system which gives flood alert level for 72 hours ahead ➤ HEC-HMS model configured as catchment based semi-distributed hydrologic model type intended to represent the spatial variation of the rainfall and the proposed hydraulic facilities such as storage dam. ➤ Hydraulic configuration and modeling using HEC-RAS <p>The model input consists of data from three existing rainfall stations and flow data from corresponding gauging stations at Gummara, Ribb, Megech and Dirma for calibration and verification of the model.</p>
	Key Words	Flood Forecasting, Model Calibration, Hydrologic Modeling, Hydraulic Modeling, Rainfall Forecast
	Originator	ENTRO
	Credit	Flood Forecasting Model was developed for the Ministry of Eater Resources and Energy of Ethiopia by Addis Ababa University, Civil Engineering Department.
Document Currency	Beginning date	February 4, 2009
	Ending date	March 2010
Access	Access Constraints	The use of these documents is subjected to permission from ENTRO and Ministry of Water Resources and Energy of Ethiopia.
	Document Format	PDF and MS Word Document
	Location/Link	<p>The document is located under</p> <p>FPEW I/Flood Forecasting/Ethiopia</p> <p>Click the following links to open the document:</p> <p>Terms of Reference</p> <p>Proposal</p> <p>Contract</p>

Category	Element	Comment
		Contract - Addendum I Unsigned Contract Inception Report Interim Report Final Report Final Report - Annex I
Contact Information	Organization	Eastern Nile Technical Regional Office (ENTRO)
	Contact Name	Tirsit Endeshaw
	Contact Position	Librarian
	Mail Address	P.O. Box 27173-1000, Addis Ababa, Ethiopia
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	E-Mail	entrolibrary@nilebasin.org
	Web Address	www.nilebasin.org/entro

List of Documents for operationalization of flood forecasting model during the 2010 flood season

Documents	<p>Terms of Reference: ETH_ToR_Flood_Forecasting_Support_to_NFC.doc</p> <p>Technical and Financial proposal: ETH_PRO_Flood_Forecasting_Support_to_NFC.doc</p> <p>Minutes of negotiation: ETH_MoN_Flood_Forecasting_Support_to_NFC.doc</p> <p>Signed and unsigned contract and addendum to main contract: ETH_CON_Flood_Forecasting_Support_to_NFC.pdf ETH_CON_Flood_Forecasting_Support_to_NFC_Unsigned.doc</p> <p>Inception Report: ETH_INC_Flood_Forecasting_Support_to_NFC.pdf</p> <p>Final Report: ETH_FIN_Flood_Forecasting_Support_to_NFC.doc ETH_FIN_Flood_Forecasting_Support_to_NFC.pdf ETH_FIN_Flood_Forecasting_Support_to_NFC_Annex_1.doc ETH_FIN_Flood_Forecasting_Support_to_NFC_Annex_1.pdf ETH_FIN_Flood_Forecasting_Support_to_NFC_Annex_2.doc ETH_FIN_Flood_Forecasting_Support_to_NFC_Annex_2.pdf</p>
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Meta-document for the above list of Documents

Category	Element	Comment
Document	Title	Operationalization of Flood Forecasting and Early Warning System in 2010 Flood Season in Ethiopia
	Custodian	ENTRO, Ministry of Water Resources and Energy of Ethiopia
Description	Abstract	<p>Following the development of flood forecasting model at the National Flood Forecasting center of the Ministry of Water Resources and Energy, there was a need to operationalize and test the model during the 2010 flood season. To this end, the FPEW I supported the National Flood Forecasting Centre of Ethiopia in operating the flood forecasting model and delivering appropriate early warning messages to the concerned authorities and communities in the flood affected areas around Lake Tana area.</p> <p>Operationalizaiton of the flood forecasting model involved linking the flood forecasting model developed by Addis Ababa University and models used in the flood risk mapping developed by Riverside Technology, Inc.</p> <p>The flood forecasting system integrated the Rainfall forecasting model (using ETA), the hydrological model (HEC-HMS), the hydraulic model (HEC-RAS) and the flood plain mapping model (HEC-GeoRAS).</p>
	Key Words	Flood Forecasting, Operationalization, Hydrologic Modeling, Hydraulic Modeling, Rainfall Forecast
	Originator	ENTRO
	Credit	Flood Forecasting Model was made operational at the National Flood Forecasting Center by Addis Ababa University, Civil Engineering Department.
Document Currency	Beginning date	July 2010
	Ending date	December 2010
Access	Access Constraints	The use of these documents is subjected to permission from ENTRO and Ministry of Water Resources and Energy of Ethiopia.
	Document Format	PDF and MS Word Document
	Location/Link	<p>The document is located under FPEW I/Flood Forecasting/Ethiopia</p> <p>Click the following links to open the document:</p> <p>Terms of Reference</p>

Category	Element	Comment
		Proposal Minutes of Negotiation Contract Unsigned Contract Inception Report Final Report (poc) Final Report - Annex 1 (doc) Final Report - Annex 2 (doc) Final Report (pdf) Final Report - Annex 1 (pdf) Final Report - Annex 2 (pdf)
Contact Information	Organization	Eastern Nile Technical Regional Office (ENTRO)
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Regional

Regional:

During FPEW I implementation preparation, it was planned to carry out analysis on the existing systems to decide about new modules that can be upgraded to serve as regional based system or deliver a conceptual design that can serve the EN. However, the countries have reached a consensus to reshape the regional based system concept to Design of an Upgraded Data Acquisition, Communication and Flood Forecasting Systems in the EN countries which targets to further enhance the national forecasting centers. Accordingly, ENTRO through FPEW I contracted Riverside Technology Inc. to carry out detailed design of an Upgraded Data Acquisition, Communication and Flood Forecasting Systems in the EN countries and prepare tender document for implementation at all the national forecasting centers and ENTRO.

List of Documents for Design of an Upgraded Data Acquisition, Communication and Flood Forecasting Systems in the EN countries

Documents

Terms of Reference:

FPEW_ToR_Data Acquisition_Communication_Flood_Forecasting.doc

Technical and Financial proposal:

FPEW_PRO_Data Acquisition_Communication_Flood_Forecasting.pdf

Contract :

FPEW_CON_Data Acquisition_Communication_Flood_Forecasting.pdf

Inception Report:

Final Report:

FPEW_FIN_Data Acquisition_Communication_Flood_Forecasting.doc

FPEW_FIN_Data Acquisition_Communication_Flood_Forecasting_Appendix_A.doc

FPEW_FIN_Data Acquisition_Communication_Flood_Forecasting_Appendix_B.doc

FPEW_FIN_Data Acquisition_Communication_Flood_Forecasting_Plan.doc

Appendices to EN_FIN_Data Acquisition_Communication_Flood_Forecasting_Plan.doc are organized under folders:

Appendix_A_Ethiopia

A1_ETHIOPIA_SPECS.doc

A2_ETHIOPIA_DEMO_EOI.doc

A2_ETHIOPIA_DEMO_TOR.doc

A3_ETHIOPIA_PILOT_EOI.doc

A3_ETHIOPIA_PILOT_TOR.doc

A4_ETHIOPIA_NATIONAL_EOI.doc

A4_ETHIOPIA_NATIONAL_TOR.doc

A5_ETHIOPIA_EXPANSION_EOI.doc

A5_ETHIOPIA_EXPANSION_TOR.doc

Appendix_B_Sudan

B1_SUDAN_SPECS.doc

B2_SUDAN_DEMO_EOI.doc

B2_SUDAN_DEMO_TOR.doc

B3_SUDAN_PILOT_EOI.doc

B3_SUDAN_PILOT_TOR.doc

B4_SUDAN_NATIONAL_EOI.doc

B4_SUDAN_NATIONAL_TOR.doc

Appendix_C_ENTRO

C1_ENTRO_SPECS.doc

C2_ENTRO_HMDSS_EOI.doc

C3_ENTRO_HMDSS_TOR.doc

Meta-document for the above list of Documents

Category	Element	Comment
Document	Title	Design of an Upgraded Data Acquisition, Communication and Flood Forecasting Systems in the EN countries
	Custodian	ENTRO, Ministry of Water Resources and Irrigation of Egypt, Ministry of Water Resources and Energy of Ethiopia, and Ministry of Irrigation and Water Resources of Sudan
Description	Abstract	<p>The Design of an Upgraded Data Acquisition, Communication and Flood Forecasting Systems in the EN countries aimed at the designing of upgrade of the real time data acquisition, Flood Forecasting, and Communication capacity within the National Flood Forecasting Centers (NFC) of Egypt, Ethiopia, and Sudan. It includes software and hardware aspects for real time data acquisition and transmission, the types of forecast information to be generated and the communication systems, and also to link ENTRO to the national forecasting centers. ENTRO is to provide technical back-stopping for NFCs such as data sharing, training, etc.</p> <p>The documents presented here provide details on</p> <ul style="list-style-type: none"> ➤ Background and context of the project ➤ Results of the gap analysis for each country in flood forecasting and hydro-meteorological network system ➤ Overview of the individual components that can be used for a real-time data collection network ➤ Recommendations for real time data collection networks in Ethiopia and Sudan ➤ Design for a data processing and storage and a data communication system. ➤ Procurement plan along with specifications, demo expression of interest and demo terms of reference
	Key Words	Procurement Plan, Detail Design, Hydro-Meteorology, Expression of Interest, Data Acquisition, Flood Forecast, Real Time
	Originator	ENTRO
	Credit	All documents related to Detail Design of an Upgraded Data Acquisition, Communication and Flood Forecasting Systems in the EN countries are produced by Riverside Technology, Inc. for ENTRO except the ToR and Contract.
Document Currency	Beginning date	May 7, 2010

Category	Element	Comment
	Ending date	December 2010
Access	Access Constraints	The use of these documents is subjected to permission from ENTRO and Ministry of the water affairs of the EN countries.
	Document Format	PDF and MS Word Document
	Location/Link	<p>The document is located under FPEW I/Flood Forecasting/Regional</p> <p>Click the following links to open the document:</p> <p>Terms of Reference</p> <p>Proposal</p> <p>Contract</p> <p>Final Products</p> <p>Final Report</p> <p>Appendix A</p> <p>Appendix B</p> <p>Procurement Plan</p> <p>Appendix A</p> <p>Ethiopia Specification</p> <p>Ethiopia Demo EOI</p> <p>Ethiopia Demo ToR</p> <p>Ethiopia Pilot EOI</p> <p>Ethiopia Pilot ToR</p> <p>Ethiopia National EOI</p> <p>Ethiopia National TOR</p> <p>Ethiopia National EOI</p> <p>Ethiopia Expansion ToR</p> <p>Appendix B</p> <p>Sudan Specification</p> <p>Sudan Demo EOI</p> <p>Sudan Demo EOI</p> <p>Sudan Pilot EOI</p> <p>Sudan Pilot ToR</p> <p>Sudan National EOI</p> <p>Sudan National TOR</p> <p>Appendix C</p> <p>ENTRO Specification</p> <p>ENTRO Data Sharing System EOI</p> <p>ENTRO Data Sharing System ToR</p>
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Sudan

Sudan:

After the 1988 devastating floods, the Sudanese Ministry of Irrigation and Water Resources (MoIWR) initiated the establishing of an operational flood forecasting system to allow flood warnings to be provided with sufficient lead time. This system was developed with technical assistance from the Netherlands, and became operational in 1992. The flood forecasting system was operated successfully from 1992 to 1995. Following 1995, there were problems with the obtaining of remotely sensed rainfall data and the forecasting system failed to fully function.

To strengthen the flood forecasting efforts in Sudan, ENTRO through Flood Preparedness and Early Warning (FPEW I) project contracted the University of Khartoum Consultancy Corporation (UKCC) to develop, install, calibrate, and validate an early warning system based on flood forecasting and routing methodologies in the Blue and Main Nile reaches from Eddeim to Dongola in February 2008. UKCC was also contracted to operationalize the forecasting system during the 2010 flood season. The forecasting system developed by UKCC, then integrated into the Delft FEWS by contracting Deltares in July 2010 which resulted in Sudan FEWS.

The documents organized under this folder were generated through the above mentioned consultancy activities. The list of documents and meta-documents are presented below.

List of Documents generated during the development of flood forecasting system in Sudan

Documents
Terms of Reference: SDN_ToR_Flood_Forecasting_Model_Development.doc Contract : SDN_CON_Flood_Forecasting_Model_Development.pdf

<p>SDN_CON_Flood_Forecasting_Model_Development_Addendum_I.pdf SDN_CON_Flood_Forecasting_Model_Development_Addendum_II.pdf SDN_CON_Flood_Forecasting_Model_Development_Unsigned.doc</p> <p>Inception Report: SDN_INC_Flood_Forecasting_Model_Development.doc</p> <p>Interim Report: SDN_INT_Flood_Forecasting_Model_Development.doc</p> <p>Final Report: SDN_FIN_Flood_Forecasting_Model_Development.doc</p>
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Meta-document for the above list of Documents

Category	Element	Comment
Document	Title	Calibration and Training for Flood Forecasting Model in Sudan
	Custodian	ENTRO, and Ministry of Irrigation and Water Resources of Sudan
Description	Abstract	<p>The Calibration and Training for Flood Forecasting Model in Sudan was mainly to develop, install, calibrate, and validate an early warning system based on flood routing methodologies in the Blue and Main Nile reaches from Deim to Dongoloa, as well as conducting training within the National Forecast Center in the Ministry of Irrigation and Water Resources.</p> <p>The early warning system developed has a rainfall-runoff modeling component and a hydraulic/hydrologic routing component. The rainfall runoff model used is the HEC-HMS that simulates surface and subsurface hydrological processes within the Blue Nile catchment and generates river flow at the boarder station of Eddeim. The hydraulic routing component is based on HEC-RAS model that was calibrated for the Blue Nile reach between Eddeim and Khartoum using data on channel geometry, reservoir characteristics and 26 years of flow and water level data at Eddeim and Khartoum covering the period 1980-2005.</p> <p>A separate component based on hydrologic routing using black box model, Linear Perturbation Model (LPM) is also incorporated to give another alternative that can either be used for comparison purpose or in case of lack of reliable geometric data. LPM has the capabilities of single input-single output form and multiple input-single output form. The LPM has been applied for real time forecasting at Tamaniat and</p>

Category	Element	Comment
		Dongola stations on the main Nile based on upstream flows at all major tributaries.
	Key Words	Flood Forecasting, Early Warning, Model Calibration, Hydrologic Modeling, Hydraulic Modeling, Flood Routing
	Originator	ENTRO
	Credit	All reports were produced by University of Khartoum Consultancy Corporation (UKCC) for ENTRO
Document Currency	Beginning date	February 2008
	Ending date	October 2009
Access	Access Constraints	The use of these documents is subjected to permission from ENTRO and Ministry of Irrigation and Water Resources of Sudan.
	Document Format	PDF and MS Word Document
	Location/Link	The documents are located under FPEW I/Flood Forecasting/Sudan Click the following links to open the documents: Terms of Reference Signed Contract Addendum I to the Contract Addendum II to the Contract Unsigned Contract Inception Report Interim Report Final Report
Contact Information	Organization	Eastern Nile Technical Regional Office (ENTRO)
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	E-Mail	entrolibrary@nilebasin.org
Web Address	www.nilebasin.org/entro	

List of Documents generated during operationalization of flood forecasting system in Sudan

Documents
<p>Terms of Reference: SDN_ToR_Flood_Forecasting_Support_to_NFC.doc</p> <p>Proposal: SDN_PRO_Flood_Forecasting_Support_to_NFC.doc</p> <p>Minutes of negotiation: SDN_MoN_Flood_Forecasting_Support_to_NFC.doc</p> <p>Contract : SDN_MoN_Flood_Forecasting_Support_to_NFC.pdf SDN_CON_Flood_Forecasting_Support_to_NFC.pdf SDN_CON_Flood_Forecasting_Support_to_NFC_Unsigned.doc</p> <p>Inception Report: SDN_INC_Flood_Forecasting_Support_to_NFC.doc</p> <p>Final Report: SDN_FIN_Flood_Forecasting_Support_to_NFC.doc</p>

Meta-document for the above list of Documents

Category	Element	Comment
Document	Title	Support Operationalization of Flood Forecasting and Flood Early Warning System in 2010 Flood Season in Sudan
	Custodian	ENTRO, and Ministry of Irrigation and Water Resources of Sudan
Description	Abstract	<p>Following the development of flood forecasting model at the National Flood Forecasting center of the Ministry of Irrigation and Water Resources, there was a need to operationalize and test the model during the 2010 flood season. To this end, the FPEW I supported the National Flood Forecasting Centre of Sudan in operating the flood forecasting model and delivering appropriate early warning messages to the concerned authorities and pilot communities in the flood affected areas along the Blue Nile reaches.</p> <p>Operationalizaiton of the flood forecasting model involved linking the flood forecasting model developed by University of Khartoum Consultancy Corporation and models used in the flood risk mapping developed by Riverside Technology, Inc.</p>
	Key Words	Flood Forecasting, Early Warning, Model Calibration,

Category	Element	Comment
		Hydrologic Modeling, Hydraulic Modeling, Flood Routing
	Originator	ENTRO
	Credit	All reports were produced by University of Khartoum Consultancy Corporation (UKCC) for ENTRO
Document Currency	Beginning date	August 5, 2010
	Ending date	December 2010
Access	Access Constraints	The use of these documents is subjected to permission from ENTRO and Ministry of Irrigation and Water Resources of Sudan.
	Document Format	PDF and MS Word Document
	Location/Link	The document is located under FPEW I/Flood Forecasting/Sudan Click the following links to open the documents: Terms of Reference Signed Contract Unsigned Contract Inception Report Final Report
Contact Information	Organization	Eastern Nile Technical Regional Office (ENTRO)
	Contact Name	Tirsit Endeshaw
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	Web Address	www.nilebasin.org/entro

List of Documents generated during Operationalization of Delft-FEWS software for Flood Forecasting and Flood Early Warning System in Sudan

Documents
Terms of Reference: SDN_ToR_FEWS.doc Minutes of negotiation:

<p>SDN_MoN_FEWS.pdf</p> <p>Contract :</p> <p>SDN_CON_FEWS.pdf</p> <p>SDN_CON_FEWS_Unsigned.pdf</p> <p>Inception Report:</p> <p>SDN_INC_FEWS.pdf</p> <p>Interim Report:</p> <p>SDN_INT_FEWS.doc</p> <p>SDN_INT_FEWS.pdf</p> <p>Final Report:</p> <p>SDN_FIN_FEWS.pdf</p> <p>System Documentation:</p> <p>SDN_FIN_FEWS_HECRAS_To_FEWS.pdf</p> <p>SDN_FIN_FEWS_HECHMS_To_FEWS.pdf</p>
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Meta-document for the above list of Documents

Category	Element	Comment
Document	Title	Operationalization of Delft-FEWS software for Flood Forecasting and Flood Early Warning System in Sudan
	Custodian	ENTRO, and Ministry of Irrigation and Water Resources of Sudan
Description	Abstract	<p>The main intent of rehabilitating Sudan-FEWS with Delft-FEWS was to upgrade the forecasting capabilities available to the Ministry of Irrigation and Water Resources of Sudan and bring these to the state-of-the-art in operational forecasting.</p> <p>The system integrates several key steps:</p> <ul style="list-style-type: none"> ➤ Import and storage of observed hydrological data from key stations on the Blue Nile, White Nile, main Nile, Rahad and Dinder in Sudan, ➤ Import and storage of observed meteorological data from selected rainfall stations in the Upper Blue Nile catchment in Ethiopia, ➤ Import and processing of satellite rainfall estimates from three different sources, including RFE, TRMM and CMORPH, ➤ Processing of imported precipitation data to provide a merged precipitation input to the running of HEC-HMS rainfall runoff models. ➤ Running of a HEC-HMS model for the Upper Blue Nile

Category	Element	Comment
		<p>catchment using the merged precipitation data, and subsequently routing the observed hydrograph through the Blue Nile using a HEC RAS model of the Blue Nile between El Deim and Khartoum,</p> <ul style="list-style-type: none"> ➤ Importing and processing of forecast rainfall from the ETA numerical weather prediction model run either at MoIWR, or at the Sudanese Meteorological Agency ➤ Running the HEC-HMS model and HEC-RAS model in the forecast period to predict flows and levels at key stations over the desired forecast period. ➤ Developing of reports for dissemination to users such as the High Flood Commission, and others. <p>In addition to the system implementation, recommendations on further development of forecasting capabilities in the Sudan that may in the future be integrated with the system was made.</p>
	Key Words	Flood Forecasting and Warning, Detail System Design
	Originator	ENTRO
	Credit	The system and reports were produced by Deltares for ENTRO
Document Currency	Beginning date	June 20, 2010
	Ending date	December 2010
Access	Access Constraints	The use of these documents is subjected to permission from ENTRO and Ministry of Irrigation and Water Resources of Sudan.
	Document Format	PDF and MS Word Document
	Location/Link	<p>The document is located under FPEW I/Flood Forecasting/Sudan</p> <p>Click the following links to open the documents:</p> <ul style="list-style-type: none"> Terms of Reference Signed Contract Unsigned Contract Inception Report Interim Report (pdf) Interim Report (doc) Final Report Adding HEC-HMS model to FEWS Adding HEC-RAS model to FEWS <p>FEWS Software and Training Materials – the containing</p>

Category	Element	Comment
		folders include links to sites on the Web, data for training and presentations. User Manual – Containing Folder Training Material – Containing Folder Software
Contact Information	Organization	Eastern Nile Technical Regional Office (ENTRO)
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Flood Forum

[Flood_Forum](#):

The Eastern Nile Annual Flood Forums were intended to facilitate sharing of experiences among practitioners, planners, and scientists within the region and other part of the world. The topics addressed on the forum include all aspects of flood management, including current and emerging practices, the use and effectiveness of recent ICT technologies in flood forecasting and risk assessment, flood damage assessment and damage prediction, assessment of socio-economic impacts of floods, etc.

During the FPEW I project implementation three flood forums were successfully conducted: the first flood forum conducted in Cairo (2008), second flood forum conducted in Khartoum (2009) and third flood forum conducted in Nazareth/Ethiopia (2010). Technical papers were presented; guest key note speakers from USA, Bangladesh, and the Netherlands participated; annual flood reports and flood forecasting models were presented. Major themes of the discussions were focused on the challenges and opportunities of flood management and flood forecasting and early warning system in the EN Region. The flood forums have been instrumental for knowledge and experience sharing among professionals of the EN countries and others from outside of the region.

The forum event materials like pictures (Event_Pics), papers and reports (Paper_and_Report), program and participants (Participants_and_Program) and

presentations (Presentations) are organized under the respective forum subfolders: [First Flood Forum](#), [Second Flood Forum](#), and [Third flood Forum](#).

Flood Report

[Flood_Report](#):

The Flood Report folder contains two subfolders: the Background for reports produced before the commencement of FPEW I and Progress_Report folder contains reports generated during the course of FPEW I implementation.

Background

[Background](#):

The reports presented here are annual flood synthesis reports of the Eastern Nile region for the 2004 and 2006 and baseline social analysis operational guidelines. The list of reports and meta-documents are presented below.

List of background reports

Documents
Annual Flood Analysis Report: FPEW_Flooding_Extent_And_Coping_Mechanism.pdf FPEW_Flood_Documentation_and_Analysis_Report.pdf Baseline Social Analysis Report: FPEW_Baseline_SA_Operational_Guidelines.pdf ETH_Baseline_SA.doc SDN_Baseline_SA.doc

Meta-document for Flooding Extent and Coping Mechanism document

Category	Element	Comment
Document	Title	Flooding Extent and Coping Mechanism in the Eastern Nile
	Custodian	ENTRO
Description	Abstract	The report presents preliminary analysis on the flooding extent and coping mechanisms in the Eastern Nile region. Among others, the report outlines the following: <ul style="list-style-type: none"> ➤ Inventory of available information on flooding extents in the EN countries and existing coping mechanisms, ➤ Review of available documentation on flooding and related topics, ➤ Compiled findings in the form of a background report.

Category	Element	Comment
		Country level background information included in the report on the extent of flooding problems in each EN country and existing coping mechanisms were compiled by the respective national flood coordinators.
	Key Words	Flooding Extent, Coping Mechanism
	Originator	ENTRO
	Credit	The report was produced by Abdulkarim H. Seid (Dr.-Ing.) for ENTRO
Document Currency	Beginning date	
	Ending date	July 2004
Access	Access Constraints	The use of this document is subjected to permission from ENTRO.
	Document Format	PDF
	Location/Link	The document is located under FPEW I/Flood Report/Background Click the following link to open the document: Flooding Extent and Coping Mechanism
Contact Information	Organization	Eastern Nile Technical Regional Office (ENTRO)
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Meta-document for Flooding Extent and Coping Mechanism document

Category	Element	Comment
Document	Title	Flood Documentation and Analysis in the Eastern Nile
	Custodian	ENTRO
Description	Abstract	This report presents synthesis work of the flood compilations and it is aimed at providing one comprehensive view of the

Category	Element	Comment
		<p>flood within the region from regional perspective.</p> <p>In general, the report presents the following major information:</p> <ul style="list-style-type: none"> ➤ Flooding situations and flood damages in the EN countries mainly during the 2006 flood season, ➤ Description and location of flood prone areas, ➤ Rainfall analysis of key areas of the EN sub-basins and Nile Forecasting Analysis, ➤ Hydrologic analysis, ➤ Flood affected sites and damage analysis during the 2006
	Key Words	Flood Documentation, Flood Analysis, Flood Damage
	Originator	ENTRO
	Credit	The report was produced by Mohamed Abdel Aty Sayed (Dr.) for ENTRO
Document Currency	Beginning date	
	Ending date	June 2007
Access	Access Constraints	The use of this document is subjected to permission from ENTRO.
	Document Format	PDF
	Location/Link	<p>The document is located under</p> <p>FPEW I/Flood Report/Background</p> <p>Click the following link to open the document:</p> <p>Flood Documentation and Analysis</p>
Contact Information	Organization	Eastern Nile Technical Regional Office (ENTRO)
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Meta-document for Baseline Social analysis Operational Guidelines documents.

Category	Element	Comment
Document	Title	Baseline Social Analysis Operational Guidelines
	Custodian	ENTRO
Description	Abstract	<p>The report presents the baseline social analyses which were drawn up in Sudan and Ethiopia based on primary field work in selected urban and rural communities along the Blue and Main Nile Rivers in Sudan, in the Lake Tana basin in Ethiopia and in Gambela town (south-western Ethiopia) – the two national reports ETH_Baseline_SA.doc, and SDN_Baseline_SA.doc present country level analyses on which the Operational Guidelines document is based on. The baseline analyses show to what extent communities are coping with annual flood events as well as high flood disasters. From this research emerges an understanding of the challenges of local flood management. These social baselines were mainly targeted to help the project preparation consultants to create a project that is relevant to the varying local needs and institutional dynamics in Ethiopia and Sudan.</p> <p>The report is organized into eight sections:</p> <ul style="list-style-type: none"> ➤ Review of the main findings of the Ethiopia and Sudan social baseline analyses, ➤ Outline of basic operational principles, ➤ Summary of targeting issues, ➤ Analysis of information flows (bottlenecks and how to improve flow), ➤ Analysis of Coping Strategies, ➤ Guidelines for the Resettlement Framework, ➤ Guidelines for the Environmental Management Framework, and ➤ Suggested interventions including M & E (monitoring and evaluation) indicators.
	Key Words	Baseline Social Analysis, Operational Guidelines
	Originator	ENTRO
	Credit	The report was produced by Jennifer Bush, Woldeab Teshome (PhD), and Hassan A. Abdel Ati (PhD) for ENTRO
Document Currency	Beginning date	May 2005
	Ending date	December 2005

Category	Element	Comment
Access	Access Constraints	The use of this document is subjected to permission from ENTRO.
	Document Format	PDF
	Location/Link	The document is located under FPEW I/Flood_Report/Background Click the following links to open the documents: Ethiopia Baseline Social Analysis Sudan Baseline Social Analysis Baseline Social Analysis Operational Guidelines
Contact Information	Organization	Eastern Nile Technical Regional Office (ENTRO)
	Contact Name	Tirsit Endeshaw
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	Web Address	www.nilebasin.org/entro

Progress Report

[Progress_Report:](#)

Monthly, quarterly, semi-annual and annual project implementation progress reports for the FPEW I starting from January 2008 till the end of project life, December 2010 which were produced by the Regional Flood Coordination Unit are organized here. The reports were produced for internal follow up of activities implementation and communication to the World Bank. Available reports are presented in the following table.

Folder	Report File and Description
2007_08	RFCU_Monthly_Progress_Report_01_08.doc - Progress report for the January 2008.
	RFCU_Monthly_Progress_Report_02_08.doc - Progress report for the February 2008.
	RFCU_Monthly_Progress_Report_03_08.doc - Progress report for the March 2008.
	RFCU_Quarterly_Progress_Report_1_08_2.doc – 2008 1 st Quarter (January – March) progress report.
	RFCU_Monthly_Progress_Report_04_08.doc - Progress report for the April 2008
	RFCU_Monthly_Progress_Report_05_08.doc - Progress report for the May 2008.
	RFCU_Progress_Report_January_May_08.doc - Progress report from January to May

Folder	Report File and Description	
	2008.	
2008_09	RFCU_Monthly_Progress_Report_06_08.doc - Progress report for the June 2008.	
	RFCU_Monthly_Progress_Report_07_08.doc - Progress report for July 2008.	
	RFCU_Monthly_Progress_Report_08_08.doc - Progress report for August 2008.	
	RFCU_Quarterly_Progress_Report_1_08_1.doc - 2008/09 1 st Quarter Progress report.	
	RFCU_Quarterly_Progress_Report_1_08_2.doc - Project component based progress report for the 1 st Quarter of 2008/09 produced for World Bank.	
	RFCU_Monthly_Progress_Report_10_08.doc - Progress report for October 2008.	
	RFCU_Monthly_Progress_Report_11_08.doc - Progress report for November 2008.	
	RFCU_Quarterly_Progress_Report_2_08_1.doc - 2008/09 2 nd Quarter Progress report.	
	RFCU_Semiannual_Progress_Report_1_08_1.doc - 2008/09 semiannual progress report.	
	RFCU_Semiannual_Progress_Report_1_08_2.doc - Project component based semiannual progress report for the 2008/09 fiscal year produced for World Bank.	
	RFCU_Monthly_Progress_Report_01_09.doc - Progress report for January 2009.	
	RFCU_Monthly_Progress_Report_02_09.doc - Progress report for February 2009.	
	RFCU_Progress_Report_07_08_02_09.doc – Progress report from July 2008 to February 2009 produced for World Bank.	
	RFCU_Monthly_Progress_Report_03_09.doc - Progress report for March 2009.	
	RFCU_Quarterly_Progress_Report_3_09_1.doc - 2008/09 2 nd Quarter Progress report.	
	RFCU_Monthly_Progress_Report_04_09.doc - Progress report for April 2009.	
	RFCU_Monthly_Progress_Report_05_09.doc - Progress report for May 2009.	
	RFCU_Annual_Progress_Report_09_1.doc - Annual report for the 2008/09 fiscal year.	
	2009_10	RFCU_Monthly_Progress_Report_07-09.doc - Progress report for July 2009.
RFCU_Monthly_Progress_Report_08_09.doc - Progress report for August 2009.		
RFCU_Monthly_Progress_Report_09_09.doc - Progress report for September 2009.		
RFCU_Progress_Report_03_09_09.doc - Progress report from March – September 2009 produced for World Bank.		
RFCU_Quarterly_Progress_Report_1_09_1.doc - 2009/10 1 st Quarter Progress report.		
RFCU_Monthly_Progress_Report_10_09.doc - Progress report for October 2009.		
RFCU_Monthly_Progress_Report_11_09.doc - Progress report for November 2009.		
RFCU_Semiannual_Progress_Report_1_10_1.doc - 2009/10 semiannual progress report.		
RFCU_Monthly_Progress_Report_01-10.doc - Progress report for January 2009.		
RFCU_Monthly_Progress_Report_02-10.doc - Progress report for February 2009.		
RFCU_Quarterly_Progress_Report_3_10_1.doc - 2009/10 3 rd Quarter Progress report.		
RFCU_Monthly_Progress_Report_04-10.doc - Progress report for April 2009.		
RFCU_Progress_Report_10_09_03_10.doc - Progress report from March to September 2009 produced for World Bank.		
RFCU_Monthly_Progress_Report_05-10.doc - Progress report for May 2009.		
RFCU_Monthly_Progress_Report_06-10.doc - Progress report for October 2009.		
RFCU_Annual_Progress_Report_10_1.doc - Annual report for the 2009/10 fiscal year.		
2010_11		RFCU_Monthly_Progress_Report_07-10.doc - Progress report for July 2010.
		RFCU_Monthly_Progress_Report_08-10.doc - Progress report for August 2010.
		RFCU_Quarterly_Progress_Report_1_10.doc - 2010/11 1 st Quarter Progress report.
	RFCU_Monthly_Progress_Report_10-10.doc - Progress report for October 2010.	
	RFCU_Final_Progress_Report_October_2010.doc – Compiled progress report from June	

Folder	Report File and Description
	2007 to October 2010 produced for World Bank.
	RFCU_Monthly_Progress_Report_11-10.doc - Progress report for November 2010.

Flood Risk Mapping

[Flood_Risk_Mapping](#):

The flood risk mapping studies were conducted in the pilot areas around Lake Tana in the Fogera and Dembia flood plains in Ethiopia and in the pilot areas along the Blue Nile reaches in Sudan. The flood risk mapping exercise helps identify flood plain boundaries, areas where structural, non structural works are required; assess flood risks and provide the result by each potentially impacted sector including among others: people and livelihoods; public service infrastructures (health centers, schools, religious and cultural centers, etc); river diversions and channel structures, urban and village structures. The products from the flood risk mapping exercise include primary and secondary data and information resources collected and compiled, study reports, maps (flood extent, velocity maps, flood duration, depth, vulnerability, and risk maps), hydrologic and hydraulic models and flood damage assessments.

The datasets collected and generated during the study are organized in enterprise Geodatabase which resides on ENTROKBASE server, and other documents are organized under Flood_Risk_Mapping folder. Note that the map documents are big in size (A0 size) and included with the reports as separate subfolder ([ETH PDF Maps](#) and [SDN PDF Maps](#)). Each map folder contains six other subfolders for Depth, Duration, Extent, Risk, Velocity and Vulnerability maps. The map documents can be viewed with Acrobat Reader. If hard copies are required, A0 wide format plotter should be used to print.

The hydrologic and hydraulic models developed during the study are also maintained under the [Models](#) subfolder. The Ethiopia subfolder under Models contains model files for HEC-HMS ([HEC HMS](#)) and HEC-RAS ([HEC RAS](#)). The HEC-RAS models include steady and the unsteady flow models. Similarly, the Sudan HEC-RAS models (steady and unsteady flow models) are maintained under the Sudan subfolder ([Sudan](#)). In addition to the steady and unsteady flow models subfolder, the Sudan subfolder contains [Boundary Polygon](#) subfolder which contains Shapefiles used to clip the flood map extents to the adjacent floodplain. This was done because in Khartoum the cross section geometry extended into the White Nile floodplain.

In addition to the data, information and knowledge products generated through the flood risk mapping studies, professionals from Ethiopia and Sudan were retrained on the methodologies and tools utilized in the study to generate flood risk mapping products. The training mainly focused on Terrain Modeling, Hydrologic Simulation, Hydraulic modeling, Flood Hazard and Flood Risk Mapping. The training documents, training data and other related materials are organized under the subfolder Training_Materials.

List of flood risk mapping documents

Documents
<p>Terms of Reference and Request for Proposal:</p> <p>ETH_ToR_Flood_Risk_Mapping.doc ETH_RFP_Flood_Risk_Mapping.doc SDN_RFP_Flood_Risk_Mapping.doc SDN_ToR_Flood_Risk_Mapping.doc</p> <p>Proposal:</p> <p>ETH_PRF_Flood_Risk_Mapping.doc ETH_PRT_Flood_Risk_Mapping.doc SDN_PRF_Flood_Risk_Mapping.doc SDN_PRT_Flood_Risk_Mapping.doc</p> <p>Minutes of negotiation:</p> <p>ETH_SDN_MoN_Flood_Risk_Mapping.pdf</p> <p>Contract :</p> <p>ETH_CON_Flood_Risk_Mapping.pdf ETH_CON_Flood_Risk_Mapping_Addendum_I.pdf ETH_CON_Flood_Risk_Mapping_Addendum_II.pdf ETH_CON_Flood_Risk_Mapping_Addendum_III.pdf SDN_CON_Flood_Risk_Mapping.pdf SDN_CON_Flood_Risk_Mapping_Addendum_I.pdf SDN_CON_Flood_Risk_Mapping_Addendum_II.pdf</p> <p>Inception Report:</p> <p>ETH_INC_Flood_Risk_Mapping.pdf SDN_INC_Flood_Risk_Mapping.pdf</p> <p>Interim Report:</p> <p>ETH_INT_Flood_Risk_Mapping.pdf SDN_INT_Flood_Risk_Mapping.pdf</p> <p>Final Report:</p> <p>ETH_FIN_Flood_Risk_Mapping.doc ETH_FIN_Flood_Risk_Mapping.pdf SDN_FIN_Flood_Risk_Mapping.doc SDN_FIN_Flood_Risk_Mapping.pdf</p>

Meta-document for flood risk mapping documents for the pilot areas in Ethiopia

Category	Element	Comment
Document	Title	Flood Risk Mapping for Pilot Areas in Ethiopia
	Custodian	ENTRO, Ministry of Water Resources and Energy of Ethiopia

Category	Element	Comment
Description	Abstract	<p>The flood risk mapping documents for pilot areas surrounding Lake Tana in Ethiopia presented here are the results of multi-disciplinary study that include products from topographic data collection and surveying, terrain modeling, hydrologic analysis, hydraulic modeling and analysis, flood hazard mapping, economic data collection and damage analysis, and vulnerability and risk assessment.</p> <p>The pilot areas considered were:</p> <ul style="list-style-type: none"> ➤ Gumara and Ribb Rivers in the Fogera floodplain ➤ Megech and Dirma Rivers in the Dembiya floodplain <p>The maps developed as a result of this study convey the most basic information about the general vicinity in which flooding can be expected with varying frequencies. Local communities can make immediate use of these maps to identify areas of focus for flood protection, preparedness, warning, and future development guidelines. A flood extent map can be a valuable aid in communicating flood risk to local populations as part of education and outreach programs to encourage appropriate response.</p>
	Key Words	Flood Risk, Flood Hazard, Vulnerability, Flood Damage, Frequency Analysis, Hydrologic Modeling, Hydraulic Modeling, Flood Plain, Flood Risk Mapping
	Originator	ENTRO
	Credit	The report was produced for ENTRO by Riverside Technology Inc. in cooperation with its partners, Tropics Consulting Engineers (TCE) and Shebelle Consult of Ethiopia.
Document Currency	Beginning date	November 18, 2008
	Ending date	July 2010
Access	Access Constraints	The use of the documents is subjected to permission from ENTRO and/or Ministry of Water Resources and Energy of Ethiopia.

Category	Element	Comment
	Document Format	PDF and MS Word Document
	Location/Link	The document is located under FPEW KBase/FPEW I/Flood Risk Mapping Click the following links to open the documents: Terms of Reference Request for Proposal Proposal: Financial Proposal Technical Proposal Minutes of Negotiation Contract Addendum to Contract I Addendum to Contract II Addendum to Contract III Inception Report Interim Report Final Report: PDF Format MS Document Format Map Folders: Dembia Fogera
Contact Information	Organization	Eastern Nile Technical Regional Office (ENTRO)
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	Web Address	www.nilebasin.org/entro

Meta-document for flood risk mapping documents for the pilot areas in Sudan.

Category	Element	Comment
Document	Title	Flood Risk Mapping for Pilot Areas in Sudan
	Custodian	ENTRO, Ministry of Irrigation and Water Resources of Sudan

Category	Element	Comment
Description	Abstract	<p>The flood risk mapping documents for pilot areas along the Blue Nile River in Sudan presented here are the results of multi-disciplinary study that include products from topographic data collection and surveying, terrain modeling, hydrologic analysis, hydraulic modeling and analysis, flood hazard mapping, economic data collection and damage analysis, and vulnerability and risk assessment.</p> <p>The pilot areas considered were:</p> <ul style="list-style-type: none"> ➤ Khartoum City, covering part of Khartoum City along the Blue Nile and the proposed development area at Soba ➤ Hasahisa and Wad Medani at the River Rahad junction ➤ Singa City ➤ Roseires Dam <p>The maps developed as a result of this study convey the most basic information about the general vicinity in which flooding can be expected with varying frequencies. Local communities can make immediate use of these maps to identify areas of focus for flood protection, preparedness, warning, and future development guidelines. A flood extent map can be a valuable aid in communicating flood risk to local populations as part of education and outreach programs to encourage appropriate response.</p>
	Key Words	Flood Risk, Flood Hazard, Vulnerability, Flood Damage, Frequency Analysis, Hydrologic Modeling, Hydraulic Modeling, Flood Plain, Flood Risk Mapping
	Originator	ENTRO
	Credit	The report was produced for ENTRO by Riverside Technology Inc. in cooperation with its partners, UNESCO Chair in Water Resources of Sudan.
Document Currency	Beginning date	November 18, 2008
	Ending date	July 2010

Category	Element	Comment
Access	Access Constraints	The use of the documents is subjected to permission from ENTRO and/or Ministry of Irrigation and Water Resources of Sudan.
	Document Format	PDF and MS Word Document
	Location/Link	The document is located under FPEW KBase/FPEW I/Flood Risk Mapping Click the following links to open the documents: <i>Terms of Reference</i> <i>Request for Proposal</i> Proposal: <i>Financial Proposal</i> <i>Technical Proposal</i> <i>Minutes of Negotiation</i> <i>Contract</i> <i>Addendum to Contract I</i> <i>Addendum to Contract II</i> <i>Inception Report</i> <i>Interim Report</i> Final Report: <i>PDF Format</i> <i>MS Document Format</i> <i>Map Folder</i>
Contact Information	Organization	Eastern Nile Technical Regional Office (ENTRO)
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Training Materials

[Training_Materials:](#)

The flood risk mapping training was conducted twice: the first training conducted in Addis Ababa combining both Ethiopia and Sudan participants in October 2009 and the second training was done at national level (in Khartoum-Sudan and in Nazareth-

Ethiopia) in December 2010. The following table presents list and brief description of containing folders and training material developed and used during both trainings.

Folder, File Names and Descriptions	
1	<p>First_Round_2009</p> <p>The first round training materials are organized here. It contains the following subfolders.</p> <p>Day_1, Day_2, Day_3 and Day_4 subfolders contain training manual for the day and data required to complete the training.</p> <p>Final_HECHMS and Final_HECRAS subfolders contain the HEC-HMS and HEC-RAS model files respectively for hydrologic and hydraulic training.</p> <p>Software_Tools – this subfolder contains HEC-HMS and HEC-RAS software and user manuals used during the first round training.</p> <p>Training_Printed_Materials – Subfolder contains printed training materials. The list and links to the manuals are provided below.</p> <p>Day_1_TerrainDevelopment.pdf – Terrain development manual for day 1.</p> <p>Day_2_HECHMSTrainingDocumentation.pdf – HEC-HMS training manual.</p> <p>Day_3_01_Digitizing.pdf - Digitizing a river network in HEC-GeoRAS.</p> <p>Day_3_02_RAS_Import.pdf – Step for RAS GIS Import File.</p> <p>Day_3_03_RAS_Unsteady_Flow.pdf – HEC-RAS unsteady flow analysis steps.</p> <p>Day_3_04_Hazard_Mapping.pdf – Hazard mapping steps.</p> <p>Day_4_Risk_Assessment.doc – Risk Assessment steps.</p> <p>HEC-GeoRAS42_UsersManual.pdf - HEC-GeoRAS user manual.</p>
2	<p>Second_Round_2010</p> <p>The second round training materials are organized here. It contains the following subfolders.</p> <p>HEC_User_Manuals subfolder contains HEC-HMS, HEC-RAS, HEC-GeoRAS and HEC-SSP user manuals provided by the trainer for reference.</p> <p>Presentations subfolder contains other subfolders (Ethiopia and Sudan) that contain presentations used during the training sessions.</p> <p>Software_Tools – contains all the necessary HEC family software tools used during the training sessions.</p> <p>Training_Data – all the datasets used during the training sessions are organized here.</p> <p>Training_Manual – the following training manual was produced and provided by the trainer which were printed and distributed to the trainees.</p> <p>ETH_Training_Manual.doc, ETH_Training_Manual.pdf – Training manual for Ethiopia.</p> <p>SDN_Training_Manual.doc, SDN_Training_Manual.pdf – Training manual for Sudan.</p>

Folder, File Names and Descriptions

[ETH_SDN_Appendix_A.pdf](#) – appendix to training manuals both for Ethiopia and Sudan.

[Unit_Hydrographs](#) – contains data related to unit hydrograph used during the hydrologic modeling training session.

Pilot Communities

[Pilot_Communities:](#)

Community flood preparedness and response activities of the FPEW I project include determining information needs by the community for effective response, facilitation and development of community action plans and evaluation of the effectiveness the action plans. To this end, together with the national flood coordinators and local officials, eight pilot communities in each country, Ethiopia and Sudan, were selected.

In Each country, for each pilot community, community level short-term and long-term flood preparedness and response action plans were prepared. Some of these action plans, which were within the time frame of FPEW I project implementation and available budget were implemented.

The documents which are organized under Pilot_Communities are those which were produced during the implementation of the Pilot Flood Preparedness and Emergency Response component of the project.

Ethiopia

[Ethiopia:](#)

All documents related to Ethiopia pilot communities have been organized under Ethiopia subfolder.

List of Documents for the Ethiopia pilot communities

Documents
<p>Terms of Reference:</p> <ul style="list-style-type: none"> ETH_ToR_2008_Community_Action_Plans.doc ETH_ToR_Community_Action_Plans.doc ETH_ToR_Peak_Season_Community_Surveillance.doc <p>Proposal:</p> <ul style="list-style-type: none"> ETH_PRO_Community_Action_Plans.doc ETH_PRO_Peak_Season_Community_Surveillance.doc <p>Minutes of negotiation:</p> <ul style="list-style-type: none"> ETH_MoN_Peak_Season_Community_Surveillance.doc <p>Contract :</p>

<p>ETH_CON_2008_Community_Action_Plans.pdf ETH_CON_Community_Action_Plans_Unsigned.doc ETH_CON_Community_Action_Plans.pdf ETH_CON_Community_Action_Plans_Addendum_I.pdf ETH_CON_Peak_Season_Community_Surveillance.pdf ETH_CON_Peak_Season_Community_Surveillance_Unsigned.doc</p> <p>Inception Report: ETH_INC_Community_Action_Plans.doc ETH_INC_Peak_Season_Community_Surveillance.doc</p> <p>Final Report: ETH_FIN_2008_Community_Action_Plans.doc ETH_FIN_Community_Action_Plans_Volume_I.doc ETH_FIN_Community_Action_Plans_Volume_I.pdf ETH_FIN_Community_Action_Plans_Volume_II.doc ETH_FIN_Community_Action_Plans_Volume_II.pdf ETH_FIN_Community_Action_Plans_Volume_III.doc ETH_FIN_Community_Action_Plans_Volume_III.pdf ETH_FIN_Community_Action_Plans_Volume_IV.doc ETH_FIN_Community_Action_Plans_Volume_IV.pdf ETH_FIN_Peak_Season_Community_Surveillance.doc</p>
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Meta-document for the Community Action Plans prepared for 2008/09.

Category	Element	Comment
Document	Title	Community Action Plans for the 2008/2009
	Custodian	ENTRO, Ministry of Water Resources and Energy of Ethiopia
Description	Abstract	<p>The community action plans prepared for four pilot communities (Wagettera, Nabega, Gendawuha and Ttez Amba) around flood affected communities in the Fogera Floodplain drawn based on participatory consultative planning process. The major activities identified and highlighted in the plan of action include:</p> <ul style="list-style-type: none"> ➤ Enhancing Community Participation and Use of Early Warning System ➤ Reduce the impact of physical isolation due to floods. ➤ Upgrade community preparedness and response capabilities. ➤ Enhance community awareness and build

Category	Element	Comment
		capacity of community to prepare for and manage the incidence of floods.
	Key Words	Community Action Plan, Flood Preparedness, Flood Early Warning
	Originator	ENTRO
	Credit	The report was produced for ENTRO by Yohannes Habtu, Semunesh Golla, Mulugeta Tadesse, and Aderaw Dagne.
Document Currency	Beginning date	July 14, 2008
	Ending date	July 31, 2008
Access	Access Constraints	The use of the documents is subjected to permission from ENTRO and/or Ministry of Water Resources and Energy of Ethiopia.
	Document Format	PDF and MS Word Document
	Location/Link	The document is located under FPEW KBase/FPEW I/Pilot Communities/Ethiopia Click the following links to open the documents: Terms of Reference Contract Final Report
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Meta-document for the Preparation, Training, and implementation of flood Preparedness Action Plans for Pilot Communities in Ethiopia.

Category	Element	Comment
Document	Title	Preparation, Training, and implementation of flood Preparedness Action Plans For Pilot Communities in Ethiopia
	Custodian	ENTRO, Ministry of Water Resources and Energy of Ethiopia
Description	Abstract	<p>This document presents the preparation, training and facilitation of the implementation of the pilot community flood preparedness action plans for selected eight pilot communities around Lake Tana. The community action plans prepared for the four pilot communities for the 2008/09 were revised, enhanced and made part of this document. The document includes:</p> <ul style="list-style-type: none"> ➤ prioritized investment plan for supporting flood affected pilot-project communities with interventions that can help the communities improve their flood early warning and preparedness capabilities, ➤ community action plans for eight pilot communities severely affected by recurrent floods, ➤ Flood impact maps prepared based on community knowledge, ➤ Training manual that helps as a reference book for starting-up and guiding communities and local government stakeholders participating in Flood Preparedness and Early Warning activities.
	Key Words	Community Action Plan, Flood Preparedness, Flood Early Warning
	Originator	ENTRO
	Credit	The report was produced for ENTRO by Organization for Rehabilitation and Development in Amhara (ORDA)
Document Currency	Beginning date	May 4, 2009
	Ending date	August 31, 2010

Category	Element	Comment
Access	Access Constraints	The use of the documents is subjected to permission from ENTRO and/or Ministry of Water Resources and Energy of Ethiopia.
	Document Format	PDF and MS Word Document
	Location/Link	The document is located under FPEW KBase/FPEW I/Pilot Communities/Ethiopia Click the following links to open the documents: <i>Terms of Reference</i> <i>Proposal</i> <i>Contract</i> <i>Addendum to Contract I</i> <i>Unsigned Contract</i> <i>Inception Report</i> Final Report: <i>Main Report - Volume I (doc)</i> <i>Main Report - Volume I (pdf)</i> <i>Investment Plan - Volume II (doc)</i> <i>Investment Plan - Volume II (pdf)</i> <i>Action Plan - Volume III (doc)</i> <i>Action Plan - Volume III (pdf)</i> <i>Training Manual - Volume IV (doc)</i> <i>Training Manual - Volume IV (pdf)</i>
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	Web Address	www.nilebasin.org/entro

Meta-document for Peak Season Community Surveillance in Ethiopia.

Category	Element	Comment
Document	Title	Peak Season Community Surveillance in Ethiopia
	Custodian	ENTRO, Ministry of Water Resources and Energy of

Category	Element	Comment
		Ethiopia
Description	Abstract	<p>This documents had been prepared in an effort to evaluate the effectiveness of the FPEW I interventions during the 2010 flood season in terms of early warning communication and training of communities and management interventions at the community level.</p> <p>The final document provides :</p> <ul style="list-style-type: none"> ➤ An assessment result on the effectiveness of the newly developed flood early warning system at community, kebele, district and regional level. ➤ An assessment of community and institutional response to the flood, in particular the effectiveness of the pilot interventions financed through FPEW I (e.g. mobile phones, temporary shelter, color poles, escape routes, risk mapping etc.) ➤ Lessons learned from the performance and short comings of the FPEW I early warning and flood management system and recommendations for the scaling up in FPEW II.
	Key Words	Peak Season Surveillance, Flood Early Warning
	Originator	ENTRO
	Credit	The report was produced for ENTRO by Organization for Rehabilitation and Development in Amhara (ORDA)
Document Currency	Beginning date	July 14, 2010
	Ending date	December 31, 2010
Access	Access Constraints	The use of the documents is subjected to permission from ENTRO and/or Ministry of Water Resources and Energy of Ethiopia.
	Document Format	PDF and MS Word Document
	Location/Link	<p>The document is located under FPEW I/Pilot Communities/Ethiopia</p> <p>Click the following links to open the documents:</p> <p>Terms of Reference</p> <p>Proposal</p> <p>Minutes of Negotiation</p>

Category	Element	Comment
		<i>Contract</i> <i>Unsigned Contract</i> <i>Inception Report</i> <i>Final Report</i>
Contact Information	Organization	Eastern Nile Technical Regional Office (ENTRO)
	Contact Name	Tirsit Endeshaw
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	E-Mail	entrolibrary@nilebasin.org
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Sudan

Sudan:

All documents related to Sudan pilot communities have been organized under Sudan subfolder.

List of Documents for the Sudan pilot communities

Documents
<p>Terms of Reference:</p> <ul style="list-style-type: none"> SDN_ToR_2008_Community_Action_Plans.doc SDN_ToR_Community_Action_Plans.doc SDN_ToR_Peak_Season_Community_Surveillance.doc <p>Proposal:</p> <ul style="list-style-type: none"> SDN_PRO_Community_Action_Plans.doc SDN_PRO_Peak_Season_Community_Surveillance.doc <p>Minutes of negotiation:</p> <ul style="list-style-type: none"> SDN_MoN_Peak_Season_Community_Surveillance.doc <p>Contract :</p> <ul style="list-style-type: none"> SDN_CON_2008_Community_Action_Plans.pdf SDN_CON_Community_Action_Plans.pdf SDN_CON_Community_Action_Plans_Unsigned.doc SDN_CON_Peak_Season_Community_Surveillance.pdf SDN_CON_Peak_Season_Community_Surveillance_Unsigned.doc

<p>Inception Report: SDN_INC_Community_Action_Plans.doc SDN_INC_Peak_Season_Community_Surveillance.doc</p> <p>Final Report: SDN_FIN_2008_Community_Action_Plans.doc SDN_FIN_Community_Action_Plans.doc SDN_FIN_Community_Action_Plans_Training_Manual.doc ETH_FIN_Peak_Season_Community_Surveillance.doc</p>
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Meta-document for the Community Action Plans prepared for 2008/09.

Category	Element	Comment
Document	Title	Community Action Plans for the 2008/2009
	Custodian	ENTRO, Ministry of Irrigation and Water Resources of Sudan
Description	Abstract	<p>The community action plans prepared for four pilot communities (Toti Island, Wawsi, Elabka and Sidon) in the Blue and Main Nile Floodplain drawn based on participatory consultative planning process. The major activities identified and highlighted in the plan of action include:</p> <ul style="list-style-type: none"> ➤ Enhancing Community Participation and Use of Early Warning System ➤ Reduce the impact of physical isolation due to floods. ➤ Upgrade community preparedness and response capabilities. ➤ Enhance community awareness and build capacity of community to prepare for and manage the incidence of floods.
	Key Words	Community Action Plan, Flood Preparedness, Flood Early Warning
	Originator	ENTRO
	Credit	The report was produced for ENTRO by Dr Salah Mohamed Elawad
Document Currency	Beginning date	July 14, 2008
	Ending date	August 2008
Access	Access	The use of the documents is subjected to permission

Category	Element	Comment
	Constraints	from ENTRO and/or Ministry of Irrigation and Water Resources of Sudan.
	Document Format	PDF and MS Word Document
	Location/Link	The document is located under FPEW I/Pilot Communities/Sudan Click the following links to open the documents: Terms of Reference Contract Final Report
Contact Information	Organization	Eastern Nile Technical Regional Office (ENTRO)
	Contact Name	Tirsit Endeshaw
	Contact Position	Librarian
	Mail Address	P.O. Box 27173-1000, Addis Ababa, Ethiopia
	Telephone	+251-116-461-130/32
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	E-Mail	entrolibrary@nilebasin.org
	Web Address	www.nilebasin.org/entro

Meta-document for the Preparation, Training, and implementation of flood Preparedness Action Plans for Pilot Communities in Sudan.

Category	Element	Comment
Document	Title	Preparation, Training, and implementation of flood Preparedness Action Plans For Pilot Communities in Ethiopia
	Custodian	ENTRO, Ministry of Irrigation and Water Resources of Sudan
Description	Abstract	This document presents the preparation, training and facilitation of the implementation of the pilot community flood preparedness action plans for selected eight pilot communities in Sudan. The community action plans prepared for the four pilot communities for the 2008/09 were revised, enhanced and made part of this document. The document includes:

Category	Element	Comment
		<ul style="list-style-type: none"> ➤ prioritized investment plan for supporting flood affected pilot-project communities with interventions that can help the communities improve their flood early warning and preparedness capabilities, ➤ community action plans for eight pilot communities severely affected by recurrent floods, ➤ Flood impact maps prepared based on community knowledge, ➤ Training manual that helps as a reference book for starting-up and guiding communities and local government stakeholders participating in Flood Preparedness and Early Warning activities.
	Key Words	Community Action Plan, Flood Preparedness, Flood Early Warning
	Originator	ENTRO
	Credit	The report was produced for ENTRO by Sudanese Red Crescent Society (SRCS)
Document Currency	Beginning date	May 19, 2009
	Ending date	September 2010
Access	Access Constraints	The use of the documents is subjected to permission from ENTRO and/or Ministry of Irrigation and Water Resources of Sudan.
	Document Format	PDF and MS Word Document
	Location/Link	<p>The document is located under FPEW I/Pilot Communities/Sudan</p> <p>Click the following links to open the documents:</p> <p>Proposal</p> <p>Contract</p> <p>Addendum to Contract I</p> <p>Unsigned Contract</p> <p>Inception Report</p> <p>Final Report:</p> <p>Main Report</p> <p>Training Manual</p>
Contact Information	Organization	Eastern Nile Technical Regional Office (ENTRO)
	Contact	Tirsit Endeshaw

Category	Element	Comment
	Name	
	Contact Position	Librarian
	Mail Address	P.O. Box 27173-1000, Addis Ababa, Ethiopia
	Telephone	+251-116-461-130/32
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	E-Mail	entrolibrary@nilebasin.org
	Web Address	www.nilebasin.org/entro

Meta-document for Peak Season Community Surveillance in Sudan.

Category	Element	Comment
Document	Title	Peak Season Community Surveillance in Sudan
	Custodian	ENTRO, Ministry of Irrigation and Water Resources of Sudan
Description	Abstract	<p>This documents had been prepared in an effort to evaluate the effectiveness of the FPEW I interventions during the 2010 flood season in terms of early warning communication and training of communities and management interventions at the community level.</p> <p>The final document provides :</p> <ul style="list-style-type: none"> ➤ An assessment result on the effectiveness of the newly developed flood early warning system at community and other administrative levels. ➤ An assessment of community and institutional response to the flood, in particular the effectiveness of the pilot interventions financed through FPEW I (e.g. mobile phones, temporary shelter, color poles, escape routes, risk mapping etc.) ➤ Lessons learned from the performance and short comings of the FPEW I early warning and flood management system and recommendations for the scaling up in FPEW II.
	Key Words	Peak Season Surveillance, Flood Early Warning
	Originator	ENTRO
	Credit	The report was produced for ENTRO by Sudanese Red Crescent Society (SRCS)

Category	Element	Comment
Document Currency	Beginning date	August 1, 2010
	Ending date	December 31, 2010
Access	Access Constraints	The use of the documents is subjected to permission from ENTRO and/or Ministry of Irrigation and Water Resources of Sudan.
	Document Format	PDF and MS Word Document
	Location/Link	The document is located under FPEW I/Pilot Communities/Sudan Click the following links to open the documents: Terms of Reference Proposal Minutes of Negotiation Contract Unsigned Contract Inception Report Final Report
Contact Information	Organization	Eastern Nile Technical Regional Office (ENTRO)
	Contact Name	Tirsit Endeshaw
	Contact Position	Librarian
	Mail Address	P.O. Box 27173-1000, Addis Ababa, Ethiopia
	Telephone	+251-116-461-130/32
	Facsimile	+251-116-459-407
	E-Mail	entrolibrary@nilebasin.org
Web Address	www.nilebasin.org/entro	

Rainfall Forecasting

[Rainfall_Forecasting:](#)

The Rainfall_Forecasting folder contains sub-folders for maintaining forecast data, consultancy reports related to rainfall forecasting; software model used to forecast rainfall and tools used and developed to process forecasted rainfall data; and training materials related to rainfall forecasting.

Forecast Data

[Forecast_Data:](#)

Forecast_Data folder is mainly to hold output rainfall forecast data exported from Eta model that will be used as an input for processing in GIS environment, workspaces (file Geodatabase and temporary folder), image and output folders.

Input

Input:

This folder holds the input text file generated by GrADS script from the daily rainfall forecast GRIB file. The text file is the input data to the rainfall tabulation tool (see description under Tools folder) interfacing Python script (for example rain_16JUN2011.txt is a file for one of the daily rainfall forecast values).

Output

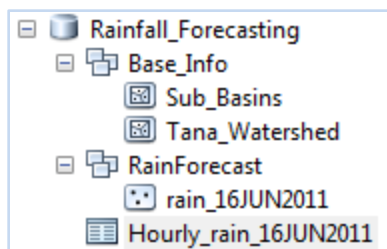
Output:

This folder holds the output text file generated by ArcGIS Python script from the daily rainfall forecast grid points through grid interpolation and zonal statistics. The text file is the input data to hydrological modeling tool to generate runoff. The output text file is the exact copy of an average hourly rainfall table maintained in Rainfall_Forecasting.gdb. For example, in the Geodatabase, which is named as Hourly_rain_16JUN2011 will be 16JUN2011.txt in the Output folder.

File Geodatabase for Rainfall Forecasting

Flood_Forecasting.gdb is a file Geodatabase created to serve as a workspace for holding sub-catchment feature class, rainfall grid point with attribute rainfall forecast data for 72 hours, and output forecasted average rainfall tabulated based on sub-catchments of Gumara, Ribb, Megech and Dirma rivers.

The snapshot at the left shows the structure of the Geodatabase as viewed in ArcCatalog. The Base_Info feature dataset contains Sub_Basins which is the sub-catchment feature class and Tana_Watershed represents the boundary of Tana sub-



basin which is meant only for mapping purposes. The RainForecast is the repository feature dataset for daily rainfall forecast grid points. The processed average daily rainfall forecast over the sub-catchments using grid point interpolation and zonal statistics are maintained as tabular data (for example, Hourly_rain_16JUN2011 is a table that

contains average hourly rainfall forecast over the sub-catchments for 72 hours.

Temp

Temp:

The Temp folder usually contains two files when viewed in ArcCatalog: one for interpolated rainfall surface (hr_rain) and the other zonal statistics table (tbl_zone) created during the last 72-hour rainfall analysis. When viewed in Windows File Explorer hr_rain is a folder and the tbl_zone is located under info folder. This folder is used as a temporary workspace by Python script that tabulates average hourly rainfall based on sub-catchment codes. Note that users shouldn't make any change to the content of this folder either in Windows Explorer or ArcCatalog.

Image

Image:

The Image folder is created to store sample images used to describe some of the documents maintained under Rainfall_Forecasting main folder.

Report

Report:

This folder contains contracts, and reports produced by rainfall forecasting model consultant for Model Setup and Intelligent use of Model Products, Implementation, Calibration and Training of Rainfall Forecasting Model in Ethiopia and Sudan. The following files are maintained under the Report directory:

- A. Contract between ENTRO and Cairo University for implementation, calibration and training of rainfall forecasting model in Ethiopia and Sudan, Interim and Final Reports.
 - i) CON_Rainfall_Forecasting.pdf – Contract,
 - ii) INT_Rainfall_Forecasting.pdf – Interim Report
 - iii) FIN_Rainfall_Forecasting.doc – Final Report
- B. Training report on the Numerical Weather Prediction course that was held at the Cairo Regional Meteorological Training Center
 - i) TRN_Rainfall_Forecasting_Training_Report.doc – Training Report

The following table presents meta-documents for the files listed above:

Documents	CON_Rainfall_Forecasting.pdf, INT_Rainfall_Forecasting.pdf, FIN_Rainfall_Forecasting.doc, and TRN_Rainfall_Forecasting_Training_Report.doc	
Category	Element	Comment
Document	Title	Implementation, Calibration and Training of Rainfall Forecasting Model in Ethiopia and Sudan
	Custodian	ENTRO, EN Countries (Egypt, Ethiopia and Sudan ministry of water affairs and meteorological agencies)

Documents	CON_Rainfall_Forecasting.pdf, INT_Rainfall_Forecasting.pdf, FIN_Rainfall_Forecasting.doc, and TRN_Rainfall_Forecasting_Training_Report.doc	
Category	Element	Comment
Description	Abstract	<p>These documents were produced as a result of contract agreement entered between ENTRO and Cairo University for Implementation, Calibration, and Training of Rainfall Forecasting Model in Ethiopia and Sudan.</p> <p>CON_Rainfall_Forecasting.pdf is contract agreement signed on 16th of December 2007.</p> <p>INT_Rainfall_Forecasting.pdf is an interim report completed by May 2008.</p> <p>FIN_Rainfall_Forecasting.doc is the final report completed by September 2008.</p> <p>TRN_Rainfall_Forecasting_Training_Report.doc is brief training completion report.</p> <p>The documents provide set of activities carried out for implementation and training of Eta model in Ethiopia and Sudan.</p> <p>The document includes:</p> <ul style="list-style-type: none"> ➤ Identification of data needs and preparation of a list of the data required to operate the model, as well as needed historical cases to calibrate and validate the model, and also means for collecting needed data and filling missing gaps. ➤ Assess availability of data at ENTRO or variety of other sources, identify data gaps and propose mechanism on how to overcome this data related constraint. ➤ Identify detail model setup and hardware requirements and specifications, as well as communication requirements to operationally run the model. ➤ Training accomplishment at Cairo Regional Meteorological Training Center.
	Key Words	Rainfall, Forecasting, Eta Model, MM5 Model, Rainfall Forecasting
	Originator	ENTRO
	Credit	Interim and Final Report produced by Cairo University for Flood Preparedness and Early

Documents	CON_Rainfall_Forecasting.pdf, INT_Rainfall_Forecasting.pdf, FIN_Rainfall_Forecasting.doc, and TRN_Rainfall_Forecasting_Training_Report.doc	
Category	Element	Comment
		Warning Project of ENTRO.
Document Currency	Beginning date	December 2007
	Ending date	September 2008
Access	Access Constraints	The documents require permission from ENTRO to use.
	Document Format	The contract and Interim Reports are in PDF format and the final report and training reports is in MS Word format.
	Location/Link	The documents are located under FPEW_KBase/FPEW_I/Rainfall_Forecasting/Reports Click the following links to open the documents: Contract Interim Report Final Report Training Report
Contact Information	Organization	Eastern Nile Technical Regional Office (ENTRO)
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	Web Address	www.nilebasin.org/entro

Tools

Tools:

The Tools folder holds Eta_Model, GRIB_Packages, NETCDF sub-folders and custom built ArcGIS tool and other scripts developed to automate some tasks. All the scripts have internal documentation and are further described below.

The following Table provides the list of all the files, scripts and tools organized under the Tools sub-folder.

File Names and Descriptions	
1	<p>Eta_Data_Download_URLs.txt</p> <p>Text file containing list of all URLs to the datasets for running Eta model. The URLs should be updated by running UpdateDate.vbs before the text file is used by download accelerator.</p>
2	<p>get_eta_input.sh</p> <p>Linux Shell script for downloading Eta model input data. The script should be placed under /home/wseta/ws_eta/routine folder and then run at the Shell command line.</p>
3	<p>grib_ascii.gs</p> <p>GrADS script used to extract rainfall forecast values for 72 hours from the Eta model output GRIB file and export it to comma delimited text format.</p> <p>The script requires OpenGrADS V.2.0.a7.oga.2 or latest and need to be place under /opt/opengrads/Resources/Scripts. Note that /opt is not mandatory location for opengrads installation. Once opengrads is installed in the location of interest, the script should be placed under opengrads/Resources/Scripts folder.</p> <p>Users are also advised to open the script in any text editor and make change to the reference in the script for output text file location which is accessible to MS Windows.</p>
4	<p>rain_image.gs</p> <p>GrADS script used to export rainfall forecast values accumulated over 24 hours, 48 hours, and 72 hours to PNG image format.</p> <p>The script requires OpenGrADS V.2.0.a7.oga.2 or latest and need to be place under opengrads/Resources/Scripts. Similar to grib_ascii.gs script, make change to the reference in the script for output image files location of interest.</p>
5	<p>Rainfall Tabulation Tool.tbx</p> <p>This ArcGIS Tool Box holds scripting tool which helps tabulate average rainfall generated through rainfall surface interpolation and zonal statistics. The content of the tool box can only be viewed in ArcGIS environment.</p>
6	<p>Renamefiles.vbs</p> <p>Use this script to rename the Eta model input data downloaded from the Internet using download accelerator. The script should be place in the folder where the data are maintained. If the script is required to be placed in a folder other than the location of the data, the script should be edited to provide full path of the location where the data reside.</p>
7	<p>Tabulate_Rainfall_Forecast.py</p> <p>Python script that is used to process hourly rainfall forecast from Eta model in a comma delimited text file based on sub-catchments of Gumara, Ribb, Megech and Dirma rivers defined for hydrological processing. The output from running the script is also comma delimited text file averaged for each sub-catchment. The script tool utilizes Spatial Analyst Interpolation and zonal statistics facilities of the ArcGIS software. The complete metadata</p>

File Names and Descriptions

defined for the tool is provided below.

8 UpdateDate.vbs

This VBScript updates the name of the Eta Model input data URLs which is based on the current and yesterday's date using system date. You need to place this script in the folder where the text file, Eta_Data_Download_URLs.txt, that contains list of URLs reside. Faulty system date will wrongly set the current date and results in the failure of data download by an accelerator.

Metadata for Tabulate Average Hourly Rainfall Forecast tool:

Metadata for Tabulate Average Hourly Rainfall Forecast tool

Title Tabulate Average Hourly Rainfall Forecast

Summary

Tabulate average hourly rainfall forecast over Gumara, Ribb, Megech and Dirma river sub-catchments using Inverse Distance Weighted interpolation technique as implemented in ArcGIS and zonal statistics facilities of ArcGIS Spatial Analyst.

Illustration



Usage

This tool is compatible with ArcGIS Desktop 9.3 and latest. To use this tool make sure the following preconditions are met:

1. Spatial Analyst Extension is licensed and checked out.
2. In ArcCatalog 9.3 from tools menu, go to Options
 - Under General tab, turn on Coordinate System.
 - Under Geoprocessing tab, turn on Overwrite outputs of Geoprocessing operations check box
3. In ArcCatalog 10.0, Turn on Coordinate System from Customize menu

Metadata for Tabulate Average Hourly Rainfall Forecast tool

- ArcCatalog Options -> General tab
- Turn on Overwrite the Outputs of Geoprocessing Operations check box from Geoprocessing menu -> Geoprocessing options

The tool requires

- Inverse Distance Weighted (IDW) interpolation tool (Idw_sa) of Spatial Analyst,
- Zonal statistics tool (ZonalStatisticsAsTable_sa)
- File Geodatabase to archive input and output data
- Temporary workspace for intermediate.

The result from running the tool will be comma delimited text file.

Syntax

TabulateAverageRainfall_Stats (Input_text_file, Temporary_folder_workspace, File_Geodatabase, Feature_class_for_sub-catchments, Output_text_file)

Parameter	Explanation: Dialog /Python Reference	Data Type
Input_text_file	Comma delimited text file with Easting, Northing, HR01, HR02, ..., HR72 fields. This text file should contain rainfall grid point locations (Easting and Northing), and other 72 fields for forecasted rainfall data from Eta model.	Text File
Temporary_folder_workspace	Temporary workspace/folder used by the tool for storing intermediate outputs and processing.	Folder
File_Geodatabase	Workspace to store input as well as output data. The comma delimited input text file will be stored as grid point data under RainForecast feature dataset. The copy of the output from running this tool will also be stored in the database as table for future reference.	Workspace or Feature Dataset
Feature_class_for_sub-catchments	The feature class (sub-catchments of Gumara, Ribb, Megech and Dirma rivers) will be used as input to the tool for which the average rainfall data values will be generated based on surface interpolation and zonal statistics. Note that the sub-catchments should have appropriate catchment code (WS_CODE) which is mandatory. If the field name of the catchment code is	Feature Class

Metadata for Tabulate Average Hourly Rainfall Forecast tool		
	changed, the Python script need to be edited to reflect this change.	
Output_text_file	Coma delimited output text file that will have catchment code and average hourly rainfall forecast field names on the first line and rainfall values on subsequent lines. The number of records will match with the no of sub-catchments used as input feature class.	Text File

Eta Model

Eta_Model:

This folder contains Workstation Eta (version 3.1.i) model software source codes which need to be built in Linux environment, GrADS software version 1.7, and the Portland Group PGI FORTRAN compiler version 7.02. Users need to follow the how to install document provided with the model. GrADS and PGI FORTRAN software are incorporated in the Eta model installation procedure.

GRIB Packages

GRIB_Packages:

Supplementary tools that are helpful to manipulate and process GRIB data formats are maintained under this folder. Users may consult the documentation of the tools or seek help from the web sites maintained by the respective developers.

Training

Training:

Development of rainfall forecasting model involved series of trainings at regional and national level. Meteorologists, modelers and IT professionals from the meteorological agencies and ministry of water affairs of the EN countries trained on Numerical Weather Prediction Models both at the regional training center in Cairo and at national levels. Lecture notes, tutorials, sample scripts, list of participant, presentations and supplementary notes have been organized under this folder for future reference.

Lecture Notes

Lecture_Notes:

The materials organized under this sub-folder are either developed or compiled from other sources by the trainers who involved in the training during the course of different training session at regional or national level. The table below provides list of the materials and brief description of each of the documents.

File Names and Descriptions	
1	<p>GrADS_Tutorial</p> <p>This is a sub-folder that holds Tutorial file (<i>tutorial.html</i>), <i>GrADS reference card version 1.7</i> and <i>GrADS scripting language reference card version 1.7</i>.</p>
2	<p>Sample_Scripts</p> <p>Sub-folder that contains sample scripts used during the training sessions.</p>
3	<p>Cairo_Workstation_Eta.pdf</p> <p>Workstation Eta model Technical Report (No 1-A) documented by Egyptian Meteorological Authority, Scientific Research Department, Cairo Numerical Weather Prediction Center, July 2008. This technical report helps users on how to install, configure and run Eta model on Linux and True64 Unix platforms.</p>
4	<p>Fundamentals_of_Shell_Scripting_Using_Bash.pdf</p> <p>Fundamentals of Bash shell scripting training manual prepared by Sayed ABD EL-RAHMAN, December 2010.</p>
5	<p>Introduction_To_Basic_Unix_Commands.doc, Introduction_To_Basic_Unix_Commands.pdf</p> <p>Introduction to basic Unix commands prepared by Dr. Abdellatif Esawy A. Abdou (Egyptian Meteorological Authority) as a part of the "Training program in Addis Ababa for Using ETA and MM5 Models in rainfall enhancement, 7Jul – 6 Aug 2008".</p>
6	<p>Introduction_To_FORTRAN_Programming.doc</p> <p>Introduction to FORTRAN Programming prepared by Dr. Abdellatif Esawy A. Abdou (Egyptian Meteorological Authority) as a part of the "Training program in Addis Ababa for Using ETA and MM5 Models in rainfall enhancement, 7Jul – 6 Aug 2008".</p>
7	<p>Introduction_To_Shell_Programming.doc</p> <p>Introduction to Shell Programming prepared by Dr. Abdellatif Esawy A. Abdou (Egyptian Meteorological Authority) as a part of the "Training program in Addis Ababa for Using ETA and MM5 Models in rainfall enhancement, 7Jul – 6 Aug 2008".</p>
8	<p>MM5_Practical_Shell_Scripts.doc</p> <p>MM5 Practical Shell Scripts compiled by Dr. Abdellatif Esawy A. Abdou (Egyptian Meteorological Authority) as a part of the "Training program in Addis Ababa for Using ETA and MM5 Models in rainfall enhancement, 7Jul – 6 Aug 2008".</p>
9	<p>NWP_Numerical_Methods.doc</p> <p>Brief note on equations governing numerical weather prediction models presented by Dr. Ahmed Yousef, Egyptian Meteorological Authority.</p>
10	<p>Using_GRIB.pdf</p> <p>Brief technical note on the data structure and use of GRIB (Gridded Binary) data</p>

File Names and Descriptions
structure; installation and use of software tools that reads and manipulate GRIB data.

Participants[Participants:](#)

This folder holds files that present the list of training workshop participants.

Presentations[Presentations:](#)

Some of the presentations used by the trainers during the training programs are maintained here. The files are in FDF as well as in PowerPoint file formats.

Supplementary Notes[Supplementary_Notes:](#)

The documents maintained under this subfolder are materials obtained from the trainers for ENTRO's internal use. These documents shouldn't be shared with external users outside of ENTRO. The access constraint attached to these documents is not known. So, to be on the safe side, don't publish these resources or meta-document describing them.

Special Studies[Special_Studies:](#)

As part of project implementation plan of the Flood Preparedness and Early Warning Project, in the due course of the project implementation, special studies that could be expected to have a direct and positive impact on subsequent implementation activities would be conducted. To this end, four special studies had been identified: Special Study on Eta Model Testing and Improvement for Better Performance; Flood Embankment Design, Operation and Maintenance Manual Preparation and Training; 2009 Flood Early Warning Survey in Sudan; and Enhancing Existing Policy in Participatory Voluntary Resettlement in Sudan.

Eta Model Testing[Eta_Model_Testing:](#)

Through the assistance of FPEW I project, Eta atmospheric model has been set up at the meteorological agencies and flood forecasting centers of the ministry of water affairs in the three EN countries. The models are at operational level at all the forecasting centers. The model outputs were utilized during the 2009 flood season as an input to the flood forecasting models in Sudan and Ethiopia. During the same flood

season a study was conducted to compare the model outputs from the three countries with the objective of uniform testing and improvement of model performance. The document maintained here is the result of this study.

List of Documents for the Eta Model Testing and Improvement for Better Performance

Documents
Terms of Reference: FPEW_ToR_Eta_Model_Special_Study.doc Contract : FPEW_CON_ETA_Special_Study.pdf FPEW_CON_ETA_Special_Study_UnSigned.doc Final Report: FPEW_FIN_Eta_Model_Special_Study.doc FPEW_FIN_Eta_Model_Special_Study.pdf

Meta-document for the Community Action Plans prepared for 2008/09.

Category	Element	Comment
Document	Title	Eta Model Testing and Improvement for Better Performance
	Custodian	ENTRO
Description	Abstract	The main purpose of this study was to carry systematic inter-comparison of the rainfall simulations produced by numerical weather predication models (Eta) used in Egypt, Ethiopia, and Sudan in order to achieve uniform testing and improvement of model's performance. The emphasis is on the general process of how to test and improve a numerical rainfall prediction model, rather than the specifics of this Eta model.
	Key Words	Eta Model Testing, Numerical Simulation
	Originator	ENTRO
	Credit	The report was produced for ENTRO by Prof. Dr Elfatih A. B. Eltahir
Document Currency	Beginning date	July 5, 2009
	Ending date	March 17, 2010
Access	Access Constraints	The use of the documents is subjected to permission from ENTRO.
	Document Format	PDF and MS Word Document

Category	Element	Comment
	Location/Link	The document is located under FPEW I/Special Study/Eta Model Testing Click the following links to open the documents: Terms of Reference Contract Unsigned Contract Final Report (doc) Final Report (pdf)
Contact Information	Organization	Eastern Nile Technical Regional Office (ENTRO)
	Contact Name	Tirsit Endeshaw
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	Telephone	+251-116-461-130/32
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Flood Embankment Design

[Flood_Embankment_Design:](#)

The flood embankment design operation and maintenance manual was prepared to fill the knowledge gap both in Ethiopia and Sudan in the proper embankment design procedure and practices. The decision to prepare the manual for both the counties was based on World Bank project implementation support mission team recommendation after field observation of embankments which lack sound technical design.

List of documents related to Flood Embankment Design, Maintenance and Operation Manual for Ethiopia and Sudan

Documents
Terms of Reference: ETH_ToR_Flood_Embankment_Design.doc SDN_ToR_Flood_Embankment_Design.doc Proposal: ETH_PRO_Flood_Embankment_Design.doc SDN_PRO_Flood_Embankment_Design.doc Contract :

<p>ETH_CON_Flood_Embankment_Design.pdf ETH_CON_Flood_Embankment_Design_Unsigned.doc SDN_CON_Flood_Embankment_Design.pdf SDN_CON_Flood_Embankment_Design_Unsigned.doc</p> <p>Final Report: ETH_FIN_Flood_Embankment_Design.doc ETH_FIN_Flood_Embankment_Design.pdf SDN_FIN_Flood_Embankment_Design.pdf</p>

Meta-document for Flood Embankment Design, Maintenance and Operation Manual for Ethiopia

Category	Element	Comment
Document	Title	Flood Embankment Design, Operation and Maintenance Manual in Ethiopia
	Custodian	ENTRO, Ministry of Water Resources and Energy of Ethiopia
Description	Abstract	<p>The purpose of this manual is to present basic principles used in the design and construction of flood protection embankments and associated structures in Ethiopia. The manual applies to all engineers and institutions having responsibility for designing and constructing flood protection works.</p> <p>The manual identifies a set of design standards and procedures to be used for the planning, design, construction and maintenance of flood protection embankment mainly associated with irrigation and land development projects in flood plain areas.</p> <p>The manual is general in nature and not intended as step by step design procedures and needs the judgment of the design engineer on a particular project.</p>
	Key Words	Flood Embankment, Embankment Design
	Originator	ENTRO
	Credit	The report was produced for ENTRO by Ephrem Tamiru
Document Currency	Beginning date	September 4, 2008
	Ending date	April 2010

Category	Element	Comment
Access	Access Constraints	The use of the documents is subjected to permission from ENTRO and/or Ministry of Water Resources and Energy of Ethiopia.
	Document Format	PDF and MS Word Document
	Location/Link	The document is located under FPEW I/Special Study/Flood Embankment Design Click the following links to open the documents: Terms of Reference Proposal Contract Unsigned Contract Final Report: PDF Format MS Document Format
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Meta-document for Flood Embankment Design, Maintenance and Operation Manual for Sudan

Category	Element	Comment
Document	Title	Flood Embankment Design, Operation and Maintenance Manual in Sudan
	Custodian	ENTRO, Ministry of Irrigation and Water Resources of Sudan
Description	Abstract	The purpose of this manual is to present basic principles used in the design and construction of flood protection embankments and associated structures in Sudan. The manual applies to all engineers and institutions having responsibility for

Category	Element	Comment
		<p>designing and constructing flood protection works.</p> <p>The manual identifies a set of design standards and procedures to be used for the planning, design, construction and maintenance of flood protection embankment mainly associated with irrigation and land development projects in flood plain areas.</p> <p>The manual is general in nature and not intended as step by step design procedures and needs the judgment of the design engineer on a particular project.</p>
	Key Words	Flood Embankment, Embankment Design
	Originator	ENTRO
	Credit	The report was produced for ENTRO by The Hydraulics Research Station (HRS) of Sudan
Document Currency	Beginning date	September 1, 2009
	Ending date	March 2010
Access	Access Constraints	The use of the documents is subjected to permission from ENTRO and/or Ministry of Water Resources and Energy of Ethiopia.
	Document Format	PDF and MS Word Document
	Location/Link	<p>The document is located under</p> <p>FPEW I/Special Study/Flood Embankment Design</p> <p>Click the following links to open the documents:</p> <p>Terms of Reference</p> <p>Proposal</p> <p>Contract</p> <p>Unsigned Contract</p> <p>Final Report</p>
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Flood Early Warning Survey in Sudan

[Flood_Early_Warning_Survey](#):

The purpose of the 2009 flood early warning survey was to assess how the flood forecasting and early warning system in Sudan had performed during the 2009 flood season. The flow in the Nile System was low and the triggering water level did not reach the alarming level at which National Flood High Committee (NFHC) could be formed. But many places within the country including Khartoum encountered severe flash flood damages. Even though there were rainfall forecasts from the ETA/M55 models and other sources, the system was unable to respond in due time and disseminate the right message to the flood affected communities.

List of documents related to the 2009 flood early warning survey in Sudan

Documents
Terms of Reference: SDN_ToR_2009_Flood_Early_Warning_Survey.doc Contract : SDN_CON_2009_Flood_Early_Warning_Survey.pdf Final Report: SDN_FIN_2009_Flood_Early_Warning_Survey.doc SDN_FIN_2009_Flood_Early_Warning_Survey.pdf

Meta-document for the report of the 2009 flood early warning survey in Sudan

Category	Element	Comment
Document	Title	Flood Early Warning Survey in Sudan
	Custodian	ENTRO, Ministry of Irrigation and Water Resources of Sudan
Description	Abstract	The report presents the result of flood early warning survey for the 2009 flood season in Sudan to make use of the lessons learnt for a sustainable flood early warning system. The report also presents challenges and opportunities of the currently functioning flood early warning system in the country and provides

Category	Element	Comment
		recommendations on the improvement.
	Key Words	Flood Early Warning, Flood Damage
	Originator	ENTRO
	Credit	The report was produced for ENTRO by Dr. Mohy el Deen El Tohami Taha
Document Currency	Beginning date	February 1, 2010
	Ending date	July 20, 2010
Access	Access Constraints	The use of the documents is subjected to permission from ENTRO and/or Ministry of Irrigation and Water Resources of Sudan.
	Document Format	PDF and MS Word Document
	Location/Link	The document is located under FPEW I/Special Study/Flood Early Warning Survey Click the following links to open the documents: Terms of Reference Contract Final Report: MS Document Format PDF Format
Contact Information	Organization	Eastern Nile Technical Regional Office (ENTRO)
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Policy Enhancement in Sudan

[Policy_Enhancement:](#)

Voluntary resettlement of rural villages or parts of villages in flood risk areas has been a policy option of the Government of Sudan for all flood affected villages along the Blue Nile and Main Nile. Alternative sites have been allocated in several cases, but

policy implementation has been met with varying successes to date. Success has depended on how seriously communities had recently been affected by floods, on the accessibility to their fields, and on the prior provision of services at the new settlement sites. The most common cause of lack of success has been failure to provide adequate services at the new sites and in some cases location of new site at a greater distance from fields that make them unattractive destinations for resettlement. Lack of adequate funding has been a significant obstacle to the successful implementation of this policy.

A review of the World Bank mission team observed that there is a need for enhancing the existing policy and for building capacity in participatory voluntary resettlement in Sudan and the mission team in its Aid Memoir recommended for ENTRO to give technical assistance in this regard.

To this effect, resettlement policy enhancement study was conducted to enhance, modify, improve or supplement existing policy and give training to concerned governmental institutions and NGOs.

List of documents related to existing resettlement policy enhancement in Sudan

Documents
Terms of Reference: SDN_TOR_Enhancing_Policy_for_Voluntary_Resettlement.doc Contract : SDN_CON_Enhancing_Policy_for_Voluntary_Resettlement.pdf Final Report: SDN_FIN_Enhancing_Policy_for_Voluntary_Resettlement.doc SDN_FIN_Enhancing_Policy_for_Voluntary_Resettlement.pdf

Meta-document for the report of existing resettlement policy enhancement in Sudan

Category	Element	Comment
Document	Title	Enhancing Existing Policy in Participatory Voluntary Resettlement in Sudan
	Custodian	ENTRO, Ministry of Irrigation and Water Resources of Sudan
Description	Abstract	The report presents the result of the study on the assessment of existing voluntary resettlement policy in Sudan, resettlement policy guidelines and operational principles and policy framework and implementation mechanisms.
	Key Words	Resettlement Policy, Policy Framework, Policy

Category	Element	Comment
		Formulation
	Originator	ENTRO
	Credit	The report was produced for ENTRO by Dr. Hassan A Abdel Ati
Document Currency	Beginning date	August 25, 2009
	Ending date	May 4, 2010
Access	Access Constraints	The use of the documents is subjected to permission from ENTRO and/or Ministry of Irrigation and Water Resources of Sudan.
	Document Format	PDF and MS Word Document
	Location/Link	The document is located under FPEW I\Special Study\Policy Enhancement Click the following links to open the documents: Terms of Reference Contract Final Report: MS Document Format PDF Format
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Study Tour

[Study_Tour:](#)

Under the Regional Coordination component of FPEW I, study tour was organized and conducted to build capacity of technical specialists and managers from EN countries through experience and knowledge sharing from centers of India and Bangladesh which

successfully tackled issues related to the implementation of flood mitigation and management practices.

The study tour focused on all aspects of flood management with specific emphasis on the following thematic areas:

- i) Flood forecasting system: hydraulic and hydrologic models, weather forecasting models, rainfall forecasting models, flood early warning and communication, etc.
- ii) Information and communication system: information infrastructure and the effectiveness of ICT technologies in flood forecasting, warning and risk assessment.
- iii) Flood risk mapping: flood risk assessments of communities, land use planning of flood plains, flood emergency planning, flood-damage assessment, and assessment of the impact of flood mitigation interventions.
- iv) Community flood preparedness and responses: Build a safer and disaster resilient system with multi-disaster and technology-driven strategy for flood disaster management.

The document list presented below is either study tour report produced by ENTRO staff or consultants hired to facilitate the study tour in India and Bangladesh. Additional Materials (presentations, reports, and videos) which were collected during the tour are organized under [Presentations_Docs](#).

Documents
<p>Terms of Reference and Concept Note:</p> <p>FPEW_ToR_Study_Tour_to_Bangladesh.doc</p> <p>FPEW_ToR_Study_Tour_to_India.doc</p> <p>FPEW_FIN_Study_Tour_Concept_Note.doc</p> <p>Contract :</p> <p>FPEW_CON_Study_Tour_to_Bangladesh.pdf</p> <p>FPEW_CON_Study_Tour_to_Bangladesh_Unsigned.doc</p> <p>FPEW_CON_Study_Tour_to_India.pdf</p> <p>FPEW_CON_Study_Tour_to_India_Unsigned.doc</p> <p>Final Report:</p> <p>FPEW_FIN_Study_Tour_Report.doc</p> <p>FPEW_FIN_Study_Tour_Report.pdf</p> <p>FPEW_FIN_Study_Tour_Report_Bangladesh.doc</p> <p>FPEW_FIN_Study_Tour_Report_India.doc</p>

Meta-document for the above documents

Category	Element	Comment
Document	Title	International Study Tour to India and Bangladesh

Category	Element	Comment
	Custodian	ENTRO
Description	Abstract	The study tour reports provide information about areas, institutions, and communities visited in Bangladesh and India, and insights of the experiences of the countries related to flood management at national, local and community levels.
	Key Words	Study Tour, Flood Management
	Originator	ENTRO
	Credit	The reports were produced for ENTRO by ENTRO staff, CEGIS of Bangladesh and Pragmatix Research and Advisory Services Private Limited of India
Document Currency	Beginning date	March 29, 2009
	Ending date	April 6, 2009
Access	Access Constraints	In a public domain
	Document Format	PDF and MS Word Document
	Location/Link	The document is located under FPEW I/Study Tour Click the following links to open the documents: Terms of Reference Bangladesh Terms of Reference India Concept Note Contract Bangladesh Contract Bangladesh Unsigned Contract India Contract India Unsigned Final Report: ENTRO (doc) ENTRO (pdf) Bangladesh India
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	Facsimile	+251-116-459-407
	E-Mail	entrolibrary@nilebasin.org
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Bridging Phase

[FPEW_I_II_Bridging_Phase:](#)

Bridging Phase refers to the time period between the FPEW I and the start of Phase II (FPEW II), i.e. from December 2010 to the point in time in the future when FPEW II fully starts. Currently, only the Ethiopia component of FPEW II is under implementation through the Tana and Beless Integrated Water Resources Development Project. But it also doesn't include the Gambela area.

All the activities that have been carried out or will be carried and any knowledge resources collected and generated during the Bridging Phase will be organized under this folder.

FPEW II

[FPEW_II:](#)

Main Folder used to organize documents and reports related to Flood Preparedness and Early Warning (FPEW) Project preparation, Enhancement documents to FPEW Project Implementation Plan for Phase II and Summary of FPEW II Proposals.

FPEW II Brief Proposals

[FPEW_II_Brief_Proposals:](#)

This folder contains the following documents which are excerpt from FPEW project implementation plans intended for ENTRO internal use and communication to development partners and other stakeholders.

File Names and Descriptions	
1	FPEW_Phase_II_Project_Brief.doc FPEW project brief which provides general background information about the Flood preparedness and Early Warning project.
2	FPEW_Phase_II_Breif_Proposal.doc This document is an excerpt from FPEW Project Implementation Plan which provides brief description of FPEW and Phase II subprograms: Egypt subprogram,

File Names and Descriptions	
	Ethiopia subprogram, Sudan subprogram and Regional subprogram along with implementation financial requirement of Phase II.
3	FPEW_Summary_of_Phase_II_Sudan_Component.doc Similar to the document above, this document is an excerpt from FPEW Implementation Plan that provide financial requirement for Sudan subprogram.

FPEW II PIP Enhancement

[FPEW_II_PIP_Enhancement:](#)

During the FPEW Project conceptualization phase, it was determined that Project Preparation would include formulation of national and regional flood risk management strategies, and development of project implementation plans for priority actions. It was further agreed that forecasting activities to be included in the project would focus on riverine flooding.

The Project Implementation Plan (PIP) prepared by SMEC International lacks clarity concerning the synergies between implementation mechanism at different levels and among different programs. This is particularly evident with the case of community level interventions in Ethiopia and Sudan and their links to national and regional activities. The document presented here was intended to enhance the PIP to bring it into an implementation ready state, so it can serve to guide project implementers in all the activities, levels and countries.

Documents
<p>Contract :</p> <ul style="list-style-type: none"> FPEW_CON_Phase_II_PIP_Laura.pdf FPEW_CON_Phase_II_PIP_Laura_Addendum_I.pdf FPEW_CON_Phase_II_PIP_Laura_Addendum_II.pdf FPEW_CON_Phase_II_PIP_Laura_Addendum_III.pdf FPEW_CON_Phase_II_PIP_Salah.pdf FPEW_CON_Phase_II_PIP_Salah_Addendum_I.pdf FPEW_CON_Phase_II_PIP_Salah_Addendum_II.pdf FPEW_CON_Phase_II_PIP_Yohannes.pdf FPEW_CON_Phase_II_PIP_Yohannes_Addendum_I.pdf <p>Final Report:</p> <ul style="list-style-type: none"> FPEW_FIN_Phase_II_PIP.doc FPEW_FIN_Phase_II_PIP.pdf FPEW_FIN_Phase_II_PIP_Appendices.doc FPEW_FIN_Phase_II_PIP_Appendices.pdf

Meta-document for the above documents

Category	Element	Comment
Document	Title	Flood Preparedness and Early Warning Project Implementation Plan
	Custodian	ENTRO
Description	Abstract	This PIP describes the components, tasks and activities of the Project and provides a budget, financial and economic analyses, and a financing plan for Phase II Project implementation. It discusses risks associated with Project implementation, and appropriate management measures. Implementation and institutional arrangements are included, with plans and schedule for implementation, plans for procurement and financial management, and a disbursement schedule. A framework for monitoring and evaluation is provided. There is a summary of consultations, and a proposed Environmental and Social Management Framework (ESMF) and a Resettlement Policy Framework (RPF) are included consistent with World Bank requirements.
	Key Words	Project Implementation Plan, Environmental Management Framework, Social Management Framework, Resettlement Policy Framework
	Originator	ENTRO
	Credit	The reports were produced for ENTRO by SMEC International and Enhanced by Dr. Laura Hammond, Mr. Yohannes Habtu and Dr. Salah ElAwad
Document Currency	Beginning date	October 25, 2007
	Ending date	January 2009
Access	Access Constraints	The use of the documents is subjected to permission from ENTRO
	Document Format	PDF and MS Word Document
	Location/Link	The document is located under FPEW II/FPEW II PIP Enhancement Click the following links to open the documents: Dr. Laura's Contract Dr. Laura's Contract Addendum I

Category	Element	Comment
		<i>Dr. Laura's Contract Addendum II</i> <i>Dr. Laura's Contract Addendum III</i> <i>Dr. Salah's Contract</i> <i>Dr. Salah's Contract Addendum I</i> <i>Dr. Salah's Contract Addendum II</i> <i>Mr. Yohannes's Contract</i> <i>Mr. Yohannes's Contract Addendum I</i> Final Report: <i>MS Document Format</i> <i>Appendices MS Document Format</i> <i>PDF Format</i> <i>Appendices PDF Format</i>
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FPEW PIP

FPEW_PIP:

The development objective of the FPEW Project is to reduce human suffering and damages from, and capture the benefits of, flooding in the Eastern Nile. The project focuses on flood risk management and non-structural approaches to managing the impacts of floods: including floodplain management and flood mitigation planning; flood forecasting and warning; and emergency response and preparedness at regional, national, local and community levels. This will contribute to the longer term goal of establishing a comprehensive regional approach to flood management that integrates watershed, river and floodplain management, and incorporates a suite of structural and non-structural flood mitigation measures within a broad multipurpose framework.

Outcomes expected from the FPEW Project include:

- Assessment of the flood risk in the Eastern Nile region to support flood management planning and ENSAP investment planning.
- Improved floodplain management for major urban centers vulnerable to flood damage, and for flood-prone rural communities.
- Operational flood forecasting systems in Eastern Nile countries with appropriate compatibility and mechanisms for exchange of information and data.
- Improved emergency response by governments at all levels, and enhanced community preparedness.
- Enhanced regional collaboration and cooperation during flood events.

The list of documents presented below is FPEW Project Implementation Plan, Technical Background Paper, Consultation Records and Sample Implementation Terms of Reference packages. The documents in MS Word format are fragmented into chapters and are listed as they are to avoid merge errors.

Documents
<p>Project Implementation Plan:</p> <p>FPEW_FIN_PIP.pdf</p> <p>FPEW_FIN_PIP_Preliminaries.doc</p> <p>FPEW_FIN_PIP_Chapter_1.doc</p> <p>FPEW_FIN_PIP_Chapter_2.doc</p> <p>FPEW_FIN_PIP_Chapter_3.doc</p> <p>FPEW_FIN_PIP_Chapter_4.doc</p> <p>FPEW_FIN_PIP_Chapter_5.doc</p> <p>FPEW_FIN_PIP_Chapter_6.doc</p> <p>FPEW_FIN_PIP_Chapter_7.doc</p> <p>FPEW_FIN_PIP_Chapter_8.doc</p> <p>FPEW_FIN_PIP_Chapter_9.doc</p> <p>FPEW_FIN_PIP_Appendix_A.doc</p> <p>FPEW_FIN_PIP_Appendix_B.doc</p> <p>FPEW_FIN_PIP_Appendix_C.doc</p> <p>FPEW_FIN_PIP_Appendix_D.doc</p> <p>FPEW_FIN_PIP_Appendix_E.doc</p> <p>Technical Background Paper:</p> <p>FPEW_FIN_Volume_1_Main_Report.pdf</p> <p>FPEW_FIN_Volume_1_Main_Report_Preliminaries.doc</p> <p>FPEW_FIN_Volume_1_Main_Report_ExecSummary.doc</p> <p>FPEW_FIN_Volume_1_Main_Report_Chapter_1.doc</p> <p>FPEW_FIN_Volume_1_Main_Report_Chapter_10.doc</p> <p>FPEW_FIN_Volume_1_Main_Report_Chapter_11.doc</p> <p>FPEW_FIN_Volume_1_Main_Report_Chapter_2.doc</p> <p>FPEW_FIN_Volume_1_Main_Report_Chapter_3.doc</p>

FPEW_FIN_Volume_1_Main_Report_Chapter_4.doc
FPEW_FIN_Volume_1_Main_Report_Chapter_5.doc
FPEW_FIN_Volume_1_Main_Report_Chapter_6.doc
FPEW_FIN_Volume_1_Main_Report_Chapter_7.doc
FPEW_FIN_Volume_1_Main_Report_Chapter_8.doc
FPEW_FIN_Volume_1_Main_Report_Chapter_9.doc
FPEW_FIN_Volume_1_Main_Report_References.doc
FPEW_FIN_Volume_2_Appendices.pdf
FPEW_FIN_Volume_2_Appendices_Cover.doc
FPEW_FIN_Volume_2_Appendix_A.doc
FPEW_FIN_Volume_2_Appendix_B.doc
FPEW_FIN_Volume_2_Appendix_C.doc
FPEW_FIN_Volume_2_Appendix_D.doc
FPEW_FIN_Volume_2_Appendix_E.doc
FPEW_FIN_Volume_2_Appendix_F.doc
FPEW_FIN_Volume_2_Appendix_G.doc
FPEW_FIN_Volume_2_Appendix_H.doc
FPEW_FIN_Volume_2_Appendix_I.doc
FPEW_FIN_Volume_2_Appendix_J.doc
FPEW_FIN_Volume_2_Appendix_K.doc
FPEW_FIN_Volume_2_Appendix_L.doc

Records of Consultation

FPEW_FIN_Volume_3_Appendix_M_Consultation_Records_Cover.doc
FPEW_FIN_Volume_3_Appendix_M_Consultation_Records.doc
FPEW_FIN_Volume_3_Consultation_Records.pdf

Implementation Terms of Reference packages:

FPEW_Phase_II_Impementation_TOR_Package_A.doc
FPEW_Phase_II_Impementation_TOR_Package_A.pdf
FPEW_Phase_II_Impementation_TOR_Package_B.doc
FPEW_Phase_II_Impementation_TOR_Package_B.pdf
FPEW_Phase_II_Impementation_TOR_Package_C.doc
FPEW_Phase_II_Impementation_TOR_Package_C.pdf
FPEW_Phase_II_Impementation_TOR_Package_D.doc
FPEW_Phase_II_Impementation_TOR_Package_D.pdf
FPEW_Phase_II_Impementation_TOR_Package_E.doc
FPEW_Phase_II_Impementation_TOR_Package_E.pdf
FPEW_Phase_II_Impementation_TOR_Package_F.doc
FPEW_Phase_II_Impementation_TOR_Package_F.pdf

Meta-document for the above documents

Category	Element	Comment
Document	Title	Flood Preparedness and Early Warning Project Implementation Plan
	Custodian	ENTRO
Description	Abstract	This PIP describes the components, tasks and activities of the Project and provides a budget, financial and economic analyses, and a financing plan for Phase II Project implementation. It discusses risks associated with Project implementation, and appropriate management measures. Implementation and institutional arrangements are included, with plans and schedule for implementation, plans for procurement and financial management, and a disbursement schedule. A framework for monitoring and evaluation is provided. There is a summary of consultations, and a proposed Environmental and Social Management Framework (ESMF) and a Resettlement Policy Framework (RPF) are included consistent with World Bank requirements.
	Key Words	Project Implementation Plan, Environmental Management Framework, Social Management Framework, Resettlement Policy Framework
	Originator	ENTRO
	Credit	The reports were produced for ENTRO by SMEC International
Document Currency	Beginning date	
	Ending date	January 2007
Access	Access Constraints	The use of the documents is subjected to permission from ENTRO
	Document Format	PDF and MS Word Document
	Location/Link	The document is located under FPEW II/FPEW PIP Click the following links to open the documents Project Implementation Plan: <i>PDF Format:</i> Project Implementation Plan

Category	Element	Comment
		<p><i>MS Word Document:</i> Preliminaries (Cover, Content, Executive Summary) Chapter 1, Chapter 2, Chapter 3, Chapter 4, Chapter 5, Chapter 6, Chapter 7, Chapter 8, Chapter 9, Appendix A, Appendix B, Appendix C, Appendix D, Appendix E</p> <p>Technical Background Paper: <i>PDF Format:</i> Volume 1 Main Report Volume 2 Appendices Volume 3 Consultation Records</p> <p><i>MS Word Document</i> <i>Volume 1 Main Report:</i> Preliminaries (Cover and Content) Executive Summary Chapter 1, Chapter 2, Chapter 3, Chapter 4, Chapter 5, Chapter 6, Chapter 7, Chapter 8, Chapter 9, Chapter 10, Chapter 11, References,</p> <p><i>Volume 2 Appendices:</i> Cover Appendix A, Appendix B, Appendix C, Appendix D, Appendix E, Appendix F, Appendix G, Appendix H, Appendix I, Appendix J, Appendix K, Appendix L,</p> <p><i>Volume 3 Records of Consultation</i> Appendix M - Cover Appendix M</p> <p>Implementation Terms of Reference packages: <i>PDF Format:</i> Package A, Package B, Package C Package D, Package E, Package F</p> <p><i>MS Word Document:</i> Package A, Package B, Package C Package D, Package E, Package F</p>
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