FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA

MINISTRY OF WATER AND ENERGY & MINSTRY OF URBAN AND INFRASTRCTURE

ETHIOPIA FLOOD MANAGEMENT PROJECT (ET-FMP)

(P176327)

TERMS OF REFERENCE FOR CONSULTANCY SERVICE ON

URBAN FLOOD RISK MANAGEMENT

February/2025

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1 Background and Project Description

The Ethiopia Flood Management Project (EFMP) aims to strengthen urban resilience against increasing flood risks driven by climate change, rapid urbanization, and inadequate flood management infrastructure.

Recognizing that urban floods have severe economic, social, and environmental impacts, this project focuses on multi-stakeholder coordination, leveraging advanced technology for flood risk assessment, and ensuring long-term sustainability.

This consultancy will provide a comprehensive assessment of urban flood risks, identify priority interventions, and support capacity building and institutional strengthening to enhance urban flood resilience in Ethiopia.

2 Objective of the Assignment and Scope of Services

2.1 Objective of the Assignment

The main objective of this consultancy is to develop an integrated urban flood risk management strategy that aligns with international best practices while addressing Ethiopia's specific challenges. The key objectives include:

1. Comprehensive Urban Flood Risk Assessment: Identify flood-prone areas, vulnerable populations, and at-risk infrastructure.
2. Climate-Responsive Flood Management Solutions: Incorporate climate change adaptation strategies into urban planning.
3. Stakeholder Engagement & Capacity Building: Strengthen institutional and community resilience through participatory governance.
4. Technology-Driven Early Warning Systems: Utilize GIS, remote sensing, and hydrological models to improve flood forecasting and risk mapping.
5. Cost-Benefit Analysis for Feasible Interventions: Evaluate economic viability and sustainability of proposed flood control measures.
6. Policy and Institutional Framework Recommendations: Strengthen regulatory structures for urban flood risk management.
7. Sustainable Implementation Strategy: Develop an exit strategy to ensure continuity beyond the project period.

2.2 Scope of the Services

The consultancy firm will undertake the following tasks:

2.2.1 Tasks and Deliverable

Task 1: Inception Report

1) Prepare a detailed inception report outlining:

- ✓ Proposed methodologies.
- ✓ Stakeholder engagement strategies.
- ✓ A comprehensive work plan.

2) Facilitate an inception workshop to validate methodologies and work plans with key stakeholders.

Deliverables: Inception report

Workshop report summarizing key feedback

Task 2: Diagnostic Assessment of Urban Flood Risks

1) Conduct a detailed analysis of urban flood risks across Ethiopia based on historical data, trends, and projections.
2) Analyze socioeconomic vulnerabilities, including marginalized groups and high-risk populations.
3) Identify data gaps and recommend measures for addressing them.

Deliverables: Comprehensive diagnostic assessment report,

Socioeconomic vulnerability analysis and

Data inventory and gap analysis

Task 3: Climate Change Adaptation Strategy

1. Assess the impact of climate change on urban flooding and hydrological regimes.
2. Propose adaptation measures, including resilient infrastructure, risk-sensitive urban planning, and green solutions.

Deliverables: Climate change impact assessment report,

Climate adaptation strategy document

Task 4 Legal and Institutional Framework Analysis

1. Evaluate the existing legal, regulatory, and institutional frameworks.
2. Recommend strategies to improve institutional coordination and policy alignment for flood risk management.

Deliverables: Framework analysis report,

Actionable recommendations for legal, regulatory and institutional strengthening

Task 5: Feasibility Study and Design of Interventions

1) Identity and select flood risk reduction interventions (both physical and non-physical) including Nature Based Solutions (NBS) applicable to each of 10 target cities (See table 3 in the Annex) through intensive analysis and stakeholder engagement. Multiple purpose facilities (for example, green parks and sports facilities) will be considered in selecting interventions.
2) Produce conceptual design and conduct a cost-benefit analysis for proposed urban flood risk management interventions considering co-benefit as appropriate.
3) Develop detailed engineering designs, specifications, and tender documents.

4) Recommend sustainable flood mitigation infrastructure.

Deliverables: Feasibility study report,

Detailed designs and tender documents

Task 6: Environmental and Social Impact Assessment (ESIA)

An environmental assessment will be conducted for each proposed component to identify potential direct, indirect, cumulative, and induced impacts and risks to physical, biological, socioeconomic aspects (including impacts on livelihood, environmental media, health and safety, vulnerable groups, and gender issues), and physical cultural resources within the project's area of influence. This assessment will ensure the close integration of environmental sustainability and climate resilience in infrastructure designs.

- Conduct an Environmental and Social Screening of the proposed investment.
- Perform an Environmental and Social Impact Assessment (ESIA).
- Prepare an Environmental and Social Management Plan (ESMP).

Deliverables/Outputs of Task 6:

- Documentation showing the results of the Environmental and Social Screening for the proposed investment.
- Documentation displaying the results of the Environmental and Social Impact Assessment (ESIA).
- Prepared Environmental and Social Management Plan document (ESMP) outlining strategies for managing environmental and social impacts effectively.

Task 7: Capacity-Building support to Selected Cities, Regions & Federal Staff

Training and capacity building are essential components of the consultancy project. Stakeholders and key players in risk reduction will receive hands-on training on various aspects of the project, including "what if scenarios" modeling, flood risk assessment, profiling, impact of risk and hazard management, and GIS mapping. The following activities will be considered:

- Provide technical assistance for mainstreaming Integrated Urban Flood Risk Management at the city level.
- Offer technical support in non-physical measures in the urban development sector through various Technical Assistance (TAs), such as flood risk-conscious urban development planning, floodplain management, land use regulation, building regulation, preparedness, and response.
- Enhance capacity for flood risk assessment, flood-related database management, GIS mapping, and modeling.
- Build capacity for planning, designing, constructing, and maintaining flood risk reduction infrastructures.
- Conduct training sessions with representatives of selected Urban Local Governments (ULGs) to provide technical support on disaster risk assessment (hazard, exposure, vulnerability, and loss) and risk-sensitive land use planning (including integrating risk data into planning instruments).

- Organize Training of Trainers (TOT) on Geographic Information Systems (GIS) and other relevant software (e.g., hazard modeling software like Hec-Ras or Open Quake) for ULGs, regions, and Ministry of Urban Infrastructure (MUI) staff by developing manuals and modules for each training session.

Deliverables/Outputs of Task 7:

- Detailed training manuals, training plans, and materials for the activities listed above.
- Conduct appraisal workshops for the mentioned activities at different times.
- Report on the assessment of the legal, regulatory, and institutional framework for urban flood risk management, including coordination between ULGs/cities.

Task 8: Analysis of Legal and Institutional Framework

The task involves assessing the legal and institutional framework for urban flood risk management and coordination among Urban Local Governments (ULGs)/cities and other government entities, such as the Ministry of Water and Energy (MoWE) for basin-level infrastructure, Disaster Risk Management Centers (DRMC) for preparedness and emergency response, and National Meteorological Agencies.

Deliverables/Outputs of Task 8:

Identification and organization of an effective legal, institutional, and regulatory framework that enables urban flood risk management.

3 Implementation Plan for Deliverables

The implementation plan aligns with the 12-month contract period, ensuring deliverables are completed in a phased approach:

Task	Deliverable	Timeline
Task 1	Inception Report	Months 1
Task 2	Diagnostic Assessment	Months 2
Task 3	Climate Change Strategy	Months 3-4
Task 4	Legal Framework Analysis	Months 5-6
Task 5	Feasibility Study	Months 7-8
Task 6	ESIA Reports	Months 9
Task 7	Capacity Building	Months 10
Task 8	Sustainability Strategy	Months 11 - 12

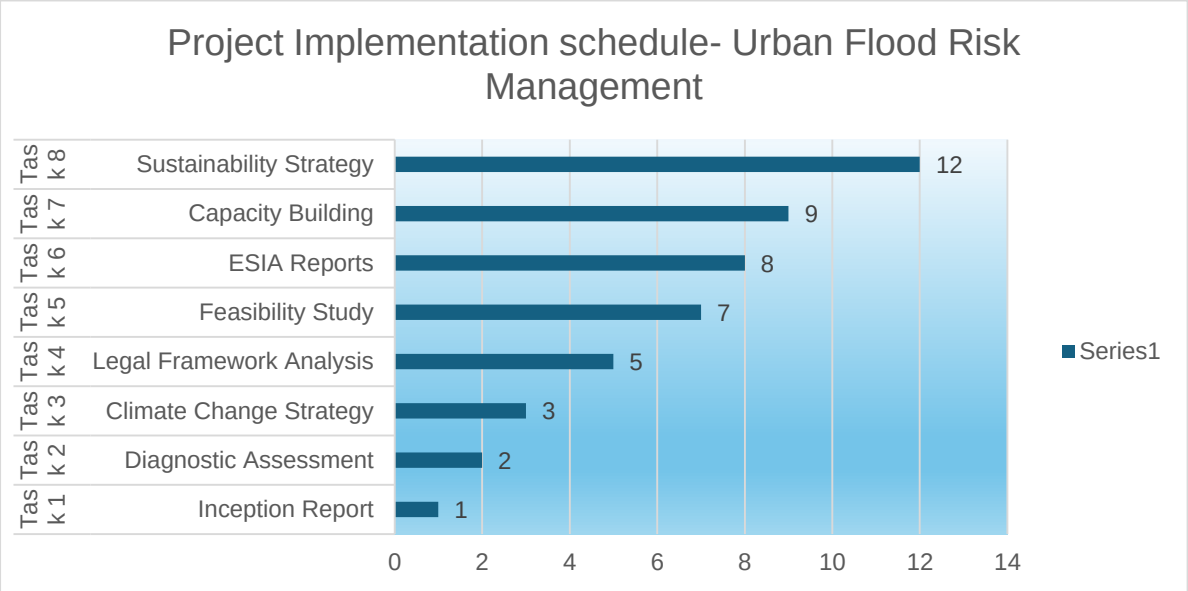

Figure 1.0: Gantt chart implementation Schedule of the Tasks

3.1 Inception Report

The draft inception report will be presented at a joint workshop within one month of the agreement signing, attended by representatives from federal, regional, and selected city authorities. The report will outline the scope of work, work plan, time frame, and analysis. The consultants will finalize the inception report within two weeks after the workshop.

- Comprehensive Analysis of the Country's Urban Flood Situation within 15 days
- Hazard Profiling for Urban Flood, Inundation, and Landslides within 1months
- Exposure, Vulnerability Assessment & Urban Flood Risk Estimation and Profiling within 1 month
- Identification of high-risk major city areas, recommendations on general flood risk management interventions, and engineering design and drawings for physical investments within 1.5 months

3.2 Feasibility Report:

After completing the specified tasks, the final deliverables will be submitted to the client in both hard and soft copies. The deliverables will include:

- Reports on climatic scenarios, hydrologic and hydraulic model outputs, GIS files, calibration data, survey data, and spatial data outputs for each city
- Reports on flood risk assessment studies conducted for each city
- GIS-based modeling tools for flood, landslide, loss calculation, and vulnerability mapping
- Reports on flood hazard maps and flood evacuation maps for each city
- Reports on socio-economic profiles for each city
- Reports on flood risk reduction interventions for each city
- Reports on environmental and social impact assessment studies for each city
- Training manuals and materials for capacity-building activities
- Draft Feasibility report to be submitted within sixteen (6) months from the agreement signing date

- Final Feasibility report to be submitted within twenty (7) months from the agreement signing date
- Capacity building and institutional analysis

3.3 Design of Flood Risk Reduction Investments Report:

The design report will be submitted to the client in five hard and soft copies, including:

- Planning and Preliminary Design Report
- Technical Specifications
- Construction Method and Stage of Implementation Strategy
- Operation and Maintenance Manuals
- Tender Documents

Submission of the planning and draft preliminary design report and associated costs will be within twenty (11) months from the agreement signing date, while the final Planning and Preliminary Design Report submission will be within twenty-five (12) months from the agreement signing date.

4 Approach and Methodology

In executing the contract assignment, the consultant will adhere strictly to the work plan and agreed-upon schedule with the Ministry of Water and Energy (MUI).

- The consultant will collaborate with the MUI to determine an appropriate methodology for the project.
- Data and information required for the study will be collected from various sources, including Urban Local Government departments, Regions, Ministries, and other relevant entities.
- The consultant will thoroughly review, assess, and analyze the gathered data and information in close consultation with the MUI.
- Facilitation of presentations and coordination of stakeholder workshops and consultations will be conducted by the consultant in alignment with the agreed work schedule.

5 Contract Period

The activities outlined in this contract are expected to be completed within twelve (12) months from the date of signing the agreement.

Firm Consultant Staffing Requirements

The shortlisted consultants are required to propose staff members to support their technical proposal in response to the request for proposals. The staffing requirements and qualifications are as follows:

Team Leader (#1)

- Duration: 12 months
- Educational Requirements: Minimum of MSc. in Climate Change Science, Hydraulics, Water Engineering, Hydrology, Disaster Risk Management, or related fields
- Experience Required:

- Minimum of 14 years of relevant work experience in hydraulics structures, flood-prone zone work, hydrology, or related fields.
- At least 8 years of experience in a management position as a team leader (project manager) of consultancy assignments or a combination of hydraulics structures and flood protection technologies.
- Project management capability, including managing teams of national/international experts.
- Knowledge of Ethiopia's development strategies, urban planning, flood risk protection, climate change adaptation measures, infrastructure, and urban development policy.

- Skills/Knowledge:
  - Ability to work with a group of specialists and stakeholders from diverse fields.
  - Proficiency in collating, harmonizing, synthesizing, and drafting technical reports in English.
  - Familiarity with the logical framework approach and the development of time-bound action plans.

The consultant team should be well-equipped with the necessary expertise and experience to effectively carry out the tasks outlined in the consultancy agreement.

Table 1. Staffing requirement

No	Position	Man-Months	Educational Requirement	Experience Required	Task Assignment
1	Team Leader (#1)	12 months	MSc in Climate Change Science, Hydraulics, Water Engineering, Hydrology, Disaster Risk Management, or related fields	Minimum 14 years of relevant work in hydraulic structures, flood-prone zones, and hydrology, with 8 years in management roles. Knowledge of Ethiopia's urban development policies and strategies is advantageous.	Oversee overall execution, manage coordination, and quality deliverables.
2	Hydraulics Engin (#2)	7 months	MSc in Hydraulics Engineering or related fields	Minimum 10 years in hydrological modeling and flood risk mapping. Experience in vulnerability analysis and Ethiopia's urban planning policies is desirable.	Conduct hydraulic modeling, flood hazard mapping, and data processing for vulnerability assessment.
3	Climate Change Specialist (#1)	6 months	MSc in Climate Change Science, Disaster Risk Management, or related disciplines	Minimum 3 years in disaster risk reduction, hazard assessment, and climate modeling. Knowledge of GIS, IPCC tools, and Ethiopia's climate adaptation measures is preferred.	Assess climate change impacts on urban flooding, including risk mapping and institutional policy recommendations.

No	Position	Man-Months	Educational Requirement	Experience Required	Task Assignment
4	Structural Engineer (#2)	4 months	MSc in Civil or Structural Engineering	Minimum 10 years in structural engineering, with expertise in flood-resilient infrastructure.	Design and evaluate structural interventions for flood risk management.
5	Hydrologist (#2)	6 months	BSc in Hydrology, Watershed Management, or related fields	Minimum 10 years in watershed management, climate impact assessments, and hydrological hazards analysis.	Conduct hydrological studies for short- and long-term flood risk mitigation.
6	Socio-Economist (#2)	5 months	MSc in Socioeconomics, Sociology, Geography, or related fields	Minimum 10 years in socio-economic impact analysis, with experience in urban flood risk adaptation policies.	Assess socio-economic impacts of flood risks and develop mitigation strategies.
7	GIS and Database Specialist (#3)	3 months	Postgraduate degree in GIS	Minimum 10 years in GIS applications, hydrological modeling, and database management. Familiarity with Ethiopia's flood risk policies is advantageous.	Develop GIS databases, create flood hazard maps, and support hydrological modeling.
8	Surveyor (#2)	5 months	BSc in Surveying Engineering or related fields	Minimum 10 years in surveying for land and flood risk mapping.	Conduct field surveys and support GIS mapping.
9	Geotechnical Engineer (#2)	5 months	Postgraduate degree in Geological Engineering or related fields	Minimum 10 years in geological engineering, slope stability assessment, and flood hazard mapping.	Evaluate geological conditions for structural stability in flood-prone areas.
10	Urban Planning Specialist (#1)	6 months	MSc in Urban or Regional Planning	Minimum 10 years in urban planning and flood risk reduction.	Develop urban planning strategies for flood mitigation.
11	Draftsperson (#2)	7 months	Diploma or degree in Drafting Technology	Minimum 10 years in drafting for engineering and urban planning projects.	Prepare technical drawings for structural and flood protection designs.
12	Architect (#2)	5 months	BSc in Architecture or Urban Planning	Minimum 10 years in architecture, with expertise in flood-adaptive urban designs.	Design urban spaces with flood resilience considerations.
13	Urban Flood Modeling	8 months	Degree in Hydraulics Engineering or related	Minimum 10 years in flood modeling, including	Develop advanced urban flood models

No	Position	Man-Months	Educational Requirement	Experience Required	Task Assignment
	Specialist (#1)		fields	surface water management and vulnerability assessments.	to predict and mitigate surface water inundation risks.
14	Environmental Specialist (#1)	4 months	MSc in Environmental Science, Disaster Risk Management, or related fields	Minimum 3 years in disaster risk management, policy formulation, and environmental assessments. Familiarity with Ethiopia's climate adaptation policies is advantageous.	Conduct environmental assessments and develop mitigation strategies for flood-p

N.B The table above Clarifies that a total staff member of 24 is planned to hire (to recruit and select) 7.

6 Reporting Requirements

The consultant is expected to adhere to the following reporting requirements throughout the contract:

1. **Work Plan and Time Schedule Compliance:**
   - The consultant must strictly follow the agreed work plan and schedule set with the Ministry of Water and Energy (MUI) for the contract assignment.
2. **Methodology Determination:**
   - An appropriate methodology for the project will be determined by the consultant in consultation with the MUI.
3. **Data Collection:**
   - The consultant is responsible for collecting all required data and information from various sources, including Urban Local Government departments, Regions, Ministries, and other relevant entities.
4. **Data Review and Assessment:**
   - The consultant will conduct a thorough review, assessment, and judgment of the collected data and information in close consultation with the MUI.
5. **Stakeholder Engagement:**
   - The consultant will facilitate presentations and coordinate stakeholder workshops and consultations as per the agreed work schedule.

Adherence to these reporting requirements is essential to ensure the successful implementation of the contract assignment and the timely delivery of project outcomes.

7 Monitoring and Evaluation

The project will be monitored and evaluated on a result-based approach. The Consulting Firm should set up milestones for the implementation of the project. The firm shall, in addition, take into consideration in their work plan the project implementation risk associated with the unreliability and authenticity of data availability and quality, staff recruitment, and also time constraints.

8 Technical Evaluation Criteria

Table 2 List Technical Proposal Evaluation Criteria

Technical Proposal Scoring Criteria		Points
1	**Consultant's Specific Experience to Perform Assessment**	20
1.1	Educational Requirements	8
1.2	Total Experience	7
1.3	Relevant tasks as per the assignments	5
2	**Implementation Plan**	45
2.1	Approach and Methodology	20
2.2	Work Plan	15
2.3	Organization and Staffing	10
3	Ability to Transfer Knowledge	5
4	Individual Consultant / key professionals engaged in Consultancy service (CVs)	30
4.1	Team Leader/Task Manager &Deputy Team Leader	10
4.2	Team Members	20
Total		100

9 Payment Schedule

The payment schedule for the consultancy work is structured as follows:

1. **Advance Payment:**

- 20% of the contract price will be paid as an advance following the signing of the contract. This advance payment will require an acceptable unconditional bank guarantee for the same amount. The bank guarantee will be released after the completion of the assignment, and the advance will be deducted proportionally from subsequent payments.

2. **First Payment:**

- 20% of the lump sum amount will be paid upon the approval of the Final Inception Report, which includes revisions based on client feedback, updated methodology, work program, and field visit schedule.

3. **Second Payment:**

- 35% of the lump sum amount will be paid upon the submission of the Final Draft Reports.

4. **Third and Final Payment:**

- 25% of the lump sum amount will be paid upon the submission and approval of all final reports and deliverables, including workshop and training reports containing presentations, manuals, and a summary of recommendations and agreements reached.

10 Budget Source and Payments

- The consultancy work's budget source is the Ethiopia Flood Management Project (EFMP), with the Ministry of Urban and Infrastructure being responsible for all payments to the consultant. Formal approval from the steering committee is required for the disbursement of funds.
- The individual consultant cost breakdown should encompass all validation workshops undertaken with stakeholders. Payments will be made according to the agreed-upon payment schedule outlined in the contract, with specific percentages allocated for different milestones and deliverables.

ANNEX 1

The data provided in **ANNEX 1 (Table 3: Lists of Towns Vulnerable to Flood Hazards in Ethiopia)** forms a critical foundation for consultants engaged in urban flood risk management. This annex offers an overview of towns and cities across Ethiopia that are susceptible to flooding, categorized by region. The information serves as a preliminary guide for identifying flood-prone areas and prioritizing towns for detailed studies and interventions.

Significance of the Data for Initial Work

Regional Overview of Flood Vulnerability:
The comprehensive list in Table 3 provides a broad understanding of the geographical distribution of flood-prone towns across Ethiopia's regions. This insight helps consultants grasp the nationwide scale of flood risks and the variation of vulnerabilities influenced by regional factors such as topography, rainfall intensity, and urbanization patterns.

Scientific and Collaborative Basis for Prioritization:
From the extensive list, **10 priority towns and cities** were identified through discussions with regional urban bureaus and analyses conducted by the Ethiopian Meteorological Institute (EMI). This prioritization was guided by:

1. Rainfall forecasts and climate data.
2. Preliminary flood mapping analyses of vulnerable towns.
3. Input from regional stakeholders.
   This process ensures that the selection of priority towns is rooted in both scientific evidence and local expertise, making the data highly relevant for consultants' initial

Table 3 Lists of Towns Vulnerable to Flood Hazards in **Ethiopia**

s.n	Name of Region	Lists of Towns Vulnerable to Flood in the Region
1	Tigray	Adigrat
		Moheni
		Abiyadi
		Alamata
		Mekele
		Mayichew
		Adwa
		Wukiro
		Atsbi
		Aksum
		Shire
		Entiche
		Adishiho
		Korem
2	Afar	Dufti
		Asembo

3	Amara	Gonder
		Bahirdar
		Dessie
		Woldia
		Woreta
		Finoteselam
		Debiremarikos
4	Oromia	Ginbi
		chiro
		Shakiso
		Adama
		Hirna
		Mechara
		Deder
		Chira(Jima)
		Bili(west wellega)
		Metehara
		Anango(west wellega)
5	Somale	Jigjiga
		Godey
		Kabri Dahar
		Dhagah Buur
		Tog-Wajaale
		Kabri Bayah
6	Benshangul Gumze	Asosa
		Bambis
		Horazab
		Kurmuk
		Mambuk
		Debrezeyit
		Dbati
		Bulen
		Pawe
		Zeyi
		Dembi
		Sherkole
s.n	Name of Region	Lists of Towns Vulnerable to Flood in the Region
7	Gambela	Kuachthiang
		Kuergeng
		Nyinenyang
		Matar
		Tiergol
		Itang
		Ungoke
		Pugneda
		Gambela
8	Harari	Harar
9	South Ethiopia	Arbaminch

		Welayitasodo
		Soyama
		Gidole
		Kamba

S.n	Region	Lists of Towns Vulnerable to Flood in the Region
		Gerse
		Wenago
		Chelelekitu
		Gesuba
		Beto
		Laska
10	Central Ethiopia	Bonesha
		Agena
		Daloch
		Demboya
		Saja
		Bu'i
		Koshe
		Mudula
11	Diredawa Administration	Diredawa
12	Sidama	Hawasa
		Leku
		Aleta chuko
		Daye
		Wendogenet
		Daraqawado
		Daraotilicho
		Borch
		Yaye
		Billate
		Hanxaxe
		Cirre
		Girja
13	South West Ethiopia	Bonga
		Mizan
		Tercha
		Ameya

1	Addis Ababa	Addis Ababa
2	Amhara	Dessie
3	Oromia	Adama
4	Somale	Gode
5	Sidama	Hawassa
6	South Ethiopia	Wolayta Sodo
7	Gambela	Gambela
8	Harari	Harar
9	Dire Dawa	Dire Dawa
10	South West Ethiopia	Bonga

Table 4: Lists of Selected Vulnerable towns to Flood Hazards in **Ethiopia**