Research Methodology Note

Shocks Monitoring Index (SMI) - Jur River shocks verification and flood resilience study
SSD1902
South Sudan

September 2022
V1

REACH Informing more effective humanitarian action

1. Executive Summary

Country of intervention	South Sudan					
Type of Emergency	x	Natural disaster	□	Conflict	□	Other *(specify)*
Type of Crisis	x	Sudden onset	□	Slow onset	x	Protracted
Mandating Body/ Agency	BHA					
IMPACT Project Code	32DPW/AIE, 32EFI/ANS					

Research Timeframe		
	1. Pilot/ training: 04/10/2022	6. Preliminary presentation: NA
	2. Start collect data: 05/10/2022	7. Outputs sent for validation: 25/11/2022
	3. Data collected: 11/10/2022	8. Outputs published: 9/12/2022
	4. Data analysed: 19/10/2022	9. Final presentation: TBD
	5. Data sent for validation: 19/10/2022	

Humanitarian milestones	**Milestone**		**Deadline**
	X	Donor plan/strategy	TBD
	□	Inter-cluster plan/strategy	_ _/_ _/_ _ _ _
	□	Cluster plan/strategy	_ _/_ _/_ _ _ _
	□	NGO platform plan/strategy	_ _/_ _/_ _ _ _
	□	Other (Specify): CARB Consortium Strategy	TBD

Audience Type & Dissemination *Specify who will the assessment inform and how you will disseminate to inform the audience*	**Audience type**		**Dissemination**	
	x Strategic		**x** General Product Mailing (e.g. mail to NGO consortium; HCT participants; Donors)	
	X Programmatic		x Cluster Mailing (Education, Shelter and WASH) and presentation of findings at next cluster meeting	
	x Operational		x Presentation of findings (e.g. at HCT meeting; Cluster meeting)	
			x Website Dissemination (Relief Web & REACH Resource Centre)	

Detailed dissemination plan required	□	Yes	x	No

General Objective	To understand the conditions in settlements affected by frequent flooding, especially in relation to FSL, coping strategies utilised by these populations. In addition, the

	assessment will help to understand how relevant authorities manage disasters, as well as ground-truth* and guide REACH's approach to monitoring flooding through remote sensing. The assessment will inform humanitarian response and disaster risk reduction (DRR) programming in Jur River county and more broadly in flood-prone areas across South Sudan.
Specific Objective(s)	• To understand the extent, causes, and patterns of recent flooding in major settlements across Jur River county, and its impact on livelihoods. • To understand the measures in place by both communities and relevant authorities to mitigate the effects of flooding in Jur River county, and opportunities to improve DRR awareness, practices and infrastructure (including eco-DRR measures) across the area. • To gain a better understanding of the social and ecological vulnerabilities populations face towards flooding and their resilience towards such events, including any disproportionate impacts on female populations. • To gain an understanding of the spatial variability of flood susceptibility and risk across Jur River county, with a more detailed focus on assessed high risk settlements. • To compare remote sensing data on water levels / extent and land cover in Jur River county with the situation on the ground and identify stategies to improve detection of flooding.
Research Questions	• Which settlements/bomas in Jur River county are most at risk from flooding? • What are the main livelihood and income generating activities in the settlement? • What is the current physical extent and severity of flooding in major settlements across Jur River county? • How do communities perceive the occurrence of flooding (and other climatic shocks), including their severity and impacts? • In what ways have flooding and excessive rainfall affected access to livelihoods in Jur River county in recent years? • What DRR infrastructure and measures,, are in place in Jur River county to mitigate the impact of flooding and excessive rainfall and what are the perceived gaps? • What are the gendered coping strategies in place in Jur River county to mitigate the impact of flooding and excess rainfall?
Geographic Coverage	Settlements at high risk of flooding in Jur River county, Western Bahr el Ghazal, South Sudan – including in Udici, Kangi, Rocrocdong, Wau Bai and Marial Bai payams.[1]
Secondary data sources	• Open source medium digital elevation model: SRTM DEM • High resolution satellite imagery: - Digital Globe archive imagery requested from IMPACT Initiatives HQ, or/and Sentinel 2 imagery • Land cover: FAO land cover atlas for South Sudan / ESA WorldCover • REACH Integrated Needs Tracking System and Shock Monitoring Index • FSNMS+ and Food Security Cluster • Precipitation: climate Hazards Group Infrared Precipitation with Station data (CHIRPS) – in locality & upstream to understand influx from Ethiopian Highlands

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[1] This is a preliminary list of settlements to assess, which may be adjusted after consulting with KIs, access issues, etc.

* Ground-truthing is the process of collecting information about the environment at a specific location, recorded on a GPS device to cross-check with, and help validate, remote sensing (satellite) imagery.

	• River and lake water levels: DAHITI (to understand flooding dynamics) • Livevlihood zone information: FEWS NET, South Sudan Livelihoods Zones and Descriptions, 2018 • Historic flood extent data: UNOSAT flood extent data (VIIRS), Sentinel 1 flood extent data derived from GEE, and wet pixel data (NDWI) from UNOSAT. • Flood risk analysis: UNDRR (United Nations officer for Disaster Risk Reduction), 2018: Words into action guidelines, implementation guide for addressing water-related disasters and transboundary cooperation • WorldPop population estimates and demographic data (estimates of age, sex, etc. to help build vulnerability profile) • Shelter data (Humanitarian OpenStreetMap)			
Population(s)	□	IDPs in camp	□	IDPs in informal sites
	□	IDPs in host communities	□	IDPs [Other, Specify]
	□	Refugees in camp	□	Refugees in informal sites
	□	Refugees in host communities	□	Refugees [Other, Specify]
	x	Host communities	□	[Other, Specify]

Stratification *Select type(s) and enter number of strata*	□ Geographical #:_ _ _ Population size per strata is known? □ Yes □ No	□ Group #: _ _ _ Population size per strata is known? □ Yes □ No	x *[Other Specify]* #: NA Population size per strata is known? □ Yes □ No

Data collection tool(s)	x	Structured (Quantitative)	**x**	Semi-structured (Qualitative)

	Sampling method	**Data collection method**
Structured data collection tool # 1 Direct geospatial observations	x Purposive □ Probability / Simple random □ Probability / Stratified simple random □ Probability / Cluster sampling □ Probability / Stratified cluster sampling □ [Other, Specify]	□ Key informant interview (Target #):_ _ _ _ _ □ Group discussion (Target #):_ _ _ _ _ □ Household interview (Target #):_ _ _ _ _ □ Individual interview (Target #):_ _ _ _ _ x Direct observations (Target #): 16[2]□ [Other, Specify] (Target #):_ _ _ _ _
Semi-structured data collection tool (s) # 1 Focus group discussions with participatory mapping	x Purposive □ Snowballing □ [Other, Specify]	□ Key informant interview (Target #):_ _ _ _ _ □ Individual interview (Target #):_ _ _ _ _ x Focus group discussion (Target #): 8[3] □ [Other, Specify] (Target #):_ _ _ _ _
Semi-structured data collection tool (s) # 2 Key Informant Interviews with local authorities, Partnership for Resilience and Recovery (PFRR), NGO staff working on DRR, health workers.	x Purposive X Snowballing □ [Other, Specify]	x Key informant interview (Target #): 8 □ Individual interview (Target #):_ _ _ _ _ □ Focus group discussion (Target #):_ _ _ _ _ □ [Other, Specify] (Target #):_ _ _ _ _

[2] In each location to be assessed, at least eight physical measurements are to be taken.
[3] The target is eight focus group discussions, with four to eight participants each. Groups will be divided by gender and be selected from the same ethnic group.

Data management platform(s)	x			IMPACT		
	□	[Other, Specify]		□	UNHCR	
Expected ouput type(s)	□	Situation overview #: 1				
	□	Presentation (Preliminary findings) #: _ _	X	Report #: 1	□	Profile #: _ _
	□	Interactive dashboard #:_	x	Presentation (Final) #: 1	□	Factsheet #: _ _
	□	[Other, Specify] #: _ _	□	Webmap #: _ _	x	Map #: 2
Access	x	Public (available on REACH resource center and other humanitarian platforms)				
Access	□	Restricted (bilateral dissemination only upon agreed dissemination list, no publication on REACH or other platforms)				
Visibility	REACH					
Visibility	Donor: BHA / FCDO					

2. Rationale

2.1 Background

Western Bahr el Ghazal State and other parts of South Sudan have experienced abnormally high levels (and changing patterns) of rainfall and flooding in recent years, coupled with intercommunal violence with cattle keepers from outside communities coming into Jur River for grazing annually, particularly in 2019. Jur River County is located in Western Bahr el Ghazal State. It borders Wau County to the west, Northern Bahr el Ghazal State to the north-west, Warrap State to the east and Western Equatoria State to the south. Located in the West of the state, Jur River County falls within the Ironstone Plateau livelihood zone in the south and the Western floodplain sorghum and cattle livelihood zone to the north (Fewsnet, 2018).

Due to a combination of abnormally high flows from upstream on the Jur River, and the aforementioned heavy rainfall in the immediate area, water levels in the lowlands are higher than usual and many locations along the Jur River and surrounding tributaries of the river that normally host settlements have been flooded.
IPC data from March 2022 indicated that 166,000 of the population across Western Bahr el Ghazal state were in Phase 3 for acute food insecurity, with some people in Phase 4 putting it at critical and extremely critical in most areas in Jur River. Given the impacts floods can have on food insecurity, undertaking a climate assessment in this county would be highly beneficial.

Fig. 1 below shows the detected extent of flooding across Jur River County in 2019, 2020 and 2021 based on analysis of Sentinel 2 data conducted as part of the Shocks Monitoring Index (SMI), with darker blues indicating areas flooded on multiple years. Floodwater detected in August 2022 by UNOSAT is also shown in pink. Population density is also shown to understand exposure to flooding across the county.
The names of the preliminary selected payams for the assessment are labelled in red in the map. Satellite data indicates that Wau Bai and Marial Bai payams host populations that are exposed to recent flooding along Jur River itself, whilst consultations with NGOs operating in the area and information from the recent Inter-Agency Rapid Needs Assessment (IRNA) report from August 2022 indicate affected populations in Udici and Rocrocdong. Population density is greatest along the Jur river and the Wau to Kuajok road. As indicated in Fig. 1, these areas are also close to satellite-detected

flood-affected areas in recent years. However, as the map shows, there is also a large area affected by flooding in the north of Kangi Payam.
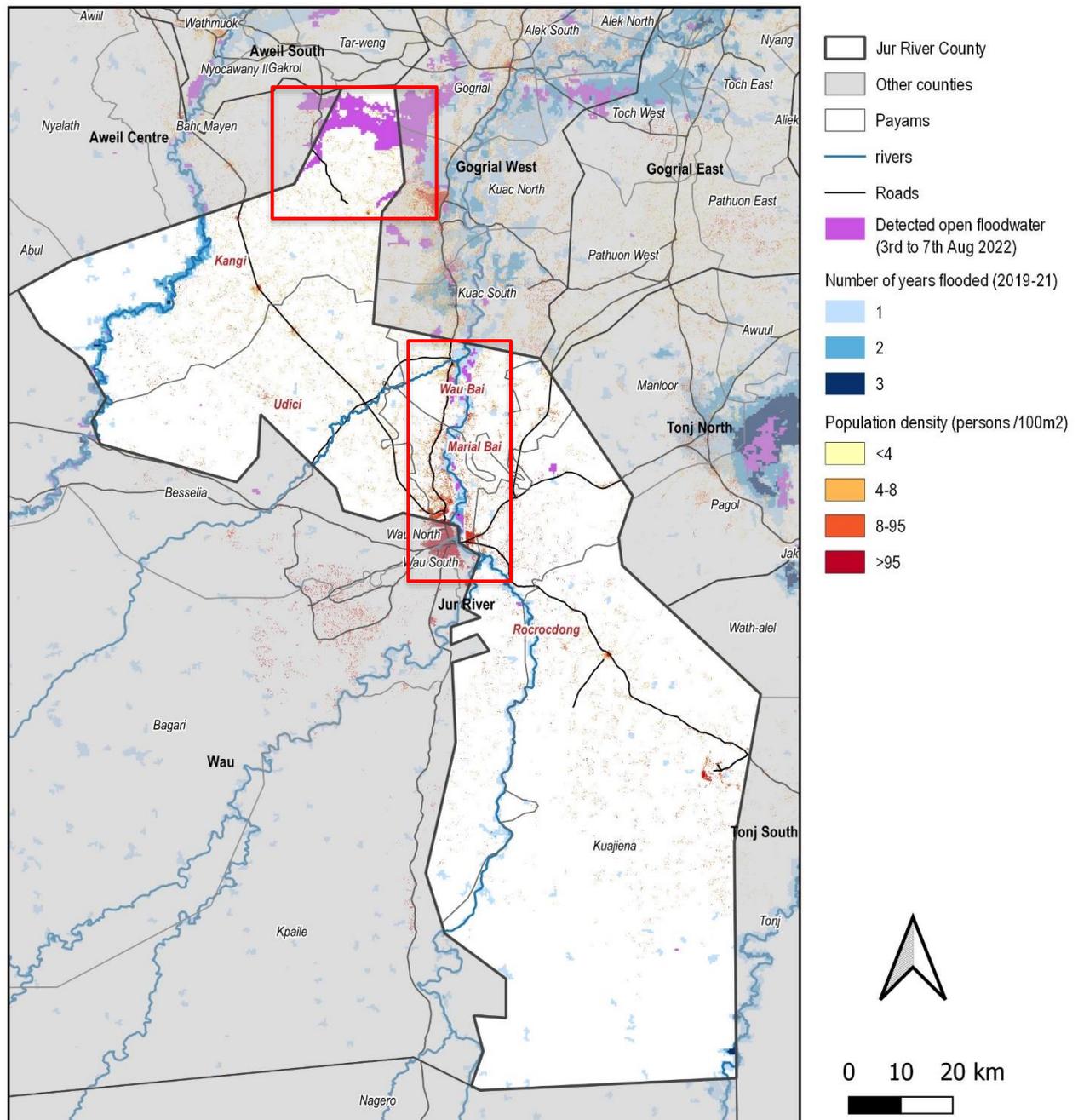
Fig. 1. Flood extent 2019-2022 (on selected dates, as per UNOSAT data). Darker blues indicate areas that have flooded on multiple years. Proposed areas of assessment are indicated, but may be adjusted based on consultations with key informants.

Few assessments have been undertaken recently in Jur River county by organisations operating in the area, partly due to conflict and access constraints in recent years fueled by clashes between agriculturalists and cattle herders from outside communities. With floods occurring on consecutive years across Jur River County and other parts of South Sudan, a shift towards disaster risk reduction and resilience-building has the potential to benefit the emergency response by reducing costs in the long term. This is particularly relevant in the context of climate change and potentially increasing severity and frequency of climatic shocks.

Flooding in Jur River County is generally less extensive and more localized than other parts of South Sudan and is located in an area where DRR measures are undertaken by various actors. This suggests the location would be a suitable location to conduct an assessment to gain an improved understanding of the perceived efficacy of these measures, as well as potential gaps in existing mechanisms, early warning systems and capacity at the community and local governance levels in disaster management.

In particular, further development of flood control, protection structures and early warning systems is likely to benefit populations in the county. Through developing an understanding of hydrology, flow dynamics, response and mitigation strategies, this study could also help build a picture of risk across the county and better understand appropriate types of flood protection measures. Building an understanding of local perceptions and insights into flood shocks and disaster risk reduction will provide a complimentary source of information. This could also help serve as a model for disaster risk reduction which could be relevant and eventually be adapted to other parts of the country.

2.2 Intended impact

The intended impact of the assessment consists of three components:

1.To inform humanitarian organisations operating in Jur River County of the current state of humanitarian needs in relation to flooding, and gaps in mitigation and DRR efforts with a gendered approach.

2.To provide strategic actors in South Sudan with a case study of the evolution of needs in areas affected by protracted and recurring flooding. Given the high levels of flooding across South Sudan, this will give partners an insight into prioritisation of aid and funding for flood-affected areas and specific response modalities that may be relevant across these areas. In addition, this will support longer-term mitigation and disaster risk reduction initiatives in high risk areas.

3.To inform REACH's future work on flood monitoring, including through remote sensing. Through new climate-focused work streams, REACH South Sudan regularly monitors the levels of standing water in flood-affected areas and the potential effects on humanitarian needs under the Shocks Monitoring Index (SMI), but further research is needed to inform how this data should be interpreted. Visiting a flooded location will aid with this.

3. Methodology

3.1 Methodology overview

The field assessment will consist of three components and will be conducted in the study area outlined in the previous section (although the exact settlements to assess may change on arrival in the county due to reported needs, access constraints, etc). The first two components are qualitative in nature, and will comprise focus group discussions (FGDs) with an integrated participatory mapping exercise with local populations, as well as key informant interviews (KIIs) with local authorities, community leaders and NGO staff in the selected settlements. KIIs will also consist of participatory mapping exercises to understand the extent of flooding in previous years and location of exposed populations and infrastructure. The third component is quantitative in nature, and will consist of physical measurements (ground-truthing) of flooded areas and mapping of key infrastructure. These locations will be georeferenced using ODK / GPS. The tool will incorporate questions on infrastructure functionality and damage, and will include collection of photos of the site.

Finally, based on qualitative and quantitative data collected in the field, a flood risk map will be drawn up for the assessed area based on remote sensing data, plus additional data collected in the field, from participatory mapping exercises, and information from KIIs / FGDs undertaken. Ground truth data will also be utilised to tweak and improve flood detection scripts developed for the Shocks Monitoring Index (SMI), which REACH uses to monitor flood extent across the whole of South Sudan.

3.2 Population of interest

The area of interest will consist of major flood-prone settlements along Jur River and its tributaries in Jur River County. The team will preliminarily visit Udici, Rocrocdong, Wau Bai, Kangi, and Marial Bai payams. Other locations will be considered based on whether the team is able to physically access them. These areas were chosen because they have been particularly severely affected by fluvial flooding this year, as well as between 2019 and 2021 (see above map). It will also be important to visit at least one hard-to-reach rural location where less flood protection measures may be available. Participants in each will be chosen from the local population with the assistance of community mobilisers.

Key informants will include staff working for local authorities and NGOs on disaster risk reduction (DRR) activities, health care workers, as well as other individuals with good knowledge of the local area and flood mitigation mechanisms. This could include community leaders as well as the Partnership for Resilience and Recovery (PFRR), based in Wau. Focus group discussion participants will be selected in coordination with local partner NGOs and the Relief and Rehabilitation Commission.

3.3 Secondary data review

Reports such as the FEWNET Livelihood Zones Map of South Sudan and recent IRNAs will be consulted for contextual analysis. GIS and remote sensing analysis will be conducted using data from UNOSAT indicating detected flood extent, as well as recent high resolution imagery. In addition, ground-truth data collected in the field will support in validating and improving flood detection scripts developed by REACH within the Integrated Needs Tracker (INT) and Shocks Monitoring Index (SMI) flag as being inundated with water. This secondary data will then be compared to primary (physical) measurements in order to calibrate remote sensing scripts. Additionally, data collected will be compared with available land cover classifications by the United Nations Food and Agriculture Organisation, in order to determine where changes in land use may have occurred over time.

3.4 Primary Data Collection

1. Focus Group Discussions (FGD)

In order to understand how communities perceive flooding, and their perspectives around the main challenges and what those communities need, the use of FGDs have been chosen. In each settlement visited (at least four), the REACH field team will conduct at least two FGDs: at least one with only women and one with only men, with samples from the ost host community, and IDP populations, where relevant. Each FGD will include at least four participants, and no more than six. These discussions will begin with a participatory mapping exercise, where participants will be encouraged to map their community, key landmarks and facilities in their community, any flood protection infrastructure, and finally the extent of the flooding that was affecting the community at the peak of the previous rainy season.

Further components of the FGDs will cover the impact of flooding in the area, specifically as it relates to food security and livelihoods, as well as perceptions on flooding and flood protection infrastructure. Information will be recorded through detailed notes of what was said, and analysed in line with [IMPACT Initiatives Qualitative Data Processing & Analysis Minimum Standards.](#) Participants will be selected in coordination with local NGO partners and the Relief and Rehabilitation Commission, and will need to have good knowledge of the local community and surrounding areas.

2. Key Informant Interviews

The REACH field team will interview representatives of local authorities such as the Relief and Rehabilitation Commission (RRC) and local government, as well as NGO staff working on DRR and within the Partnership for Resilience and Recovery (PFRR). If possible, at least 4 interviews will be conducted with actors working on DRR related activities. At least one KI from a national NGO, and at least 1 female KI will be interviewed. KIIs were selected to get a understanding of who the main actors are working in DRR in the area and what they perceive as limitations or good examples of DRR in the area. Mostly these will be conducted in Wau as this is the state capital for Western Bahr el

Ghazal. Key Informants will be recruited through a snowballing methodology, starting with the RRC, local NGOs, and other humanitarian actors, and proceeding with individuals they recommend talking to who have good knowledge of the topic. In assessed payams, community leaders will be interviewed prior to conducting FGDs. These interviews will be qualitative in nature and focus on the nature of flooding, and how it has changed over time, as well as how it affects livelihoods and access to key services. Finally, Key Informants (KIs) will be asked about the measures and infrastructure in place to cope with flooding, and how functional they are, as well as disaster management mechanisms in place at the community and local governance levels. In each location, at least one Key Informant will be interviewed. The information will be recorded through detailed notes of each interview, and analysed in line with [IMPACT Initiatives Qualitative Data Processing & Analysis Minimum Standards.](#)

3.   Geospatial component

The geospatial component of primary data collection will incorporate (1) verification of GIS data/models (ground-truthing), and (2) geolocating key infrastructure. This will be conducted using a KOBO tool developed by REACH to collect a GPS location, photograph and other key information on the relevant point of interest.

(1)   Ground-truthing: GIS staff will physically verify and ground-truth the location of current floodwater inundation around the assessed settlements. The locations to be assessed will be selected purposively with the help of community mobilisers. The aim is to collect samples of land inundated with floodwater. It will be especially important to collect ground-truth information on areas of both open floodwater versus flooded vegetation, which show different spectral responses in satellite imagery. This information will be used for two purposes:
   - To help develop a map of the area indicating flood risk in and around the Jur River area.
   - To help validate and train the Google Earth Engine flood detection scripts used as part of the Shocks Monitoring Index (SMI) to monitor flood extent across the whole of South Sudan – including detection of both open water and flooded vegetation

   In each settlement, at least 4 areas currently inundated by floodwater will be mapped, including 2 areas of open floodwater and 2 areas of flooded vegetation, if applicable. As well as a GPS point, data on the land use type, level of inundation and a photograph will be collected using the KOBO tool at each location.

(2)   Geolocating key infrastructure: in each location, GIS staff will collect point locations of infrastructure such as markets, schools, health centres and nutrition centres. This geospatial data will be incorporated into the flood risk maps for the selected settlements. The KOBO tool will be used to collect information on the facility name, functionality and other key details. Point locations of dykes will also be collected, whilst high resolution satellite imagery requested from UNOSAT will later be used in conjunction with these GPS points to digitise the dykes. Prior to mapping features such as dykes, enquiries will be made with local authorities or NGOs that may already have this data in case they are able to share it.

3.5 Data Processing & Analysis

Records from KI interviews and FGDs will be processed in accordance with IMPACT Initiatives Qualitative Data Processing & Analysis Minimum Standards, which include the preparation of Data Saturation and Analysis Grids outlining key topics of conversation and recoding the information collected in order to analyse it. Participatory mapping data will be overlaid with satellite imagery to verify and augment remote sensing analysis of flooding completed in Google Earth Engine. Geospatial data of the extent of flooding and of water depth will be compared to satellite imagery in order to verify how inundation appears in satellite imagery, and to calibrate ongoing remote sensing analysis of flooding in Google Earth Engine. In addition, flood susceptibility and risk mapping will be undertaken, as outlined below.

Flood risk analysis

Flood risk mapping will be conducted for the assessed area of Jur River County, based on primary hazard and exposure data collected during this assessment, and from various secondary sources. As defined in the World Risk Report 2021, flood exposure is defined based on the following equation:

Risk = Hazard susceptibility x Exposure x Vulnerability

1. **Hazard susceptibility component**: the methodology to derive hazard susceptibility will be adapted from the UNSPIDER Recommended Practice for Flood Hazard Mapping, indicated in the diagram below. Preliminarily, hazard susceptibility indicators will be as follows:
   - Flow accumulation – derived from SRTM DEM.
   - Slope – derived from SRTM DEM.
   - Runoff curve number (CN) grid – derived from ESA WorldCover 10m land cover dataset. provides an estimation of the amount of runoff expected from different combinations of land cover and soil types.[4]
   - Extent / frequency of past flooding – digitized inundation areas from participatory mapping exercises, along with analysis of maximum annual flood extent from Sentinel 1 SAR data using Google Earth Engine flood detection scripts developed for the SMI (tweaked based on ground-truth information).
   - Rainfall data – CHIRPS.
   - Locations of dykes will also be mapped
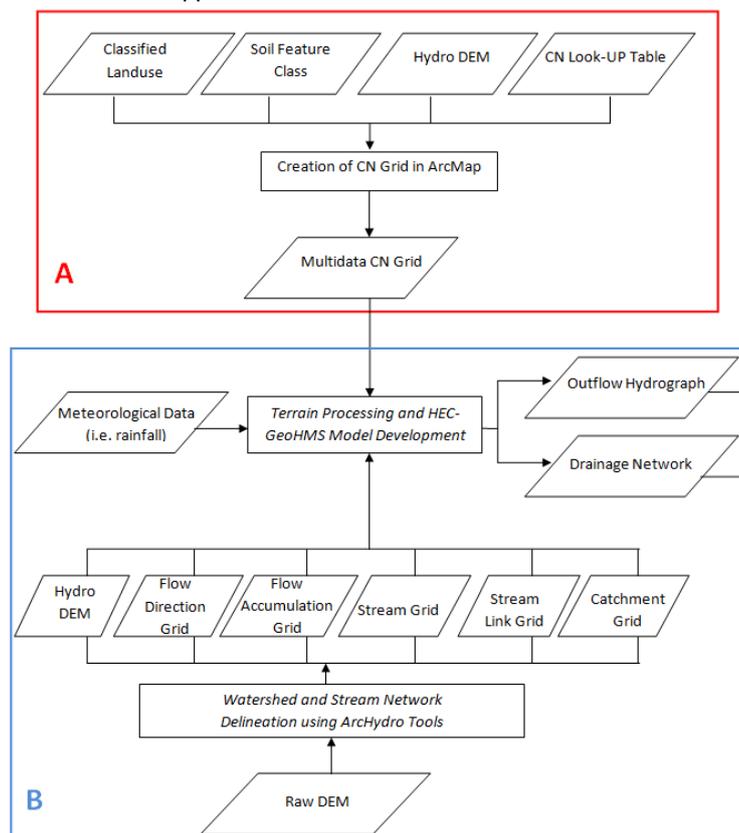
Flowchart showing the UNSPIDER recommended practice for flood hazard mapping.

2. **Exposure component**: exposure is a critical part of the risk equation as it describes the population or assets which are exposed to a hazard. Indicators will include the following:

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[4] Unfortunately soil data is not available for the study area at the desired resolution, so only land cover will be used.

- Exposed population – density of shelters from Humanitarian OpenStreetMap data, if available, or WorldPop population density data.

Locations of agricultural / grazing land and key infrastructure mapped during the field assessment will be added to the map to indicate exposed assets, but will not directly feed into the risk analysis model.

3. **Vulnerability indicators:** vulnerability indicates the degree to which exposed populations will be adversely affected by a hazard. These indicators will be more challenging to collect as they usually require household-level information which should be representative at a sub-settlement scale. However, a number of proxy indicators could be used, such as:

- Distance from higher ground – distance from areas of higher ground, identified as having low flood susceptibility (as mapped in participatory mapping and cross-checked with DEM).
- Distance to critical infrastructure that aid in community coping capacity – health centres, nutrition centres, markets, etc.

The values for each of these indicators will be scaled between 0 and 1, weighted and summed to create a composite score for hazard, exposure and vulnerability for each grid cell across the study area. Higher values will indicate greater levels of hazard, exposure or vulnerability. Greater weights will give specific indicators more influence in the final score. The composite indicators will then be multiplied by each other to create a final risk index. Again these can be weighted to alter the overall influence of the component in generating risk.

4. Key ethical considerations and related risks

The proposed research design meets / does not meet the following criteria:

The proposed research design…	*Yes/ No*	*Details if no (including mitigation)*
… Has been coordinated with relevant stakeholders to **avoid unnecessary duplication** of data collection efforts?	Yes	A recent IRNA was undertaken, but this was more focussed on impacts of recent flooding and immediate needs. Partners have been consulted in case some infrastructure data already exists.
… **Respects respondents, their rights and dignity** (*specifically by: seeking informed consent, designing length of survey/ discussion while being considerate of participants' time, ensuring accurate reporting of information provided*)?	Yes	Some questions in KI tool will not need to be asked to all KIs
… Does not **expose data collectors to any risks as a direct result** of participation in data collection?	Yes	
… Does not **expose respondents / their communities to any risks as a direct result** of participation in data collection?	Yes	
… Does not involve **collecting information on specific topics which may be stressful and/ or re-traumatising** for research participants (both respondents and data collectors)?	Yes	
… Does not involve **data collection with minors** i.e. anyone less than 18 years old?	Yes	
… Does not involve **data collection with other vulnerable groups** e.g. persons with disabilities, victims/ survivors of protection incidents, etc.?	Yes	

… Follows IMPACT SOPs for management of **personally identifiable information**?	Yes	

5. Roles and responsibilities

Table 2: Description of roles and responsibilities

Task Description	Responsible	Accountable	Consulted	Informed
Research design	Senior Climate Assessment Officer, Humanitarian Situation Monitoring (HSM) Assessment Officer	Research Manager	Research Design Unit (HQ), FSL Specialist (HQ), Remote Sensing Specialist (HQ), ACTED DRR Technical Specialist, HSM Senior Assessment Officer	Research Reporting Unit (HQ), Country Coordinator
Supervising data collection	Senior Climate Assessment Officer, HSM Assessment Officer	Research Manager	Relief and Rehablitation Commission	Country Coordinator
Data processing (checking, cleaning)	Senior Climate Assessment Officer, HSM Assessment Officer, GIS officer	Research Manager	Remote Sensing Specialist (HQ), FSL Specialist (HQ), HSM Senior Assessment Officer	Research Unit (HQ)
Data analysis	Senior Climate Assessment Officer, HSM Assessment Officer, GIS officer	Research Manager	Remote Sensing Specialist (HQ), FSL Specialist (HQ), Research Reporting Unit (HQ), HSM Senior Assessment Officer	Research Design Unit (HQ)
Output production	Senior Climate Assessment Officer, HSM Assessment Officer	Research Manager	Senior GIS Manager (HQ), DRR Specialist (HQ), Research Reporting Unit (HQ), HSM Senior	Research Design Unit (HQ)

			Assessment Officer	
Dissemination	Senior Climate Assessment Officer, HSM Assessment Officer	Research Manager	Country Coordinator	Local partners
Monitoring & Evaluation	Senior Climate Assessment Officer, HSM Assessment Officer, Research Manager	Research Manager	Local partners	Country Coordinator
Lessons learned	Senior Climate Assessment Officer, HSM Assessment Officer, GIS Officer, Research Manager	Country Coordinator	Local partners	Donors, Research Unit (HQ)

Responsible: *the person(s) who executes the task*

Accountable: *the person who validates the completion of the task and is accountable of the final output or milestone*

Consulted: *the person(s) who must be consulted when the task is implemented*

Informed: *the person(s) who need to be informed when the task is complete*

6. Data Analysis Plan

Research Questions	SUBQ#	Data collection method	Sub-research question group	Sub-research Question	Questionnaire QUESTION	Probes	Key disaggregations
Which settlements/bomas in Jur River county are most at risk from flooding?	*A.1.1.*	*FGD/KOBO*		*Where is the key infrastructure and how is it exposed to flooding?*	*Participatory mapping exercise and mapping with KOBO tool*	*Where are prominent landmarks/geographic features?* *- Please identify locations of key infrastructure:* *- Health facilities* *- Educational facilities* *- Local authorities* *- Distribution sites* *- Markets* *- Cattle grazing areas* *- Fishing camps* *- Dykes/flood barriers* *- What is the land in surrounding areas normally used for? (Wetland, agriculture, livestock, etc.)* *- Please draw areas of different land use on the map.*	
What are the main livelihood and income generating activities in the settlement?	*B.1.1.*	*KI*		*What are the main livelihood or income generating activities in your settlement?*	*What are the main livelihood or income generating activities in your settlement?*	*Probing: livestock, cultivation, fishing, trade, casual labour, collection of wild foods, hunting* *- What are the main crops grown? Sorghum, maize, vegetables, fruits, beans, nuts, etc.* *- What does the usual seasonal calendar look like (months of*	

						sowing/growing/harvesting)? *- When is the dry season? When is the rainy season?* *- When does cattle migration take place?* *- What are the basic goods your households need and typically buy from the market?* *- How often do you normally go to the marketplace to buy food?*	
	B.2.1.	*KI*		*What are the gendered livelihood roles in the area?*		*What role do women and girls play In these activities?*	
	B.2.2	*KI*			*What role do women and girls play in cultivating and cattle rearing?*	*In the dry season?* *- In the rainy season?* *- Consider other livelihoods that may be female-specific such as fishing and collection of wild foods* *- What are the impacts of excess rainfall and flooding for women and girls In the area?*	*Female FGDs only*
What is the current physical extent and severity of flooding in major settlements across Jur River county? How does this compare to previous years? How do you think the	*C.1.1.*	*FGD/KI*		*Which shocks are currently affecting the community?*	*What difficulties or shocks has your community encountered in the last year? When did these occur?* *(E.g. drought, flooding, conflict-related, disease,*	*What shocks took place and when?* *- What was the impact on the community?* *[Only ask if another shock is mentioned other than flooding]*	

					crop pests, others - please specify…)		
	C.2.1.	*FGD/KI*		*What is the current physical extent and severity of flooding this year? How does flooding this year compare to previous years?*	*What are the patterns of flooding and rainfall this year? How does this compare to previous years?*	*a. When did flooding start this year? Have the levels of floodwater changed since then?* *b. Please indicate (on the map) which areas are currently inundated with water/ have been inundated in the past two months.* *c. How does flooding this year compare to flooding in the previous year (2021)?* *i. Prompt: water levels, flooding extent, duration, severity/impact on community?* *d. What about in the last +-15 years?* *e. When did the worst flooding occur and how does it compare to this year?* *f. How have patterns of flooding and climate (rainfall/ temperatures) changed over time?*	
	C.3.1.	*FGD/KI*		*What are your expectations of climatic shocks in the future?*	*Do you expect to encounter further difficulties in the future in relation to flooding, drought or climate change?*	*When and how?* *- If so which areas do you think will be most affected?* *- What will be the impacts of these changes on the community? Duration? Extent?*	

situation will evolve in the future?

How do communities perceive the occurrence of climatic shocks, including their severity and impacts?	***D.1.1.***	*FGD/KI*		*What is the perception of communities of flooding?*	*How is a "flood" defined in the community, as opposed to normal seasonal variations in water levels?*	*Are different terms given to floods of different severity? Like small scale, medium and high level flooding*	
	D.2.1.	*FGD/KI*		*What are the perceived causes of flooding and how are shocks influenced by vulnerability?*	*What do you think is the main cause of the flooding shock that has affected the community this year?*	*a. People moving into flood plains (e.g. due to conflict, better access to farmland, etc)* *b. Higher dependency on livelihoods that are impacted by flooding (e.g. cultivation)* *c. Increase in rainfall or water levels in river* *d. Is this different from in previous years?*	
	D.3.1.	*FGD*		*Has there been any environmental degradation in recent years, and how may this have affected the impact of climatic shocks?*	*Have you noticed any degradation of the environment in recent years? E.g. deforestation, changes in natural resource availability, changes in availability of wild foods/firewood, etc*	*What is the impact of environmental degradation on livelihoods?* *Do you think this has affected flood severity?*	

What measures or coping strategies are in place in Jur River county to mitigate the impact of flooding and excessive rainfall and what are the gaps?	***E.1.1.***	*FGD/KI*		*What are the DRR measures and infrastructure currently in place in the area and how effective is it?*	*14. What are the current DRR measures currently in place to reduce the impact of flooding? (At the community and institutional level) (infrastructure: dykes, platform, forestry near rivers; mechanisms: early warning system)*	*a. What efforts are made by the community to prepare for and mitigate the impacts of flooding and excessive rainfall?* *b. What is the level of community awareness towards disaster vulnerability and resilience?* *c. What efforts do individuals, community leaders and/or local governments make to prompt further response efforts for flooding?* *d. What infrastructure is in place in your community to reduce the impact of flooding?* *i. When was this infrastructure erected?* *ii. Are there any issues associated with this infrastructure? (E.g. broken, not enough)* *iii. Who is in charge of maintaining this infrastructure?* *e. What are the perceived needs in terms of flood protection measures? Which measures are perceived to be the most successful?*	

| | E.2.1. | FGD | | What early warning systems are in place, how is information communicated, and how effective are these systems? | What are the available mediums for receiving flood early warning information and rain forecasts from relevant departments/ Other actors (community DRR systems, INGOs/ UN agencies), if Yes, how effective are they? [If early warning system was mentioned in question 14] | a.What kind of information is provided? Is there any mechanism in place to timely inform them about the rising water level? b. What is your preferred channel of receiving information E.g. cellular network, radio broadcasts, from local community leaders, from govt departments, mobile announcements/ mega phones, etc. c. Are some population groups unable to receive information? E.g. women, elderly, children, persons with disability, etc. | |
| | E.2.2. | KI | | | What are the available mediums for sharing flood early warning information and rain forecasts with communities and relevant departments/ Other actors (INGOs/ UN agencies), if Yes, how effective are they? [If early warning system was | a. What kind of information is provided? Is there any mechanism in place to provide timely information about the rising water level? b. What communication channels are used to provide early warning information to communities? E.g. cellular network, radio broadcasts, information from local community leaders, from government departments, mobile announcements/ mega phones, etc. c.   Who set these up? g. Who are in the groups? (Are there women, elderly, disabled, youth in these | |

					mentioned in question 7]	*groups?)* *h. Are some population groups unable to receive information? Why?* *E.g. women, elderly, children, persons with disability, etc.* *i. Are these CMDRR groups trusted?* *j. Do communities respond positively to evacuation calls by government officials? If not, what are the possible reasons?*	
	E.2.3.	*KI*		*What are the gaps in DRR mechanisms in the area?*	*What are the opportunities to further develop DRR infrastructure or strategies?*	*Which organization are currently carrying out DRR activities in the area?* *- Is there collaboration between organizations?* *- Has there or will there be institutional capacity building? Is there any designated department or focal person by the govt for DRR/ CCA/ Floods response/emergency response* *- Do you know any organization, who is working in your area for risks planning, DRM , preparedness and Contingency planning?* *- Are there any shared contingency plans for all partners?*	

	F.1.1.	FGD/KI		*What coping strategies are in place in Jur River county to mitigate the impact of flooding and excessive rainfall?*	*If flooding this year has resulted in a lack of resources to meet their basic needs, what are the usual strategies that most households in your community adopt to cope?*	*a. Are most households currently able to use these strategies?* *a. if not, which coping strategies are they currently using? Were more households using these coping strategies during the peak/aftermath of this year's flooding? b. Have there been any extreme coping mechanisms deployed by communities?*	
	F.2.1	FGD/KI			Has there been any population movement due to flooding? What about in previous years?	Where have people moved from/to? - Do people from the community normally move due to flooding at this time of year? - Have there been any barriers that restrict households' ability to move to certain locations? - What are these barriers? (flooding, lack of money, security) - Are there any people/population groups who are unable to travel?	
	F.2.2.	FGD			Extreme coping mechanism (To be used only if extreme coping mechanisms were afore mentioned) Moderator Reads: There was mention of extreme coping mechanism during the discussion. We	Are people eating wild foods that are known to make them sick? - are most households currently able to use these strategies? - are people marrying off daughters for food? - are people selling or slaughtering their last cattle? How common is this? - What Do to better off households Do to cope with shortages? Worse off households?	

					would like to ask some follow up questions to ensure that we can flag this important information to humanitarian actors to inform their planning. Do you consent to answering these follow-up questions? They should not take more than 5-10 minutes.		
To what extent have flooding and excessive rainfall affected access to livelihoods in Jur River county in recent years?	*F.3.1.*	*FGD/KI*		*What is the impact of flooding on ivelihoods?*	*What impact has flooding had on livelihood opportunities this year?*	*a. What have been the impacts on agricultural livelihoods?* *i. Have crop yields been affected?* *ii. Do you expect there to be any changes to crop planting next year?* *b. What have been the impacts on pastoralist livelihoods?* *i. Has there been a reduction in numbers of livestock?.* *ii. Have patterns of cattle migration changed?* *c. What about the impacts on other livelihood opportunities?* *i. Has access to wild foods been affected?* *ii. Have fishing activities been affected?*	

	F.3.2.	*KI*		*Which population groups are worst affected by flooding?*	*Which population groups remain the worst affected by flooding?*	*female-headed households* *- Older population groups* *- Children.* *- Men* *- Boys (under the age of 18 years)* *- Youth (as this definition varies across the country, it should be contextualized by moderators and with the age bracket clearly noted. Generally, youth are males between the ages of 15-35 years)* *- Girls (under the age of 18 years)* *- Persons with disabilities*	
	F.3.3.	*FGD/KI*		*What are the gendered impacts of flooding on livelihoods?*	*How has flooding impacted women and girl's ability to engage in livelihood activities?*	*Are you having to travel further to gather wild foods or collecting raw materials? (firewood, grass, wild foods).* *- What risks or security concerns does this lead to, if any?* *- How are women and girls effected during flooding and excess rainfall? (girls taken out of school to work in agriculture, early marriage, trading girls for livestock)* *- What mechanisms do communities use to mitigate these risks during flooding and excess rainfall?* *- Are there specific areas where women and girls cannot go during flooding and excess rainfall?*	*KIs/Female FGDs only*

| | F.3.4. | FGD/KI | | *What are the other implications of flooding on communities?* | *Has the flooding this year had any other significant implications? (increase in illnesses, services, GBV, competition for resources, grazing land issues, housing and property disputes, security)* | *Have there been any impacts on markets? (Supply, price increase, physical damage, item availability)*
- Has there been an increase in the level of disease and illness?
- Have there been any changes in access to services/resources? If yes, how? Which services have been affected?
- Has flooding increased competition in accessing resources such as water sources and grazing land? | |

7. QUESTION ROUTES

1. KEY INFORMANT INTERVIEW TOOL

Introduction (2 minutes)

Welcome and thank you for agreeing to be interviewed. My name is _____. I am part of the REACH Assessment Team.

The information you will provide us today will be used to inform response strategy and planning of humanitarian actors in South Sudan. Please note that this interview does not have any impact on whether you or your family will receive assistance in the future.

You have been asked to participate because your point of view is important and we want to hear your opinions and perspectives regarding your community and [settlement]. There are no right or wrong answers and we will appreciate it if you speak as openly as possible.

Please note that everything you tell us will be kept confidential. We will not take down your name for this exercise.

We may touch on some sensitive subjects. If you or someone you know is affected by any of the topics of discussion, you can come to ask for information about services available after the group discussion ends. Please do not feel obliged to share specific incidents of violence that you may have experienced within the group.

You are free to decide whether you want to answer questions or not once the interview starts. If you choose to stop the interview or to skip any questions, it will have no negative impacts whatsoever on your ability to access services from any agency. Please feel free to ask me any questions now, or at any point during the discussion. **Do you consent to this interview?**

The interview will take no more than one-and-a-half hours.

Note that this tool is semi-structured and some questions may only be asked to a specific KI if it is relevant to them.

<u>Section 1: livelihoods</u>

1. What are the main livelihood or income generating activities in your settlement?

Objective: to understand what are the ways in which people generate money in the settlement.

Probing: livestock, cultivation, fishing, trade, casual labour, collection of wild foods, hunting.

    a.   What are the main crops grown? Sorghum, maize, vegetables, fruits, beans, nuts, etc.
    b.   What does the usual seasonal calendar look like (months of sowing/growing/harvesting)?
    c.   When is the dry season? When is the rainy season?
    d.   When does cattle migration take place?
    e.   What are the basic goods households need and typically buy from the market?
    f.   How often do you normally go to the marketplace to buy food?

<u>Section 2: flooding and climate change</u>

2. What difficulties or shocks has the community encountered in the last year? When did these occur?
E.g. drought, flooding, conflict-related, disease, crop pests, others - please specify.

Objective: To understand what shocks have occurred, and when, in the past year (not just climatic shocks)

    a.   What shocks took place and when?
    b.   What was the impact on the community? [Only ask if another shock is mentioned other than flooding, as it will be covered later]

3. What are the patterns of flooding and rainfall this year? How does this compare to previous years?

Objective: To understand the extent of flooding that occurred this year in comparison with previous years.

    a.   When did flooding start this year? Have the levels of floodwater changed since then?

b. Please indicate (on the map) which areas are currently inundated with water/ have been inundated in the past two months.
c. How does flooding this year compare to flooding in the previous year (2021)?
    i. Prompt: water levels, flooding extent, duration, severity/impact on community?
d. What about in the last +-15 years?
e. When did the worst flooding occur and how does it compare to this year?
f. How have patterns of flooding and climate (rainfall/ temperatures) changed over time?

4. What difficulties do you expect the community will encounter in the future in relation to flooding, drought or climate change?

Objective: To understand the community prediction on flooding and the impacts in the future

a. When and how?
b. If so which areas do you think will be most affected?
c. What will be the impacts of these changes on the community? Duration? Extent?

5. How is a "flood" defined in the community, as opposed to normal seasonal variations in water levels?

Objective: to understand community perceptions and definitions as to what is a flood or excess rainfall.

a. Are different terms given to floods of different severity? Like small scale, medium and high level flooding

6. What do you think is the main cause of the flooding shock that has affected the community this year?

Objective: to understand factors that may be increasing community vulnerability to flooding

a. People moving into flood plains (e.g. due to conflict, better access to farmland, etc)
b. Higher dependency on livelihoods that are impacted by flooding (e.g. cultivation)
c. Increase in rainfall or water levels in river
d. Is this different from in previous years?

7. Have you noticed any degradation of the environment in recent years?

(For example, deforestation, changes in natural resource availability, changes in availability of wild foods/firewood, etc)

Objective: To Understand what are the impacts of flooding or other climatic shocks has had on the environment in the past

a. What is the impact of environmental degradation on livelihoods?
b. Do you think this has affected the occurrence or severity of flooding?

Section 2: Preparedness and Mitigation

8. What are the Disaster Risk Reduction measures currently in place to reduce the impact of flooding? (At the community and institutional level) *E.g. infrastructure: dykes, platform, forestry near rivers, etc.; mechanisms: e.g. CMDRR systems, early warning systems, contingency plans, hazard maps, etc.*

Objective: To understand what flood protection barriers are currently in place to reduce to impacts of flooding in the community

a. What efforts are made by the community to prepare for and mitigate the impacts of flooding and excessive rainfall?
b. What is the level of community awareness towards disaster vulnerability and resilience?
c. What efforts do individuals, community leaders and/or local governments make to prompt further response efforts for flooding?
d. What infrastructure is in place in your community to reduce the impact of flooding?
    i. When was this infrastructure erected?
    ii. Are there any issues associated with this infrastructure? (E.g. broken, not enough)
    iii. Who is in charge of maintaining this infrastructure?
e. What are the perceived needs in terms of flood protection measures? Which measures are perceived to be the most successful?
f. Was assistance provided in response to recent flooding? Are there any barriers to accessing assistance after a flood?

9. What are the available mediums for sharing flood early warning information and rain forecasts with communities and relevant departments/ Other actors (INGOs/ UN agencies), if Yes, how effective are they? [Ask If early warning system was mentioned in question 14]

Objective: To understand the early warning systems in place and their functionality

      a.   What kind of information is provided? Is there any mechanism in place to provide timely information about the rising water level?

      b.   What communication channels are used to provide early warning information to communities? E.g. cellular network, radio broadcasts, information from local community leaders, from government departments, mobile announcements/ mega phones, etc.

      c.   Who set these up?

      d.   Who are in the groups? (Are there women, elderly, disabled, youth in these groups?)

      e.   Are some population groups unable to receive information? Why? E.g. women, elderly, children, persons with disability, etc.

      f.   Are these CMDRR groups trusted?

      g.   Do communities respond positively to evacuation calls by government officials? If not, what are the possible reasons?

10. What are the opportunities to further develop DRR infrastructure or strategies?

Objective: To understand the current DRR infrastructures or strategies and what areas can be built upon

      a.   Which organization are currently carrying out DRR activities in the area?

      b.   Is there collaboration between organizations?

      c.   Has there or will there be institutional capacity building? Is there any designated department or focal person by the government for DRR/ CCA/ Floods response/emergency response

      d.   Do you know any organization, who is working in your area for risks planning, DRM , preparedness and Contingency planning?

      e.   Are there any shared contingency plans for all partners?

Section 3: Impacts of flooding on livelihoods

11. What impact has flooding had on livelihood opportunities this year?

Objective: To understand what are the main challenges flooding is having on other livelihoods

      a.   What have been the impacts on agricultural livelihoods?

          i.   Have crop yields been affected?

          ii.   Do you expect there to be any changes to crop planting next year?

      b.   What have been the impacts on pastoralist livelihoods?

          i.   Has there been a reduction in numbers of livestock?.

          ii.   Have patterns of cattle migration changed?

      c.   What about the impacts on other livelihood opportunities?

          i.   Has access to wild foods been affected?

          ii. How have fishing activities been affected?

12. How are women and girls affected during flooding and excess rainfall?

Objective: To understand the main challenges faced by women and girls during periods of excess rainfall and flooding

      a.   Are women having to travel further to gather wild foods or collecting raw materials? (*firewood, grass, wild foods*).

      b.   What risks or security concerns does this lead to, if any?

      c.   How has flooding impacted women and girls' ability to engage in livelihood activities? What mechanisms do communities use to mitigate these risks during flooding and excess rainfall?

      d.   Are there specific areas where women and girls cannot go during flooding and excess rainfall?

      e.   What protection issues do girls and women face when they have to evacuate their houses and go for temporary shelter?

      f.   How do they maintain menstrual hygiene during floods emergency?

13. Has the flooding this year had any other significant implications?

(increase in illnesses, services, GBV, competition for resources, grazing land issues, housing and property disputes, security)

Objective: to understand any other possible implications flooding has had this year on communities.

    a. ave there been any impacts on markets? (Supply, price increase, physical damage, item availability)
    b. Has there been an increase in the level of disease and illness?
    c. Have there been any changes in access to services/resources? If yes, how? Which services have been affected?
    d. Has flooding affected relations with neighbouring communities?
    e. Have there been any changes to security in the community? (women, girls, boys, men, elderly, persons with disabilities)

Section 4: Coping Strategies

14. If flooding this year has resulted in a lack of resources to meet their basic needs, what are the usual strategies that most households in your community adopt to cope?

Objective: To understand how communities employ coping strategies during flooding to meet basic needs

    a. Are most households currently able to use these strategies?
        a. if not, which coping strategies are they currently using? Were more households using these coping strategies during the peak/aftermath of this year's flooding?
    b. Have there been any extreme coping mechanisms deployed by communities?

15. Has there been any population movement due to flooding this year? What about in previous years?

Objective: To understand if people have moved or been displaced as a result of flooding and excessive rain fall

    a. Where have people moved from/to?
    b. Do people from the community normally move due to flooding at this time of year?
    c. Have there been any barriers that restrict households' ability to move to certain locations?
    d. What are these barriers?
    e. Are there any people/population groups who are unable to travel?

2. FOCUS GROUP DISCUSSION AND PARTICIPATORY MAPPING TOOL

Introduction (5 minutes)

Facilitator's welcome, introduction and instructions to participants

Welcome and thank you for volunteering to take part in this focus group discussion. My name is _____. I am part of the REACH Assessment Team.

The information you will provide us today will be used to inform response strategy and planning of humanitarian actors in South Sudan. Please note that this discussion does not have any impact on whether you or your family will receive assistance in the future.

You have been asked to participate because your point of view is important and we want to hear your opinions. We appreciate your time. **Please note that everything you tell us will be kept confidential and will not be attributed to you. We will not take down your name for this exercise.**

We may touch on some sensitive subjects. If you or someone you know is affected by any of the topics of discussion, you can come to ask for information about services available after the group discussion ends. Please do not feel obliged to share specific incidents of violence that you may have experienced within the group.

Your participation in this discussion is entirely voluntary, and anyone who does not want to participate can leave now or at any time during the discussion. You can decide whether you want to answer questions or not once the discussion starts. If you choose not to take part or to skip any questions, it will have no negative impacts whatsoever on your ability to access services from any agency. Please feel free to ask me any questions now, or at any point during the discussion. **Do you consent to participate in this discussion?**

This discussion will take no more than one hour and fifteen minutes.

Group agreements

Before we begin, it is important that we create a safe environment for this discussion where people feel free to speak openly. Therefore, it will be good if we can make certain agreements among the group. What should we include in these agreements?

Start by suggesting one and wait for people to come up with other agreements. If any of the below agreements are not mentioned by the participants, suggest to also include those.

- We must ensure that each participant is at an appropriate distance from other participants and the moderators in this group, in adherence with COVID-19 social distancing rules.
- The most important rule is that only **one person speaks at a time**. There may be a temptation to jump in when someone is talking but please wait until they have finished.
- There are no right or wrong answers.
- You do not have to speak in any particular order.
- When you do have something to say, please do so. There are many of you in the group and it is important that we hear from all of you.
- You do not have to agree with the views of other people in the group.
- All participants must be respectful towards one another.
- Everyone must respect the confidentiality of the discussion and not repeat what is discussed here, or attribute it to participants.
- Does anyone have any questions? (answers)

Please can everyone confirm that you agree with these community agreements? OK, let's begin.

Question route

Section 1: flooding and climate change

1. What difficulties or shocks has your community encountered in the last year? When did these occur?
E.g. drought, flooding, conflict-related, disease, crop pests, others - please specify.

Objective: To understand what and when climatic (and other) shocks have occurred in the last year

a.   What shocks took place and when?

b.   What was the impact on the community? [Only ask if another shock is mentioned other than flooding, as this will be covered later]

2. What are the patterns of flooding and rainfall this year? How does this compare to previous years?

Objective: To understand the extent of flooding that occurred this year in comparison with previous years.

a. When did flooding start this year? Have the levels of floodwater changed since then?

b. Please indicate on the map which areas are currently inundated with water/ have been inundated in the past two months.

c. How does flooding this year compare to flooding in the past +-15 years? When did the worst flooding occur?
     Prompt: water levels, flooding extent, duration, severity/impact on community?

d.   How have patterns of flooding and climate (rainfall/ temperatures) changed over time?

3. How do you expect flooding, drought or climate change to affect your community in the future?

Objective: To understand the community prediction on flooding and the impacts in the future

a.   When and how?

b.   If so which areas do you think will be most affected?

c.   What will be the impacts of these changes on the community? Duration? Extent?

4. How is a "flood" defined in the community, as opposed to normal seasonal variations in water levels?

Objective: to understand community perceptions and definitions as to what is a flood or excess rainfall.

a.   Are different terms given to floods of different severity? Like small scale, medium and high level flooding

5. What do you think is the main cause of the flooding shock that has affected the community this year?

Objective: to understand factors that may be increasing community vulnerability to flooding

a.   People moving into flood plains (e.g. due to conflict, better access to farmland, etc)

b.   Higher dependency on livelihoods that are impacted by flooding (e.g. cultivation)

c.   Increase in rainfall or water levels in river

d.   Is this different from in previous years?

6. Have you noticed any degradation of the environment in recent years?

For example, deforestation, changes in natural resource availability, changes in availability of wild foods/firewood, etc.

Objective: To Understand what are the impacts of flooding or other climatic shocks has had on the environment in the past

a.   What do you think is the impact of environmental degradation on livelihoods?

b.   Do you think that this has affected the occurrence and severity of flooding?

Section 2: Preparedness and mitigation

7. What are the DRR measures currently in place to reduce the impact of flooding, and how effective do you think they are? (At the community and institutional level) *E.g. infrastructure: dykes, platform, forestry near rivers, etc.; mechanisms: e.g. CMDRR systems, early warning systems, hazard maps, etc.*

Objective: To understand what flood protection barriers are currently in place to reduce to impacts of flooding in the community

a. What efforts do individuals, community leaders and/or local governments make to mitigate the impacts of flooding and to prompt further response efforts for flooding?

b. What infrastructure is in place in your community to reduce the impact of flooding?
     i. Are there any issues associated with this infrastructure? (E.g. broken, not enough)
     ii. Who is in charge of maintaining this infrastructure?

c. What are the perceived needs in terms of flood protection measures? Which measures are perceived to be the most successful?

d. Was assistance provided in response to recent flooding? Are there any barriers to accessing assistance after a flood?

8. What are the available mediums for receiving flood early warning information and rain forecasts from relevant departments/ Other actors (community DRR systems, INGOs/ UN agencies). How effective are they? [If early warning system was mentioned in question 7]

Objective: How are communities informed of when flooding may take place and the warning mechanisms in place?

> a. What kind of information is provided? Is there any mechanism in place to timely inform them about the rising water level?
> b. What is your preferred channel of receiving information?
> E.g. cellular network, radio broadcasts, from local community leaders, from government departments, mobile announcements/ mega phones, etc.
> c. Are some population groups unable to receive information? E.g. women, elderly, children, persons with disability, etc.

Section 3: Impacts of flooding on livelihoods

9. What impact has flooding had on livelihood opportunities this year?

Objective: To understand what are the main challenges flooding is having on other livelihoods .

> a. What have been the impacts on agricultural livelihoods?
> b. Have crop yields been affected?
> c. Do you expect there to be any changes to crop planting next year?
> d. What have been the impacts on pastoralist livelihoods?
>> i. Has there been a reduction in numbers of livestock?
>> ii. Have patterns of cattle migration changed?
> e. What about the impacts on other livelihood opportunities?
>> i. Has access to wild foods been affected?
>> ii. Have fishing activities been affected?

10. How has flooding impacted women and girl's ability to engage in livelihood activities? Female FGDs only

Objective: To understand the impact of flooding on livelihood activities on women and girls

> a. Are you having to travel further to gather wild foods or collecting raw materials? (*firewood, grass, wild foods).*
> b. What risks or security concerns does this lead to, if any?
> c. How are women and girls effected during flooding and excess rainfall? *(girls taken out of school to work in agriculture, early marriage, trading girls for livestock)*
> d. What mechanisms do communities use to mitigate these risks during flooding and excess rainfall?
> e. Are there specific areas where women and girls cannot go during flooding and excess rainfall?
> f. How do they maintain menstrual hygiene during floods emergency?

11. Has the flooding this year had any other significant implications? *E.g. increase in illnesses, services, GBV, competition for resources, grazing land issues, housing and property disputes, security.*

Objective: to understand any other possible implications flooding has had this year on communities.

> a. Have there been any impacts on markets? (Supply, price increase, physical damage, item availability)
> b. Has there been an increase in the level of disease and illness?
> c. Have there been any changes in access to services/resources? If yes, how? Which services have been affected?
> d. Has flooding increased competition in accessing resources such as water sources and grazing land?
> e. Have there been any changes to security in the community? (women, girls, boys, men, elderly, persons with disabilities)

Section 4: Coping Strategies

12. If flooding this year has resulted in a lack of resources to meet their basic needs, what are the usual strategies that most households in your community adopt to cope?

Objective: To understand how communities employ coping strategies during flooding to meet basic needs

      a.   Are most households currently able to use these strategies?

            i.   if not, which coping strategies are they currently using? Were more households using these coping strategies during the peak/aftermath of last year's flooding?

           ii.   Have there been any extreme coping mechanisms deployed by communities?

13: Has there been any population movement due to flooding this year? What about in previous years?

Objective: To understand if people have moved or been displaced as a result of flooding and excessive rain fall

      a.   Where have people moved from/to?

      b.   Do people from the community normally move due to flooding at this time of year?

      c.   Have there been any barriers that restrict households' ability to move to certain locations?

      d.   What are these barriers? (flooding, lack of money, security)

      e.   Are there any people/population groups who are unable to travel?

Extreme coping mechanism

(To be used only if extreme coping mechanisms were mentioned previously)

Moderator Reads: There was mention of extreme coping mechanism during the discussion. We would like to ask some follow up questions to ensure that we can flag this important information to humanitarian actors to inform their planning. Do you consent to answering these follow-up questions? They should not take more than 5-10 minutes.

      a.   Are people eating wild foods that are known to make them sick?

      b.   Are most households currently able to use these strategies?

      c.   Are people marrying off daughters for food?

      d.   Are people selling or slaughtering their last cattle? How common is this?

      e.   What do better off households do to cope with shortages? Worse-off