Republic of Sudan

Humanitarian Affairs Commission (HAC)

Disaster Preparedness, Mitigation and Response in Sudan

Expert Group Meeting on Coordinating Responses to Climate Change & Disaster Risk Reduction in Arab Region

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Beirut, Lebanon

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General background
Sudan hazard

• Sudan is a disaster prone country.

• Floods, Drought, and desertification are the most common environmental hazards.

• There are another hazards and disasters either man-made or natural disaster such as civil conflicts, pest infestation, epidemics, these have had immense devastating impacts on the social structure and the economies of the country.

• Rainfall is the first limiting factor to crop production in mechanized and traditional sectors in eastern and western parts of Sudan.

• Yields of sorghum and millet (the stable food) depends on water available during the growing season, beside the total rainfall amount available, the timing of rainfall relative to the developmental stage of the crop is also critical.
In general, it is possible to recognize 5 distinct rainy zones; desert the rainfall amounts ranges between 0 to below 50mm, arid (50-200mm), semi-arid (200-500 mm), sub-humid (500-800mm), humid (above 800mm).

The duration of the rainy season and the amounts of rainfall vary considerably within these zones.

The length of the growing season varies from more than 4 months in the extreme south-western of Sudan to less than two months in the northern and river Nile states in the north of Sudan.
Seasonal Rainfall in 2017 by Late July

By 31 July, cumulative rainfall across Sudan was broadly on to above average (Fig 2a).

- Kassala, east of Northern Darfur and west of Northern Kordufan states experienced below average total rainfall. (Fig 2a).
- Higher than 400 mms registered east of Sennar, south of Southern Kordufan, Gadaref and Blue Nile states (Fig 2b).
The effective rains were in mid-July in very few areas, but in the majority of the states they were in late July and early August, and even the areas which received good showers in June, witnessed long dry spells in July.

The continuation of rains during September and even early October is crucial for the success of crops in the rain-fed sector.
Sudan has a unimodal rainy season with peak occurring during July-August and September, where more than 70% of the annual rainfall occurs during the growing season.
Drought
Vulnerability and livelihood strategies in Sudan

- Based on livelihood strategies Sudan rural population can be classified into 4 major groups:
  - Subsistence sedentary crop-rearing societies in traditional rain fed sectors
  - Transhumant livestock-rearing societies in traditional sector
  - Owners of and labours on mechanized agricultural sectors
  - Societies in irrigated sector

- Most of the recorded local conflicts between the first two groups: fighting over access to land and water in traditional sector.
The impact of drought on food security

- Reduced income for farmers and agricultural labour.
- Decrease in prices of livestock as farmers are forced to sell, because increase in the cost of pasture and purchased food.
- Increase prices of stable food.
- Inability of certain groups within the population to afford increased food prices, result in:
  - Switch to cheaper and sometimes wild food
  - Reduction in overall food intake
  - Selling assets to raise purchasing power
  - Migration in search of employment opportunities.
  - Migration to where relief food is being distributed.
  - Competition for access to water resources may lead to increased incidence of local disputes, tribal conflicts
  - Water shortages during long drought periods may have an impact on the quality of water, resulting in sanitation problems and an increase of diarrhea diseases.
Early Actions during Al Nino 2015-16

• Building Strategic Reserve: The Strategic Reserve Corporation Cereals Stock till early August 2016 was estimated at one million tons.

• Expansion of cultivated areas in irrigated sector: Increased areas under sorghum in irrigated sector in Geziera scheme from 400,000 feddan as planned earlier to more than 700,000 feddan to compensate the decrease in sorghum areas in the mechanized rainfed sector.

• The government planned to import about 2 million tones of wheat through the commercial channel to bridge the expected gap.
• Diversification and integration of pasture management, livestock and crop production; Diversified income sources will make households more resilient to climate variability

• Identifying and strengthening local breeds of livestock that have adapted to local climatic stress and improving local genetics through cross-breeding with heat and disease-tolerant breeds

• Introducing drought resistant varieties of sorghum

• Reduction of livestock numbers, a lower number of more productive animals lead to more efficient production.

• Improved management of water resources through the introduction of simple techniques for localized watering accompanied by infrastructure for water harvesting
Flood
There are two main types of flood in Sudan:

1. **Flash floods generated by torrential rainfall**
   Flash floods are formed from excess rains falling on mountainous areas and upper streams and run to the lower parts with high speed and force, often resulting in losses of human life and property.

2. **River floods which takes place along the River Nile and its tributaries.**
   During the rainy season, the Blue Nile and tributaries create severe flood risks.
Vulnerability to Flash flood

- occur as a result of heavy rainfall and it affects areas located on the slopes of the highlands and valleys and low-lying areas. This type of flood considered one of the most dangerous because it allows very short lead time
### Vulnerability to Floods by State

- Based on the worst scenario, states potentialities to flood risk are categorized as follows:

<table>
<thead>
<tr>
<th>States</th>
<th>Potential impacts</th>
<th>Flood impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Khartoum, Gezera, Kassala</td>
<td>Very High Threat to Life and Property, numerous rescues, evacuations of and damage to homes and public utilities</td>
<td>Disastrous</td>
</tr>
<tr>
<td>White Nile, Sinnar</td>
<td>Major Damage: High Threat to Life and Property, several rescues, evacuation of and/or damage to several homes and public utilities</td>
<td>Severe</td>
</tr>
<tr>
<td>South Darfur, Gedaref, Blue Nile, North Kordofan, Red Sea</td>
<td>(Considerable damage: Some rescues, evacuations, few houses/public utilities flooded</td>
<td>Moderate - minor</td>
</tr>
<tr>
<td>West Darfur, South Kordofan, River Nile, North Darfur</td>
<td>Light Damage: Numerous road closures, numerous creeks and streams flooding</td>
<td>Minor - moderate</td>
</tr>
<tr>
<td>Northern state</td>
<td>Little or no damage: Few road closures, creeks and streams out of their banks</td>
<td>Little or no impacts</td>
</tr>
</tbody>
</table>
• In 2013 rains resulted in flood damage to varying degrees in all 18 states of Sudan with an estimated 500,000 people affected throughout the country, Khartoum state was the most affected area, followed by Gezeira and Blue Nile states.

• In 2014, heavy rainfall caused floods, affecting some 280,000 persons

• In 2015 (el Nino), impact was limited: some 51,000 persons

• In 2016 affected population was 216,000 persons
Flood Management coordination - 2016
The FTF was established in 2006 encompasses representatives from line ministries, the Sudanese Red Crescent Society (SRC) and United Nations agencies/sectors.

A sectoral approach is used, sectors are mandated to coordinate the operational aspects of the response, the main sectors are:

1. Basic Infrastructure and Settlement
2. Education
3. Food Security and Livelihoods
4. Health and Nutrition
5. Non-Food Items and Emergency Shelter
Cooperation/ Response Mechanism
Flood Task Force (FTF)

Purpose
• The Flood Task Force (FTF) facilitates and coordinates contingency planning, emergency relief and monitoring between actors of Government, UN, NGO community and donors to ensure preparedness and a timely and adequate response in case of floods.

Mandate
• Under the guidance of HAC and supported by the UNOCHA, the FTF aims at improving coordinated efforts for emergency preparedness/contingency planning. It streamlines common tools for needs assessment and establishes/strengthen mechanisms for Information Sharing/Early Warning.
• In case of flood events, it coordinates the emergency relief in support of the authorities on state level. The FTF recommends policy actions to address bottlenecks. It also incorporates lessons learned into the planning process and revises the lessons learned after the flood season accordingly.
BASIC INFRASTRUCTURE

Objectives

• Restore basic infrastructure affected by the floods by repairing structures and facilities of economic and social importance.

• Reduce vulnerability and risk of future floods.
EDUCATION

Objectives

• To rehabilitate schools/learning spaces that has been damaged/destroyed by heavy rains and floods.

• To train teachers in disaster risk management and incorporate disaster risk reduction education into the curriculum.
FOOD SECURITY

Objectives

Agriculture

• To restore agricultural production and food security of the flood-affected households, vulnerable farmers, and pastoralists in the flood-affected areas.

• To strengthen livelihoods and support mechanisms of flood victims and families residing in the flood-affected areas.

Food Aid

• Ensure timely and adequate provision of food to the most vulnerable among the flood-affected people during three months.

• Protect livelihoods and restore assets for flood-affected communities.
HEALTH AND NUTRITION

Objectives

To control and prevent diseases by providing essential drugs, medical supplies and equipment, to reinforce disease surveillance and monitor the health condition of the populations affected through the following key objectives:

• Monitoring health threats, risks and outbreaks through surveillance and integration with existing routine health information systems/early warning surveillance and outbreak response systems;

• Ensuring access to quality health care services in the flood-affected areas and ensuring delivery of essential drugs and supplies to health facilities; and

• Ensuring coordination of the humanitarian relief in the health sector.
NON-FOOD ITEMS

Objectives

To achieve an effective interagency NFI and Emergency Shelter sector flood response through:

• Expanded coordination;

• Provision of additional NFI resources for imminent needs and replenishment;

• transport and distribution of NFIs, considering increasing inaccessibility of destinations, and

• increased capacity to conduct NFI distributions and assessments.
OBJECTIVES

Key objectives of the flood response plan are to:

• Ensure safe water supply to the affected population, who are at risk of disease outbreaks such as diarrhoea and cholera

• Provide immediate safe water supply to the affected people by tankers,

• Re-establish safe water supply and sanitation facilities to people, who are either displaced or whose systems were damaged,

• Provide soap for people who are at risk of cholera, and

• Provide sanitation facilities for school children.
# National Flood Task Force
## Rapid Flood Situation Report

**General Site Information**

<table>
<thead>
<tr>
<th>Q1.</th>
<th>Take the GPS location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q2.</td>
<td>Name of the data collector</td>
</tr>
<tr>
<td>Q3.</td>
<td>Darfur State</td>
</tr>
<tr>
<td>Q4.</td>
<td>Locality</td>
</tr>
<tr>
<td>Q5.</td>
<td>Administrative unit</td>
</tr>
<tr>
<td>Q6.</td>
<td>Village council</td>
</tr>
<tr>
<td>Q7.</td>
<td>Village</td>
</tr>
</tbody>
</table>

**Questionnaire on Affected Population**

| Q8. | Approximately, how many households in total are directly affected in this area? (includes IDPs and host community) |
| Q9. | Approximately, how many households are displaced in camps? |
| Q10. | Approximately, how many households are displaced in spontaneous gatherings? |
| Q11. | Approximately, how many households are displaced in community buildings? (schools etc.) |
| Q12. | Approximately, how many households are displaced living amongst host community? |
| Q13. | Estimated number of children under 5 years among the displaced HHRs? |
| Q14. | Estimated number of children under 18 separated from family/without family support among the displaced population? |
| Q15. | Estimated number of women headed households among displaced population? |
| Q16. | Estimated number of persons with disability/serious medical condition among the displaced population? |
| Q17. | Do you have information of men/women among the displaced people? |

**DAMAGE SUMMARY**

<table>
<thead>
<tr>
<th>Damage caused by</th>
<th>Heavy Rain</th>
<th>Flash flood</th>
<th>River overflow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td></td>
<td>Date</td>
<td>Date</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number affected</th>
<th>Number of affected houses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 5 years</td>
<td>Number of women</td>
</tr>
<tr>
<td>Number of displaced HH</td>
<td>Current Location</td>
</tr>
</tbody>
</table>

**Any vulnerable individuals/groups (elderly, disabled, chronically ill, unaccompanied/separated children, child-headed HH etc.)? If yes, how many individuals per category?**

**Any current/planned arrangements for vulnerable individuals**

- [ ] Heavy Rain
- [ ] Flash flood
- [ ] River overflow

- [ ] Out of a total number of homes
- [ ] Out of a total number of latrines
- [ ] Out of a total number of water points
Early Warning
EW Monitoring and Analysis system

VULNERABILITY ANALYSIS
- Understanding livelihoods
- Socio-Econ. Baselines provide context

MONITORING AND EARLY WARNING
- Agro-climatic
- Food prod/availability
- Food access;
- Markets and trade
- Diseases/malnutrition
- Flood watch update
- Conflict indicators

OUTCOMES
- Impact and implications of hazard
- Location
- Numbers

DECISION-MAKING
- Information dissemination;
- Preparedness
- Numbers affected
- Actions needed
• The MoWR provided a daily sheet, daily report on water levels readings, covering Damazine-Sinnar monitoring unit; the Sinnar – Khartoum unit; Khartoum – Shandi; Khashm El Gerba – Atabra; Atabra – Marawi Dam.

• A separate Directorate focuses on El Gash flooding in Kassala State.
Early Warning- HAC

- EWC of HAC in coordination with SMA and MOWR provides a **flood watch update** on 3 day basis including but not limited to rainfall prediction, rainfall performance for the previous 3 days, damages and losses and river water levels.
الموقف السيول والفيضانات خلال 72 ساعة المنتهية في 10 أغسطس 2014

الامطار العالية التي غطت اجزاء واسعة من ولايات شمال كردفان وغرب وجنوب كردفان وجزاء من الولاية الشمالية ونهر النيل والخرطوم والجزيرة وشمال دارفور خلال الأيام الثلاث الماضية الحقت اضراراً واسعة بهذه الولايات واحتشت خسائر مقدرة في الممتلكات والمنازل جراء السيول وال撤离 والاودية

irce: USGS- Nasa Agency
Water level of Blue Nile at Khartoum from 25 July to 10 August 2014

Deviation from readings (m) of 2014 for the last three days

<table>
<thead>
<tr>
<th>days</th>
<th>prev. day</th>
<th>2013</th>
<th>1988</th>
<th>alert</th>
<th>critical</th>
<th>flooding</th>
</tr>
</thead>
<tbody>
<tr>
<td>08-Aug</td>
<td>-0.04</td>
<td>0.64</td>
<td>0.52</td>
<td>1.38</td>
<td>0.38</td>
<td>-0.12</td>
</tr>
<tr>
<td>09-Aug</td>
<td>0.00</td>
<td>0.54</td>
<td>0.48</td>
<td>1.38</td>
<td>0.38</td>
<td>-0.12</td>
</tr>
<tr>
<td>10-Aug</td>
<td>0.02</td>
<td>-0.03</td>
<td>0.45</td>
<td>1.40</td>
<td>0.40</td>
<td>-0.10</td>
</tr>
</tbody>
</table>
Monthly Bulletin

Flood Watch Update

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Plan forward
Hazard analysis and risk assessment: Development of a risk-based, multi-agency mechanism at the national and state levels to identify the needs and requirements for DRR services, such as:
  
  - Data products;
  - Hazard analyses (statistical and forward looking);
  - Forecasts and warnings;
  - Technical advice and operational support;

Improvement of hazard-analysis products to support risk assessment, through:
  
  - Building capacities in areas of modeling in order to predict the level of water upstream;(data required are: slop, velocity of water and topography
  - Access to long time series of observations at national and regional levels, which should include
Priorities with regard to Multi-hazard Early Warning System

• It is necessary to develop an EW model based on the availability of climate data, soil analysis and climate water coefficient, this will help us to predict the impact of drought in real time using RS techniques and relationship between NDVI, rainfall and historical data of yield.

• Sharing of good practices and transfer of knowledge and experience through workshops and training;

• Strengthening of comprehensive approach that meet the needs of DRM agencies and other stakeholders (in terms of lead time, national constraints,...etc)
Thank you for your Attention