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

19 -20 December, 2017

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.

Seasonal rainfall

- 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

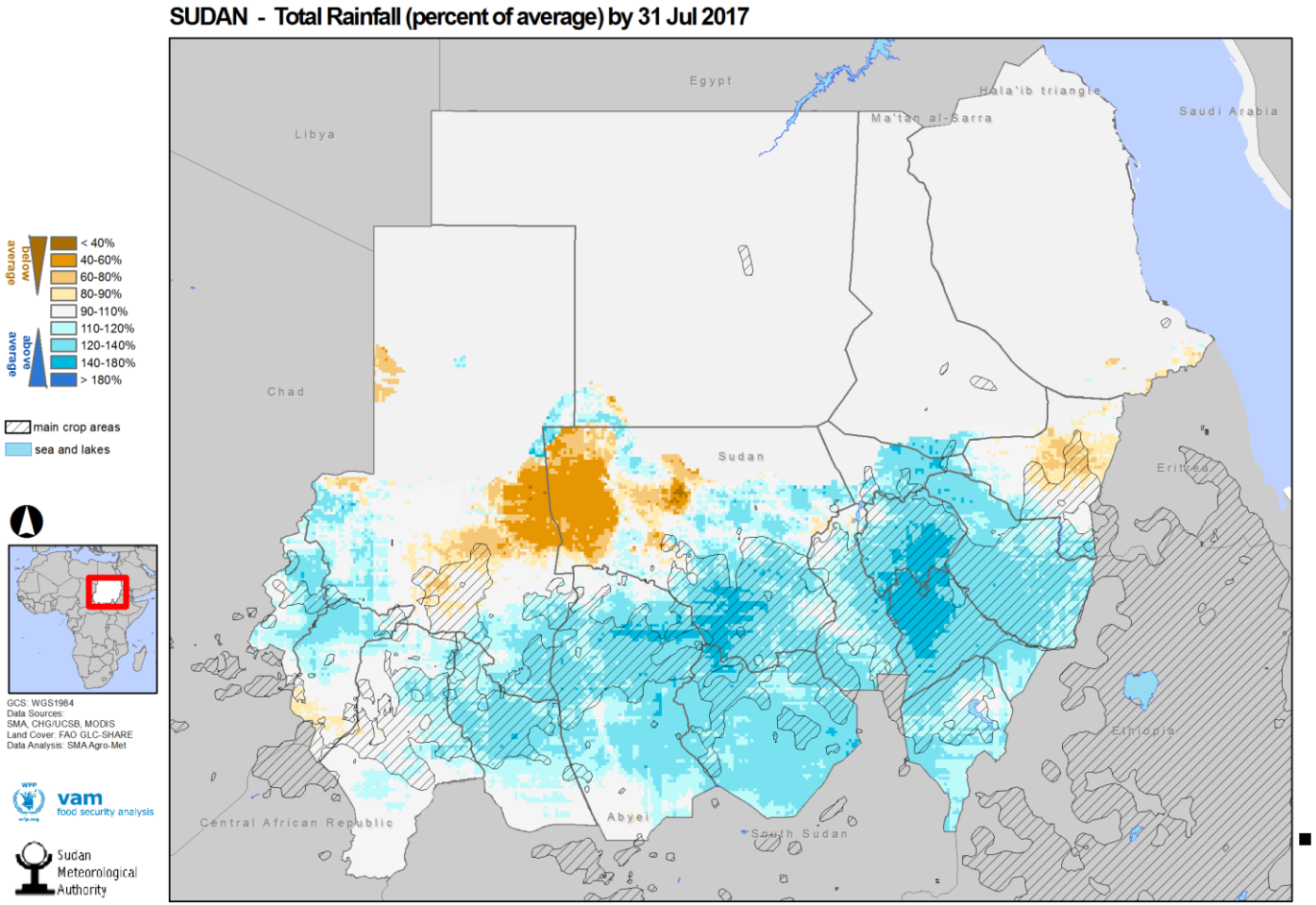


Fig 2a: Total Rainfall (percent of average) by 31-July 2017

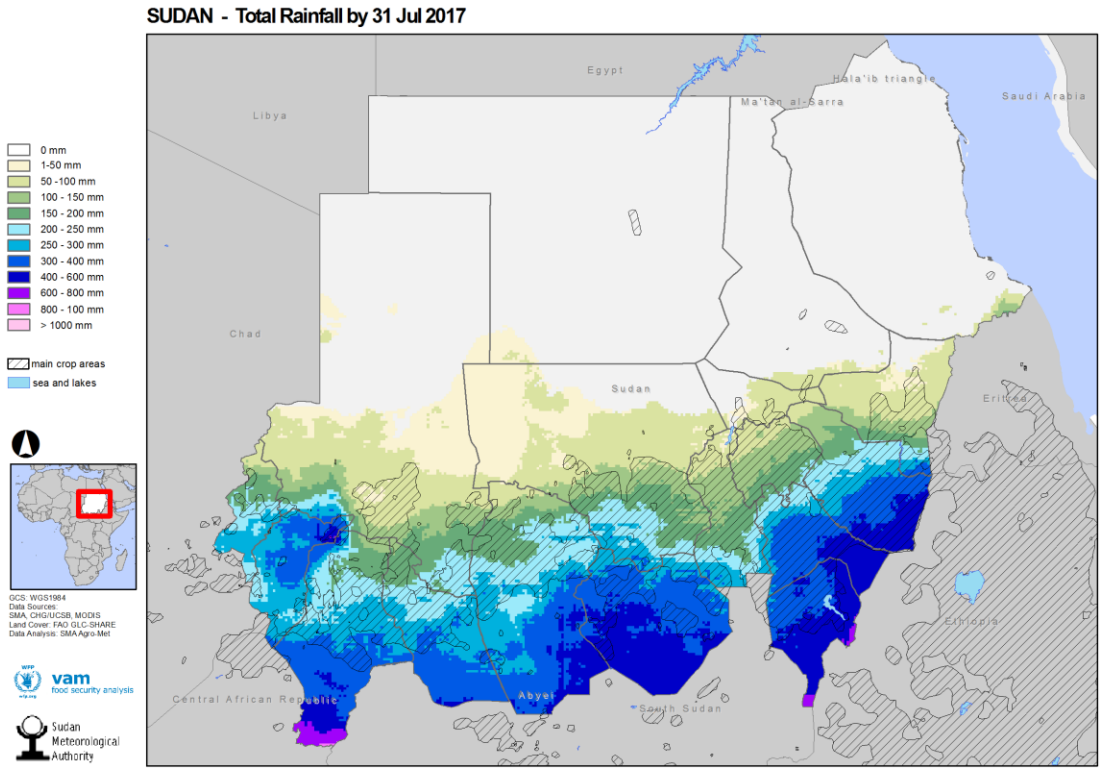
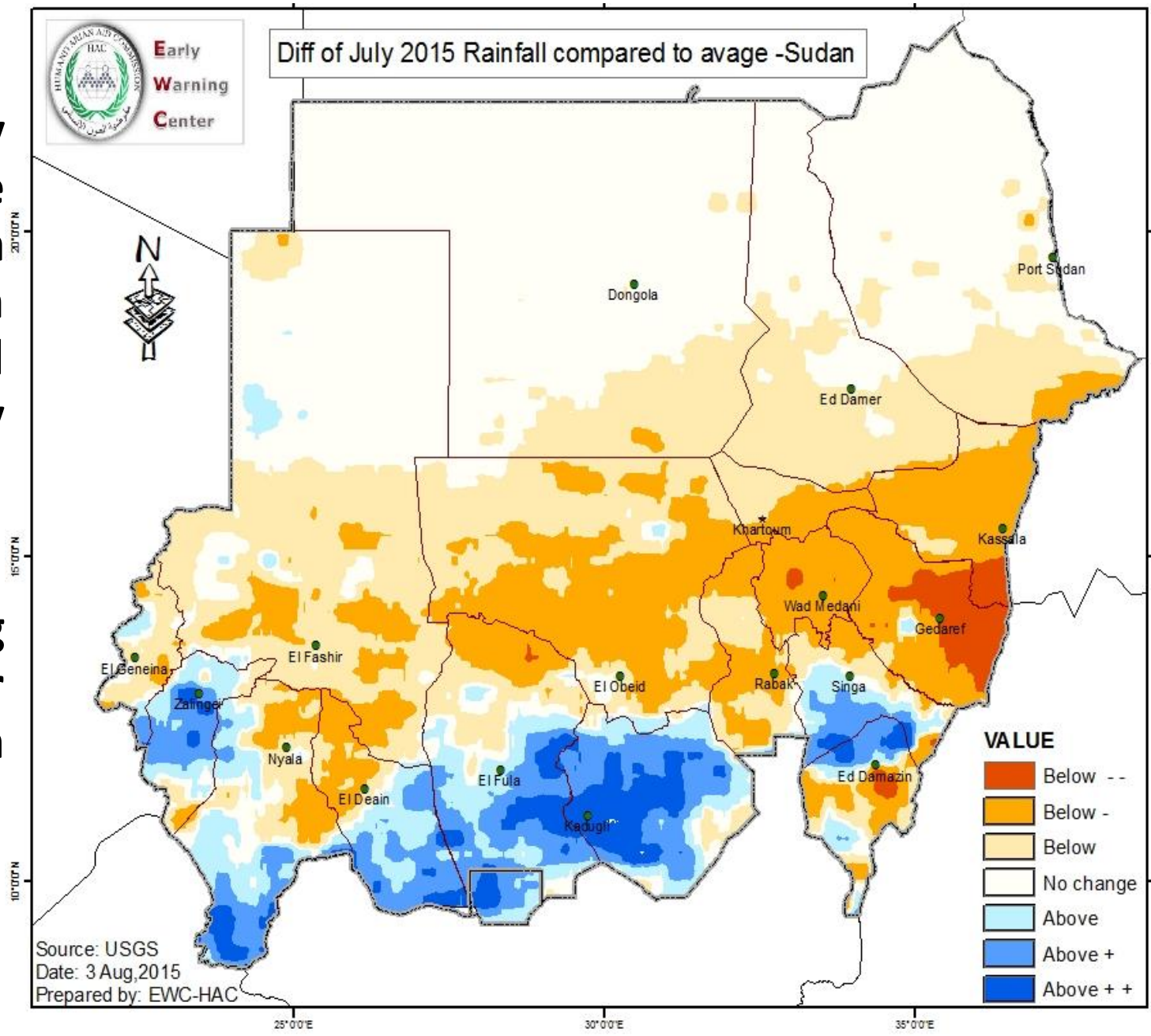


Fig 2b: Total amount of rainfall by late July

- 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.



Seasonal calendar for typical year

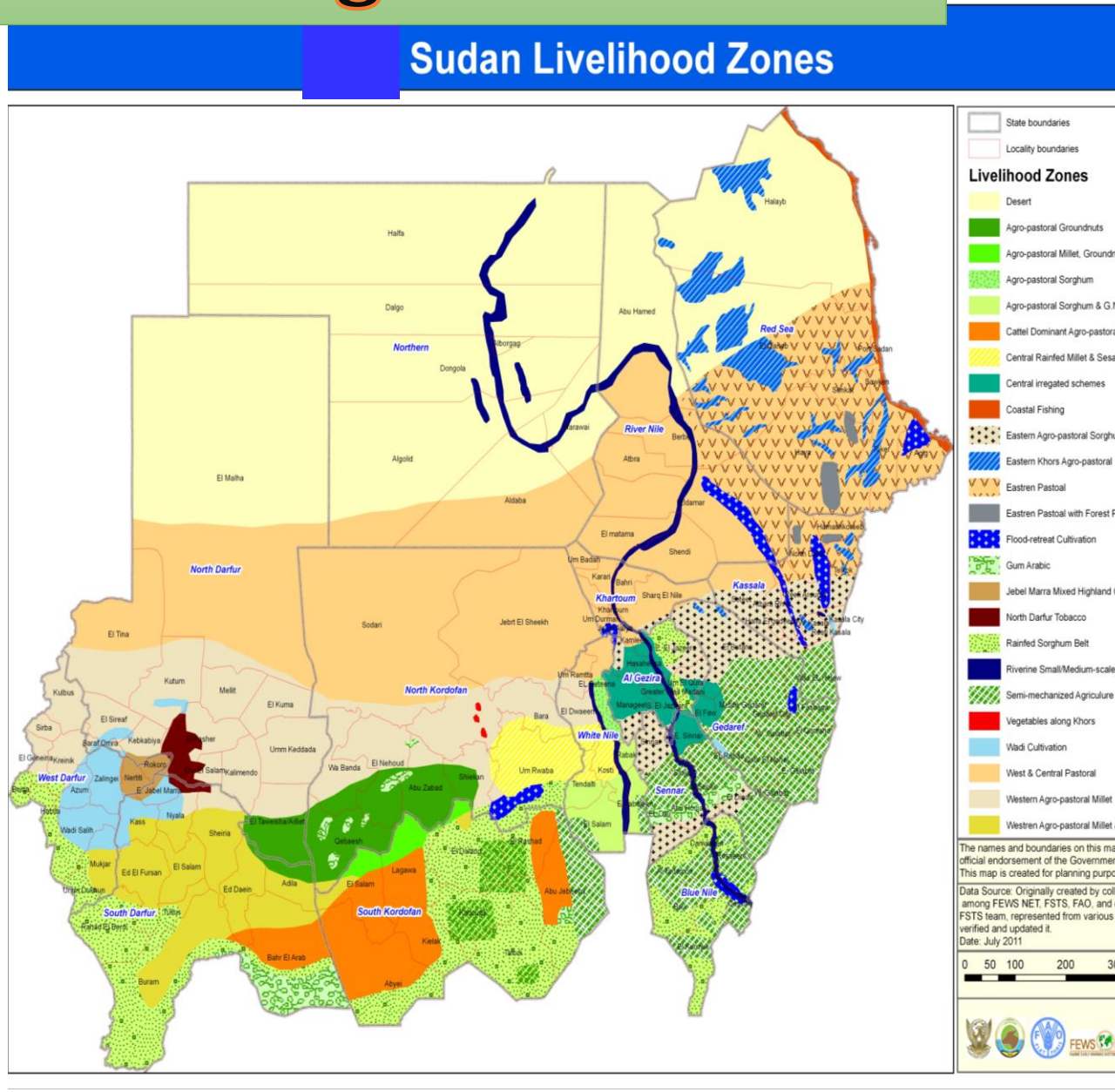
	Months															
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
land pre+ planting(sorghum + millet)																
growth cycle (sorghum + millet)																
harvest (sorghum + millet)																
lean season																
wheat l.pre+ planting + harvest																
growing cycle (Wheat)																
rainy season																
autumn grazing areas (moving north)																
summer grazing araes (moving south)																
conflicts (herders + farmers)																
drought + dry spells																
flooding																

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.**

Preparedness and Mitigation measures

- **Diversification and integration of pasture management, livestock and crop production; Diversified income sources will made 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**

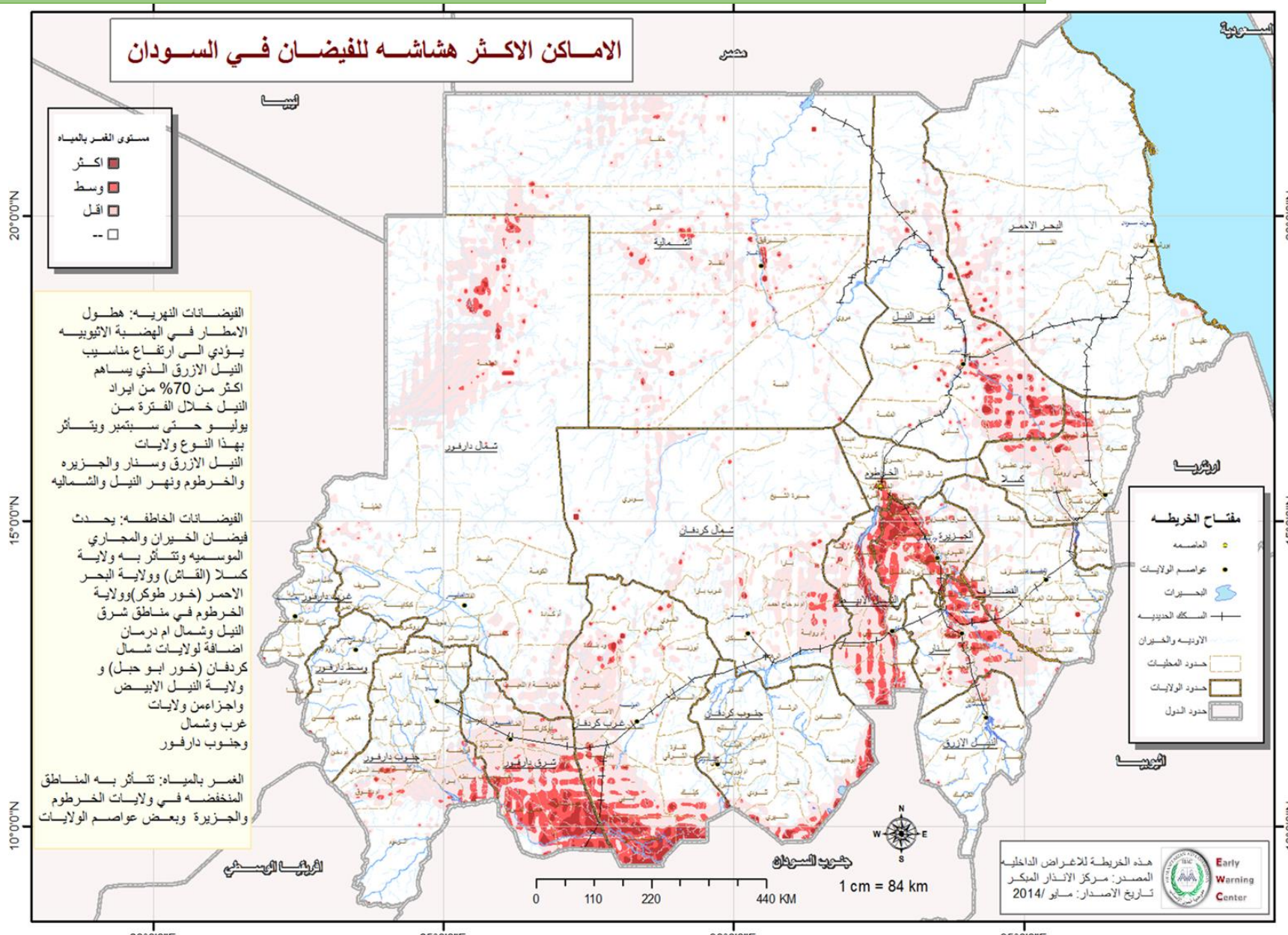
   Flash floods are formed from excess rains falling on mountainous areas and upper streams and run to the lower parts with high speed and force, often resulting in losses of human life and property

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:**

	States	Potential impacts	Flood impacts
	Khartoum, Gezera, Kassala	Very High Threat to Life and Property, numerous rescues, evacuations of and damage to homes/and public utilities	Disastrous
	White Nile, Sinnar	Major Damage :High Threat to Life and Property, several rescues, evacuation of and/or damage to several homes and public utilities	Severe
	South Darfur, Gedaref, Blue Nile, North Kordofan, Red Sea	(Considerable damage: Some rescues, evacuations, few houses/public utilities flooded	Moderate -minor
	West Darfur, South Kordofan, River Nile, North Darfur.	Light Damage: Numerous road closures, numerous creeks and streams flooding	Minor - moderate
	Northern state	Little or no damage: Few road closures, creeks and streams out of their banks	Little or no impacts

Flood and their humanitarian impacts - some statistics

- 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

Coordination Mechanism: Food Task Force Approach

- **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**
  6. **Water and Sanitation.**

Coordination/ 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.**

WATER AND SANITATION

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

Date.....التاريخ Prepared by (اعداد): .... Organization (المنظمة): .....

Objective: to briefly summarize, (i) Severity of the situation/flood and its impact (ii) Actions being taken locally (iii) Local coping capacities (including locally available resources) (iv) Immediate priorities for external relief required and approximate quantities for the same (v) Best logistic means for delivering relief (vi) Forecast of possible future developments including new risks.

State		الولاية	Locality		المحلية
Town/Village		القرية	GPS ____° ____' ____" شE ____° ____' ____" شN		الاحداثيات
HH AFFECTED:.....الاسر المتاثرة بالسيول		Under 5 years ..... اقل من 5 سنوات		Number of women.....عدد النساء	
Number of displaced HH عدد النازحين		Displaced from النزوح من		Current Location الموقع الحالي	
No of Injured..... جرحى		No of deaths ..... موتى			

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

.....

DAMAGE SUMMARY ملخص الخسائر

Damage caused by :سبب الضرر او الخسائر	Heavy Rain (أمطار غزيرة) Date.....التاريخ	Flash flood (سيول) Date.....التاريخ	River overflow (فيضان نهر) Date.....التاريخ
Out of a total number of..... .....homes	Out of a total number of .....latrines	Out of a total number of .....water-points	

National Flood Task Force
Rapid Assessment- Flood season 2016

General Site information					
G1. Take the GPS location		G2. Name of the data collector			
G3. Darfur State	G4. Locality	G5. Administrative unit	G6. Village council	G6. Village	
G7. Who is the key informant?					
Position/ responsibilities:			Geographic area:		
DAMAGE/Situation caused by ☐Heavy Rain		☐Flash flood ☐River overflow			

Quantitative Information on affected population		
Please note: The following questions on number of affected and/or displaced households are related only to the current flood. The displaced households by precedent events should be clearly marked as such and considered separately.		
Q1. Approximately, how many households in total are directly affected in this area? (includes IDPs and host community)	Q2. Approximately, how many households are displaced in camps?	Q3. Approximately, how many households are displaced in spontaneous gatherings?
Q4. Approximately, how many households are displaced in community buildings? (schools etc)	Q5. Approximately, how many households are displaced living amongst host community?	Q6. Estimated number of children under 5 years among the displaced HHs?
Q. Estimated number of children under 18 separated from family/without family support among the displaced population?	Q.8. Estimated number of women headed households among displaced population?	Q9. Estimated number of persons with disability/serious medical condition among the displaced population?
Q7. Do you have information about number of men/women among the displaced people?		
☐Approximately or above 70% more men than woman	☐Approximately or above 70% more women than men	
☐Men less than 30 % of total displaced	☐Women less than 30% of total displaced	☐Equal

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

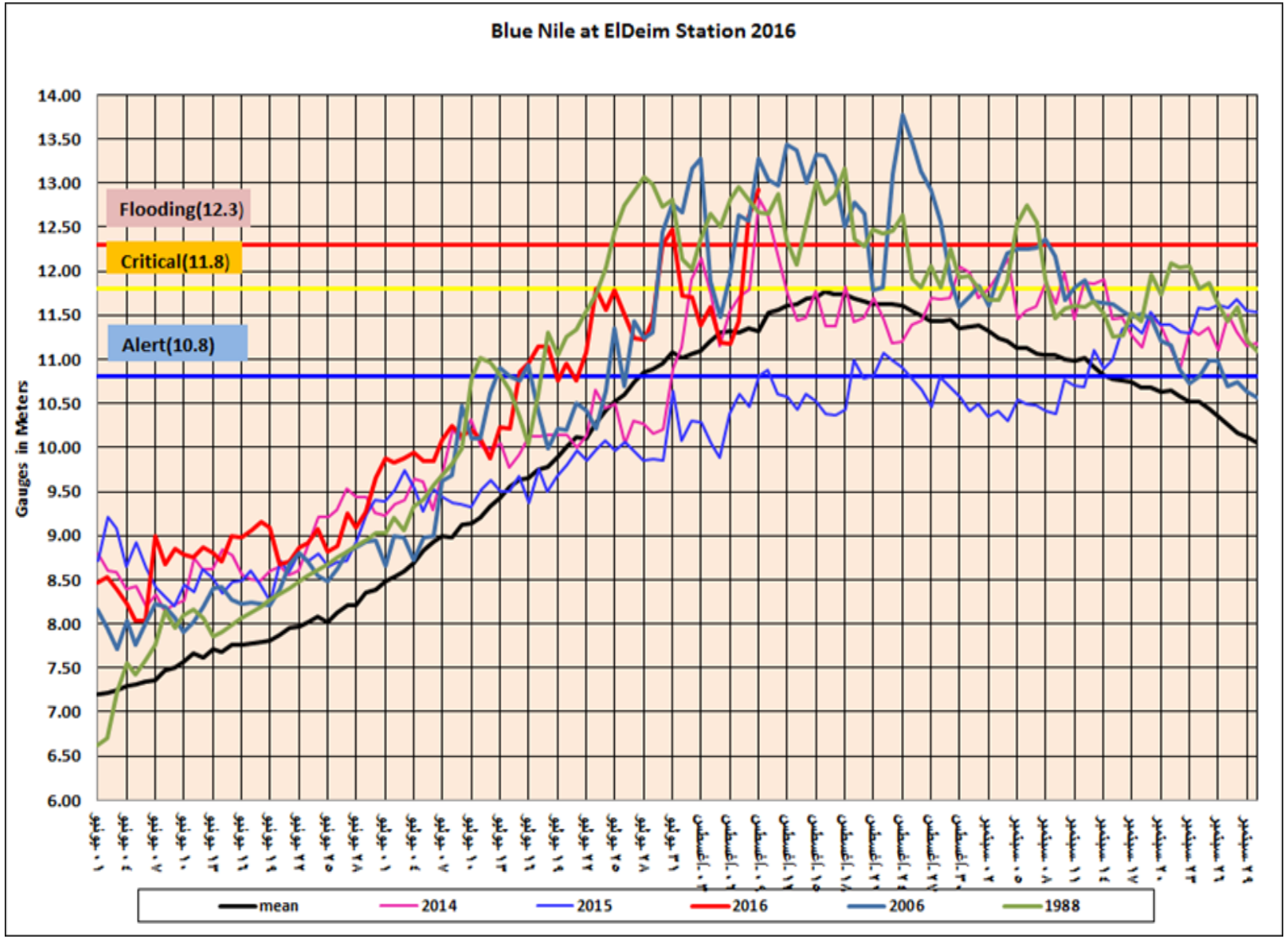
- ❑ Impact and implications of hazard
- ❑ Location
- ❑ Numbers

DECISION-MAKING

- Information dissemination;
- Preparedness
- Numbers affected
- Actions needed

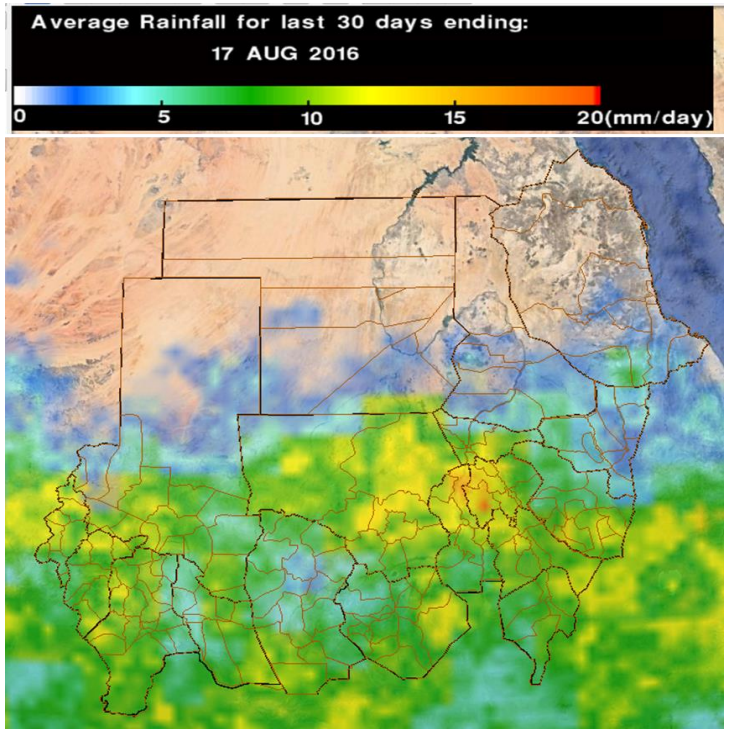
Early Warning- Ministry of Water Resources

- **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.



بسم الله الرحمن الرحيم

Ministry of Social Welfare

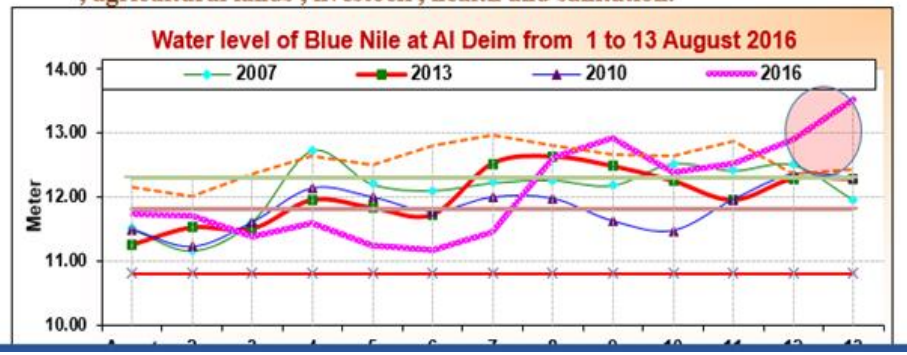
Humanitarian Aid Commission (HAC)

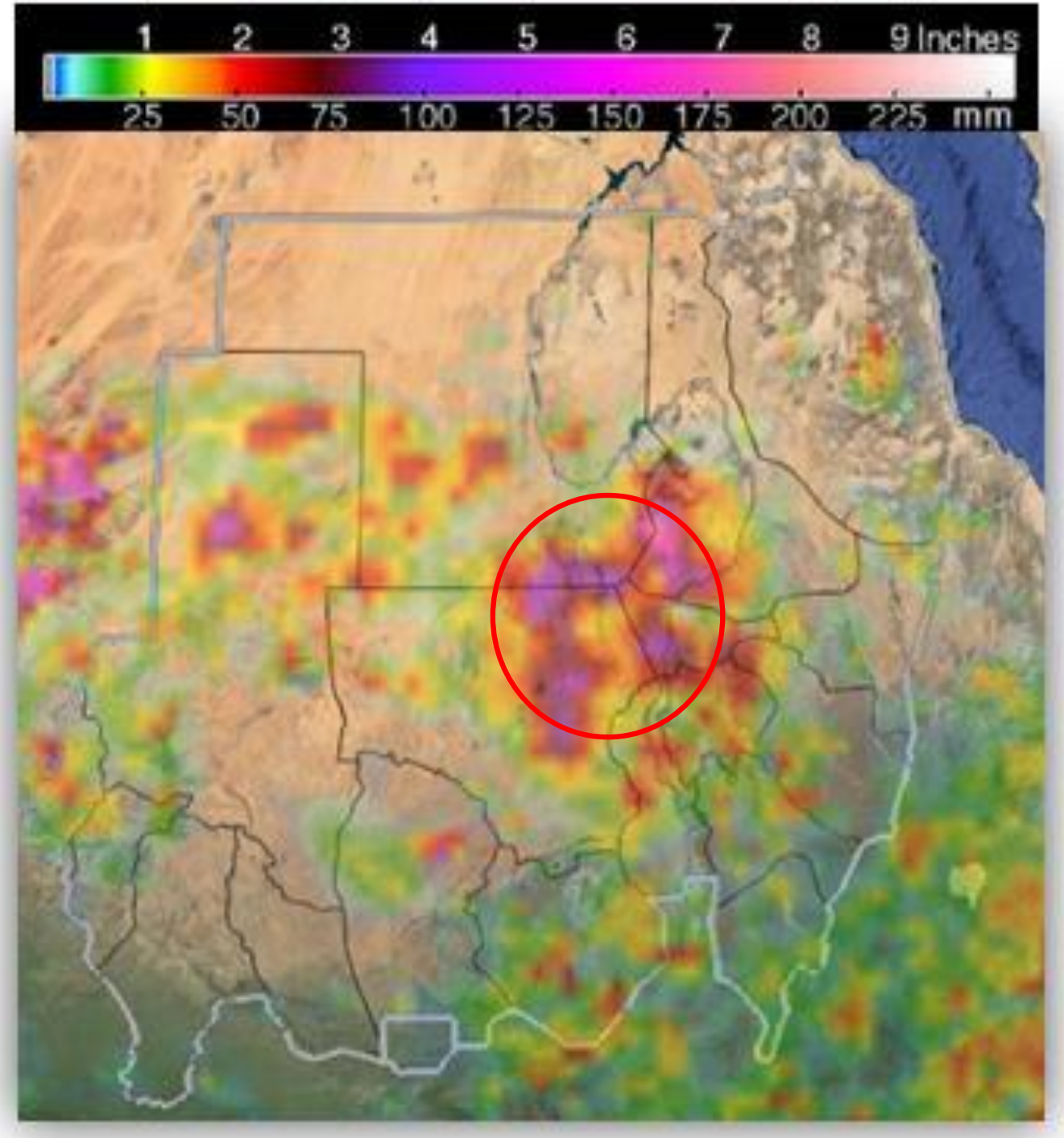
Multi-Hazard Early Warning and Mitigation Center (EWARN)

Vol 16 # 10	Flood Watch update	13/8/2016

Blue Nile River: Big wave coming, endangering Sennar, Gezera , Khartoum , River Nile, Northern and White Nile state

- As reported by MOWR , Blue Nile at Deim station reading for today 13th of August is 13.52 .This is indicate that the Blue Nile level at Deim station for today is 1 meter higher than the level registered on 11th of August .the level is 62 cm higher the the previous day , 1.1 m hi[Chart Title]n 1988 , 2.72 m higher than alert level and far above the flooding level by 1.22 m.
- The level of the Blue Nile and the main Nile will rise sharply during the coming two day to a Higher than the record level, endangering communities, along the banks of the Blue Nile , the main river Nile course and the white Nile River as well. Blue nile state, Gezera , Khartoum , River Nile, Northern and the White Nile state have to consider the seriousness of the imminent hazard and to take efficient preventive actions to reduce possible adverse impacts on human beings , properties , agricultural lands , livestock , health and sanitation.



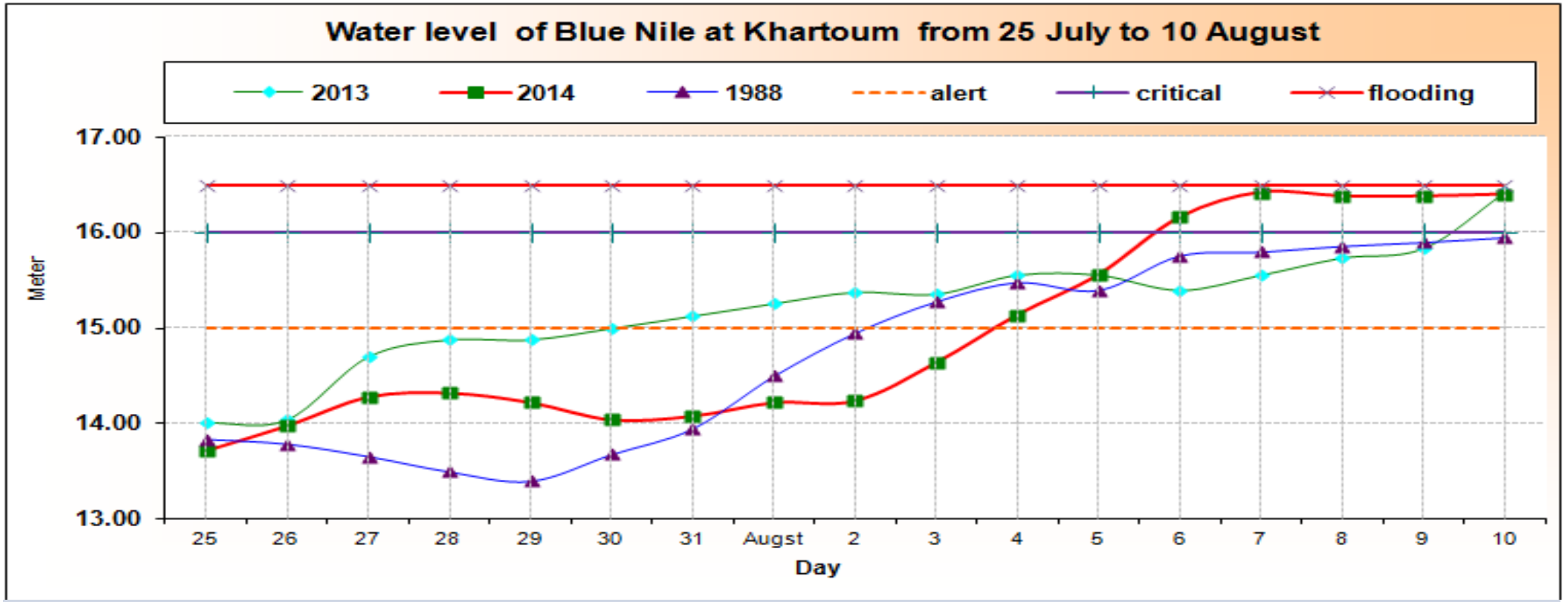


موقف السيول والفيضانات خلال 72 ساعة المنتهية فى 10 اغسطس 2014

الامطار العالية التى غطت اجزاء واسعة من ولايات شمال كردفان وغرب وجنوب كردفان واجزاء من الولاية الشمالية ونهر النيل والخرطوم والجزيرة وشمال دارفور خلال الايام الثلاث الماضية الحقت اضرارا واسعة بهذه الولايات واحدثت خسائر مقدرة فى الممتلكات والمنازل جراء السيول والخيران والاودية

ırce: 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

days	prev. day	2013	1988	alert	critical	flooding
08-Aug	-0.04	0.64	0.52	1.38	0.38	-0.12
09-Aug	0.00	0.54	0.48	1.38	0.38	-0.12
10-Aug	0.02	-0.03	0.45	1.40	0.40	-0.10

Monthly Bulletin

مفوضية العون الإنساني _ الإدارة العامة للمخاطر والمساعدات الإنسانية

مركزالإنذار المبكر

مؤشرات الوضع الإنساني خلال الفترة الحرجة (مايو - سبتمبر 2014م)

الإصدارة الشهرية رقم (10) مجلد رقم (1)

بدأت سمات الفترة الحرجة مبكراً منذ أبريل في هذا الموسم ويعزى ذلك للأسباب التالية :

- انخفاض إنتاج الحبوب الغذائية في موسم 2013 -2014 مقارنة بالموسم السابق وبمتوسط الأعوام الخمس الماضية
- تزايد وتيرة العنف في دارفور خلال الربع الأول من العام والمتوقعات ذلك على الأوضاع الإنسانية بولايات دارفور والذي تمثل في موجة جديدة من الحراك السكاني في ولايات دارفور الكبرى إضافة الى التوترات الأمنية التي تشهدها ولاية جنوب كردفان
- تدهور استراتيجيات التكيف والتعويض لدى شرائح كثيرة من السكان في ولايات السودان المختلفة الى حد الصفر بالمكتئبات الإنتاجية في بعض مناطق انتاج وتآكل المخزونات لدى الأسر خصوصاً في المناطق التي تعاني من التكتلات الأمنية والنزاعات القبلية في دارفور .
- وجود بعض الإختلالات الهيكلية المرتبطة بالخدمات الأساسية في ولايتي البحر الأحمر و شمال كردفان خاصة في مجال الصحة وتدني القار والنقص في المياه .
- انخفاض أو ثبات أسعار الحيوانات كنتيجة لمحدودية المراعي الطبيعية ونقص المياه و تدهور ميزان التبادل السلعي بين المعاملين والحيوانات لصالح المعاملين.
- تأثير الفيضانات والسيول خلال العام 2013 على شرائح من السكان في ولايات الخرطوم والجزيرة والنيل الأزرق و بعض الولايات الأخرى
- توالي ارتفاع أسعار الحبوب الغذائية كالذرة والدخن والتي تمثل الغذاء الرئيس للسكان الى مستويات قياسية ويعزى هذا الإرتفاع جزئيا الى تدني الإنتاج المعني لموسم 2013 – 2014 وجزئيا الى التوقعات موجة الإرتفاع في أسعار الحبوب الغذائية عالمياً.

التوصيات :

- يلعب المخزون الإستراتيجي دوراً محورياً خلال الفترة الحرجة بتوفير مخزون الإزان في الولايات يكفي لاستهلاك 3 شهور يتم طرحه خلال الفترة الحرجة لضبط الأسعار إضافة الى تأمين مخزون للطوارئ يوضع تحت تصرف مفوضية العون الإنساني لمعالجة الأوضاع الإنسانية الطارئة .
- تنفيذ برامج حصاد المياه في الولايات التي تعاني نقصاً في المياه .
- استمرار برامج المساعدات الإنسانية وبرامج التكفل الإجتماعي والإهتمام بالشرائح الضعيفة في المجتمعات المحلية .
- ضبط تصرب المحاصيل الغذائية عبر الحدود الى دول الجوار.
- إعداد الخطط الإحترازية واتخاذ الإجراءات التحوطية والإستعداد لفصل الخريف.
- استيراد كميات من الحبوب الغذائية كأعلاف.

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Flood Watch Update

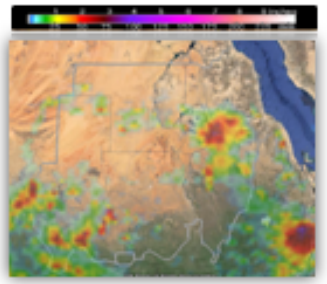
مفوضية العون الإنساني – الادارة العامة لمخاطر الكوارث والمساعدات الانسانية

مركزالإنذار المبكر

7 اغسطس 2014 مراقبة الفيضان (8)

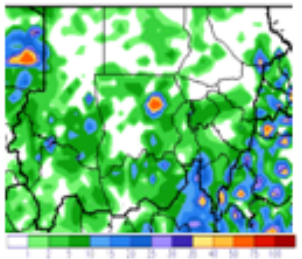
موقف السيول والفيضانات خلال 24 ساعة المنتهية في 7 اغسطس 2014

- اظهرت الصور المرفقة ان حالة الطقس في ولاية نهر النيل تحديدا مناطق عطبرة وبربر قد تعرضت الى معدلات عالية من الامطار قد يترتب عليها جريان بعض السيول والخيران التي يتوقع ان تشكل تهديدا للقرى المجاورة للنيل اضافة للغمر بمياه الامطار التي قد تؤدي الى انهيار بعض المنازل . يتوقع تفاقم حجم الخسائر في الاجزاء الشمالية من ولاية نهر النيل اثر الامطار خلال ال 24 ساعة الماضية.



- معدلات متوسطة الى خفيفة من الامطار يتوقع ان تكون قد غطت مساحات واسعة من مناطق سهل البطانة وكسلا وبنار والقضارف اضافة الى محلية مروى التي قد تتأثر ببعض الاضرار جراء جريان السيول .
- من المتوقع ان تكون المعدلات العالية من الامطار قد تواصلت خلال ال24 ساعة الماضية وغطت كل ارجاء ولايات دارفور الكبرى الامر الذي يحتم اتخاذ ما يلزم من تدابير لحماية الارواح والممتلكات.
- من المتوقع ان ترتفع مناسيب النيل الازرق والانهار التي تتبع من الهضبة الاثيوبية نتيجة تواصل المعدلات العالية من الامطار التي شهدتها الهضبة الاثيوبية خلال ال24 ساعة الماضية.

التوقعات لفترة ال 24 ساعة القادمة حتي 10 اغسطس 2014



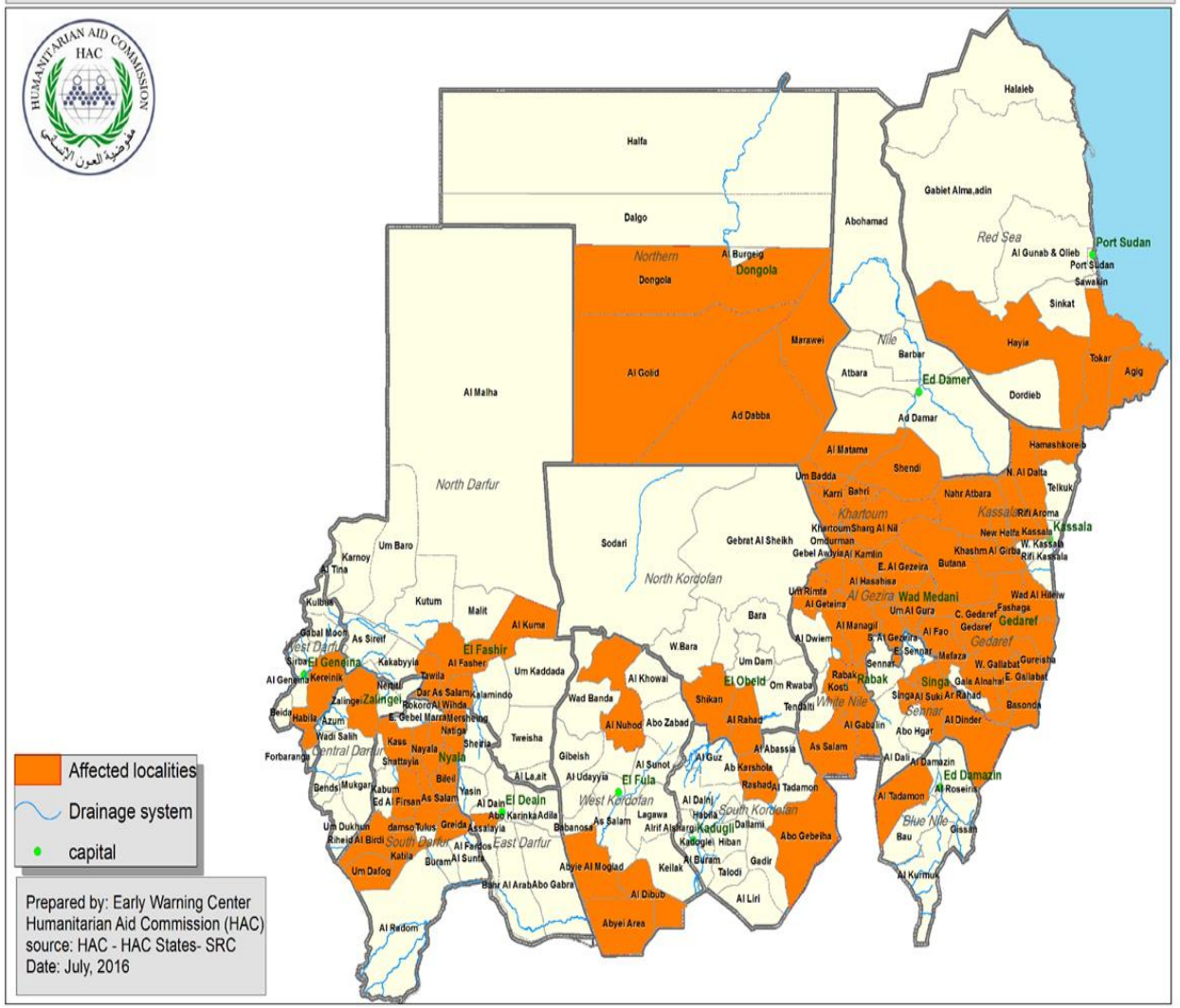
- يتوقع تواصل الارتفاع المضطرد في منسوب النيل الازرق وارتفاع منسوب نهر القاش وجريان خور بركة اضافة لنهر عطبرة مما يحتم اتخاذ اعلى درجات الحذر في ولايات النيل الازرق وكسلا والبحر الاحمر نتيجة لاستمرار هطول الامطار العالية الى المتوسطة خلال ال24 ساعة القادمة في الهضبة الاثيوبية والمرتفعات الارترية.
- يتوقع ان تشهد ولاية القضارف وكسلا وبنار واجزاء من ولاية الجزيرة والخرطوم اضافة الى ولاية نهر النيل معدلات منخفضة الى متوسطة من الامطار خلال الاربع وعشرين ساعة .
- من المتوقع ان تشهد اجزاء واسعة من من ولايات دارفور الكبرى خاصة ولايات شمال وغرب ووسط وجنوب دارفور معدلات امطار عالية الى متوسطة اضافة لى الاجزاء الغربية من ولاية شمال كردفان .

SUDAN: FLOODING SNAPSHOT

Early June - 09 August 2016

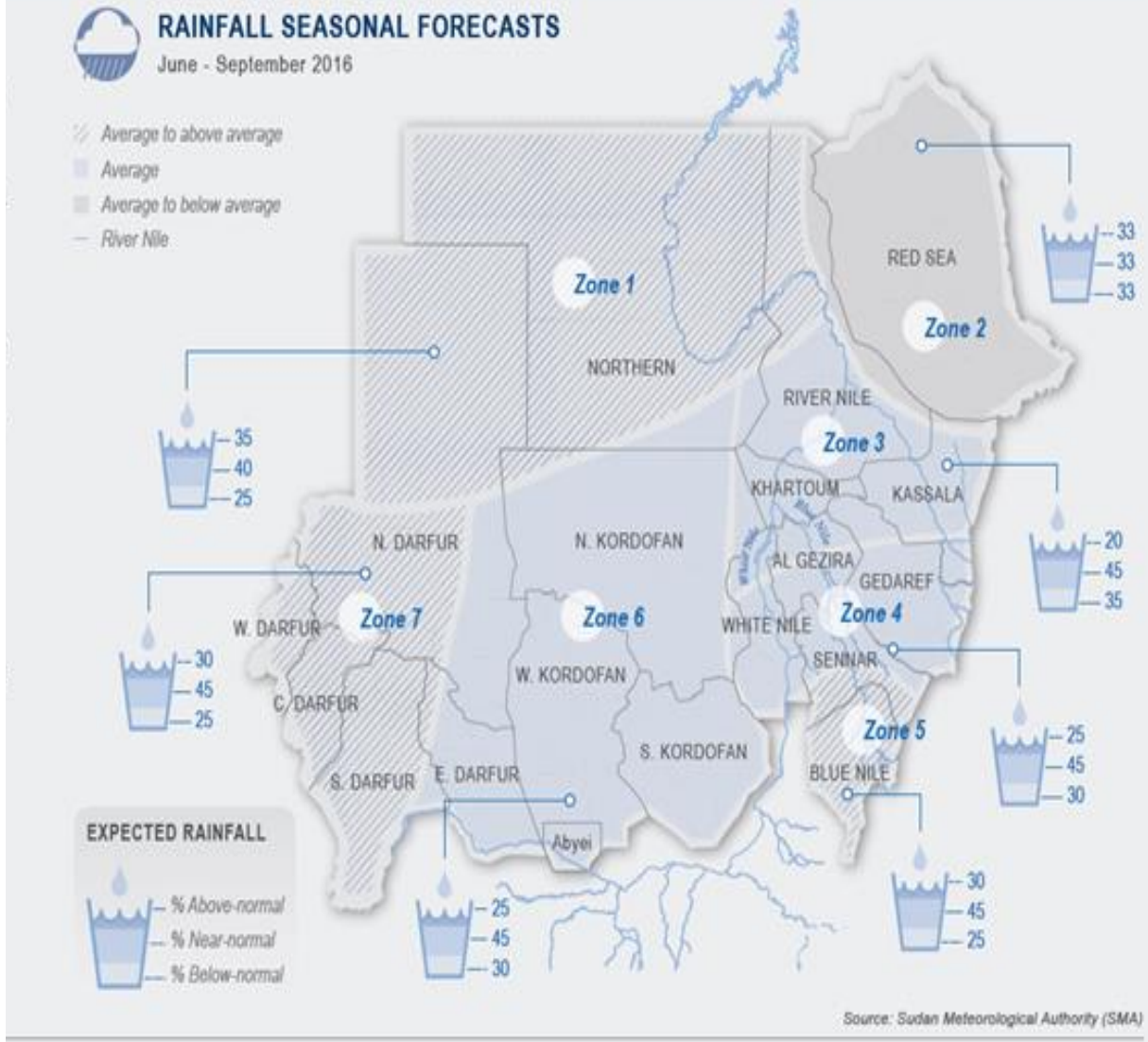
OCHA Sudan

Areas Affected by Flood in Sudan, update 22 August 2016



RAINFALL SEASONAL FORECASTS

June - September 2016



Source: Sudan Meteorological Authority (SMA)

Plan forward

priorities with regard to product and service development

- **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 o 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