

HIGHLIGHTS

- Several roads linking different governorates were cut off owing to barrage overflows after heavy rains across the country
- Widespread floods swept agricultural lands resulting in huge agro-economic losses
- An increase in relative humidity sparked the spread of fungal and bacterial diseases in vegetables and fruit crops. These conditions also triggered the spread of livestock diseases such as Old World Screwworms (OWS)
- Desert Locust's presence is expected to increase as small-scale breeding continues its extension to the Eastern plateau following widespread rainfall activities

I. METEOROLOGICAL REVIEW

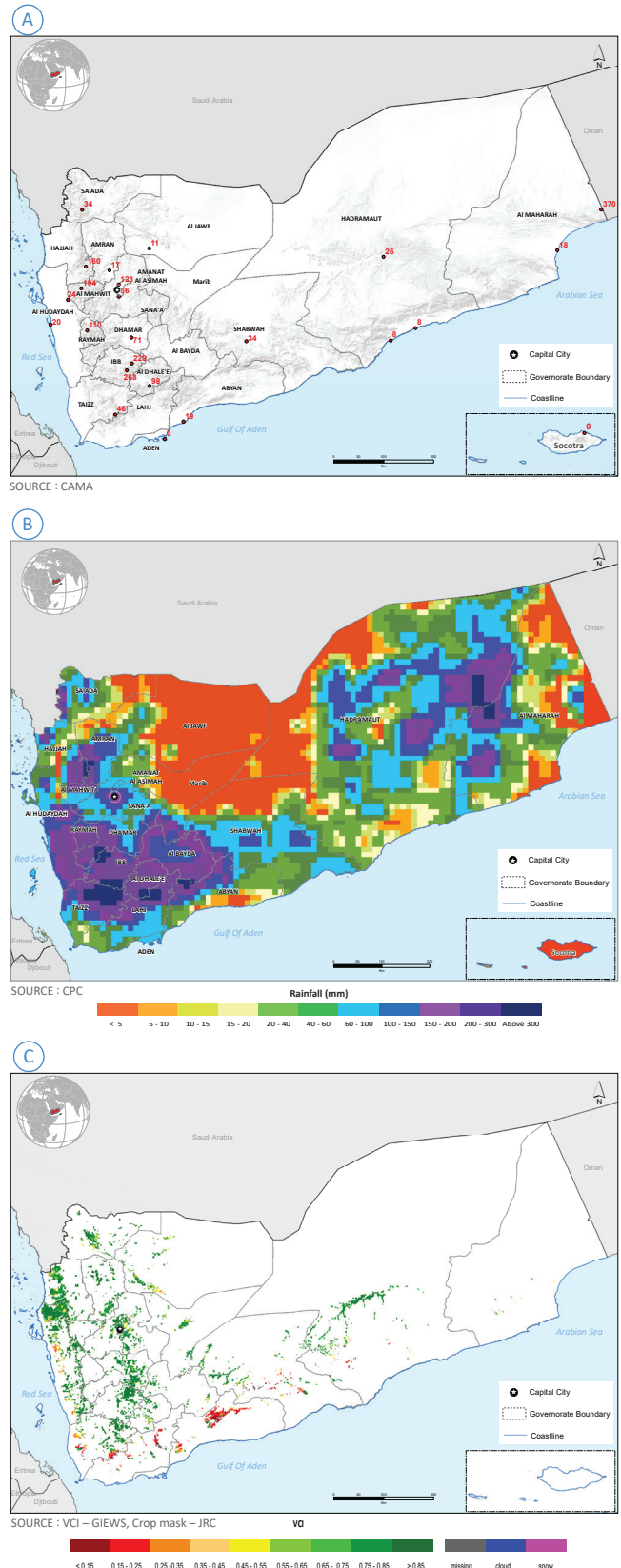
Food (in)security is one of the major challenges faced by policymakers, farmers, and the general populace in Yemen; this is in part because agriculture is primarily rainfed and the climate is characterized by abrupt changes which are often punctuated by extreme meteorological events. A review of agrometeorological conditions in July 2021 shows that much of the country was characterized by widespread rainfall activities with cumulative amounts exceeding 100 mm being reported in Al Maharah (Serfeet, 381 mm), Ibb (Ibb City 269 mm), Ibb (Alsaddah, 253 mm), Al Mahwit (Almahweet, 199 mm), Hajjah (186 mm), Sana'a (123 mm), and Rimah (Al Jabeen-Rimah, 123 mm) governorates (Fig. 1A and B). Heavy rainfall was also reported across several other governorates such as Al Maharah and Shabwah where 7 people, among them women and children, were reported to have drowned due to severe mudflows¹. Overall, about 13,600 households are documented to have been critically affected by torrential rains and attendant floods especially in Hajjah, Marib, Sana'a, and Taizz governorates. When rainfall anomalies (difference from long term average, 1983 - 2013) were examined, results showed spatial patterns consistent with the observed torrential rains, flash floods, and mudflows with the whole country generally experiencing normal to above normal rainfall especially across the western and north-eastern parts of the country (Fig. 2A).

The progress of rainfall from the beginning to the end of the month collaborated with the observed monthly spatial distribution which showed the western half being relatively wetter than the remaining parts of the country. Further, the first 10 days of the month (Fig. 3A) were generally not as wet as the mid-10-day period (Fig. 3B) and the end (Fig. 3C). In response to widespread rainfall, indices showed that vegetation conditions were generally good apart from a few patches near the Gulf of Aden (Fig. 4A – C) and this was also observed in the monthly dataset (Fig. 1C) and anomalies (Fig. 2B). Consistent with observed widespread rainfall activities, cloudy conditions were also observed on vegetation maps and on the Agricultural Stress Index (ASI) which is used as an indicator for drought conditions. Overall, no drought was detected from the beginning to the end of the month (Fig. 6A – C).

An assessment of temperature variations across the country revealed that most areas that have previously been characterized by very hot weather experienced reductions in July which can be attributed to the cooling effect of widespread rainfall. The only places that experienced relatively high temperatures as reported by field weather stations are Hadramaut (Seiyoun, 43.4°C) and Al Jawf (Al Jouf, 42.0°C) governorates (Fig. 5A and Table 1) while the lowest was reported in Dhamar (9.6°C) (Fig 5B and Table 1).

The weather outlook indicates that from 16 – 18 August, the whole country will generally be dry with sporadic showers expected not to exceed 10 mm cumulatively. However, slight intensification of rainfall is expected after 18 August especially across Ibb, Taizz, Al Dhale'e, Shabwah, and Hadramaut governorates. By 31 August, most places in the southwestern parts of the country are likely to receive over 100 mm which may trigger flash floods especially in areas with poor drainage infrastructure, caution is therefore strongly advised across these areas.

Fig. 1: Progress of monthly rainfall and vegetation conditions A) Observed rainfall (mm) B) Satellite-based rainfall estimates (mm) C) Vegetation Condition Index.



¹ <https://www.urdupoint.com/en/world/at-least-7-people-dead-in-mudflows-caused-by-1308059.html>

Fig. 2: Monthly anomalies (difference from long term average, LTA) for A) rainfall (LTA: 1983 – 2013) B) Normalized Difference Vegetation Index (LTA: 1984- 2015)

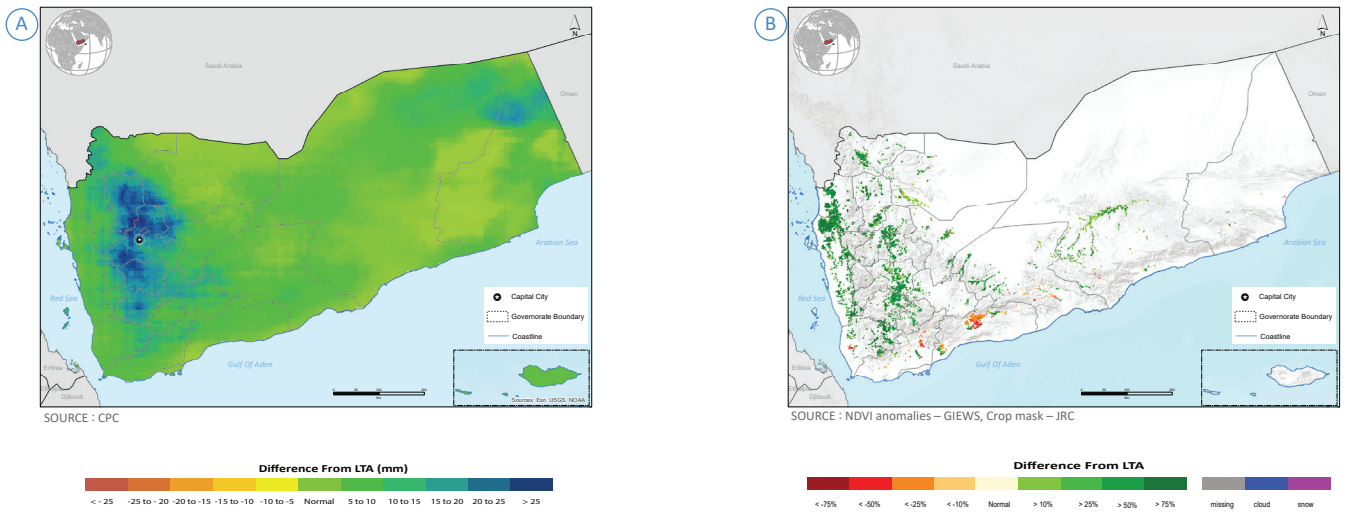


Fig. 3: Progress of rainfall estimates A) 1 to 10 July B) 11 to 20 July C) 21 to 31 July

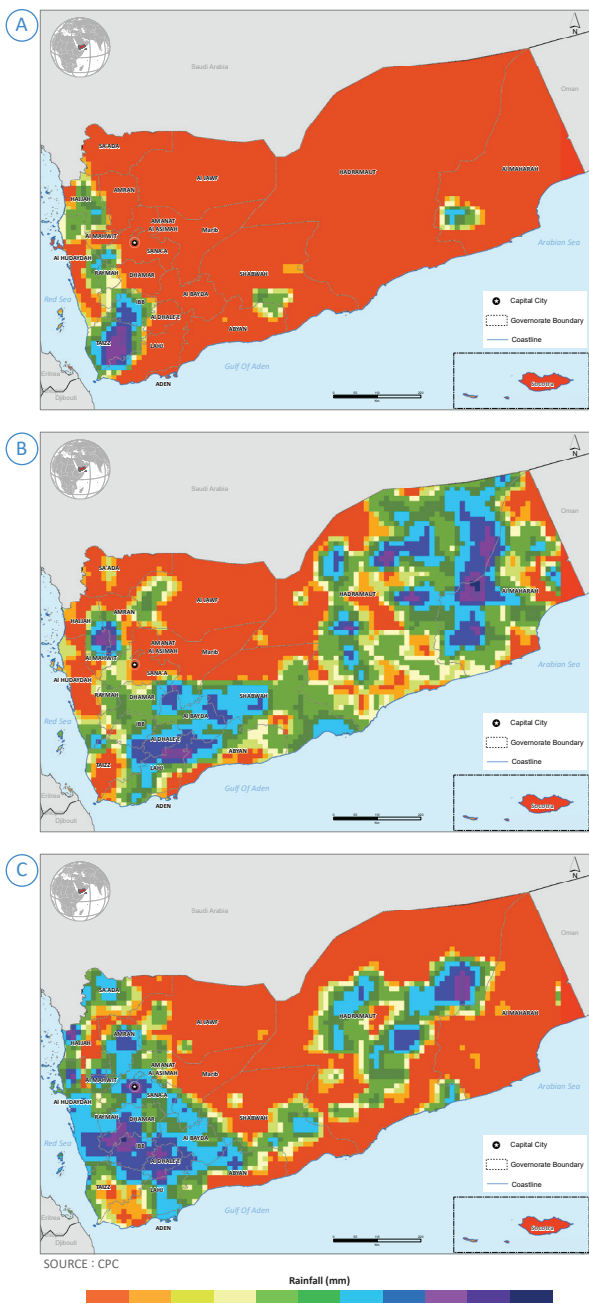


Fig. 4: Progress of vegetation conditions for A) 1 to 10 July B) 11 to 20 July C) 21 to 31 July

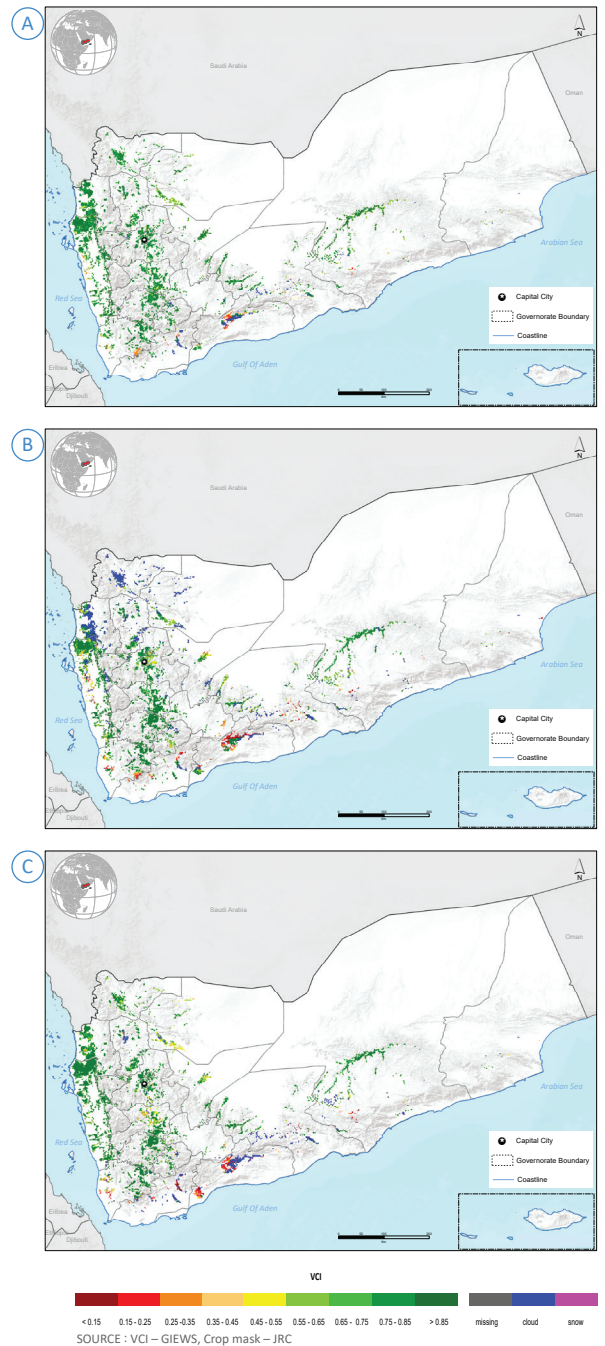


Fig. 5: Progress of monthly temperature conditions for A) Maximum B) Minimum

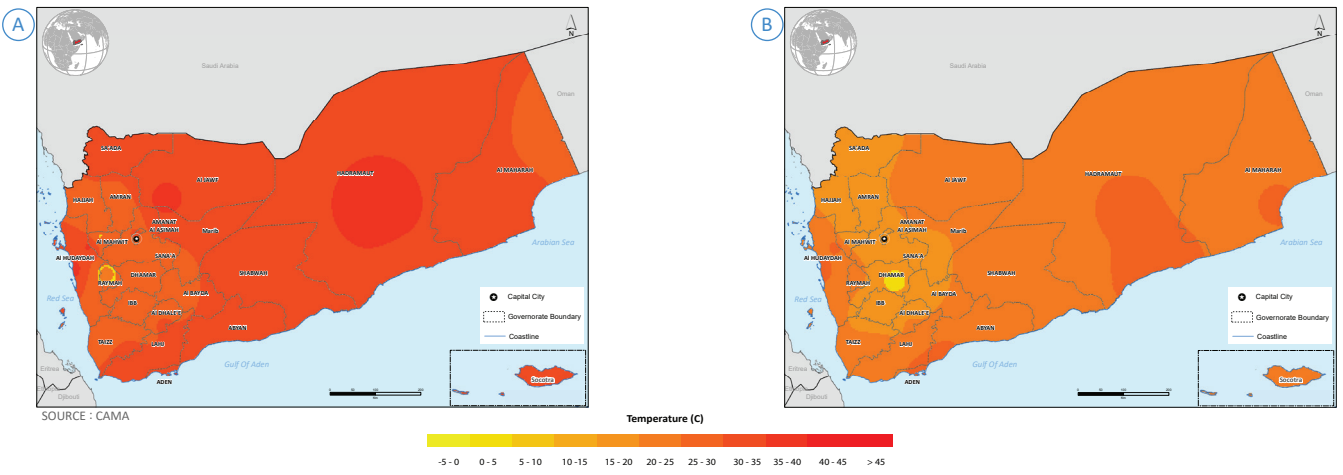
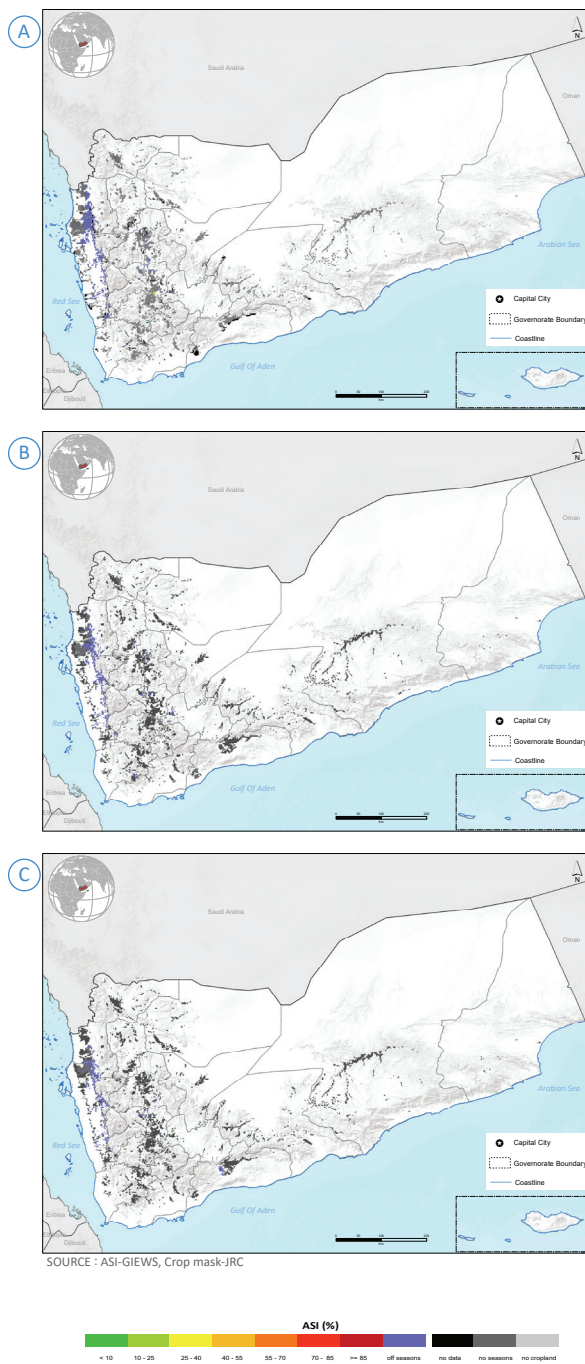


Fig. 6: Progress of Agricultural Stress Index (ASI) for A) 1 to 10 July B) 11 to 20 July C) 21 to 31 July



II. IMPACT ON AGRICULTURE

Given the drop in temperature and a general increase in rainfall observed throughout July, agricultural activities across the Southern Uplands, Northern and Central Highlands (Fig. 8) have been centered on cereal planting especially of maize, sorghum, wheat, and barley while the harvesting of fruits (e.g., apples, pomegranates, and grapes) and vegetables (e.g., chilly, tomatoes, and potatoes) has been ongoing and is expected to last until the end of September. Farmers in the southern and eastern coastal regions are also engaged in the planting of maize, fodder crops, and harvesting fruits such as dates and bananas. Rainfall has also intensified across the Tihama plain thus leading to an equally intensified period of agricultural operations especially land preparations for the fast-approaching main rainy season which will begin in September. Tihama plain is considered one of the largest agricultural plains in Yemen. It extends from the borders of Sa'adah in the north to Taizz governorate in the south, and it contains five of the largest Wadies in Yemen (i.e., Wadi Zabid, Wadi Rima, Wadi Siham, Wadi Sardud, and Wadi Mawr).

Although increased rainfall was favorable for most agricultural activities such as cereal planting, heavier than normal rains were reported across some parts of the country (See Section I) which led to widespread floods that swept agricultural lands resulting in huge agro-economic losses. According to local reports, rains that fell during the period 21 – 23 July in Al-Maharah, Hadramout, Shabwah, and Abyan governorates killed 14 people and cut off the main roads linking these governorates. In Hadramaut, local reports stated that heavy rains flooded areas of the Wadi and desert districts thus, causing road cuts and significant property as well as agricultural damage. The widespread wet weather conditions were accompanied by a general increase in relative humidity which sparked the spread of fungal and bacterial diseases, especially in vegetables and fruit crops. These conditions were also found to trigger the spread of livestock diseases such as Old World Screwworms (OWS) and diarrheal cases.

In Ibb, Dhamar, Sana'a, and Al Mahwit governorates, rainfall was accompanied by heavy hail which damaged vegetables and fruit trees. Such extreme weather events compounded by ongoing conflicts and general economic decline fuel the current food crisis in Yemen where 79 percent of the population live below the poverty line and have major food consumption gaps². Farmers are therefore strongly advised to take precautions. Specifically, farmers in the Central and Northern Highlands are encouraged to open water drains of their fields to avoid accumulating large amounts of water which may lead to crop damage through injury and root suffocation especially on farms where vegetables, grapes, apples, and pomegranates are grown.

Fall armyworms (*Spodoptera frugiperda*) were spotted across rainfall prone areas with almost 90 percent infestation in Ibb, Dhamar, Taizz, and Sana'a governorates and about 40 percent infestation in Raymah, Al Mahweet, Amran, Sa'adah, and Hajjah governorates thus putting cereal such as sorghum, millet, and maize at risk of damage in these areas. Other vegetables and green fodder were also threatened by the infestation. Although Fall armyworms entered latency³ towards the end of the month their return is eminent especially in Ibb governorate. An integrated

pest management approach that does not rely heavily on pesticides is encouraged across infested areas.

Outlook for August indicate that Desert Locust presence will increase as small scale breeding continues its extension to the Eastern Plateau⁴ following widespread rainfall activities. However, no invasions are expected⁵. Intensive Desert Locusts (DL) surveys indicate that in July, some swarms were present in Sa'adah, Sana'a, Ibb, Al Bayda, Shabwah, Marib, and Hadramaut governorates.

Fig. 7: Forecast for 16 – 31 August 2021

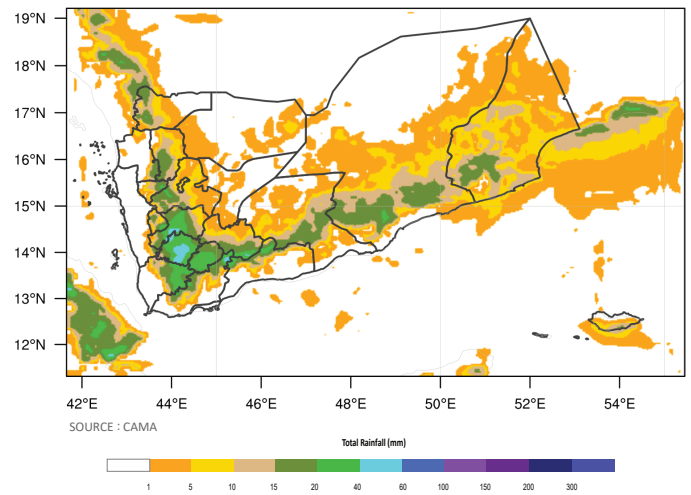
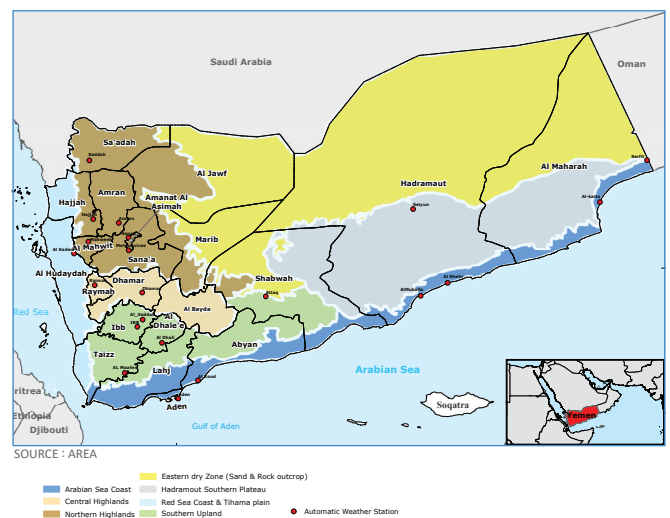


Fig. 8: Agro-ecological zones and location of observatory stations



² <https://www.undp.org/press-releases/prolonged-conflict-would-make-yemen-poorest-country-world-undp-study-says>

³ the state of existing but not yet being fully developed

⁴ <http://www.fao.org/ag/locusts/en/info/info/>

⁵ <http://www.fao.org/ag/locusts/common/ecg/1914/en/DL514e.pdf>

Sources:

- Primary data are sourced from the Civil Aviation and Meteorology Authority (CAMA), Ministry of Agriculture and Irrigation (MAI) and FAO Global Information Early Warning System (GIEWS).
- Vegetation indicators are sourced from FAO GIEWS and are based on 10-day (dekadal) vegetation data from the METOP-AVHRR sensor at 1 km resolution (2007 and after). Data at 1 km resolution for the period 1984-2006 are derived from the NOAA-AVHRR dataset at 16 km resolution. <http://www.fao.org/giews/earthobservation/country/index.jsp?lang=en&code=YEM#> and from the European Union's anomaly hotspots of agricultural production (ASAP)
- Rainfall estimates (RFE2) are sourced from the Climate Prediction Centre (CPC) of The National Oceanic and Atmospheric Administration (NOAA)

Technical Partners

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Resource Partner



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III. VARIATIONS OF RAINFALL AND NDVI

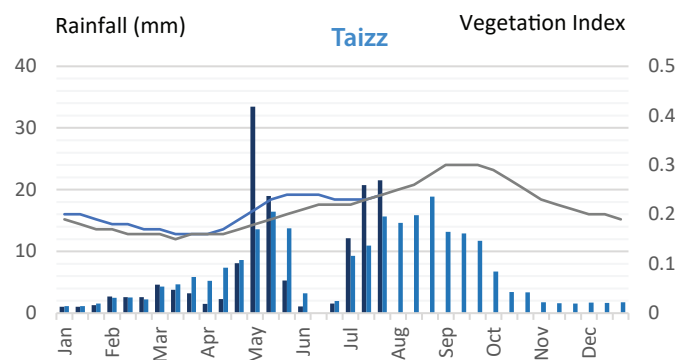
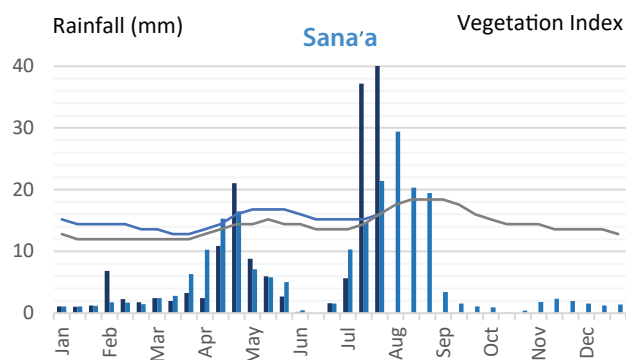
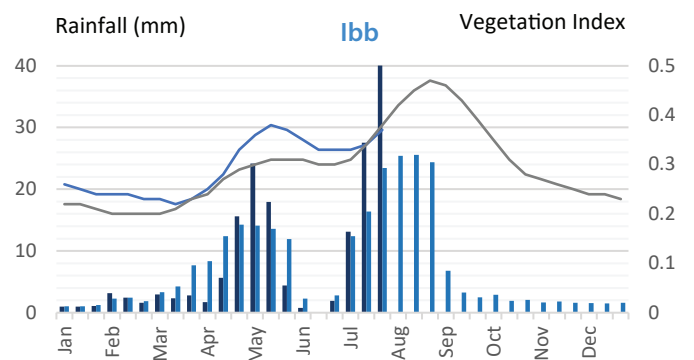
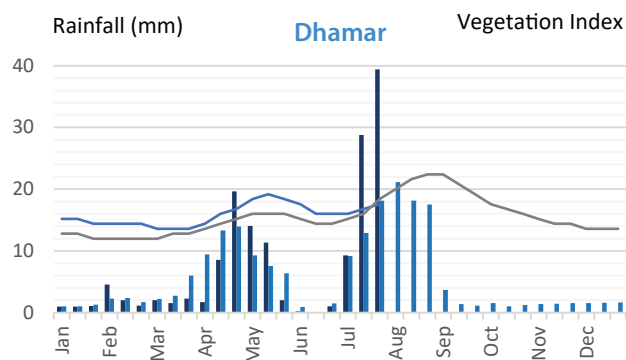
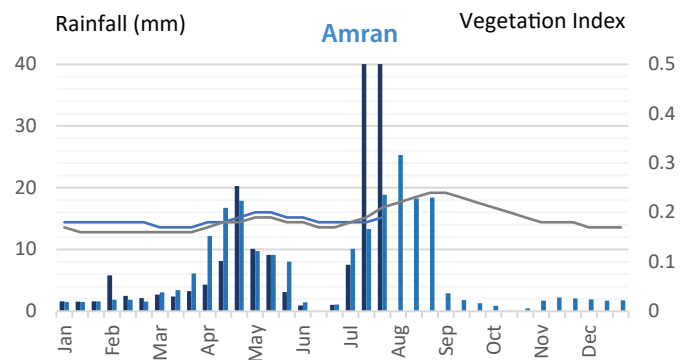
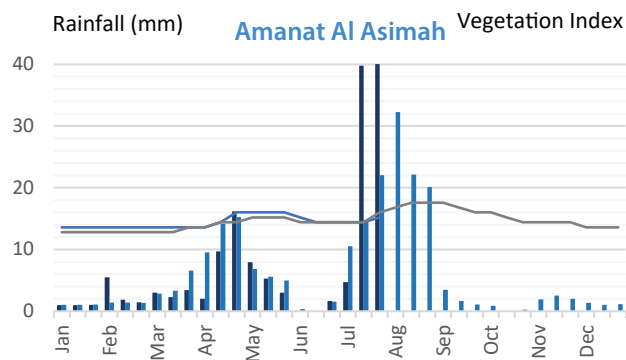
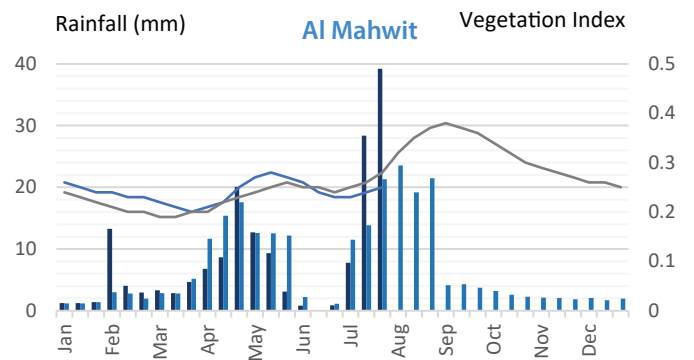
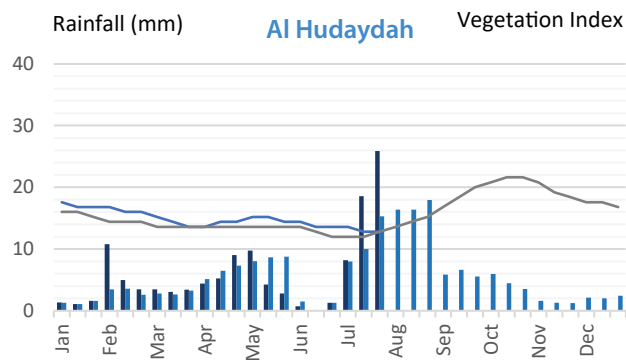
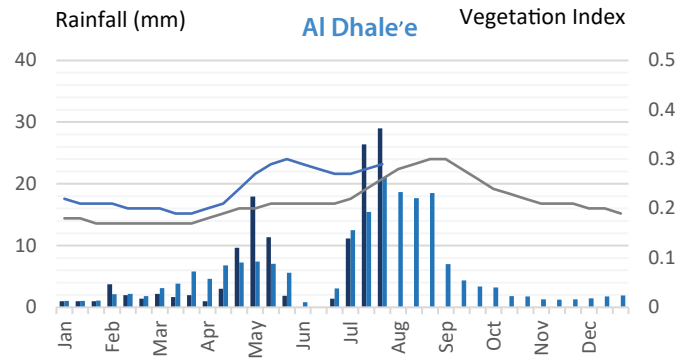
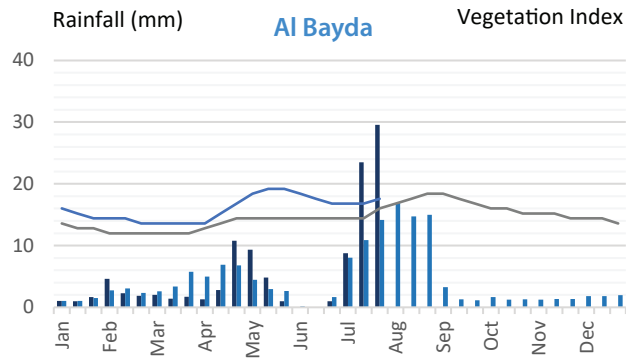


Table 1: Observed Station Data: Rainfall and Temperature

Governorate	Station	Rainfall (mm)	Temperature (°C)	
		Monthly	Max	Min
Abyan	Al Kood	20	36.3	25.2
Aden	Aden	0	38.7	25.8
Al Dhale'e	Al Dhala	99	33.74	17.8
Al Hudaydah	Al Kaden	25	37.6	13.7
Al Hudaydah	Al Hudaydah	20	38.6	15
Al Jawf	Al Jouf	22	42	18.8
Al Maharah	Algaidha	18	36.4	23.8
Al Maharah	Serfeet	381	37.9	18.8
Al Mahwit	Almahweet	199	31.6	13
Amanat Elasemah	CAMA/YMC Office	45	-	-
Amanat Elasemah	Al-Asbahi	89	-	-
Amanat Elasemah	Aljamaah	93	32	14
Amanat Elasemah	Alhasba	91	-	-
Amanat Elasemah	Baghdad	131	-	-
Amanat Elasemah	Shamlan	120	-	-
Amanat Elasemah	Sawan	0	-	-
Amran	Amran	25	33.5	12
Amran	Hamdah	4	31	14
Amran	Qa'a Alboon	96	33	12
Amran	Amran Gov.	101	32	13
Amran	Eial Sourih	0	-	-
Dhamar	Dhamar	93	31.5	9.6
Dhamar	AREA-HQ	309	30	10
Dhamar	Rosabh	0	-	-
Dhamar	Dhamar (MAI)	92	-	-
Dhamar	Maqar-Alhya'a	103	32	12
Dhamar	Qa'a Shrah	0	-	-
Hadramaut	Al Mukalla	8	-	-
Hadramaut	Al Shaheer	8	37.18	24.1
Hadramaut	Seiyoun	26	43.4	22
Hadramaut	Assom	0	-	-
Hadramaut	Tarim	0	-	-
Hadramaut	Sah	0	-	-
Hadramaut	Aliotoof	0	-	-
Hadramaut	Seyun Pr	16	-	-
Hadramaut	Seyun Re	0	-	-
Hadramaut	Hawrah	0	-	-
Hadramaut	Doaan	0	-	-
Hadramaut	Shibam	0	-	-
Hadramaut	Ard Makharsh	0	-	-
Hadramaut	Brom	0	-	-
Hajjah	Hajjah	186	31	15
Ibb	Alsaddah	253	30	12
Ibb	Ibb	269	29.8	13.7
Ibb	Ibb (MAI)	-	30	14
Rimah	Al Jabeen-Rimah	123	27	12.8
Sa'ada	Sadah	35	36.6	15.9
Sana'a	Sana'a	123	33.8	11.6
Sana'a	Al Erah	125	33	14
Sana'a	Sanhan	101	-	-
Shabwah	Ataq	34	39.7	19
Socotra	Socatra	0	33.4	15
Taizz	Al Maafer	47	34.3	19
Taizz	Mashra and Hadnan	-	-	-
Taizz	Al Modafar	-	-	-
Taizz	Al Qahera	-	-	-
Taizz	Wadi Arafat	-	-	-
Taizz	Hawban Qadas	-	-	-
Taizz	Al Akahel	-	-	-
Taizz	Sabar almoadhmi	-	-	-