

**Emergency Transboundary
Outbreak Pest (ETOP) Situation
Update for July, 2017 with a
Forecast till mid-September, 2017
Un résumé en français est inclus**

SUMMARY

The **Desert Locust** (*Schistoseca gregaria* - **SGR**¹) situation remained calm in the Western Outbreak Region (WOR) and only some solitary adults were reported in a few places during July.

Low density immature and mature adults were detected in River Nile State and some copulating adults were observed in irrigated areas in Northern State in **Sudan** in the Central Outbreak Region (COR) in July. Surveys were not possible in Darfur or **Yemen** due to ongoing situations. No locusts were reported in other countries in the region during this month.

In the Eastern Outbreak Region (EOR), control operations treated 8,500 ha in **Iran**, but no locusts were reported in other countries in the region during this month.

Forecast: Small-scale breeding is likely in some areas in **Mauritania**, **Mali**, **Niger**, **Chad** and **Algeria** where ecological conditions are favorable due to unusual rainfall, but

significant developments are not likely during the forecast period.

In COR, small-scale breeding is likely in the interior of **Sudan**, in coastal areas in **Eritrea**, eastern **Ethiopia**, **northern Somalia**, **Saudi Arabia** and **Yemen** where moderate to good rainfall was recorded, but significant developments are not likely during the forecast period.

In EOR, limited SGR activities are likely in summer breeding areas along **Indo-Pakistan** borders, but significant activities are not expected during the forecast period.

Red (Nomadic) Locust (*Nomadacris septemfasciata*) (**NSE**): NSE swarms and concentrations persisted in Lake Chilwa/Lake Chiuta Plains in **Malawi** and **Mozambique**, in Ikuu Katavi plains and Malagarasi Basin in **Tanzania** and in Kafue Flats in **Zambia** during July. Scattered NSE populations were also reported in Buzi Gorongosa plains in **Mozambique**.

Fall armyworm (FAW) (*Spodoptera frugiperda*) (**SFR**): SFR continued damaging maize and other crops in **Ethiopia**, **Kenya**, **South Sudan**, **Uganda**, **Malawi**, **Tanzania**, **Zambia** and **Zimbabwe** during July. SFR (FAW) has also been detected / reported in Sahel West Africa in **Burkina Faso**, **Cape Verde**, **Mali**, and **Niger**. Aided by the inter-tropical front and seasonal trade winds, the pest continues spreading and taking advantage of associated ecological

¹ Definitions of all acronyms can be found at the end of the report.

conditions to breed. Its presence is suspected in the **Gambia, Sierra Leone** and **Senegal**, but yet to be confirmed (**inexperienced observers can confuse SFR with the indigenous African Armyworm (AAW)**) (AGRHYMET, FAO/SSD, IRLCO-CSA, PPD/Ethiopia, OFDA/PSPM, PHS/Tanzania).

USAID/OFDA/PSPM continues closely monitoring SFR (FAW) and other ETOPs and engaging with key national, regional and international partners to explore and investigate the most effective means and ways to address the looming threat to food security and livelihoods of vulnerable populations and provide advice, guidance and updates as often as necessary.

For further detail on SFR (FAW) please, see below pages 10-16.

African Migratory Locust (LMI) and *Catolopus* grasshopper populations persisted in the Kafue flats in **Zambia** during this month, but further details were not available at the time this report was compiled

The African Armyworm (AAW): The AAW outbreak season has ended in the IRLCO-CSA member-states and no AAW outbreaks were reported during July. AAW infestations were reported in June in **Ethiopia** and **Uganda** where control operations were carried out with material and technical assistance from the MoA and it is likely that this pest continued

causing a problem in these countries. An update was not reported at the time this report was compiled, however, it is likely that the pest continued appearing in these countries and elsewhere in the region and affecting crops and pasture (IRLOC-CSA, OFDA/PSPM).

Italian (CIT), Moroccan (DMA), Asian Migratory (LMI) Locusts:

No update was received at the time this report was compiled, however, it is likely that CIT and LMI activities continued in the primary outbreak and invasions areas in the CAC region in July (OFDA/PSPM).

Tomato leaf miner (*Tuta absoluta* - TAB) outbreak was reported in Botswana back in February, but no update received at the time this report was compiled.

Note: TAB is native to the tropical South America and alien to the African continent. Since it was first detected in Spain in 2006 it has reached dozens of countries across Africa, Europe, Mediterranean, Middle East, Asia and Pacific.

In Africa, TAB was first detected in 2008 and has since spread to over 16 countries stretching from North Africa to Central West Africa to East Africa and to Southern Africa. It will continue spreading over much of the continent and affect tomatoes and other fruits and vegetables. This pest is expected to have been on AU's phytosanitary quarantine pest list along with SFR or included on such list
End note.

Quelea (QQU): QQU outbreaks were not reported in the IRLCO-CSA member-states during July, but no updates were reported in DLCO-EA member-countries during this month (IRLCO-CSA, OFDA/PSPM).

Active surveillance and timely preventive interventions in areas where ETOP activities persist are essential to abate any threats these pests pose to crops and pasture remain critical at all times.

The **USAID/OFDA-FAO-DLCO-EA** sponsored emergency desert locust management project for the Horn of Africa is showing progress. Technical and material supports have been provided to strengthen capacity of participating locust affected frontline countries to better monitor, report, prevent, and abate locusts in the sub-region.

USAID/OFDA/PSPM continuously monitors ETOPs in close collaboration with its network of national PPDs/DPVs, Migratory Pest Units and international and regional organizations, including FAO, CLCPRO, CRC, DLCO-EA, IRLCO-CSA and provides timely analytical reports, updates and advices to HQ, field staff, partners and other stakeholders as often as necessary. **End summary**

RÉSUMÉ

La situation du Criquet pèlerin (Schistoseca gregaria - SGR) est restée calme dans la région de

Western Outbreak (WOR) et seulement quelques adultes solitaires ont été signalés en quelques endroits en juillet.

Des adultes démultipliés et matures ont été détectés dans l'État du Nil-Fluvien et certains adultes copulants ont été observés dans les régions irriguées de l'État du Nord au Soudan dans la région d'émergence centrale (COR) en juillet. Des enquêtes n'étaient pas possibles au Darfour ou au Yémen en raison de situations en cours. Aucun criquet n'a été signalé dans d'autres pays de la région au cours de ce mois.

Dans la région d'évasion de l'Est (EOR), les opérations de contrôle ont traité 8 500 ha en Iran, mais aucun criquet n'a été signalé dans d'autres pays de la région au cours de ce mois.

Prévisions: l'élevage à petite échelle est probable dans certaines régions de la Mauritanie, du Mali, du Niger, du Tchad et de l'Algérie, où les conditions écologiques sont favorables en raison de précipitations inhabituelles, mais des développements importants ne sont pas probables pendant la période de prévision.

En COR, l'élevage à petite échelle est probable dans l'intérieur du Soudan, dans les zones côtières de l'Érythrée, de l'est de l'Éthiopie, du nord de la Somalie, de l'Arabie saoudite et du Yémen, où des précipitations modérées à bonnes ont été enregistrées, mais des

développements importants ne sont pas probables pendant la période de prévision.

Dans l'EOR, les activités limitées de SGR sont probables dans les zones de reproduction estivale le long des frontières indo-pakistanaises, mais des activités importantes ne sont pas prévues pendant la période de prévision.

Rouge (Nomadic) Locust (Nomadacris septemfasciata) (NSE): des essaims et des concentrations de NSE ont persisté dans les plaines du lac Chilwa / Lac Chiuta au Malawi et au Mozambique, dans les plaines d'Ikuu Katavi et le bassin de Malagarasi en Tanzanie et à Kafue Flats en Zambie en juillet. Des populations dispersées de NSE ont également été signalées dans les plaines de Buzi Gorongosa au Mozambique.

Goutte de l'armée de l'automne (FAW) (*Spodoptera frugiperda*) (SFR): SFR a continué à nuire au maïs et à d'autres cultures en Éthiopie, au Kenya, au Sud-Soudan, en Ouganda, au Malawi, en Tanzanie, en Zambie et au Zimbabwe en juillet. SFR (FAW) a également été détecté / signalé dans le Sahel Afrique de l'Ouest au Burkina Faso, au Cap-Vert, au Mali et au Niger. Aidé par le front intertropical et les alizés saisonniers, le ravageur continue de se propager et de profiter des conditions écologiques associées pour se reproduire. Sa présence est suspectée

en Gambie, en Sierra Leone et au Sénégal, mais encore à confirmer (les observateurs inexpérimentés peuvent confondre le SFR avec le ver de l'armée africaine indigène (AAW) (AGRHYMET, FAO / SSD, IRLCO-CSA, PPD / Ethiopie, PHS / Tanzanie).

L'USAID / OFDA / PSPM continue de suivre de près le SFR (FAW) et d'autres ETOP et s'engager avec des partenaires nationaux, régionaux et internationaux clés pour explorer et étudier les moyens et les moyens les plus efficaces pour remédier à la menace imminente pour la sécurité alimentaire et les moyens de subsistance des populations vulnérables et fournir Conseils, conseils et mises à jour aussi souvent que nécessaire.

Pour plus de détails sur SFR (FAW), veuillez consulter les pages 10 à 16 ci-dessous.

Les populations de **sauterelles Migratrices africaines (LMI)** et **Cataloipus** ont persévétré dans les appartements de Kafue en Zambie au cours de ce mois, mais des détails supplémentaires n'étaient pas disponibles au moment où ce rapport a été compilé

Cheille Légionnaire (AAW):

La saison des épidémies AAW s'est terminée dans les États membres IRLCO-CSA et aucune épidémie AAW n'a été signalée en juillet. Les infestations AAW ont été signalées en juin en Ethiopie et en Ouganda où les

opérations de contrôle ont été menées avec l'assistance matérielle et technique du MoA et il est probable que ce parasite continue de causer un problème dans ces pays. Une mise à jour n'a pas été signalée au moment où ce rapport a été compilé, mais il est probable que le ravageur continue à apparaître dans ces pays et ailleurs dans la région et affecte les cultures et les pâturages (IRLOC-CSA, OFDA / PSPM).

Italien (CIT), Marocaine (DMA), Migrateurs asiatiques (LMI)

Criquets: Aucune mise à jour n'a été reçue au moment où ce rapport a été compilé, mais il est probable que les activités CIT et LMI se sont poursuivies dans les zones d'épidémie primaires et d'invasions dans la région CAC en juillet (OFDA / PSPM).

L'épidémie de mine de feuilles de tomates (**Tuta absoluta - TAB**) a été signalée au Botswana en février, mais aucune mise à jour reçue au moment où ce rapport a été compilé.

Note: TAB est originaire de l'Amérique du Sud tropicale et étranger au continent africain. Depuis qu'il a été détecté pour la première fois à Sprain en 2006, il a atteint des dizaines de pays à travers l'Afrique, l'Europe, la Méditerranée, le Moyen-Orient, l'Asie et le Pacifique.

En Afrique, le TAB a d'abord été détecté en 2008 et s'est depuis répandu dans plus de 16 pays s'étendant de l'Afrique du Nord à

l'Afrique Centrale-Orientale en Afrique de l'Est et en Afrique australe. Il continuera à s'étendre sur une grande partie du continent et affectera les tomates et autres fruits et légumes. Ce parasite devrait avoir été sur la liste de parasites de quarantaine phytosanitaire de l'UA avec SFR ou inclus sur cette liste **Note finale**.

Quelea (QQU): les éruptions QQU n'ont pas été signalées dans les États membres IRLCO-CSA en juillet, mais aucune mise à jour n'a été signalée dans les pays DLCO-EA au cours de ce mois (IRLCO-CSA, OFDA / PSPM).

La surveillance active et les interventions préventives en temps opportun dans les domaines où les activités ETOP persistent sont essentielles pour réduire les menaces que ces organismes nuisibles posent aux cultures et les pâturages restent critiques en tout temps.

Le projet de gestion des criquets pèlerins de l'urgence USAID / OFDA-FAO-DLCO pour la Corne de l'Afrique affiche des progrès. Des supports techniques et matériels ont été fournis pour renforcer la capacité des pays de première ligne affectés par les acridiens à mieux surveiller, signaler, prévenir et réduire les sauterelles dans la sous-région.

L'USAID / OFDA / PSPM surveille en permanence les ETOP en étroite collaboration avec son réseau de PPD / DPV nationaux, les unités de lutte antiparasitaire et les organisations

internationales et régionales, y compris la FAO, CLCPRO, CRC, DLCO-EA, IRLCO-CSA et fournit des rapports analytiques, des mises à jour Et des conseils au QG, au personnel de terrain, aux partenaires et aux autres parties prenantes aussi souvent que nécessaire. **Résumé final**

OFDA's Contributions to ETOP Activities

The online Pesticide Stock Management System (PSMS) that was developed with financial assistance from USAID/OFDA and other partners has been installed in some 65 countries around the globe and is helping participating countries maintain inventories. Thanks to this tool many countries have been able to avoid unnecessary procurements and stockpiling of pesticides and helping them avoid costly disposal operations and improve safety and well-being of their citizens and shared environment.

The USAID/OFDA funded community-based armyworm monitoring, forecasting and early warning (CBAMFEW) project that was concluded last September has been incorporated in the annual work plan of the national crop protection departments in all participating countries <http://bit.ly/1C782Mk>. The project enabled farmers to detect and report AAW and prevent major crop/pasture damage. Participating countries continue expressing their gratitude for having the project implemented in their countries. USAID/OFDA/PSPM will maintain a line of communication with participating countries and monitor progresses.

OFDA/PSPM is working with other interested parties to explore means and

ways to expand this innovative technology to other AAW affected countries and benefit farmers and rural communities.

OFDA/PSPM's interests in sustainable pesticide risk reduction in low income countries to strengthen their capacities and help improve safety of vulnerable populations and shared environment continued. It intends to expand this initiative to other parts of Africa, the Middle East, CAC, etc., as needed. OFDA continued its support for DRR programs to strengthen national and regional capacities for ETOP operations. The program which is implemented through FAO has assisted several frontline countries to mitigate, prevent, and respond to ETOP outbreaks. It has helped participating countries avoid from misuse and mishandling of pesticides, pesticide-incorporated materials and application platforms.

*USAID/OFDA-sponsored project implemented by FAO to strengthen national and regional capacity for locust control and prevention and help more than 25 million people in Caucasus and Central Asia (CAC) live of agriculture and livestock ended this month. The project has promoted and created collaboration among neighboring countries for joint monitoring, surveillance, reporting and preventive interventions for three major locust species in the region. Thanks to this project, dozens of technical staff from **Sahel West Africa, Northwest Africa, Eastern and Northeastern Africa, CAC, and the Middle East** were trained in health and safety of rural communities and Environmental Monitoring in ETOP operations and PSMS management.*

Note: ETOP SITREPs can be accessed on USAID Pest and Pesticide Management website: USAID/OFDA PPM Website

Weather and Ecological Conditions

WOR: With the inter-tropical front (The Front) moving further north by hundreds of km than its usual position and reaching central Mauritania, northwest Mali, southern Algeria, northern Niger and northeastern Chad, low to moderately heavy rains continued falling in several places in summer breeding areas in the region for the 2nd consecutive months.

In **Mali**, light to moderate rains were recorded across the country except for a few areas in northwest region of Kayes, north of Ségou and Koulikoro where dry conditions persisted. Ecological conditions are progressively improving and annual and perennial plants are developing and the soil is moist in areas of recent rainfall and low laying wadis in **Mali**.

In **Chad**, The Front oscillated between the 18th and 20th parallel and as a result precipitation was reported in Abeche, Haraze Djombo, Guéreda and Arada with the average maximum temperature of 39°C in Faya during July. Ecological conditions are favorable in some areas in southern **Algeria** and in Zizi and Ghris Valley in southeastern **Morocco** during July (CNLA/Chad, CNLA/Mauritania, CNLAA/Morocco, CNLP/Mali, CNLA/Tunisia, FAO-DLIS, NCLC/Libya).

Note: Combinations of precipitation, warm weather and green vegetation MUST be closely watched as this mix coupled with the seasonal wind trajectory can favor, breeding and facilitate

migration and further spread of the new pest – **Fall Armyworm. End note.**

COR: In COR, good rains were reported in summer breeding areas in **Sudan**. Moderate rainfall was reported and vegetation has begun developing in North Kordofan State in Sudan. Light to moderately heavy rains were reported in Muscat, Dakhiliya, North and South Sharqiya, North and South Battinah, Bureimi and Dhahera regions in **Oman** during July, but ecological conditions remained unfavorable for SGR to develop.

In **Yemen** light to moderately heavy rains fell during the 1st and 2nd dekads of July in the interior Areas in Marib, Ataq, Hadhrmout and Al Jof. Rain also fell in winter breeding areas around Gulf of Aden, southern coastal areas along the Arabian Sea between Am Rija in Lahij and Ahor in Abyan as well as in southern Tehama in July. Flooding occurred in some of in these places (DLMCC/Yemen, DLMC/Oman, FAO-DLIS, PPD/Sudan).

EOR: Moderate to heavy rains continued falling in summer breeding areas along the Indo-Pakistan borders from Rajasthan to Tharparkar and Cholistan. Light rain was reported in southeastern Iran during July (FAO-DLIS).

NSE Outbreak Region: The NSE outbreak regions generally remained cool and dry during July. Only isolated showers were recorded in a few places in Buzi Gorongosa plains in **Mozambique** (Gorongosa 20 mm, Nhamatanda 12 mm, Buzi 18 mm, Mafambisse 30 mm). Vegetation burning continued in most of the outbreak areas further drying up ecological conditions (IRLCO-CSA, PPD/Uganda).

CAC: In Central Asia, the weather has been favorable for locusts to further develop in the CAC regions in July.

http://www.cpc.ncep.noaa.gov/products/international/casia/casia_hazard.pdf

Note: Changes in the weather pattern and the rise in temperature can contribute to ecological shift in ETOP habitats and increase the risk of pest outbreaks, resurgence and emergence of new pests. In Uzbekistan, Moroccan locust (DMA) which is normally a low to medium altitude pest has shown a considerable vertical habitat expansion by up to 1,000 feet or 300 meters from its normal ambient altitude due to warmer higher elevations.

The **Asian migratory locust**, an insect that bred just once a year, recently began exhibiting two generations per year. These anomalous manifestations and phenomena, which are largely attributed to the change in the weather pattern and associated ecological shift, are a serious concern to farmers, rangeland managers, crop protection experts, development and humanitarian partners and others. Regular monitoring, documenting and reporting anomalous manifestations in pest behavior and habitat remain critical to help avoid and minimize potential damages to crops, pasture and livestock and reduce subsequent negative impacts on food security and livelihoods of vulnerable populations and communities. **End note.**

Detailed Accounts of ETOP Situation and Forecast for the Next Six Weeks

SGR – WOR: SGR situation remained calm in most of the WOR except limited control that treated 3 ha in irrigated

areas in **Algeria** during July. No locusts were reported in Chad, Libya, Mali, Mauritania, Morocco, Tunisia or other countries in the WOR in July (CNLA/Chad, CNLP/Mali, CNLAA/Morocco) (CNLA/Mauritania, CNLA/Libya, CNLA/Tunisia, FAO-DLIS).

Forecast: Small-scale breeding is likely in some areas in Mauritania, Mali, Niger, Chad and Algeria where ecological conditions are favorable due to unusual rainfall, but significant developments are not likely during the forecast period (CNLA/Chad, CNLP/Mali, CNLAA/Morocco) (CNLA/Mauritania, CNLA/Libya, CNLA/Tunisia, FAO-DLIS).

SGR (Desert Locust) - COR: Survey operations covered over 75,000 ha in White and River Nile, North Kordofan, Red Sea, Kassala, Khartoum and the Northern State in **Sudan**, but only low density immature and mature adults were detected in irrigated areas along the Nile Valley, Atbara seasonal river and near Sodiri (North Kordofan) and summer breeding areas in the Red Sea State. Copulating adults were also reported in Amtar irrigated scheme south of Ed debbo.

In **Oman** surveys were carried out in Bureimi and Dakhiliya regions, but no locusts were detected. Survey operations were not possible in **Yemen** due to ongoing problem and the locust situation remains unclear although adults may be present in the interior of the country where rainfall was reported during this month. No locusts were reported in Eritrea, Ethiopia, Somalia, Djibouti, or Saudi Arabia during July (DAF/Djibouti, DLMCC/Yemen, FAO-DLIS, LCC/Oman, PPD/Sudan).

Forecast: In COR, low numbers of adults may appear and breed on small-scale in areas of recent rainfall between West Darfur and the Red Sea hills in **Sudan** and **Yemen** more adult locusts will likely appear and breed on small-scale in the interior of Marib, Ataq, Hadhrmout and Al Jof as well as the southern coastal areas during the forecast period in areas where rains fell during July, but significant developments are not likely here or elsewhere in the region during the forecast period (DLMCC/Yemen, FAO-DLIS, LCC/Oman, PPD/Sudan).

SGR - EOR: Hoppers and adult locusts were treated on some 8,500 ha in Jaz Murian Basin in southeastern **Iran** during the 1st dekad of July. Isolated adults were reported in the summer breeding areas along the **Indo-Pakistan** borders where above-normal monsoon rains were reported. Scattered, mature solitary adults were reported in summer breeding areas in Baluchistan, Pakistan. No reports were received from Afghanistan, Iran or India during this month (FAO-DLIS).

Forecast: In EOR, limited SGR activities are likely in summer breeding areas along **Indo-Pakistan** borders, but significant activities are not expected during the forecast period (FAO-DLIS).

Active monitoring, timely reporting and preventive interventions remain critical to abate any major developments that could pose serious threats to crops and pasture in areas where locust activities are present.

Red (Nomadic) Locust (NSE): NSE situation remained serious in its southern outbreak region where swarms and concentrations persisted in the Lake

Chilwa/Lake Chiuta Plains (the plain is shared by **Malawi** and **Mozambique**), more than 10,000 ha of infested areas in this area need to be controlled to reduce further population increase and the threats they cause. Community Based Monitors reported the presence of scattered populations in Buzi Gorongosa plains in **Mozambique**. NSE swarms and adult concentrations were also detected in IkuuKatavi plains and Malagarasi Basin in **Tanzania** as well as in Kafue Flats in **Zambia** (IRLCO-CSA).



(file photo)

Forecast: Vegetation burning that is in progress in all NSE outbreak areas will force locust swarms and groups to further concentrate. If left uncontrolled the locusts will likely migrate and threaten crops and pasture in neighboring countries. Concerted efforts are required to carry out active surveillance, scouting, monitoring and to the extent possible, implement preventive interventions in the outbreak areas and abate further spread.

African Migratory Locust (LMI) and Cataloipus grasshopper populations persisted in the Kafue flats in **Zambia** during this month, but further details were not available at the time this report was compiled (IRLCO-CSA).

IRLCO-CSA, the only regional entity in the southern region with the mandate to survey, monitor, help prevent and control locusts, armyworm and quelea birds, continues appealing to its member-states to avail resources to carry out timely surveillance and control interventions. It is in the interest of all concerned countries and partners that IRLCO-CSA member-states favorably respond to the Organization's appeal for resources to prevent these pests successfully from ravaging crops and pasture (IRLCO-CSA, OFDA-AELGA).

Madagascar Migratory Locust (LMC): No update was received at the time this report was compiled. However, locust activities are expected to have continued in the primary outbreak areas in the central plateau and other parts of the country during July.

www.fao.org/emergencies/crisis/madagascar-locust/en/.
<http://www.fao.org/emergencies/resources/videos/video-detail/en/c/430729/>

Italian (CIT), Moroccan (DMA) and Migratory (LMI) Locusts in Central Asia and the Caucasus (CAC): No update was received at the time this report was compiled, however, it is likely that CIT and LMI activities continued in the primary outbreak and invasions areas in the CAC region during July. It is to be recalled that in June control operations treated 3,437 ha against late instar hoppers and adult CIT in Kakheti and Kvemo Kartli regions of Georgia. At the time the locusts were reported causing damage to sorghum, sunflowers, winter pastures, melons and watermelons, vegetables (PPD/Georgia). (PPD/Georgia, OFDA/PSPM).

Forecast: Ecological conditions have improved and locust activities continue developing in most of breeding areas. + Breeding areas, such as, northern **Afghanistan** where undisturbed prolonged egg laying exploited the ongoing insecurity situation are expected to experience increased locust activities. Vigilance, mapping hatching grounds and to the extent possible, preventive interventions remain essential.

Note: Italian, Migratory and Moroccan locusts and some grasshopper species are a constant threat to the CAC region. They profusely multiply and attack tens of millions of hectares of crop and pasture and adversely affect food security and livelihoods of more than 20 million vulnerable inhabitants that eke out a living primarily from farming and herding. With the ability to travel more than 100 km (60 miles) each day, these locusts can decimate dozens of hectares of cereal crops, pasture, cotton, fruit trees, leguminous plants, sunflower, tobacco, vineyard, vegetable and others over vast areas. Many CAC countries affected by these locusts lack robust and well established capacity to effectively prevent and control these pests, but do their level best and invest tremendous amounts of resources to keep these pests under control. USAID/OFDA has been supporting a DRR program to strengthen national and regional capacity to help abate these beasts (for further detail, refer to page 6, column two paragraph two). **End note.**

**Fall armyworm (FAW)
(*Spodoptera frugiperda*) (SFR):** SFR continued affecting late planted and or irrigated maize crops in **Ethiopia, Kenya, South Sudan, Uganda, Malawi, Tanzania, Zambia**

and **Zimbabwe** during July. The pest continues spreading aided by the inter-tropical front and seasonal trade winds and breeds taking advantage of associated moisture. It has also been detected / reported in Sahel West Africa in **Burkina Faso, Cape Verde, Mali, and Niger** and suspected in the **Gambia, Sierra Leone** and **Senegal**, but has yet to be confirmed.

(inexperienced observers can confuse SFR with the indigenous African Armyworm (AAW))

(AGRHYMET, FAO/SSD, IRLCO-CSA, OFDA/PSPM, PPD/Ethiopia, PPD/Uganda, PHS/Tanzania)

In **Ethiopia**, as of July 31, 2017 (Hamlie 24, 2009 E.C.) 2,689,684 ha of maize were planted and more than 616,264 ha were reported attacked by FAW in 411 districts in 49 zones in six administrative regions. Control operations were effected in more 483,695 ha – 213,872 ha with chemical and 269,763 ha through mechanical and cultural means (PPD/Ethiopia).

An earlier estimate by MoA/Ethiopia, i.e., a potential loss of 15–30% in SNNP and 5–10% in Oromia where some localities reported 100% loss to FAW was revised and puts a potential harvest loss of some 5% across the affected regions of the country. This estimate could increase as the pest continues affecting more and more crops. GoE has so far responded to the FAW with material, logistics, and financial support worth more than USD 2 million. It has extended a call to the public and the army to help abate the devastation the pest is causing. UN/FAO has provided USD 600,000

through its Technical Cooperation Project (TCP) to support FAW operations in the country. OCHA estimates some 2 million ha could be affected and USD 3.1-4.5 would be needed to abate the pest (OCHA).

<https://www.acaps.org/country/ethiopia/special-reports>



Fall armyworm

SFR (FAW) larva (file photo K State R and E)

FAW continued its north and westward migration following the inter-tropical front and taking advantage of associated rain during July. As of July 28, 2017, the pest has been detected, reported and /or suspected in several countries in Sahel West Africa - **Burkina Faso, Cape Verde, the Gambia, Mali, Niger, Sierra Leone** and **Senegal**. According to information received on July 28, FAW had caused a significant damage to maize, sorghum, rice and other cereal crops in 30,000 ha in 13 regions in **Burkina Faso**. The GoBS has spent USD 2.3 million for pesticides and application equipment and has since called on farmers to procure their own pesticides to fight the pest (AGRHYMET, Bloomberg).

In **Kenya**, SFR outbreak continued affecting late planted maize crops in July

and control operations were carried out by affected farmers with technical and material support from the Ministries of Agriculture was in progress. The MoA in **Kenya** provided training to extension staff and farmers on identification and control of FAW. The Country estimates 20-25% crop loss to FAW overall and allocated substantial amount of monetary and personnel resources to counter the pest that has already attacked and/or threatened maize crops in most of its maize growing countries. National Agricultural Research Centers are aggressively exploring and investigating for effective and sustainable control tools (IRLCO-CSA, PPD/Kenya).

Irrigated maize crops are attacked by FAW in **Malawi, Tanzania, Zambia** and **Zimbabwe** and control operations are implemented by the affected farmers with technical and material assistance from the MoAs. Comprehensive loss estimates have yet to be available, but it is expected that substantial losses will be incurred by the affected countries across the continent (IRLCO-CSA).

In July, FAW was reported attacking maize and sorghum in Eastern Equatorial State, Jubik, Central Equatorial, Northern Bahr El Gazal and Western Equatorial State Tambura Counties (FAO/SSD) in the **Republic of South Sudan (SSD)**. SFR has been reported in SSD since June where it was reported attacking maize and sorghum fields in Eastern, Central and Western Equatorial (Nzara and Tambura Counties) and Northern Bahr El Ghazal. In Jubik it was detected during the 3rd dekad of June. According to FAO/**SSD**, farmers in Magwi Country in Eastern Equatorial State first detected the pest in areas adjacent to northern Uganda where it was observed attacking

late planted maize crops during mid-May, but neither the farmers nor the extension staff were able to determine whether it was African armyworm or FAW or other armyworm until a field photo was shared with OFDA/PSPM senior technical advisor who identified the pest as SFR. Access to the affected areas in iMagwi County was not possible to FAO staff due to the security situation in the region (FAO/SSD).



Maize plant damaged by SFR (PPD/SSD, July, 2017)

The first FAO/SSD field visit to the affected areas in Magwi County took place during the 3rd dekad of June where staff could travel with a UNMISS convoy and assess maize fields that were affected (see pictures below). The preliminary assessment suggested serious crop damage in 25% of the fields that were affected. Early planted maize fields were largely free from the pest attack.

The pest has gained attention from GoSSD for support. Meanwhile, mechanical and cultural interventions remain essential to assist affected farmers, e.g., handpicking larvae, intercropping, crop coverage, crop hygiene, destroying severely affected

plants, regular monitoring to reduce the larval caseload while other means of control interventions will be aggressively explored and implemented as soon as possible. USAID/OFDA/PSPM continues communicating with partners in SSD and shares relevant technical information with partners. OFDA/PSPM will continue monitoring the situation closely and provide advice and guidance as necessary.

Although an update was not received from **Uganda**, it is likely that the pest continued attacking maize crops in northern and other parts of the country during this month. Earlier MoA/**Uganda** estimates a potential annual loss of some 450,000 MT of maize to potentially established and unabated SFR outbreaks. GoU assisted affected farmers with material and technical support and helped control FAW outbreaks. It has also developed an action plan with a budget of USD 1 million before the pest migrated to several dozen districts and it is expected to have revised the action plan after the pest continued affecting many more districts (MoA/Uganda).

Rwanda has developed an action plan and mobilized its military force to control SFR caterpillars through mechanical and means.

Burundi requested an emergency technical assistance from FAO and FAO is considering a TCP project to assist with FAW issues (FAO-SFE)

Tanzania has developed an action plan to carry out surveillance and monitoring during the coming seasons and is on the lookout (PHS/Tanzania).

The Republic of **Sudan** took a preventive action back in June to get ahead of a

potential SFR invasion and sent PPD experts to **Ethiopia** in collaboration with FAO/SFE and PPD/Ethiopia to observe, learn biology, detection, prevention and control interventions (PPD/Ethiopia).

Forecast: SFR will continue attacking late planted and irrigated crops in Ethiopia, South Sudan and may reach Sudan, and Eritrea. *In the southern Africa outbreak region, SFR will likely attacking crops, especially irrigated cereal and late planted crops.* With the inter-tropical front in Sahel West Africa moving further north by close to 350 km than its usual position and reaching central Mauritania, northwest Mali, southern Algeria, northern Niger and northeastern Chad SFR (FAW) will take advantage of associated rainfall and ecological conditions to further spread to rain-fed and irrigated cropping areas in these countries and cause damage to crops and pasture. The seasonal trade winds that may appear in the surrounding areas during the coming months will increase the chance of the pest spreading beyond Sahel Africa (OFDA/PSPM).

*It is to be recalled that FAW was first reported in southcentral West Africa – **Nigeria, Benin, Sao Tome and Principe, and Togo** and later in **Ghana, and Cameroon**. The FAW larval specimens that were collected in **Togo** where identified by USDA/ARS scientists as similar to those that exist in Central (Meso) America and southeastern states of the United States (i.e., Florida, etc.) (Nagoshi et al. 2017). It has yet to be determined whether caterpillars that affected Southern Africa and later migrated to Eastern Africa were the*

same as those identified in Togo or Nigeria or different haplotypes.

Note: FAW adult moth can travel up to 100 km/day looking for favorable conditions for breeding and foraging. It has the capacity to reach more than 1,000 km during its life and even further with the support of strong storms and trade winds. The likelihood of this pest appearing more often is high due to its ability to bypass diapauses and continuously breed under ideal ecological conditions. This will be exacerbated by the presence of late planted and irrigated maize and other crops in different regions across the continent. However, a comprehensive assessment of its impact on crops and pasture has yet to be studied. Meanwhile, efforts should be made at all levels to remain vigilant and implement appropriate interventions to the extent possible. Countries that have installed pheromone and other traps are urged to continue managing the traps and reporting on moth catches. Field inspection and extension staff as well as farmers scouts are encouraged to remain vigilant and inspect crops to determine the presence of the pest in their respective regions and share pest information as quickly and regularly as possible. **End note.**

If established on the continent, a phenomenon that appears to be highly likely given the nature of the pest and the favorable ecological and climatological conditions in many countries across the continent, this aggressive and fast spreading pest will likely continue affecting agricultural production across the continent and threaten food security and livelihoods of tens of millions of households.

As a new pest to the continent, extensive studies are required to better understand its biological behavior, host preference, habitat selection, migration range and pattern, and competition between indigenous species, etc., all of which will help develop effective control tools.

Awareness raising and training and empowering local communities, agricultural agents and other concerned entities are essential for effective identification, detection surveillance, monitoring as well as to implement preventive and curative control interventions.

Cultural control, such as intercropping maize with beans have been reported reduced SFR infestation by 20-30 percent (CIMMYT, 2017) and such methods should be experimented and tried out. As part of a long-term preventive and curative control options, identification and selection of resistance crop varieties remain critical to implement as part of inclusive and sustainable pest management strategies. The search and research for biological control tools – parasitoids, parasites, predators, pathogens (e.g., birds, insects, and other animals could predate on SFR and must be aggressively searched for).needs to be encouraged to help develop an array of control tools in a tool box.

So far, different estimates of SFR damage have been suggested on maize in sub-Saharan Africa over the past several months, but comprehensive loss assessments have yet to be concluded as harvests have not come in in several countries. A preliminary Evidence Note from CABI estimates a potential damage of 13.5 million tons of maize (valued at US\$3 billion). The Evidence Note

estimates a predicted total loss of more than USD 13.38 billion in maize, sorghum, rice and sugarcane – mostly rice paddy, maize and sugarcane. This information document is being revised to reflect an ongoing and evolving situation of the SFR.

FAW is not a single farmer or a single community or a single village or even a single country pest. It is a trans-regional pest that needs public efforts, more so in almost all of sub-Saharan Africa. Abating, preventing and effectively managing and/or controlling it would require well organized, concerted beyond-a-single-country efforts.

Actions being taken to address the ongoing damage and abate future threats of SFR (FAW) to food security and livelihoods of millions of farmers across Africa and perhaps beyond

Host-countries across the continent have taken the leading role in assisting affected farmers and communities in the implementation of prevention and curating control interventions. Technical, material and modest financial assistance from different stakeholders have also been instrumental in strengthening affected countries' capacity to identify, assess and implement control interventions.

USAID Actions: USAID has established an intra-agency working group on fall armyworm and brings together experts from USAID, USDA, US Land Grant US Universities, State Department, and several others. The Working Group meets and discusses the ongoing SFR situation, analyzes reports and information, charts the course for better and effective

contributions to preventive and curative interventions from USAID and other GoS entities. It also tracks the FAW situation, actions taken or planned from within and outside the Agencies and shares info and collaborates with different stakeholders across a wide spectrum.

USAID Office of U.S. Foreign Disaster Assistance (OFDA) will soon be co-sponsoring a project to be implemented by UN/FAO, the Desert Locust Control Organization for the Eastern Africa (DLCO-EA), Center for Agriculture and Biosciences International (CABI), International Center for Insect Physiology and Ecology (ICIPE) and of course, National Crop Protection Departments and National Agricultural Research Organizations. The project is aimed at strengthening national and regional capacities and empowering farmers and local communities to better monitor, scout, forecast, prevent and control FAW outbreaks.

USAID/OFDA will soon be sponsoring a project to *develop and distribute a comprehensive expert-vetted standardized fall armyworm management field manual* through a consortium led by the International Center for Maize and Wheat Improvement (CIMMYT). The two projects will complement and strengthen training and capacity strengthening, community-empowerment, and effective SFR prevention and control interventions. They will also augment and streamline relevant action items from the continent-wide FAW Nairobi and other similar meetings.

USAID/OFDA supported field assessments on impacts of FAW on maize crops in Southern Africa and FAW monitoring and

surveillance in the region through its drought response program.

USAID-funded Integrated Pest Management Innovation Lab, a two-day awareness and management workshop in Addis Ababa, Ethiopia in collaboration with ICIPE. Over 75 representatives from international organizations, governments, and missions participated in the workshop.

UN/FAO regional and sub-regional offices in southern, eastern and western Africa conducted training in FAW for national crop protection officers and others in affected countries across Africa. It has also convened technical expert workshop, donors' awareness/appraisal meeting and training workshop on Farmers Field School at its regional in Accra, Ghana. FAO held regional and trans-continental workshops and meetings, including those in Zimbabwe in February and Nairobi in April, 2017 in collaboration with national, regional and international partners and FAW experts to discuss the ongoing FAW situation, factors that lead to the ongoing situation and explore means and ways for effective implementation of sustainable FAW management interventions in close collaboration with national, regional international partners. Other UN Offices (OCHA), partners and stakeholders (e.g. AGRA, CABI, CIMMYT, DiFID, DLCO-EA, ICIPE, etc.,) provided and continue providing technical and material support to help address the SFR problem.

Useful websites on fall armyworm

Armyworm Network: A web resource for armyworm in Africa and their biological control:

<http://www.lancaster.ac.uk/armyworm/>

Latest African and Fall Armyworm Forecast from IRLCO-CSA - 5th Jul 2017:
http://www.lancaster.ac.uk/armyworm/forecasts/?article_id=002971

Invasive Species Compendium Datasheets, maps, images, abstracts and full text on invasive species of the world:
<http://www.cabi.org/isc/datasheet/29810>

Drought and armyworm threaten Africa's food security:
<http://www.theeastfrican.co.ke/news/Drought-and-armyworm-threaten-Africa-food-security/2558-3996692-ggws8q/index.html>

African Armyworm (AAW): AAW outbreaks were reported attacking sorghum and pasture in Dire Dawa, Oromya and the SNNPR, **Ethiopia** where more than 80,300 ha of crops and 35,420 ha of pasture where reported attacked during June. Control operations treated close to 27,960 ha with 38,384 liters of pesticides during that time. AAW infestations may have continued in Ethiopia in July, updates were not available at the time this report was compiled. No AAW outbreaks were reported in the southern outbreak regions in Africa during July (IRLCO-CSA, OFDA/PSPM).

Forecast: AAW outbreaks will likely occur in northern and Rift Valley regions of Ethiopia and perhaps southern Eritrea and Sahel West Africa, but southern outbreak countries will likely remain calm during the forecast period (IRLCO-CSA, OFDA/PSPM).

Where applicable, CBAMFEW forecasters must remain vigilant and report any trap catches on time to concerned authorities

to facilitate rapid interventions (IRLCO-CSA, OFDA/AELGA).

Note: PSPM continuous developing and improving AAW information in both the SOR and COR and so far, printable and web-based maps have been developed for AAW outbreak and invasion countries in the central and southern regions (click on the below link for the maps (OFDA/PSPM in collaboration with the GIU will develop a map for FAW similar to AAW):

<http://usaid.maps.arcgis.com/apps/Viewer/index.html?appid=9d2ab2f918284595819836d1f16a526f>

Quelea (QQU): No updates were received on QQU bird outbreaks in IRLCO-CSA member-states during July. However, outbreaks are likely in Zimbabwe where winter wheat crops are likely affected. During previous month, QQU outbreaks were reported in Konso, **Ethiopia** where the pest was seen attacking Teff and Sorghum crops and it is likely that this continued in July, but no update was received at the time this report was compiled (IRLCO-CSA, OFDA/PSPM).

Forecast: QQU birds will likely continue being a problem to small grain cereal crops in the Rift Valley and Nyanza Provinces of **Kenya** in **Ethiopia**, in Morogoro, Mbeya and Kilimanjaro Regions of **Tanzania** and winter wheat growing provinces in **Zimbabwe** (IRLCO-CSA).

Facts: QQU birds can travel ~100 km/day in search of food. An adult QQU bird can consume 3-5 grams of grain and destroy the same amount each day. A medium density QQU colony can contain

up to a million or more birds and is capable of consuming and destroying 6,000 to 10,000 kg of seeds/day, enough to feed 12,000-20,000 people/day (OFDA/AELGA).

Rodents: No information was received on rodents during July.

Note: On average an adult rat can consume 3-5 gm of food (grains etc.)/day and a population of 200 rats/ha (a very low density) could consume what a sheep can eat in one day (not to mention the amount they can damage, destroy or pollute making it unfit for human consumption) and the zoonotic diseases they carry and can transmit.

All ETOP front-line line countries must maintain regular monitoring. Invasion countries should remain alert. DLCO-EA, IRLCO-CSA, DLCCs, DLMCC, CNLAs, national DPVs and PPDs, ELOs are encouraged to continue sharing ETOP information with stakeholders as often as possible and on a timely basis. Lead farmers and community forecasters must remain vigilant and report ETOP detections to relevant authorities immediately.

Inventories of Pesticide Stocks for ETOP Prevention and Control

During July 3 ha were treated in **Algeria**.

Control operations continued against AAW and SFR (FAW) in several countries in **Sub-Saharan Africa** where hundreds of thousands of ha were affected and treated during this July.

Note: A sustainable Pesticide Stewardship (SPS) can strengthen a pesticide delivery system (PDS) at the

*national and regional levels. A strong and viable PDS can effectively reduce pesticide related human health risks, minimize environmental population, reduce the cost of pest control, improve food security and contribute to the national economy. A viable SPS can be effectively established by linking key stakeholders across political borders and geographic regions. **End note.***

OFDA/PSPM encourages the use of alternatives to hard core pesticides to implement IPM and thereby reduce risks associated with pesticide stockpiling. A judiciously executed triangulation of surplus stocks from countries with large inventories to countries in need is a win-win situation worth considering.

Table 1. ETOP Pesticide Inventory in Frontline Countries during March, 2016

Country	Quantity (l/kg)*
Algeria	1,188,742~
Chad	38,300
Egypt	68,070~ (18,300 ULV, 49,770 l)
Eritrea	17,124~ + 20,000 ^D
Ethiopia	9,681~
Libya	25,000~
Madagascar	206,000~ + 100,000 ^D
Mali	7,000
Mauritania	14,998 ^{DM}
Morocco	3,490,732 ^D
Niger	75,750~
Oman	10,000~
S. Arabia	89,357~
Senegal	156,000~
Sudan	169,710~
Tunisia	68,514 obsolete
Yemen	40,090 ^D + 180 kg GM~

*Includes different kinds of pesticide and formulations - ULV, EC and dust;

~ data may not be current;

^D = Morocco donated 100,000 l of pesticides to Madagascar and 10,000 l to Mauritania in 2015

^D = In 2013 Morocco donated 200,000 l to Madagascar

^D = Saudi donated 10,000 to Yemen and pledged 20,000 l to Eritrea

^{DM} = Morocco donated 30,000 l of pesticides to Mauritania

GM = *GreenMuscle*TM (fungal-based biological pesticide)

LIST OF ACRONYMS

AAW *African armyworm (*Spodoptera exempta*)*

AELGA *Assistance for Emergency Locust Grasshopper Abatement*

AFCS *Armyworm Forecasting and Control Services, Tanzania*

AfDB *African Development Bank*

AME *Anacridium melanorhodon (Tree Locust)*

APLC *Australian Plague Locust Commission*

APLC *Australian Plague Locust Commission*

Bands groups of hoppers marching pretty much in the same direction

CAC *Central Asia and the Caucasus*

CBAMFEW *Community-based armyworm monitoring, forecasting and early warning*

CERF *Central Emergency Response Fund*

CIT *Calliptamus italicus (Italian Locust)*

CLCPRO *Commission de Lutte Contre le Criquet Pélerin dans la Région Occidentale (Commission for the*

	<i>Desert Locust Control in the Western Region)</i>
CNLA(A)	<i>Centre National de Lutte Antiacridienne (National Locust Control Center)</i>
COR	<i>Central SGR Outbreak Region</i>
CPD	<i>Crop Protection Division</i>
CRC	<i>Commission for Controlling Desert Locust in the Central Region</i>
CTE	<i>Chortoicetes terminifera (Australian plague locust)</i>
DDLC	<i>Department of Desert Locust Control</i>
DLCO-EA	<i>Desert Locust Control Organization for Eastern Africa</i>
DLMCC	<i>Desert Locust Monitoring and Control Center, Yemen</i>
DMA	<i>Dociostaurus maroccanus (Moroccan Locust)</i>
DPPQS	<i>Department of Plant Protection and Quarantine Services, India</i>
DPV	<i>Département Protection des Végétaux (Department of Plant Protection)</i>
ELO	<i>EMPRES Liaison Officers –</i>
EMPRES	<i>Emergency Prevention System for Transboundary Animal and Plant Pests and Diseases</i>
EOR	<i>Eastern SGR Outbreak Region</i>
ETOP	<i>Emergency Transboundary Outbreak Pest</i>
Fledgling	<i>immature adult locust /grasshopper that has pretty much the same phenology as mature adults, but lacks fully developed reproductive organs to breed</i>
GM	<i>GreenMuscle® (a fungal-based biopesticide)</i>
ha	<i>hectare (= 10,000 sq. meters, about 2.471 acres)</i>
ICAPC	<i>IGAD's Climate Prediction and Application Center</i>
IGAD	<i>Intergovernmental Authority on Development (Horn of Africa)</i>

IRIN	<i>Integrated Regional Information Networks</i>
IRLCO-CSA	<i>International Red Locust Control Organization for Central and Southern Africa</i>
ITCZ	<i>Inter-Tropical Convergence Zone</i>
ITF	<i>Inter-Tropical Convergence Front = ITCZ)</i>
FAO-DLIS	<i>Food and Agriculture Organizations' Desert Locust Information Service</i>
Hoppers	<i>young, wingless locusts/grasshoppers (Latin synonym = nymphs or larvae)</i>
JTWC	<i>Joint Typhoon Warning Center</i>
Kg	<i>Kilogram (~2.2 pound)</i>
L	<i>Liter (1.057 Quarts or 0.264 gallon or 33.814 US fluid ounces)</i>
LCC	<i>Locust Control Center, Oman</i>
LMC	<i>Locusta migratoriacaupo (Madagascar locust)</i>
LMM	<i>Locusta migratoria migratorioides (African Migratory Locust)</i>
LPA	<i>Locustana pardalina</i>
MoAFSC	<i>Ministry of Agriculture, Food Security and Cooperatives</i>
MoAI	<i>Ministry of Agriculture and Irrigation</i>
MoARD	<i>Ministry of Agriculture and Rural Development</i>
NALC	<i>National Agency for Locust Control</i>
NCDLC	<i>National Center for the Desert Locust Control, Libya</i>
NOAA (US)	<i>National Oceanic and Aeronautic Administration</i>
NPS	<i>National Park Services</i>
NSD	<i>Republic of North Sudan</i>
NSE	<i>Nomadacris septemfasciata (Red Locust)</i>
OFDA	<i>Office of U.S. Foreign Disaster Assistance</i>
PBB	<i>Pine Bark Beetle (<i>Dendroctonus</i> sp. – true weevils</i>
PHD	<i>Plant Health Directorate</i>
PHS	<i>Plant Health Services, MoA Tanzania</i>

PPD	<i>Plant Protection Department</i>
PPM	<i>Pest and Pesticide Management</i>
PPSD	<i>Plant Protection Services Division/Department</i>
PRRSN	<i>Pesticide Risk Reduction through Stewardship Network</i>
QQU	<i>Quelea Qulelea (Red Billed Quelea bird)</i>
SARCOF	<i>Southern Africa Region Climate Outlook Forum</i>
SFR	<i>Spodoptera frugiperda (SFR) (Fall armyworm (FAW)</i>
SPB	<i>Southern Pine Beetle (Dendroctonus frontalis) – true weevils</i>
SGR	<i>Schistoseca gregaria (the Desert Locust)</i>
SSD	<i>Republic of South Sudan</i>
SWAC	<i>South West Asia DL Commission</i>
PBB	<i>Pine Bark Beetle</i>
PSPM	<i>Preparedness, Strategic Planning and Mitigation (formerly known as Technical Assistance Group - TAG)</i>
Triangulation	<i>The process whereby pesticides are donated by a country, with large inventories, but often no immediate need, to a country with immediate need with the help of a third party in the negotiation and shipments, etc. Usually FAO plays the third party role in the case of locust and other emergency pests.</i>
USAID	<i>the United States Agency for International Development</i>
UN	<i>the United Nations</i>
WOR	<i>Western SGR Outbreak Region</i>
ZEL	<i>Zonocerus elegans, the elegant grasshopper</i>
ZVA	<i>Zonocerus variegatus, the variegated grasshopper, is emerging as a fairly new dry season pest, largely due to the destruction of its natural habitat through deforestation, land clearing, etc. for agricultural and</i>

*other development efforts and due
to climate anomalies...*

Who to contact for more information:

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