

**Emergency Transboundary
Outbreak Pest (ETOP) Situation
Report for December with a
Forecast till mid-February, 2013**

Summary

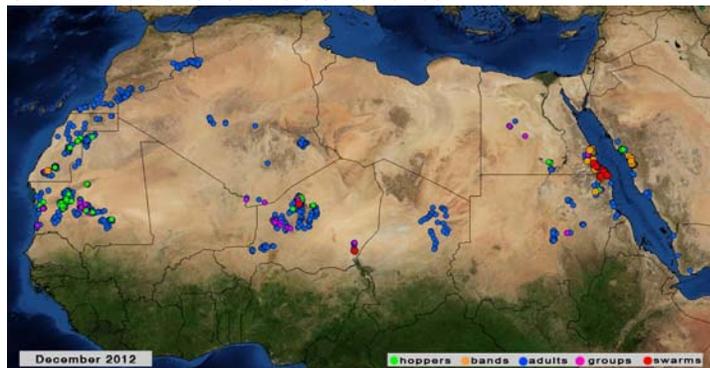
The Desert Locust (SGR¹) situation improved in December in Sahel West Africa and Northwestern Africa. Control operations coupled with unfavorable ecological conditions caused locust numbers to decline. The pest remained active in winter breeding areas in southeastern Egypt, the northern coast of Sudan and Saudi Arabia along the Red Sea coasts where egg laying and hoppers and bands were detected. Control operations continued through December and treated more than 120,000 ha since November. No locusts were reported in other countries during this period (AELGA, DLCO-EA, DLCD/Libya, DPPQS/India, FAO-DLIS, PPD/Sudan).

Forecast: SRG will likely continue breeding and more hoppers, bands and small swarms will form along the Red Sea coasts, but locust numbers will further decline in Sahel West Africa and Northwest Africa. Other outbreak and invasion regions will remain relatively calm during the forecast period (AELGA, DLCO-EA, DLCD/Libya, DPPQS/India, FAO-DLIS, PPD/Sudan).

OFDA will continue monitoring the situation closely and provide updates

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

and advise through its monthly ETOPs SITREPs and *dekadal* alerts.



(SRG situation in December, 2012, FAO-DLIS, December, 2012)

Other ETOPs

Red (Nomadic) Locust (NSE): Extensive surveys were carried out in Tanzania. NSE activities were not reported in the outbreak areas during this time (IRLCO-CSA).

Forecast: Breeding will likely commence and hoppers and bands will form in February in areas where residual parental stocks are expected to have persisted. IRLCO-CSA and MoAs will carry out survey and control where high density hopper bands are located (IRLCO-CSA).

Madagascar Migratory Locust (LMC): No update was received on LMC at the time this report was compiled, but locust activities may have commenced in the primary breeding areas following the seasonal rains (AELGA).

Forecast: LMC activities will likely continue in Madagascar during the forecast period.

Moroccan (DMA), Italian (CIT) and Migratory (LMI) locusts in Central Asia and the Caucasus (CAC): No update was received in December and no locust

activities are expected during this period the CAC.

Forecast: Locusts activities are not expected during the forecast period (AELGA, FAO-AGPM).

African Armyworm (AAW): AAW outbreaks were reported causing considerable damage to maize and pasture crop in Zimbabwe, Zambia, Malawi and Tanzania in December. Some maize fields were completely destroyed and needed re-planting. There are concerns among some farmers that yield from re-planted fields will be significantly reduced (AELGA, IRLCO-CSA, PHS/Tanzania).

Forecast: AAW activities will continue in Zambia, Zambia, Tanzania, Malawi, and possibly begin appearing in Mozambique and other neighboring countries (AELGA, DLCO-EA, IRLCO-CSA).

Quelea (QQU): QQU outbreaks were reported in Nyanza Province in Kenya in December. No QQU activities were reported in other countries during this period (AELGA, DLCO-EA, IRLCO-CSA).

Forecast: QQU birds will likely be a problem to small grain cereal growers in several districts in Kenya, Tanzania and Mozambique (AELGA, DLCO-EA, IRLCO-CSA).

(Note: a single QQU bird can consume and/or destroy 6-10 grams of grain/day and a single QQU colony can contain more than a million birds and consume and/or destroy enough seeds to feed 12,000-20,000 people for one day. End note)

OFDA/AELGA (Assistance for Emergency Locust and Grasshopper Abatement) will continue monitoring ETOP situations closely in all regions and issue updates and advices as often as necessary. **End summary**

Progress in SGR Frontline Countries:

Sahel West Africa's SGR frontline countries (FCs) namely **Chad, Mali, Mauritania, Niger** have established autonomous national locust control units (CNLA) responsible for all DL activities.

Funds provided by the African Development Bank, USAID, the World Bank, France, FAO, host-governments, neighboring countries and others enabled the FCs to equip CNLAs with tools and materials and strengthen the infrastructure as well as help train staff to prevent and respond to SGR outbreaks. Through these, FCs were able to minimize and avoid the threats the SGR poses to food security and livelihoods of vulnerable communities.

It is worth noting that the ongoing insecurity situation in the SRG outbreak region continues undermining implementation of timely and effective survey and control interventions.

CNLAs' continued efforts *to prevent, mitigate, avert and/or respond to potentially devastating SGR outbreaks and invasions* with modest input are a good example of **sustainable disaster risk reduction** that *deserves encouragements and support.*

OFDA ETOP Activities and Impacts

- OFDA/TAG continues its pesticide risk reduction initiatives through stewardship network (PRRSN) programs to ensure safety

of vulnerable populations and protect their assets as well as shared environment against pesticide poisoning and pollution. OFDA/TAG has successfully launched two sub-regional PRRSNs in Eastern Africa and the Horn. The Horn of Africa PRRSN initiative has created a "model" Association dubbed as Pesticide Stewardship Association-Ethiopia (PSA-E).

- Discussions that began several months ago to launch similar PRR initiatives in North Africa and the Middle East were delayed by the unrests manifested. An effort is underway to resume dialogue with partners in these regions.
- OFDA continued its assistance for DRR capacity strengthening programs through a cooperative agreement with FAO to mitigate, prevent, and respond to and reduce the risk of ETOP emergencies, including unsafe use and mishandling of pesticides and application platforms.
- OFDA's assistance for obsolete pesticide prevention and management has enabled FAO to develop a pesticide stock managing system (PSMS) that has streamlined pesticide inventory monitoring and management. Thanks to OFDA's contributions PSMS has enabled participating countries to conduct regular inventories and monitoring and make informed decisions to prevent the accumulation of obsolete stocks and thereby avoid costly disposal operations.
- For the first time, OFDA has started supporting a program to

strengthen national and regional capacities in Central Asia and the Caucasus (CAC). The program which is being implemented by FAO is aimed at strengthening capacity of affected countries to coordinate locust monitoring and reporting as well as jointly plan prevention and mitigation efforts to help abate and minimize the threats these pests pose to food security and livelihoods of vulnerable populations.

- OFDA just recently approved a three-year fixed obligation grant to support a project on scaling up community-based armyworm monitoring, forecasting and early warning. The program is aims at reducing the risk of armyworm threats to food security and livelihoods of rural communities and vulnerable populations Program activities are being coordinated by the Desert Locust Control Organization for Eastern Africa and implemented in Ethiopia, Kenya and Tanzania.

Note: All ETOP SITREPs, including the current one can be accessed on our website:

http://transition.usaid.gov/our_work/humanitarian_assistance/disaster_assistance/locust/ **end note.**

Weather and ecological conditions

The ITCZ migrated further south and only light rain was reported in some of the locust breeding areas in southwestern Libya during the first dekad of December. Moderate to good rains that were recorded in November in a few places in winter breeding areas along the Red Sea coast improved breeding conditions in northeast Sudan, southeast Egypt and northwestern Saudi Arabia. Wadis and low laying grounds in Sudan sustained patched of green vegetation. Dry conditions prevailed in most of the SGR summer

breeding areas. The rains commenced in previous months and continued in most of the NSE outbreak areas and breeding conditions improved from Tanzania to Zimbabwe (AELGA, DLCO-EA, IRLCO-CSA, PPD/Sudan).

Note: *The shift in the ecology and changes in the weather patterns of ETOP habitats are believed to exacerbate the risk of pest outbreaks, resurgence and lead to emergence of new pests. Regular monitoring and reporting of anomalous changes in habitats and pest situation are essential. End note.*

Detailed accounts of the ETOP situation and predictions for the next six weeks are presented henceforth.

SGR - Western Outbreak Region: The SGR situation improved in December in Sahel North Africa. Only small groups of hoppers and adults were seen forming in Niger and northwest Mauritania in early December, but large-scale control operations (close to 120,000 ha in two months) and unfavorable ecological conditions caused locust numbers to decline. Migration of locusts from Sahel North Africa to northwestern Africa decreased significantly during this period. Egg laying was detected in southern Algeria and mature and immature adults were observed in southwestern Morocco where limited-scale breeding was reported. Control operations were carried out in Algeria and Morocco during this period. Low density scattered, immature solitary adults were reported Northwest of Ghat and in Barjouj Agricultural Project in Morzuog in the southwestern Libya. No locusts were reported in other countries in the region during this period (DLCD/Libya, FAO-DLIS).

Forecast: The SGR situation will likely continue to improve and locust number will

decrease in Sahel West Africa and Northwestern Africa during the forecast period. Other countries in the region will remain calm during this period (AELGA, DLCD/Libya, FAO-DLIS).

SGR - Central Outbreak Region:

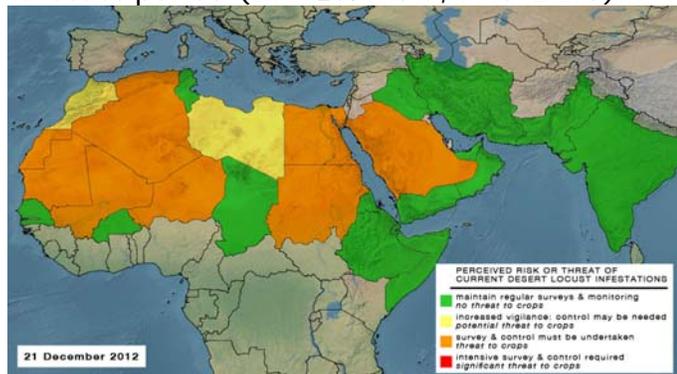
Infestations declined significantly in the summer breeding areas in the interior of Sudan. Locusts that moved to the northeastern coasts of the country formed mature swarms and various instar in *Wadi Diib* where vegetation was green and the soil was wet during the last week of December. Surveys and control operations continued in December in the winter breeding areas along the Red Sea coasts in Egypt, Sudan and Saudi Arabia where a cumulative total of some 14,000 ha was treated during the month. Low density locusts were reported in *Wadi Ok*, *in Toker Delta*, Khor Baraka and the areas between Swakin & Toker where ecological conditions are favorable. Breeding was reported on the northern Red Sea coast of Saudi Arabia where hoppers and bands were formed. Isolated adults were detected on the coastal plain along the Red Sea and Gulf of Aden in Yemen. No locusts were reported in Oman, Ethiopia, Somalia and no reports were received from other countries in the region during this period (DLCO-EA, FAO-DLIS, PPD/Sudan).

Forecast: Breeding is expected to continue in the winter breeding areas in Egypt, Sudan, and Saudi Arabia during the forecast period. Small-scale breeding may also commence on the Red Sea coasts in Yemen and Eritrea during this period, but significant developments are not expected. Other countries in the region will remain relatively calm during this period (see map below for reference) (DLCO-EA, FAO-DLIS, PPD/Sudan).

SGR - Eastern Outbreak Region: No locusts were reported in India, Iran or Pakistan in December (DPPQS/India, FAO-DLIS).

Forecast: Low numbers of adults may appear on the coast of Baluchistan in western Pakistan and southeastern Iran, but significant

developments are not expected during the forecast period (DPPQS/India, FAO-DLIS).



Potential SRG risk levels in the various regions during the forecast period, FAO-DLIS, 2013)

Red (Nomadic) Locust (NSE): Extensive aerial surveys were carried out in the NSE outbreak areas in Wembere, Ikuu-Katavi and Lake Rukwa plains and Malagarasi Basin and Bahi Valley in Tanzania out over more than 138,800 ha. Financial support from UN/FAO provided enabled MoA/Tanzania and IRLCO-CSA to conduct the survey operations which were aimed at assessing ecological conditions and determine potential breeding grounds in the NSE outbreak areas. Some 36,000 ha were considered potentially suitable for breeding. Residual populations in Lake Chilwa/Lake Chiuta plains and Mptasanjoka Dambo in Malawi; Dimba and Buzi-Gorongosa plains in Mozambique; Kafue Flats and Lukanga swamps in Zambia were expected to have started breeding on the onset of the rains in November 2012, but this could not be confirmed as survey and close examinations were not launched. No activities were initiated in other countries in the region during this time (IRLCO-CSA).

Forecast: Hatching will commence in January and hoppers and bands will likely begin appearing by mid-February in the primary outbreak areas, including Ikuu-Katavi, South and North Rukwa plains and Malagarasi Basin in Tanzania; Buzi and Dimba plains in Mozambique; Kafue and Lukanga swamps in Zambia where

significant residual parental populations were located before the onset of the rains. IRLCO-CSA and MoAs in affected countries will carry out survey and launch control where high density hopper bands are detected. IRLCO is proposing to use a fungal-based safer biological pesticide – Green Muscle - in ecologically sensitive areas to minimize unwanted harms to the ecosystem (AELGA, IRLCO-CSA).



NSE outbreak countries and localities (yellow) and localities (red dots) (IRLCO-CSA)

Tree locust (*Anacridium sp.*): No update was received on tree locusts during this month.

Madagascar Migratory Locust (LMC): No update was received on the Malagasy locust at the time this report was compiled (AELGA).

Forecast: Some locust activities may have begun in the outbreak areas as the seasonal rains have commenced. Given an incomplete control of the outbreaks in previous years and considering the insufficient capacity at the local level, it remains prudent that a well thought out strategy that embraces preventive and curative interventions is put in place ahead of potentially serious breeding/outbreak seasons to abate

imminent threats to food security of vulnerable communities (AELGA).

Moroccan (DMA), Italian (CIT) and Migratory (LMI) locusts in Central Asia and the Caucasus (CAC): No update was received in December in CAC and no locust activities are expected during this time (AELGA).

Forecast: DMA and LMI will commence hatching next spring. Extensive hatching could form significant numbers of LMI hoppers during the next spring breeding season in the flood plains of the Aral Sea and the surrounding areas where massive egg laying occurred late last year. Provided ecological conditions become favorable (moist ground, but not heavily flooded habitat) in the Aral Sea flood plains, the region could experience extended invasions for months (AELGA, FAO-AGPM, miscellaneous).



(Locust prone CAC countries, FAO)

Australian Plague Locust (APL): Adult numbers showed a moderate increase in early December in the northern Riverina and Far Southwest New South Wales, parts of Southwest and Central West Queensland, and locally within the Northeast region of South Australia due to concentrations in response to heavy rainfall in November. Sporadic egg laying was reported in areas of heavy

rainfall in December. Locust number remained low in South Australia, Queensland and New South Wales. Spring populations declined in the wheat belt in Western Australia during December.

Forecast: Locust numbers will likely remain low and adult numbers will to decline during January and February. Only small migrations from regions where populations are increasing are likely during this time. Low to medium size populations are likely during summer. Egg laying may occur in parts of Southwest and Central West Queensland and hoppers begin appearing in areas where heavy rains fell during the second half of December, but widespread summer infestations is unlikely. Summer rainfall distribution will influence the likelihood and location of any significant developments during the forecast period (APLC).



(Australian plague locust, source: APLC)

Timor and South Pacific: No update was received in December on the locust situation in Timor and South Pacific.

African Armyworm (AAW): AAW outbreaks were reported in southern and south central Africa. **In Zambia,** widespread AAW outbreaks were reported in 33 districts in 7 of the 10 provinces where the caterpillars were reported attacking maize and pasture. More than 96,720 ha of maize and pasture were infested and some of the maize fields were completely destroyed needing re-sowing. Close to 73,000 farmers were affected. Control operations were carried out by the affected farmers with technical and material support from MoAL (MoA provided 660 l of cypermethrin 6% EC, sprayers

and protective equipment) and IRLCO-CSA, supplied posters for use in sensitization of farmers and motorized knapsack and Mini ULVA sprayers and assisted with control operations.

The GoZ, in collaboration with NGOs, provided 2,000 MT of short cycle seeds to the affected farmers (at a cost of \$5 million). Although these seeds are early maturing, some farmers are worried that late planting (**3 weeks after the normal planting date**) could mean low yield.

In **Zimbabwe**, widespread AAW outbreaks were reported in Mashonaland Central, Mashonaland West, Mashonaland East, Mateleland North, Bulawayo and Midland Provinces during the first week of January. The outbreaks spread to other parts of the country by the second week of January. The pest was seen damaging maize and sorghum crops as well as pasture. Control operations were carried out by the affected farmers with material and technical assistance from the MoA. MoA provided more than 600 kg of Carbaryl 85% WP to the farmers and the pesticide was used up by the end of the first week of January. Control operations continued at the time this report was compiled (Note: *Zimbabwe consumes more than 2 million MT of maize each year, some 2/3rd by humans and the rest by livestock. Any loss AAW could bring to the country's maize production could significantly affect food security among vulnerable populations*). Though GoZi takes the AAW invasions seriously, MoA's current pesticide inventory is limited (AELGA, IRLCO).

In **Malawi**, AAW outbreaks were reported in Ntcheu and Dedza, Kasungu, Rumphu and Mchinji districts where more than 1,017 ha of maize were infested affecting thousands of households. Control operations were in progress at the time this report was compiled (IRLCO-CSA).



(Maize plants completely destroyed by AAW caterpillars in Zambia; courtesy: D. Zulu, 2013)

In **Tanzania**, the pest was reported attacking maize and pasture crops in Tabora, Morogoro, and Rukwa Regions. Control was carried out by the affected farmers with technical advice from MoA staff (IRLCO-CSA).

Forecast: Armyworm outbreaks will likely continue in Malawi, Tanzania, Zambia and Zimbabwe and extend to Mozambique and possibly other neighboring counties during the forecast period. As the caterpillars mature into adult moths, they will begin migrating hundreds of kilometers away from their current locations following the wind (ITCZ) and reach new destinations. If so, a new wave of caterpillars could develop and threaten crops and pasture in those areas which could be in Zambia, Zimbabwe, Tanzania, Mozambique, Malawi or other neighboring countries. Some of these countries are already hit hard by the pest and any new infestations could further exacerbate the situation and significantly impact food security and livelihoods of vulnerable communities (AELGA, IRLCO-CSA, Lancaster University, UK).

Farmers and extension agents are advised to keep an eye on cereal crop fields and surrounding vegetation/hedges and inspect plants regularly for AAW caterpillars. Trap operators, including community-based forecasters are strongly advised to inspect traps on a daily basis and report moth catches to the national forecasting units and relevant authorities immediately.

Note: A prediction model developed by Lancaster University in UK, suggests that in years where AAW outbreaks occur before Christmas, more serious outbreaks will follow and threaten cropping areas and pasture in multiple countries over a prolonged period provided ecological conditions remain favorable. *End note)*

Quelea (QQU): QQU bird outbreaks were reported in Siaya and Nyando districts of Nyanza Province in Kenya. Plans were underway to launch aerial control at the time this report was compiled. No reports were received from other countries during this time (AELGA, DLCO-EA, IRLCO-CSA).

Forecast: QQU birds will pose a problem to small grain cereal growers in Siaya, Nyando, Kisumu and Kirinyaga districts of Kenya, in Dodoma, Shinyanga, Morogoro and Mbeya regions of Tanzania and in Chokwe district of Mozambique during the forecast period (AELGA, IRLCO-CSA).

Facts: *QQU birds can travel ~100 km/day looking for food. An adult QQU bird can consume 3-5 g of grain and perhaps destroy the same amount each day. A QQU colony can contain a million birds (very common) and is capable of consuming and destroying 6,000 to 10,000 kg of seeds/day, enough to feed 12,000-20,000 people for a day.*

Rodents: Rodent outbreaks were reported in five districts, four in the southern and one in the eastern parts of Tanzania in early December. Additional information

was being awaited at the time this report was compiled (PHS/T).

Forecast: As the long-rains commence and ecological conditions continue improving, more rodents will likely begin appearing in Tanzania (AELGA).

Note: *Several raptor birds, such as barn owl, Tyto Alba and other animals are known nature's biological control agents that contribute to maintaining the balance between moderate rodent outbreaks and a period of lull. End note.*

Front-line countries where ETOP outbreaks first occur are advised to remain vigilant. Invasion countries should maintain the capacity to monitor and avoid any unexpected surprises. DLCO-EA, IRLCO-CSA, national PPDs, CNLAs, DPVs, ELOs, and others are encouraged to continue sharing information with partners and other stakeholders as often as possible. Lead farmers and community forecasters should be encouraged to remain vigilant and report any ETOP sightings to field agents and other contact persons.

Inventories of Acridid Pesticide Stocks

A revised inventory of pesticides in November showed more than 90,000 l (including 16,405 in Mauritania, 42,890 in Niger and 26,690 l in Sudan and some in Algeria, Chad, Morocco, Egypt and Saudi Arabia) most of which were used against SRG. In December the inventory was reported at around 32,000 l for SRG (292 l in Algeria, 4,922 in Mauritania, 2,582 in Morocco, 12,875 in Niger, 1,363 in Saudi Arabia and 5,566 in Sudan). Several thousand litres of pesticide were also used for AAW control mainly in Zambia and Tanzania.

Mindful of the risk of pesticides becoming obsolete once passed their usability, ETOP-prone countries, particularly those with large inventories, but less likely to use them within a reasonable time period, are encouraged to test their stocks regularly and determine whether they should use, retain, share or discard them

immediately. All options should be explored to avoid the risks that old stocks pose to humans, the environment, and non-target organisms as well as the huge financial burden associated with disposing them. It is worth mentioning that Mauritania, Senegal, Algeria and Morocco have been donating pesticides to Niger, Mali and Chad to assist with the SRG control operations.

A judiciously executed triangulation of stocks from countries with large inventories to where there are immediate needs is a win-win deal worth considering.

Note: The core message of **pesticide stewardship Program** is to strengthen the national and regional pesticide delivery systems by linking partners at different levels and thereby reduce pesticide related health risks and environmental pollution and improve food security as well as contribute to the national economy. **End note.**

Estimates of (ETOP-acridid) pesticide inventories

Country	Quantities in '000 l/kg ^s
Algeria	1,200~
Chad	102.66~
Eritrea	43.9~
Egypt	Data not available
Ethiopia	1.6+~
Libya	25
Madagascar	Data not available
Mali	208.8d~
Mauritania	182+~
Morocco	4,100~
Niger	45.00~
Senegal	156~
Saudi Arabia	Date not available
Sudan	609.9
NSD	860"
Tunisia	167.6~
Yemen	33.00 + .527 kg GM~
These quantities include ULV, EC and dust formulations	

~ data not necessarily current
 l = Mali donated 21,000 l for RL in Malawi, Mozambique and Tanzania late last year and
 FAO facilitated the triangulation
 + quantity reported in Agadez
 @ left-over stocks of Chlopyrifos from the 2003-5 DL campaign was tested for quality and found to be usable through 2012
 This includes EC, ULV and Dust for all crop protection uses
 GM = GreenMuscle
 b = biopesticide (Madagascar)
 c = conventional pesticides (Madagascar)
 g = insect growth regulator (Madagascar)

LIST OF ACRONYMS

AAW	African armyworm (<i>Spodoptera exempta</i> - SEX)
AELGA	Assistance for Emergency Locust Grasshopper Abatement
AFCS	Armyworm Forecasting and Control Services, Tanzania
AfDB	African Development Bank
AME	<i>Anacridium melanorhodon</i>
APL	Australian Plague Locust
APLC	Australian Plague Locust Commission
CAC	Central Asia and the Caucasus
CBAMFEW	Community-based armyworm monitoring, forecasting and early warning
CERF	Central Emergency Response Fund
CIT	<i>Calliptamus italicus</i>
CLCPRO	Commission de Lutte Contre le Criquet Pèlerin dans la Région Occidentale (Commission for the Desert Locust Control in the Western Region)
CNLA/CNLAA	Centre National de Lutte Antiacridienne (National Locust Control Center)
CRC	Commission for Controlling Desert Locust in the Central Region
CTE	<i>Chortoicetes terminifera</i>

DDLC	Department of Desert Locust Control	MoARD	Ministry of Agriculture and Rural Development
DL	Desert Locust	NOAA	National Oceanic and Aeronautic Administration
DLCO-EA	Desert Locust Control Organization for Eastern Africa	NSD	Republic of North Sudan
DMA	<i>Dociostaurus maroccanus</i>	NSE	<i>Nomadacris septemfasciata</i>
DPPQS	Department of Plant Protection and Quarantine Services	OFDA	Office of U.S. Foreign Disaster Assistance
DPV	Département Protection des Végétaux (Department of Plant Protection)	PHD	Plant Health Directorate
ELO	EMPRES Liaison Officers	PHS	Plant Health Services, MoA Tanzania
EMPRES	Emergency Prevention System for Transboundary Animal and Plant Pests and Diseases	PPD	Plant Protection Department
ETOP	Emergency Transboundary Outbreak Pest	PPSD	Plant Protection Services Division/Department
GM	Green Muscle (a fungal-based biopesticide)	PRRSN	Pesticide Risk Reduction through Stewardship Network
ha	hectare (= 10,000 sq. meters, about 2.471 acres)	QQU	<i>Quelea quelea</i>
IRIN	Integrated Regional Information Networks	SARCOF	Southern Africa Region Climate Outlook Forum
IRLCO-CSA	International Red Locust Control Organization for Central and Southern Africa	SGR	<i>Schistoseca gregaria</i>
ITCZ	Inter-Tropical Convergence Zone	SWAC	South West Asia DL Commission
ITF	Inter-Tropical Convergence Front = ITCZ)	TAG	Technical Assistance Group
FAO-DLIS	Food and Agriculture Organizations' Desert Locust Information Service	USAID	Unites States Agency for International Development
Kg	Kilogram (~2.2 pound)	UN	the United Nations
L	Liter (1.057 quarts or 0.264 gallon or 33.814 US fluid ounces)	ZEL	<i>Zonocerus elegans</i> , elegant grasshopper
LMC	<i>Locusta migratoriacapito</i>	ZVA	<i>Zonocerus variegatus</i> , variegated grasshopper
LMM	<i>Locusta migratoria migratorioides</i> (African Migratory Locust)		
LPA	<i>Locustana pardalina</i>		
MoAFSC	Ministry of Agriculture, Food Security and Cooperatives		

Point of Contact:

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