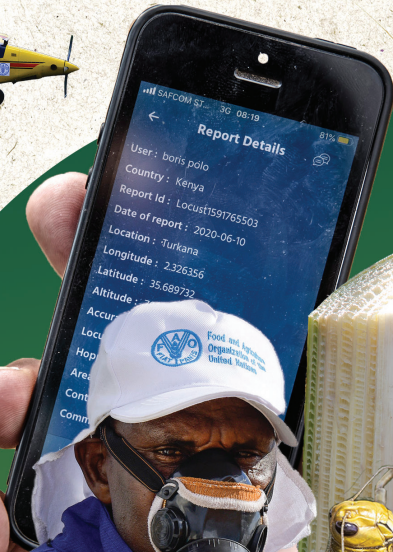
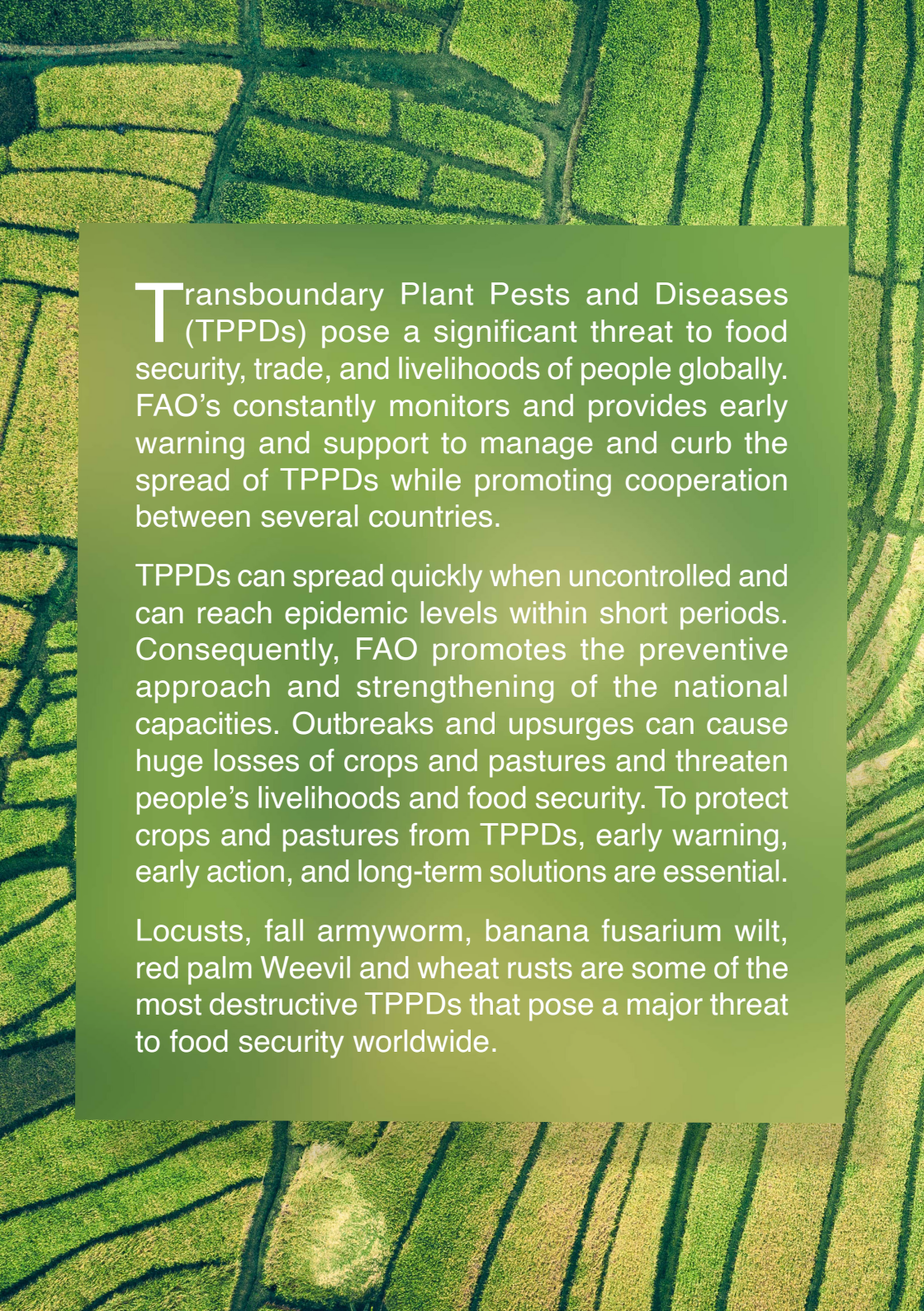




Food and Agriculture Organization
of the United Nations

Locusts and other transboundary plant pests and diseases





Transboundary Plant Pests and Diseases (TPPDs) pose a significant threat to food security, trade, and livelihoods of people globally. FAO's constantly monitors and provides early warning and support to manage and curb the spread of TPPDs while promoting cooperation between several countries.

TPPDs can spread quickly when uncontrolled and can reach epidemic levels within short periods. Consequently, FAO promotes the preventive approach and strengthening of the national capacities. Outbreaks and upsurges can cause huge losses of crops and pastures and threaten people's livelihoods and food security. To protect crops and pastures from TPPDs, early warning, early action, and long-term solutions are essential.

Locusts, fall armyworm, banana fusarium wilt, red palm Weevil and wheat rusts are some of the most destructive TPPDs that pose a major threat to food security worldwide.



What are TPPDs?

“Those that are of significant economic, trade and/or food security importance for a considerable number of countries; which can easily spread to other countries and reach epidemic proportions; and where control/management, including exclusion, requires cooperation between several countries.”

Definition recommended by FAO
EMPRES Expert Consultation, 24-26 July 1996

FAO’s Locusts and Transboundary Plant Pests and Diseases team promotes sustainable and ecological approaches to prevent and control the potential impact of TPPDs through continuous monitoring, early warning, innovative and environmentally friendly preventive control strategies to manage pests and diseases sustainably. Training, capacity building and knowledge transfer are at the heart of FAO’s mission, ensuring long lasting solutions to tackle TPPDs worldwide.



Strengthening national capacities

FAO operates the Desert Locust Information Service (DLIS) and manages projects on different TPPDs to improve the monitoring and early warning, identification and diagnosis, control and management, contingency planning and human health and environmental impact of TPPDs worldwide.

FAO provides technical support, advice, and guidance for other locusts such as in Latin America, Southern Africa and Madagascar when requested.





Locusts

FAO's current role in locust monitoring and control dates back to its original founding in 1945 and is at the core of the Organisation's mandate. Desert locust is an extremely voracious and dynamic pest with a massive distribution area, that covers 20% of the earth's land surface and contains some 500 species of host plants. The pest, considered as the most dangerous migratory pest species globally, can be extremely volatile with adult swarms migrating up to 150 km per day. A single adult desert locust can eat roughly its own weight in fresh food each day, amounting to around two grams. A 1 km² swarm can contain about 40–80 million locusts, which can eat as much food each day as 35 000 people.

Throughout most of the year, desert locust is present in the solitary phase scattered across the deserts of North Africa, the Near East, and southwest Asia. Under optimal condition, outbreaks can occur and locusts change their behaviour to form hopper bands and adult swarms. Winds can carry the swarms across borders, continents, and seas to invade vast areas of pasture and crops.



Early warning

The combined analysis of field data, satellite imagery and prediction models allow FAO to forecast the spread of pests and diseases and identify the best course of action.

The outputs of the early warning systems such as regular situation assessments, forecasts, and alerts, as well as online platforms and dashboards, allow member countries and the public to receive timely information on TPPDs and prepare action accordingly.

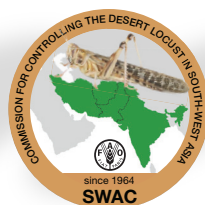
Desert Locust Information Service (DLIS)

FAO operates a centralised Desert Locust Information Service (DLIS) that monitors the desert locust situation worldwide daily. DLIS continuously analyses weather and environmental conditions to assess locust development, breeding and migration, taking advantage of the rich archive and latest innovative technologies to provide accurate and timely situation updates, forecasts and warnings. DLIS, initially established in the 1930s in the UK and later transferred to FAO, has been producing alerts and advice as well as more than 500 monthly desert locust bulletins since the 1970s.

Desert locust commissions

Three FAO desert locust regional commissions have been providing continuous support to 30 desert locust affected countries for nearly 55 years. FAO coordinates and supports the work of these commissions: the FAO Commission for Controlling the Desert Locust in the Western Region (CLCPRO), Central Region (CRC) and in South-West Asia (SWAC). FAO staff members are Executive Secretaries of the Commissions.

The commissions support the implementation of the locust preventive control strategy through promoting the establishment of autonomous national desert locust units, and strengthening national capacities in survey and early warning, reporting, preventive control, capacity development, contingency planning and human/environmental safety standards.



Desert Locust Control Committee (DLCC)

Established in 1955, the Desert Locust Control Committee (DLCC) is the primary forum that brings together locust-affected countries, donors, and other agencies to discuss desert locust management. The DLCC defines global desert locust prevention strategies and approaches that are implemented at regional and national levels.

DLCC provides funding for the operation of DLIS, including the monthly desert locust bulletins, annual training of one national locust information officer in DLIS, technical publications such as the FAO Desert Locust Guidelines, and the convening of the Locust Pesticide Referee Group (LPRG), an independent body that evaluates the effectiveness of products for locust control and their potential impact on human health and the environment.



Locusts in Caucasus and Central Asia (CCA)

The Locust Programme in CCA is a multi-funded and interregional programme founded in 2011. The programme benefits ten countries and is supported by resource partners, including JICA and USAID.

The Programme is working to promote interregional cooperation and strengthen national capacities to manage three native locust species and reduce the risk of locust control on human health and the environment.

By implementing the developed geospatial and analysis tools, Automated System for Data Collection (ASDC) and Caucasus and Central Asia Management System (CCALM), the programme is helping to reduce locust outbreaks and the risk of locust control on human health and the environment.

Locusts worldwide

FAO provides technical and operational support, advice and technical guidance to locust outbreaks based on the requests received by regional offices and countries directly concerned. Over the years, technical support for different locust species has been provided in Latin America, Southern Africa, Madagascar and South East Asia.

Transboundary plant diseases

FAO actively monitors and provides early warning for plant diseases such as banana fusarium wilt, wheat rust and xylella fastidiosa. The team actively supports FAO's TR4 global network by providing technical guidance and training. FAO coordinates and provides support to a multitude of projects tackling Transboundary Plant Diseases (TPDs) such as cassava mosaic, brown streak and responds to emerging diseases by providing early warning, technical support, and control operations to curb their spread worldwide.

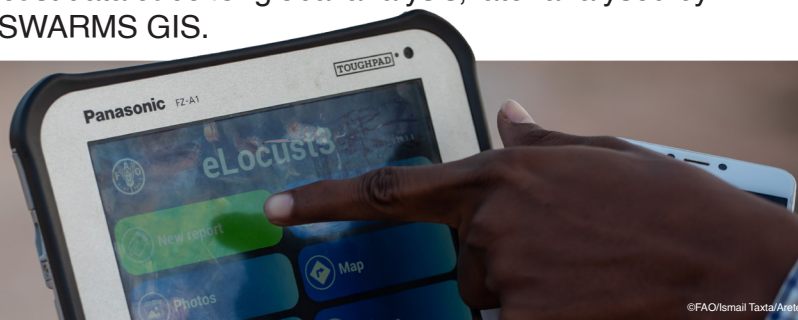
eLocust3

eLocust3 is FAO's answer to near-real time data transmission and mapping of locust infestations across countries to facilitate rapid response and minimize damage.

eLocust3 is a rugged handheld tablet with a custom application that allows field teams to record and transmit survey and control data in real time from the field via satellite to National Locust Control Centres (NLCC) and FAO's DLIS. eLocust3 tablets are in use by field teams in 24 countries.

During the 2020 upsurge, an ever-growing demand for more eLocust3 tablets by the numerous teams deployed to the field, led FAO to develop eLocust3m, eLocust3mPRO, eLocust3g and eLocust3w. These new eLocust3 versions allowed to reach a larger number of users such as extension agents, communities and NGOs allowing them to contribute to crowd-sourced monitoring, thus, increasing the data available to the NLCC for planning operations and to DLIS for early warning. eLocust3m and eLocust3mPRO are custom smartphone app developed thanks to the partnership between FAO and Penn State University, allowing locust data transmission and in-country chat. It is freely available for Android and iOS devices. eLocust3g, developed by FAO and Garmin, allows basic data collection and satellite transmission using a handheld Garmin inReach Explorer+® GPS. eLocust3w, developed by FAO using Kobo Toolbox, is a web form compatible with any device with an internet connection used to share locust data.

The eLocust3 suite represents the foundation of FAO's global desert locust early warning system that is operated by the DLIS. The data feeds into the locust data cube for global analysis, later analysed by DLIS using the SWARMS GIS.





Surveillance and monitoring

The development and continuous innovation of surveillance and monitoring systems have allowed the team to improve data collection, forecasting, early warning, and management of TPPDs. These systems consist of digital tools such as eLocust3, ASDC, CCALM, FAMEWS, and SusaHamra as well as satellite imagery, weather predictions, models, and geographic information systems, supplemented by the use of drones for monitoring locusts.

Satellites and models

Satellite imagery is widely utilised by the DLIS to better understand where it has rained, where soil has become moist for breeding and where vegetation is green, helping to identify desert locust habitats, that constitute up to 20 percent of the Earth's land surface. This imagery not only helps to monitor vast areas, but the National Locust Control Centres (NLCC) use it to identify potential areas of desert locust infestations and prioritize survey and control operations, allowing preventive action to be taken rapidly and effectively before outbreaks develop. Numerical models are used to estimate egg and hopper development times while trajectory and dispersal models are used to estimate swarm migrations.

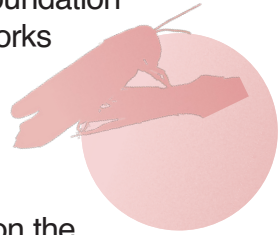
Drones



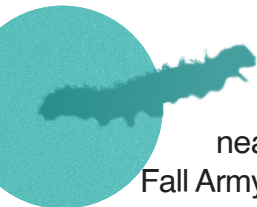
FAO and the Desert Locust Commissions have developed a custom drone for locust survey. The purposely built fixed-wing drones help survey teams to cover larger areas and reach otherwise inaccessible places to detect green vegetation and locust infestations. FAO is evaluating drones for locust control operations, allowing personnel to reduce the risk of exposure to pesticides and potentially harmful chemicals.

CCALM & ASDC

The CCA locust management (CCALM) platform was developed to facilitate and improve locust data analysis and develop forecasts at the national and regional levels. The platform is the foundation for the locust early warning system in CCA. CCALM works in conjunction with the Automated System for Data Collection (ASDC) to collect and record standardized geo-referenced locust survey and control data in the field, which is fed into the CCALM GIS, together with satellite products, for analysis. The software is freely available on the Google Play store and can be filled out by national observers during survey and control operations.



FAMEWS



The Fall Armyworm Monitoring and Early Warning System (FAMEWS) consists of a smartphone app for collecting data in the field that is fed into a global platform, providing near real-time situation overviews, maps and analytics on Fall Armyworm infestations in Africa and Asia. The data also helps practitioners to learn more about this pest's behaviour and population dynamics. Actions taken in the field are closely monitored and compared worldwide to provide decision support about the most appropriate management options.

SusaHamra

FAO developed a mobile application, SusaHamra, to help farmers better monitor and manage red palm weevil infestations. The application is used to collect data during inspection, treatment and pheromone trap checking on palm trees. The data are analysed to shed light on potentially effective management strategies, providing precious information for treating and curbing the spread of red palm weevil globally.



Emergency operations

Thanks to decades of experience, the transboundary plant pests and diseases team is the primary technical unit to assist FAO to implement sound solutions when facing TPPD-induced emergencies. The team's longstanding history uses data gathered since the 1930s, allowing FAO to provide informed decisions for tackling TPPD threats worldwide.

Early warning systems are at the forefront of FAO's prevention strategy, allowing the team to identify, develop and implement technologies and systems to safeguard the world from TPPD threats. The monitoring and early warning systems allow the team to provide accurate and timely advice and forecasts to countries, allowing better planning and shorter reaction times.

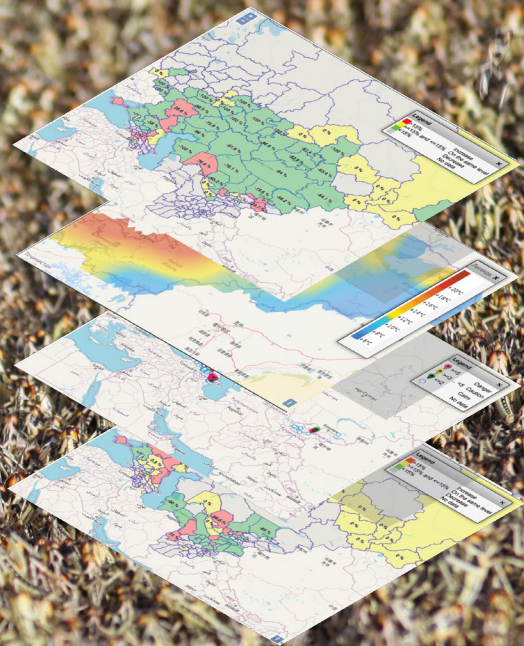
The team works in close contact with entities inside and outside the organisation to ensure best practices are always applied and operational risk is reduced to the minimum. Training, guidance, and advice are essential actions FAO implements on a regular basis to ensure that the best course of action for managing TPPDs are always employed.



Achievements

Over the years, FAO has achieved significant successes by protecting millions of people's food security and livelihoods thanks to its team members' long-standing knowledge and expertise. FAO's Locusts and Transboundary Plant Pests and Diseases team has achieved major milestones in TPPD early warning and management, paving the road to increased food security worldwide and environmental protection by applying innovative solutions and providing essential guidance to ensure healthier plants, paving the road to increased food security and better environmental protection worldwide.





Looking ahead

FAO is facing increased challenges posed by climate change and extreme weather that continues to create favourable conditions for TPPDs to proliferate globally at a never seen before rate.

FAO leverages its unique global expertise and success in locust monitoring and early warning by applying working concepts and lessons learned to other TPPDs. FAO's expert team strives to provide all countries with the most technically-sound guidance in managing TPPDs effectively and safely in a sustainable manner. FAO continuously pioneers new technologies and tools that can be used by countries to control and prevent outbreaks. Innovative paradigms and strategies are constantly being explored and adapted for better monitoring, early warning and management of TPPDs throughout the world.

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