

# Locust-Tec – Technologies for locust management in Kazakhstan

## Client II – International partnerships for sustainable innovations

**Locust plagues are a serious threat to agricultural production, food security, and the environment. They can cause severe economic damage and starvation crises and destroy large areas of vegetation and the livelihoods of farmers. Current strategies for monitoring and controlling locust swarms are often costly, inadequate, or have very negative impacts on health and the environment. The German-Kazakh project “Locust-Tec” develops innovative technologies for monitoring and forecasting locust outbreaks as well as environmentally friendly techniques for control. The project promotes preventive control and the introduction of alternative monitoring methods to reduce the use of insecticides.**

### Innovative, sustainable locust management

The systematic and accurate monitoring and control of locust populations is of critical importance in many parts of the world in order to prevent locust plagues. If this work is neglected or not done efficiently, it can lead to enormous damage to agricultural areas such as in Kazakhstan, Madagascar, or Sardinia.



Visible damage to vegetation caused by Moroccan locusts in southern Kazakhstan.

One of the aims of the “Locust-Tec” project is to improve the prediction of locust plagues as well as to establish an innovative and effective monitoring system in Kazakhstan. In addition to this, the project also aims to develop alternative and environmentally friendly control options. The project methodology is built on three closely connected pillars: risk of locust outbreak, locust monitoring, and locust control.

### Applying innovative methodologies

In order to develop a method for predicting locust outbreaks, “Locust-Tec” uses satellite and climate data to create geo-information products for the large-scale mapping of conditions for possible outbreaks. State-of-the-art German and European satellite sensor technology will be

used to develop algorithms for automatically identifying, analyzing and evaluating areas favored by locusts as well as for defining habitat conditions.

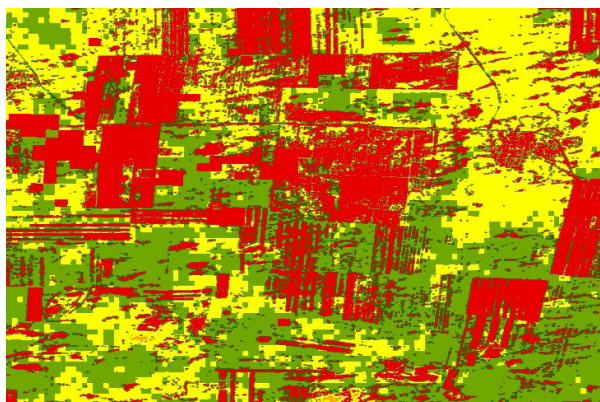
Outbreak forecast data sets will provide important information for innovative approaches to field-based locust monitoring, which will enable the implementation of innovative and effective locust control for large and remote areas. The project focusses on data collection with drones, the use of mobile geodata acquisition applications, and GIS systems. These monitoring techniques are intended to facilitate and improve the work of ground surveying teams in key development phases.

The improved forecasting and monitoring of locust swarms will allow for preventive control options to be developed. These can be implemented at an early stage in locust development when there is no immediate threat to farmland. Environmentally friendly mechanical control techniques are to be used according to precisely defined benchmarks. These measures are less harmful to humans and the environment than the use of insecticides.

### Impact and contribution to sustainability

The innovative locust management technologies implemented within the project have many environmental, economic, and social benefits. In terms of ecology, the project will support efforts to reduce the negative environmental impact of current locust control measures by promoting preventive control and the introduction of alternative control methods. This will help to reduce the use of insecticides, which in turn will reduce the pollution of soil and the environment and impacts on fauna. The introduction of electric grids in Kazakhstan holds further potential for sustainability as an innovative control method. These

grids are environmentally friendly and economically effective as they eliminate locusts without the use of insecticides. The insects can therefore also be used as an additional protein source in animal feed.



Habitat mapping of the Italian locust (CIT) in the Pavlodar region based on remote sensing and climate data.

The German Remote Sensing Data Center is responsible for the project's coordination and dissemination. It also manages locust forecasting activities by evaluating remote sensing and climate data. The Surveying Office and Geo-information Centre Schwing & Neureither is responsible for the GIS system and app development as well as carrying out drone flights and data analysis. Quellwerke GmbH is responsible for the technical implementation of the app development. The company Horizont is to develop and test the electric grid for controlling locust swarms and will also investigate the further utilization of insects as an animal feed supplement.

The results of the "Locust-Tec" project are intended to be used by the local authorities responsible for monitoring and controlling locusts. The concept will be developed on a generic basis so that it can subsequently be transferred to other regions and species of locust.

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Client II – International partnerships for sustainable innovations

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