# Locust Crisis

# Amid a Global Pandemic

## LEARNING FROM THE INFESTATIONS OF 2020 IN SINDH, PAKISTAN


CWS JAPAN
Church World Service

community WORLD service ASIA
peace resilience dignity

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# TABLE OF CONTENTS

# LIST OF ABBREVIATIONS

| | |
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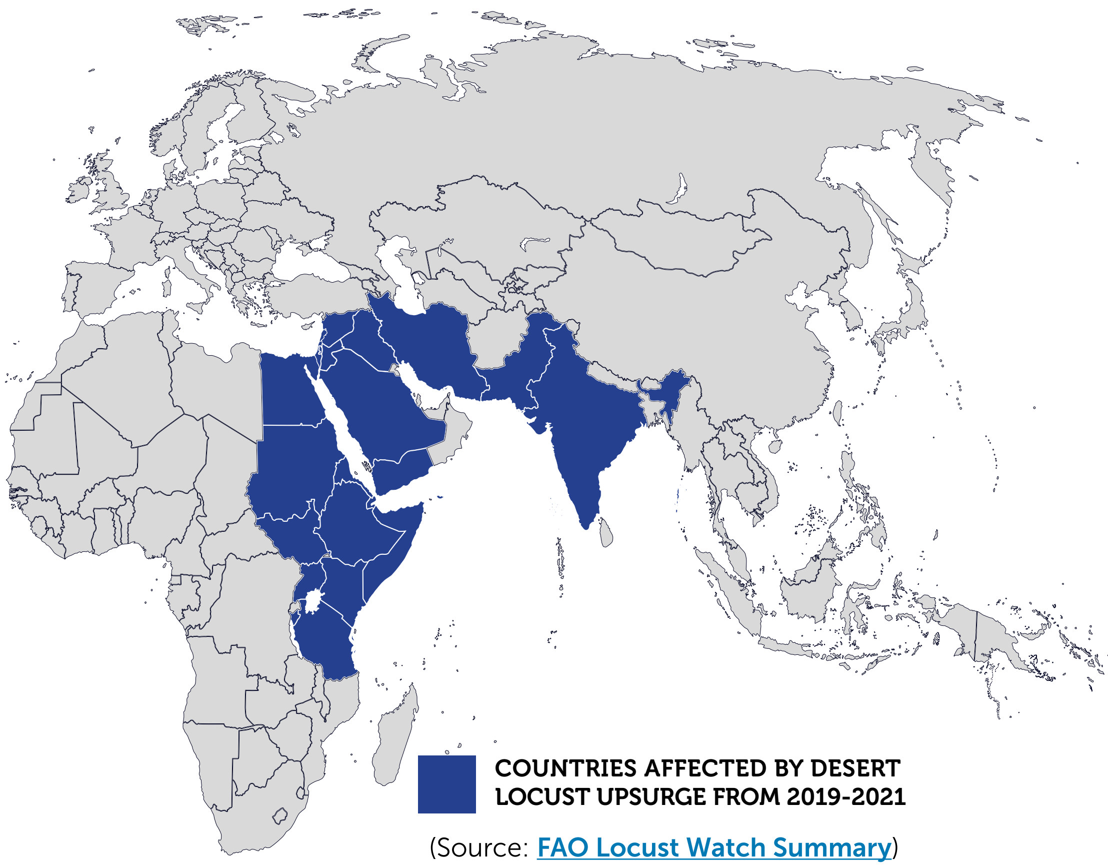
| **CWS** | Church World Service |
| **CWSA** | Community World Service Asia |
| **FAO** | Food and Agriculture Organization of the United Nations |
| **ICM** | Integrated Crop Management |
| **IPM** | Integrated Pest Management |
| **NGO** | Non-Government Organization |
| **PDM** | Post Distribution Monitoring |
| **WMO** | World Meteorological Organization of the United Nations |

# EXECUTIVE SUMMARY

Desert locust infestation is seen as a serious problem throughout history, and it continues to threaten agriculture and food security over large parts of Africa, the near east and southwest Asia even at present day. Desert locusts can be found in 30 countries, but during upsurges they can affect as many as 60 countries. The most recent upsurge happened from 2019 to 2021. Following some unusual weather events in 2018 and early 2019, desert locusts swarmed in large numbers in many countries, including Kenya, Ethiopia, Uganda, Somalia, Eritrea, India, Pakistan, Iran, Yemen, Oman and Saudi Arabia. In case of Pakistan, this was the largest attack since 1992.




(Source: FAO Locust Watch Summary)

The infestation of 2019 to 2021 coincided with the COVID-19 pandemic, which not only hampered the efforts to control the infestation, but also affected businesses, jobs and overall income in the affected areas. CWS Japan, in partnership with Community World Service Asia (CWSA) and with support from Japan Platform, responded to this compound disaster in the Sindh province of Pakistan. This report looks at the issues and solutions through the CWS response and some in-depth interviews conducted in October 2021, and attempts to capture the lessons for future responses to similar disasters.

Desert locusts have two different states called “phases”: the solitarious phase and the gregarious phase. When the locusts are present at low densities, the individuals are solitarious. Under certain climatic and environmental conditions, their behavior and physiology can change and they become gregarious. They have three main stages of growth: egg, nymph (hopper) and adult. Adult locusts can create swarms of thousands of millions to behave as one unit (Cressman et al, 2001). The nymphs or hoppers can form “bands” that eat any kind of plant materials on their path.

Bringing a locust upsurge under control can be extremely challenging. Agricultural farmers developed a variety of traditional methods to scare or drive away desert locusts, and the practices are similar in many parts of the world. These methods, which include creating smoke, beating drums, and fanning, do very little to reduce the swarm in size, but they are often partially effective against small infestations to scatter the locusts away temporarily. Chemical pesticides, on the other hand, are fast and most effective method to control extreme locust infestations, although all chemical pesticides pose some sort of risk for the environment and eventually its living beings. Another challenge of chemical pesticides is making them available at the right time. They are not produced in most countries that are usually attacked by locusts, so they need to be procured and transported from other countries. The process may take time and cause unnecessary delay. Scientists have been researching for alternatives like nature-based biological pesticides. These biopesticides take much longer than chemical pesticides to work, but in situations when the timing allows for their use, they offer a reliable, less harmful alternative for controlling locust outbreaks before they reach crisis levels.

The methods applied for the CWS response included (1) tilling, which had double effects of preparing the land for cultivation and destroying the eggs laid below the surface of the lands; and (2) making trenches to catch the hoppers. These methods were simple, sustainable, and environmentally friendly, yet relatively unknown among the participants. Post Distribution Monitoring (PDM) surveys showed that these methods were very successful in controlling the infestation. Besides, it was revealed through an in-depth qualitative interview that the pandemic had seriously affected the coping strategies, pushing people further towards poverty and food insecurity. Since the execution of the above methods was done by the participants through cash for work, some much-needed income was ensured during a compound disaster situation.

Knowledge on the ecology of desert locusts and the forecasting of swarms have developed considerably over time, but understanding the species and having the technology for the forecast is not enough. Without international policy and implementation cooperation, and, more importantly, without the timely communication of the forecast, outbreaks cannot be stopped. Moreover, response to locust infestation is a long process and requires much more than locust control. A more flexible, holistic approach is therefore needed, with the preparedness for compound disaster situations.

# INTRODUCTION

A Desert Locust infestation can cause considerable damage in agriculture, which can lead to significant risks for a population's food security. It has been seen as a serious problem throughout history, and it continues to threaten agriculture and food security over large parts of Africa, the near east and southwest Asia even at present day. Desert locusts can be found in 30 countries, but during upsurges they can affect as many as 60 countries. If the infestation is not controlled at an early stage, the impact on crops and vegetation can drive up hunger in regions already struggling with high levels of food insecurity.

Following some unusual weather events in 2018 and early 2019, desert locusts swarmed in large numbers in many countries, including Kenya, Ethiopia, Uganda, Somalia, Eritrea, India, Pakistan, Iran, Yemen, Oman and Saudi Arabia. The local media in Northern Kenya reported in February 2020 that a swarm covering 2,400 sq km (930 sq miles) was recorded in northern Kenya and could have been the largest on record for the country. In case of Pakistan, this was the largest attack since 1992, and many farmers suffered as the of knowledge and practice of control measures were lost during the long interval of 28 years.

Unfortunately, 2020 is also the year when the COVID-19 pandemic started. Restrictions on movement and travel all over the world not only hampered the efforts to control the infestation, but they also affected businesses, jobs and overall income in many areas where the infestation was happening. When the locust plague had already caused significant damage to agriculture, eventually causing severe food shortage, the pandemic made the situation even more difficult.

In 2020, CWS Japan, in partnership with Community World Service Asia (CWSA) and with support from Japan Platform, responded to this compound disaster in the Sindh province of Pakistan in two phases. This report looks at the issues and solutions through the CWS response and some in-depth interviews conducted in October 2021, and attempts to capture the lessons for future responses to similar disasters. The report also tries to capture learnings on managing compound disasters, which are becoming more and more common.

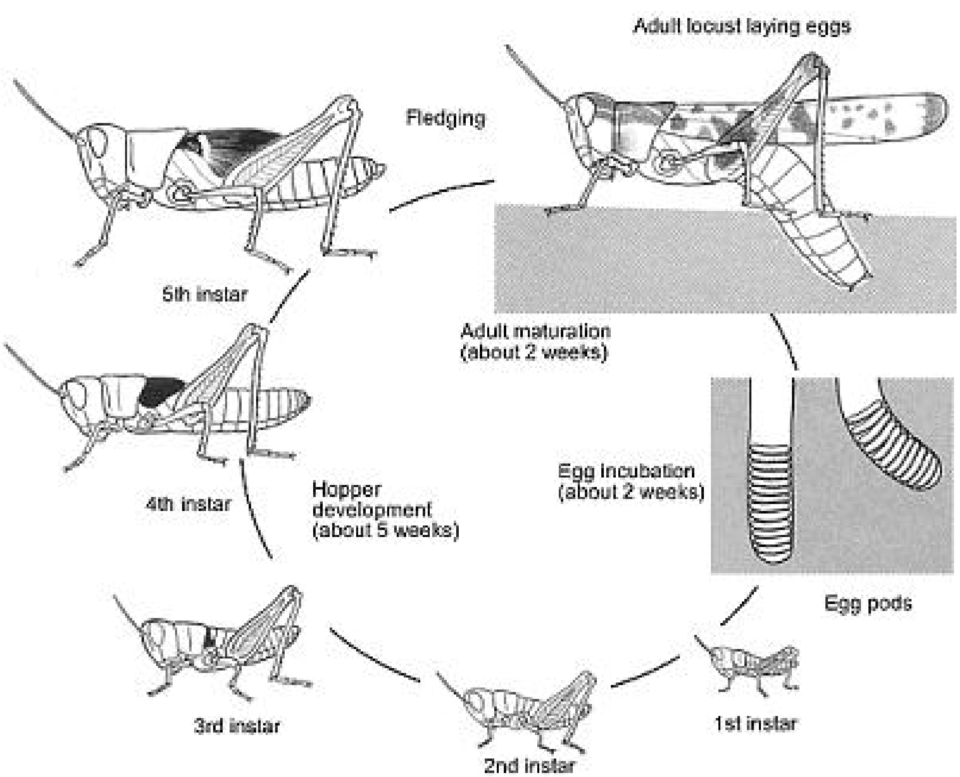
# ABOUT LOCUSTS AND LOCUST INFESTATION

Desert locusts belong to a family called "Acrididae", same as grasshoppers, and are unique by their ability to form swarms. Under certain climatic and environmental conditions, these short-horned grasshopper like insects can change their behavior and physiology, and create a swarm of thousands of millions of adult insects to behave as one unit (Cressman et al, 2001). A full-grown desert locust can consume as much as its own weight in plant materials (about 2.5 g) every day. One small swarm of one square kilometer area has the potential to eat the same amount of crops in one day as 35,000 people (FAO, 2020). The size of the swarms can vary from less than one square kilometer to several hundred square kilometers. To be able to take necessary and timely action, it is important to understand the physiological and behavioral aspects of desert locusts.

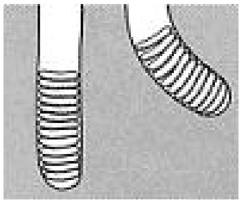
Desert locusts have two different states called "phases": the solitarious phase and the gregarious phase. When they are present at low densities, the individuals are solitarious. As the population increase, they cluster into dense groups, and they become gregarious.

The desert locust, like other locusts and grasshoppers, has three main stages of growth: egg, nymph (hopper) and adult.

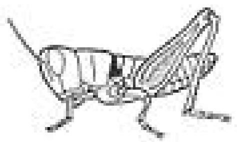
| STAGE | DURATION | DAMAGE TO CROPS |
|---|---|---|
| EGG | 10-65 DAYS | Cannot cause damage |
| NYMPH (hopper) | 24-95 DAYS<br>(36 DAYS ON AVG) | Can form "bands" that eat any kind of plant materials on their path |
| ADULT | 2.5-5 MONTHS | Can form "swarms" and can cause severe damage of crops and plants |



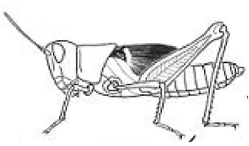

Locust lifecycle
(Source: FAO 2022)



**The eggs** are laid by females in batches called egg pods, in areas of bare sandy soil. Generally, the female will not lay unless the soil is moist at about 5-10 cm below the surface. This is done mainly to protect the eggs from birds, animals, humans and other hazardous things. The other reason is that the eggs need to absorb sufficient moisture to complete their development. The female lays eggs in batches called egg pods. The pod is 3-4 cm long and is laid so that its top is about 5-10 cm below the surface. The eggs look like rice grains and are arranged like a miniature hand of bananas. Swarms often lay egg pods in dense groups, with tens and even hundreds of pods per square meter. The pods contain fewer than 80 eggs in the gregarious phase and typically between 90 and 160 in the solitarious phase.

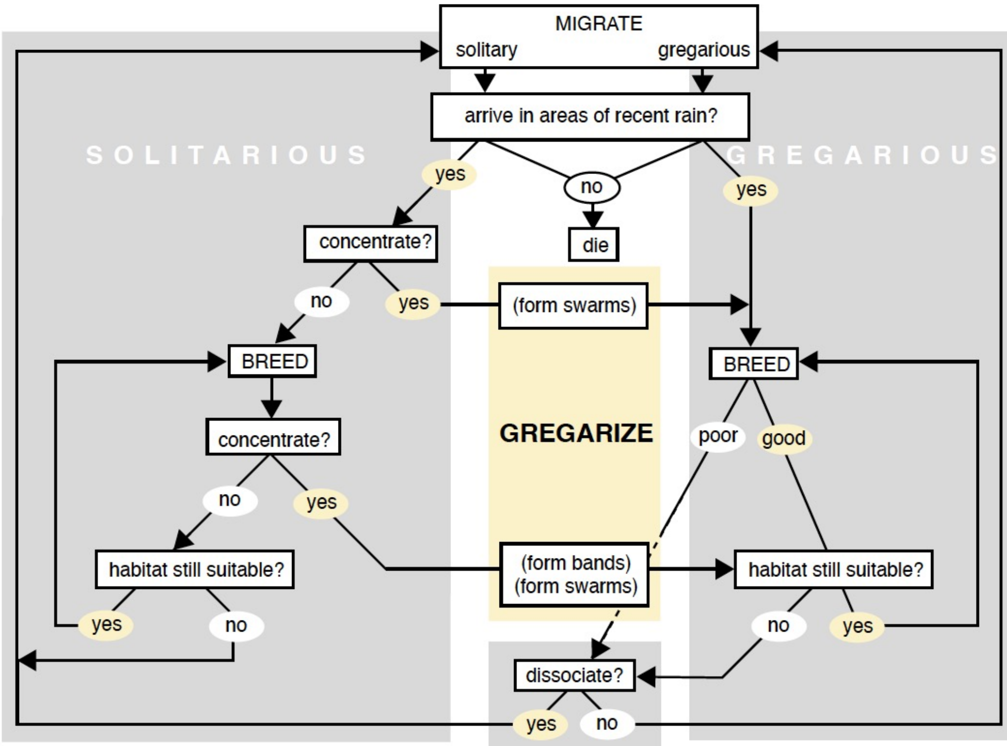


After **the nymphs or the hoppers** hatch from the eggs, they pass through five stages by shedding skin over a period of 24 to 95 days (36 days in average), before they become adults. During solitary phase, when the hopper numbers start to grow, they become attracted to each other and groups start to form. This behavioral change is followed by some physiological changes. It is important to note that when groups of hoppers are found in the field, it is a good indication that hopper populations are becoming gregarious, and bands are likely to form. This process may be accelerated when large numbers of grasshoppers or other locusts are present.



**An adult** locust's maturation is usually associated with rain. Immature adults can survive for six months or more waiting for the conditions to match. It takes some time for the wings of the immature adults to harden sufficiently to sustain long flights for migration. A mature locust can cause others to mature, which may explain why maturation is well synchronized in swarms. In the right environmental conditions, an adult female locust can start laying eggs within three weeks of maturation and can lay up to two pods on an average in its lifetime. Like hoppers, solitary adults change their behavior in response to the environment and numbers. The presence of adult groups is an important indication that the adults are becoming gregarious and may form swarms. This process may be accelerated by other incoming adults or when large numbers of grasshoppers or other locusts are present.

**An outbreak** occurs when there is an increase in locust numbers through concentration, multiplication and gregarization, which takes place over several months. Outbreaks are often localized and restricted to certain habitats, but if they are not controlled at an early stage and if favorable environment conditions continue, this can lead to a regional upsurge that may extend to other regions and eventually cause a plague. **A plague** can occur when favorable breeding conditions continue, and control operations are unsuccessful or delayed. It can last for several years with recession periods in between and can spread across as many as 60 countries, or about 20% of land surface of the earth (approximately 30 million square kilometers), costing hundreds of millions of dollars in control efforts. While outbreaks and upsurges occur under matching environmental conditions with an interval of several years, no statistically significant evidence has been found to suggest any regularity of these events (Cressman et al, 2001).




Summary of Desert Locust population dynamics, showing the influence of the environment on locust behavior and phase. (Source: FAO 2001)

## THE LOCUST PLAGUE OF 2020

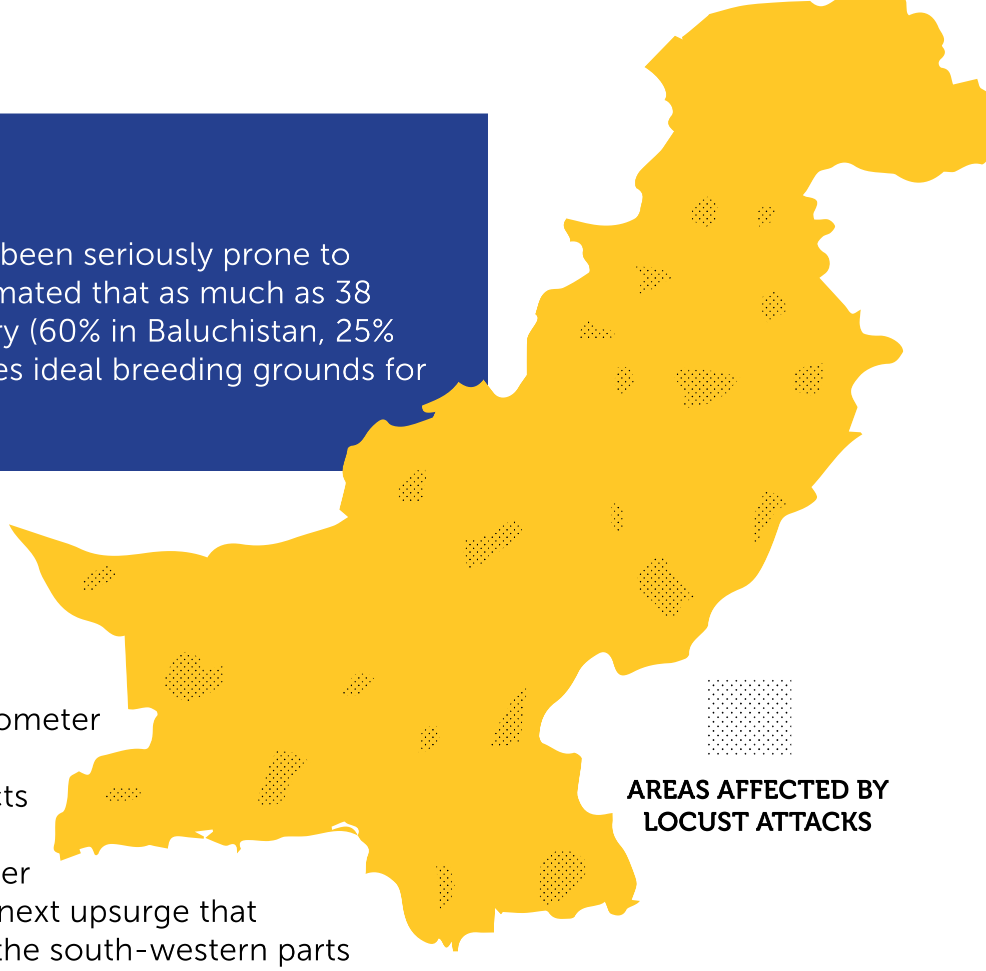
As discussed in the previous section, desert locusts only spread when certain environmental conditions overlap. This, added by failure of early detection and risk communication – not only at local or national level, but at the regional and international level – are usually the main reasons why swarms develop and start migrating.

In May 2018, an unusually powerful tropical cyclone called "Mekunu" made landfall over the Arabian Peninsula. Tropical cyclones usually weaken upon reaching land, but Mekunu crossed over Oman, causing heavy rainfall that created patches of water in the deserts of Saudi Arabia. The warm, sandy and wet soil was the perfect environment for desert locusts to hatch from eggs, develop and breed. The dry conditions in this region would normally kill these breeds, but another tropical cyclone followed in October 2018, providing a lifeline for the continuation of the first outbreak. The outbreak spread to Yemen, where it continued uncontrolled due to political instability and lack of coherent government response. By the end of 2019, the winds of yet another tropical cyclone facilitated the migration of desert locusts to East Africa. A lack of preparedness, chronic political instability and limited capacity made the invasion the worst in a quarter of a century for most countries.

Controlling such outbreaks requires a swift and coordinated response. However, the limited financial capacity of some of the affected countries and the lockdown due to the coronavirus pandemic have further hampered control efforts.

## THE CASE OF PAKISTAN

In the past century, Pakistan has been seriously prone to repeated locust attacks. It is estimated that as much as 38 percent of the area of the country (60% in Baluchistan, 25% in Sindh and 15% in Punjab) makes ideal breeding grounds for the desert locust.




After the independence in 1947, the region confronted the first locust attack in 1952. The next significant attack was in 1962, when the swarm attacked almost 29 million square kilometer across 60 Afro-Asian countries, and seriously affected agricultural products including wheat, sugarcane and rice. This plague ended in 1963, but another one occurred in 1967 and 1968. The next upsurge that reached Pakistan was in 1978, when the south-western parts of the country saw the first wave of invasion in June. An area of around 5,500 square kilometer was affected. The second wave came in August to affect an area of 17,000 square kilometer. Intense spraying operation through land and air brought the situation under control in October. Another upsurge happened from 1987 to 1989, when over 30 million hectares of land in affected countries including Pakistan was treated with chemical insecticides and pesticides through support from the international communities. The last plague before 2020 was in 1992 (Pervaz, 2021).

In June 2019, locust swarms entered Baluchistan province of Pakistan from Iran, and quickly devastated large areas of agricultural lands across the southwestern districts, ravaging cotton, wheat, maize and other crops. The reported spread of the locust was in 61 districts of Pakistan in 2019-20 which included 29 districts of Baluchistan, 18 districts of Punjab, 9 districts in Khyber Pakhtunkhwa and 5 districts of Sindh province.

The United Nations' Food and Agriculture Organization (FAO) estimates losses to agriculture from the 2020 plague in Pakistan could be as high as 2.2 billion dollar for winter crops, and about 2.6 billion dollar for summer crops.

# LOCUST CONTROL: METHODS AND CHALLENGES

The swarm is highly mobile and can migrate from 50 to more than 100 km in a day. Due to the irregular occurrence of locust upsurges and plagues, experience, funds and supplies often lack in the affected countries. Which is why controlling desert locust after the swarm forms, can be extremely difficult and complicated. The traditional methods practiced by farmers through generations, although work only temporarily on a small area, are usually environmentally friendly, low cost and simple. On the other hand, the extra measures like spraying pesticides, although very fast and effective, have serious environmental and health implications. While new, environmentally friendly sprays are being developed by scientists, given the unpredictability of the outbreaks, making them available in the affected areas at the right time can be a challenge.

## TRADITIONAL METHODS

Agricultural farmers developed a variety of traditional methods to scare or drive away desert locusts, and the practices are similar in many parts of the world. These methods, which include creating smoke, beating drums, and fanning, do very little to reduce the swarm in size, but they are often partially effective against small infestations to scatter the locusts away temporarily. The traditional methods are usually used in combination, side by side with extra measures such as spraying pesticides.

In case of very large swarm, like that of 2020, practicing these traditional methods can take their toll on the physical and mental health of the farmers and their families – particularly children – as they need to continue the process for days, even for months. Children often have to skip schools for the whole period to help parents at the fields. The physical exhaustion, multiplied by the food shortage because of the infestation, can cause health damages among the residents of the affected areas.

## EXTRA MEASURES – PROS AND CONS OF USING PESTICIDES

Chemical pesticides have been the fastest and most effective method to control extreme locust infestations. And because they work the quickest, they remain a key tool in extreme cases. However, all chemical pesticides pose some sort of risk for the environment and eventually its living beings. They greatly affect the ecosystems, such as bees and other insects that pollinate up to 70% of human food, and thus can threat food security. Besides, unless they are handled with the utmost care – at all stages of storage, treatment, monitoring, clean up and disposal – the chemicals can severely affect human health.

One of the biggest challenges of using pesticide is making it available at the right time. Pesticides are not produced in most countries that are usually attacked by locusts, so they need to be procured and transported from other countries. The process may take time and cause unnecessary delay. In case of 2020 plague, the ongoing pandemic complicated the process farther. Besides, each country has its own approved list of pesticides, which may not match the kind that are available. Because of these issues, the supply often comes too late, or even after the infestation is in control, which leaves the management with no other option but to store the unused chemicals indefinitely. It is worth mentioning here that pesticide manufacturers generally guarantee a shelf-life of two years, although many products maintain a good quality for longer than that. However, it obligates the management to ensure the right storage environment, and do periodic monitoring through an effective storage administrative system following the FAO guidelines (Valk, 2019).

Food and Agriculture Organization of the United Nations (FAO) and other organizations have been searching for alternatives like nature-based biological pesticides. One method is the use of pathogen. Fungi varieties of the Metarhizium acridum species have proven to be very effective in controlling locusts, killing hoppers and adults within a week or two. These biopesticides take much longer than chemical pesticides to work, but in situations when the timing allows for their use, they offer a reliable, less harmful alternative for controlling locust outbreaks before they reach crisis levels. They also offer a solution for treating outbreaks in fragile ecosystems. (FAO 2020)

## EXPERIMENTS ON CONSUMPTION AS FOOD

One of the control methods that are being suggested in the recent years is to collect the locusts for consumption. Desert locusts contain significant proportions of energy, proteins, fats, vitamins and minerals and can be a nutritious food source for both humans and animals. Upsurges and plagues are an ideal opportunity to harvest these insects for food and feed. However, this is unlikely to significantly reduce the population.

During the plague of 2020 attempts were made to harvest the locusts by a project in Pakistan. It offered farmers US$ 0.125 per kg of locusts collected at night (news article by Khan, 2020). Locusts cannot fly at night and remain almost motionless till sunrise, which makes it an ideal opportunity to catch them. The insects are then turned into chicken feed by animal feed mills. A five-week study on the nutritional aspects of the chicken showed very good results. In this project, people from 10 villages in Pakistan harvested the desert locust for 4 days. They captured 1,275 kg from a swarm of 5 square kilometer. However, the 1,275 kg harvested was only 0.3% of the population of this swarm (Samejo et al., 2021). Given that the population was barely reduced by the harvesting effort, it is unlikely that this would have had any impact. With a multiplication rate of 2, 5, 10 and 20, about 80 to 95 percent of the locust population will need to be destroyed for its control, which, compared to the results from the project, seems extremely challenging.

It is important to note that these experiments were done based on the assumption that the locusts were not sprayed with chemical pesticides. When it is not clear whether they were treated with pesticides, consuming them as food can cause serious health problems. When a swarm arrives, it is likely that it was treated in its previous locations, and thus may contain a sublethal dose of pesticides.

## METHOD USED FOR CWS RESPONSE (PHASE 1): TILLING

As mentioned previously, desert locusts usually lay their eggs 5-10 cm below the surface of bare sandy or sand-clay soil in batches called "pods". Swarms can lay hundreds of pods per square meter, and each pod can contain about 80 eggs. Unless they are destroyed before hatching, thousands of nymphs or hoppers can grow from only one square meter area. The most concerning thing is that the eggs can stay undamaged in the sand for a whole year waiting for the right environmental condition for hatching. Exposing the eggs to the surface is a sure way of damaging them, which can eventually stop the breeding process. This can be done easily by agricultural tools, and the process is called "tilling" or ploughing. The added advantage of tilling that it also prepares the land for sowing the seeds. This method, which has been implemented in some parts of Asia and Africa in the past, may not eliminate all the eggs from the soil, but considering its simplicity and added benefit of ploughing, it can easily be taught and sustainably implemented at a wide scale.

In case of CWS response, tilling method was used during the first phase, and it was revealed from a Post Distribution Monitoring (PDM) survey that 95% of the 310 respondents have not witnessed any locust swarm in the entire area after the tilling operation, and the remaining 5% said that they witnessed small swarms in the nearby areas.

The tilling or ploughing work was done by the community members through cash for work. This ensured some much-needed income during a compound disaster situation. Responding to a long disaster like locust infestation goes much beyond controlling the locust – ensuring alternate sources of food and income for the affected people becomes equally important. With the situation made much worse because of the pandemic, this project where the farmers received cash in exchange of tilling the land, addressed both the problems at the same time.

For the effective monitoring of the work, village committees were formed consisting of people from various social and demographic groups and administrative levels. Because of the vastness of the infested area, and also because of an ongoing pandemic, it was not possible to deploy project staff and resources to monitor everything at all times, and the formation of the village committee proved to be a very effective solution to ensure the right implementation.

## METHOD USED DURING CWS RESPONSE (PHASE 2): TRENCHING

Locust nymphs or hoppers cannot fly, but they are able to crawl. They usually grow near vegetation under certain temperature and environmental conditions. They crawl in bands along the height of plants, eating the parts on their way. Since they are not able to fly, it is possible to sweep them towards a particular place – usually to a trench dug for this purpose. The trenches, which are typically dug about 2 feet wide and 3 feet deep, are covered with plastic sheets or sacks, and when the hoppers are collected in them, the sheets or sacks are closed and transported to a place where they are usually buried or burnt.

Trenching is a simple, sustainable, and environmentally friendly method of locust control, which can be easily taught through one-time training. This method was chosen for the second phase of the CWS response, and they collaborated with a local research institute that has expertise in the installation of trenches. This process fostered knowledge and understanding within the local stakeholders and the field team about this very harmless, environmentally friendly method.


## TRAINING OF FARMERS

One of the major components of the CWS project was building and strengthening capacity of project participants on Integrated Crop Management (ICM) and Integrated Pest Management (IPM).

ICM is a complete approach to improve crop production and protection, and through the training the participant farmers got to learn about many things including sustainable agriculture, drought resistant crops, quality seeds and method of storage, regular weeding, pests and diseases and so on.

In case of IPM the participants learnt about various growth phases of locusts, ideal depth of ploughing, how to destroy the eggs, and various methods of locust control.

Training materials were prepared and printed on growth stages of locust, different methods to control them, details of the trenching method and so on.

# FURTHER CHALLENGES

## DETECTION AND FORECASTING

Early detection of locust swarms and communication of the risk with the vulnerable communities are essential first steps towards their control. Weather patterns and historical locust records help experts predict where swarms might form. Survey teams monitor seasonal breeding areas and send the data to the expert forecasters, who, together with additional weather data prepare the forecasts.

Meteorological information can be vital at many stages of the forecasting (WMO and FAO, 2016), such as:

a. Where breeding is likely to occur.
b. When the next generation is likely to be flying.
c. Where and when that generation is likely to reach, i.e., areas at risk of invasion.
d. Effects of weather on logistics of survey and control.

However, at the field, the early stages of an outbreak are often unobserved. Hoppers may be concealed in the vegetation and easily missed during surveys, and adults may be dispersed widely, appearing too few in numbers. Therefore, very careful field inspections are necessary at the usual habitats when weather and environmental conditions start matching with the suitable conditions for locust breeding.

Most of the desert locust upsurges and plagues develop as a result of unusual meteorological conditions such as those associated with cyclones and other extreme weather events that lead to heavy rainfall, which, in turn, causes ecological conditions to become extremely favorable for locust breeding. Unfortunately, climate change is likely to increase weather unpredictability, and bring more cyclones and severe rains that make for ideal breeding grounds for hoppers. It may be a timely investment for the governments in the vulnerable regions to put in place a multi-hazard early warning system with robust surveillance and forecasting methods, and strengthen the existing risk communication mechanism.

Besides, close cooperation is vital at international levels too. The presence of swarms in any country is a threat to other countries, even though the countries may be thousands of kilometers away from the source of invasion. Information sharing between countries, and then from national level to the local level, is crucial for taking timely measures.

## EARLY RISK COMMUNICATION

There needs to be a strong and planned pathway from the national level to the community level for communicating the forecasts to ensure timely measures at all levels. Through the CWS response, it was found that this communication was very weak in case of the locust plague of 2020 in Pakistan. The communities need to be oriented on the attacks and their possible mitigation measures as soon as the forecasts indicate a possible attack. Because of its infrequent nature, communities are not prepared for any kind of response when a plague occurs, and it is usually too late to depend on words of mouth, since it means that the swarm has already reached the nearby areas.

To ensure early risk communication, the Department of Plant Protection and the Ministry of National Food Security and Research – who are the lead institutions tasked with monitoring and managing the desert locust threat in Pakistan, can be the coordinating body for information sharing and issuing the early warning. NGOs can also play their role in bridging this communication gap. Technologies such as E-Locust developed by FAO (Cressman et.al., 2016) can be introduced to monitor the situation, while media channels can be used for sharing the updates. Text messages, radio announcements and loudspeaker announcements can also be used.

## LONG-TERM RESPONSE PERIOD

As mentioned previously, a plague can take several years to control, even with the best efforts. There are mainly two reasons for this:

a. It may take several generations to complete the transition from gregarious to solitarious behavior. Females can influence the phase of their offspring by adding a gregarizing chemical to the egg pod foam.

b. The eggs can survive in the soil for a whole year waiting for the right opportunity to hatch. This is particularly concerning, because on the surface it can look like the locusts are already under control, even though in reality they are not.

The long duration of the plague calls for a long, consistent response. Close monitoring is necessary even after the locusts seemingly recede. Preparedness is required in case there is a recurrence. Besides, for the people of the affected areas, who suffer the most from the agricultural damage and food shortage caused by the plague, alternate sources of food and income need to be ensured over a much longer period. Treating the plants and fields infested with locusts only addresses a part of the problem.

Moreover, a long duration may mean there will be possibility of compound disasters. In case of the locust plague of 2020, it was a global pandemic that affected almost all the countries of the world. In case of Sindh province, there was also a flood in the month of August, which complicated the situation farther. There was standing water in the agricultural fields, and it became very difficult to access the affected areas. Therefore, management of locust plagues should be planned with the possibility of a compound disaster situation in the process, with a longer and more lasting support than the duration of the plague itself.

## INTERVIEW ON THE RESPONSE AND COPING STRATEGIES

Aside from review of existing literature and the experiences gathered through the CWS response, an in-depth interview of 9 persons from two villages of the Sindh province in Pakistan were conducted for the research of this report, to understand (a) the traditional responses to locust infestation, (b) the usual coping strategies, and (c) how the two were affected by the COVID-19 pandemic, (interview guide in Appendix). The summary of the interviews is discussed here.

1. **TRADITIONAL RESPONSES**
   Traditional responses to locust infestation can only drive the locusts away temporarily, and do not have any effect on the population/ swarm. Traditional methods include emission of smoke, creating loud noise by beating drums and utensils, creating reflections through mirrors, driving the locusts away from the field by cloths, hitting them with cloths if they are flying low.

2. **EFFECT OF PANDEMIC ON THE RESPONSE**
   While the COVID-19 pandemic did not have much effect on the traditional responses, since they are performed outdoors at the fields, it did affect the extra measures taken by the government. The timely supply of the pesticides was affected because of the pandemic. Some respondents mentioned that the timely treatment of the affected fields could prevent the situation from getting so bad.

3. **THE METHODS USED FOR THE CWS PROJECT WERE RELATIVELY UNKNOWN**
   The two methods used for the two phases of the CWS project – tilling or ploughing the land to damage the egg pods, and collecting the hoppers in trenches – even though not entirely new in the region, were relatively unknown to the people. The respondents appreciated the training that was provided to ensure the correct implementation of these methods.

4. **THE USUAL COPING STRATEGIES**

The usual coping strategies mentioned by the respondents are as follows:

a. Doing casual labor to compensate the loss of income
b. Selling livestock to buy food and daily supplies
c. Borrowing money for survival
d. To limit consumption by adults. It was revealed from a Post Distribution Monitoring (PDM) survey that 47% of the 310 respondents were taking less number of meals to cope with the situation.

5. **EFFECT OF PANDEMIC ON COPING STRATEGIES**

The pandemic has greatly affected people's coping strategies.

a. Opportunities of casual labor reduced, creating income deficiency.
b. People could not sell livestock, because those who usually buy the animals were affected too.
c. Borrowing money was not possible as the lenders did not have money to lend.
d. The only way to cope was to limit consumption, which is a negative strategy. This only works temporarily for a very short time, and usually has serious health implications.

6. **HEALTH IMPLICATIONS**

The compound disaster affected people's health in many ways, including the following:

a. Severe food shortage because of the damaged crops due to locust infestation.
b. Poverty and income loss forced people to negative coping strategies like consuming less food.
c. Food shortage, less consumption of food as coping strategy, and related hunger and malnutrition made people more vulnerable to COVID and other infectious diseases.
d. The pesticides—where they were used—had some effects on the farmers who worked in the fields.

# CONCLUSION

Knowledge on the ecology of desert locusts and the forecasting of swarms have developed considerably over time, but understanding the species and having the technology for the forecast is not enough. Without international policy and implementation cooperation, and, more importantly, without the timely communication of the forecast, outbreaks will continue to happen. If the right measures are taken at an early stage based on the forecast, locust plagues can be prevented. States, provinces, and even countries need to cooperate and work together, because, if a swarm forms in parts of the neighboring areas, they can easily fly over.

It is also important to improve the early warning communication pathway between the central and the regional bodies. Through the CWS project, it was found that the forecasts were not properly communicated with the residents of the affected areas, even though there was adequate time. The forecasts from the regional and international bodies are usually delivered to the government, and unless that information is properly relayed and distributed to the communities, the people have no way of knowing about the upcoming hazard.

Another aspect that makes locust control difficult is the irregular and long intervals between the outbreaks. The knowledge and experience gained by one generation may not be passed on properly to the next because of the length of the intervals. For the same reason, governments and stakeholders are often not prepared for immediate action. It is important to document the learnings and lessons from each outbreak, upsurge, and plague, to ensure a proper transformation of knowledge between generations.

Moreover, response to locust infestation is a long process and requires much more than locust control. As discussed previously, it is important that such long response includes the possibility of compound disasters, which can make the management very complicated. A more flexible, holistic approach is therefore needed, with the preparedness for compound disaster situations. The locust control efforts carried out under the CWS response also addressed the issue of hunger and income loss, which, according to the interview findings, had worsened manifolds because of the pandemic. Practices like this need to be encouraged especially at a time when the risk landscape is increasingly becoming complex, for various reasons including the implications of climate change.

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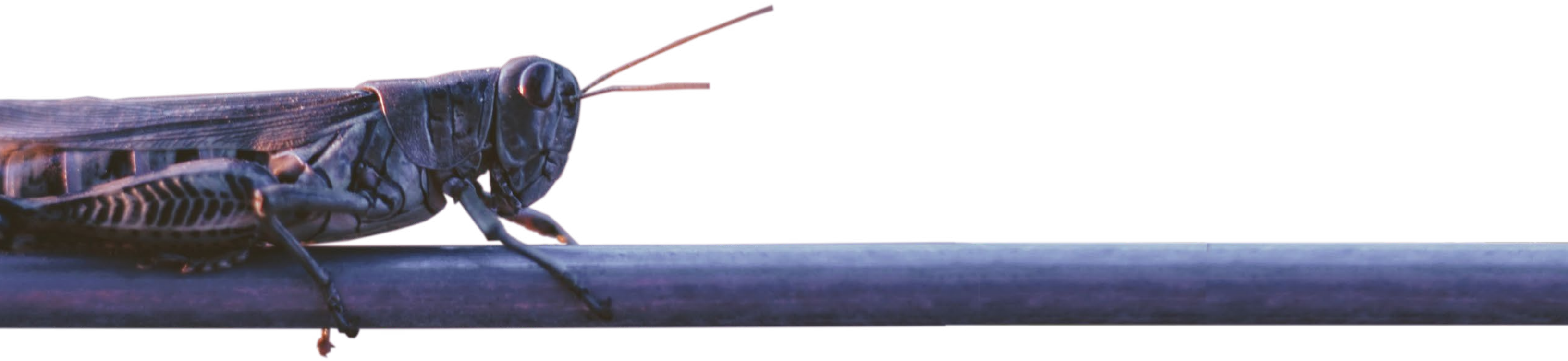

# APPENDIX

## QUESTIONS FOR SEMI-STRUCTURED INTERVIEW
on the response and coping methods

## NOTES

- *This Semi-Structured Interview* is designed to take from 30 and 40 minutes. (Please allow extra time in case the respondent shows willingness to spend more time with the interviewer and to provide additional information.)
- Interviews should be recorded by the interviewer in the form of written notes taken during the interview.
- Responses should be transcribed as soon as possible after the interview in Microsoft Word. Please use this file as base, and add as much space as needed after each question to type the responses.
- Please send the responses to CWS Japan research team by no later than October 31.
- The name of the respondent should not appear on the typed transcription to ensure confidentiality.
- The Word file must not be shared with anyone other than CWS Japan research team members.
- All local guidelines and regulations related to COVID-19 must be followed during the interviews.

## BASIC DATA ABOUT THE RESPONDENT

Respondent no.
Date (day)
Location
Number/ age/ gender of family members
(Not needed for DRR / health representative)
Main (usual) source of family income
(Position/ designation in case of DRR/ health representative)

## QUESTIONS

### ABOUT RESPONSE

1. What do you know about locust plague? What is the traditional way of dealing with this disaster in your community?
2. Did the COVID-19 pandemic affect the traditional response? If yes, how?
3. (If yes to no. 2) What was done differently / additionally with respect to the traditional response?
4. What else could be done additionally / differently?

### ABOUT COPING METHODS

5. What are the usual coping strategies of the families / your family during locust plagues? (i.e., selling livestock / other things for cash, doing day labor / livelihood diversification)
6. How were they different this time?

### ONLY FOR DRR/ HEALTH REPRESENTATIVES:

7. Was there reverse migration in your community because of the pandemic?
8. How were the returnees affected by the locust plague?
9. How did the flood affect the response?
10. How did the locust plague affect health? (i.e., implications of food shortage/ hunger, health complications from pesticides etc.)

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