

INTEGRATED LOCUST (PEST) CONTROL PLAN

Rajasthan Agriculture Competitiveness Project (RACP)

Background: Locusts are highly migratory and are marked by polymorphism and voracious feeding behavior. They can form swarms (adult's congregation) and hopper bands (nymphal congregation) capable of causing great devastation to natural and cultivated vegetation at times leading to national/state emergency of food and fodder. If appropriate control measures are not taken in time, economic losses through crop failures, particularly for small and marginal farmers are likely. Locust swarms are projected to attack western districts of Rajasthan during May 2020 and continuing through the calendar year.

The Locust Control Proposal: To counter the emerging locust attack in Rajasthan, RACP is proposing taking up locust control measures in select western districts which include the project clusters of Kheruwala, Phoolasar, Z-distributary, Ladnun and Pisanganh. The Department of Agriculture will bring approximately 50,000 Ha under the proposed locust control plan.

Principles of the Integrated Locust (Pest) Control Plan

- Consider multiple locust control measures combining different methods for maximizing results and minimizing adverse environmental impacts.
- The decision regarding locust control measure(s) will be based on the best-practice method and informed by the locust population, life stages, behavior and numbers (numbers/density per hectare), farming system, technical capability and the availability of products/equipment.
- Preference will be given to the use of biopesticides, where applicable and depending on availability.

Overall Approach of the Locust Control Plan:

Stage of Locust Attack	Recommended Locust Control Methods
Onset & Early Stage Low Intensity	<ul style="list-style-type: none"> • Use cultural and Biological Control Methods • Use of Biopesticides is preferred • Follow Relevant Mitigation Measures
Locust Build up Stage Moderate Intensity (<10,000 / Ha)	<ul style="list-style-type: none"> • Continue with Biopesticides, cultural and Biological Methods • Use of FAO Recommended Chemical Pesticides (WHO Class III) • Follow Relevant Mitigation Measures
Mature Stage Severe Intensity (>10,000 / Ha)	<ul style="list-style-type: none"> • Use of FAO Recommended Chemical Pesticides (WHO Class II & III)¹ • Regular Monitoring for Pesticide Residue • Follow Relevant Mitigation Measures

¹ WHO classification is based on acute mammalian oral toxicity and doesnot reflect the scale and intensity of impacts on non-target species, carcinogenicity and/or other long-term impacts, toxicity through other routes (such as inhalation), persistence in the environment, ability to be absorbed and concentrated by crops or livestock.. It is also a classification only of active ingredients, not of actual formulated products, which can vary enormously in terms of toxicity/hazard depending on concentration of the active ingredient, possibly toxic “inert” ingredients and other factors. Therefore, utmost caution is to be exercised while using the pesticides and the suggested mitigation measures must be adhered to, monitored, documented and reported.

Depending up on the intensity of the attack, it is recommended to use the various control methods. As far as possible use of multiple control methods is recommended.

1.	Cultural Control Method	<p><i>Use during the early/initial stages of locust attack</i> <i>Train/orient farmers to implement these on their farms</i></p> <ul style="list-style-type: none"> ▪ Deep summer ploughing for exposing the eggs ▪ Trimming and cleaning the farm bunds ▪ Digging trenches and lighting bonfires etc.
2.	Insect Growth Regulators	<p><i>Use for preventing growth of the larvae</i> <i>Do not use close to waterbodies, as they may interfere with the natural growth of arthropods and mollusks</i></p> <ul style="list-style-type: none"> ▪ Diflubenzuron, Teflubenzuron and Triflumuron can be used which will interfere with production of cuticle
3.	Biological Control Method	<p><i>Use of biological inputs that pose low risk to non-target species, such as, birds, reptiles etc. that usually eat the dead locusts</i></p> <ul style="list-style-type: none"> ▪ Bio Pesticides like <i>Metarhizium acridum</i> (mycoinsecticide) can be used, depending on the availability, during early stage of locust attack when intensity is low
4.	Chemical Control Method	<p><i>Use when the locust numbers have reached Moderate or Severe Intensity</i></p> <ul style="list-style-type: none"> ▪ Chemical (pesticide) sprays will be done through drones/planes and tractor/truck mounted sprayers. ▪ Use of WHO Class IA (extremely hazardous) & IB (highly hazardous) is not permitted. ▪ Use WHO Class III for Moderate Intensity (<10,000 adults/ha). ▪ Use WHO Class II for Severe Intensity (>10,000 adults/ha). ▪ Strict mitigation measures are to be adopted while resorting to chemical control.

Pesticides Proposed to be used for Locust Control by RACP: All pesticides proposed below are recommended according to the 10th Pesticide Referee Group report of the FAO and are permissible and registered for use in India as per relevant national legislation and rules.

S. No.	Name of the Pesticides	Dosage (per Ha)	WHO Class
1.	Bendiocard 80% WP	125 gm	Class II - Moderately Hazardous
2.	Chloropyrifos 20% EC	1200 ml	Class II
3.	Chloropyrifos 50% EC	480 ml	Class II
4.	Deltamethrin 2.8% EC	625 ml	Class II
5.	Deltamethrin 1.25% ULV	1400 ml	Class II
6.	Lambda Cyhalothrin 5% EC	400 ml	Class II
7.	Lambda Cyhalothrin 10% WP	200 gm	Class II
8.	Diflubenzuron 25% WP	120 gm	Class III – Slightly Hazardous
9.	Malathion 50% EC	1850 ml	Class III
10.	Malathion 25% WP	3700 gm	Class III

Mitigation Measures to be adopted for addressing adverse environmental and social impacts

Activity	Suggested Mitigation Measures
<p align="center">Spraying Operations</p>	<ul style="list-style-type: none"> ▪ For spray operations, Standard Operating Procedures (SOPs) issued by the Directorate of Plant Protection, Quarantine & Storage, Ministry of Agriculture & Farmer Welfare to be followed. <ul style="list-style-type: none"> ○ SOPs on Aerial Spraying for Desert Locust; and ○ SOP for Desert Locust Ground Control. ▪ Only trained and experienced personnel will be used for tractor-mounted spray operations. ▪ Personal Protective Equipment (PPE) is compulsory during spraying (e.g., masks, eyeglasses, gloves, adequate clothing or hazmat suit). ▪ The spray workers/team to be rotated frequently to reduce exposure to pesticides. ▪ A vehicle for emergency purpose (or an ambulance) should be kept ready close to the site of operations with first-aid kits appropriate for the selected chemicals. ▪ Spraying and supervising staff during spray operations to be tested for Cholinesterase (AChE) levels before, during and after spray operations. ▪ The antidotes for Organophosphates (i.e. Atropine) to treat accidental poisonings. ▪ Avoid spraying during windy hours and rainy days. ▪ In case of drone sprays, the following non-targeted areas and ecologically sensitive areas will be marked and strictly avoided: <ul style="list-style-type: none"> ○ Water bodies (wetlands and ponds, fishponds, canals, etc.); ○ No spraying over residential areas; ○ Avoid spraying over grazing areas (grasslands, pastures etc.) and ○ Cover private open wells.
<p align="center">Community Awareness</p>	<ul style="list-style-type: none"> ▪ Organize awareness meeting(s) with farmers and other community members in the affected villages before the planned spray operations – inform the spraying schedule and likely impacts and precautions. ▪ Provide advance knowledge of spraying schedule through multiple modes, including public address system and printed copies in local language. ▪ Convey key precautions in print form (local language) and through other means, such as, local radio and TV stations, local newspapers and through public address systems within the villages: <ul style="list-style-type: none"> ○ Avoid exposure to pesticides during spray by staying indoors and keep the doors and windows closed; ○ Collect and store fodder for a few days; ○ Keep cattle safe and cover all the fodder and water troughs; and ○ Do not take livestock for grazing until few days after spraying and only stall-feed.
<p align="center">Specific Community Group(s)</p>	<ul style="list-style-type: none"> ▪ Move nomadic herders to safe locations and ensure provision of fodder for their livestock. ▪ Beekeepers will be advised to move colonies to safer locations away from pesticide spray areas. The bees should be released for foraging only after the safe period (as directed by the Agriculture Department).
<p align="center">Handling of Pesticides</p>	<ul style="list-style-type: none"> ▪ Only FAO recommended pesticides to be used and no new formulations (by combining active ingredients) to be prepared and used. ▪ The transport and storage of the pesticides will follow national and International guidelines (FAO guidelines). ▪ The drivers will be sensitized on accident prevention and spillage response

Activity	Suggested Mitigation Measures
	actions. <ul style="list-style-type: none"> ▪ Follow FAO guidelines for transporting pesticides (with proper cover and labels etc.). Pesticides will not be transported with food grains, vegetables, fruits, meat or live animals (poultry etc.) and any packaged food (processed or raw). ▪ Updating of stock registers and limited access to pesticide stocks. ▪ All spray equipment will be washed as prescribed. ▪ Empty pesticide containers will be accounted for and safely disposed of and the process documented.

Institutional Arrangements and Responsibilities: As one of the Line Departments implementing RACP, DoA will be the nodal agency for implementing this Locust Control Plan, including all mitigation measures listed above. The RACP Project Director will provide overall leadership with the help from the RACP Environment Specialist and in close collaboration with other relevant Line Departments (Animal Husbandry, Health & Family Welfare, Fisheries, Rural Development) and district-level administration.

Key Responsibilities

- Training of spray staff in safe handling and management of pesticides and emergency procedures in the case of accidental exposure and/or spills;
- Communicating with the community and ensuring all messages are periodically conveyed;
- Ensuring availability of printed material in local language to community;
- Based on the pesticide use, prescribe safe period for communities to stay indoors;
- Ensuring moving nomadic groups to safe locations and providing resources until resuming normal activities;
- Ensuring availability of necessary first-aid kits (and antidotes) for communities and staff for immediate relief in case of accidental exposure to pesticide;
- Ensuring coordination with NGOs who may be required to support communications with communities;
- Determining and communicating re-entry periods into pastures, fields, water bodies etc.;
- In case of sprays in standing crops, informing about safe harvest periods of different crops (where applicable);
- Regularly monitoring for pesticide residues in crops, soils and waterbodies;
- Pre-, during and post testing of staff involved in spraying operations; and
- Informing the district hospital and local health centers about the use of specific pesticides and preparing for any health emergency.

Key Monitoring and Reporting Requirements

- Any incidents of accidental exposure of humans and livestock will be documented and reported;
- Adherence to suggested re-entry periods into pastures, fields, water bodies etc. will be monitored and recorded;
- Soil and water samples should be tested on weekly/fortnightly basis till the residue levels are within permissible limits;
- Any grievances from the community relating to spray operations will be registered through existing Grievance Redress Mechanism (GRM) and duly addressed as appropriate;
- Field visits will be done based on the need and feasibility as and when required; and
- The RACP Environment Specialist will document the implementation of the Locust Control Plan (with support of the broader RACP team), including implementation of the mitigation measures in this Plan.

Capacity Building: The Department of Agriculture has satisfactory capacity and experience in executing the locust control operations in the state. In addition, the RACP Environment Specialist will conduct an online orientation for the district-level functionaries on this Integrated Locust Control Plan.