



Stress Management Agro-Advisory for the State of Maharashtra

September 17-30, 2021



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Managing Abiotic and Biotic Stresses in Agriculture

Agro-Advisory for the State of Maharashtra

(September 17-30, 2021)

Advisory No.: NIASM/MH/21-20

Date: September 16, 2021

1. Weather Forecast (India Meteorological Department, New Delhi)

1.1. Rainfall

- Rainfall may remain 2-5 mm/day above normal in the Vidarbha and Konkan in both the weeks, while in some parts of the Madhya Maharashtra and Marathwada it may remain 2-5 mm/day below normal in the first week.
- In the first week, the Konkan and eastern part of the Vidarbha region may receive rainfall 10-20 mm/day and in the remaining parts of the state it may vary between 2-5 mm/day, while in the second week in most parts of the state may receive rainfall 5-10 mm/day.

1.2. Temperature

- Maximum temperature may vary between 30-34 °C, remaining up to 3°C below normal in the most parts of the state.
- Minimum temperature may vary between 20-24 °C. In the first week, it may remain up to 1 °C below normal in the parts of the Konkan and Vidarbha; while it may remain up to 2 °C above normal in the Madhya Maharashtra and some parts of the Marathwada.

2. Managing Abiotic and Biotic Stresses

2.1. Atmospheric Stresses

2.1.1. Crops

- **Green gram/Black gram:** Carry out the first harvesting of matured pods (75% dried) in early sown green gram/black gram crop and keep them at safe place, as rainfall is forecasted.
- **Dragon fruit:** During rainy days, remove corolla portion 3-4 days after flowering to avoid its decay leading to fruit drop.
- **Grape:** Under cloudy rainy conditions, foliar sprays of magnesium sulphate followed by Potassium sulphate @ 3-5 g L⁻¹ at weekly interval are required to fulfil nutrition requirements and enhance cane maturity.
- **Orchards:** New planting shall be done to take advantage of rains and favourable climatic conditions. Protect the newly planted seedlings from heavy rainfall and strong winds by providing support with bamboo sticks.

2.1.2. Livestock

- Feed colostrum to new born calves within (highly useful 15- 30 minutes) 2 hours for higher absorption in the body @ 1/10th of body weight for five days.
- Observe for complete expulsion of placenta in calved animals. If the placenta is not expelled within 6-12 hours of parturition, take the help of local veterinarian.
- The floor of the animal shed should be kept dry and clean to avoid udder related diseases in animals.
- The feed and fodder should be stored properly to prevent the growth of moulds.
- Maintain hygiene around animal shed and remove the unwanted vegetation nearby the sheds.

- Protect young animals from excessive consumption of newly grown green vegetation; add dry roughages along with green fodder.
- Protect animals from grazing immature (less than 45 days old) sorghum plants (Kadval).
- Prepare silage if extra green forages (maize, jowar and grasses) are available.

2.1.3. Fisheries

- Before stocking the fish in pond make pre-stocking management such as eradication and control of aquatic weeds and algae, eradication of unwanted fish, fertilization of ponds for primary production and monitoring water quality parameters.
- Maintain stocking of carp fish i.e., Catla: Rohu: Mrigal: Silver Carp: Grass carp: common carp in the ratio of 1.5: 2.0: 1.5: 2.5: 1.0: 1.5 and stocking of Catla: Rohu: Mrigal in the ratio of 4: 3: 3 to utilize maximum of the feed available in the pond.

2.2. Water Stresses

2.2.1. Crops

- **Pigeon pea:** Care should be taken to avoid waterlogging condition in pigeon pea.
- **Dragon fruit:** Drain out the water from root zone to avoid fruit cracking.
- **Orchards:** Open drainage channels in orchards to avoid water stagnation during heavy rains.
- **Vegetable crops:** Raised beds/ridges for planting to be preferred to avoid damage due to waterlogging and better root aeration. Light irrigation during dry spells to be given through drip irrigation while ensuring mulching to reduce direct evaporation of soil moisture and weeds/pests/diseases.

2.2.2. Livestock

- Provide clean and potable drinking water to animals round the clock.
- Provide mineral mixture @ 30-40 g/day to cattle for improving the milk production and reproduction efficiency.

2.2.3. Fisheries

- Strengthen the embankment and side slopes during this period with optimum depth of 2.0-3.0 m with 1.5 m water holding capacity particularly in Konkan region where heavy rainfalls are expected.
- Apply cow dung @ 0.75-1.0 t ha⁻¹ after lime application in the corners of the pond.
- Apply cow dung, urea and SSP only after the pond is filled with water.
- Apply powdered lime in the bottom of the pond @ 120-130 kg ha⁻¹. Fill the pond with water after 10 days of lime application.
- Measure turbidity of the pond water with the Secchi disc for maintenance of pond water transparency (30-45 cm).

2.3. Soil Stresses

- **Orchards:** Under wet-soil condition, do not run heavy machinery from near the root-zone to avoid soil compaction. Timely weeding should be done to avoid competition between weeds and seedlings.
- **Saline soil:** In case of saline soils make provision for proper drainage so that rain water can wash away the excess salt.
- **Waterlogging condition:** If there are symptoms of nutrient deficiency due to waterlogging spray 0.3-0.5% KNO₃ on foliage for faster recovery.

2.4. Biotic Stresses

2.4.1. Crops

- **Soybean:** For rust management spray Propiconazole @ 1.0 ml L⁻¹ or Hexaconazole @ 0.5 ml L⁻¹ or Tridamefon @ 1.0 g L⁻¹ in case of late sown crop avoiding those which are already nearing maturity to minimise the residues.
- **Maize:** Set up pheromone traps @ 20 traps ha⁻¹ for managing fall armyworm. Spray the crop with Azadirachtin at weekly interval @ 3 ml L⁻¹ of water. Under severe condition spray the crop with Emamectin benzoate @ 0.2 g L⁻¹ or Spinetoram 11.7% SC @ 2 ml L⁻¹ of water.
- **Sugarcane:** Erect light traps to control nocturnal pests. Apply fungal formulation of *Beauveria brongniartii* @ 2.5 kg ha⁻¹ mixed with FYM or press mud at the base of the clumps in the furrows for controlling white grubs.
- **Guava and dragon fruit:** For fruit fly management set up methyl eugenol para-pheromone traps @ 20 traps ha⁻¹. Spray the orchard with Azadirachtin at weekly interval @ 3 ml L⁻¹ of water to repel the flies visiting the orchard for oviposition. Spray Malathion 50 EC @ 2 ml L⁻¹ and Dimethoate 30 EC @ 1 ml L⁻¹ during fruit growth if higher pest population exists.
- **Guava:** Anthracnose characterized by small pin-head sized spots on the unripe fruits gradually enlarges to form sunken and circular, dark brown to black spots. For managing this, avoid too much waterlogging around the trees. Spray Mancozeb 75% WP @ 2.5 g L⁻¹ or Copper oxy chloride 50% WP @ 2.5 g L⁻¹.
- **Sapota:** For leaf webber (chiku moth) and hairy caterpillar management spray two rounds of, Quinalphos 0.05 % at 20 days' interval after new shoot formation. For managing leaf spot infestation, spray Mancozeb @ 0.25% or Copper oxychloride 0.2%.
- **Grape:** Spray Bordeaux mixture 1% or Copper oxychloride @ 2 g L⁻¹ to avoid untimely defoliation and to reduce inoculum load of anthracnose and downy mildew. Prefer biological control agents like *Trichoderma harzianum* for foliar as well as soil application under rainy conditions.
- **Pomegranate:** For fungal leaf spot and fruit rot management, spray of Bordeaux mixture 0.5% or Copper oxychloride 50% WP @ 2.5-3.0 g L⁻¹ followed by 2-bromo, 2-nitro propane-1, 3-diol (Bronopol 95%) @ 0.5 g L⁻¹ spray can be taken at 10 days' interval. For Bacterial leaf blight management, spray of streptomycin sulphate + tetracycline hydrochloride 10% (Streptocycline) @ 0.5 g L⁻¹ once a month and at 7-10 days' interval from Bronopol.
- **Citrus:** For brown fruit rot management spray 1% Bordeaux mixture or Copper oxychloride @ 3 g L⁻¹.
- **Dragon fruit:** Prophylactic sprays of Copper oxychloride 0.2% can reduce incidence of soft rot and anthracnose.
- **Custard apple:** To control mealy bugs adults and crawlers, spray at the initial stage or when pest population is lower spray with soap solutions or fish oil rosin soap (FORS) neem oil 5 ml L⁻¹ may be carried out to dissolve the waxy layer secreted by the mealybugs. In case of higher pest occurrences spray Imidacloprid or Acetamiprid @ 1-2 ml L⁻¹. Prophylactic sprays of neem oil and systematic insecticides (Imidaclopride or Acetamiprid or Dichlorovas) shall be taken to avoid pest occurrence.
- **Brinjal:** Use of water trap/Leuci lure pheromone traps to manage fruit and shoot borer to monitor, attract and kill the male moths @ 12 ha⁻¹ and change the vial once in 3 weeks.
- **Vegetable crops:** Integrated management of pest and diseases practices to be followed for this healthy and disease-free seedlings of should be procured from certified nursery is pre-requisite. For disease management application of preventive spray of liquid *Trichoderma sp.* formulation @ 5 ml L⁻¹ and application of *Trichoderma sp.* + *Pseudomonas sp.* @ 1 ml L⁻¹ through drip irrigation system to manage soil borne pathogens.

2.4.2. Livestock

- There is very high risk of Peste des Petits Ruminants (PPR) in Ahmednagar, Dhule and, Nashik districts; and high risk in Aurangabad district of Maharashtra. Very low risk of Foot and Mouth Disease (FMD) is prevailing in majority of districts. Vaccination for PPR and FMD (animals above 3 month of age) may be done in consultation with the local veterinarians and as decided by state animal husbandry authorities.
- There is very high risk of *Haemorrhagic septicaemia* (HS) in Thane district and high risk in Ahmednagar, Dhule and Nashik districts. Black Quarter (BQ) is having very high risk in Dhule district. There is very high risk of Sheep and Goat Pox in Kolhapur and Sangli districts. Vaccination may be done in consultation with the local veterinarians.
- There is very high risk of Theileriosis in Akola district.
- Care need to be taken to close all cracks and crevices by roughcasting and smoothing of the outer and inner surfaces of the cattle sheds for the eradication of the parasite from the farm.
- Vaccinate the left-over livestock for *Haemorrhagic septicaemia* (HS), Black quarter (BQ) and Sheep and Goat Pox with the consultation of local veterinarians.
- Monitor animals for any sickness particularly related to digestive, dermal or respiratory problems and treat them by consulting veterinarian.
- Treatment of ecto-parasitic infestation, dipping (if not done during last three months) need to be carried out with Ectomin/Butox, post-shearing on sunny days. Anti- parasitic drugs should be used under guidance of Veterinarian.
- Deworm livestock at least 15 days before vaccination with broad spectrum anthelmintic for optimum benefits.
- Spot the sick animals isolate them in separate shed for treatment.

3. Covid-19 Advisory (Ministry of Agriculture, Govt. of India)

3.1. Precautionary Measures for Agricultural Activities

- Strictly follow social distancing and avoid contacts with persons migrated from red quarantined zones.
- In manual field operations of harvesting/picking, accomplish the operation in 4-5 feet spaced strips assigning one strip to one person.
- Stagger the field operations wherever possible.
- Prefer mechanized operations over the manual wherever feasible.
- All machines should be sanitized at the entry point and at regular intervals.
- All transport vehicles, gunny bags or other packaging material should be sanitized.

3.2. Livestock and Poultry

- Wash hands with soap and water before and after milking of lactating animals and clean the utensils thoroughly.
- Don't allow visitors to enter animal premises and use mask and maintain social distancing while distribution/sell of milk.
- Use of hand sanitizer or washing hands frequently need to be practiced routinely while carrying out various day to day operations.
- All the bio-security measures need to be followed strictly in the poultry farms.

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