



Stress Management Agro-Advisory for the State of Maharashtra

July 08 - 21, 2022



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Managing Abiotic and Biotic Stresses in Agriculture

Agro-Advisory for the State of Maharashtra

(July 08 - 21, 2022)

Advisory No.: NIASM/MH/22-14

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

1.1. Rainfall

- The rainfall may remain above normal in the most parts of the state.
- The Konkan and western part of Madhya Maharashtra region may receive rainfall more than 20 mm/day; while in the other parts of the state it may vary between 5-10 mm/day.

1.2. Temperature

- The maximum temperature may vary between 26-30 °C. It may remain up to 1 °C below normal in most parts of the state.
- The minimum temperature may vary between 20-24 °C. It may remain up to 1 °C below normal in most parts of the state.

2. Managing Abiotic Stresses

2.1. Atmospheric Stresses

2.1.1. Crops

- **Sugarcane:** Carry out earthing-up and propping to prevent lodging due to strong winds.
- **Grape:** Due to increase in relative humidity the shoot vigor will be more that should be removed by pinching. Delay in pinching of extra growth results into loss of nutrients and further delay the cane maturity.
- **Spraying operations:** Do not spray in windy conditions and on wet foliage immediately after rains. Use sticker adjuvant along with spray solutions.

2.1.2. Livestock

- Repair roofs of the animal sheds wherever necessary to ensure protection for animals from rains.
- For livestock, prevent prolonged exposure to direct rainfall.
- The floor of the animal shed should be kept dry and clean.
- The feed and fodder should be stored properly to prevent the growth of moulds.
- Maintain the surrounding of animal shed clean and hygienic and remove the unwanted vegetation nearby the sheds.

2.1.3. Fisheries

- Use Aerator system during rain to maintain the pH and dissolved oxygen.
- Keep space in the pond to accommodate rainwater during monsoon.
- It is also recommended to maintain pond dykes in low-lying areas, where large volume of runoff water from adjoining catchment area can enter the pond.
- To prevent erosion of pond dykes due to heavy rainfall, it is recommended to grow grass and other plants on the slopes as well as the top crest to prevent erosion and avoid excess turbidity.

2.2. Water Stresses

2.2.1. Crops

- **Kharif crops:** Drainage channels should be formed to prevent waterlogging in the fields.
- **Soybean:** In soybean, use Broad-Bed-Furrow (BBF) planter in the areas receiving more rainfall to drain out excess water from crop rows.
- **Orchards:** In case rain exceeds 5 mm on a given day, irrigation water application can be skipped for that day. Prepare the drains to move out excess water from orchards and avoid water logging at root zone.
- **Vegetables:** In the rainy season vegetable crops should be transplanted onto the raised beds for proper drainage of excess water.

2.2.2. Livestock

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

2.2.3. Fisheries

- Measure turbidity of the pond water with the Secchi disc for maintenance of pond water transparency (30-45 cm).
- Monitor and maintain the water quality parameters viz. dissolved oxygen (6.0-7.0 ppm), pH (7.0-8.5), ammonia (0.05 ppm), nitrate (50-150 ppm), nitrite (0.1 ppm), CO₂ (less than 10 ppm), and H₂S (0.002 ppm) in fish pond. For this aerate the ponds either by adding fresh water or by using aerators to maintain oxygen level in fish pond.

2.3. Soil Stresses

- **Grapes:** After current rains give foliar spray of SOP @ 3-5 g L⁻¹. In case of calcareous soils showing acute iron deficiency, spray Ferrous sulphate @ 2-3 g L⁻¹ followed by soil application of Ferrous sulphate 25 kg ha⁻¹. Potassium application is required from cane maturity stage onwards. Approx. 64 kg of Sulphate of potash (soluble grade) should be applied in this stage.
- **Orchards:** Avoid use of heavy machinery movement on wet soil near the plants to avoid soil compaction and suffocation of roots. In case of monsoon rains, remove mulch cover on the bund/basins and allow the rain water to seep into the soil. This will leach the accumulated salts in the root zone. The mulch so removed can be mixed with the soil to improve the soil porosity.

3. Managing Biotic Stresses

3.1. Crops

- **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.
- **Grape:** Spray Bordeaux mixture 1% or copper oxy chloride @ 2.5 g L⁻¹ for controlling downy mildew and anthracnose infection. Due to reduction in temperature and cloudy conditions, mealybug infestation may be noticed. Use of broad spectrum insecticides should be avoided for mealybug control. Spray Buprofezin 25 SC @ 1.25 ml L⁻¹ to manage mealybugs. Give preventive plant wash, on stem and cordons, with biocontrol agents such as *Verticillium*, *Metarhizium* and *Beauveria*.
- **Grape:** Red colour stem borer has started egg laying and infestation under bark in grape areas. Remove loose bark from stem and cordons and give preventive wash on stem and cordons with biocontrol agent *Metarhizium* @ 3-5 ml L⁻¹.
- **Sugarcane:** To manage white grubs set up light traps (preferably below neem tree if available) to attract white grub adults which emerge after receipt of rain. 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. Drench the root zone of crop with Chlorpyrifos 20 EC @ 4.0 L ha⁻¹ or

Quinalphos 25EC @ 3.2 L ha⁻¹ three weeks after the adult emergence. Furrow application of insecticides such as, Thiamethoxam 25 WS @ 1.9 L ha⁻¹ or Fipronil 5FS @ 2.0 L ha⁻¹.

- **All vegetable crops:** It is necessary to follow integrated pest and diseases management practices since from the beginning such as the use of disease-free seedlings from the certified nurseries, field sanitation, use of mulching, sticky traps for sucking pests, and light traps for the lepidopteran pest. Use of environmentally safer pesticides like Spinosad (Lepidopteran) in eggplant and chilli, Spinetoram in chilli (thrips, fruit borer), and Neem oil of 10,000 ppm @ 1 ml L⁻¹ to manage sucking pests.
- **Biological Control Measures:** As soon as cloudy conditions prevail with increased humidity, use biological control agents like *Trichoderma viridae/ harzianum*, *Pseudomonas fluorescence*, *Beauveria bassiana* and *Metarhizium anisopliae* through soil drenching and foliar spray, for management of various pests and diseases in orchards.

3.2. Livestock

- There is very high risk of Foot and Mouth Disease (FMD) in Ahmadnagar district and moderate risk of Peste des Petits Ruminants (PPR) in Ahmadnagar, Osmanabad and Wardha districts.
- Vaccination for FMD and PPR (animals above 3 month of age) may be done in consultation with the local veterinarians and as advised by state animal husbandry authorities.
- There is very high risk of Haemorrhagic septicaemia (HS) in Jalgaon district and moderate risk of Black quarter (BQ) in Latur district Affected animals may be isolated and treated with suitable antibiotics and vaccination in consultation with the local veterinarians.
- Care needs to be taken to close all cracks and crevices by roughcasting and smoothing of the outer and inner surfaces of cattle sheds for the eradication of the ecto-parasites from the farm.
- 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.
- Spot the sick animals isolate them in separate shed for treatment.

4. Other Advisories

4.1. Crops

- **Pigeon pea:** Intercropping of pigeon pea + pearl millet (1:2), pigeon pea + sorghum (1:2 or 1:4), pigeon pea + cotton (1:6 or 1:8) and pigeon pea + soybean/ green gram/black gram (1:2 or 1:3) should be followed for better risk management as well as to increase yield and maintain soil health.
- **Maize:** Intercropping of maize with black gram, green gram, cowpea, groundnut and soybean are encouraged.
- **Soybean and Pigeon pea:** Before sowing, soybean and pigeon pea seeds should be treated with rhizobium culture @ 20 g per kg seed and @ 40 g per kg seed, respectively.
- **Mango:** In high density plantation, light pruning immediately after harvest is required to remove criss-crossed /intermingled branches and dried floral stalks.
- **Dragon fruit:** Manual pollination is highly recommended to improve fruit set and quality when flowering coincides with continuous overnight rains. Red flesh types respond extremely well to cross pollination as much of them are self-incompatible.
- **Vegetables:** The seedlings should be procured from the nursery at the proper growth stage that is healthy and disease-free, with proper stem girth at 20-25 cm height in case of solanaceous vegetables.

4.2. Fisheries

- Strengthening of embankment and side slopes may be completed during this period with optimum depth of 2.0-3.0 m with 1.5 m water holding capacity throughout the year.
- Apply cow dung @ 0.75-1.0 t ha⁻¹ after lime application in corner of the pond.
- Cow dung, urea and SSP should be applied only after pond filled with water.
- Apply powdered lime in pond bottom @ 120-130 kg ha⁻¹ and after 10 days of lime application water may be filled in the fish pond.

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

5.1. Precautionary Measures for Agricultural Activities

- 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.

5.2. Livestock and Poultry

- Wash hands with soap and water before and after milking of lactating animals and clean the utensils thoroughly.
- Use mask and maintain social distancing while distribution/sale of milk.
- All the bio-security measures need to be followed strictly in the poultry farms.

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