Kharif Agro-Advisory for Farmers in Covid-19 Pandemic

Krishi Vigyan Kendra, Khordha
ICAR-Central Institute of Freshwater Aquaculture
Kausalyaganga, Khordha District, Odisha
Kharif Agro-Advisory for Farmers in Covid-19 Pandemic
Krishi Vigyan Kendra, Khordha, Odisha

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Guidance
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FOREWORD

The second wave of COVID-19 pandemic has imposed serious problems and caused huge losses to the farming community across the globe. To mitigate the impact of pandemic, concerted efforts with suitable technological options are necessary and are made both at government as well as farmers levels, for which the country recorded the highest crop production in last year. Also the normal monsoon prediction in 2021 indicates good agriculture production in the country. During pandemic Krishi Vigyan Kendra-Khordha has reached the farmers across the district, provided necessary support and inputs and also linked the farmers through electronic platforms. The kharif season is approaching but disruption in normal farming operations and logistics supply are foreseen. To cope with shortages in labour and timely availability of inputs at affordable prices farmers need to enhance the use of on-farm inputs and adopt best practices for increasing farm production. KVK-Khordha has prepared a Kharif Agro-advisory covering crops, livestock, poultry and fisheries that serves as guidelines for the farmers for farming in this unprecedented pandemic situation.

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The farmers of Khordha district during Covid-19 pandemic lockdown in 2020 and 2021 never lagged behind in spite of all odds and excelled in farming. Krishi Vigyan Kendra-Khordha has reached the farmers across the district, provided necessary inputs and support by providing seed and planting materials at their door steps and linked the farmers through electronic platforms, WhatsApp groups, YouTube, Television and Community Radio programs. During this period KVK organised a number of skill development trainings for the local farmers, field level testing and on-farm trials, strictly following all Covid-19 safety guidelines. During the period, KVK has established a Livestock Farmers Field School, first of its kind in Odisha. In collaboration with NGO, Tanager, also established two Farmers Producer Companies ‘Sambalit’ and ‘Divyalok’ each consisting of 500 farmers in 25 Farmers Interest Groups. KVK collaborated with ICAR-Central Institute of Freshwater Aquaculture, State Government Line Departments, ATARI-V, Kolkata, KVKs in Odisha and NGOs. In line with the guidelines of Government of India and Indian Council of Agricultural Research (ICAR), KVK-Khordha has prepared an advisory for the farmer for Kharif Monsoon farming with necessary precautions for managing COVID-19 pandemic. The advisory ‘Agro-Advisory for Farmers in Covid-19 Pandemic’ includes guidelines that’s to be followed in crops, livestock and fisheries for maximising production as well as enhancing farm income.

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KVK-Khordha Kharif Agro-Advisory for Farmers in Covid-19 Pandemic

Introduction

Covid-19 pandemic has put serious discomfort at every level of the society. Apart from loosing near and dears majority have lost their jobs. The current second wave of Covid-19 is posing a serious threat to the national economy and seized the national economic activities. In spite of all the odds our farmers, the real Covid warriors, have never seized their farming activities and always trying to feed the masses. With their efforts, Indian Agriculture has established unprecedented production during Covid-19 pandemic. In 2021, Kharif has approached in the middle of 2nd Covid wave and likely there will be disruption in normal farming activities and logistics. To cope with the crisis, focus is necessary on availability of labour forces and farm inputs at affordable prices and adoption of best practices for increasing production and productivity. In view of the KVK-Khordha, Odisha has prepared a Kharif agro-advisory for the farmers during covering major crops, livestock, poultry and fisheries. Selection of suitable crops, seed treatment, nutrient management, pest management practices in crops, feed and health management for livestock, poultry and fisheries have been suggested in the advisory. Also, for getting additional household income, advisory for bee keeping and mushroom cultivation, very popular in the area, are included.

Farmers are also suggested to wash and sanitize the farm equipment and appliances with soap water before and after use. Wearing face mask and social distancing of at least 5-6 feet during farming operations, transport and marketing of farm inputs and farm produces should be religiously followed. The guidelines issued by the Government of India and Government of Odisha for preventing and mitigating the Covid pandemic may be strictly adopted by the farmers.

In view of the on-going pandemic, the Kharif Agro-Advisory of KVK-Khordha will be disseminated through e-communication channels such as electronic/social media/mobile apps etc.

Cereals/Pulses and Oil Seeds Production Management

- Sow Dhanicha seed @ 10-12 kg/acre in medium and low land area two months before transplanting paddy. Burry the dhanicha plant in soil at 5-6 weeks of age or 10-15 days before transplanting paddy. This will supplement 60-80 quintal green manure and 30 kg nitrogen/acre of paddy crop.
- Treat deep paddy seed in Salinet water treatment to separate the half filled/chaffy grains from paddy seed. For this add 20g common salt per liter water and stir, put paddy

Fig. 1. Dhanicha cultivation for green manuring
seed in the salt solution and stir thoroughly. Strain out half filled / chaffy grain those grains
and wash the good quality twice grains in normal water and dry under shade.

- Treat the seed with Bavistin @2g/kg or Vitavax Power @2.5g/kg against seed borne
disease minimum 6 hours before broadcasting/direct seeding in main field or seed
soaking for nursery raising.

- Use drum seeder for direct line sowing of paddy.

- Use paddy variety Swarna Sub-1 in flood affected lands.

- Use paddy variety CR Dhan 402 (Luna Sampad), CR Dhan 403 (Luna Suvarna) in saline
affected areas.

- Sundry the paddy seeds for 1-2 hours. Thereafter, soak the paddy seed in water for 24
hours for wet nursery raising. Strain the seeds and put under straw and gunny bag cover in
a shade place. During this period sprinkle luke-warm water 2-3 times over the soaked
seeds to facilitate germination within 24-30 hours.

- Apply 3g Carbofuran 3% G per square meter of paddy nursery before 7 days of uprooting.

- To facilitate easy uprooting of paddy seedlings apply 25 g gypsum per square meter
nursery.

- Transplant paddy with spacings distance of 15x10 cm, 20x10 cm and 20x15 cm between
line-line and plant-plant for early, medium and late paddy varieties, respectively.

- Raise paddy seedling in mat nursery for line transplanting in main field by Rice
Transplanter. About 28 square meters of mat seedling will be required for transplanting
one acre land. 15-21 days old mat seedlings is used in Rice Transplanter.

- In direct seeded paddy, broadcast herbicide Pretilachlor @ 500 ml/acre mixing with 20 kg
sand within 1-2 days of first shower / rainfall to control weed.

- Apply Pretilachlor @ 600 ml/acre mixing with 20 kg sand within 3-5 days of transplanting
or spray Pyrazosulfuran (Sathi) 80 g/acre at 12-15 days or Bispyribac Sodium (Nominee
Gold) 80 ml/acre at 20-25 days after transplanting to control the weeds.

- Always apply fertilizer in the paddy crop based on the soil testing report. In case soil test
has not been performed, apply fertilizer @ 32:16:16 kg NPK/acre in high yielding paddy
under medium and low land condition. For this, use 35 kg DAP 18:46, 4 kg urea and 14 kg
MOP per acre as basal dose during last land preparation. Top dress with 35 kg Urea/acre
at 12-16 days after transplanting and 17 kg urea and 13kg MOP/acre at panicle initiation
stage.

- In case Dhanicha is used as green manure, reduce 50 percent nitrogenous fertilizer in
paddy crop. For this, use 35 kg DAP 18:46 and 14 kg MOP per acre as basal dose during last
land preparation. Top dress with 12 kg urea/acre at 12-16 days after transplanting and 9 kg
urea and 13 kg MOP/acre at panicle initiation stage.

- For cultivating hybrid rice varieties use chemical fertilizer @ 40:20:20 kg NPK/acre. To
achieve this, apply 44 kg DAP, 4 kg Urea, 25 kg MOP during last land preparation; 1st top
dressing with 22 kg urea at 21 days after transplanting, 2nd top dressing with 22 kg Urea
and, 9 kg MOP at panicle initiation stage and 3rd top dressing with 22 kg urea at panicle emergence stage.

- Use Leaf Colour Chart (LCC) to manage nitrogenous fertilizer requirement particularly urea in paddy crop. To paddy LCC get contact; Nitrogen Parameters, Post Box No 8707, Adambakam, Chennai -600088, India, Mobile No-9884222269, email-business@nitrogenparameters.com

- In paddy fields where sudden water stagnation is a problem and it is not possible to top dress with urea, in that situation mix 1 part urea with 5 parts moist soil and make earthen balls. After 72 hours, put the earthen balls in the crop field @1 ball/4 hills and press it in soil by feet.

- Put 10-12 numbers tree branches inside the paddy field as bird perch.

- Spray Fipronil 5 SC (Reagent) @ 0.4 L in 200 L water or broadcast Chlorantraniliprole (Ferterra) @ 4 kg/acre against stem borer and leaf folder problem in paddy.

- Spray Propiconazol 25% EC (Tilt) @ 200 ml in 200 l of water against Sheath Blight disease in paddy.

- Spray Tricyclazole 75% WP (Civic) @ 120 g in 200 L of water against Sheath Blight disease in paddy.

- Cultivate Maize at a spacing distance of 60 cm between row-row and 20 cm plant-plant in up lands.

- Complete sowing of Arhar variety UPAS 120 / ICPL 87 @1 kg/acre on the paddy field bond during month of August. Inoculate Arhar seeds with rhizobium culture @ 25 g/kg seed prior to sowing.

- Complete sowing of Sesamum within month of July. Apply DAP 17 kg, Urea 19 kg, MOP 13 kg/acre during final land preparation.

**Horticulture Crops Production Management**

**Seedling Production in Pro-trays**

- Raise vegetable seedlings in pro-trays.

- Use 50 plug trays for growing cucumber, pumpkin, bitter gourd and ridge gourd for seedlings, and 98 plug trays for brinjal and chilly.

- Mix cocopit and vemicompost at 1:1 ratio and fill up the pro-trays before seeding.

**Pro-trays**

- Protray, cocopit, vemicompost are
available at Utkal Seeds and Nursery, Delta Chhak, Bhubaneswar (Mobile: 9438682456 / 9438295913) and at Good Earth, Indradhanu Market, Bhubaneswar (Mobile: 9937163717).

- Spray Ridomyl (2.5g/L) and Traizophos (2 ml/L) to the seedlings in por-trays at 15 and 25/L days of their age to prevent disease and pests.
- Spray the seedlings in por-trays at 18 days with speciality fertilizer NPK 19:19:19 @ 3 g/L for growth.
- Harden the seedlings in pro-trays before planting. To achieve this, expose the pro-tray seedlings to sunlight for 1-2 hours on daily basis at least seven days before planting in the main field.

**Seedling Production in Nursery Bed**

- In case of seedlings raised in nursery beds, make sure that the nursery beds are of minimum 15 cm more height than the ground level to facilitate easy drainage.
- Make adequate arrangement for protection of nursery beds against rain.
- Each bed should be of 10 ft length and 2.5 ft width.
- Apply 30 kg compost, 100 g Single Super Phosphate (SSP), 35 g urea, 30 g Muriate of Potash (MOP) and 50 g Carbofuran 3 % G to each nursery bed and mix it well in the soil.
- Sow the seeds in line at 5-6 cm apart in the nursery bed.
- To prevent damping off and rot disease, drench the nursery beds with Ridomyl (2.5 g/L) and Plantomycin (1 g/L) solution at 10 and 25 days after germination.
- Harden the seedlings by controlling irrigation water in the nursery beds seven days before plantation.

**Vegetable, Tuber and Fruit Crop Cultivation and Management**

- Apply bleaching powder @15 kg/ha of land and mix it with soil thoroughly before 25-30 days of transplanting of Brinjal / Chilly where bacterial wilting is a problem.
- Make sufficient arrangements for drainage of excess rain water from the vegetable crop field.
- Adopt Integrated Pest Management for control of Fruit and Shoot Borer in Brinjal. Keep the crop field clean. Apply 100 kg of Neem oil cake/acre during final land preparation. Fix 12-15 Pheromone traps with lucin lure per acre at
initiation of flowering in Brinjal. Collect the affected shoots and fruits from crop field and bury it at 1ft depth in soil. Spray Cartap Hydrochloride 50 WP @ 2 g/L mix with Neem oil @5 ml/L at 10-12 days interval in the crop. Spray Spinosad @7 ml/15 L or Spinetoram @20 ml/15 L water alternatively at 12-15 days interval, if pest is not controlled.

- Apply Ehtephon 29% SL (Ethrel) @1 ml/4 L water in Cucumber, Bitter gourd, Ridge gourd and Pumpkin at 2 and 6 leaf stage for production of more female flowers.
- Use single trellising system for vine management in Cucumber, Bitter gourd, Ridge gourd and Yard Long Bean.
- Inoculate the seeds of Yard Long Bean with Rhizobium and Phosphobacter bacterial culture @ 25 g each/ kg of seed, before sowing in the main field. Apply 45 kg DAP 18:46 and 40 kg MOP per acre land for fertilizer management.
- Fix fruit fly trap @ 12-15/acre to control fruit fly infestation in pumpkin and bitter gourd.
- Sow hybrid Okra at a spacing of 60 cm line -line and 30 cm plant - plant in the main field. Apply 53 kg Gromor 28:28:0, 94 kg SSP, 50 kg MOP and 96 kg urea per acre in 4 spl doses from sowing to first plucking in Okra for better production.
- Sow Colocasia var. Telia in rain fed uplands. This will be harvested within 135-150 days. The seeds are available at RC-CTCRI, Dumduma, Bhubaneswar.
- Treat the Colocasia seeds before planting with Ridomyl, Plantomycin and Chloropyriphos 20% EC solution for 30minutes. About 20-25 L medicinal solution will be required for treating 100 kg colocasia seed.
- Apply 52 kg DAP18:46, 54 kg MOP and 50 kg urea for fertilizer management in Colocasia. This will be applied in 3 spl doses during planting and at 30 and 60 days after planting in the crop.
- For propagating yam seed, cut the whole tuber into pieces of 200-250 g weight keeping the outer skin intact.
- Prepare a mixture of 2 kg raw cow dung,1L cow urine, 20 g Bavistin, 10 g Plantomycin and 20 ml Chloropyriphos 20% EC in 10 L of water. Put the cut tuber pieces in the solution for 30 minutes. Dry the treated tubers in shade for 2-3 days before planting.
- Apply 4 tractor load compost, 75 kg SSP and 30 kg MOP per acre land during planting of Turmeric. Top dress the crop with 26 kg urea at 45 days after planting and again 26 kg urea and 30 kg MOP at 90 days after planting.
• Cultivate Sweet corn during June-July in high lands in place of paddy. 3 kg seed is required to sow one acre land.

• Apply 35 kg DAP 18:46, 74 kg urea and 27 kg MOP per acre in 3 spl doses for fertilizer management in Sweet corn.

• Spray Emamectin Benzoite (EM-1) @ 6g/15 L water to control stem borer attack in Sweet corn.

• Plant Tissue Culture Banana var. Bantala G-9. The TC Banana saplings are available at Regional Plant Resource Centre (RPRC), Ekamrakanan, Bhubaneswar and Tissue Culture Laboratory, OUAT, Baramunda, Bhubaneswar.

• Adopt High Density Planting practice for TC Banana. For this purpose space between lines/rows at alternate distance of 5 ft and 6 ft and plant the TC saplings at 5 ft distance in each line/row.

• Make circular pit of 30 cm deep 3 ft away from the trunk of fruit bearing coconut plants. Apply 60 kg compost, 500 g urea, 1 kg Single Super Phosphate, 1 kg Muriate of Potash and 200 g Borax per bearing plant in the pit and cover with soil.

Soil Testing

• Test the soil of your land well in ahead of cultivating/sowing/transplanting any crop.

• Soil testing facilities are available at the Office of the Block Agriculture Officer. Soil tastings are done free of cost at Gram Panchayat levels by Mobile Soil Testing Van.

• Soil testing can be done on payment at Department of Soil & Agricultural Chemistry, OUAT, Bhubaneswar.

• Apply chemical fertilizer i.e DAP, Gromor, urea, SSP, MOP etc. in phased manner to the crops, based on the soil analysis reports to minimise the cost of crop production.

Paddy Straw Mushroom Production Management

• Grow paddy straw mushroom strain OSM 11 and OSM 12 for getting higher production. The spawn is available at Centre Tropical Mushroom Research and Training (CTMRT), OUAT, Bhubaneswar.

• Soak the paddy straw with Calcium Carbonate @ 10 g/L water to prevent Coprinus and other harmful mould infestation in mushroom beds.

• Spawning @200 g spawn per bed of paddy straw mushroom (7 kg substrate/bed).

• Apply 200 g wheat bran as a substrate supplement per paddy straw mushroom beds.

Animal and Poultry Management

Housing Management

• Clear the drainage and fill up the ditches around the animal and poultry houses to prevent
water logging.
• Wash the cattle shed with phenyl (dilution 1:20 ratio with water) and sprinkle Bleaching powder around the shed at weekly intervals.
• Put raised/elevated platform with bamboo up to 2.5-3 feet height inside the goat house to prevent hoof/foot rotting disease.
• Poultry house should have adequate ventilation and optimum numbers of drinkers to prevent excess moisture and cake formation of litter. Apply slaked lime @1 kg/10 square meter floor area.
• Provide heat through electric bulb / lantern during night time to the newly hatched chicks of backyard poultry.

**Health and Hygiene Management**

• Provide clean drinking water to the livestock and poultry. In case clean water is not available, use halogen tablets (1 tablet/10 l water) to purify water.
• **Vaccinate your cattle against** Haemorrhagic Septicaemia (H.S.) and Black Quarter (B.Q.) and goat, sheep against PPR before the onset of rainy season.
• Deworm all except pregnant animals for external and internal parasites in consultation with the veterinarian before start of rainy season.
• Ticks spread more rapidly in the rainy season. Spray Butox @ 2 ml/L water over cattle shed to keep the house tick free. Applying Flumethrin 1% solution (Flupour /Pour-On) or Deltamethrin 1.25% solution (Butox) topically @ 1 ml/ 10 kg body weight along the back line from top of shoulder to tail setting remove ticks from animal body.
• Mastitis is a common problem in high yielding cows in rainy season. Keep the cattle shed clean and dry. Clean the udder in soap water daily before milking. Apply Mastilep ointment over the udder after each milking. In case animal feels pain in udder, kicks the milkman while milking, milk gets curdled or blood tinged contact Veterinary Doctors immediately to treat the animal.
Fish Culture Management

Carp Seed Production

- Utilize the seasonal/shallow ponds in villages for fish fingerling production.
- Clean the pond and its margin, plough the pond bottom soil and leave for sun drying.
- Fill up the ponds with rain water.
- Test the soil and water samples at ICAR-CIFA, Kausalyaganga, Bhubaneswar prior to stocking of spawn.
- Apply soap-oil emulsion (mixture of 18 kg cheap soap and 56 kg vegetable oil per hectare) 2-3 days prior to stocking to control aquatic insects.
- Manure the ponds with raw cow dung and Single Super Phosphate (SSP) / Di-Ammonium Phosphate (DAP) as per recommendation in water testing report to enhance plankton production.
- Stock spawn of Indian Major Carp @ 30-50 lakh/ha of water area either in morning or evening hours after 2-3 days of manuring. Spawn are available at ICAR-CIFA, state Govt. Hatchery, Kausalyaganga and other private hatcheries.
- Repeat manuring after 5 and 10 days of stocking during the rearing period.
- Feed finely powdered mixture of groundnut oil cake and rice polish two-three times daily at 1:1 ratio by weight @ 600 g/lakh of spawn/day for the first 5 days and 1200 g/lakh of spawn/day for the subsequent rearing period after stocking spawn.
- After 15-20 days of rearing, thin out and sale the fry or shift to another pond if available. Maintain a stocking density 2-3 lakh fry/ha to produce fingerlings in another 2-3 months.
- Provide the same feed @8% of body weight in the first month and reduce to 6% and 4% in the subsequent months. Similarly from the third month start selling the fingerlings (8-10 g) size or shift to grow-out pond for further culture to table size.

Grow-out Fish Culture Management

- Before starting a new culture cycle harvest all the table size fish along with weed fishes by repeated netting when the water depth is at the minimum level.
- Raise the height of the pond dykes, repair the damaged dykes if necessary and keep proper outlet to drain out excess water. Put net in the lower dyke or outlet to avoid escape of fish from the pond.
- Determine the water quality, parameter mainly pH and alkalinity during rain season at ICAR-CIFA, Bhubaneswar or District Fisheries Office, Khordha. To monitor fertilizer & line requirement.
- Stock fingerlings/yearlings of Indian Major Carps @5,000/ha when the water depth in pond is at 2-3 m stock. 2000 Catla, 2000 Rohu/Jayanti rohu and 1000 Mrigal at a ratio of 2:2:1. Also other stock combination viz 80-90% rohu and 10-20% catla can be followed.
• In weed infested ponds (Chingudiadala) put some grass carp yearlings (500 no/ha) along with Catla, Rohu and Mrigal to control the pond

• Apply lime at 3-month interval on water surface or as recommended in the water sample test report. As raw cowdung is not allowed in most community ponds, apply Di-Ammonium Phosphate (DAP) at fortnightly interval.

• Provide supplementary feeding to the stocked fishes with commercial floating feed containing minimum 25% protein.

• Adopt sample netting using cast net at every 2-months intervals to check the growth and health of fish.

• Due to cloudy weather (low pressure days) fishes come up to the water surface in the morning hours due to stress. Immediately circulate pond water with the help of water pump (3/5HP) to increase the dissolved oxygen content of pond water.

• Go for partial harvesting of fish (500 g size and above) after 6 months of culture so that smaller fish will get scope to grow.

**Feeds and Feeding Livestock, Poultry and Fish**

• Purchase the feed ingredients in the harvesting season of crops /3-4 months before rainy season when their price is at low.

• Do not purchase ingredients/ feeds in bulk quantity. The feeds and ingredients are stored in air tight plastic bags at dry and cool places, and on the wooden platforms.

• It is preferable to expose the feed ingredient sacks/bags under Sun every week to prevent the feeds getting more moisture.

• The windows of feed storage room must be covered with iron nets to make the feed store rodents and insect proof.

• Prepare small quantity of feed, just sufficient for feeding for a month.

• Cultivate and supplement Azolla @ 1-1.5 kg in daily ration of cattle to reduce the feed cost by 20%.

• Provide supplementary feeding such as broken rice, paddy, cooked rice, azolla etc. to the backyard poultry birds during continuous rain.
Due to low level oxygen stress in fish in rainy season less quantity of feed may be provided. Due to heavy rain, the pond water becomes cold and the fish do not come to the surface during morning time. So, fish are to be fed after 10 AM and before 4 PM.

**Honey Bee / Bee hive Management**

- The bee box should be placed on the stand keeping preferably 2-3 meter height from the ground in shaded area.
- Cover the top of bee hives with polythene or GI sheets and tie properly for protection against rain and wind.
- Place the bee boxes around 1-2 km radius of the nectar plants.
- The hives should be kept away from road, kitchen, cow shed etc.
- Hives must be protected from flies, ants, insects, pests, lizards, crow, hen and monkey.
- Make provision to keep water at the base of the bee box stand to prevent entry of ants inside the boxes.
- Keep the surroundings of the colony clean by cutting the unwanted vegetation which may hamper free circulation of the air. Clean the bottom board of the bee hive at regular intervals.
- During rain season supplement the honey bees with sugar syrup twice in a week as per requirement of the colony to overcome the food stress. Take equal volume of sugar and water; boil it for 5 minutes to prepare sugar syrup.
- Examine the colony every week. It is better to remove the empty drawn out comb from the hives.

**Fig. 12. Honey bee and bee hive management**