

Directorate of Agriculture Development and Farmers' Welfare

Vikas Bhavan, Thiruvananthapuram – 695033
e-mail:cru.agridir@kerala.gov.in, Phone: 0471-2304481

No: ADFW /9931/2023-TF2**08-09-2023****CIRCULAR**

Sub:- Annual Plan 2023-24 -Scheme for Soil Health Management And Productivity Improvement.- Working Instructions issued -Rrg.

Ref:- 1) Letter No. ADFW /5637/2023-TP2 dated 13/06/2023 of the Director of Agriculture

2) G.O (Rt) No.766/2023/AGRI dtd. 03/08/2023

3) G.O (Rt.) No. 427/2023/ AGRI dated 05/05/2023

Considering the fact that Kerala soils are generally deficient in essential secondary and micro nutrients and to improve the physical, chemical and biological features of soil which are essential for long term sustainable agricultural production with minimal environmental impact, the undersigned submitted a proposal as per ref.1 of this circular for which the Government accorded administrative sanction for an amount of Rs. 218.53780 under the scheme 'Soil and Root Health Management and Productivity Improvement' which is operated in the Head of Account 2401-00-800-28 (P) for which a budget provision of Rs. 550.00 is included in the approved annual plan of the Department. An amount of Rs. 331.46 lakh was sanctioned by the Government as e-LAMS as per ref.3 of this circular.

Under these circumstances the following instructions are issued for compliance at all levels with immediate effect.

1. Promotion On-farm production technology for mass production of *Trichoderma* spp. and *Pseudomonas* using the NIPHM low-cost technology (Rs.80.00 lakh).

(a). The National Institute of Plant Health Management (NIPHM) has a revolutionary and patented low-cost technology for the on-farm mass production of *Trichoderma* spp and *Pseudomonas* sp. This technology uses the specific growing media such as 'Brown media' for *Pseudomonas* and 'White media' for *Trichoderma*.

(b). Directions for the use of Brown media: Pour 250 ml of water in a sterile steel vessel and add 4 g of 'brown media' of NIPHM and mix well. Boil the mixture for 5-10 minutes with occasional stirring. Transfer the boiled media in to a sterile flat tray and allow it to cool. Add 2 ml of the *Pseudomonas* inoculum and cover the tray with a polythene cover tying the top portion with a rubber band of suitable size. Keep the tray at room temperature for 3-4 days for incubation. Observe the growth and a brown layer appears on full growth. Transfer the contents in to sterile water of 1 litre volume and this can be stored for 3 months (Refrigerated condition is desirable). A part of the solution can

be used as inoculum for further culturing using the brown medium as specified earlier and the resultant solution can be applied at dilution rate of 5% for the field application.

(c). Directions for the use of white media: Pour 250 ml of sterile steel vessel and add 15 g of white media developed by NIPHM and mix well by stirring. Boil the mixture for 5-10 minutes and allow it to cool. Transfer the cooled medium in to a sterile flat tray and add 5 ml of *Trichoderma* inoculum and mix well. Cover the tray with polythene cover and tie the mouth with a rubber band of suitable size and incubate the mixture for 3-4 days. Observe the growth of a green layer after 4 days. Crush the layer for 1 minute and make up the volume to 2 litres by adding clear water. A portion of the same can be used as inoculum for future multiplication and the solution can be applied at 5% rate of dilution.

(d). The Additional Director (Crop Production) shall enter in to an MOU with NIPHM for the supply of brown and white media for an amount of Rs. 80.00 lakhs as sanctioned by the Government. The amount shall inclusive of the cost of materials and transportation and taxes if any are applicable. The amount shall be transferred to NIPHM by suitable proceedings after the MOU is signed.

(e). The NIPHM shall also be requested by the Additional Director (CP) for imparting suitable trainings in the mass multiplication process to the extension officials of the Department. There exists sufficient number of PGDPHM diploma holders in the Department and there are candidates at present who are undergoing the diploma programme and they all shall be the master trainers and technology providers for this programme. All Principal Agricultural Officers shall utilise their service in the technology transfer of this low-cost technology. No separate funds are allowable for the training programmes. However, they can be the part of the formal and informal extension works of the field level officers and can combine with routine training programmes of farmers

(f). The rates of the media as published by NIPHM is as follows.

Sl. No	Items/material	Quantity	Cost (Rs.)
Growth media			
1.	White Medium for <i>Trichoderma</i> production	15 g	10/-
2.	In Bulk: White medium	1 kg	660/-
3.	Brown Medium for <i>Pseudomonas</i> production	4 g	10/-
4.	In Bulk: Brown medium	1 kg	2500/-

As per estimates of NIPHM, 1 kg of the medium would be sufficient for treatments for 4 ha., with repeated mass culture and mass production. However, for the easiness in application and considering the promotion of the technology NIPHM may be requested from the Directorate for providing the media as small packed units of 15 g and 4 g for *Trichoderma* and *Pseudomonas* respectively. Necessary inclusions shall be

incorporated in the MOU regarding this. The district wise targets for the number of such packets would be issued after the MOU is finalized and signed. Farmers shall be properly demonstrated with the use of technology and they shall be provided with sufficient packets of the media as per the requirements.

(g). Necessary inoculum shall also be supplied by NIPHM along with the media. No separate funds are needed for this as the Institute supplies sample vials of culture along with the media under usual conditions.

(h). The maximum assistance for the adoption of this technology is limited to maximum Rs. 750.00 per hectare as per the following estimate.

Sl. No.	Item	Quantity	Rate / Unit	Amount (Rs.)
01	Cost of White medium	17 no.s of 15 g Packets	Rs. 10 / pack	170.00
02	Cost of Brown medium	50 no.s of 10 g Packets	Rs. 10 / pack	500.00
03	Cost of plastic trays of size 40.5 x 30.0 x 7 cm	2 Nos.	Rs. 40 / unit	80.00
	Total			750.00

(i). The NIPH shall be given district wise targets for the distribution of packets media as and when the MOU is signed. Necessary action for this shall be by the implementing section of the Directorate.

2. Establishment of On-farm VAM production units

(a). The main benefits of vesicular-arbuscular mycorrhizae (VAM) involve the increased uptake of nutrients especially phosphorus and transport them to the host plant. Vesicular arbuscular mycorrhizal fungi belong to the class zygomycetes and are responsible for improving the growth of host plant species. Hence on-farm production of VAM is important for improving the nutrient use efficiency cut down the cost of production.

(b). Method of mass production of soil-less arbuscular mycorrhizal fungal inoculums As per the Bureau of Indian Standards (BIS) specifications, an AM fungal inoculum should contain a minimum of 100 propagules per gram of substrate. The inoculum for the same shall be obtained from KAU or any other State Agricultural Universities. Usually, 200 g of the inoculum is sufficient for inoculating plants grown in 100 pots of 30 cm size ideally. The potting medium in the standard ratio shall be prepared and solarization shall be done. The seeds of sorghum, maize etc., shall be used for mass production of VAM. The procedure as published by KAU, NIPHM and other Government

Agencies shall be followed for the on-farm production programme.

Note: Traditionally, the inoculum is multiplied on live host plant roots grown on different substrates like sand: soil mixture, vermiculite, perlite, etc which are bulky materials for handling and transport. Further, propagule count on such media does not meet the standards often. In this context, the technology developed by IIHR provides a method for soil-less production of AM fungal inoculum by utilizing sterile 'Arka Fermented Cocopeat' as the sole substrate for host plant growth with the intervention of a beneficial bacteria (applied at the rate of 0.5 kg per 1000 kg Arka Fermented Cocopeat substrate). This helps in enhancing the host plant root growth, AM fungal colonization and proliferation within the host plant roots, and to derive an inoculum free of any cross contamination. The entire process can be carried out in a time span of 60 days under ambient conditions either under shade or glass house. As per the reports of the Institute a count of $0.28 - 0.35 \times 10^5$ infective propagules / gram of substrate was obtained using this method. The shelf life is up to one year. This technology can also be adopted.

(c). The indicative cost for the mass production of one unit of VAM is as follows.

Sl. No.	Item	Quantity	Rate (Rs.)	Amount (Rs.)
1	Plastic pots of medium size	100 no.	50.00	5000
2	Starter inoculums	200g.	1000 / 200g.	1000
3	Seed material of rice/ragi/maize/sorghum	250g.		100
4	Carrier material-vermicompost / Arka fermented cocopeat	500 kg.	12 / kg.	6000
5	Labour charges	10 mandays	500/manday	5000
6	Miscellaneous			2900
	Total			20,000/-

Alterations in the above components are permitted except labour charges, where it shall not be beyond Rs. 5000.00 per unit.

(d). Individual farmers, Krishikoottams, farmer clusters, farm clubs, Kudumbasree units can be supported for the start of such small ventures. It is sanctioned to establish a total of 100 numbers of on-farm production units of VAM in the state during 2023-24. The district wise targets are appended as Annexure I of this circular. The VAM units established as part of other schemes shall not be provided assistance under this programme.

3. Conducting soil test campaigns.

(a). Soil testing is an important tool to practice balanced fertilization, which differs from region to region and from crop to crop. Farmers would be able to know the type and quantity of fertilizers and nutrients which are to be applied to the field for improving the efficiency and reducing the cost of production.

(b). All the Krishibhavans of the State shall conduct a soil test campaign during the Rabi Season of 2023-24 without fail. The Chief Soil Chemist is hereby directed to issue orders to all Mobile Soil Testing units to conduct such campaigns in consultation

with respective AOs / AFOs. The campaign shall have live soil testing sessions, short classes and demonstrations. The campaigns can also be arranged in consultation with the officials of the Soil Survey and Soil conservation Department. The results of the same shall also be fed in to a portal which in due course is expected to be developed by the SS & SC Department.

(c). The maximum amount sanctioned for one such campaign is Rs. 3500 per Krishibhavan. The amount can be used for light refreshments, honorarium for experts (@ Rs. 500 per session / campaign), small banner, materials for demonstration and very essential fuel charges for the mobile unit and any other connected expenses. The minimum number of participant farmers shall be 25.

(d). Four numbers of need-based Block level campaigns are also sanctioned at the rate of Rs. 8500.00 per campaign. The components are as described under 3 (c) of this circular and the minimum number of participants shall be 50.

4. Support for secondary and micro nutrients

(a). Soils in Kerala are generally deficient in essential secondary and micro nutrients. The joint survey conducted by the State Planning Board and the Department of Agriculture under the “Soil based plant nutrient management plan for Agro-Eco systems of Kerala” reveals that Kerala soils are deficient in micro nutrients. Micro nutrient availability generally decreases as the soil pH increases with the exception of Molybdenum. There are seven micro nutrients which are needed for proper growth and productivity of crops namely, Zinc, Copper, Boron, Iron, Manganese, Molybdenum and Chlorine. The essential secondary nutrients are Calcium, Magnesium and Sulphur. This component of the scheme is to provide assistance for the use of secondary and micro-nutrients.

(b). It is hereby sanctioned to provide assistance for micro nutrients and secondary nutrients under the scheme. The scheme component applies to all crops other than paddy. Assistance to the tune of maximum Rs. 500.00 per hectare or 50% of the cost whichever less is allowed. Soil test results are necessary and the deficient element / (s) are only permitted.

(c). The materials shall be supplied in kind and no direct cash subsidy for the beneficiaries are allowed.

(d). The district wise targets are appended as Annexure III of this circular.

5. Financial abstract of the scheme

(a). The component wise financial allocation is as follows:

--	--	--

Sl. No.	Components	Financial Outlay (Rs. in lakh)
1	Support for Root health management	
A	Promotion On-farm production technology for mass production of <i>Trichoderma spp.</i> and <i>Pseudomonas</i>	80.00
b	Establishment of On-farm VAM production units	20.00
2	Conduct of Soil Testing Campaigns	38.00
3	Support for secondary and micro nutrients	80.53780
	Total	218.53780

(Rupees Two crore eighteen lakh fifty three thousand seven hundred and eighty only)

(b). The budget provision available for the scheme “Soil and Root Health Management & Productivity Improvement” under Head of Account 2401-00-800-28 Plan is Rs.550.00. After deducting the amount of Rs. 331.46220 lakh approved in e-LAMS, there is a balance of Rs.218.53780 lakh, and the financial requirement of the current proposal shall be met from this balance.

6. Scheme management

(a). The scheme shall be managed by the Additional Director (CP) at the State level. PAOs of the Districts shall closely watch the progress of implementation of the scheme. The DDA (WM) shall be the district level monitoring official.

(b). The Chief Soil Chemist shall assure that the campaigns are taking place in time. The DSTLs shall be given directions for conducting soil testing campaigns wherever MSTLs are not available.

(c). All formalities regarding Store Purchase Rules shall be followed for purchases and procurements.

(d) Do not park funds at any level.

(e). Implementation of the scheme shall be strictly in accordance with the instructions issued and as per release of funds.

(f). Progress report of the same shall be submitted to the undersigned

ANNEXURE I

Physical and Financial targets for the establishment of VAM on-farm production

Units

Sl. No.	Districts	(Physical target) No.	Financial target (Rs. in lakh)
---------	-----------	-----------------------	--------------------------------

		of units	
1	Thiruvananthapuram	8	1.60
2	Kollam	7	1.40
3	Pathanamthitta	7	1.40
4	Alappuzha	8	1.60
5	Kottayam	8	1.60
6	Idukki	7	1.40
7	Ernakulam	7	1.40
8	Thrissur	8	1.60
9	Palakakd	7	1.40
10	Malappuram	7	1.40
11	Kozhikode	6	1.20
12	Wayanad	7	1.40
13	Kannur	7	1.40
14	Kasaragod	6	1.20
	Total	100	20.00

ANNEXURE II

District wise targets for Soil testing campaigns

Sl. No.	Districts	Targeted No. of campaigns	Financial Targets (Rs. In lakh)
1	Thiruvananthapuram	89	3.115
2	Kollam	78	2.73
3	Pathanamthitta	57	1.995
4	Alappuzha	78	2.73
5	Kottayam	79	2.765
6	Idukki	53	1.855
7	Ernakulam	97	3.395
8	Thrissur	105	3.675
9	Palakakd	95	3.325

10	Malappuram	108	3.78
11	Kozhikode	81	2.835
12	Wayanad	26	0.91
13	Kannur	89	3.115
14	Kasaragod	41	1.435
	Total	1076	37.66

ANNEXURE III

Physical and Financial targets for the Support of Secondary and Micro - nutrients

Sl. No.	Districts	Target area (ha)	Financial target (Rs. in lakh)
1	Thiruvananthapuram	1000	5.00
2	Kollam	900	4.50
3	Pathanamthitta	1250	6.25
4	Alappuzha	1000	5.00
5	Kottayam	1750	8.25
6	Idukki	1500	7.50
7	Ernakulam	1000	5.00
8	Thrissur	1250	6.25
9	Palakad	1250	6.25
10	Malappuram	1057.56	5.2878
11	Kozhikode	1000	5.00
12	Wayanad	1250	6.25
13	Kannur	1000	5.00
14	Kasaragod	900	4.50
	Total	16.107	80.5378

ANJU K S IAS
DIRECTOR

To All Additional Directors of Agriculture & SAE
All PAOs and PD (ATMA)
The Director NIPHM, Hyderabad with C/L
Senior Finance Officer

I/126546/2023

SW Section, Planning Section
IT Cell for publishing in the website
Stock / Spare