

Technical Protocol



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OPDSC



Madhyam Foundation (SODI)

Technical Protocol

Seasons

- [Khariff \(June – October\)](#)
- [Rabi \(October – January\)](#)
- [Summer \(February – June\)](#)

<i>Major Agricultural Operations</i>	<i>Activities</i>	<i>Practices</i>
Pre cultivation	Crop selection	Crop planning at HH level
	Seed selection	Local variety , indigenous variety and variety in practice for long time
	Seed treatment	Seed treatment is done to avoid seed borne diseases, and to enhance germination percentage Seed treatment with Cow urine, Bijamrita ,Ass , and Red color soil
Cultivation	Sowing	Line sowing with proper spacing In SRI method in Paddy and line sowing in pulses, millet and vegetable
	Transplanting	Raising seedlings in poly pots and trays, transplanting the seedlings after root treatment
	Weeding	Manual, and mechanical(Cono & Mandua weeder),Khurupi , weeding as per crop requirement and weed intensity
Water Conservation/ Management practices	Methods of water conservation/Management/Irrigation practices	Mulching ,Field bonding & ridge and furrow method
	Timing/ Scheduling	Differs from crop to crop
Soil fertility Mgmt.	Bio fertilizer /Organic Manure/	Application of compost, Hadari
/Soil health		,Jevamrita , Amrut mati ,, Organic

enrichment		urea, Amruta jal
	Duration/ Scheduling of application	4 times in crop with an interval of 8-15 days basing upon the plant size
Insect/Pest Management	Insect/ Pest control methods/ practices (E.G. If ,IPM - please specify particular method of control under IPM)	
	Insect/ Pest control substances(bio pesticide/ others etc)	Handikhata, Neem oil,neem cake, juice of Bel ,tulsi and papaya leaves, custard apple leaves and Hingu
Disease Management	Disease control methods/ Practices	Handikhata,
	Disease control substance (bio fungicide/others)	Application of Handi Khata,
	Pruning	Not practiced
Post cultivation	Selection of fruit for seed & seed collection	Selection of plant/ Fruit for seed collection, marking and covering with a cotton/net to protect from external pest attack.
	Sorting ,grading, washing	Practice of Sorting, Grading and washing of crop done for better marketing
	Interim storage (zero energy cool chamber	Storage of balance produces to minimize distress sale, in zero energy cool chambers
	Preservation of seed	Preservation of seed coated with red colour soil,/ Ash

This is about the preparation and application of various organic formulations widely used in organic farming and sustainable agriculture practices The experiences from the practices are consolidated and described below for wider dissemination.

THE POT MEDICINE (*HANDI KHATA*)

This is an organic formulation, cheaply prepared by farmers to control all type of plant diseases and pests. It has a diversified use to control a wide range of pest and diseases. If you prepare and use only one medicine you can keep your crops free from many insects and diseases. It has both protective and curative ability. This will also help to increase the hormonal balance of the plants.

Ingredients:

1. One Earthen Pot [Approx. 5-7 litre capacity]
2. Fresh cow dung -1 Kg [Country cow]
3. Cow urine [Approx. 5 litre]
4. Gur/Jaggery [Molasses]- 50 gm.
5. Neem leaves-1 Kg.
6. Karanja leaves -1Kg [Pongamia Pinnata]
7. Arakha leaves -1Kg [Calotropis]



Preparation:

1. Keep the cow dung, cow urine, gur (*jaggery*) in the earthen pot and mix thoroughly.
2. Make all the leaves (*Neem, Arakha & Karanja*) in to small pieces.
3. Then add all the chopped leaves to the pot.
4. Thoroughly mix it and cover the mouth of the pot. Keep the pot in shade for a week (7 days).
5. After a week take out only the liquid portion from the pot keeping the solid part in side. The solution is called (*Handikhata*). This can be kept for 6 months for use.
6. Then add about 5 litres of cow urine only to the pot and repeat the process. Then keep the pot as instructed previously for another week and extract the solution in same process.
7. One can do like this for 4 months without adding any other ingredients except cow urine. In similar process one can collect the medicine every week for 4 months and get 60-70 litres of the medicine.
8. After four months, it is required to prepare fresh solution with all the ingredients once again .This 60 -70 litres of medicine are sufficient for one hector of crop for one season.



HOW TO USE:

1. The standard recommended dose is 20 ml per 1 Litre of water.
2. 2-For nurseries and younger plants- 10-12ml. per Litre of water.

It is capable to prevent all the insects coming to the field and damaging the crop due to its repellent and anti feeding nature. It is 100% eco-friendly. It can also cure many of the diseases in the vegetable crops including viral diseases such as yellow mosaic virus in okra. It can also be used as a solution for seed treatment.

Use 20 ml of this medicine in 1 litre of water and soak the seeds before sowing. This helps in quicker germination and vigorous plant growth.

AMRUT JALA

This is a solution in which the number and diversity of anaerobic micro-organisms are very high. The chemical elements and the micro- organisms present in it make the soil fertile and increase the chemical and physical properties of the soil.

Presence of Micro-organisms performs the following actions:

- Convert the elements in the soil to an available form from which can be taken up by the feeder roots of the plants
- Prepare humus (the building block through which nutrient uptake happens in soil-plant system) from organic materials (leaves, bark etc.).
- Make the soil fertile
- It acts as protective cover for beneficial insects and pathogens.

Ingredients for 111 Ltr. Amruta Jal:

1. Fresh cow dung -1 Kg [Country cow]
2. Cow urine- preferably of a country /local breed) [Approx. 5 litre]
3. Gur / Jaggery- 50 gm/ Country Molasses / 12nos of overripe bananas / 6nos of apples / 500gm grapes /6nos of Guavas / 12nos of jackfruit colas / 500ml of sugarcane juice / 12 nos of cashew fruits, whichever is available]- 50 gm
4. Ten litre of water [10 ltr]



Points to note:

- Quality of urine and cow dung of local breed cows is better. The older the cow, better the urine quality.
- The cow dung should be fresh, since a large number of micro-organisms are present in fresh cow dung.
- Preference should be given to the use of country/black molasses because no chemical is used in its preparation.

In order to prepare Amrut Jal of desired volume, quantity of raw materials can be altered in the same proportion.

Process of making Amrut Jala

- Mix one litre of cow urine into ten litres of water.
- Mix one kg of fresh cow dung into it by stirring it well.

- After this, mix 50 grams of jiggery/ molasses into this solution till it is properly mixed. In case molasses is not available, use 12nos of over-ripe bananas / 6nos of Guavas / 12 pieces of jackfruits or 500 ml of sugarcane juice or pulp of 12 cashew fruits, which one is available. Now leave this mixture covered.
- Rotate this mixture clockwise and anti clock wise 12 times each, 3 times a day which will help make the solution.
- Mix 100 litres of water in this mixture after 72 hours. You will get about 111 litres of this solution which is called *Amrut Jal* & which is enough for one acre crop for one application.

Caution

- Don't let any plastic, stone or metal mix in the solution.
- Always keep it covered.

Uses

- 10% of solution can be used as a soil booster by flow irrigation and the same as foliar spray for all crops, once in 15 days to one month.

Requirement:

- For Flow irrigation- 500 litres / acre
- For Foliar spray - 10 litres / acre

Special features

- Enriches even degraded soil with less micronutrients and humus
- Increases soil microbes and earthworm population
- Enriches the aeration of the soil
- Plants grow faster with deep and dense roots
- Acts as a growth promoter and increases the yield
- Easy and economical to prepare.

OTHER USEFUL NATURAL PRODUCTS:

Amirtha solution:

This can be used as a starter solution.

Ingredients:

Ingredients for Amirtha solution:

5. *Fresh cow dung -10 Kg [Country cow]*
6. *Cow urine- preferably of a country /local breed) [Approx. 10 litres]*
7. *Gur / Jaggery- 250 gm*
8. *Ten litre of water [100 ltr]*



Mix the above ingredients in a cement tank or plastic container and stir twice daily. The fermented solution will be ready for use after 24 hours.

Mulching:

Mulching is a method of covering the surface of the soil with any decomposable/ bio degradable material (grass, hay, paper, kitchen wastes, leaves, twigs, plant residues) etc. so that the soil is not exposed to the drying action of the sun or wind.

It is a mechanical manipulation of the soil with an object to break the surface crust and the water capillaries or any covering over the soil surface which obstructs evaporation and protect soil and plant roots from the effects of raindrops, soil crusting, freezing etc.

The mulch may be classified into two categories:-

1. **Natural Mulch** – Breaking of surface crust and water capillaries to avoid direct contact of soil water from atmosphere and there by obstructing evaporation is called as a natural mulching.
2. **Artificial mulch** – Spreading of any material like straw, saw dust, leaves, paper etc. for creating obstruction in direct contact of soil and atmosphere.

Surface mulch is not incorporation of biomass. Mulching allows harvesting of the fullest value of plant biomass and obviates the need for composting. The population of naturally

occurring local earthworms increases substantially with this practices. There should be no need to prepare and use expensive vermi- compost.

Surface mulch is very important for sustainable agriculture. Several crops can emerge out of up to 10 cm thick plant biomass. Weeds are a resource for biomass and elements needed for crop growth as some weeds are rich in micro nutrients.

Point to be noted:

1. Dry and green biomasses are suitable for mulching.
2. The woody part of the twig should not be used as this will not check evaporation.
3. Immediately harvested green biomasses not suitable for mulching.
4. Half decomposed biomasses very suitable for mulching.
5. The twig size should be 3-4”.

ORGANIC METHOD OF SEED TREATMENT

Seed treatment using cow dung extract

Treating the seeds in cow dung extract enhances the germination capacity. Dilute fresh cow dung in water at 1:100 wt/vol. Soak the seeds which have low germination capacity in water for 10-12 hrs and then put it in the cow dung for 5-6 hrs. Dry the seeds in shade before sowing in the nursery. Seed treated with cow dung is antifungal and antibacterial. Every gram of cow dung can have up to 10 million plant growth promoting microorganisms.

Methods:

- Take fresh cow dung 1 kg (approx), mix with 10 litres of water.
- Filter the extract with gunny cloth.
- Add 5 liters of water to the filtrate and repeat the filtration process.
- You will get a clear cow dung solution.
- This solution will be a seed treating solution as stated above and this solution also sprayed to control leaf blight and other bacterial disease.

Seed treatment with cow urine:

There is no other seed treatment material in the world comparable with cow urine. Cow urine contains potassium, calcium, magnesium chloride, urea, phosphate, Ammonia, and krianinin.

Method:

Dilute 500 ml of cow urine in 2 ½ litres of water. Tie the seeds which are to be treated in plain cotton cloth and soak them in the cow urine extract (time varies according to the thickness of skin of the seeds) dry the seeds in shade before sowing.

1. Cow urine is the cheapest and efficient seed treating material (CRR).
2. Cow urine is anti fungal and antibacterial and contains photonic Hormones.

Note: Old (which was collected and stored for longer period) cow urine is better than fresh.

Disease Control:

Take 50 ml of cow urine and dilute it with 500 ml of water. Keep this solution over night. Spray this solution on the plants early morning. This controls viral, bacterial and fungal disease.



KHAJARA OR HADARI

It is organic manure suitable for all sorts of crop. This is the left over waste materials of cowshed. This material is the cheapest and always available in all rural farmers house. The quality cannot be compared with any other organic manure.

Collection procedure:

- Before the cow,/ bullock enters to cowshed spread a thin film of wood/leaf ash, saw dust, bran on the cow shed floor.
- Next day morning after the animals go out for grazing or any other purpose, take out the cow dung and left over food materials from the cow shed.
- Then with a help of broom stick or a wooden plate scrap slowly. The material collected is called **HADARI**.
- The quantity depends on the number of animals and size of cowshed.
- After collecting the **Hadari** keep it in a gunny bag near a shadow place or corner of cowshed. Older the Hadari, better the quality.



- For one acre of crop field mix 15-20 kgs of *Hadari* with equal quantity termite hill soil or fertile soil from field bond and spread evenly when the field is wet.
- It is better to irrigate immediately after application of HADRI in the crop field .
- In paddy crop, if it will be applied twice with an interval of 20-25 days, then no need of any chemical fertilizer.
- Also this can be used for all nursery bed.
- Hadari contains all type of nutrients and minerals.
- It has also capacity to protect pest and diseases.

BIJAMRITA

Bijamrita is a seed treating formula which protects the seeds from harmful fungus, bacteria and pathogens. It protects the crops from soil born diseases. Bijamrita has hormones and alkaloids, which enhance the germination, neutralize the anti germinating chemicals in the embryo, give the protection power to the seedlings.

Ingredients for Bijamrita:

1. Fresh cow dung -5 Kg [Country cow]
2. Cow urine- preferably of a country /local breed) [Approx. 5 liters]
3. Ten litre of water [20 ltrs]
4. One hand Full of soil from surface
5. Lime Powder- 50gm



Preparation Process:

Take 20 litres water. Then take 5 Kgs of country-cow dung in a cloth and bind it with a small rope to make a bundle. Hang this bundle of cow dung in 20-litres of water for a night (12 hours). Then take one litre water and add 50 gms of lime in it, let it stabilize for a night. Then next morning, squeeze this bundle of the cow dung in that water thrice continuously, so that all essence of cow dung will accumulate in that water. Then add a hand full of soil in that water solution and blend it well. Then add 5 litre Deshi (country)cw

urine or human urine in that solution & add the lime water and stir it well. Now Bijamrita is ready to treat the seeds.

Take some paddy seed & bring the essential water, add some salt in that water, then add these paddy seeds in that salty water. Let it remain for an hour. Damaged and insect infected seeds will float on the surface of the water. Remove these floated seeds and use for mulching.

Then remaining of the best quality sunk seeds is to be removed from that Salty water. Keep that seeds to dry for some time in the shadow. After that, treat these seeds with Bijamrita and now sow it.

Add Bijamrita on the spread seeds of any crops, treat these seeds well by hands, dry it well and use for sowing.

Application:

If you want to treat sugarcane, banana, ginger & turmeric seeds, please take 20 litres of water in Bijamrita instead of 10 litres. Rest is same for preparation of Bijamrita. Take the seeds of sugar cane, banana, ginger or turmeric seeds and put them in Bijamrita. After sometime remove the seeds out of Bijamrita and plant in the field. Seedlings of paddy, tomato, brinjal, onion, flower, cabbage, chilli or any oriented seedlings should be taken in hand, sink the other transplanting roots of these seedlings in the Bijamrita and plant them in the field

If you want to plant cutting of any crop for germination, first sink the cutting in the Bijamrita and then plant them in the field.

If you want to treat leguminous seeds i.e. Green gram, Black gram, Beans, Cowpea, Groundnut, Ghewda beans etc, only soak seeds in Bijamrita for few minutes and remove, it dry it and sow it. Don't rub the leguminous seeds by hands with Bijamrita. By rubbing the leguminous seeds, the upper coating is removed and germination reduced.

ZERO- ENERGY COOL CHAMBERS

Storage of fresh horticultural produce immediately after harvest is one of the most critical problems of a tropical country. Fruits and vegetables contain high moisture content (>85%). Thus they are perishable by nature and are liable to be spoiled. Moreover, they are living entities and carry out all the vital activities such as transpiration, respiration and ripening even after harvest. The spoilage of fruits and vegetables can be controlled by storing the products at a low temperature. But refrigerated cool storage is energy intensive and expensive. It also involves large initial capital investment which is not possible for an ordinary farmer to afford. Further, some of the fruits and vegetables undergo chilling injury when subjected to refrigerated storage.

Therefore, a technology based on evaporative cooling has been developed for short-term storage of fruits and vegetables. This is an on-farm storage chamber working on the principle of evaporative cooling. Cooling effect is due to evaporation of water.

The zero energy cool chambers can retain the freshness of the fruits and vegetables for a short period. Small farmers can easily construct these chambers near their fields/house and store a few days after harvest before dispatching them to the market. In this way, the farmers can avoid the clutches of the middlemen and are not forced to make any distress sale. In India, 90% of horticultural produce is sold in fresh form. Due to the pressure of middlemen, the price of horticultural raw material is 60-100% higher in mandis than in growing areas. 'Apart from farmer's fields, the cool chambers can be installed profitably wherever the fruits and vegetables are held temporarily, e.g.

- i. Village mandis
- ii. Packing stations
- iii. Wholesale markets of metropolitan cities
- iv. Railway stations
- v. Bus terminals
- vi. Supermarkets



vii. Retail outlets

viii. Remote places where supplies come once in a week.

ix. Fruit processing factories.

This is an on-farm fruit & vegetable storage place, otherwise known as zero energy cool chambers can be constructed easily anywhere with locally available materials like brick, sand, bamboo, khaskhas/ straw, gunny bag etc. with a source of water. The main objectives are to improve the nutritional status of the rural mass, increase per capita availability of fruits and vegetables, maintain the ecological balance and improve economic condition of farmers. The chamber is most effective during the dry season.

List of materials required for construction of zero- energy cool chamber.

1. Bricks 400 numbers.

2. Sand 10 bags

3. Bamboo, khaskhas etc. for top cover.

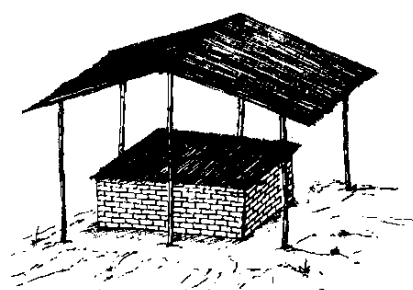
4. Water tank, pipes, tubes and drippers.

5. Thatched shed.



Steps of construction

- Select an upland having a nearby source of water supply.
- Make a floor of 165cm x 115cm size with bricks.
- Erect the double wall of 125mm thickness to a height of 67.5cm leaving a cavity of 7.5cm.
- Drench the chamber with water.
- Soak the fine riverbed sand with water.
- Fill the 7.5cm cavity between the double wall with this wet sand.
- Make a frame of top cover with bamboo (180cm x 130cm) frame, straw and gunny cloth.



- Make a thatch/shed over the chamber in order to protect it from direct sun or rain.

Operation

1. Keep the sand, bricks and top cover of the chamber wet with water.
2. Water it twice daily (Morning and evening) in order to achieve desired temperature and relative humidity or fix a drip system with plastic pipes and micro tubes connected to an overhead water source.
3. Store the fruits and vegetables in this chamber by keeping in perforated plastic crates. Do not use bamboo, wood or fibre board boxes because these will be damaged by moisture.
4. The cool chamber should be reinstalled once in three years with new bricks. The pores of the bricks get become blocked over time and this reduces the chambers effectiveness. The old bricks maybe utilized for other purposes.

Precautions

- Build your chamber on a site where breezes blow.
- Build on an elevated site to avoid water logging.
- Use clean, unbroken bricks with good porosity.
- 4. Sand should be clean and free of organic matters and clay etc.
- Keep the bricks and sand saturated with water.
- Provide a shed over cool chamber to prevent direct exposure to sun and rain.
- Use plastic crates for storage. Avoid bamboo baskets, wooden/ fibre board boxes or gunny bags. These might get spoiled due to high moisture environment.
- Prevent water drops' coming in contact with stored material.
- Keep the chamber clean and disinfect the chamber periodically with permitted insecticide/fungicide to protect from fungus, insect/pests and reptiles etc. Remove all produce before treating the chamber with insecticide or fungicide.

Specific Advantages

- It can be constructed by an unskilled person. .
- No mechanical or electrical energy is needed.
- Allows small farmers to store produce for a few more days. Thus a distress sale can be avoided.
- Ideal for household storage.
- Reduces losses and thus pays a higher return in a short time.
- Useful for temporary storage of curd, milk and cooked food.

JIBAMRITA (MIRACLE MICROBIAL CULTURE) :

JIBAMRITA is a miracle microbial culture. JIBAMRITA is not a fertilizer. There is no need to apply any fertilizer for the growth of the crops. No question arises to utilize any fertilizer. The mother soil have full of nutrients. But these nutrients in the soil are in that stage, in which the roots cannot take or absorb those nutrients. That means, those nutrients are not available for roots. Some microorganisms, fungus and earthworms are activated only using this JIBAMRITA with irrigation water or farm yard manure at the sowing period to the soil. Deshi cow dung (dropping) is the main base of JIBAMRITA. Deshi cow dung (Gomaya) is ocean of effective microorganisms, which are converters.

The cow dung is a great culture or Bio fertilizer as well as, a great attractor of specific beneficial effective microbe spiky and local earthworms.

In the deshi(country) cow dung, there is a great ability to attract them and to activate them in the soil. So, the Deshi cow dung is a medium culture.

Utilize the cow dung is natural process which is in existence in nature, is natural. Dropping and its ability to attract the earthworm and microbes is the natural process. Jaggery has some specific scent and type of ability to attract the microbes, so mixing of Jaggery with the cow dung and urine helpful for speedy decomposition.

In the decoct seeds or grains, the proportion of proteins are much more may be twice or more times than monocot. In the protein, lot of energy is stored by nature. During

decomposition of these decoct seeds and residues of that decoct plants, this energy is liberated and used by microorganisms in the soil and microbial saturation in the soil is speedily created. Soil becomes alive and animate; humus maintenance is speedily enhanced. So, if we use the flour of the leguminous decoct grains i.e. Green gram (*Phaseolus aureus*), Black gram (*Phaseolus mungo*), Bengal gram (*Cicer arietinum*), Cow pea (*Vigna Sinensis*), Moth bean (*Phaseolus aconitifolius*), Pigeon pea (*Cajanus cajan*), Moth bean (*Phaseolus aconitifolius*), Pigeon pea (*Cajanus cajan*) with the cow dung, urine, Jaggery. The multiplication and strength of micro organism double the quality of Jevamrita if a handful of soil from banyan tree area or 1 kg of termite soil is added to it. The hormonal ability of both the soil help quick growth and checks flower and fruit drops.

How to prepare JIBAMRITA:

Ingredients of JIBAMRITA:

Ingredients for Jiwamrita:

1. Fresh cow dung - 10 Kg [Country cow]
2. Cow urine- preferably of a country /local breed) [Approx. 5-10 liters]
3. Water [200 ltrs]
4. Jaggery (black/red): [2 kg]
5. Flour of any pulse crop (Beans/ Blackgram/ Redgram /Arhar – [2 kg]
6. Handfull soil from bund of the farm or forest or 1 kg of Termite soil



Preparation:

- Take 200 litres water in a barrel. Put 10 kgs of Cow dung / bullock or buffalo dung in that water. Stir it well with a stick clock wise.
- Then add broken Jaggery and pulses flour in that solution. Again stir it well. Then add Deshi (country)cow urine or urine of bullock and buffalo with the Deshi cow urine or human urine with Deshi cow urine and handful soil as mentioned in that solution. Stir it well.

- Keep the cover of jute bag on the barrel.
- Keep this solution quite stable for two to seven days to ferment. Stir this solution by a stick. Keep the barrel in shade or shadow. You can utilize this JIBAMRITA after two days.
- Within two days, JIBAMRITA is totally saturated by microbial count. All these microorganisms are useful, effective microorganisms. These are the converter microbes, which take conversion of soil nutrients from non-available to available form.

How to use JIBAMRITA

Take the barrel and keep it on the bank of the main water canal near the well in such a way that the JIBAMRITA will slowly flow through a tap of the small pipe to the irrigation water of canal. This small pipe is to be attached in the hole to the bottom of the barrel opening outside the barrel, taking the hole to the barrel in the bottom at one side; through which JIBAMRITA will flow in the canals. When you want to give JIBAMRITA, prepare the JIBAMRITA with this barrel and move the tap of bottom pipe in such a way that the JIBAMRITA will get out of the tap slowly. Maintain the speed of the jibamrita flow in such a manner, so that 200 litre JIBAMRITA will be sufficient for one acre. 200 litre JIBAMRITA is a minimum dose. You can use 400 litres per acre also.

JIBAMRITA is to be used more than once a month. If you give it twice a month, it will be much better. If you have no barrel prepares JIBAMRITA in a Pit. The pit should be dug on the bank of canal. Add this JIBAMRITA in the flowing canal water. This is very simple, economical and practical method.