Crop & Soil Nutrient Management

Under

PRINCIPLE:

- Gradual reduction of chemical fertilizer with incremental addition of bulky organic manure/ bio agents (Rhizobium, Azetobactor, PSB etc.)
- Appropriate crop rotation
- Inclusion of legume in crop sequence
- Mixed crop, inter crop, crop mixture, relay crop etc.
- Limited irrigation & use of quality irrigation water at evening and day time

Sl. No	Crop (name of the crops)	Method	When to be done	What are the benefits of this treatment	Preparation method (how to prepare the seed treatment mixture)
1	Rice- SRI approach	• Gradual reduction of chemical fertilizer to 1/3 & supplementation bulky organic manures • Limited, controlled irrigation	Basal dose of full quantity bulky organic manure, 50% of chemical fertilizer of N& K 100% P. Top dress with 50% N& K in two splits	• Reduction of cost of cultivation • Enhancement of soil microbial activity	• Seed dressing • Bio cultures, like Trichoderma Viridae (TV), Trichoderma Flurosense AND Trichoderma Harzianium (Th)

2	Wheat – SWI approach	Do	Do	Do	• Seed dressing • Bio cultures, like Trichoderma Viridae (TV), Trichoderma Flurosense AND Trichoderma Harzianium (Th) • Seed deep in 54 degree Celcious worm water for 30 minutes to control Loose Smart Disease of wheat
3	Maize- SMI	Do	As above rice except use of saline water	Do	Do
4	Mustard	On residual	Foiler spray with liquid bio fertiliser	Do	Do
5	Pulses	Enriched bulky organic manures (Phospho compost preferred)	Basal	Do	Seed treatment as in rice
6	All vegetables	Bio fertilizers and manures and liquid manures	Basal application or foliar spray	Low cost of production, production of healthy food,	Vermin compost/compost tea, Farm Yard manure (FYM) preparation technique

Sl. no	**Name of the practices which enhance the biomass and the nutrient in the soil?**	**What is the method to enhance soil biomass and soil nutrient and/or health management**	**How this method is enhancing the soil quality and nutrient availability**
1	Farm Yard Manure (FYM), Bio Compost, High Temperature Bio Compost	• Decomposition of organic matter including animal dung • Dry paddy straw, green leaves & animal dung & soil in the ratio of 3:2:1	• Enhancement of soil fertility • Increased movement of air in soil – there by increased soil microbial activity • Enhancement of water holding capacity
2	Liquid manure / Compost tea (*Panchamritam)*	• Take equal quantity of green leaves especially leguminous leaves , twigs with smell and animal dung • Keep these mixture in a sack tied with rope • Dip the tied sack into the drum filled with water & cover the drum with a lid • Stir with stick twice in a day clock wise and anti clock wise for 2-3 minutes in each stir • Add Jaggary at the end of three weeks • 3-4 weeks is needed for ready to use. • Dilute the liquid manure with 2-3 times of water and spray to plants/ apply directly to plant root • 1 litre liquid manure is to be applied in 1 squre meter of area	• Enhancement of soil fertility • reduce pest attack
3	Vermi compost	• Decompose of Soil, animal dung & other organic matter & dry organic matter like paddy straw etc in the ratio of 1:2:3 • After being decomposed, 100-150 earth	Compared to ordinary soil, the soil contain 4-5 times more nitrogen, seven times more phosphorus and 11 times more potassium. They are rich in humic acids and improve the structure of the soil.

		worms added with each kg.of decomposed matter	
4	Green manure	• Mix green leaves, roots, tender twigs etc. in soil directly and plouging for better mixing • Apply small quantity of water for quick decomposition • For low land- dhonche, neel, khasari • For up land-long bean, mung, mascalai	Enhancement of nitrogen, carbon and micro organism
5	Green leaves manure	• Mix green leaves and tender twigs – preferably leguminous tree leaves, functions as nutrition pump (Gliricidea, subabul , bokful, jam, madar etc.	Enhance soil fertility there by productivity of soil increased by 30 to 50%e, draw up minerals from greater depth & deposit in surface soil
6	Gobor (cow dung) gas slurry (slurry is residues after production of gobor gas/bio gas)	• Drying the slurry in sun • Mix slurry with equal quantity of water and Azosspirilum, Phospho Bacteria & Zinc Sulphate – dip the paddy seedling's root in the mixture before planting • Mix Azosspirilum, Phospho Bacteria & Zinc Sulphate with slurry and apply to seed	Enhancement of soil fertility there by enhancement of production Enhancement of nitrogen, carbon , Phophet, Potus and micro organism
7	Phospho compost	• Add Rock Sulphate, Pyrite, Urea and micro organism with Bio compost • If Rock Sulphate is unavailable, Single Super Phosphate could be used	Enhancement of soil fertility and plant nutrition

8	Azolla cultivation	• Cultivate Azolla in paddy field • Quickly multiplies to cover water- 5 kg of Azolla multiplies into 200 quintal within 100 days • During plantation and weeding, it needs to mix with soil for better result	• Nitrogen fixing capacity is more (one bigha of area covering with Azolla is equivalent to 2 kgs of Urea • It also provides Phosphorus, Potus , organic carbon and various micro nutrients • Suppressing weeds in paddy field Also used as animal feed
9	Rhizobium-Gram-negative soil bacteria that fix nitrogen	• The bacteria colonize plant cells within root nodules; here the bacteria convert atmospheric nitrogen to ammonia and then provide organic nitrogenous compounds • Prepare a dissolution of poris and water • Mix 300gm of Rhizobium with the dissolution for every bigha of land and mix seeds with the solution • Dry the seed under shed and sow them • Specific Rhizobium is needed for a particular legumes	It fixes Nitrogen from air which acts as natural fertilizer to plant
10	Azetobactor & Azospirilum	• Nitrogen fixing bacteria belonging to genus *Azotobacter* and *Azospirillum* • Take ½ litre of porridge and add 300gm of Azospirillum to it • Mix seed with it and dry in cool place • Sow the dry seeds as early as possible • Prepare a solution of 1 kg of Azospirillum with 10 liters of water and dip seedlings in the solution for 10-30 mins and plant the seedlings • It may be applied to soil with compost manure	• Used as nitrogenous fertilizers • substantial increase in yield after a short period of time • Eliminates the need for nitrogenous fertilizers.

11	Phosphate Solubilizing Bacteria (P.S.B)	• Phosphorus (P) is one of the major essential macronutrients for plants • Soil microorganisms play a key role in soil P dynamics and subsequent availability of phosphate to plants • Microorganisms excreting organic acids that dissolve Phosphatic minerals those are easily used by plants as their nutrients • Mix 300 gm of PSB • Mix seeds with the solution • Dry the seeds in cool place and sow them	• Phosphate solubilizing bacteria (PSB) are being used as biofertilizer • Release of P by PSB is an important aspect regarding P availability in soils.

1. **Please mention the source of the input to the community in all the above practice.**

   Ans: Transfer of technology by demo/handholding, supply inoculums etc to the community by PIA , line department experts, local institutions etc. local farmers with traditional technical knowledge play very important role

2. **Please mention the components of convergence, where ever applicable.**

Ans. All ingredients required for the items mentioned above like, material, infrastructure, methods as well as knowledge etc.

3. In the above mentioned practices please mention the method and dose of application, wherever is applicable.

Ans. Already mentioned above

4. What is the role of PIA and community in the above mentioned interventions?

PIA performs the role of facilitator & catalyst in the process. PIA prepares technical protocol using the expertise of their experienced and qualified team of agriculture scientists. The experts of LKP have long term experience in agriculture. LKP disseminates the knowledge among the community people through capacity building in the form of in- house training as well as handholding support in the field. In the process, community earns capability to take ownership of the development initiative.

CROP & SOIL NUTRIENT MANAGEMENT


Application of Liquid Manure in field, Birbhum


Vermi compost under preparation in Home Nutrition Garden
Gangutia Church Line, Katchuni block, Jalpaiguri


Compost manure and liquid manure
Dakshin Dinajpur

Loka Kalyan Parishad

Popularization of legumes- inclusion in cropping system to improve soil health