

# **INTEGRATED NUTRIENT MANAGEMENT FOR DRYLANDS**

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# INTEGRATED NUTRIENT MANAGEMENT FOR DRYLANDS

- ❖ Use of mineral fertilizers is the quickest way to increase crop production
- ❖ High cost, unavailability and risks and soil related problems

## INM strategy

- \* Soil fertility & plant nutrient supply
- \* Cropping system approach
- \* Does not preclude the use of chemical fertilizers
- \* Optimal use of renewable nutrient sources & minimal use of fertilizers



## Sources of nutrients for crop production

- ❖ Soil organic matter (SOM)



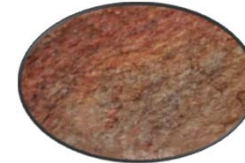
- ❖ Biological Nitrogen Fixation



- ❖ Mineral fertilisers



- ❖ Soil reserves



- ❖ Organic manures



- ❖ Precipitation



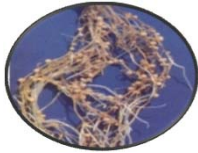
# BIOLOGICAL INPUTS FOR NUTRIENT MANAGEMENT

## Biological process

- ❖ Decomposition of plant and animal residues
- ❖ Nutrient flow (immobilization) & mineralization

## Beneficial microorganisms

- ❖ Symbiotic N fixer



- ❖ Phosphate solubilising Mos



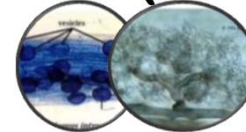
- ❖ PGPR



- ❖ Non - Symbiotic N fixer



- ❖ Vesicular Arbuscular Mycorrhiza (VAM)



# BIOLOGICAL INPUTS FOR NUTRIENT MANAGEMENT

## Use of bio-fertilizer by seed inoculation

- ❖ *Rhizobium* inoculation is practiced to ensure adequate N nutrition of legumes instead of fertilizer nitrogen
- ❖ Select the right type of inoculant as different crops require different rhizobia
- ❖ Prepare inoculum slurry using sticking agent (jaggery)
- ❖ Mix seeds with inoculum slurry, dry the seeds and sow seeds within 48 hours after inoculation



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Legumes , grown in rotation or as intercrops, increase crop yields of succeeding non-legume crop 0.5 to 3t/ha saving upto 120kg N/ha compared to sequential cropping of non-legume crops

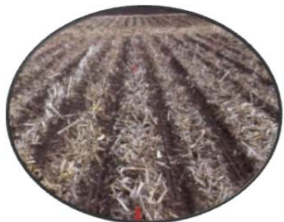
## **ORGANIC INPUTS FOR NUTRIENT MANAGEMENT**

- ❖ **Organic manures: FYM & Composts – Oil cakes**
- ❖ **FYM most used organic manure & crop residues can be recycled by composting**
- ❖ **Combination of crop residue restitution, fallowing or green manuring can be used to maintain organic matter levels in the soil**

**Increases biological activity in soil**

**Reduces nitrogen losses through immobilization**

**Improves performance of microorganisms**



# MINERAL FERTILIZERS FOR NUTRIENT MANAGEMENT

- ❖ Use appropriate mineral fertilizers to meet the demand for necessary nutrients
- ❖ Ensure that efficiency of applied fertilizers is optimized through adoption of suitable practices

**Form or type – as recommended for the crop**  
**Method – furrow placement & covering with soil**  
**Time – split N doses instead of one application**  
**Quantity – just sufficient to meet plant demand**



## **ON-FARM PRODUCTION OF BIOMASS & COMPOST**

**Planting of green manure trees on field bunds for on-farm production of biomass and compost and modifying the microclimate**

- ❖ **During the rainy season plant a mixture of 2-4 species of green manures on the earthen bunds of the farm field**
- ❖ **Add leaves obtained from the prunings of trees to the compost pit**
- ❖ **Use the compost as manure after four to six months of decomposition**
- ❖ **Leaves obtained can also be incorporated into the soil by suitable methods**



## ON-FARM PRODUCTION OF BIOMASS & COMPOST



### Advantages

- ❖ **Increases soil fertility and the microbial activity in the soil**
- ❖ **Reduces the soil erosion**
- ❖ **Increases the water holding capacity of the soil**
- ❖ **Improves the micro-climate**

**Since soil moisture is limiting in drylands, the availability of nutrients becomes limited. For this, a proper mixing of organics and inorganics would be desirable. So, INM practices holds key for nutrient management in drylands**

**Nutrients like potassium help to increase drought tolerance by affecting plant-soil-water relationship besides yield advantage**

**Management of legumes in crop sequences/intercropping for their residual effect should be encouraged**

**INM is essential to maintain soil fertility and increase food production without harming the environment**