Bio-fertilizer applications in India: Current status and future prospects

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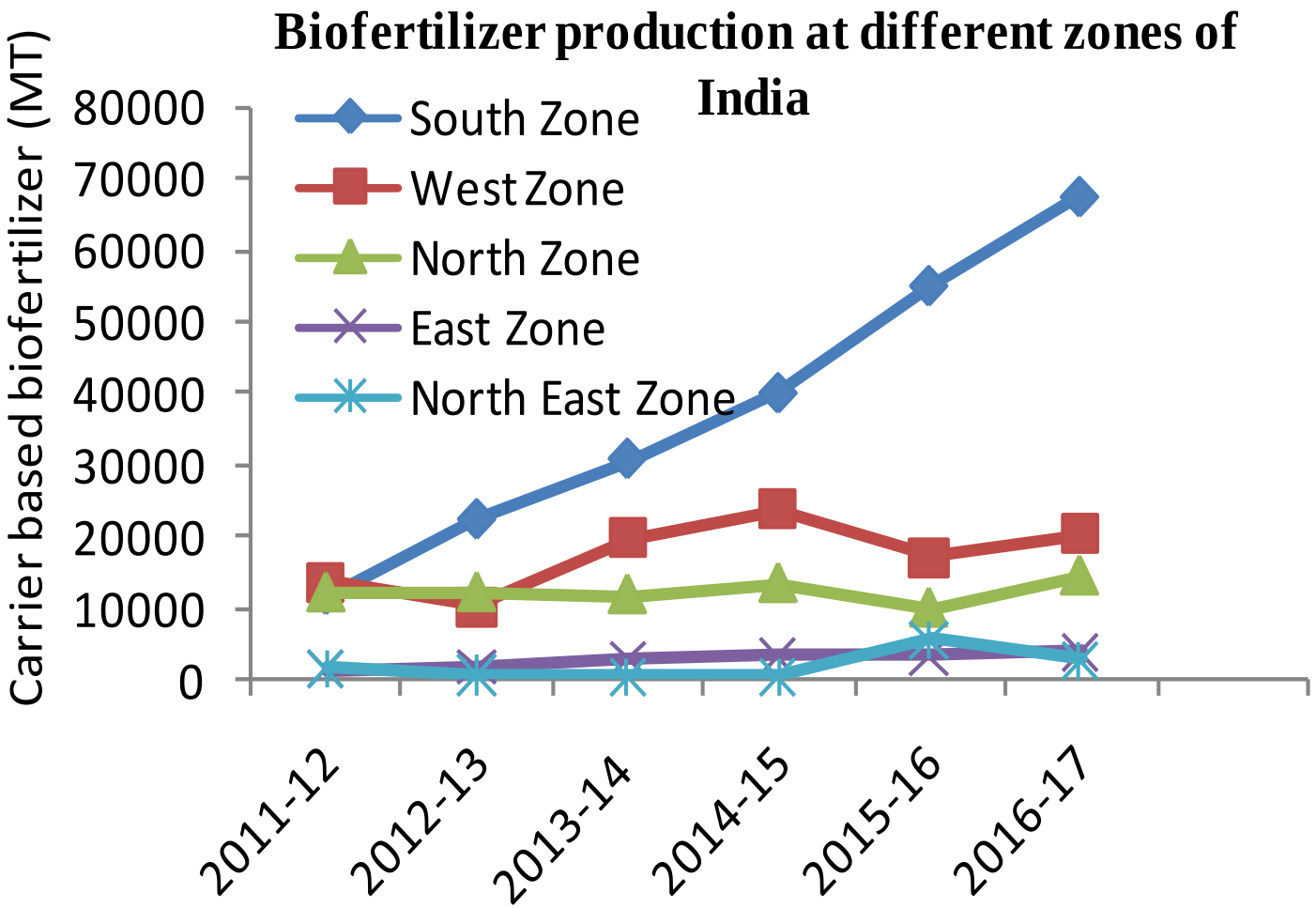
Biofertilizers in Indian Agriculture

- India is one of the 12 mega-biodiversity countries of the world. With only 2.5% of the land area it already accounts for 7-8% of the recorded species of the world. Indian soils are losing C and hence its biodiversity is critically affected.
- As population is increasing, to increase the food production in India will require additional fertilizers (N+P+K). Visualizing the economic burden and environmental cost of applying this huge quantity of additional fertilizer, even if a small part of this increased demand if can be met from biological sources like biofertilizers, will have large impact.
- Biofertilizers are known to not only improve yields and produce quality but also improve nutrient use efficiency.
- The use of cheap and eco-friendly inputs like biofertilizers is especially important for India where most of the farming will continue to be in the hands of small farmers.

Extent of benefits rendered by microbial inoculants

Microorganisms used as biofertilizer	Nutrient fixed (kg/ ha/year)	Beneficiary crops
Rhizobium	50 to 300	Groundnut, Soybean, Redgram, Greengram, Black-gram, Lentil, Cowpea, Bengal-gram and Fodder legumes
Azotobacter	0.026 to 20	Cotton, Vegetables, Mulberry, Plantation Crop, Rice, Wheat, Barley, Ragi, Jowar, Mustard, Safflower, Niger, Sunflower, Tobacco, Fruit, Spices, Condiment, Ornamental Flower
Azospirillum	10-20	Sugarcane, Vegetables, Maize, Pearl millet, Rice, Wheat, Fodders, Oil seeds, Fruit and Flower
Blue Green Algae	25	Rice, banana
Azolla	900	Rice
Phosphate solubilizing bacteria and fungi	Solubilize about 50-60% of the fixed phosphorus in the soil	All Crops (non specific)

Biofertilizer production status in India



Recent introductions in biofertilizer in India

- ***Acetobacter diazotrophicus*** **– Endophytic N-fixer in sugarcane**
- **K-mobilizer (*Fraturia and Bacillus sp*)**
- **Zn- solubilizer *(Pseudomonas, Bacillus and Thiobacillus)***
- **EM- Effective microorganisms – a mixture of Yeasts, *Lactobacillus and Rhodopseudomonas*. Excellent for quick residue degradation and fixed nutrient solubilization**

Biofertilizer promotion schemes

- Government of India has been implementing the scheme for the promotion of bio-fertilizers since 7th Five Year Plan. Under this scheme, one national centre-NCOF and six regional centres-RCOFs have been established.
- The main function of these centres includes the promotion of bio-fertilizer through training, demonstration and supply of 10 efficient culture for production of bio-fertilizers.
- The total estimated current demand for bio-fertilizers in India is 18,500 tonnes per year, whereas estimated production is about 10,000 tonnes per year.

Financial support for biofertilizer production

Component	Pattern of assistance
1. Setting up of State of art Biofertilizer units	100% Assistance to State Govt Agencies up to a maximum limit of Rs.160 lakh /unit. 25% of cost limited to Rs.40 lakh/unit for individuals/ private agencies through NABARD
2. Setting up of Bio-fertilizer testing Quality Control Laboratory (BOQCL) or Strengthening of existing Laboratory under FCO.	Assistance up to Rs. 85 lakh for new laboratory and up to a maximum limit of Rs. 45 lakh for strengthening of existing infrastructure to State Government Laboratory.
3. Promotion of Biofertilizer on farmer's field	50 % of cost subject to a limit of Rs. 5000/- per ha and Rs. 10,000 per beneficiary.

All India Network Project on Soil biodiversity-Biofertilizer

Indian Institute of Soil Science
Bhopal, India

Recent Development in Biofertilizer Technology in India

Maize seed coated with Azospirillum, Phosphobacteria and Pseudomonas

Green gram seed coated with Rhizobium, Phosphobacteria and Pseudomonas

Soybean seed coated with Rhizobium, Phosphobacteria and Pseudomonas

Training of tribal farmers on application of biofertilizers

Summary and conclusion

- ✓ Our dependence on chemical fertilizers and pesticides sustained and encouraged the growth of chemical input industries which not only affected human health but also disturb the ecological balance.
- ✓ Shifting the focus from chemical fertilizers to biological fertilizers will lead to proliferation of biofertilizer industries and incentivizing the ecological benefits will encourage the farming community for application of biofertilizers.
- ✓ Biofertilizers would play a key role in productivity and sustainability of soil and protect the environment as eco-friendly and cost effective inputs for the farmers.
- ✓ Strain improvement using genomic and biotechnological tools for better nutrient fixation/solubilization and plant growth promoting attribute will further lead to gain confidence in biofertilizers by stakeholders.

- ✓ **Selection of effective and competitive multi-functional bio-fertilizers for a variety of crops.**
- ✓ Quality control system for the production of inoculants and their application in the field.
- ✓ **Study of microbial persistence of biofertilizers in soil under stressful environments conditions. .**
- ✓ **Establishment of "Bio-fertilizer Act" and strict regulation for quality control in markets and**

Thank you for your attention