The role of organic/bio inputs in non-chemical sustainable agriculture

S D Naib, DGM (Mktg.), IFFCO
• Chemicals combine and recombine to give physical existence to every living thing, and this physical entity dissolves again to form lesser and lesser complex chemicals, so non chemical agriculture appears as misnomer.

• When we classify inputs in agriculture the difference among them can be pure chemical compound, synthetic organic compound or organic compound, most of these ultimately break into ions before their entry in to plant system.

• Before organism returns to mineralised form the intermediaries in the process can play multiple roles like store house of nutrients and water, carrier of nutrients, cement in building and maintaining soil structure etc.
• Putting in simpler words soil as we know is alive only because of organic matter and microbes in it without these it will turn in mere dust where nothing can germinate or grow.

• Microbes have been used as symbiotic/non-symbiotic nutrient fixers, nutrient solubilises and mobilisers, crop pest and disease control agents, they also act as PGPR products

• Other forms of bio inputs have been successfully used and bio stimulants and plant growth promoters, soil conditioners etc.
Need of Reduction in use of Chemical Inputs

Reduction in all forms of inorganic chemicals in Agriculture is very essential to

- Prevent pollution they cause in their manufacture & use and their residual impact on environment
- Very high cost
- Declining use efficiency
- Ill effects on health of consumers
**Scientific community**

- Developing effective microbe cultures which perform under diverse agro climatic conditions with proven efficiency
- Increasing lab to field program in collaboration with industry
- Combination products which address multiple issues in farming
- Developing commercially scalable products w.r.t.
  - Production
  - Shelf life
  - Ease of application
  - Logistics
- Joint ventures with Industry
Industry

• Sincerity and honesty in production and marketing
• Openness to change
• Marketing bio inputs as standalone input rather than as tagging product with input in short supply
FPO

• Imparting education on importance of soil health
• Educating on correct usage of microbial and bio products
• Educating users regarding slow but effective impact of microbial and bio products
## Rewari Treatment Details

<table>
<thead>
<tr>
<th>Season</th>
<th>Crop</th>
<th>Traditional N:P:K:S</th>
<th>Bio Input</th>
<th>Nano Input</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>FYM/ City Compost</td>
<td>NPK Consortia</td>
<td>Sagrika Gr</td>
</tr>
<tr>
<td><strong>Rabi 2019</strong></td>
<td>Wheat</td>
<td>115:60:30:25</td>
<td>2500</td>
<td>1.2</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Kharif 2020</strong></td>
<td>Pearl Millet</td>
<td>60:30:0:0</td>
<td>2500</td>
<td>1.2</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td><strong>Kharif 2020</strong></td>
<td>Seasame</td>
<td>37.5:0:0:0</td>
<td>1250</td>
<td>1.2</td>
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<tr>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Rabi 2021</strong></td>
<td>Wheat</td>
<td>150:60:30:25</td>
<td>2500</td>
<td>1.2</td>
</tr>
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<td></td>
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<tr>
<td><strong>Rabi 2021</strong></td>
<td>Mustard</td>
<td>80:30:20:25:25</td>
<td>1250</td>
<td>1.2</td>
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<tr>
<td><strong>Kharif 2021</strong></td>
<td>Pearl Millet</td>
<td>60:30:0:0</td>
<td>2500</td>
<td>1.2</td>
</tr>
</tbody>
</table>

- **Kharif 2020**Pearl Millet: Three Sprays
- **Kharif 2021**Pearl Millet: Two sprays Nano N & Nano DAP
## Rewari Experiment Yield

<table>
<thead>
<tr>
<th>Season</th>
<th>Crop</th>
<th>Area (Acre)</th>
<th>Seed yield (kg/ha)</th>
<th>Straw yield</th>
<th>Gross cost (Rs./ha)</th>
<th>Gross return</th>
<th>Net return</th>
<th>B:C ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rabi 2019</td>
<td>Wheat</td>
<td>50</td>
<td>4905 4887</td>
<td>5650 5820</td>
<td>56890 58580</td>
<td>108546 161160</td>
<td>51656 102580</td>
<td>1.9 2.75</td>
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<tr>
<td>Kharif 2020</td>
<td>Bajra</td>
<td>30</td>
<td>2250 2345</td>
<td>3490 3550</td>
<td>27020 28837</td>
<td>58845 61067</td>
<td>31825 34320</td>
<td>2.23 2.3</td>
</tr>
<tr>
<td>Kharif 2020</td>
<td>Seasame</td>
<td>20</td>
<td>396 492</td>
<td>0 20100</td>
<td>19780 29700</td>
<td>36900 9600</td>
<td>17120 14120</td>
<td>1.41 1.68</td>
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<tr>
<td>Rabi 2021</td>
<td>Wheat</td>
<td>50</td>
<td>5050 5320</td>
<td>5540 5860</td>
<td>57025 54242</td>
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<tr>
<td>Rabi 2021</td>
<td>Mustard</td>
<td>10</td>
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<td>125760 150020</td>
<td>85997 112202</td>
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</tr>
<tr>
<td>Kharif 2021</td>
<td>Bajra</td>
<td>30</td>
<td>2430 2625</td>
<td>3560 3810</td>
<td>33687 32217</td>
<td>62925 62925</td>
<td>29238 35650</td>
<td>1.87 2.11</td>
</tr>
</tbody>
</table>
Season & Crop wise Net Return

- Net return FF
- Net return Bio Input

Crop: Wheat, Bajra, Seasame, Wheat, Mustard, Bajra

Net Return:
- Wheat: 120000
- Bajra: 140000
- Seasame: 60000
- Wheat: 80000
- Mustard: 20000
- Bajra: 40000
- Seasame: 60000
Rewari Trials
## Economics

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Product</th>
<th>Farmer Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Farm Yard Manure 25 Quintal</td>
<td>In House</td>
</tr>
<tr>
<td>2</td>
<td>IFFCO Liquid Consortium – 1 Litre</td>
<td>200</td>
</tr>
<tr>
<td>3</td>
<td>Sagarika 10Kg Granule Bag</td>
<td>450</td>
</tr>
<tr>
<td>4</td>
<td>Nano Urea – 500ml</td>
<td>240</td>
</tr>
<tr>
<td>5</td>
<td>Sagarika Liquid – 1Litre</td>
<td>550</td>
</tr>
<tr>
<td></td>
<td><strong>Total Cost per Acre</strong></td>
<td><strong>Rs. 1440/-</strong></td>
</tr>
</tbody>
</table>

Farmer paid premium of at least 20% for chemical free output plus improved soil health.

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### Conventional Fertiliser Dose – Most Crops

- 2 Bags Urea = Rs. 533
- 1.5 Bag DAP = Rs. 2025
- 1 Bag MOP (30-40Kg minimum) = Rs. 800

Total Cost = Rs. 3358/Acre
Bulk Fertilizer Cost and Efficiency

**Bulk Fertiliser Cost**

1. Urea Bag International Price = 1300$/MT = Rs. 4387.50/Bag Subsidized Price = Rs. 266.50/45Kg Bag Subsidy/Bag = 4145.50/Bag

1. DAP Bag International Price = 1200$/MT = Rs. 4500/Bag Subsidized Price = Rs. 1350/50Kg Bag Subsidy/Bag = 3150/Bag

**Subsidy Cost to Government of India = 1.5 Lakh Crores**

**Nutrient Use Efficiency of Bulk Fertilizer**

1 Bag Urea 45Kg 46% (N) 20.70% (N)/Bag NUE – 30% 6.21% Nitrogen Uptake by the plant.

1 Bag DAP 50Kg 46% (P) 23% (P)/Bag NUE – 20% 4.60% Phosphorous Uptake by the plant.

1 Bag MOP 50Kg 60% (K) 30% (K)/Bag NUE – 30% 9.00% Potassium Uptake by the plant.
Nutrient Use Efficiency of Organic Inputs

• 2500Kg of FYM will deliver the following Macro Nutrients

  N = 12.50Kg  
  P = 5.00Kg  
  K = 25.00Kg (most crops requirement/acre)

• Due to IFFCO Liquid Consortium treatment 35% of ground locked Phosphorous and Potassium also becomes available to plant.

• Sagarika Granules besides seaweed nutrition also delivers 1% Zinc and 0.25% Boron and fulfils the micronutrient need of the crop
Thanks