Andhra Pradesh Zero Budget Natural Farming:

Mainstreaming natural farming at State level: All 60L farmers, 80L hectares, 12924 Gram Panchayats

T. Vijay Kumar
Advisor, (Agriculture and Coop), and,
Vice Chairman, Rythu sadhikara samstha
Govt of A.P

Centre for Science and Environment:
National conclave on food, March 15th, 2019
Andhra Pradesh
India’s Leading Agrarian State

- 62% of population employed in agriculture & related activities
- 80 Lakh ha cropped area
- Rice Bowl of India
- 2nd longest coastline – 974 km
- Diversified cropping systems
- India’s largest producer of fruits, eggs & aquaculture products
- Contributes 34% to state GSDP
- Horticulture 17 Lakh ha
Agriculture and Food Crisis

- High Costs
- Production and Marketing Risks
- Food Insecurity
- Rural – Urban distress Migration
- Ecosystem Degradation
- Worsening Climate crisis

Who are at Risk?
- Farmers
- Citizens
- Planet Earth

Current Agriculture system is contributing to 24% of the Green house gases
Z.B.N.F is a transformational technology

- Farmers’ welfare
  - Reduced costs and risks, increased yields, regular income, climate change resilience

- Freedom from hunger
  - More food, safe food and nutritious food

- Youth welfare
  - Reverse migration to villages

- Environment
  - Enhanced soil health, water conservation, regenerated coastal ecosystem, biodiversity.

Safeguarding our collective future
Z.B.N.F is a unique contribution of Padma Shri Dr. Subhash Palekar to the farmers of our country and to all the citizens (as consumers).

January 2016, 8-days: 5000 farmers
September 2016, 4-days: 5000 farmers
December 2017, 9-days: 8000 farmers
December 2018, 9-days: 9000 farmers
Four Wheels of ZBNF

**Beejamrutham**
- Microbial seed coating through cow urine and dung-based formulations

**Jeevamrutham**
- Enhance soil microbiome through an ‘inoculum’ of cow dung, cow urine and other ingredients

**Achhadana**
- Ground to be kept covered with crops and crop residues as mulching

**Waaphasa**
- Fast buildup of soil humus through ZBNF leading to soil aeration and water vapor harnessing

**Results**
- Higher Yields, diverse crops, Lower Costs
- Enhanced Soil Fertility, soil porosity, water infiltration
- Soil Carbon enhancement
- Reduce water requirement for crops, harnessing atmospheric water
- Resilience to Climate Shocks
40% of Plant Sugars stored in Above Ground Biomass

30% of Sugars stored in Roots

30% of Sugars moves into the Soil as Exudates, feeding vast microbial population that makes plant healthy

PLANT CONVERTS SUNLIGHT, WATER and CO2 into SUGARS

ZBNF – a paradigm shift

Image courtesy: Natural Resources SA Murray-Darling Basin YouTube channel
Other critical principles and practices in Z.B.N.F

• Use of ‘indigenous’ cow – for cowdung and urine. One cow is enough for cultivation of 30 acres

• Botanical extracts – for pest management

• Minimal tillage – ground becomes soft and porous with Z.B.N.F practices

• All inputs to be made within the village – nothing should be purchased from outside
AP ZBNF Programme at a glance

Funding required: 1250 cr.

Current funding:
RKVY and PKVY schemes of Ministry of Agriculture
Grant support of Rs.100 crores by A.P.P.I

Plan for 2019 – 20: 7.5 Lakh farmers

Total area in implementation: 5.04 lakh acres
## ZBNF IMPACTS

### CCE Results:
Major Crops - Kharif 2018

<table>
<thead>
<tr>
<th>Crop</th>
<th>Irrigated/Rainfed</th>
<th>Yield ZBNF in kgs/ha</th>
<th>Yield Non ZBNF in kgs/ha</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paddy</td>
<td>Irrigated</td>
<td>5643</td>
<td>4932</td>
<td>14%</td>
</tr>
<tr>
<td>Groundnut</td>
<td>Rainfed</td>
<td>2109</td>
<td>1573</td>
<td>34%</td>
</tr>
<tr>
<td>Cotton</td>
<td>Rainfed</td>
<td>995</td>
<td>906</td>
<td>10%</td>
</tr>
<tr>
<td>Maize</td>
<td>Irrigated</td>
<td>5962</td>
<td>4929</td>
<td>21%</td>
</tr>
<tr>
<td>Ragi</td>
<td>Rainfed</td>
<td>2710</td>
<td>2091</td>
<td>34%</td>
</tr>
<tr>
<td>Sugarcane (Tonnes)</td>
<td>Irrigated</td>
<td>147</td>
<td>97</td>
<td>51%</td>
</tr>
</tbody>
</table>
# Kharif 2018 CCEs: Yields and Net Incomes

<table>
<thead>
<tr>
<th>Crop</th>
<th>I/RF</th>
<th>Net Income ZBNF</th>
<th>Net Income Non-ZBNF</th>
<th>% Increase in yields</th>
<th>% Increase in ZBNF Net Income Over non-ZBNF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paddy</td>
<td>Irrigated</td>
<td>59448</td>
<td>39457</td>
<td>14%</td>
<td>51%</td>
</tr>
<tr>
<td>Groundnut</td>
<td>Rainfed</td>
<td>61077</td>
<td>33437</td>
<td>34%</td>
<td>83%</td>
</tr>
<tr>
<td>Cotton</td>
<td>Rainfed</td>
<td>39239</td>
<td>13222</td>
<td>10%</td>
<td>197%</td>
</tr>
<tr>
<td>Maize</td>
<td>Irrigated</td>
<td>26005</td>
<td>17844</td>
<td>21%</td>
<td>46%</td>
</tr>
<tr>
<td>Ragi</td>
<td>Rainfed</td>
<td>59200</td>
<td>26294</td>
<td>34%</td>
<td>125%</td>
</tr>
<tr>
<td>Sugarcane</td>
<td>Irrigated</td>
<td>302948</td>
<td>180615</td>
<td>51%</td>
<td>68%</td>
</tr>
</tbody>
</table>
## Best Cases in 2018

<table>
<thead>
<tr>
<th>Crop</th>
<th>ZBNF Yield (Kgs/acre)</th>
<th>Non-ZBNF Yield (Kgs/acre)</th>
<th>Percentage Change</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRI Paddy</td>
<td>2350</td>
<td>1550</td>
<td>52 %</td>
<td>Farmer: Paradani Jogi Raju (farmer), G. Madugula mandal, Vishakapatanam</td>
</tr>
<tr>
<td>Coffee</td>
<td>103</td>
<td>67</td>
<td>54 %</td>
<td>Farmer in D Gonduru, Kadagaputu, Vishakapatanam</td>
</tr>
<tr>
<td>Guli Ragi</td>
<td>1250</td>
<td>450</td>
<td>178 %</td>
<td>Farmer: Trimurthulu, Ananthagiri Mandal, Vishakapatanam</td>
</tr>
<tr>
<td>SRI Ragi</td>
<td>1320</td>
<td>450</td>
<td>193 %</td>
<td>Farmer: K Pandanna, Paderu, Vishakapatanam</td>
</tr>
<tr>
<td>Sama</td>
<td>717</td>
<td>350</td>
<td>104 %</td>
<td>Farmer: P Sonnu, Araku, Vishakapatanam</td>
</tr>
<tr>
<td>Cotton</td>
<td>557</td>
<td>360</td>
<td>54 %</td>
<td>Farmer: K Ganapathi, Duddukhallu, Vizianagaram</td>
</tr>
<tr>
<td>Cashew</td>
<td>900</td>
<td>600</td>
<td>50 %</td>
<td>Farmer: K Santa Kumari, Rampachodavaram, East Godavari</td>
</tr>
</tbody>
</table>
ZBNF IMPACTS

Drought resilience through ZBNF

Pre monsoon dry sowing (Drought Resilience)
ZBNF IMPACTS

Drought resilience through ZBNF

Pre monsoon dry sowing (Drought Resilience)

Growth timeline of the pre monsoon Navdhanya over the months
Premonsoon dry sowing crops

Bajra
ZBNF IMPACTS

Resilience to cyclones in 2018
Case of Pattabhi Rami Reddi
District – Kurnool || Land – 4 acres (Irrigated) || Crops – Paddy, Redgram

Conventional Farming
Land under cultivation- 2 acres
Cost of Cultivation- Rs. 20,000
Selling Price- Rs. 1500/ Bag
Produce - 22 bags per acre
Net Income - Rs.46,000

ZBNF Farming
Land under cultivation- 2 acres
Cost of Cultivation- Rs. 8,800
Selling Price- Rs. 2200/ Bag
Produce - 30 bags per acre
Net Income - Rs. 1,23,200 (2.7 times higher)

“I am very happy with the grain weight, next year I am going to transfer my whole land to ZBNF”
ZBNF Benefits

Rs. 13 worth direct benefits
✓ Cost Reduction
✓ Risk reduction
✓ Higher Yields
✓ Better Prices

Re. 1 investment

Food, Nutrition and Health Security
Employment
Soil Health and Water Security
Coastal Ecosystem Regeneration
Climate Resilience
Biodiversity

Ecosystem & Health Benefits to citizens

It takes Rs.27,000, over a five-year period for a farmer household to adopt Z.B.N.F and cover their entire farm (1 ha/family)
However Organic farming is not scaling up

Even after two decades, a negligible proportion of farmers are practicing it.

*Source: IFOAM, FAO Data as at 2016*
OBSTACLES TO SCALING UP

- Changing the ‘CHEMICAL ADDICTION’ of the last 60 years - FARMERS, SCIENTISTS, AGRI DEPT
- Tackling VESTED INTERESTS
- Taking it to the last mile
- Handholding each farmer to make a permanent transition *in the context of broken agri extension system*
- Are the costs affordable? Gestation period?
- How to make it Self sustaining, long-lasting
APZBNF - overcoming critical obstacles to scaling

At least 5 years handholding to each farmer

AP ZBNF Model

Farmers’ Coverage

- 2016-18
  - 8% enrolled
- 2024
  - 100%
Pillars of APZBNF Model

Commitment
State Government

Knowledge
Subhash Palekar

Extension
Champion Farmers

Ownership
Women SHGs

ICT for Knowledge, Tracking, Traceability
Collective Action for Inputs, Models, Marketing

Saturation: Farmers » Farms » Practices
AP Programme implementation : structure

Dedicated entity for implementation – the Rythu sadhikara samstha
- Agriculture Department taking up implementation at state and district level
- Technical support grants from APPI

Robust State and District Teams
- Blend of Agri dept officials, development professionals (as consultants), best practitioners (as SRPs), Thematic Leads across various themes and Young Professionals,
- Complemented by Community cadres in managerial positions - District and divisional leads – technical and institution building
- Ownership of Agriculture dept functionaries

NFF Strategy
- Young Agri Graduates, through campus recruitment, as Farmers, Trainers, Researchers and Integrators
- 284 positioned in various villages (@ 1 per cluster)
Process: longterm handholding support to each farmer

Covering all farmers and all cultivable area in a village in 5 years

Each farmer takes 3 years to cover the entire holding.

Year 3: full area

Year 2

Year 1

Area saturation in 3 years

ZBNF Adoption rate

100%

In 5 years, a village becomes a ‘BIO-VILLAGE’

Year 5

Year 3

> 80% farmers

Year 2

50% farmers

Year 1

15% farmers
Champion Farmers

5,900 Community Resource Persons @ 1 per 100 farmers

284 Young Agriculture Graduates as Natural Farming Fellows

- Inspiration
- Knowledge Transfer
- Handholding
- Video Dissemination
- Farmer Field Schools

Commitment of State Government

AP ZBNF Model Principles by Subhash Palekar

Extension by Champion Farmers

Ownership of Women SHGs

Saturation: Farmers → Farms → Practices
Farmer to farmer knowledge dissemination

CRP Strategy : 5000 strong

CRP: Important Pillar of AP Model
• Best practicing farmers
• Identified (through rigorous verification process), trained and deployed as Community Resource Persons
• Farmer-to-farmer dissemination, handholding support to farmers

Building Capacities of CRPs
• Multiple rounds of training at district and state level in three spells (pre kharif, kharif and rabi) for 15 days
• Additionally, trained by Sr CRPs for 2-3 days every month
• Apprenticeship with Sr CRP for six months

CRPs activities
• Farming Plans (in a campaign mode and in collaboration with Women SHGs)
• Weekly Farmer Field Schools
• Human mediated video disseminations
### Social capital of Women – mobilization of women in A.P

**A Programme since 1995**

<table>
<thead>
<tr>
<th>Average Number per Institutions</th>
<th>Total Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>45 – 55 MMS</td>
<td>Zilla Samakhyas 13</td>
</tr>
<tr>
<td>35 – 45 VOs</td>
<td>Mahila Mandal Samakhyas 662</td>
</tr>
<tr>
<td>10 - 20 SHGS</td>
<td>Village Organisations: 27,771</td>
</tr>
<tr>
<td>8 – 12 Members</td>
<td>Number of SHGs: 7,37,341</td>
</tr>
</tbody>
</table>

**No of SHGs Credit Facilitated:** 332,594

**Credit Amount Facilitated Dec’ 18-19:** Rs.10,750 cr

*Hundreds of thousands of women leaders, and community professionals (men and women) in various disciplines*
Women in Natural Farming: Our biggest Strength

106,991 women SHGs and their 4,825 Federations are in charge
Knowledge + Technology + Community

*in harmony with* **Nature**

- Knowledge Transfer
  - eTracking
    - Farms
    - Farmers
    - Practices, Parameters
  - eDatabase
    - Farmers
    - Produce
    - Consumers

- Traceability
Our achievements...

Vision 2024
All 6 M Farmers

APZBNF Scaling-up Plan
A systemwide transformation

Ongoing Program: Funds from Government of India, State Government and Philanthropy

Vision 2024

- 2016: 40,000 farmers (3%)
- 2017: 163,000 farmers (8%)
- 2018: 523,000 farmers (15%)
- 2019: 1M farmers (28%)
- 2020: 1.7M farmers (68%)
- 2022: 4.1M farmers

Existing Partners
- APPI
- UNEP
- FAO
- SIFF
- CIRAD
- ICRAF
- IDH
- BNP Paribas
- UNIVERSITY OF READING

2018
523,000 farmers
32%
8%
3%
2016
40,000 farmers
32%
8%
3%
2017
163,000 farmers
2019
1M farmers
2020
1.7M farmers
2022
4.1M farmers
## IMPLEMENTATION PLAN – YEAR WISE COVERAGE OF G.P S

<table>
<thead>
<tr>
<th>Year</th>
<th>GPs</th>
<th>Cumulative GPs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016-22</td>
<td>691</td>
<td>691</td>
</tr>
<tr>
<td>2017-23</td>
<td>267</td>
<td>958</td>
</tr>
<tr>
<td>2018-24</td>
<td>1917</td>
<td>2,875</td>
</tr>
<tr>
<td>2019-25</td>
<td>2000</td>
<td>4,875</td>
</tr>
<tr>
<td>2020-26</td>
<td>3000</td>
<td>7,875</td>
</tr>
<tr>
<td>2021-27</td>
<td>5049</td>
<td>12,924</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>12924</strong></td>
<td>(in about 2585 Clusters)</td>
</tr>
</tbody>
</table>
## Cost for converting one farmer household over 5 years

<table>
<thead>
<tr>
<th>#</th>
<th>Heads</th>
<th>Per Farmer Cost (in Rs)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Capacity building</td>
<td>12700</td>
<td>47%</td>
</tr>
<tr>
<td>2</td>
<td>Institution building and funds to farmers’ institutions</td>
<td>6550</td>
<td>24%</td>
</tr>
<tr>
<td>3</td>
<td>One time Subsidy/Support for access to inputs, tools etc., to farmers and Farmers' Institutions</td>
<td>1000</td>
<td>4%</td>
</tr>
<tr>
<td>4</td>
<td>PGS Certification, Quality Assurance, Tracking and Monitoring</td>
<td>2900</td>
<td>11%</td>
</tr>
<tr>
<td>5</td>
<td>Marketing Capacity Building and Marketing Support</td>
<td>1400</td>
<td>5%</td>
</tr>
<tr>
<td>6</td>
<td>Support for Science and Restructuring Farming Curriculums</td>
<td>1000</td>
<td>4%</td>
</tr>
<tr>
<td>7</td>
<td>Technical Support and Overall Programme Management – district and beyond</td>
<td>1500</td>
<td>6%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>27,050</td>
<td>100%</td>
</tr>
</tbody>
</table>
## Benefit Stream for one GP

<table>
<thead>
<tr>
<th>Year</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6 to 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm Families @1 ha</td>
<td>30</td>
<td>90</td>
<td>270</td>
<td>360</td>
<td>400</td>
<td></td>
</tr>
<tr>
<td>Reduced Cost of Cultivation</td>
<td>13,500</td>
<td>14,850</td>
<td>16,200</td>
<td>18,225</td>
<td>20,250</td>
<td>Benefits from year 6 to 12 and thereafter are: 52,451 per year</td>
</tr>
<tr>
<td>Interest Savings on Borrowed Funds</td>
<td>1,620</td>
<td>1,782</td>
<td>1,944</td>
<td>2,187</td>
<td>2,430</td>
<td></td>
</tr>
<tr>
<td>Value of Higher Yield</td>
<td>5,000</td>
<td>5,500</td>
<td>6,000</td>
<td>6,500</td>
<td>7,000</td>
<td></td>
</tr>
<tr>
<td>Intercrop Value</td>
<td>12,000</td>
<td>14,400</td>
<td>14,400</td>
<td>15,600</td>
<td>16,800</td>
<td></td>
</tr>
<tr>
<td>Fairer Returns</td>
<td>-</td>
<td>3,000</td>
<td>3,375</td>
<td>3,797</td>
<td>4,271</td>
<td></td>
</tr>
<tr>
<td>Total Benefits per farmer</td>
<td>32,120</td>
<td>39,532</td>
<td>41,919</td>
<td>46,309</td>
<td>50,751</td>
<td></td>
</tr>
<tr>
<td>Benefits for 400 members in GP (in Rs. Lakh)</td>
<td>9.64</td>
<td>35.58</td>
<td>113.18</td>
<td>166.71</td>
<td>203.00</td>
<td>1468.64</td>
</tr>
<tr>
<td>Year</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6 to 12</td>
</tr>
<tr>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
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<td>30</td>
<td>90</td>
<td>270</td>
<td>360</td>
<td>400</td>
<td></td>
</tr>
<tr>
<td>Benefits for 400 members in GP (Lakh)</td>
<td>9.64</td>
<td>35.58</td>
<td>113.18</td>
<td>166.71</td>
<td>203.00</td>
<td>1468.64</td>
</tr>
<tr>
<td>Costs (Lakh)</td>
<td>17.77</td>
<td>21.82</td>
<td>25.08</td>
<td>23.96</td>
<td>11.56</td>
<td></td>
</tr>
<tr>
<td>NPV of Benefits (1295.31 Lakh)</td>
<td>9.64</td>
<td>33.25</td>
<td>98.86</td>
<td>136.09</td>
<td>154.87</td>
<td>1295.31</td>
</tr>
<tr>
<td>NPV of Costs (88.45 Lakh)</td>
<td>17.77</td>
<td>20.39</td>
<td>21.91</td>
<td>19.56</td>
<td>8.82</td>
<td></td>
</tr>
<tr>
<td>B:C Ratio</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>13.64 times</td>
</tr>
</tbody>
</table>
## Funds Required and Economic Benefit Streams to farmers (in Rs. Crore)

<table>
<thead>
<tr>
<th>Year</th>
<th>Funds/ Budget, Rs. Crore</th>
<th>Economic Benefit to Farmers, Rs. Crore</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yearly fund requirement (in Rs. Crore)</td>
<td>Cumulative fund requirement (in Rs. Crore)</td>
</tr>
<tr>
<td>2018-19</td>
<td>216</td>
<td>216</td>
</tr>
<tr>
<td>2019-20</td>
<td>778</td>
<td>994</td>
</tr>
<tr>
<td>2020-21</td>
<td>1,648</td>
<td>2,642</td>
</tr>
<tr>
<td>2021-22</td>
<td>3,581</td>
<td>6,223</td>
</tr>
<tr>
<td>2022-23</td>
<td>3,769</td>
<td>9,992</td>
</tr>
<tr>
<td>2023-24</td>
<td>3,488</td>
<td>13,480</td>
</tr>
<tr>
<td>2024-25</td>
<td>2,218</td>
<td>15,698</td>
</tr>
<tr>
<td>2025-26</td>
<td>754</td>
<td>16,452</td>
</tr>
<tr>
<td>Total</td>
<td>16,452</td>
<td>118,040</td>
</tr>
</tbody>
</table>

Annual fertilizer subsidy for A.P is around Rs.5500 cr
Our biggest reward - Happy Farmers
Our biggest reward - Happy Farmers
Our biggest reward - Happy Farmers
Our biggest reward - Happy Farmers
Our biggest reward - Happy Farmers
Our biggest reward - Happy Farmers
Our biggest reward - Happy Farmers, happy farmer families
Thank you