Rythu Sadhikara Samstha

Government of Andhra Pradesh

Andhra Pradesh 'Zero-Budget' Natural Farming

Vision 2024: A Systemwide Transformation

5 crore people | 60 lakh farmers | 80 lakh hectares

G R Dharmendar, Thematic Lead – ZBNF Training

Agriculture and Food Crisis

Farmer Distress

- High Cost of Cultivation
- Droughts, Crop Failures
- Unseasonal Rains, Cyclones
- Tenants, Migration
- Uncertain Markets

Consumer Food Plate

Food Scarcity
Chemical Residues
Lack of Nutrients
Health Hazards

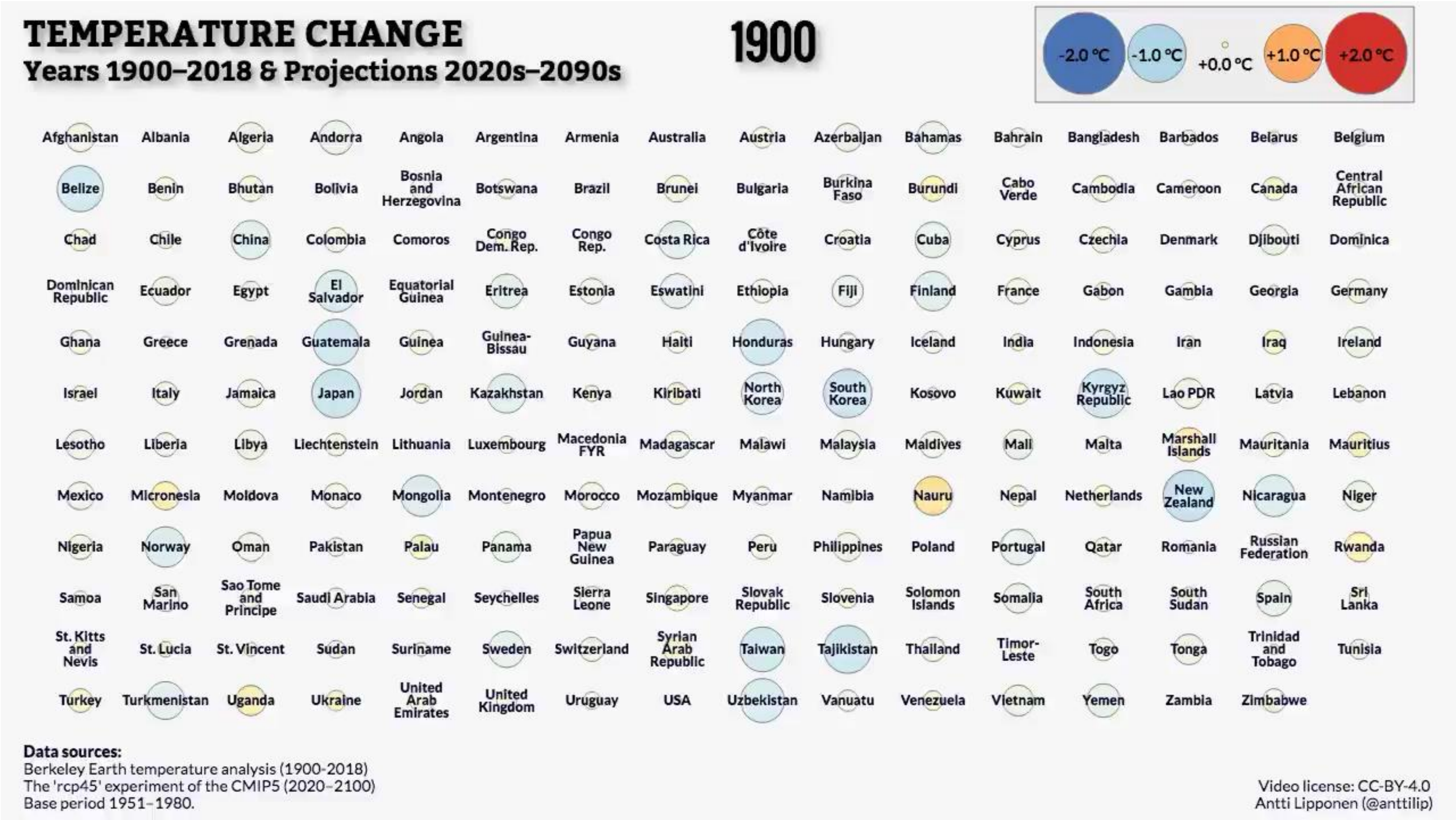
Soil Degradation

- Loss of top soil
- Lack of water storage capacity
- Decreased biodiversity

FAO warning:
Only 60 more harvest years

NEED FOR ALTERNATIVES TO ADDRESS THESE PROBLEMS

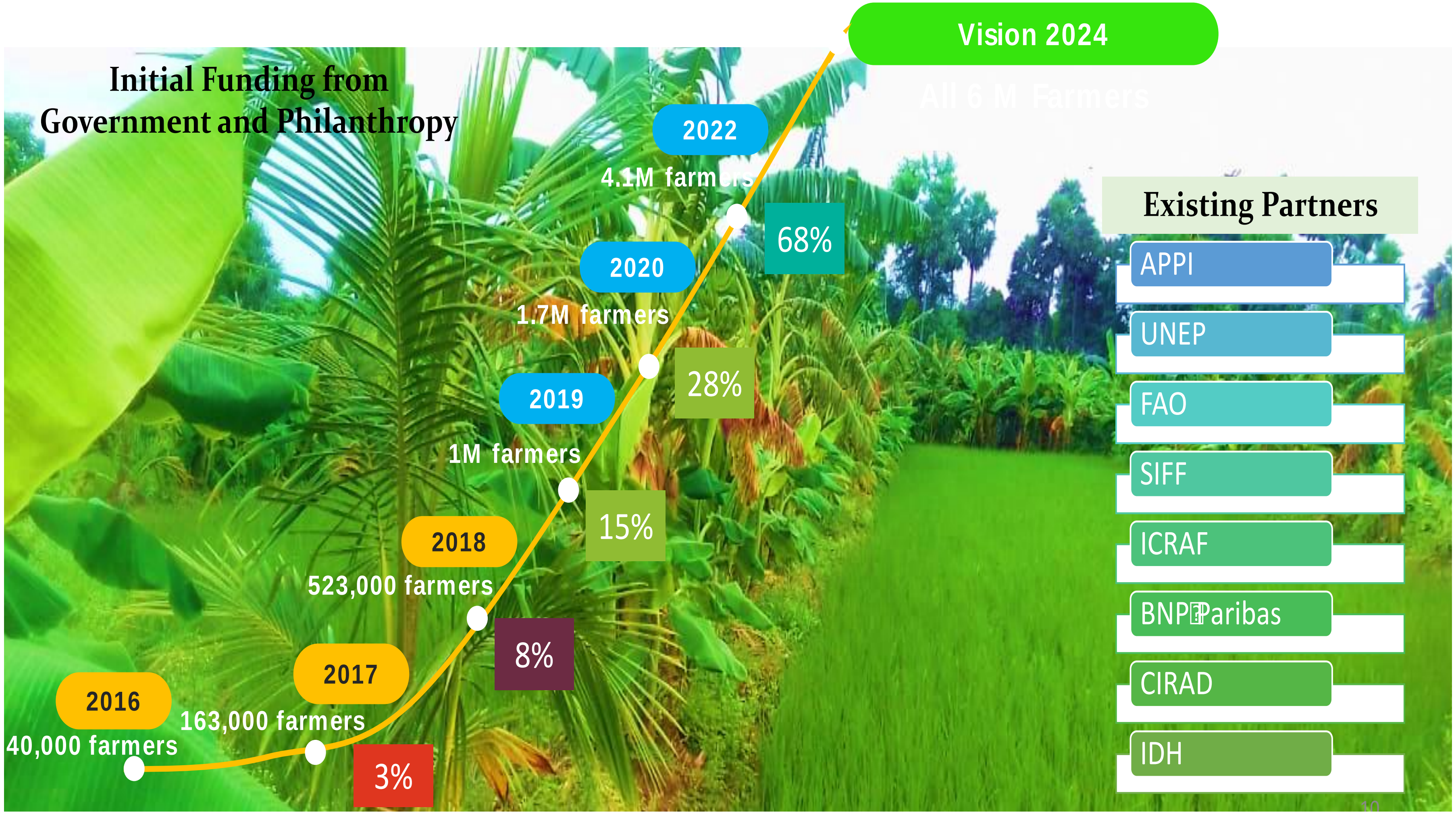
We all know where we are heading to...



Do we know the solution?

APZBNF Scaling-up Plan

A systemwide transformation



Collaborations for Systemwide Transformation

USD. 2.3B to scale up to all 6M farmers

- Financial Resources
- Science behind ZBNF
- Biodiversity Impacts
- Climate Change Mitigation
- ZBNF Health Impacts
- Sustainability Standards
- Marketing Tie-ups
- Global Knowledge Center

Community-led Measurement Framework

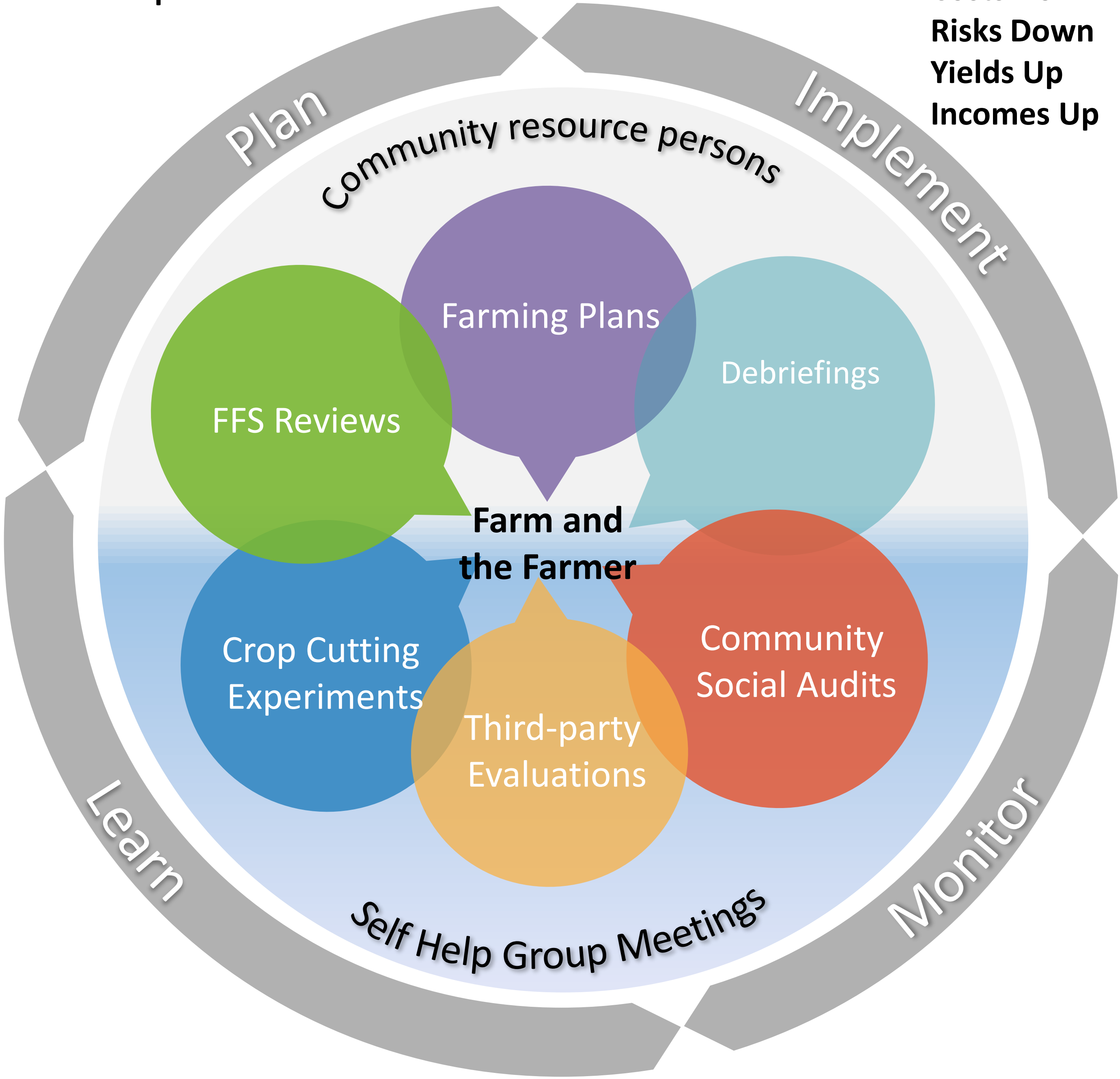
the hallmark of APZBNF Programme

Planning, Roll-out, Extension, Tracking and Monitoring

- Farming Action Plans (523,000 with Women SHGs)
- Seed-to-Seed Verification led by CRPs
- Villages, Farmers, Farms, Practices, Models
- Internal, External Crop Cutting Experiments
- Panel Studies, Profiles, Case Studies
- Monthly Debriefing Meetings
- SHG-VO-GP; Cluster-Divn-District-State

Carbon Sequestration

Costs Down
Risks Down
Yields Up
Incomes Up



Water: Conservation; Absorption from Air

Climate Stress Down

AP ZBNF Programme at a glance

Poverty eradication through women solidarity seeded in SERP 20 years ago. 2005 onwards - NPM and CMSA - through women self help groups – N.G.O support

Seeding

40,656 farmers
704 Villages

163,000 farmers
972 Villages

578,733 farmers
3011 Villages
200,000 Ha.

Target
10 lakh farmers

20 years ago

2016-17

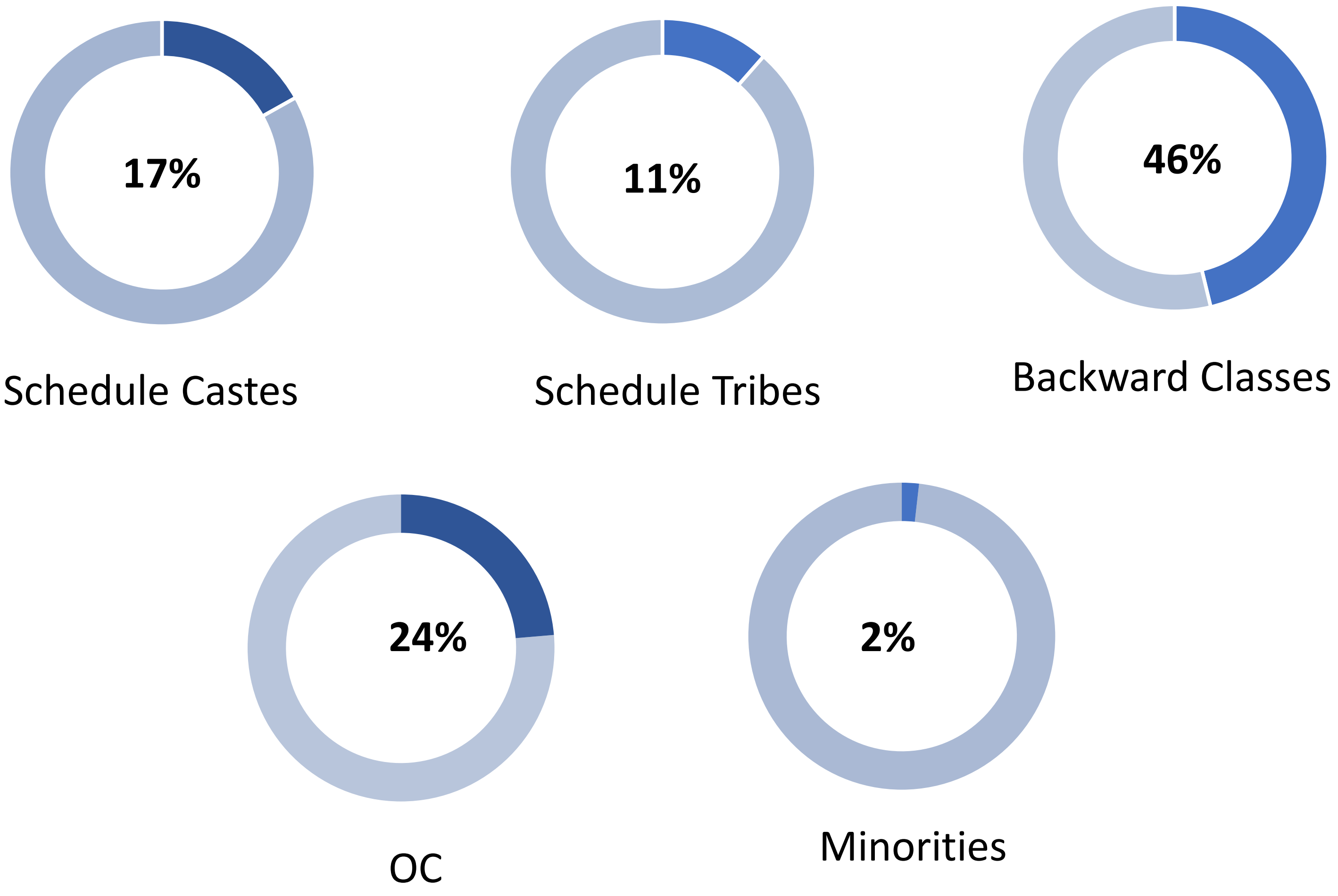
2017-18

2018-19

2019-20

AP ZBNF Programme at a glance

Social Profile of Existing 5.8 lakh ZBNF farmers in 3011 villages



Category	Farmers
Scheduled Caste	97,613
Scheduled Tribe	66,362
Backward Class	2,67,483
Other Category	1,36,846
Minority	10,429
Total	**5,78,733**

Women Empowerment by A.P through SERP

A Programme since 1995

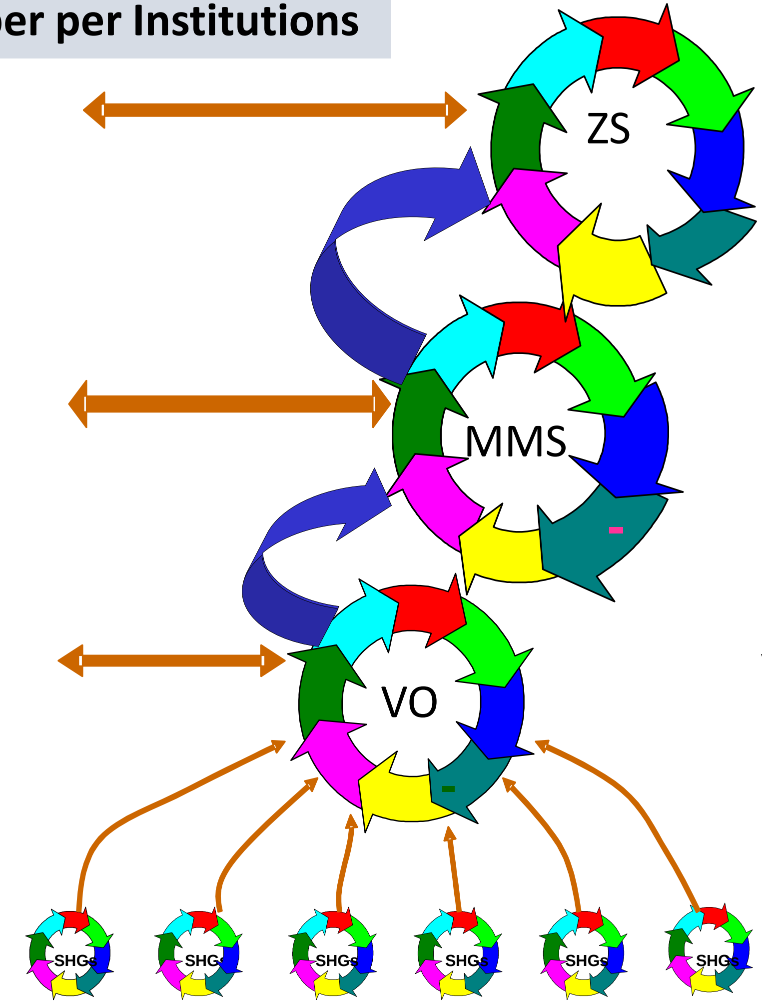
Average Number per Institutions

45 – 55
MMS

35 – 45
VOs

10 - 20
SHGS

8 – 12
Members



Total Numbers

Zilla Samakhyas
13

Mahila Mandal Samakhyas
662

Village Organisations:
27,771

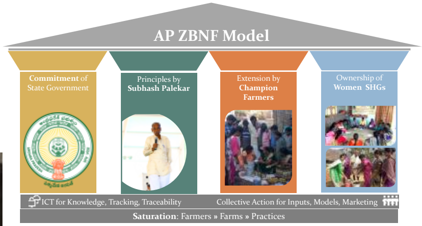
Number of SHGs:
7,37,341

No of SHGs Credit Facilitated:
332,594

Credit Amount Facilitated Dec' 18-19:
$ 1,536 M

Total No of Members
7,514,341

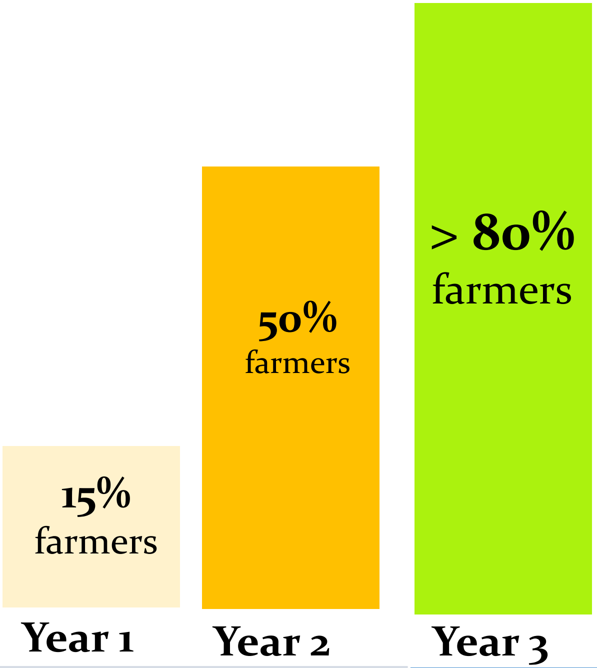
Women in Natural Farming: Our biggest Strength



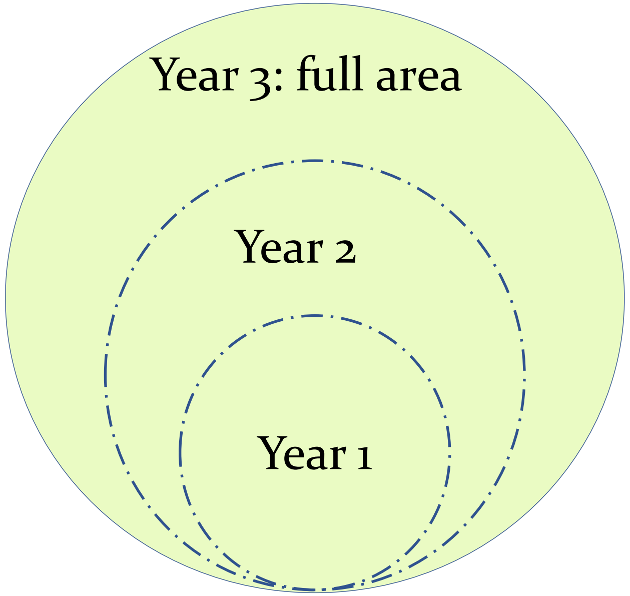
- Programme Management, transparency
- Collective Action
- Peer Learning
- Farming Plans, and, consumption plans
- Inclusive of the poorest

Saturation Approach

Each Village takes 3 years to reach all farmers.



Each farmer takes 3-6 years to adopt all practices and cover entire holding.



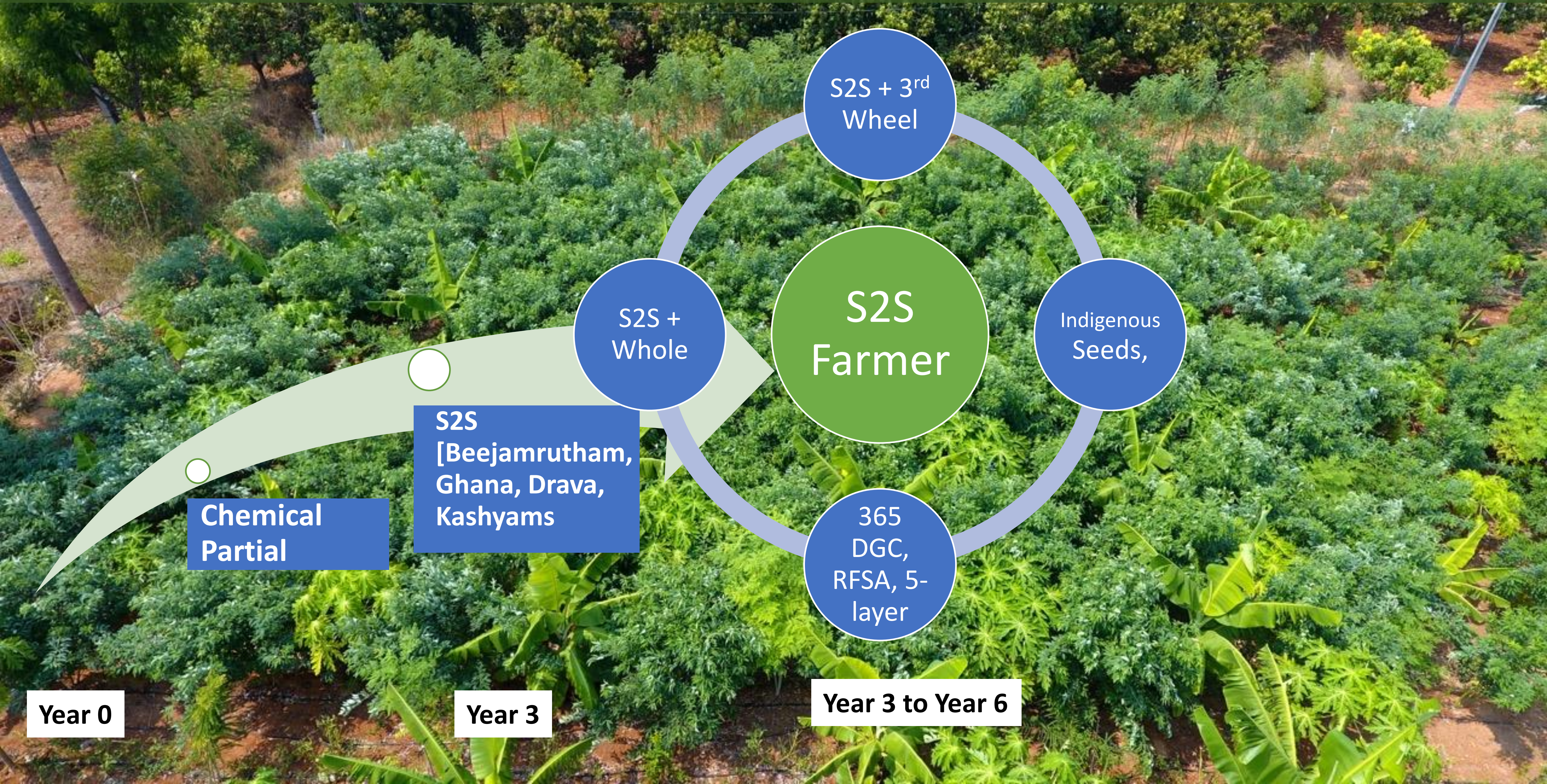
1st Bio-village in 3 years - Kondabaridi

In 5-6 years, a village becomes a 'BIO-VILLAGE

Year 5/6

All Villages | All Farmers | All Farms | All Practices

Farmer's Graduation



Emphasis on Mainstreaming Poorest of Poor

Special Plan for 1.52 lakh Landless Agriculture Labour

Target: Household food and nutrition security incomes: At least Rs.10,000 per month

Kitchen Garden

Facilitate Land Lease

Development of Assigned Lands

Special Roles (ZBNF shops, Seed Supply, Services)

Off-farm

(backyard poultry, fish-farm ponds)

AP ZBNF Programme at a glance

Funding from: RKVY, PKVY, Government (GoAP, GoI)

RASHTRIYA KRISHI VIKAS YOJANA - RKVY

सत्यमेव जयते

परम्परागत कृषि विकास योजना
Paramparagat Krishi Vikas Yojana
Department of Agriculture, Cooperation & Farmers Welfare

Funds Received

Rs. cr

Year	RKVY	PKVY	Total
2015-16	34.04	18.34	52.38
2016-17	45.91	13.3	59.21
2017-18	38.38	10.93	49.31
2018-19	63.00	90.32	153.32
Total	181.33	132.89	314.22

Plan for 2019-20, 20-21

Rs. cr

Year	RKVY	PKVY	Total
2019-20	186.64	134.65	321.29
2020-21	320.00	134.65	454.65

Funds for Scaling-up 2019-20

Rs. cr

Proposed Funds from WB-funded APIIATP for initiating the work in additional 827 GPs (up to two years).	261
Proposed Funds IFAD-funded APDMP for initiating the work in additional 330 GPs (up to two years)	104
Proposal to Bilateral Agency, KfW, for scaling up in 1,778 GPs for 5 years (Loan Agreement by Dec. 2019)	2,479

Azim Premzi Philanthropic Initiatives has committed Rs 100 crores for 5 years and 22.88 crores were utilised

Rs 1 investment

Rs 13 worth direct benefits

- ✓ Cost Reduction
- ✓ Risk reduction
- ✓ Higher Yields
- ✓ Better Prices

\+

Food, Nutrition and Health Security

Employment

Soil Health & water security

Coastal eco-system regeneration

Bio Diversity

Climate Resilience

Ecosystem & Health Benefits to citizens

Cost of Implementation:
It takes Rs.37271 per capita over 5 years for a farmer to adopt ZBNF

ZERO BUDGET NATURAL FARMING

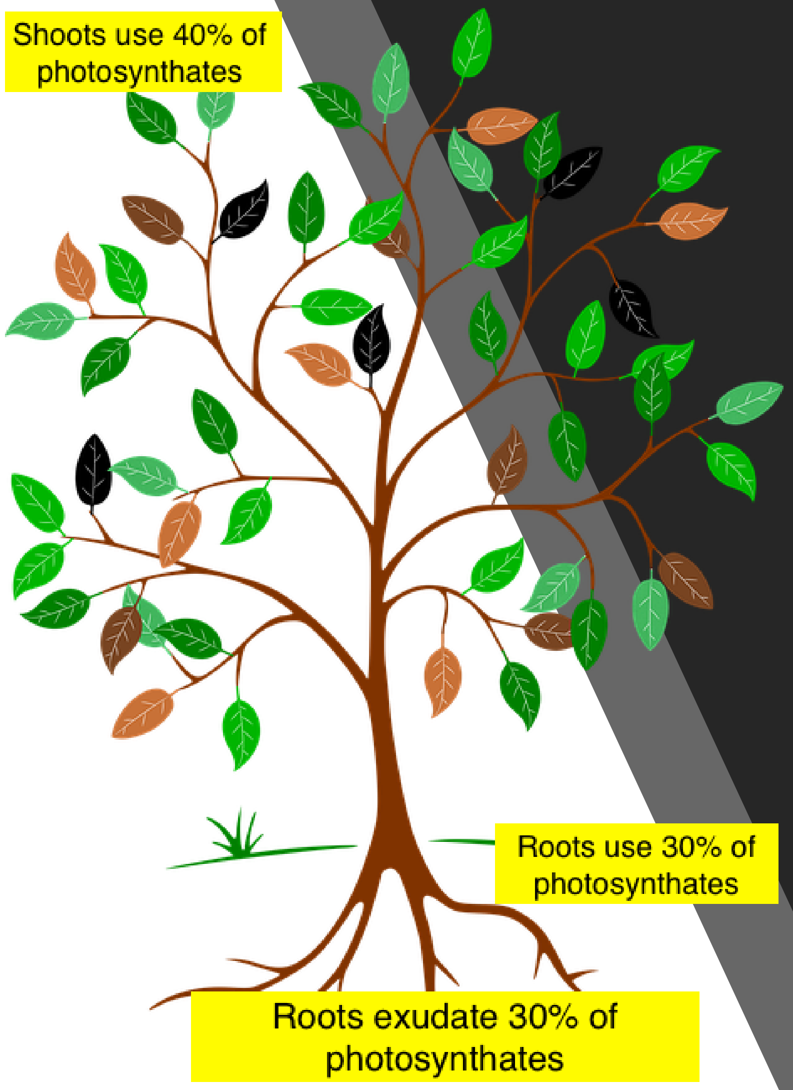
What is it?

As per the proponent of ZBNF, Padmasri Subahsh Palekar, the model involves intense intercropping, where the income from intercrops compensate all the cultivation costs; and the income from main crop is actual real income, as if that has come without investments.

It’s a package of technical innovations built on harnessing the high incomes potential from intensive multi-cropping, utilizing local inputs (desi seeds, animal dung and urine, certain tree products for pest management, etc.).

The principle is that once the biological component of soil is active, the physical properties (porosity, stable soil aggregates, infiltration, habitat for soil organisms) change that leads to improved chemical properties (nutrient supply)

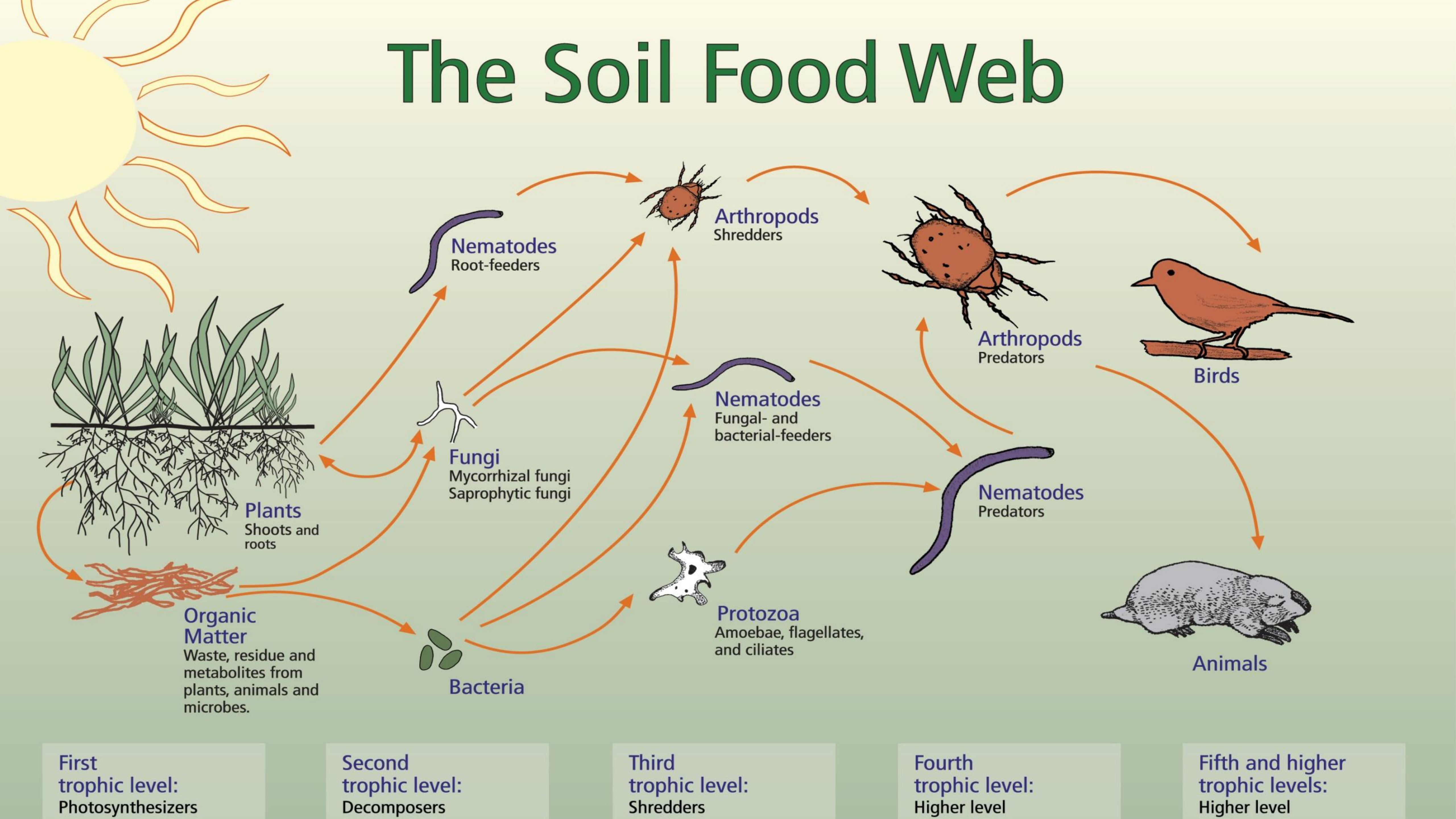
Living Roots are vital



Plant converts water and CO2 into sugars in the presence of sunlight

- Root exudates are pumped into soil by diverse and intense root activity
- Root exudates help soil microbiome to flourish and soil food web is triggered.
- Improved Soil biome brings changes in physical properties and chemical properties of soil.

Therefore this system does not require external nutrients or bulk manures to be transported and applied to soils


The Soil Food Web
Nematodes
Root-feeders
Arthropods
Shredders
Arthropods
Predators
Birds
Fungi
Mycorrhizal fungi
Saprophytic fungi
Nematodes
Fungal- and
bacterial-feeders
Nematodes
Predators
Plants
Shoots and
roots
Organic
Matter
Waste, residue and
metabolites from
plants, animals and
microbes.
Bacteria
Protozoa
Amoebae, flagellates,
and ciliates
Animals
First
trophic level:
Photosynthesizers
Second
trophic level:
Decomposers
Third
trophic level:
Shredders
Fourth
trophic level:
Higher level
Fifth and higher
trophic levels:
Higher level

- Animal dung – just as microbial inoculum, not essentially for nutrients
- Plant/tree based biomass (residues & root exudates) – in bulk as food for soil life
- Soil microbiology is a complicated area for study and is therefore undermined in present policies and practices
- Above ground diversity contributes to below ground diversity
- Increase in carbon in soil – efficient C sequestration
- Minimum/No-tillage is the goal
- **Benefits of biomass mulching, intercropping, cover cropping, conservation tillage, compost teas / liquid manures and biopesticides are well published worldwide**

Zero-Budget Natural Farming

Farming in harmony with nature. | 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

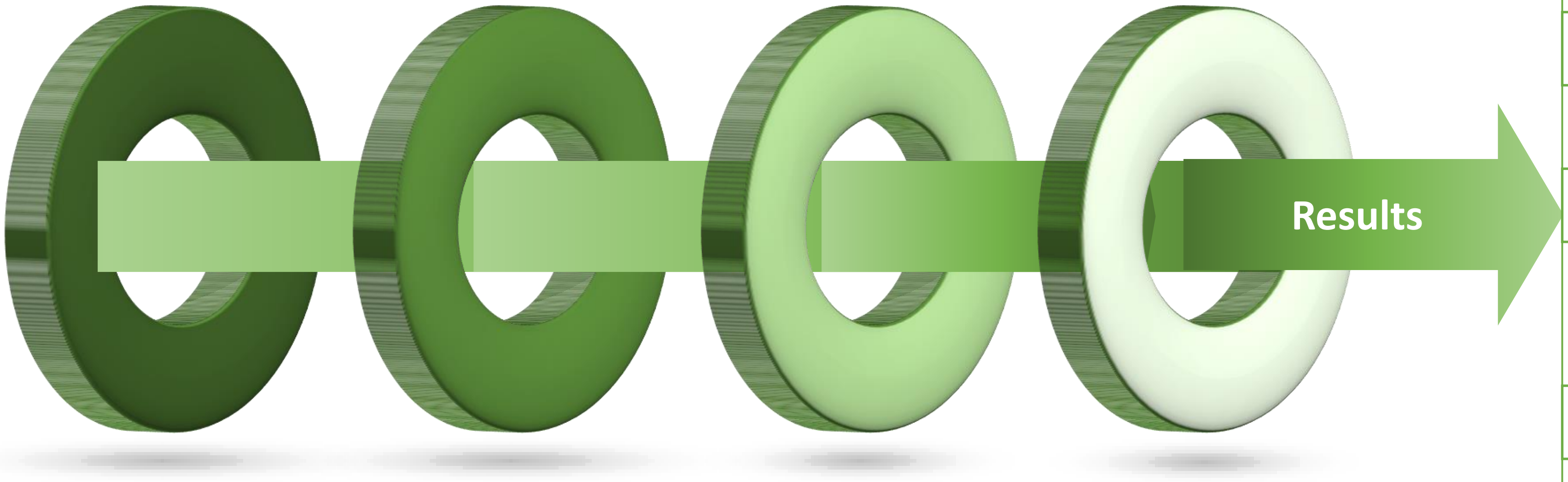
Environment

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

Safeguarding our collective *future*

Four Wheels of ZBNF

Beejamrutham | **Jeevamrutham** | **Achhadana** | **Waaphasa**



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**

- Higher Yields, diverse crops, Lower Costs
- Enhanced Soil Fertility, soil porosity, water infiltration
- Reduce water requirement for crops, harnessing atmospheric water
- Resilience to Climate Shocks
- Soil Carbon enhancement



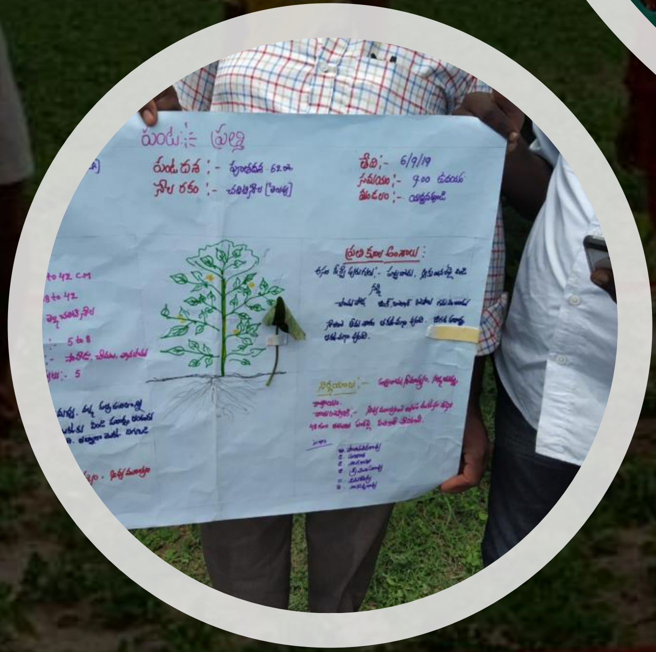


Farmer led extension system

- Setting right the broken extension system.
- Farmers (best practitioners residing in villages, called as Community Resource Persons) convincing others; and assisting the field agriculture functionaries as change agents. Last mile delivery.
- At present 930 Senior CRPs are working; 4000 Internal CRPs (ICRPs).
- Adoption of all practices under AESA based IPM and INM practices. They ensure adoption of all practices, Conduct crop-cut, trouble shooting, etc.

FAO supported Farmer Field Schools

- FAO as the knowledge partner
- Led by Natural Farming Fellows to train ICRPs and Lead Farmers
- 80 FFS launched in Kharif 2019
- 150 FFSs will be launched from Rabi 2019

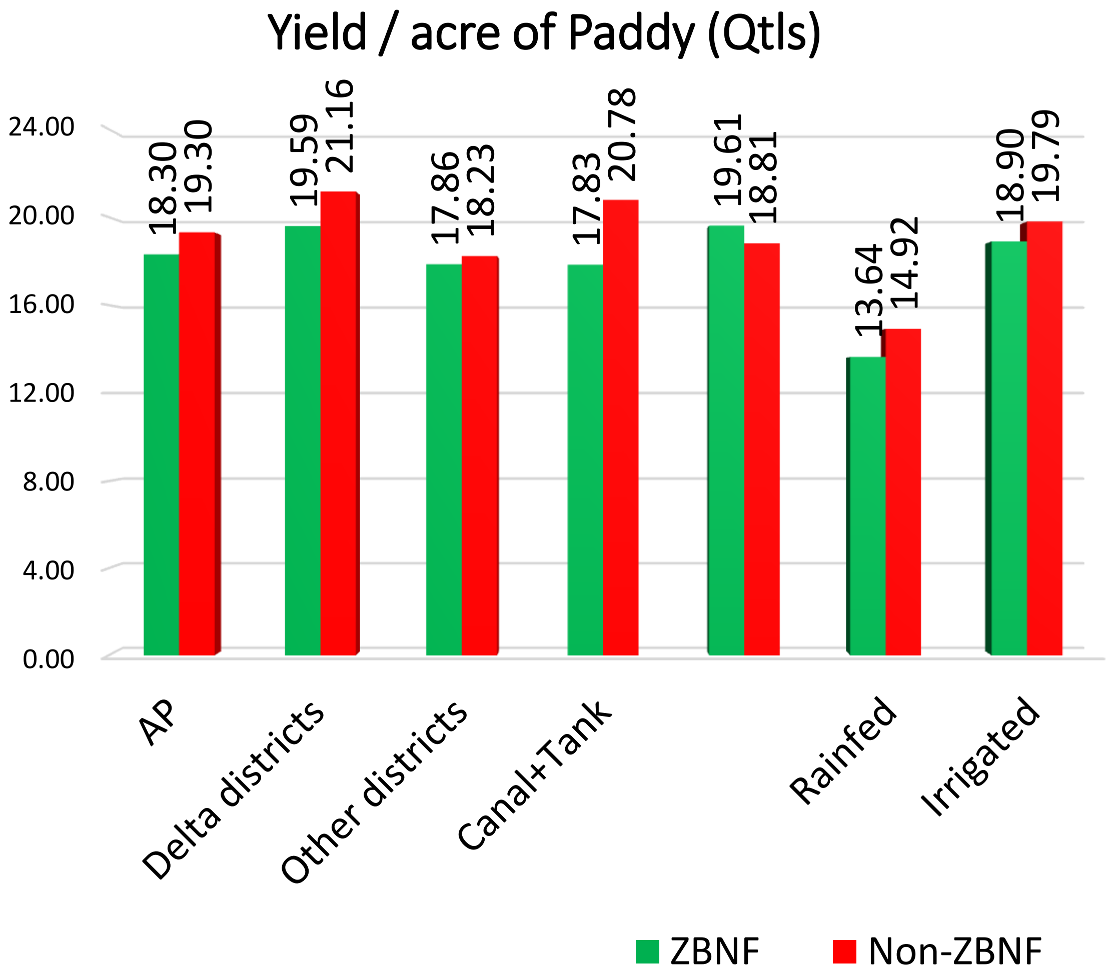


Agro Eco System Analysis based learning and decision-making

Crop-Cut Exercises

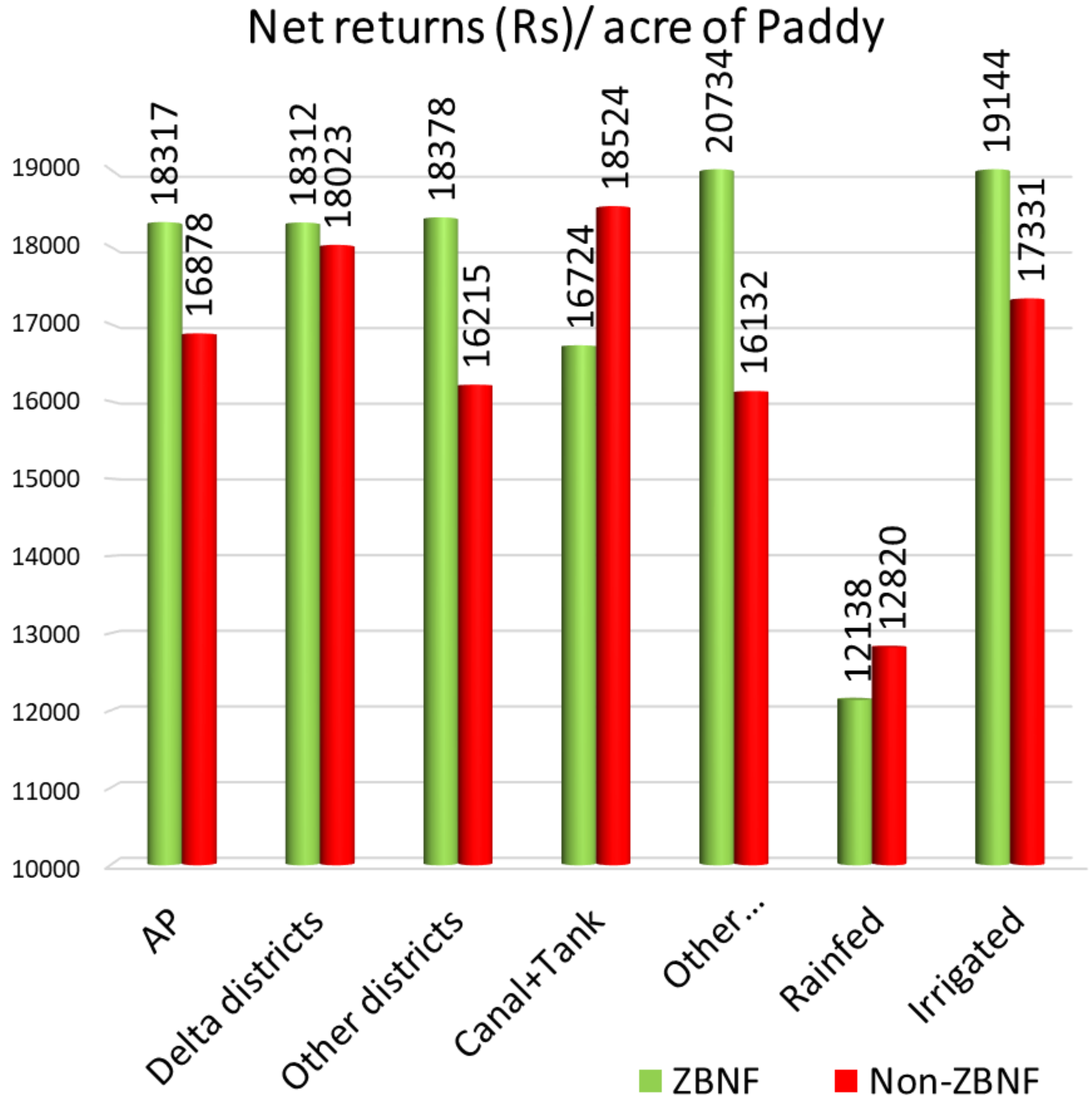
Carried out by Centre for Economics and Social Studies, an autonomous institution. Covering 1447 farmers' yields.

- Paddy - 1008 farmers (ZBNF 503 and Non-ZBNF 505)
- Maize – 35 farmers (ZBNF-17 and Non-ZBNF 18)
- Groundnut – 120 farmers (ZBNF 47 and Non-ZBNF 73)
- Cotton – 130 farmers (ZBNF 53 and Non-ZBNF 77)
- Chickpea – 27 farmers (ZBNF 15 and Non-ZBNF 12)
- Cashew – 57 farmers (ZBNF 37 and Non-ZBNF 20)
- Citrus – 55 farmers (ZBNF 26 and Non-ZBNF 29)
- Tomato – 15 farmers (ZBNF 9 and Non-ZBNF 6)

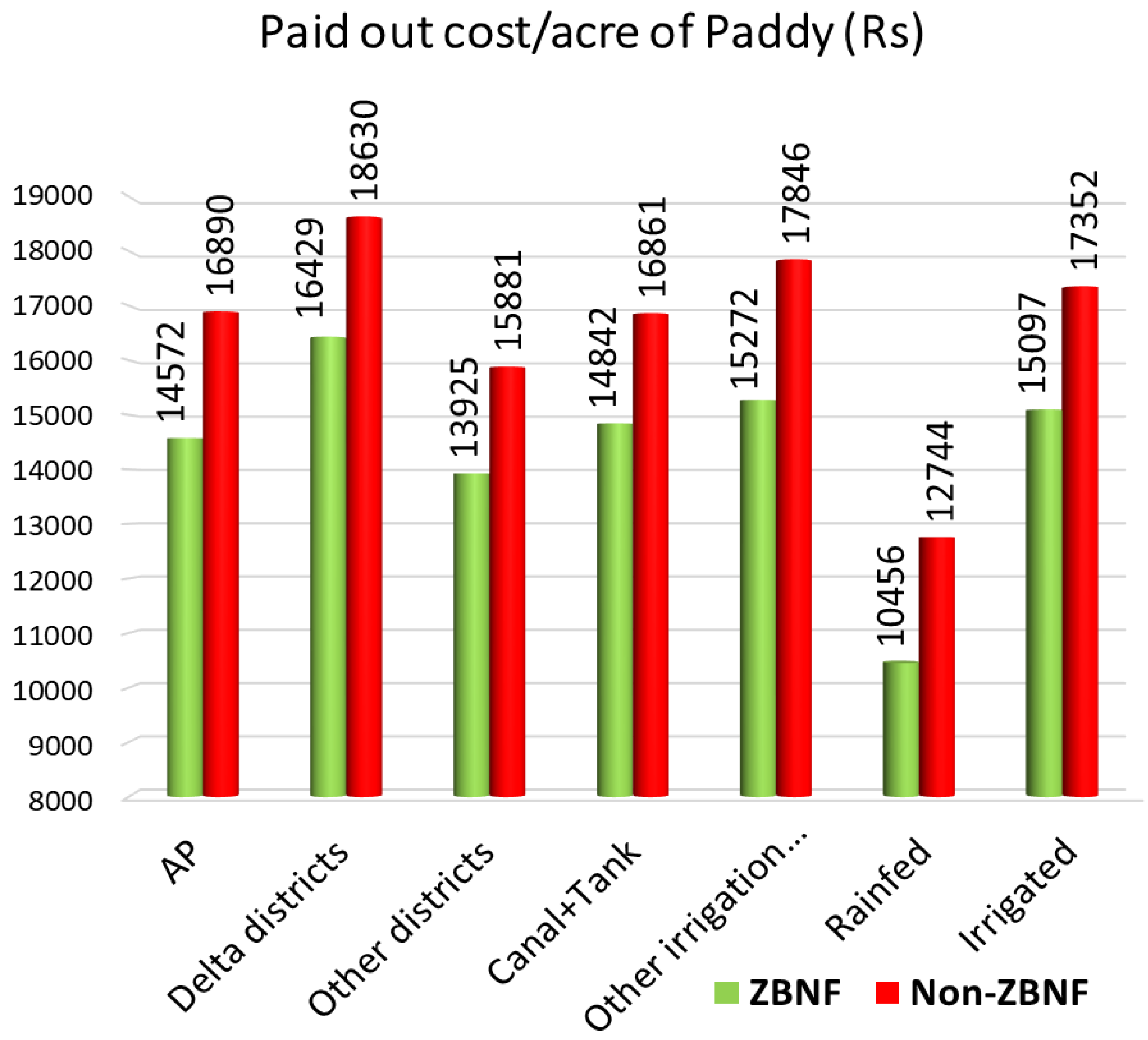


There is no significant difference in the yield of Paddy between ZBNF and non-ZBNF

There is no significant difference in yields between the reported yield by farmers and the yield arrived at through CCEs.

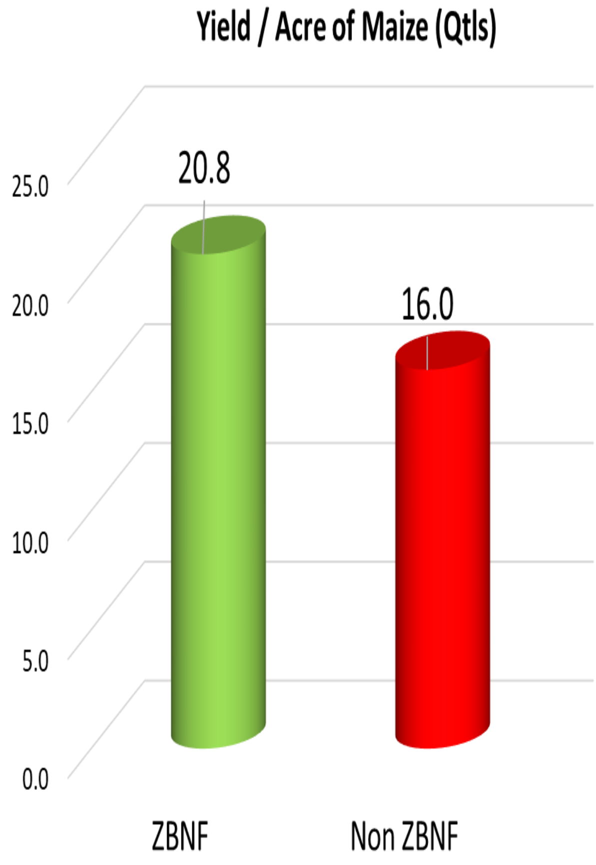


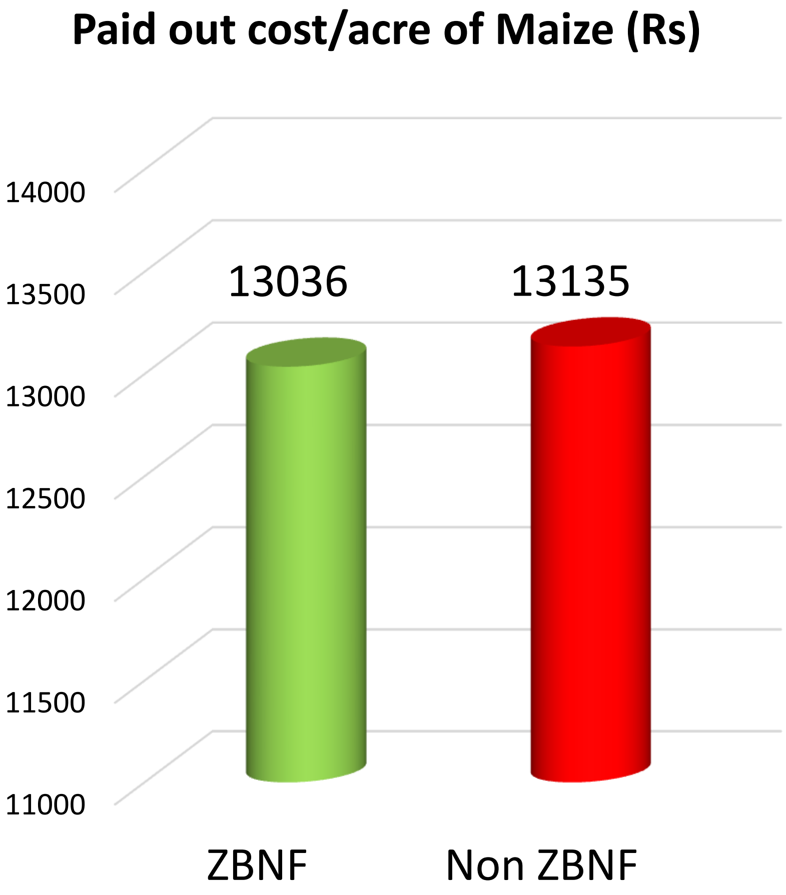
Farmers' incomes has been improved by 8 per cent and the higher improvements in the other sources of irrigation and in non-delta districts.

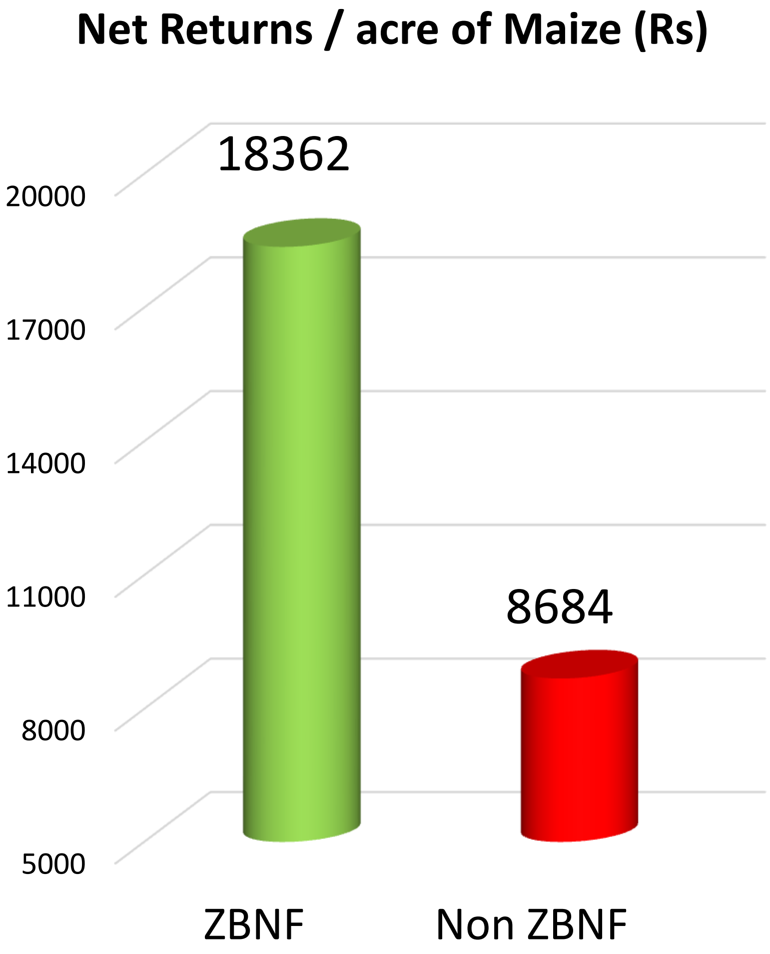


There is reduction of Rs.2318 in the paid-out cost due to the adoption of ZBNF leading to a decline by 14% in the cost of cultivation

The higher response of the yield to the biological inputs has reduced the cost per quintal of production of paddy

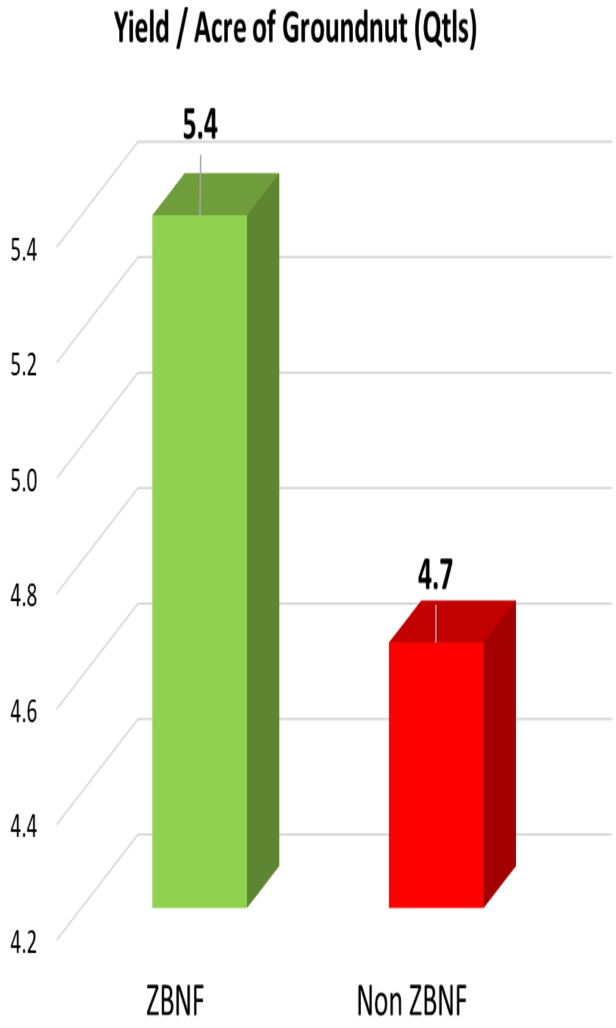


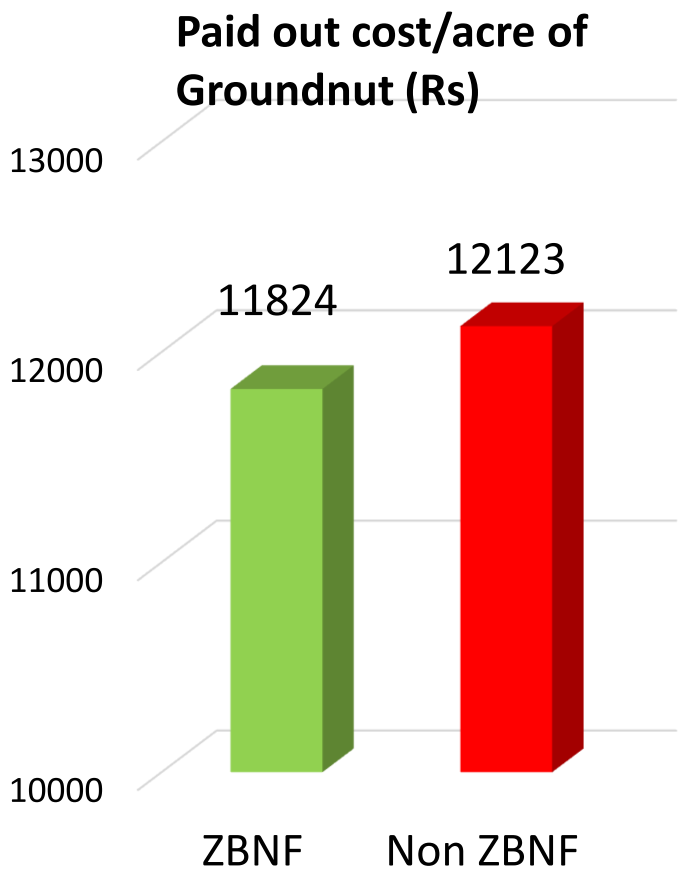


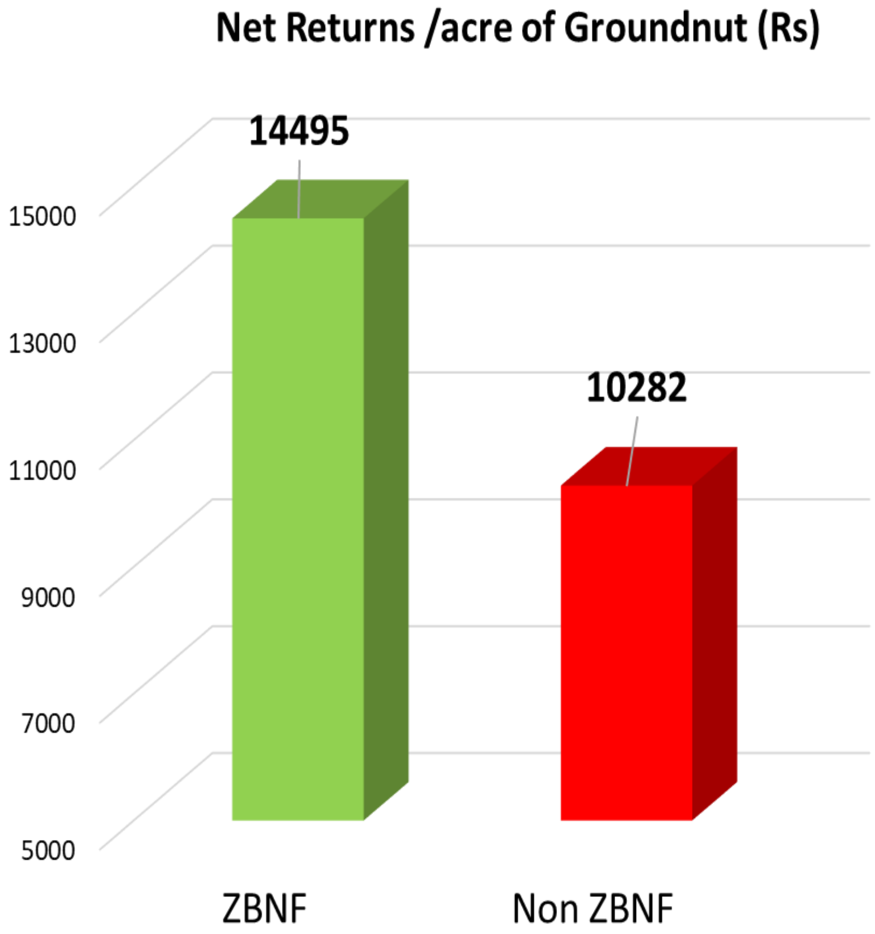


Yield of Maize under ZBNF is significantly higher than that under non-ZBNF.
This provides compelling evidence that the yield response to biological inputs is much higher than that of chemical inputs.

Highest increase in net income of farmers due to ZBNF is from Maize (111 percent)

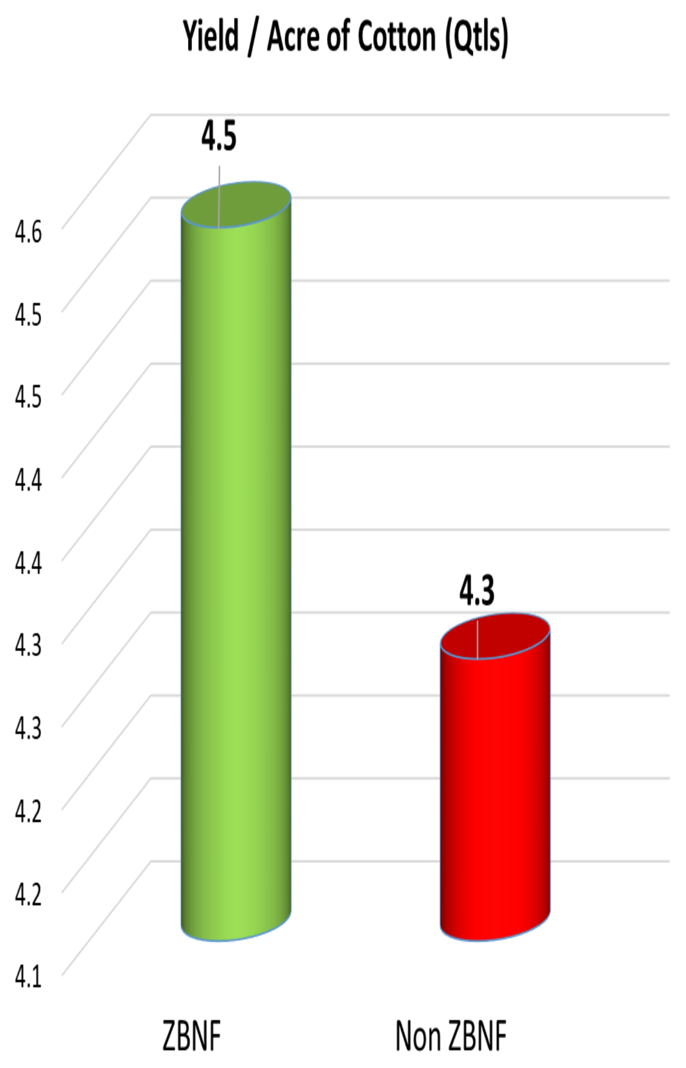


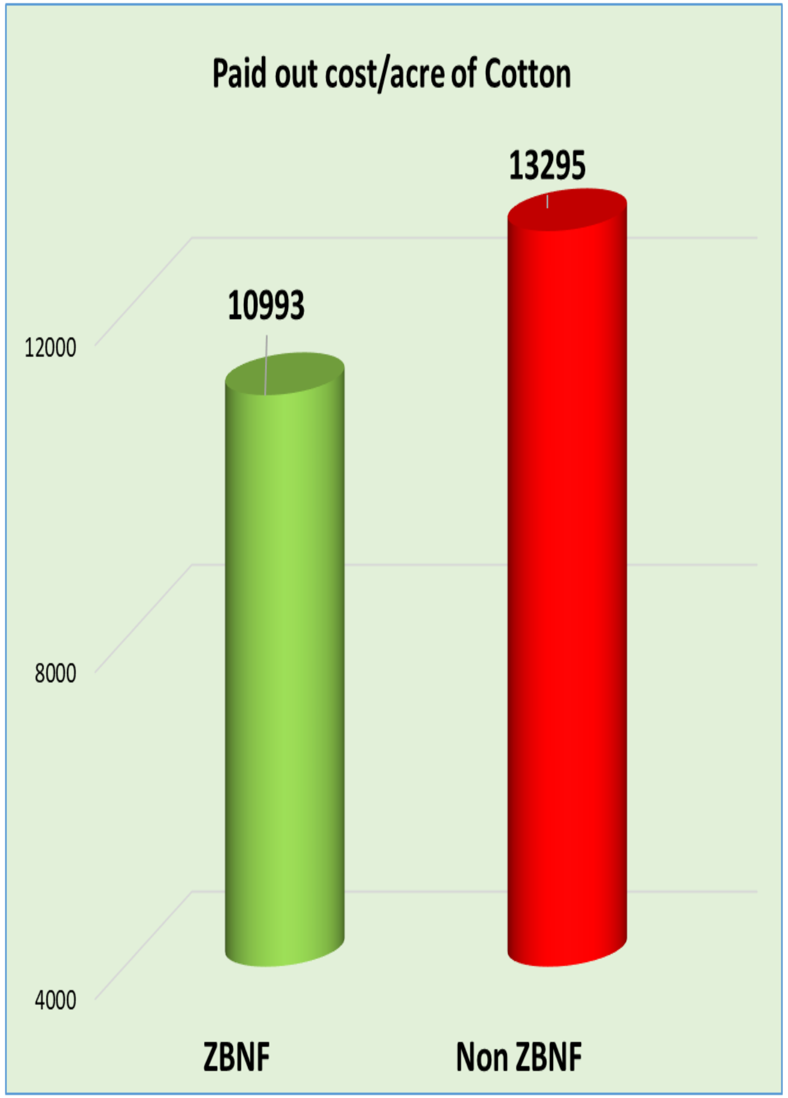


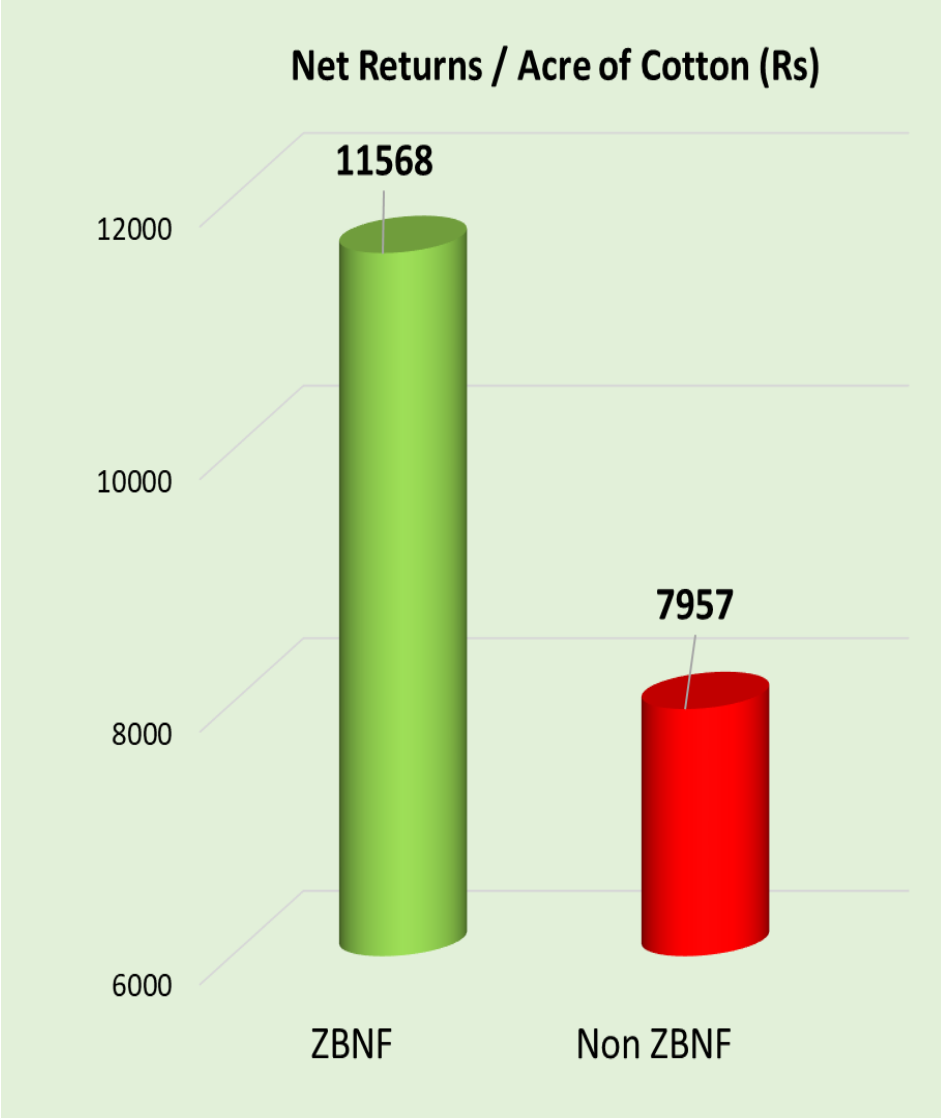


Yield of crop under ZBNF found to be on par and in fact marginally higher but insignificant

Net returns from ZBNF is higher by around Rs.4000 per acre recording an increase of 41% over non-ZBNF

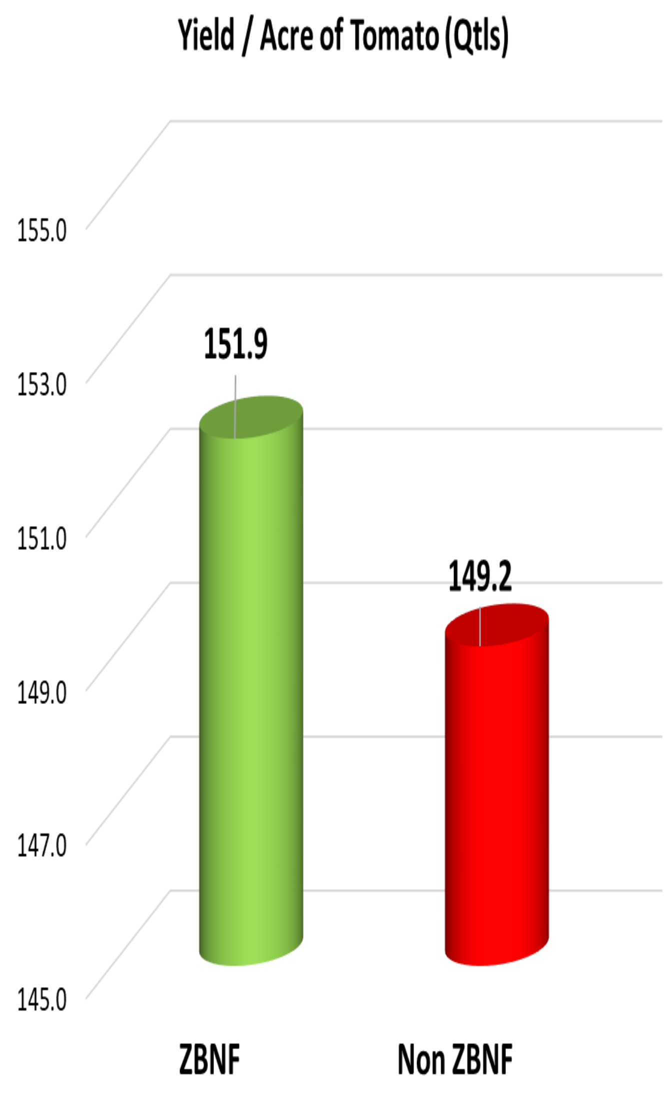


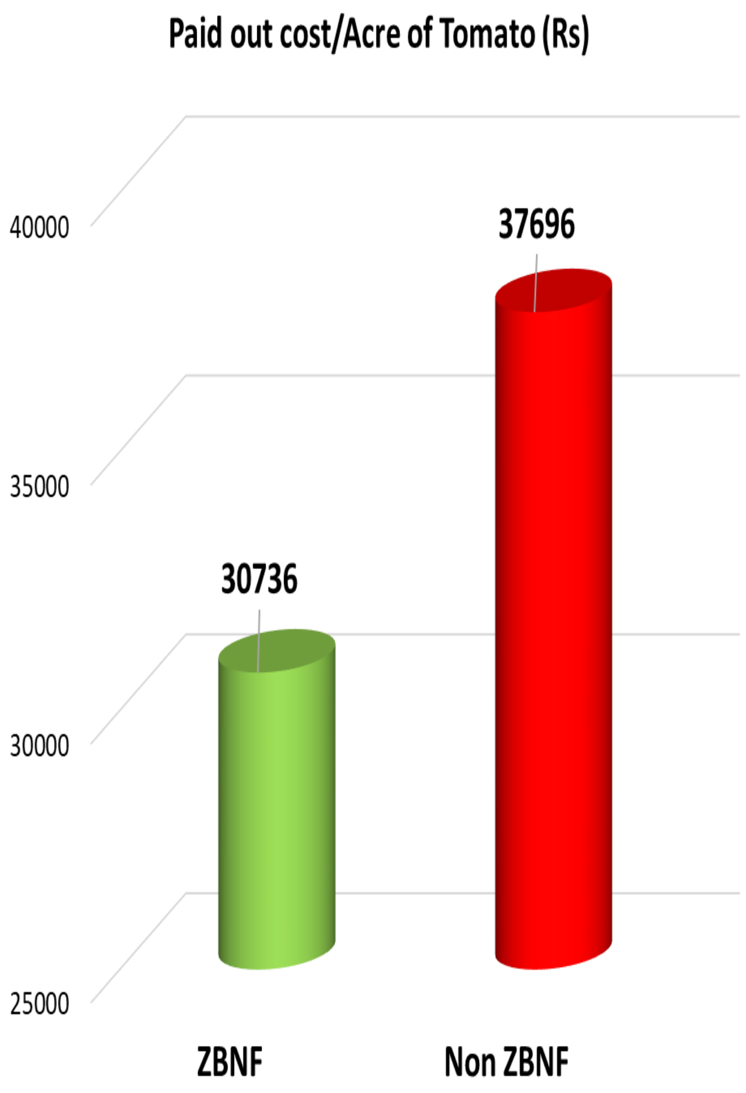


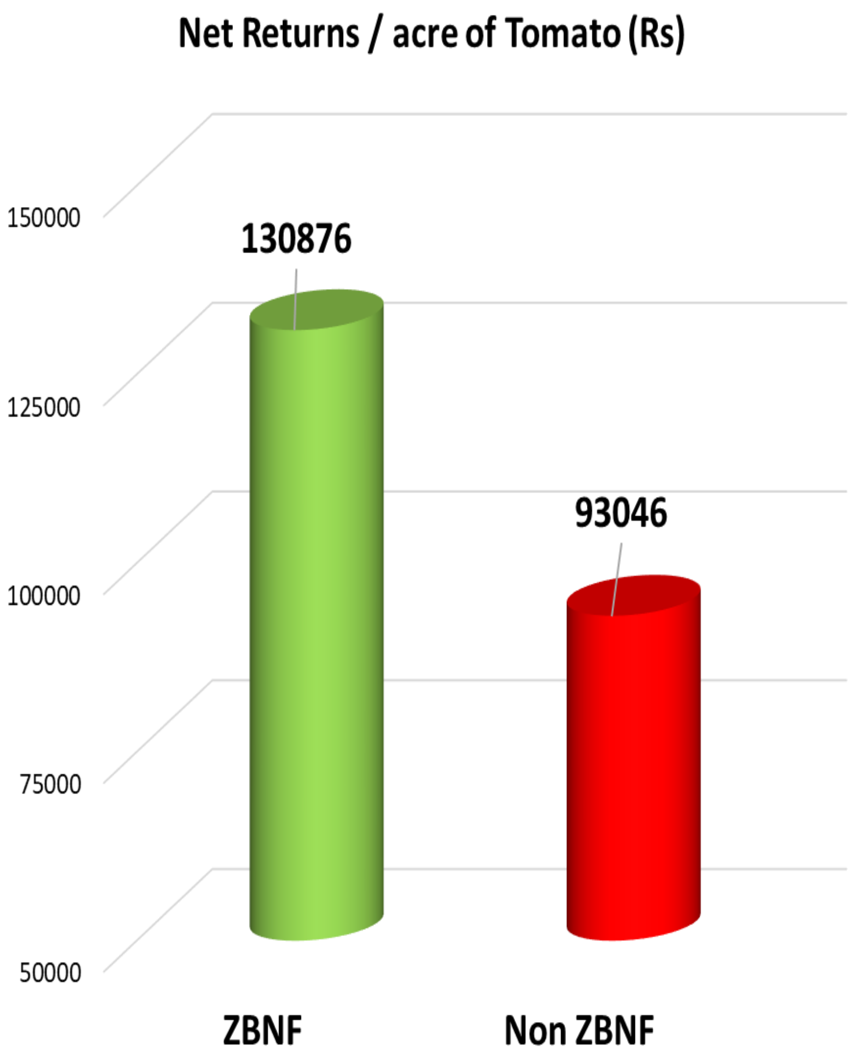


Insignificant difference between yields of ZBNF and non-ZBNF

ZBNF farmer benefited of Rs.3611 in the net income over non-ZBNF recording 45% increase over non-ZBNF







No significant difference in the yields between ZBNF and non-ZBNF

Increase in the net income of Tomato under ZBNf over non-ZBNF is around Rs.37830 per acre – an increase of 41%.

Impact of ZBNF on soil chemical properties

Analytical report of Haryana Agricultural University, KVK, Kurukshetra.

#	Particular	2017 June	2018 June	% variation
	OC and Macronutrients			
1	OC (%)	0.61	0.91	49.2
2	P (Kg/ha)	19	36	89.5
3	K (Kg/ha)	186	199	7.0
	Micronutrients			
1	Zn (ppm)	1.64	2.16	31.7
2	Fe (ppm)	19.21	24.48	27.4
3	Cu (ppm)	1.78	2.34	31.5
4	Mn (ppm)	5.7	12.18	113.7

#	Particular	2017 June	2018 Oct	% variation
	Micronutrients			
1	Zn (ppm)	1.42	2.2	54.9
2	Fe (ppm)	21.76	46.58	114.1
3	Cu (ppm)	1.84	2.67	45.1
4	Mn (ppm)	6.63	7.79	17.5

Best Cases in 2018

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

2 acres of land | Farming since 15 years | Chemical farming | Unviable | Adverse health | Left farming leased land

ZBNF changing lives

Mandal Maheswari
Sobhandhripuram village
Krishna District
Farmer &
Community Resource Person

- Community Resource Person encourage to take up ZBNF
- Took ZBNF paddy on 0.25 acres as experiment
- Phenomenal result achieved
- Encouraged by this, took back leased land to do ZBNF in all 2 acres

- Bought cow for input preparation
- Discuss ZBNF with her SHG member
- Grounded ZBNF kitchen garden
- Provides free ghanajeevamrutham and vegetable to villagers
- Phenomenal community presence, selected as community resource person

Non ZBNF Paddy	
Cost of cultivation per acre(Rs.)	20,500
Gross income per acre (Rs.)	47,250
Net income per acre (Rs.)	**26,750**

Disability is not inability

ZBNF Paddy	
Cost of cultivation per acre (Rs.)	13,200
Gross income per acre (Rs.)	61,425
Net income per acre (Rs.)	**48,225**

ZBNF Farms show resilience to extreme weather events

	ZBNF (n=24)	Non-ZBNF (n=24)
Submergence	0 cases	All suffered 25-50% due to submergence
Lodging	Only 1 case suffered 25-50% lodging	All 24 cases suffered 25-50% lodging
Wind damage	All cases upto 25%	All cases from 25-50%
Breakage of main stems	1 case suffered 25%	3 cases suffered between 25-75%
Expected yield drop	1 case expects 25% yield drop	All cases expect 25-50% yield drop
Farmers perception – crop resilience	All farmers perceived resilience as important factor for ZBNF crop	All farmers perceived their chemical plots have no resilience.

Pethai cyclone impact assessment 2018

Climate Change Resilience: Pethai Cyclone, Dec 2018

ZBNF

Banana

Non ZBNF

Banana

Paddy

ZBNF

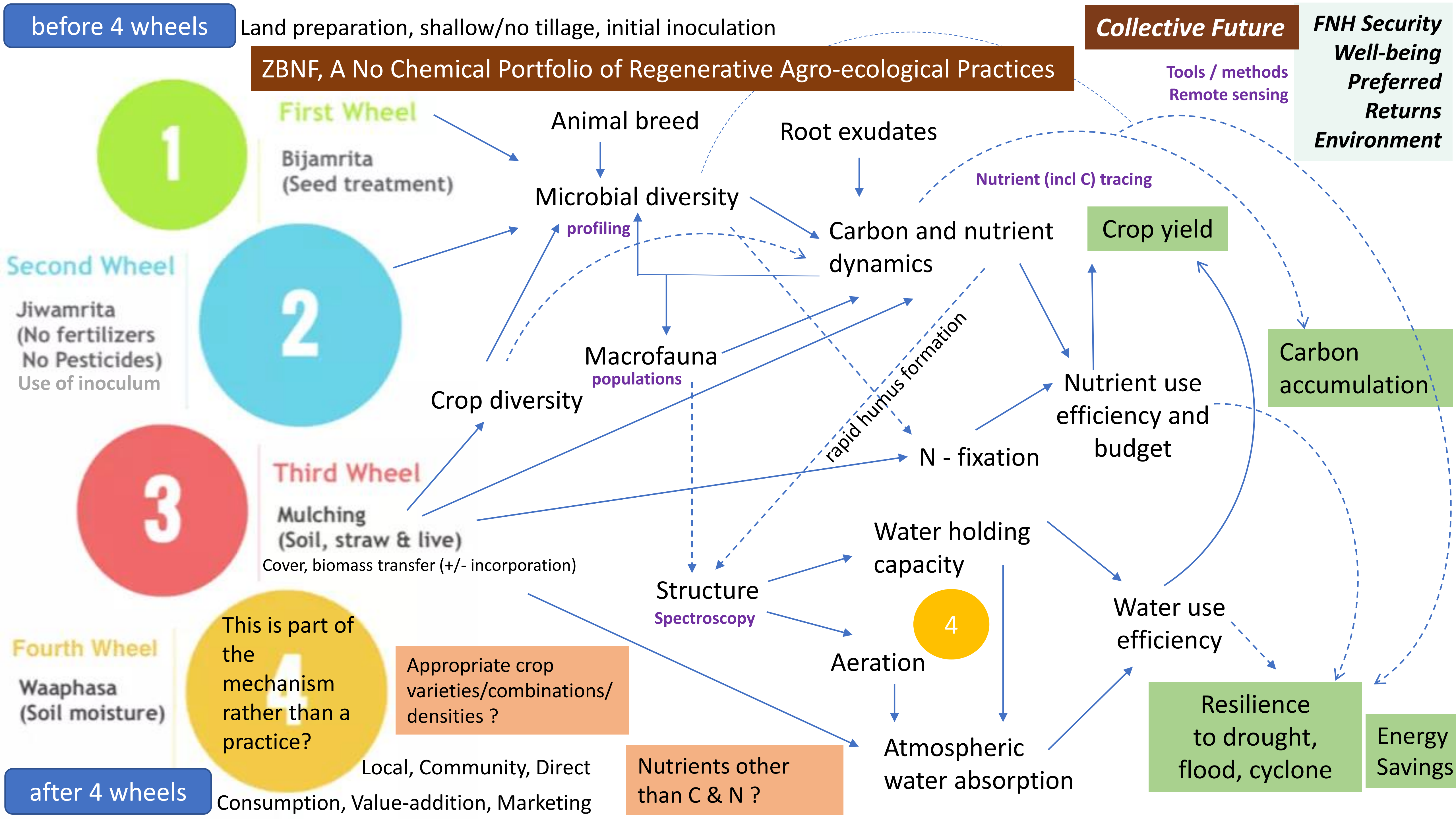
Chillies

Non ZBNF

Chillies

Evolution of research framework

- RySS has organized a workshop in collaboration with University of Reading (UK), World AgroForestry (Nairobi) on “Establishing the Scientific underpinning of ZBNF” involving experts from Indian Institute of Soil Science (Bhopal), Indian Institute of Science (Bangalore), IIT-Mumbai, EcoScience Research Foundation, APPI, CSA, etc.
- Various hypotheses on ZBNF based on the observations by practitioners were discussed.
- As the output, the research needs are identified and prioritized.



before 4 wheels
Land preparation, shallow/no tillage, initial inoculation
ZBNF, A No Chemical Portfolio of Regenerative Agro-ecological Practices
Collective Future
FNH Security
Well-being
Preferred
Returns
Environment
Tools / methods
Remote sensing
1
First Wheel
Bijamrita
(Seed treatment)
Animal breed
Root exudates
Microbial diversity
profiling
Nutrient (incl C) tracing
Carbon and nutrient dynamics
Crop yield
Second Wheel
Jiwamrita
(No fertilizers
No Pesticides)
Use of inoculum
2
Macrofauna
populations
Crop diversity
rapid humus formation
Carbon accumulation
Nutrient use efficiency and budget
N - fixation
3
Third Wheel
Mulching
(Soil, straw & live)
Cover, biomass transfer (+/- incorporation)
Water holding capacity
Structure
Spectroscopy
4
Aeration
Water use efficiency
Fourth Wheel
Waaphasa
(Soil moisture)
This is part of the mechanism rather than a practice?
Appropriate crop varieties/combinations/ densities ?
Resilience to drought, flood, cyclone
Energy Savings
Atmospheric water absorption
Nutrients other than C & N ?
Local, Community, Direct
Consumption, Value-addition, Marketing
after 4 wheels

The big five - key research topics

1. Nutrient budget and how ZBNF makes nutrients bioavailable to plants
2. Carbon budget and speed of humus (stable soil organic matter) formation and dynamics
3. How ZBNF practice (variable uptake and context) leads to change in yield (in relation to input cost), soil health, food quality, resistance to climatic stress (drought, flooding and cyclones)
4. The microbial diversity of innoculum (variable with animal type) and its impact on the soil microbiome
5. Impact of ZBNF on water harvesting, water holding capacity of soil and water use efficiency

Land Degradation Surveillance Framework – World AgroForestry, Nairobi

- 6 Sites for Survey
- Each site is 100 sq.km.
- A systematic field-based assessment of multiple variables at the same geo-referenced location
- Allows for rapid assessments of indicators of land and soil health
- Allows for the production of high quality maps of key indicators
- Robust statistical analysis on drivers of degradation
- Can be used to monitor changes over time

University of Reading, UK

Production systems comparison experiments

- 30 experiments with NFFs
- Comparing Conventional, Organic and ZBNF production systems in 6 districts of AP

ZBNF practices – exclusion experiments

- 5 experiments with Research Coordinators in 5 districts

Collaborations for establishing the science behind ZBNF

Name of the Research/study	Institution	Focus areas	Study Reach	Locations
Land Degradation Surveillance Framework (LDSF)	World Agro Forestry (ICRAF, Nairobi)	To generate a biophysical baseline at landscape level, and a monitoring and evaluation framework for assessing processes of land degradation and the effectiveness of rehabilitation measures (recovery) over time.	600 square kilometers	6 districts of Andhra Pradesh
Life Cycle Analysis (LCA) of ZBNF (in comparison with conventional) practices	World Agro Forestry (ICRAF, Nairobi)	To compare the GHGs emissions of ZBNF fields with Conventional fields	6 crops 702 pairs of farmers	13 districts of Andhra Pradesh
Agriculture production systems comparison	University of Reading (UK)	To compare the effect of Conventional, Organic and ZBNF production practices on the soil physical chemical and biological properties	25 experiments	5 districts of Andhra Pradesh
Factor contribution of ZBNF practices	University of Reading (UK)	To understand the contribution of various practices of ZBNF on crop growth	5 experiments	5 districts of Andhra Pradesh

Collaborations for establishing the science behind ZBNF

Name of the Research/study	Institution	Focus areas	Study Reach	Locations
365 Days Green Cover Experiments	RySS (Science Team)	To test the potentiality of ZBNF methods for sustaining 365 DGC; and to strengthen district level protocols	65 NFFs (5 per district)	All across AP
Foresight	CIRAD, (France) FAO-UN (India)	Scenarios for 2030/2050 with successful implementation of ZBNF	Historical data from 1970 onwards	AP
Earth worm study (All six Agro-climatic zones)	RySS	Comparing Earth worms population in ZBNF fields and Non-ZBNF fields	1022 Samples exploring 1022 sq.m.	Across AP
Pollinator Study	Indian Institute of Science and Education Research (IISER)	Pollinators awareness to the farming community	Chittoor	AP
365 Days- Green coverage	RySS (Science Team)	Evolve new and strengthen existing protocols for 365 days green coverage	65 experiments in all 13 districts	Across AP

Collaborations for establishing the science behind ZBNF

Name of the Research/study	Institution	Focus areas	Study Reach	Locations
Comprehensive survey for assessing the impact of ZBNF in AP	Centre for Economics and Social Studies (CESS)	To compare yields, costs, Net returns to ZBNF farmers with Non-ZBNF Farmers	Major crops	Covers all 13 districts
Performance Evaluation, impact assessment & Monitoring services for CR-ZBNF Programme	ICRAF	Impact assessment	Socio- economic & Technical evaluation	399 mandals of Phase-I
ZBNF for Sustainable Development Goals	Council on Energy, Environment and Water (CEEW)	Mapping the social, economic and environmental impacts of ZBNF programme vis-à-vis specific targets under each Sustainable Development Goal (SDG).	169 SDG targets across the programme	All 13 districts
ZBNF and its impacts on the saving of inputs and related issues	Council on Energy, Environment and Water (CEEW)	Estimate the usage quantity and value of chemical fertilizer and pesticide Consumption; Project estimated savings to Government in fertilizer subsidy as ZBNF scales up	Fertilizer subsidies, pesticides, savings to govt	State-level

UoR Research studies – parameters involved

#	PHYSICAL	CHEMICAL	BIOLOGICAL	PLANTS LEVEL
	Soil texture	Bioavailable nutrients using Plant Root Stimulators	Enzyme assays [(β-D-cellubiosidase (Cellulose degradation); leucine aminopeptidase (protein degradation): Phosphatase (Phosphorus mineralization) for enzymes involved in C, N (and C) and P mineralization, respectively)]	Measuring biometrics
	Soil Structure			Spectral analysis (MIR),
	Infiltration	spectral analysis (MIR XRF) – low throughput system in. 96 well auto sampler.		N, P, K, Zn, C, (other micronutrients)
	Bulk density			
	Soil temperature			
	Soil Moisture	Soil nutrients (N, P, K, Ca, Mg, S, Zn, Mn, Fe, Cu)		Crop biomass (harvestable, shoot and root)
	water holding capacity	Organic carbon		
		EC	DNA extraction for amplicon sequencing	
	Soil colour (munsell color chart values from app)	pH	Earthworm count	Visual evaluation of nodulation rates in legumes, mycorrhizal colonization

World AgroForesty – Research parameters

#	PHYSICAL	CHEMICAL	BIOLOGICAL	LANDSCAPE	GHG Emissions
	Soil texture	Bioavailable nutrients using Plant Root Stimulators	ENZYME ASSAYS	Tree density	Sources of carbon-di-oxide, Nitrous oxide and Methane
	Soil Structure			Shrub density	
	Infiltration	spectral analysis (MIR XRF) – low throughput system in. 96 well auto sampler.	β-D-cellubiosidase (Cellulose degradation)	Vegetation structure and distribution	
	Bulk density		leucine aminopeptidase (protein degradation)	Tree biodiversity	
	Soil temperature			Shrub biodiversity	
	Soil Moisture	Soil nutrients (N, P, K, Ca, Mg, S, Zn, Mn, Fe, Cu)	Phosphatase (Phosphorus mineralization) for enzymes involved in C, N (and C) and P mineralization, respectively)	Herbaceous cover type and density	
	water holding capacity	Organic carbon		Rangeland module	
	Root depth restriction	EC		Grass species richness and abundance	
		pH	DNA extraction for amplicon sequencing	Grass perennial to annual ratio	
	Soil colour (munsell color chart values from app)		Earthworm count	Distance measurements for perennial grasses	
				Soil Erosion	

INNOVATIONS

- **365-Days Green Cover**: The successful results of Premonsoon dry sowings across the state with ZBNF practices has assured that it is possible to grow crops even under moisture stress conditions. The results have demonstrated good monetary returns and longer ground cover with crops.
  - During this year, 23,693 farmers will be doing 365-DGC models in 6,318 acres across the state.
- **5-Layer models**: A multi-tiered intensive food crop model involving 20-30 different crops is being taken up by 300 farmers in 300 acres during 2019-20


The third wheel in action.

Covering the Ground, 365 days-a-year
Pre-monsoon Sowing and Dry Sowing

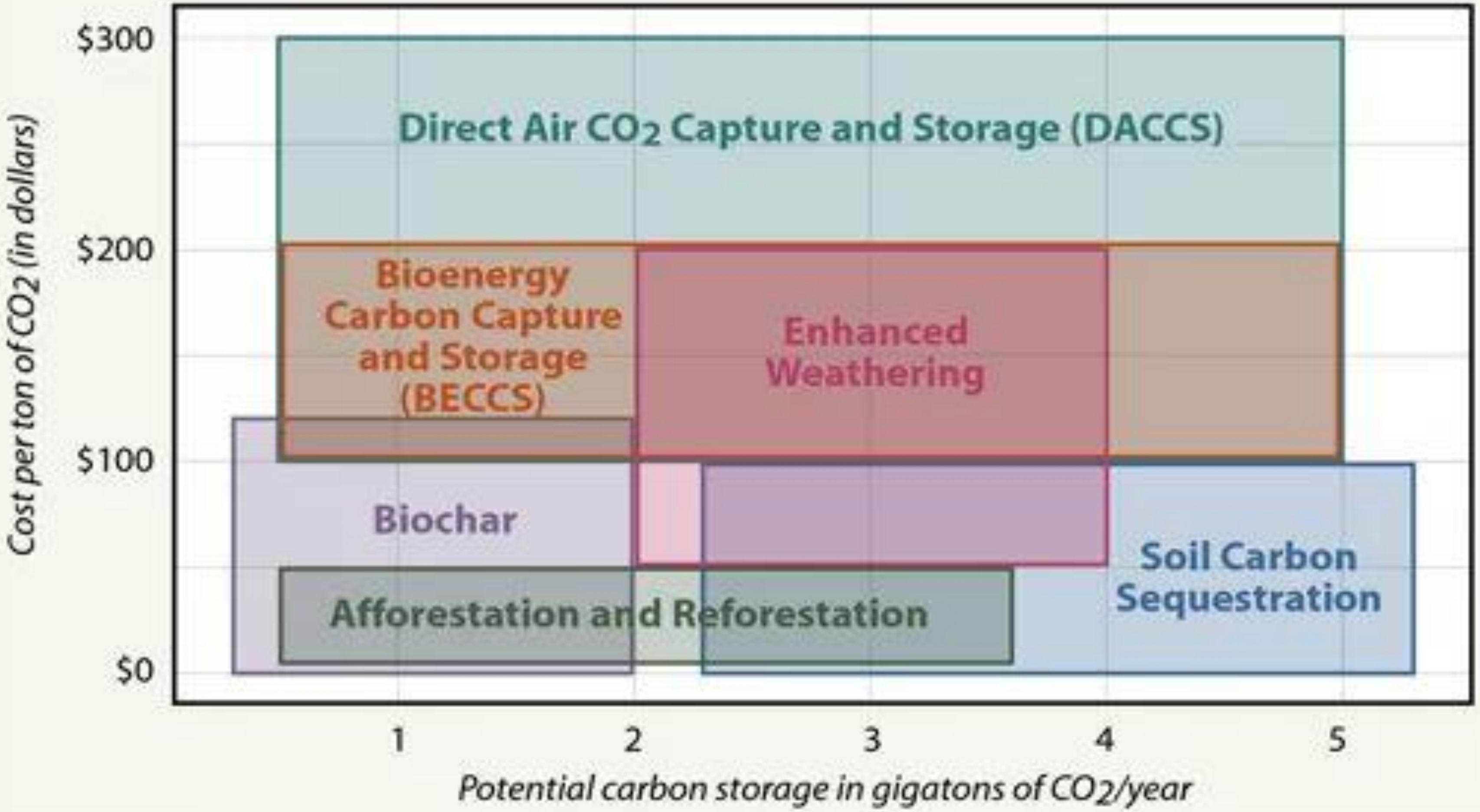
23,000 farmers enrolled for 365-Day farming in 13 districts

Intergovernmental Panel on Climate Change
(IPCC)

Z.B.N.F has a critical role in soil carbon sequestration, apart from its all other benefits

How Do Carbon Storage Techniques Stack Up?

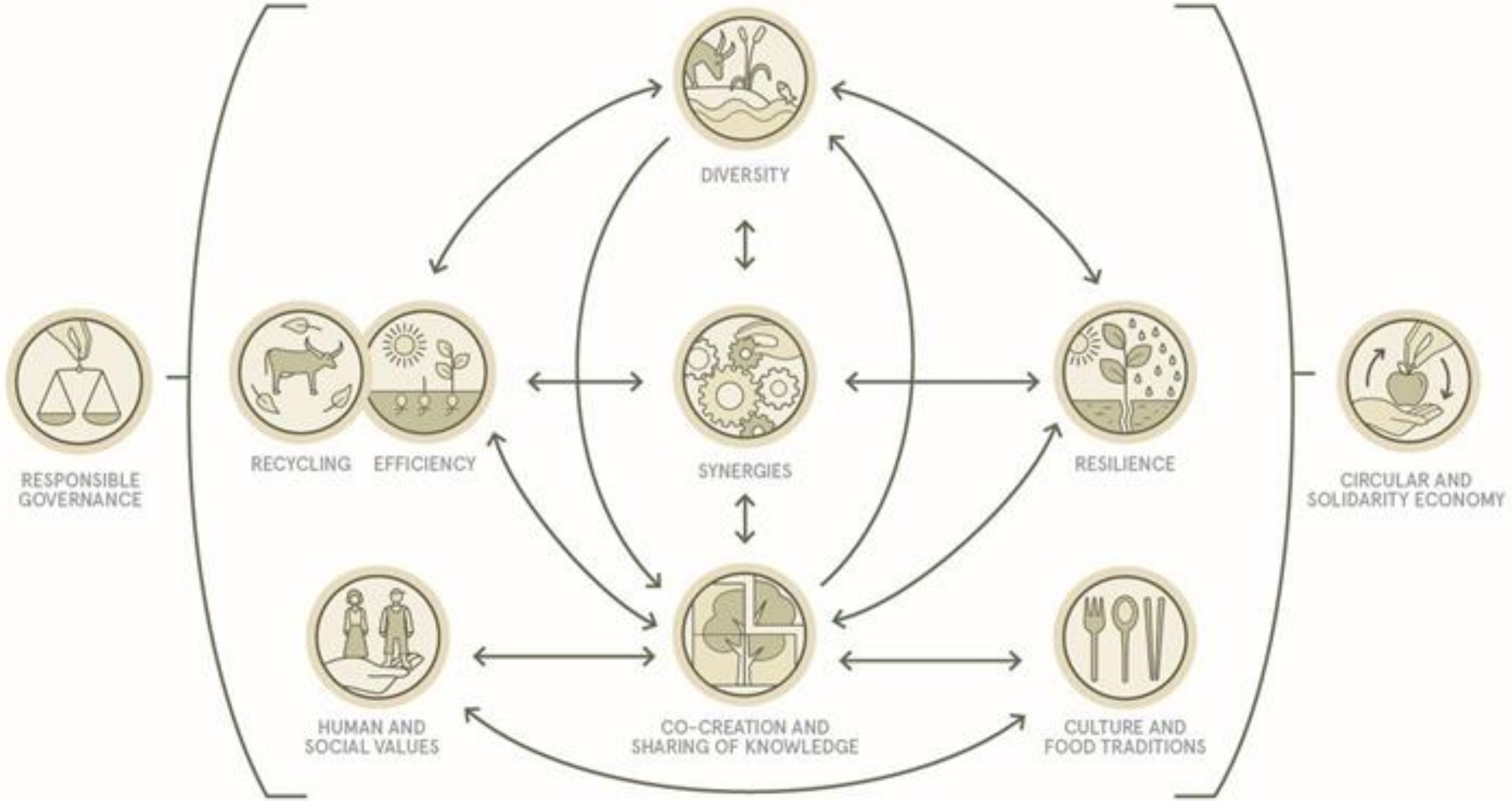
To meet the goals of the Paris climate agreement and keep global warming under 1.5 degrees Celsius, the world will have to increase the amount of carbon dioxide pulled from the atmosphere, the IPCC reports. It compared the costs and storage potential of six key methods of carbon dioxide removal. Soil carbon sequestration is one of the cheapest with the most potential.



SOURCE: IPCC

InsideClimate News

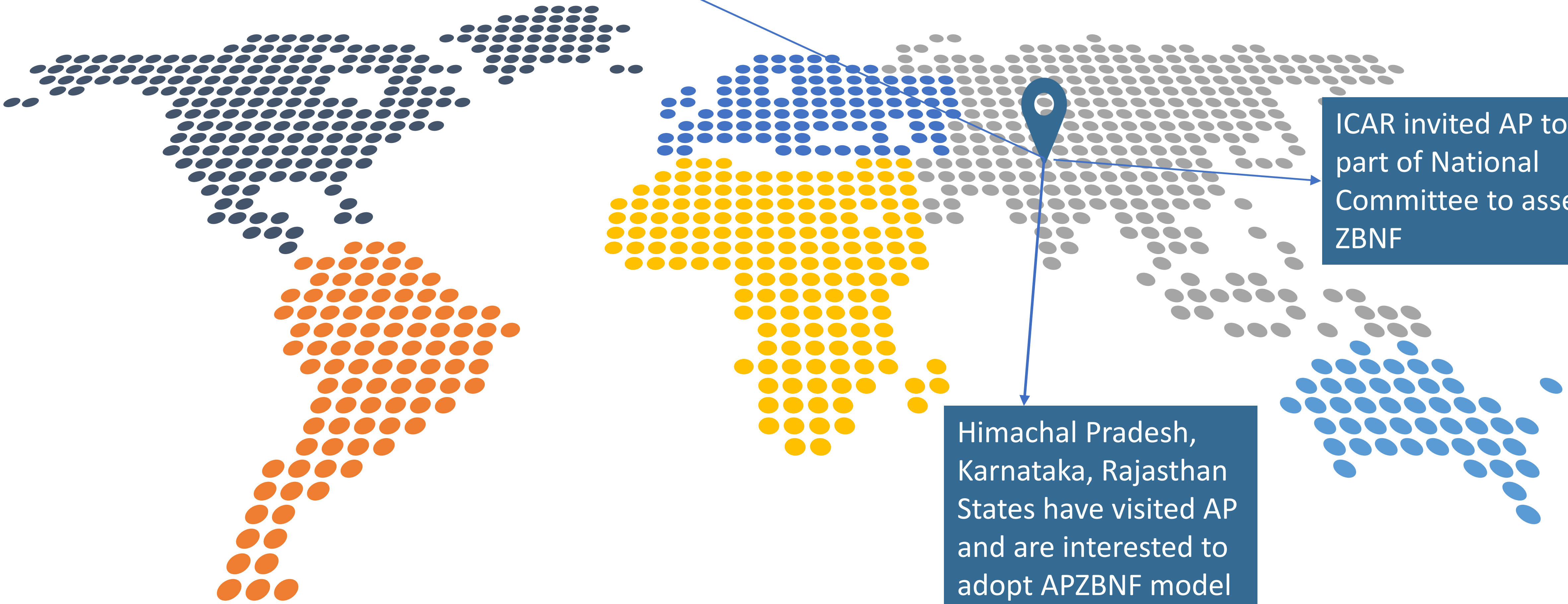
10 Elements of AgroEcology - FAO



Sustainable Development Goals addressed by APZBNF

National Recognitions for APZBNF

NITI Aayog, Govt of India has commended the Government of Andhra Pradesh's ZBNF strategy



ICAR invited AP to be part of National Committee to assess ZBNF

Himachal Pradesh, Karnataka, Rajasthan States have visited AP and are interested to adopt APZBNF model

Global Recognitions for APZBNF

UN General Assembly Event, ZBNF as case study was discussed as part of south-south collaboration, 24 Sep 2018

Paris Peace Forum: AP ZBNF is selected as top 10 projects that will receive scaling up support

Global Alliance for the Future of Food has selected AP ZBNF as one of the 21 ‘Beacons of Hope’

Indonesian Ministerial delegation visited AP to learn about ZBNF

World Future Council selected AP ZBNF as one of the top 30 most promising policies in agroecology

Thank You