

# Farm Innovations in Climate Resilient Agriculture



NICRA-TDC



ICAR - Central Research Institute for Dryland Agriculture  
Hyderabad  
Indian Council of Agricultural Research  
New Delhi

# **Farm Innovations**

## **in Climate Resilient Agriculture**

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## PREFACE

Climate change and climate variability are the major challenges for sustaining agricultural production in the country. There has been a significant rise in the frequency of extreme weather events in recent years affecting farm level productivity, threatening livelihoods particularly the small and marginal farmers in the vulnerable regions of the country. Farmers develop innovative solutions to face these challenges effectively drawing heavily from their experiences and the traditional wisdom. The drivers of the innovations are multifaceted in terms of economic, environmental, social and cultural factors wherein farmers may innovate out of necessity, adversity, opportunity and could be to improve the existing farming practices. The innovations can be a farmer developed variety, product, practice that have been integrated in to the agricultural production systems of the farmers and thus contributing effectively for improved production and returns.

Farm innovations emerged out of farmers' experience and wisdom are important for addressing climate variability and number of practices are in vogue and being adopted by the fellow farmers in various parts of the country. Documenting these innovations in proper form can help in their spread to effectively address the climate related issues. Accordingly an attempt has been made to compile these practices from various climatically vulnerable regions of the country. A systematic description and practical utility of these innovations helps other farmers get motivated to adopt these practices in similar farming situations and agroclimatic regions. Innovations observed in various facets of agriculture such as natural resource management, crop production, farm machinery, livestock production, livelihood innovations, etc., have been presented drawing from various regions of the country.

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**Disclaimer:** The views expressed by the farmers about the innovations are their personal opinion and not endorsed by the authors. The institutes and authors involved in this publication are not responsible and these innovations of farmers are only suggestive.



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## Acronyms

<b>AKRSP</b>	-	Aga Khan Rural Support Programme
<b>AR5</b>	-	Fifth Assessment Report
<b>ARS</b>	-	Agriculture Research Station
<b>ATARI</b>	-	Agricultural Technology Application Research Institute
<b>B:C</b>	-	Benefit Cost Ratio
<b>BAU</b>	-	Bihar Agricultural University
<b>BBF</b>	-	Broad Bed Furrow
<b>BDO</b>	-	Block Development Officer
<b>Bt</b>	-	<i>Bacillus thuringiensis</i>
<b>CGI sheet</b>	-	Corrugated Galvanized Iron Sheet
<b>CIAE</b>	-	Central Institute of Agricultural Engineering, Bhopal
<b>CMFRI</b>	-	Central Marine Fisheries Research Institute, Cochi
<b>Co-PI</b>	-	Co-Principal Investigator
<b>CPCRI</b>	-	Central Plantation Crops Research Institute, Kasargod
<b>CRIDA</b>	-	Central Research Institute for Dryland Agriculture, Hyderabad
<b>DAP</b>	-	Di Ammonium Phosphate
<b>Dist</b>	-	District
<b>BSKKV</b>	-	Dr. Babasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli
<b>DWDU</b>	-	District Watershed Development Unit
<b>EFY</b>	-	Elephant Foot Yam
<b>ft</b>	-	Feet
<b>FYM</b>	-	Farmyard Manure
<b>g</b>	-	gram
<b>ha</b>	-	Hectare
<b>HF</b>	-	Holstein Friesian
<b>Horti</b>	-	Horticulture
<b>HP</b>	-	Horse Power
<b>IARI</b>	-	Indian Agricultural Research Institute, New Delhi
<b>ICAR</b>	-	Indian Council of Agricultural Research, New Delhi
<b>IFFCO</b>	-	Indian Farmers Fertilizer Cooperative Company
<b>IFS</b>	-	Integrated Farming System
<b>IIHR</b>	-	Indian Institute of Horticulture Research, Bangalore
<b>INM</b>	-	Integrated Nutrient Management
<b>IPCC</b>	-	Intergovernmental Panel on Climate Change



<b>K</b>	-	Potassium
<b>LCD</b>	-	Liquid Crystal Diode
<b>kg</b>	-	kilogram
<b>KVK</b>	-	Krishi Vigyan Kendra
<b>N</b>	-	Nitrogen
<b>MA</b>	-	Master of Arts
<b>MB</b>	-	Mould Board Plough
<b>MIS</b>	-	Micro Irrigation System
<b>MOP</b>	-	Muriate of Potash
<b>MGNREGS</b>	-	Mahatma Gandhi National Rural Employment Guarantee Scheme
<b>MT</b>	-	Million Tonnes
<b>NADEP</b>	-	Compost methods
<b>NDRI</b>	-	National Dairy Research Institute, Karnal
<b>NHM</b>	-	National Horticulture Mission
<b>NICRA</b>	-	National Innovations in Climate Resilient Agriculture
<b>NPK</b>	-	Nitrogen, Phosphorous, Potash
<b>NRC</b>	-	National Research Council
<b>NRCM</b>	-	National Research Centre on Meat
<b>P</b>	-	Phosphorus
<b>PSB</b>	-	Phosphorus Solubilizing Bacteria
<b>Ph</b>	-	Phone
<b>P.O</b>	-	Post Office
<b>RAU</b>	-	Rajendra Agricultural University
<b>₹</b>	-	Rupees
<b>SMS</b>	-	Spent Mushroom Substrate
<b>SSP</b>	-	Single Super Phosphate
<b>Tal</b>	-	Taluk
<b>TDC</b>	-	Technology Demonstration Component of NICRA
<b>UBKV</b>	-	Uttar Banga Krishi Vishwavidyalaya
<b>UV</b>	-	Ultra Violet
<b>VCRMC</b>	-	Village Climate Risk Management Committee
<b>ZPD</b>	-	Zonal Project Director





## Contents

S.No.	Farm Innovations	P. No
	<b>Introduction</b>	01
<b>I.</b>	<b>Natural Resources Management</b>	05
1.1	Artificial Recharging for Enhancement of Ground Water	07
1.2	Cultivation of Watermelon with Polythene Mulch	08
1.3	Moisture Conservation through Mulching in Sugarcane	09
1.4	In-situ and Ex-situ Water Harvesting	10
1.5	Introduction of new Crop-Ginger with Drip Irrigation System	11
1.6	Mulching with Water Hyacinth in Potato	12
1.7	Sand Mulching for Soil Moisture Conservation	13
1.8	Diversified Crop Production from Harvested Rain Water	14
1.9	Sowing of Chickpea by Multi-Crop Ridger in Ridge and Furrow Method	15
1.10	Innovative Soil Health Management	16
1.11	Soil Enrichment in Pomegranate by using Bio-Organic Slurry	17
1.12	Plastic Cups for raising Vegetable Seedlings	18
1.13	Cultivation of Groundnut in Raised Bed Technique	19
1.14	Re-Use of Mushroom Bed for Vermicomposting	20
1.15	Community approach for Soil and Water Conservation	21
1.16	Integrated Farming System for variable Rainfall situations	22
1.17	Vermicomposting for minimizing the cost of chemical fertilizers	23
1.18	Adoption of Multi-Enterprises for Risk Minimization	24
1.19	Farm Pond based Integrated Farming System	25
1.20	Broad Bed Furrow Method of Sowing for Soybean	26
1.21	Bunding and leveling for Improving Productivity from Degraded Lands	27
1.22	Jalkund Stimulated Agripreneurship in Sikkim	28
1.23	Integrated Farming System with Organic Practices	29
<b>II.</b>	<b>Crop Production</b>	31
2.1	Maximum Land Utilization through Crop Diversification Practices	33
2.2	Cultivation of Elephant Foot Yam (EFY) for Enhanced Income	34
2.3	Floating Seedbed of Paddy in Frequently Flood Prone Region	35
2.4	Herb Artemisia: A Choice for Crop Diversification in Drought Prone Areas	36
2.5	Intensive Mixed Farming System	37
2.6	Mango+ Cashew Nut-based Farming System	38
2.7	Round the Year Flower Production for Income Stability	39
2.8	Radish as Intercrop in Bitter Gourd under Broad Bed System	40
2.9	Elephant Foot Yam (EFY) based Multilayer Vegetable Cropping System	41



2.10	Growing of Pigeon Pea in Wider Rows and Intercropping with Pumpkin	42
2.11	Improved Mustard/Rapeseed Cultivars with Apiculture	43
2.12	Judicious use of Interspaces of Mango by growing Mustard as a Leafy Vegetable	44
2.13	Use of "Noni" (Old Soil Dust) for better Wheat Yield in Moisture Stress condition	45
2.14	Sugarcane-based intercropping System	46
2.15	Pineapple based Intercropping Systems in North-Eastern Regions	47
2.16	Bt. Cotton based Intercropping System	48
2.17	Covering of Banana Bunches with non woven Polypropylene	49
2.18	Relay Cropping of Vegetable and Paddy-Melon	50
2.19	Non-Conventional Chilli Cultivation Practices	51
2.20	Gladiolus as Intercrop on Ridges in Sugarcane	52
2.21	Innovative and Sustainable Integrated Farming Systems at Hilly Region in Arunachal Pradesh	53
2.22	Panicle Harvesting System in Rice	54
2.23	Protective Cultivation in Poly House	55
2.24	Assured Income by Pomegranate Cultivation in Arid regions of Kutch	56
2.25	Introduction of Ashwagandh Crop for Profitability in Semi-Arid Zone	57
2.26	Agri-Horti: Integrated Farming and Protected Cultivation	58
2.27	Protected Cultivation of Capsicum in Snow Bound Temperate Region	59
2.28	Crop Diversification- Drumstick Cultivation	60
2.29	Protecting Vegetable Seedlings from Heat and Cold Stress	61
2.30	Improved Intensive-Mixed Farming System for Multiple Benefits	62
2.31	Introduction of Inter-Cropping Maize with Okra Fetches Additional Income	63
2.32	Innovative Apple Based Production System with Improved Practices	64
2.33	Cultivation of Hybrid Napier Grass for Feeding Productive Livestock	65
2.34	Mobile Sprinkler for Supplemental Irrigation in Small Onion	66
2.35	Stem Applicator for the Management of Sucking Pests in Cotton	67
<b>III.</b>	<b>Livestock, Poultry and Fishery Production</b>	69
3.1	Low Cost Pig Housing System	71
3.2	Improving Livelihood by Konkan Kanyal Goat Unit	72
3.3	Use of Chopped Raw Onion for the Control of External and Internal Parasites in Cattle	73
3.4	Innovative and Modified House for Rabbit Rearing	74
3.5	Low Cost Broiler Brooding System	75
3.6	Modified Poultry Cage	76
3.7	Fodder Management by Silage making	77
3.8	Diversification in Backyard Poultry	78
3.9	Eco-friendly Shelter House for small ruminants and Poultry	79
3.10	Low Cost Duck House	80
3.11	Modified Poultry Housing	81



3.12	Improving Fodder Production with Harvested Water in Drought Prone Regions	82
3.13	Fish Farming as Community Approach	83
<b>IV.</b>	<b>Farm Implements and Machinery</b>	85
4.1	Cycle Mounted Sprayer for Vegetable Crops in Open and Net House	87
4.2	Low Cost Bird Scaring Device	88
4.3	Indigenous Motor operated Paddy Thresher	89
4.4	Innovative Device to Plant the Seedlings at Exact Locations in SRI Method	90
4.5	Wooden Marker for SRI Techniques Using Local Materials	91
4.6	Modification of Rotavator for Efficient Operation	92
4.7	Power Tiller Attached Mobile Water Pump	93
4.8	Automatic Spray Pump for Fruit Orchards	94
4.9	Low Cost Turmeric Grinder	95
<b>V.</b>	<b>Livelihood Innovations</b>	97
5.1	Wild Lemon Grass as Insect Pest Repellent	99
5.2	Fermented Castor Solution Traps Pests of Sugarcane	100
5.3	Mushroom Cultivation over the Pond	101
5.4	Adoption of Drought Mitigation Technologies	102
5.5	Enhancing Income by Value Addition	103
5.6	Value Addition to Paddy Straw in a Productivity way	104
5.7	Cultivation of Vegetables under Ridge and Furrow Method in Flood Prone Regions	105
5.8	Improved Coating of Grain Storage Structure-Improved Duli	106
5.9	Sericulture-A boon for Dryland Farmers in Drought Prone Regions	107
5.10	Captive Rearing of Fish Seed	108
5.11	Water harvesting and Livelihood Diversification	109
5.12	Low Cost and Scientific Pisciculture	110
5.13	Green Fodder Production (Lucern) with Harvested Water	111
5.14	Livestock as an Enterprise for Sustaining Livelihood	112
5.15	Multiple Enterprises as a Drought Mitigation Strategy	113
5.16	Efficient use of Irrigation Water Improved Returns in Drought Prone Areas	114
5.17	Integrated Farming Systems Based on Harvested Rain Water in Arid Regions of Kutch	115
5.18	Adoption of Integrated Farming Systems to Reduce the Impact of Drought	116
5.19	Flower Cultivation as an Enterprise in Drought Prone Regions	117
5.20	Integrated Farming Systems for Minimizing Risk and Enhancing Productivity	118
	Annexure-I	119









# Introduction

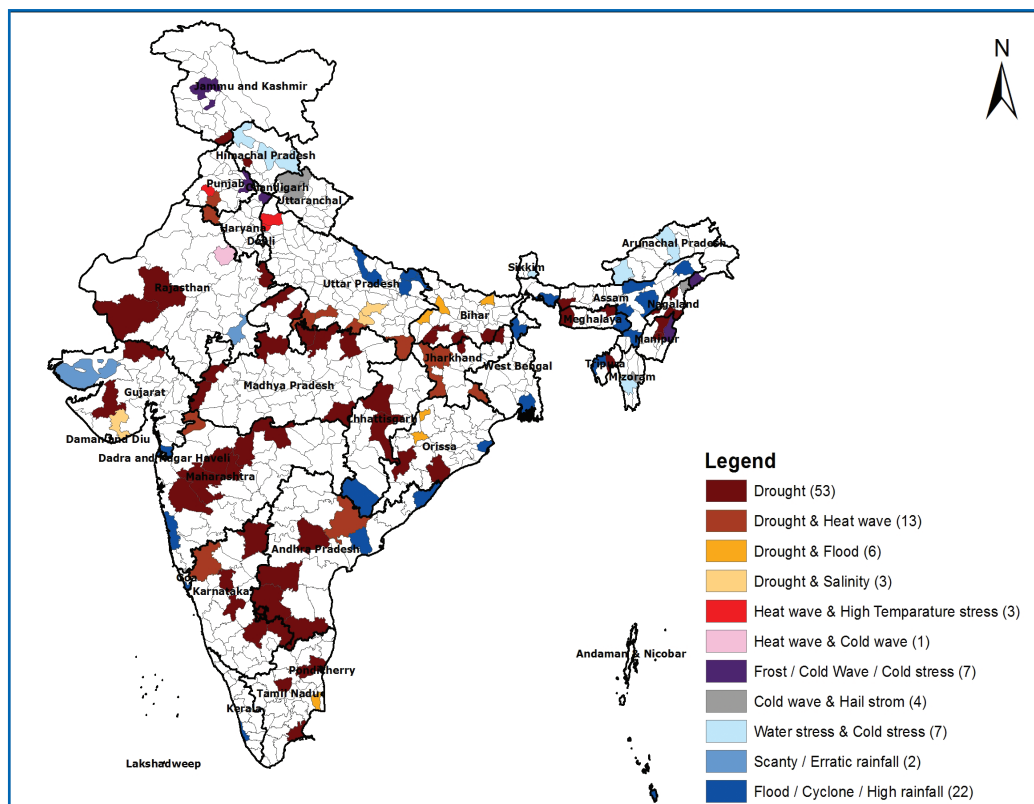




There are enough evidences to indicate that the warming of the climate system is happening. The atmosphere and oceans have warmed, the amounts of snow and ice have diminished, sea level has risen, the globally averaged combined land and ocean surface temperature has increased and concentrations of greenhouse gases have increased (IPCC, 2013). Climate change impacts on agriculture are being witnessed throughout the world, but countries like India are more vulnerable in view of large population dependent on agriculture, excessive pressure on natural resources and poor coping mechanisms. Significant negative impacts on crop yields are projected in several crops due to climate change and variability in the medium term (2010-2039), which will have serious impacts on the economy in view of the widespread dependence of the population on agriculture and related activities. Addressing climate variability is important in order to minimize the adverse impacts and to impart resilience to agricultural production systems and livelihood security of farmers.

The Indian Council of Agricultural Research (ICAR) launched the National Initiative on Climate Resilient Agriculture (NICRA) Project during February, 2011 in the XI Plan period with an aim to enhance resilience of Indian agriculture. The technology demonstration component (TDC) is an important part of NICRA which aims at enhancing the adaptive capacity of farmers in the climatically most vulnerable districts of the country by way of demonstration of location specific resilient technologies.

As part of the technology demonstration component, 121 climatically vulnerable districts were identified based on a scientific analysis of climate related problems, farmers' experiences and perceptions following a bottom-up approach. The districts selected and their climate vulnerability is depicted in Figure 1. One village or a cluster of villages from each of the 121 vulnerable districts was selected for technology demonstration. The complete list of vulnerable districts in each state is furnished in Annexure-I. The demonstration of technologies is being done by the respective Krishi Vigyan Kendra (KVK) in the district through farmer participatory approach. Planning, coordination and monitoring of the program at the national level is the responsibility of CRIDA. Eight Zonal Project Directorates (ZPDs), now ATARIs are involved in coordinating the project and KVKs in their respective zones.



**Fig 1. Map of 121 NICRA-KVK districts along with the climate vulnerabilities**



The technology demonstration component addresses climatic vulnerabilities such as droughts, floods, cyclone, heat wave, high temperature stress, cold wave, frost and the like. To address the climate vulnerability of the selected village, technology interventions are planned and implemented under four modules ensuring that these are appropriate to the local context in the village/district. Prioritization of interventions is based on extent of exposure to climate vulnerability of the different farming situations prevalent in the village and takes into account building resilience of different categories of farmers and communities. Creation of village institutions is one of the important components of the project to promote adoption of climate resilient practices and technologies by farmers so as to enhance their adaptive capacity and coping ability to climate risks.

Apart from the technologies developed by the National Agricultural Research System across the country and being demonstrated in the identified NICRA villages as part of the project, several innovative practices are being developed by farmers in these districts for minimizing the impacts of climate variability on agricultural production. An innovation can be an idea, practice or product that is perceived as new by an individual or others in a given system at a location. Using of something known in new ways or applying something altogether new to successfully produce desired social and economic outcome is an innovation. Irrespective of time period the idea or practice was originally developed, when a person first becomes aware of it, is an innovation to that person. The technologies/practices that are developed through national agricultural research systems are also innovations when they are taken up for the first time.

Innovations developed by some of the farmers and rural youth are based on the local resources and contribute significantly towards stabilizing production under variable climates. These practices are being validated and adopted over the years by the communities and have also been accepted by the fellow farmers. Such innovative technologies and methodologies are largely confined to some of the locations in the country. There is a need to make these innovations widely known so that the benefits accrued from such innovative ideas can be realized by other farmers with similar farming situations and agro ecological situations. Keeping in view of these things, the compilation of innovations and their detailed documentation is being done to make other farmers become aware of these innovations and to elicit interest in them. The innovations are presented in the following format.

### **Climate Resilient Farm Innovations**

In the publication, 100 climatic resilient farm innovations are presented component wise, viz., related to natural resources management, crop production systems, farm implements and machinery, livestock and fishery management and livelihood innovations. Each innovation is described containing the following information.

#### **Innovation details**

Comprises problem statement of the area, details of the innovation, and its contribution for addressing the vulnerability of the area in which particular NICRA technology demonstration center is located.

#### **Impacts of Innovation**

Information about how farmers got benefited, how many other farmers adopted the innovation, expansion to other farmers in the village or adjoining villages.

#### **Economics of Innovation**

The performance in terms of yield advantage, resource use efficiency, monetary benefits like B:C ratio and investment recovery of the innovation are presented.

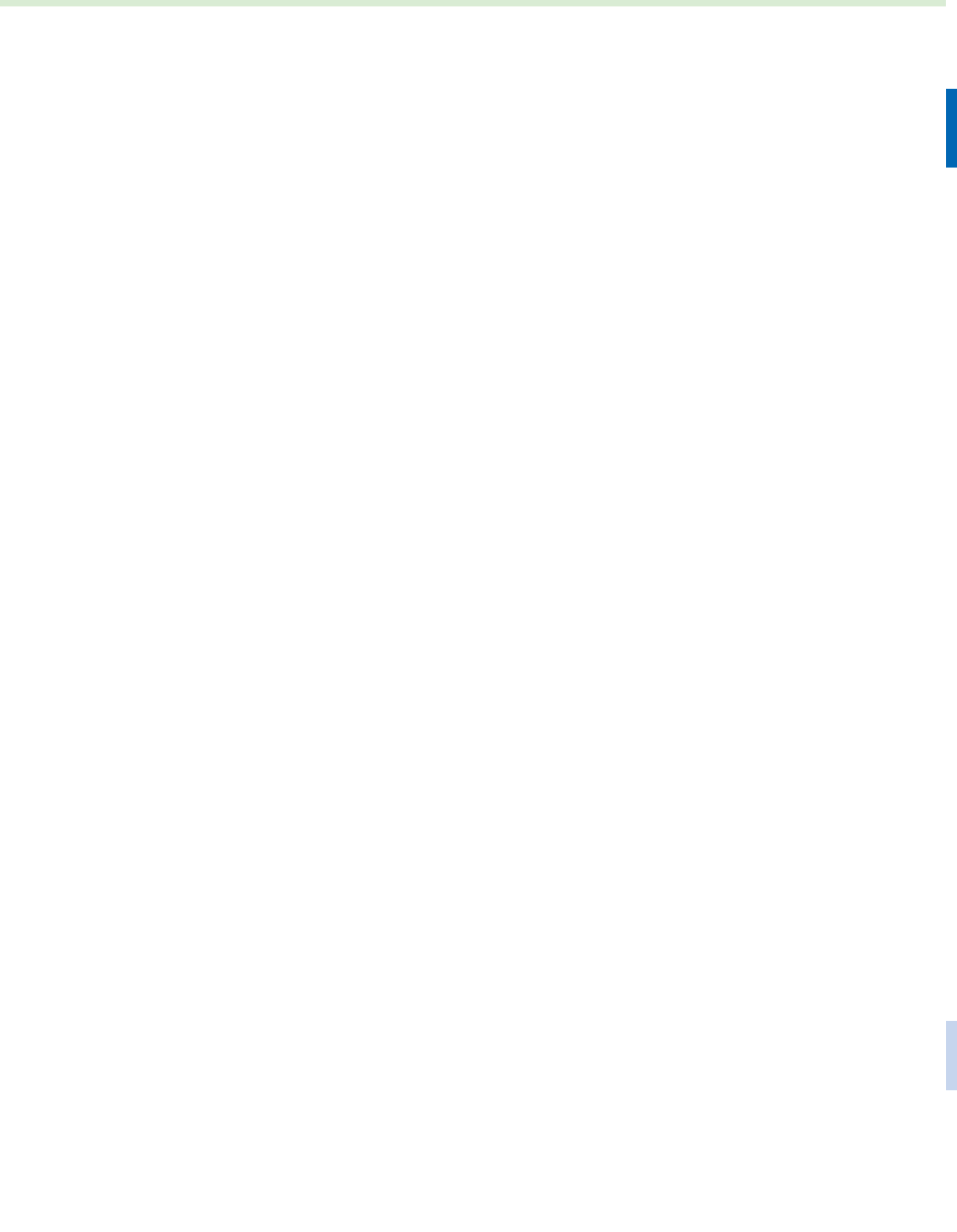






# Natural Resource Management





## Innovation : Artificial Recharging for Enhancement of Ground Water

Focus area : Soil and Water Conservation

There are many innovations in natural resource management being taken up by farmers which are subsequently adopted by other farmers in the village. Shri NM Mahesh is one such farmer from Durgada Nagenahalli, Koratagere taluk of Tumakuru District. He has developed an innovative method of recharging bore wells. Due to the renovation of check dams, his open well got additional seepage water. During peak monsoon season, the excess water overflows over and above the well. He has innovatively diverted the excess water from open well into his defunct bore well through a pipe line. The pipe connected the open and the bore well and the excess water got diverted into the bore well. About 25 bore wells have thus got recharged and became functional. This has helped nearby farmers to bring about 8 ha area under irrigation which was not irrigated earlier.



Name : Shri NM Mahesh

Age : 37 years

Phone : 9741048653

Education : Diploma

Address : D. Nagenahalli, Anupnahalli (Post),  
Kolala (Hobli), Koratagere (Taluk),  
Tumakuru-572140, Karnataka.

Land holdings : Rainfed: 5 ha ; Irrigated: 2 ha

Livestock : 3 cows

Farming experience : 12 years

Social appreciation/  
Recognition/Awards : Best Farmer Award - 2016  
from ICAR

### Impacts

Diversion of over flowing water in to the defunct bore well during the peak monsoon recharged the bore wells and increased the water table. The recharged bore wells are now being used for providing irrigation during critical stages of crop growth and significant area has been brought under irrigation during the *rabi* season. Farmers are now growing vegetables and flower crops during *rabi* and earning higher income which otherwise was monocropped. Presently, there are about 50 farmers who are following the same method for recharging groundwater.

### Economics

Shri NM Mahesh has utilized the recharged ground water for two crop seasons during *kharif* and *rabi*. He has not only intensified cropping system but also diversified. Overall, there was 26% increase in yield due to increased availability of ground water. He incurred a total expenditure of ₹ 14000/- per structure, which translated to a return of ₹ 6.0 for every additional rupee spent.



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## Innovation : Cultivation of Watermelon with Polythene Mulch

Focus area : Soil and Water Conservation

Watermelon is one of the cash crops that give good profit in a short period. However, due to incidence of insect pests and scarcity of water after the month of December, watermelon yields get adversely affected. Hence, innovative cultivation of watermelon with polythene mulch was undertaken.

Shri Palsule Desai prepared his field by using tractor and made ridges and furrows and later added FYM and SSP. Drip method of irrigation system was used and rows were covered by polythene mulch. He had sown seeds of improved variety of watermelon (Augusta and Namdhari-750) on ridges at 2 m interval with 50 cm spacing between plant to plant. About 1200 g of seed was sown in one hectare area.

### Impacts

Drip irrigation system and plastic mulching is beneficial during *rabi* season when there is scarcity of water. Moisture conserved under mulch reduces the water stress during crop growth period even in high rainfall region of Ratnagiri and contributes to crop yield improvement. The incidence of insect and pests were very low due to mulch. Shri Desai's neighboring farmers also adopted his innovative method of growing watermelon using polythene mulch on ridges and improved their income. The rainfed areas hold vast yield potential which could be harnessed by adopting innovative polythene mulching and the quality of produce was also found to be better. There are about 100 farmers practicing this kind of mulching in his village.

### Economics

Shri Palsule Desai got a harvest of 35 t/ha of fruits. Use of mulch for *in-situ* moisture conservation also recorded higher fruit yield. He has increased his income significantly as compared to the cultivation of watermelon traditionally by direct sowing on ridges and planting in zigzag manner. Shri Palsule Desai also got an additional net return of ₹ 39,900/- with cultivation of watermelon using polythene as mulch than the traditional method.



Name : Shri Atul Anant Palsule Desai

Age : 31 years

Phone : 09860341719

Education : 10<sup>th</sup> standard

Address : Whel, Lanja (Block),  
Ratnagiri (Dist.), Maharashtra.

Land holdings : Rainfed: 1.5 ha;  
Irrigated: 1.5 ha

Livestock : 4 buffaloes and 4 calves

Farming experience : 10 years

Social appreciation : Progressive farmer



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## Innovation: Moisture Conservation through Mulching in Sugarcane

Focus area : Soil and Water Conservation

Farmers burn the residue of sugarcane crop after harvesting of sugarcane. This is a concern in view of air pollution and also the green house gas emissions due to burning of crop residues. Shri Ranjit Singh is a sugarcane grower and he used to harvest the sugarcane crop and retain the crop residue as mulch instead of burning. He has noticed that during the month of April to mid-June temperature reaches 46 °C, mulching reduced the frequency of irrigations (6 -7 nos.). Mulching of sugarcane field after harvesting of crop reduced the quantum of water applied and conserved the moisture and reduced the infestation of weeds.

### Impacts

This was found beneficial for *in-situ* moisture conservation as well. Major area of the village is under sugarcane cultivation and the sugarcane residues are subjected to burning. After initiation of Sri Ranjit Singh, farmers convinced and returning crop residue after harvesting of sugarcane crop. About 72% of the farmers stopped burning of the crop residues and practicing mulching. After adopting the mulching technique, the number of irrigations reduced. About 200 farmers have adopted Shri Ranjit Singh's innovative method of mulching in sugarcane crop. The sugarcane trash mulching helped in improving soil health which can be realized with increased number of earthworms in soil. This innovation can be adopted without hampering the ratoon sugarcane cultivation.

### Economics

With mulching Shri Ranjit Singh has recorded higher yield of 71 t/ha as compared to without mulching (63.5 t/ha) of sugarcane residues, an additional yield of 7.5 t/ha. There was an additional net return of ₹ 26,250/ha under mulching than without mulching in sugarcane crop.



Name : Shri Ranjit Singh

Age : 43 years

Phone : 09125079922

Education : BA, LLB

Address : Smilepur, Begumganj (Post),  
Belsar (Block),  
Gonda-271402 (District),  
Uttar Pradesh.

Land holdings : Irrigated: 6.2 ha

Livestock : 8 cows & 3 buffalos

Farming experience : 20 Years



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## Innovation : In-situ and Ex-situ Water Harvesting

Focus area : Soil and Water Conservation

Shri Lakhan Singh Yadav adopted the rain water harvesting practice in farm pond, poly bag check dam, and renovated check dam. He used harvested rainwater for irrigation during the critical growth periods in kharif crops and pre-irrigation in rabi crops.

Crops grown by Lakhan Singh Yadav were failure due to the variability of climate specially rainfall. He constructed the poly bag check dam on a channel resided near to his farm and renovated check dam near his farm. Water harvested in the structures was used by him in irrigation for *kharif* crops during critical growth periods and for expanding the area under cultivation by giving pre sowing irrigation to *rabi* crops.

### Impacts

The adoption of this technology revealed in higher production of the rabi and *kharif* crops against before adoption of the technology. Some other farmers also benefitted with these structures also. They also used harvested water in vegetable production also. By seeing the benefits of adopted technology by Lakhan Singh Yadav, other farmers also constructed the poly bag check dam near by their farm which covered the 35 ha more area than before these structures.

### Economics

From the poly bag check dam and renovated check dam, he has harvested water of 9850 and 8781 cu. m and utilized for soybean, blackgram, wheat, mustard and obtained yields of 1275, 740, 4225 and 1325 kg/ha; and net profit of Rs. 12500, 7525, 19425 and 17250 per ha, respectively.



Name : Shri Lakhan Singh Yadav

Age : 52 years

Phone : --

Education : 10<sup>th</sup> Standard

Address : Kharag, Datia (Block & District),  
Madhya Pradesh

Land holdings : Irrigated: 7 ha; Rainfed: 18 ha

Livestock : 2 cows

Farming experience : 40 years

Social : Climate Smart farmer Award by  
appreciation/ ICAR  
Recognition/ Awards



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## Innovation : Introduction of New Crop - Ginger with Drip Irrigation System

Focus area : Soil and Water Conservation

The traditional farming in the Ratnagiri district of Maharashtra involves rice, finger millet, cowpea etc., with available sources of irrigation naturally like streams and constructed wells/borewells. Shri Vijay Sawant is one of the progressive farmers started cultivating turmeric (variety Selam) in his field. He decided to shift to ginger crop and installed drip irrigation system in view of the limited availability of water. Shri Sawant prepared land using tractor and made ridges and furrows at 120 cm apart. A total of 10 t FYM/ha was applied to 1 ha area. A basal dose of one tonne of neem cake and 200 kg sufala (natural organic fertilizer) was applied to the soil. Planting of ginger was done at 25 cm apart using 1200 kg seed material of var. *Mahim*. About 25 kg urea was applied after 30 days and 60 days of planting for proper growth of the ginger crop conditions. Finger millet is one of the major crops in upland areas of Konkan region and the aberrant weather like unseasonal rainfall, dry spells, high wind speed etc., are severely impacting the yield of crops. Crop like ginger with drip system proved to be a better option for farmers which can sustain under uncertain rainfall conditions.



Name : Shri Vijay Bhaskar Sawant

Age : 61 years

Phone : 09225696956

Education : Diploma in Arts

Address : Parule, Rajapur (Block),  
Ratnagiri (District), Maharashtra

Land holdings : Rainfed: 1ha; Irrigated: 1.5 ha

Farm experience : 35 Years

Livestock : 8 cows & 3 buffalos

Farming experience : 35 Years

Social : Krishi Bhushan Award  
appreciation/ (Block level)

Recognition/Awards

### Impacts

Shri Vijay Bhaskar Sawant replaced traditional crops like rice, finger millet, cowpea, etc. with ginger by improving irrigation facility and by resorting to drip. Growing of a ginger crop is more profitable and feasible practically using drip irrigation. Ginger crop required less water in comparison to traditional farming of growing rice. It fetches double the income in comparison to regular *kharif* crops like finger millet. There is much scope for ginger cultivation and income generation through proper marketing and some of them are now cultivating the crop under his guidance.

### Economics

He could obtain 11,000 kg/ha production and sold ginger with an average rate of ₹ 42/- per kg. The expenditure for seed material, drip irrigation system and other expenses was about ₹ 2.12 lakhs. He achieved around 2.5 lakhs as net profit by ginger farming in a year.



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## Innovation : Mulching with Water Hyacinth in Potato

Focus area : Soil and Water Conservation

Water hyacinth was applied at 20 t/ha as mulch, immediately after seed sowing or within 3-4 days after sowing. It is spread between crop rows. There is plenty of aquatic weed, water hyacinth, in this region, hence there is huge scope to use it as a mulch material. This kind of practice is economically viable to the local farmers.

### Impacts

Depending on the severity of drought, the estimated yield reduction in potato varies from 10 to 70%. Surface mulching is one of the most cost effective means, which improves the soil fertility and improve crop productivity. This innovative method of mulching

in potato can help in conservation of soil moisture as well as protects the crop from cold injuries. It is also helpful in utilization of naturally available resources like water hyacinth in nearby ponds or rivers in Bihar. Shri Bindesh Wari Mandal said that frequent application of water hyacinth in potato, boosted the soil quality as well. This weed gets quickly decomposed at field level.

### Economics

Shri Bindesh Wari Mandal recorded 30 t/ha under mulching with water hyacinth from potato crop as compared to no mulching in potato cultivation (20.4 t/ha). Net returns were ₹ 1,10,000/- and ₹ 45,000/- under mulching with water hyacinth and no mulching in potato, respectively. The practice is highly environmental friendly and renews the water bodies. Mulching with organic material is helpful for improving the soil organic carbon which improves the water holding capacity and soil quality.



Name : Shri Bindesh Wari Mandal

Age : 30 years

Phone : 7250237754

Education : 9<sup>th</sup> standard

Address : Sadanandpur, Bishanpur (Block),  
Supaul (District), Bihar.

Land holdings : Irrigated : 3.5 ha

Livestock : 3 cows 2 draught animal

Farming experience : 25 years



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## Innovation : Sand Mulching for Soil Moisture Conservation

Focus area : Soil and Water Conservation

Farmers can take up timely sowing because sand mulched soil arrests runoff as it facilitates maximum infiltration and retains soil moisture for longer period. About 5-6 inch depth of sand is spread on land and this stops evaporation of soil moisture. In non-sand mulched soil, this will not happen as it takes 2-3 rains for soaking/wetting the root zone and then only sowing is possible. It is possible to take up sowing even if there are light showers as sand mulch technology helps in water retention and prevents evaporation. Sand mulch technology helps in uniform crop stand and facilitates uniform harvesting thereby reducing labor cost and time. The arid climate of Karnataka requires the use of traditional farming practices for soil and water conservation, including the use of sand mulch. The research has confirmed the effectiveness of the sand mulch as a conservation practice but is a costly proposition. Shri Suresh Chennalli used sand mulching as a drought proofing measure; to harvest and conserve rain water for successful crop under rainfed ecosystem where rainfall is scanty and distribution is uneven). He has applied 500 t/ha of coarse sand per ha and the sand is uniformly spread to a depth of 6 inches and only shallow cultivation is practiced. Shallow root crops like green gram, *rabi* sorghum, groundnut and chickpea were successfully raised.



Name : Shri Suresh Chennalli

Age : 53 years

Phone : 09449018799

Education : 10<sup>th</sup> standard

Address : Halligudi, Mundaragi (Taluk),  
Gadag (District), Karnataka

Land holdings : Rainfed : 8 ha

Livestock : 2 oxen and 2 buffaloes

Farm experience : 30 Years

Farming experience : 35 Years

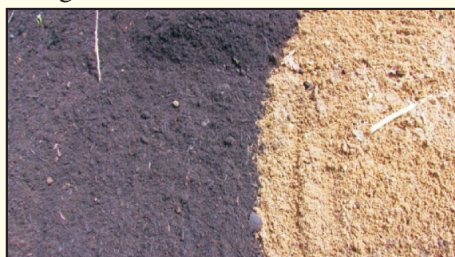
Social : Ex-member of  
appreciation/ Gram Panchayat  
Recognition/Awards

### Impacts

The sand mulching is as innovative type of mulching and it has been widely adopted by farmers in the eastern part of Gadag district where rainfall is scanty and soils are impervious. It is adopted in an area of 1000 ha covering in nearby villages such as Halligudi, Lakkundi, Ekhaspur, Venkatapur, Vitalapur, Mevundi, Baradur and Pethalur. Efficient utilization of sheep manure is possible as there is no runoff and the applied sheep manure remains in the field between coarse sand grains and releases the nutrients along with each rain. Sand mulch technology can be adopted across the system in black soil area where rainfall is scanty and where availability of coarse sand is there near to farmers' fields especially in seasonally flowing streams.

### Economics

Overall, there were 20 to 25 % increase in yield of green gram, *rabi* sorghum, groundnut and chick pea crops due to sand mulching.



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## Innovation : Diversified Crop Production from Harvested Rain Water

Focus area : Soil and Water Conservation

Shri Kuldeep Singh Parmar an innovative farmer substituted crops like maize and wheat with vegetables. Crop diversification with vegetables especially cucurbits, cole crops as well as adopting ridge and furrow technology of cultivation and biomass mulching enabled him to realize additional income from vegetable cultivation. He utilized harvested rainwater in his farm having an area of 0.4 ha. He used vermicompost @ 8-10 q /0.08 ha in two split doses at six months interval. He is getting an additional income and quality produce as compared to other farmers of adjoining areas who apply heavy doses of fertilizers. Cabbage and cauliflower are transplanted at a distance of 45 cm x 30 cm. Bitter gourd and bottle gourd are transplanted in rows at a distance of 3.0 m and plant to plant distance is maintained at 1.0 m in the furrows. Cucumber is

transplanted at a distance of 2 m x 75 cm in furrows under ridge and furrow system of cultivation. Seeds of okra are sown at a distance of 45 x 20 cm during summer and 60 x 30 cm during rainy season. Pheromone traps 'Palam traps' for fruit fly are kept @ 25 traps/ha and refilled at every 45 days interval.

### Impacts

Prior to innovations of Shri Kuldeep Singh Parmar, he used to cultivate only traditional crops like maize and wheat in 0.4 ha area. Irrigation is practiced using gravity through ridge and furrow method of cultivation throughout the year. The residue of vegetable crop is used for preparation of vermicompost. Application of vermicompost helped in increasing fertility, aeration and moisture conservation in his farm. He is earning an income of more than 2.5 lakh rupees from vegetables per annum from 0.4 ha land.

### Economics

During *Kharif* season, Shri Kuldeep Singh Parmar cultivated cucumber (Namdhari F1), bitter gourd (Aman), bottle gourd (Sharda) and okra (Tulsi) and obtained yield of 175, 200, 250 and 140 q/ha and net returns of ₹ 135000, 110000, 115000 and 105000, respectively. Likewise, cauliflower (F1 626) and cabbage (Chamant) with a yields of 240 and 230 q/ha and net returns of ₹ 78,000 and 50,000, respectively, during *rabi* season.



Name : Shri Kuldeep Singh Parmar

Age : 68 years

Phone : 9736631024

Education : 10<sup>th</sup> standard

Address : Mann, P.O. Jalari, Nadaun (Taluk),  
Hamirpur (District), Himachal Pradesh

Land holdings : Rainfed: 0.2 ha; Irrigated: 0.4 ha

Livestock : 2 buffaloes

Farming experience: 35 Years

Social appreciation/  
Recognition/  
Awards : Member of VCMRC-NICRA  
Committee at Hamirpur,  
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## Innovation : Sowing of Chickpea by Multi-Crop Ridger in Ridge and Furrow method

Focus area : Soil and Water Conservation

Chickpea is grown in *rabi*. Desi type bengalgram takes 95-105 days where as *kabuli* types take 100-110 days to mature. Traditionally, sowing of chickpea is taken up on flat bed and broadcasting method in Jalgaon KP village of Pune district. Shri Bharat Shivaji Wabale practiced ridge and furrow method for cultivation of chickpea after realizing the delay of monsoon and deficit moisture in soil. The implements used for sowing is multi-crop ridger. Chickpea crop experiences moisture stress during long dry spells and also suffers terminal moisture stress at pod formation stage. Ridge and furrow method not only facilitates moisture conservation but also drainage of excess water in black soils. Ridge and furrow sowing in

chickpea using multi crop ridger (45 x 15 cm) resulted in an yield increase of 25.6% compared to conventional sowing (10.0 q/ha) the average yield of chickpea in ridge and furrow method was 12.5 q/ha.

### Impacts

Shri Wabale's innovative method of sowing of chickpea was adopted by several other farmers in his village. Light field preparation is required for chickpea, while weed free situation is must. After harvest of *kharif* crop, field was prepared with plough and/or cultivator (Gorru) or tractor drawn cultivator so that top soil is free from weeds and at the same time stored soil moisture is preserved to the maximum extent for crop use. Sowing by multi crop ridger has resulted in overcoming of all these constraints like weed infestation, soil aeration and soil moisture, etc.

### Economics

Shri Wabale has recorded highest grain yield and net returns of 12.5 q/ha and ₹ 57,500 under multi-crop ridger method as compared to drilling in flat bed and broadcasting method were 10.0 q/ha and ₹ 45,770, respectively.



Name : Shri Bharat Shivaji Wabale

Age : 58 years

Phone : 09766715766

Education : 10<sup>th</sup> standard

Address : Jalgaon KP, Baramati (Taluk)  
Pune (District), Maharashtra

Land holdings : Rainfed: 2.5 ha

Livestock : 5 cattle; 3 milking cows and  
2 newly born calves

Farming experience : 40 years



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## Innovation : Innovative Soil Health Management

Focus area : Soil Health Management

Rice husk is a by-product from the rice mills that have favorable effects on the soil in terms of acidity correction. Incorporation of rice husk during land preparation improves the soil fertility. It also helps in improving the soil structure. The rice husk from rice mill is more preferred as it decomposes more quickly than rice husk from manual pounding of rice. Rice cultivation is being practiced on the same terrace continuously and results in decreased soil nutrient status in north east regions. Shri Vezokho Epao is incorporating 2 t/ha during land preparation of paddy field (Jan-April). Organic farming is being practiced by the farmers. Adoption of this innovation has paved the way for environment friendly and sustainable farming.



Name : Shri Vezokho Epao

Age : 49 years

Phone : 03865-281436

Education : 9<sup>th</sup> standard

Address : Thipuzu, Rihuba (Block),  
Pfutsero (Taluk), Phek (District),  
Nagaland

Land holdings : Rainfed: 2.0 ha

Livestock : 2 cows 2 draught animal

Farming experience : 30 years

### Impacts

As the farmers do not use FYM due to less availability hence they incorporate rice husk which is widely available. It also helps in easy tilling of soil and breaking of hard pan. Once the paddy is harvested i.e. after November hoeing starts and in the course of land preparation rice husk is spread on the terrace and turning is done while ploughing thus incorporating the rice husk. It improves the pH and nutrient availability and can affect the hydro-physical properties as well. The increase in pH is the most immediate. Usually, Nagaland soils are prone to acidity due to geographical position and weather condition. Amending soil with rice husk is more beneficial than other amendments for correcting the soil reaction and enhancing soil quality as well as soil health.

### Economics

After amendment of rice husk to paddy field, Shri Vezokho Epao recorded an additional paddy yield of 1.3 t/ha due to increased soil fertility condition and earned a net return of ₹ 13,000/- over without amendment of rice husk. He has created market for rice husk as an amendment for paddy fields.



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## Innovation : Soil Enrichment in Pomegranate using Bio-Organic Slurry

Focus area : Soil Health Management

Erratic rainfall and continuous drought did not give sustainable yield and income from conventional crops like soybean, pearl millet, and chickpea. Hence, farmers diverted toward crops like pomegranate, drumstick and poly house cultivation. Shri Bhausaheb Nirmal planted 0.6 ha under pomegranate during 2013. He constructed farm pond for irrigation water management. For the past three years he is using bio-organic slurry in pomegranate @ one liter per plant at one month interval for four times during fruiting period. Bio-organic slurry consists of cow dung 30 kg, cow urine 15 liters, jaggery 1 kg, pulse flour 1 kg, azatobacter, PSB, trichoderma, paecilomyces 1 kg each

in 200 liters of water and were fermented for 8-10 days. Initially, the fruit plants were applied organic inputs like well decomposed organic manure/ vermicompost, green manure and biofertilizers in appropriate quantity. These organic inputs are used for feeding the soil. Well-fed healthy soil, rich in microflora and microfauna takes care of the crop nutrient requirement.

### Impacts

Bio- organic slurry helped in improving root development, nutrient uptake, increased water holding capacity and at the same time reduced the incidence of wilt and nematodes. Relatively less infestation of bacterial blight was seen in slurry applied pomegranate plants. Crop yield increased by 10%. Pomegranate is a major cash crop of Ahmednagar district and more than 30,000 ha area is under this crop. This has been adopted by 872 farmers in 35 villages in 700 ha.

### Economics

He has harvested 12 tons of pomegranate from 0.6 ha area. Average selling rate is ₹ 60 per kg and gross income is ₹ 7.20 lakhs per annum. Total cost of cultivation is ₹ 3.30 lakhs with cost-benefit ratio of 2.2.



Name : Shri Bhausaheb  
Changdev Nirmal

Age : 45 years

Phone : 9657789707

Education : 5<sup>th</sup> standard

Address : Nirmal Pimpri, Rahata (Block),  
Ahmednagar (District), Maharashtra

Land holdings : Rainfed: 1.2 ha; Irrigated: 1.6 ha

Livestock : 3 cows and 2 goats

Farming experience : 20 years



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## Innovation : Plastic Cups for Raising Vegetable Seedlings

Focus area : Natural Resource Management

Shri Gopal Gope from the village of Burhu, is a marginal farmer. He is the owner of 2.5 ha rainfed land. Six members of his family are fully engaged in commercialized farming. He cultivate vegetables in 1.0 ha of land round the year. He succeeded to get good income in *rabi* and summer seasons. But during *kharif* season he failed to get good crop stand due to deficient rainfall during the monsoon season leading to death of seedlings. He started growing nursery for raising healthy seedlings to fill these gaps. He raised seedlings in large number so as maintain plant population in the field. Transplanted the seedlings raised in plastic cups to fill the gaps with the seedlings of same age.



Name : Shri Gopal Gope

Age : 51 years

Phone : 8901040357

Education : 10<sup>th</sup> standard

Address : Burhu, Ghaghra (Block),  
Gumla (District), Jharkhand

Land holdings : 1.5 ha

Livestock : 3 cows

Farming experience : 30 years

### Impacts

Plastic cup seedling raising idea became a boon for Shri Gopal Gope and adjoining villagers', who is involved in commercial vegetable cultivation. Shri Gope informed that most of the farmers growing vegetables are following his practice. He has sown the seeds in cups and transplanted at different dates with a view to escape the damage by heavy or defficient rains.

### Economics

By this innovative idea, Shri Gopal Gope has succeeded in maintaining optimum plant stand and earned ₹ 60000 to 80000 per ha during rainy season which is significantly higher than other fellow farmers. Though rasing seedlings involves cost but higher returns compensated the costs.



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## Innovation : Cultivation of Groundnut in Raised Bed Technique

Focus area : Natural Resource Management

The traditional practice of cultivating groundnut on flat bed is not remunerative as conservation of rain water during scanty rains and disposal of excess water during heavy rains is not possible. Shri R.K Venkataravanappa a marginal farmer from S. Raghuttahalli, Chikkaballapura district started cultivating groundnut on raised bed. In this raised bed practice, ploughing twice with tractor drawn MB plough was done followed by formation of three meters width raised beds across the slope and 0.3 meter furrow is opened in between the raised beds which conserves water. Seeds of groundnut were sown at 30 cm x 15 cm spacing using a seed rate of 100 kg/ha. Zinc and Boron were applied at 10 and 5kg /ha, respectively, as basal besides normal dose of NPK. In case of existing practice (flat bet), ploughing twice with tractor drawn MB plough followed by leveling is done and higher seed rate of 10 kg/ha over that of raised bed is needed. He also experienced ease in harvesting, good filling of pods and improved shelling percentage in raised bed technique.



Name : Shri RK Venkataravanappa

Age : 44 years

Phone : 9972745077

Education : 12<sup>th</sup> standard

Address : S. Raghuttahalli, Munganahalli (Hobli),  
Chintamani (Taluk),  
Chikkaballapura (Dist.), Karnataka

Land holdings : Rainfed: 3 ha; Irrigated: 1 ha

Livestock : 2 cows

Farming experience : 15 Years

### Impacts

This technique facilitated use of machines for raised beds as it saves 15% cost on preparation of land and yields are improved by 15-20 %. The loosened soil facilitates more absorption of rain water and easy peg penetration. As a result of good pod filling, shelling percentage has improved which resulted in increased yield by two quintal over the existing practice (flat bed). It facilitated *in-situ* conservation of rainwater and the furrows acted as drainage channels during excess rains.

### Economics

Shri RK Venkataravanappa has recorded an additional yield of 2 q/ha with net additional returns of ₹ 12,000 from his innovative raised bed technique as compared to flat bed technique. The increase in income made it possible for him to further expand the area under groundnut crop.



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## Innovation : Re-Use of Mushroom Bed for Vermicomposting

Focus area : Natural Resource Management

Spent mushroom substrate (SMS) is the left over substrate after the harvest mushroom crop, any further cultivation becomes un-remunerative. The quantity of spent mushroom substrate generated varies from 3-5 times of mushroom produced depending upon the type of mushroom. It is five times in button mushroom, three times in oyster and milky mushrooms, and 3-8 times in paddy straw mushroom. Nutritionally SMS is considered quite rich as it contains NPK (1.9:0.4:2.4%) on fresh weight basis. Mushroom production at household level by the farm-women is a common practice in Gumla district of Jharkhand. Instead of destroying the mushroom bundles and drying it for



Name : Smt Purnima Devi

Age : 38 years

Phone : --

Education : 5<sup>th</sup> standard

Address : Heth Ader, Ghagra (Block),  
Gumla (District), Jharkhand

Land holdings : Rainfed: 1 ha

Livestock : 2 cows

Farming experience : 15 years

fuel, Smt. Purnima Devi decided to use the abandoned mushroom beds for vermicompost production. The idea helped her reducing the dependence on other waste materials to prepare vermicompost. Addition of mushroom beds also increased quality of vermicompost and fetched higher returns.

### Impacts

Apart from reducing the labour and cost of vermicompost production, abandoned mushroom beds also helped in improving the quality of vermicompost. As mushroom beds are easily available in the village, less effort was needed in collecting and putting into vermicompost unit. The beds decompose easily and she could notice higher number and activity of worms. Presently, there are 25 farmers who are following re-use of mushroom bed for vermicomposting in her village where the mushroom production is being practiced.

### Economics

Smt Purnima Devi is getting an economic benefit ₹ 10000/- in this innovative vermicompositing method by re-use of spent mushroom bed. The amount saved from nutrient application was ₹ 1500 per ha and the additional benefit was about ₹ 7500 per ha.



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## Innovation : Community-approach for Soil and Water Conservation

Focus area : Natural Resource Management

Soil and water conservation programme is highly essential for the village in Bhalot, a village in Kutch region which receives a rainfall of just 350 mm. Agricultural land of the village is highly undulating. Hence, it requires land leveling and bunding as per contour lines. This required significant resources which is difficult for small farmers. Shri Karshan Bijal Chavda contacted different NGOs and government departments for the development of his village. As a result of his efforts NGOs - World Vision adopted this village and completed eight check dams, two water reservoirs and farm bunding and leveling in 40 ha land. Organizations like AKRSP (Agakhan Rural Support Programme), IFFCO, DWDU Project started their programmes in this village. He himself installed micro-irrigation systems in three ha land and started efficient use of irrigation water. Looking to the benefits of micro-irrigation systems, other farmers also started adoption of micro-irrigation systems (MIS). The innovation is the collective approach for conservation and involving communities in water conservation efforts in the village.



Name : Shri Karshan Bijal Chavda

Age : 44 years

Phone : 9879382695

Education : B.A.

Address : Bhalot, Anjar (Taluk), Kutch (District), Gujarat

Land holdings : Rainfed: 1 ha; Irrigated: 8 ha

Livestock : 3 cows

Farming experience : 25 Years

### Impacts

About two lakh cubic meters of rainwater was harvested in different structures which percolated to underground soil aquifers. Due to recharge of aquifer, water level in open wells was raised and farmers could irrigate their crops in both *kharif* and *rabi* season. Number of wells increased and farmers started to adopt micro-irrigation systems for efficient use of irrigation water. Rainfed farming became sustainable as farmers could save their crops by providing life saving irrigation during dry periods as observed frequently due to erratic behavior of monsoon. Even nearby village farmers have started this type of work after looking to the success of works in Bhalot village.

### Economics

As a result of efforts of this farmer, thirty eight check dams, three large size community based water reservoirs and seven individual farm ponds have been constructed. There are 90 farmers who installed MIS and 54 farmers got benefit of land leveling and bunding. As a result of above work, about 400 ha of land got irrigation facility. The productivity levels improved and farmers could harvest 34 q/ha of cotton and 36 q/ha of castor beans. The value of product is about ₹ 2.59 core from the village which used to be just ₹ 1.0 crore earlier. Thus, Shri Karshan Beejal Chavda acted as motivator and the best community mobilizer and took the initiative on a watershed mode.



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## Innovation : Integrated Farming System for Variable Rainfall Situations

Focus area : Natural Resource Management

Integration of various enterprises, viz., cropping, animal husbandry, fishery, forestry, etc., has great potential in stabilizing and in boosting the agricultural income. Gumla is a tribal dominated district of Jharkhand and 70% farmers belong to scheduled tribe community. The innovative model is taken up in two ha area in the vicinity of tribal settlement and integrated with six components. The component consists of three piglets (Cross T & D), fifty thousand fingerlings for fish production, high yielding paddy variety (Lalat), maize (Suwan-1), plantation of sixty mango fruit plants, pumpkin (Var.: Arka Suryamukhi), one vermicompost unit for recycling of farm waste and renovation of well.

### Impacts

He has successfully developed the pig unit within four years and became the lead supplier of improved breed of piglets in the district. Annually, he has succeeded in earning upto 1.5 lakhs from this single enterprise. He has become a role model in his village as well as for others. More than thirty farmers of the nearby villages were motivated by his success and adopted components of this small farmer climate resilient integrated farming system model.

### Economics

Shri Samsai Oraon has harvested higher paddy yields of 38.5 q/ha after the intervention as compared to 26.0 q/ha paddy yield before the intervention. Rice cultivar Suwan-1 provided 40 q/ha as compared to local cultivars yield 27 q/ha. The vegetable yield increased considerably after intervention which gave ₹ 18000 net return from pumpkin cultivation. In second year, the number of piglets increased by 15 which was started with three pigs.



Name : Shri Samsai Oraon

Age : 35 years

Phone : 9308489565

Education : 12<sup>th</sup> standard

Address : Belagarha, Ghaghra (Block),  
Gumla (District), Jharkhand

Land holdings : Rainfed: 5 ha

Livestock : 2 cows

Farming experience : 55 Years

Social appreciation/  
Recognition/  
Awards : 1. Honored by Shri Kalraj Mishra  
Hon'ble Union Cabinet  
Minister of Micro, Small and  
Medium Enterprises.

2. Honored for his interventions  
in Integrated Farming System by  
Birsa Agricultural University, Ranchi  
3. Awarded as a SMART FARMER  
for his contribution to climate  
resilient agriculture under NICRA



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## Innovation : Vermicomposting for Minimising the Cost of Chemical Fertilizers

Focus area : Natural Resource Management

Shri Babanrao Ganpat Jadhav is a small farmer owning about 5 ha of land on which he grows sorghum, pearl millet, cotton, soybean and green gram, pigeon pea. Shri Babanrao Ganpat Jadhav came to know about vermicomposting and started its preparation and using it for the last two years and now he is able to really see the difference it made in yield. He says even though there is an increase in yield but the quality of crop improved in a big way. He is using polythene for vermicomposting on the surface of ground and collecting vermiwash which is being used. He says there have been no crop diseases so far even though he has stopped using pesticides. Similarly, he is getting an additional yield of 6 q/ha of pearl millet due to application of vermicompost compared to control (no vermicompost) with same variety.



Name : Shri Baban  
Ganpatrao Jadhav  
Age : 53 years  
Phone : 9049292256  
Education : 10<sup>th</sup> standard

Address : Shekta, Siddhanathwadgaon (Post),  
Gangapur (Taluk), Aurangabad (District),  
Maharashtra

Land holdings : Rainfed:1.4 ha

Livestock : 2 buffalos 2 cows 2 bullocks  
and 1 goat

Farming experience : 35 Years

### Impacts

Inspired by the success of Shri Babanrao Ganpat Jadhav, other villager's also took up vermicomposting and about 30 units are functional in Shekta village and the number is growing. Vermiculture technology has been very much accepted and farmers from Sillod Taluka visited Babanrao Ganpat Jadhav vermicompost unit, realized the benefits of vermicompost and started implementing this intervention on their own farm. Crops that got benefitted are mainly pomegranate, sweet orange and vegetables.

### Economics

Shri Babanrao Ganpat Jadhav use vermicompost (compost and vermiwash) on his own farm and save the cost incurred on chemical fertilizers besides additional production as compared to the other farmers. Shri Babanrao Ganpat Jadhav's income increased upto 40% over other farmers.



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## Innovation : Adoption of Multi-Enterprises for Risk Minimization

### Focus area : Integrated Farming System

Shri Jitendra Singh Rajawat is a graduate farmer and large farmer with 19 ha of land holding in village Sarkho of Guna block, district Guna. He has established an integrated farm involving crops such as soybean, black gram, green gram in 17.4 ha, wheat, coriander, gram, sugarcane in 15.6 ha, horticulture production involving acid lime, jackfruit (5 trees - Rudrakshi), guava (20 trees of L-49), drumstick (2 trees of PKM-1), mango (20 trees of Amrapali), papaya (20 plants of red lady) in 1.0 ha, seasonal vegetables like okra (VRO-6), potato (K. Chipsona-1), onion (AFLR), garlic (G-282), tomato (Saurabh), spinach (all green), pea (Arkel & G-10) in 0.2 ha, livestock production with cross bred cows–Jersey two in numbers and buffalo–Murrah breed two in numbers, fish farming (composite farming of Rohu, Catla and Mrigal) in rainwater harvested ponds of size 180x60x30 ft, and established biogas and vermicompost units.



**Name** : Shri Jitendra Singh Rajawat  
**Age** : 38 years  
**Phone** : 9926519915  
**Education** : Graduate

**Address** : S/o Shri Babu Singh Rajawat,  
Guna (Block & Distt.), Madhya Pradesh

**Land holdings** : Rainfed: 1.2 ha; Irrigated: 1.6 ha

**Livestock** : 2 cows

**Farming experience** : 15 years

### Impacts

Shri Jitendra Singh Rajawat's integration of various enterprises and efficient management of resources with proper planning, and use of resilient innovations helped him in realizing higher returns. After getting good income from various innovative enterprises, he has purchased one tractor of 50 HP capacity, leveled the undulating land of about 9 ha, fenced 800 m using barbed wire and cement poles and dug four tube wells which increased the irrigated area by 34% and increased the cropping intensity from 136 to 193%. About 50 farmers adopted his innovative mix of enterprises in his village.

### Economics

Shri Jitendra Singh Rajawat obtained net returns of ₹ 295800, ₹ 33870, ₹ 10930, ₹ 66750, ₹ 34500 and ₹ 23000 and B: C ratios of 2.11, 3.74, 3.89, 2.67, 3.65 and 2.47 from crop production, horticulture crops, seasonal vegetables, livestock production and pisci culture enterprises, respectively.



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## Innovation : Farm Pond based Integrated Farming System

Focus area : Integrated Farming System

During *kharif*, significant area of Shri Chhatrapal Pateria farm remained fallow due to water logging while field crops are affected by early, mid and late drought during the monsoon or excess rainfall. He constructed farm pond in low lying area of his farm for harvesting rain water and adopted integrated farming system module involving components such as crop production + vegetable production + dairy + fisheries + composting and bio gas. Fish fingerlings of catla, rohu, mrigal and grass carp were introduced in pond. Vegetables such as chilli, tomato and brinjal were also grown for vegetable production. Waste from livestock was used for compost making with NADEP and also used in biogas production. Slurry produced from biogas was used in fish culture.

### Impacts

By adopting this integrated system module Shri Pateria made agriculture a profitable venture taking the advantages of efficient utilization of available resources, increased water use efficiency, increase in crop productivity, increase in farm income, alternate energy generation and saving of fuel wood. Farm pond was used for fish production which was an additional source of income during adverse conditions. Water from farm pond was also used for life saving irrigation in *kharif* crops during dry spells of monsoon. Farmers of the villages and adjoining villages also adopted the integrated farming system on their farms after seeing the success of Shri Pateria.

### Economics

With farmers' practice i.e., without diversified integrated farming system, the overall income was just ₹ 61,185, while income from innovated integrated farming system module developed by Shri Chhatrapal Pateria was ₹ 1,21,790. The additional expenses incurred were ₹ 23591.



Name : Shri Chhatrapal Pateria

Age : 57 years

Phone : 9584923548

Education : 12<sup>th</sup> standard

Address : Sanora, Sanora (Post), Datia (District), Madhya Pradesh

Land holdings : Rainfed: 8 ha

Livestock : 2 cows and 1 buffalo

Farming experience : 35 Years

Social appreciation/ Recognition/ Awards : Innovative farmer awards 2012 by IARI, New Delhi.  
Certificate of appreciation 2013 by ICAR- CRIDA, Hyderabad.  
Smart Farmer Award 2014 by ICAR, CRIDA, Hyderabad.  
Recognition Award 2015 Indian Society of Extension Education, Division Agri. Ext., IARI, New Delhi.  
Farmer Innovator 2016 ICAR – CRIDA, Hyderabad.



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## Innovation : Broad Bed Furrow Method of Sowing for Soybean

Focus area : Natural Resources Management

Shri Kaluram Patidar is growing soybean crop variety JS-335 under broad bed furrow (BBF) method of planting and adopted better crop management as per the recommended package of practices. In this practice, the farmer is using lesser seed rate of 50 kg/ha with plant to plant distance of 5 cm, row to row distance of 37 cm and width of furrow of 35 cm as compared to higher seed rate of 70 kg/ha, lesser row to row distance of 30 cm under the old age practice of flat-bed of sowing. This land treatment worked towards moisture conservation during lesser rainfall condition and drained out excess rainwater in case of high intensity rains. Shri Kaluram Patidar has recorded 20 to 25% of higher yield under broad bed furrow method of sowing than the old age practice of flat bed sowing.



Name : Shri Kaluram Patidar

Age : 60 years

Phone : 9907812219

Education : 8<sup>th</sup> standard

Address : Amba, Piploda (Taluk),  
Ratlam (District), Madhya Pradesh.

Land holdings : Rainfed: 2 ha; Irrigated: 4 ha

Livestock : 2 buffaloes, 1 cow and 3 calves

Farming experience : 40 years

### Impacts

Shri Kaluram Patidar narrated many advantages with his innovation and demonstrated it to other farmers. About 100 farmers are now practicing Shri Kaluram Patidar's method of sowing soybean. There are many benefits like good germination up to 90 %, lesser seed rate requirement (25%), minimized crop lodging, *in-situ* moisture conservation and avoidance of water logging condition. Broad bed furrow method of sowing for soybean helps in reducing and avoiding adverse affects of salts and creates more aeration in the root zone of crop.

### Economics

Innovative method of sowing with broad bed furrow method for soybean done by Shri Kaluram Patidar farmer recorded 5 q/ha of additional yield with a net return of ₹ 20,000 higher than the local practice of flat bed method of sowing. It improved the economic status of his family and he could expand area under other crops.



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## Innovation : Bunding and Leveling for improving Productivity from Degraded Lands

Focus area : Natural Resource Management

Shri Bakkiyaraj a small farmer of Kattusiviri village owning 2.5 ha of cultivable land. He is cultivating groundnut and blackgram. Out of his 2.5 ha of wetland one ha are is undulating and having steep slope. He had no hope to cultivate the crops in uneven sloping land. He ploughed the uneven land to start crop cultivation but failed due to high soil erosion and runoff. Finally, he decided to follow innovative agricultural practices to make use of undulating land for paddy cultivation. He divided the slope into strips based on the land topography. The strips of land were leveled and bunds were raised to make boundaries and rice was grown. When it rained, instead of runoff, the rainwater got stored in the strips. The bunds made in between the land prevented free flowing of water. Thus, the uneven sloping land was transformed as suitable wetland for paddy cultivation by Shri Bakkiyaraj although, it is commonly practiced in hilly regions.



Name : Shri Bakkiyaraj

Age : 38 years

Phone : 8901040357

Education : 12<sup>th</sup> standard

Address : Kattusiviri, Villupuram (District),  
Tamil Nadu

Land holdings : Irrigated: 2.5 ha

Livestock : 2 cows

Farming experience : 12 Years

### Impacts

The main purpose of bunding and leveling is to reduce the velocity of runoff water and thereby soil erosion by breaking the length of the slope into compartments. In this system, cultivation can be adopted on sloping land for other crops like pulses, oilseeds, vegetables and fodder crops. This would prevent the soil erosion and also favours water retention. The efficiency of a bunded and leveled system increases by applying additional conservation practices such as appropriate land preparation (contour ploughing and sowing), appropriate cultivation of crops (e. g. strip cropping) and maintaining a permanent soil cover. Shri Bakkiyaraj could convince the other farmers with advantages of bunding and leveling, presently, around 200 farmers have adopted Shri Bakkiyaraj's method.

### Economics

He got net income of ₹ 25500/- from 0.5 ha of land by bringing the land under cultivation which otherwise was left fallow without any returns.



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## Innovation : Jalkund Stimulated Agripreneurship in Sikkim

Focus area : Natural Resources Management

Shri Gokul Rai earlier used to grow single crop of rice or maize during *kharif*; leaving the field fallow during *rabi* season. He cultivated cole crops (cabbage, cauliflower and broccoli) garden pea (local Dentame) in some pockets where irrigation was provided from water for domestic use. He also raised nursery for commercial purpose under low cost rain shelter. The returns from farming were unable to manage his daily life. After thorough assessment he has constructed low-cost water harvesting structure *Jalkund*, with capacity of 40 cu. m. (size: 5 m x 4 m x 2 m) on his farm. The flowing water from the stream was accumulated for supplemental irrigation during *rabi* and vegetable seedlings under low cost structures. He also followed rice-cole crop/mustard cropping system. Efficient use of farm pond water (*Jalkund*) to irrigate *rabi* crops during dry spells with micro-irrigation systems (sprinkler and drip) made vegetable production a profitable venture for him. He lifted the sprinkler system up to 1.5 feet to cover the larger area through gravitational force. Rice cultivation var. RCM 10 (0.46 ha) during *kharif*, Cabbage var. Rareball, Broccoli var. TSX 0788, Cauliflower var. Aishwarya (0.11 ha), zero till cultivation of Mustard var. NPJ 113 (0.28 ha) during *rabi* from the water harvested. It increased the cropping intensity from 100 to 216 per cent.

### Impacts

Shri Rai is now a successful young farmer showing the path to other farmers to manage mid-season drought through farm pond technology. Shri Rai has emerged as a commercial vegetable seedlings producer and a role model for other traditional farmers and educated youth. He has become an effective techno-agent and supplies quality seedlings. He disseminates technical know-how which he constantly updates with the help of KVK scientists. He produces quality seedlings of vegetable crops for commercial purpose.

### Economics

He has earned ₹ 440000/ha/year by using improved Jalkund water to different crops with B:C ratio of 4.2.



Name : Shri Gokul Rai  
Age : 29 years  
Phone : 03592-251311  
Education : 10<sup>th</sup> Standard

Address : Nandok, East Sikkim (District), Sikkim

Land holdings : Rainfed: 1 ha

Livestock : 10 pigs

Farming experience : 10 years

Social appreciation/  
Recognition/  
Awards : His success story on “Jalkund stimulated agri-preneurship in Sikkim through winter vegetable production” uploaded on ICAR website and KIRAN website



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## Innovation : Integrated Farming System with Organic Practices

Focus area : Integrated Farming Systems

Shri Basavaraj Navi has adopted innovative Integrated Farming System (IFS) in his farm involving field crops, fruit crops, forest crops, sericulture and dairy enterprise. He has utilized space in his farm efficiently. The farmer has planted eighty sapota, forty mango, fifty drumsticks, 150 palm oil trees, 100 teak, 25 guava, 100 coconut, 100 neem trees and various grass species. The entire farm is under organics having vermicompost, vermigel and biodigester production units. He is cultivating short duration pulses and vegetables as inter crops. He has adopted drip system, a bore well recharging unit and farm pond for rain water harvesting.

### Impacts

The innovative practices of cultivating different varieties of agricultural crops, fruit crops, sericulture and practicing dairy enterprise has raised his income substantially. There is reduction in cost of inputs due

to use of farm generated organic inputs. The abundant availability of agricultural residue is being converted into compost / vermicompost. The water is being used efficiently through adoption of drip irrigation system and rain water harvesting structures. The products of neem trees, viz., seed kernels and leaves are used for preparation of botanical pesticides.

### Economics

The farmer is realizing an annual income of ₹ 8 lakhs from his integrated farming system model. Recycling of agricultural waste has improved the soil fertility status. More than 250 farmers have already adopted this innovative method of IFS under his guidance in Gadag and in neighbouring districts. Students of B.Sc (Agri) under Rural Agricultural Work Experience Programme regularly visit his farm for field experience.



Name : Shri Basvaraj Navi

Age : 52 years

Phone : 07259968715

Education : Diploma in Engenering

Address : Suganalli, Shirahatti (Taluk),  
Gadag (District), Karnataka

Land holdings : Rainfed : 2 ha  
Irrigated : 2 ha

Livestock : 2 Oxen and 4 Cows

Farming experience : 25 years

Social appreciation/  
Recognition/  
Awards : "Best Farmer"  
by University of Horticultural  
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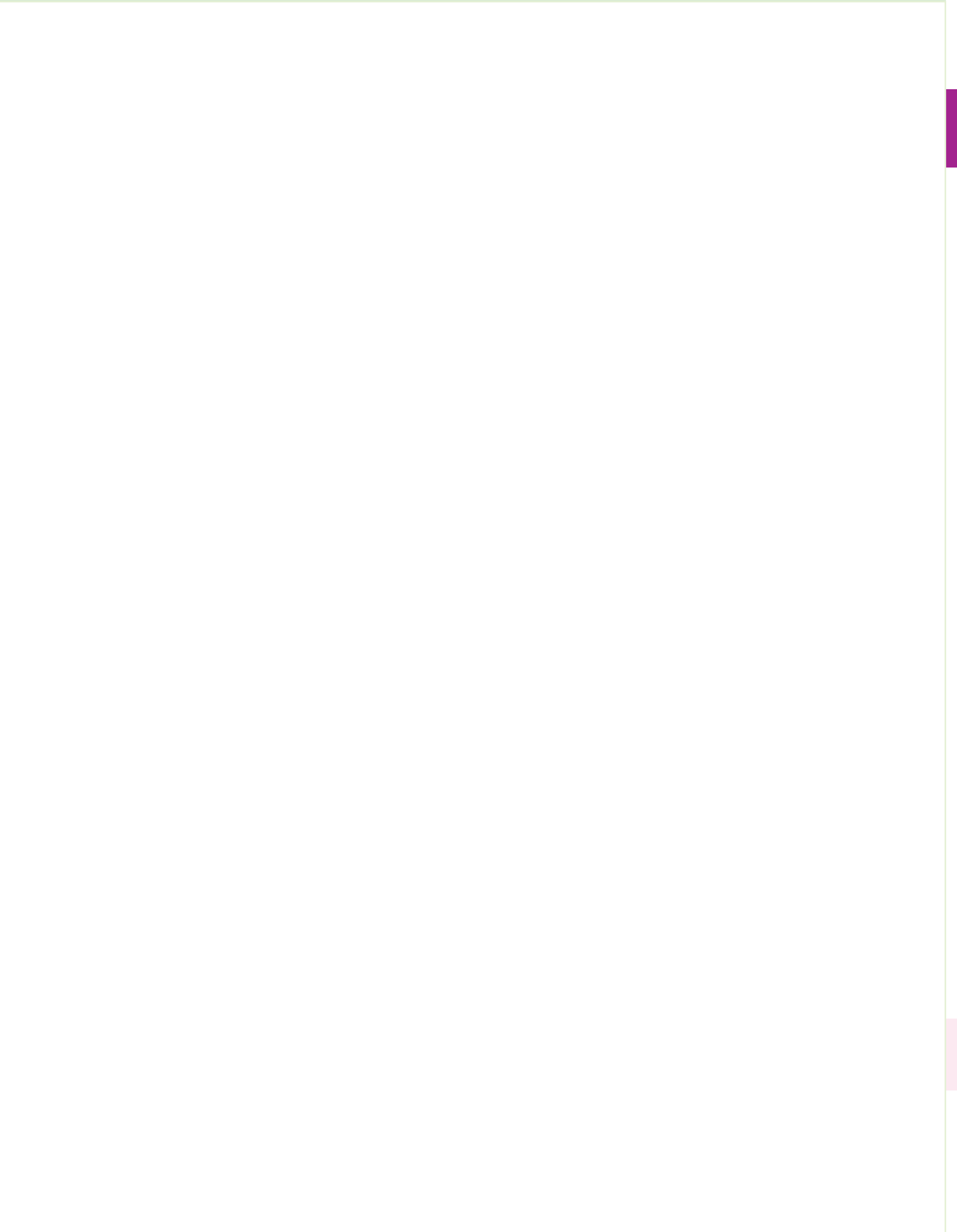






# Crop Production







## Innovation : Maximum Land Utilization through Crop Diversification Practices

Focus area : Crop Diversification and Intensification

The Nacharam village in Khammam district is frequently drought-prone. In this village, monsoon starts during the 1<sup>st</sup> week of June and frequent dry spells are common during *kharif*. Farmers generally go for re-sowing in case of long dry spells during the early stages of the crop. Shri D. Sailesh started intercropping system in cotton (cotton with leucaena) in the village. First year cost of cultivation is the same for both cotton sole crop and cotton inter crop (60cm x 40cm spacing). First year, cost of plantation establishments (sole + intercrop) is recovered by the cotton yields and provide additional returns from second year onwards. There was no additional cost involved after establishment of leucaena as it withstands drought and prolonged dry spells effectively.



Name : Shri Devabaktini Sailesh

Age : 32 years

Phone : 9492771446

Education : 8<sup>th</sup> Standard

Address : Nacharam, Enkooor (Mandal & Taluk), Khammam (Dist.), Telangana.

Land holdings : Rainfed: 5 ha ; Irrigated: 2 ha

Livestock : 6 buffaloes

Farming experience : 5 years

Social : Best Farmer, ITC, Bhadrachalam appreciation/ and KIRAN website

Recognition/Awards

### Impacts

This village receives heavy rainfall in September or October months as compared to normal rainfall and at this particular time, the cotton crop is at flowering to boll bursting stage. These heavy rains generally damage the cotton crop, resulting in lower yields. After, Shri Devabaktini Sailesh's innovation, many local farmers have overcome the terminal drought and flood situations in their villages by growing leucaena as intercrop with cotton as leucaena provides significant returns at regular intervals. Now, around 100 neighboring farmers are following his innovative method of intercropping in cotton and the system is fetching very good returns and it is environmental friendly.

### Economics

After thirty months, Shri Devabaktini Sailesh obtained good yield from leucaena, about 60 t/ha and the rate was ₹ 3500/t. Every thirty months, farmer is able to get ₹ 2,00,000/ha from the sale of leucaena. Shri Devabaktini Sailesh has maintained his own livestock unit (goat and sheep) using leucaena leaves as fodder and earning extra income of around ₹ 25,000 per annum.



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## Innovation : Cultivation of Elephant Foot Yam (EFY) for Enhanced Income

Focus area : Crop Diversification and Intensification

The Elephant Foot Yam (EFY) is good for cultivation in plantation crops like mango, sapota, papaya etc., and has less antagonistic effect with the plantation crops. It also conserves soil moisture and improves microclimate with spreading rooting pattern. Shri Mahaveer Singh is an innovative farmer cultivating yam. Shri Mahaveer Singh first took the initiative to yam cultivation in a scientific way with improved variety and planting technique. Shri Mahaveer Singh followed a seed rate of 150 q/ha with a spacing of 60 cm x 60 cm in the spaces available in between the plantation crops. He recorded an average yield of 60 q/ha as against 31 q/ha with local variety and got good market price.



Name : Shri Mahaveer Singh

Age : 45 years

Phone : 09431507690

Education : 10<sup>th</sup> standard

Address : Dulsulma, Satbarwa (Block),  
Palamu (District), Jharkhand

Land holdings : Rainfed: 0.6 ha

Livestock : 2 cows

Farming experience : 14 Years

### Impacts

Yam is having good yield potential and provide good economic returns in this region. Wild or local varieties dominate the region with very limited market as well as returns. Many local farmers adopted his practices and the area got expanded as well as the market. There are about 120 farmers who are growing yam in the existing plantations and getting additional income.

### Economics

Shri Mahaveer Singh has recorded highest yield in the range of 6000-8000 kg/ha which fetched him ₹ 1,09,600/- with cultivation of yam using improved techniques as compared to 3000-4000 kg/ha with local practice.



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## Innovation : Floating Seedbed of Paddy in Frequently Flood Prone Region

Focus area : Paddy Nursery Management

The entire seedbed is prepared on a bamboo frame that can float over water so that the paddy seedlings are protected from submergence during excess rainfall in this high rainfall and cyclone affected region. A 10 ft x 4 ft size bamboo frame is prepared and a polythene sheet is covered over the bamboo frame. A thin layer of top soil is spread over it and the frame is either fixed with bamboo poles at four corners or manually lifted with the rise of water level or fixed with empty plastic vessels to keep it floating. Seeds of paddy are sown on the floating seedbed following a seed rate of 50 kg/ha. About 25 floating seedbeds are required to meet the seedlings requirement for one hectare. Normally, the age of seedling at transplantation is 24 days.



Name : Shri Madan Mandal

Age : 49 years

Phone : 8016319599

Education : 7<sup>th</sup> Standard

Address : Bongheri, Kaikhali Ashram (Post) South  
24 Paragana (District)-743338,  
West Bengal

Land holdings : Irrigated:1 ha

Livestock : 2 cows

Farming experience : 25 years

### Impacts

Shri Madan Mandal's innovation helped to save the paddy seedbeds from prolonged submergence and subsequent crop loss. The seedbed floats over the standing water and thus escapes any immediate damage. Moreover, seedbed preparation is neither delayed nor hampered due to heavy precipitation during initial phase of monsoon. The seedlings of floating seedbed were ready for transplantation at 24 days after sowing compared to 30-35 days in case of traditional method. Timely preparation of seedbed, leads to early transplanting and escapes from submergence and enjoys the advantages associated with it. The village falls under the coastal agro-ecological zone and suffers from occasional torrential rains during monsoon. Paddy is the major crop during monsoon season. More than 75% of the agricultural lands are low lying and hence the *kharif* paddy suffers from prolonged submergence after heavy rains (>60 mm per day). Due to climate change impacts, there is an increase in intensity of rainfall during the initial monsoon period (June-July) resulting in prolonged submergence of 10-12 days.

### Economics

Floating nursery sown paddy seedlings yielded 33 q/ha with net returns of ₹ 27,000 as compared to traditional method (water soaked paddy seeds) of 27 q/ha with net returns of ₹ 20,000.



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## Innovation : Herb Artemisia: A Choice for Crop Diversification in Drought Prone Areas

Focus area : Crop Diversification and Intensification

The Artemisia is a hardy herbaceous plant which is known for essential oil. This herb is usually grown in dry and semi-dry habitats. It is used for garland making for its attractive green foliage and fragrance. A farmer from Kattusiviri, Shri Rajesh chose to grow Artemisia herb in Villupuram which is frequently affected by dry spells. He planted this herb in 1 ha of land while his fellow farmers took up cultivation of pulse crop in their lands. Due to lack of moisture at critical stage, the pulse crop failed but this herb could withstand drought and recovered with little intermittent rains. The herb attained harvestable yield within one month and fetched ₹ 2/bundle. A maximum of 10 cuttings were taken from a single crop. Application of DAP @ 20 kg/ha in split doses after every harvest gave the sustainable yield.



Name : Shri Rajesh

Age : 27 years

Phone : --

Education : Diploma

Address : Kattusiviri (Village),  
Villupuram (District) Tamil Nadu

Land holdings : Rainfed: 3 ha

Livestock : 2 cows

Farming experience : 16 Years

### Impacts

Artemisia is an annual hardy plant which could be included in crop rotation. It is best suited for sloppy land as it prevents soil erosion. The herb contains essential oil used for making perfumes. Artemisinin and derivatives are a group of compounds which are also used to treat malaria besides the widespread use of foliage. After Shri Rajesh, many farmers have come forward to grow Artemisia in their land where irrigation facilities are not available and around 200 farmers are cultivating this crop.

### Economics

Shri Rajesh is earning an average income of ₹ 10,000/- per harvest (cuttings) (10 x 10,000=1,00,000/-). The herb has high demand for its attractive foliage and pleasant odor for garland making particularly during festival and auspicious days. He is getting ₹ 80,000/- as net profit from his 1 ha of land.



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## Innovation : Intensive Mixed Farming System

Focus area : Intensive Farming System

Shri Shivvachan Yadav adopted intensive farming system on his farm by growing vegetables like potato, tomato, pea, onion, cauliflower, cabbage, radish, sugar beet, carrot and leafy vegetables with paddy, wheat and mustard crops to maximize income from multiple enterprises. Shri Yadav collected 20 varieties of guava and maintains organic kitchen garden. He is also rearing milch animals, viz., 3 buffalo (Murrah) and 2 cows (Sahiwal) with average milk production of 25 liter per day. Shri Shivvachan Yadav produces potato seed and supply to other farmers in the village. Growing of vegetables is planned based on the needs of the local markets. He adopts scientific approaches for growing of vegetables based on the package of practices given by the University or KVK.

### Impacts

Intensive mixed farming with multiple enterprises is advantageous because it allows farmers to diversify and spread risk, enables recycling and reduces dependence on external inputs, reduces the spread of diseases and pests, leads to high profits, guarantees work throughout the year and enhances farmer's social status. The utilization of equipment, labor and land is very efficient in these systems. The flow of nutrients within intensive farming system is effectively controlled and balanced. The fertility of soil is also maintained in farming systems due to recycling of residues. Mixed farming promotes water conservation and minimizes soil erosion. Presently, there are about 100 farmers in his and neighbouring villages who are following Shri Shivvachan Yadav's innovative intensive farming practices.

### Economics

The approach improved the cropping intensity and could earn ₹ 500000/ha/year. He has developed a mechanism for marketing of different varieties of the vegetables and others crops based on the supply-demand situation and advance planning.



Name : Shri Shivvachan Yadav

Age : 61 years

Phone : 8858915764

Education : 12<sup>th</sup> Standard

Address : Mahuwari Tola, Jhangha (Post),  
Jhangha (Block), Khorabar (Taluk)  
Gorakhpur (District), Uttar Pradesh

Land holdings : Rainfed: 1ha; Irrigated; 0.75ha

Livestock : 3 Buffaloes and 2 Cows

Farming experience : 35 years

Social appreciation/  
Recognition/  
Awards : Felicitated by  
NHM for quality vegetable  
production.

District level First Prize in organic  
farming, Super Master Trainer for  
organic farming

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## Innovation : Mango + Cashew Nut- based Farming System

Focus area : Plantation Crop Production

Mango and cashew nut are the tropical plants and can thrive even at high temperature. Shri Siddappa Karikatti, an innovative farmer of Hulkoti village in Gadag district has introduced cashew nut (variety : Ullal-1) as an intercrop in intra row spacing (30 x 30 feet) of his six year old mango orchard of three hectares. He has planted 180 cashew nut plants by using spacing of 8 m x 5 m and 10 m x 10 m for mango. There is no irrigation source for the farmer. The plants were watered for the initial two years by bringing water from nearby tank. At present, water is given only during flowering and fruiting stage of mango and cashew nut. In the inter space of mango, green gram and groundnut crops are cultivated.

### Impacts

Farmer has utilized the maximum space in 1.5 ha by adopting mango, cashew nut and intercrops under dry land situation. The cashew nuts are planted in intra-row spacing of mango. Both crops are pruned every year to ensure proper ventilation and new growth. Cashew nut is hardy crop and less labour intensive with minimum incidence of pest and disease. This system of cultivation is very profitable compared to cultivation of only field crop in semi-arid zones like Gadag district. This innovation has already spread in an area of 60 ha in the district. The price of cashew nut is stable and in case of low prices, the produce can be kept for longer period. He has decided to extend the same innovation to two additional hectares every year and now advocate the technique to his friends and neighbors.

### Economics

Shri Siddappa Karikatti has earned an income of ₹ 46000 from cashew nut, ₹ 64000 from mango and ₹ 62000 from green gram (cultivated as intercrop). A total income of ₹ 172000/- was realized from an area of 3 ha.



Name : Shri Siddappa Karikatti

Age : 51 years

Phone : 09448236005

Education : 10<sup>th</sup> standard

Address : Hulkoti, Gadag (Taluk & District),  
Karnataka

Land holdings : Rainfed: 3 ha

Livestock : 2 cows

Farming experience : 25Years

Social : Director of Mango Grower  
appreciation/  
Association, Hulkoti

Recognition/ Awards



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<http://khpkvk.org/>





## Innovation : Round the Year Flower Production for Income Stability

Focus area : Crop Diversification

Shri Munnusamy is a resident of Kattusiviri village holding a land area of 1.5 ha. Kattusiviri village is vulnerable to early and terminal drought and receives less rainfall. Shri Munnusamy was facing difficulty to cultivate conventional crops like paddy, sugarcane, pulses etc., due to the non availability of irrigation water. Hence, he started to grow various flower crops which require less amount of water and to get sustainable income. Under the multi flower cropping system more than two flower crops namely jasmine, button rose and tuberose were grown by the farmer. These perennial crops were cultivated in an area of 30 cents each and produced flowers year round.

Jasmine commences flowers during March-April and gets extended up to September. The button rose yield flowers throughout the year except during September-October and April-May (pruning period) and the tube rose gives flowers from June to November. These flower crops meet the market demand, fetches good price and provides a regular income to Shri Munnusamy.

### Impacts

Cultivation of various flower crops gives year round flower production. Perennial flower crops grow well in drought condition and multi flower crop production paves a way for stable income. The cut-flower business may fit well into a small holders with limited irrigation sources. After Shri Munnusamy's innovation other growers are also following his technique as the demand is growing.

### Economics

He is getting an average net income of ₹ 30,000, 35,600 and 20,500/- from Jasmine, Rose and Tuberose respectively. Fresh cut flowers are generally sold either in bunch or pre-arranged bouquets, or individually. He has designed various marketing alternatives for cut-flower growers: wholesale markets, direct to florists, pick-your-own operations etc.



Name : Shri Munnusamy

Age : 40 years

Phone : 04147-250001/02

Education : 9<sup>th</sup> Standard

Address : Kattusiviri, Villupuram (District),  
Tamil Nadu

Land holdings : 2.5 ha irrigated

Livestock : 2 Cows and 3 Buffaloes

Farming experience : 20 years



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## Innovation : Radish as Intercrop in Bitter Gourd under Broad Bed System

Focus area : Crop Diversification and Intensification

The Radish is a short duration cole crop which comes up well during September and October months in Tamil Nadu. This crop is taken by farmers every year during the north-east monsoon season. During the last three years, there was failure of monsoon and couldn't take up radish cultivation. But, Shri Ravi used to grow radish as intercrop in bitter gourd in broad bed system (1.5 m width and 0.5 m height). Shri Ravi took up bitter gourd cultivation and the inter space between bitter gourd was utilized for radish cultivation at a spacing of 15 cm during the month of August. This broad bed system enabled harvesting of rainwater and was retained for longer period. At the same time, the bed favored growth of radish below the ground. The bitter gourd plants provided favorable microclimate to radish plants. When the bitter gourd attained a height of two meters and reaches the top of *pandal*, radish crop reached harvesting stage.



Name : Shri Ravi  
Age : 45 years  
Phone : 04147-250001/02  
Education : 6<sup>th</sup> standard

Address : Kattusiviri, Villupuram (District),  
Tamil Nadu

Land holdings : Irrigated: 2 ha

Livestock : 70 goats

Farming experience : 15Years

### Impacts

The furrows between two beds store the rainwater while the beds favour the growth of underground radish, thus, both the system and the crops are compatible. The pest's population *viz.*, pumpkin beetle, fruit fly and lady bird beetle incidence was much low in the systems and the cost of plant protection was low.

### Economics

Normally a net income of ₹ 60,000/- is obtained from bitter gourd cultivation in a period of 150 days from 0.5 ha of land but in bitter gourd + radish cultivation an additional net income of ₹ 19,000/- was obtained from radish within 50-55 days from 0.5 ha.



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## Innovation : Elephant Foot Yam (EFY) based Multi-layer Vegetable Cropping System

Focus area : Vegetable Production

The improved variety of elephant foot yam (EFY) (Gajendra) and hybrid variety of bottle gourd (Mahima), ridge gourd (local) and bitter gourd (US-6214) was grown simultaneously in the same piece of land with leafy vegetables. This can be termed as EFY-based multi-tier vegetable cropping system. A *machan* like structure was erected with the help of bamboo, wire and threads over 6.5 feet height from the ground level over the main crop i.e., EFY to spread the vines of bottle gourd, ridge gourd and bitter gourd. The EFY variety Gajendra was planted during the second fortnight of June at 75 cm x 75 cm spacing in the plot size of 1000 m<sup>2</sup>. A pit size of 30 cm x 30 cm x 30 cm was dug out and 2 kg well decomposed cow manure was applied. 500 g cut tubers of elephant foot yam treated with cow dung slurry (one kg of fresh cow dung in one liter of water) one day before planting on the pit and then filled the pit with the remaining soil and small mound was formed on the pit. The seeds (hybrid) of cucurbits viz., bitter gourd, ridge gourd, and bottle gourd were sown in between two rows of main crop i.e. elephant foot yam at the recommended spacing for each crop. All the plots were fertilized with 150 kg N, 100 kg P<sub>2</sub>O<sub>5</sub> and 150 kg K<sub>2</sub>O/ ha.



Name : Shri Amrit Lal Singh

Age : 38 years

Phone : 9771973728

Education : 10<sup>th</sup> Standard

Address : Draupad, Pauriahaat (Block),  
Godda (District), Jharkhand

Land holdings : Rainfed: 2 ha; Irrigated: 1 ha

Livestock : 2 Cows

Farming experience : 15 years

### Impacts

Shri Singh is cultivating the improved variety of yam and multi-layer system not only improved the yield but also providing staggered returns.

### Economics

The net returns was recorded with EFY based multi-tier vegetable cropping system i.e., EFY+ ridge gourd, EFY+ bitter gourd and EFY+ bottle gourd were ₹ 389500/ha, ₹ 496900/ha and ₹ 430850/ha in comparison to sole cultivation of EFY, ridge gourd, bitter gourd and bottle gourd net returns are ₹ 339500/ha, ₹ 32990/ha, ₹ 132200/ha and ₹ 79745/ha, respectively.



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## Innovation : Growing of Pigeon Pea in Wider Rows and Intercropping with Pumpkin

Focus area : Crop Diversification and Intensification

The innovation is pigeon pea + pumpkin intercropping and during the land preparation made with the help of tractor mounted ridger and the distance between two pigeon pea lines were 6 feet and the distance between pigeon pea and pumpkin was 3 feet. The pigeon pea seeds were dibbled on the ridges (6'x3' i.e., row to row 6' feet and seed to seed 3' feet, similarly with pumpkin 6'x3'). The pigeon pea seeds required to be dibbled for one acre was about 400 g while for pumpkin it was 300 gm per acre. Both seeds were dibbled during 2<sup>nd</sup> week of June. Then the weeding operation was taken up after one month of dibbling. One time spraying was taken up to pumpkin for leaf eating caterpillar. The pumpkins were harvested from August 1<sup>st</sup> week to September 4<sup>th</sup> week. The nipping of top shoot was taken up in pigeon pea after 60 days of dibbling.



Name : Shri Mallanna

Age : 58 years

Phone : 9900941095

Education : 5<sup>th</sup> standard

Address : Melakunda, Kalaburagi (Taluk & District), Karnataka

Land holdings : Rainfed: 15 ha; Irrigated: 03 ha

Livestock : Nil

Farming experience : 45 Years

### Impacts

Shri Mallanna's obtained higher yield per unit area through better use of natural resources. Pigeon pea crop gave additional returns as bonus crop as pumpkin is grown traditionally as sole crop. There are around 200 farmers who have adopted this innovation in his village.

### Economics

The total harvest of pumpkin was 4 t/ha and total yield from 8 ha was about 72 tons. The income generated was about ₹ 1,20,000 per ha while the yield of pigeon pea was bonus.



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## Innovation : Improved Mustard/Rapeseed Cultivars with Apiculture

Focus area : Varietal Intervention and Apiculture

The flowers of most *Brassica* plants are attractive to honey bees. Apiculture has very good scope for Garo Hills condition due to good availability of flora and congenial climatic condition. Improved varieties of mustard/ rapeseed seeds (var: TS-36) were broadcasted in the partially pulverized field. In order to fetch additional income, bee boxes with colonies (*Tura*) were placed in and around the mustard field on a locally made stand. About 12 bee boxes were placed in an area of 0.26 ha. This not only helped her in getting honey from hives with very little initial investment but also improved the productivity of mustard.

### Impacts

After seeing this innovation, the farmers from the neighbouring village adopted apiculture not only with mustard but also with other vegetables. Nearly, 200 farmers from the hill station have adopted this approach to diversify their sources of income. She used *Apis mellifera* which is widely used as pollinator and is preferred for honey production.

### Economics

Growing of mustard with honey bees fetched her total of ₹ 55300 as the yield of mustard was high and increased by 31% with honey bees hives. Therefore, there is vast scope of improving the pollination and crop yields by native bees in agricultural ecosystems.



Name : Smt. Pronilla Sangma  
Age : 51 years  
Phone : 8014779403  
Education : 10<sup>th</sup> Standard

Address : Marapara, Kherapara (Taluk),  
West Garo Hills (District), Meghalaya

Land holdings : Rainfed: 4.98 ha

Livestock : 21 Chickens, 8 Goats and  
4 cattle

Farming experience : 32 years

Social appreciation/  
Recognition/  
Awards : President of Village Self Help  
Group Federation (2009 to  
till date); Secy., Custom Hiring  
Center (NICRA), Marapara,  
KVK, West Garo Hills



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## Innovation : Judicious Use of Interspaces of Mango by Growing Mustard as Leafy Vegetable

Focus area : Integrated Horti-Vegetable Production

In general farmers keep mango orchards weed free during initial stages and the interspaces are not utilized. Shri Jagarnath was successful and cultivated mustard as leafy vegetable for supporting his livelihood during initial years of tree growth. He could grow leafy vegetable successfully during *rabi* as well as in summer season around the individual mango plant. The mango plant covered around 1 to 1.5 sq meter area up to three years after planting and the rest of the area was available for cultivation. He started cultivation of mustard as a leafy vegetable on different staggered date around the canopy area. Now, his innovative idea has not only benefitted him but gave him higher returns per unit of area.



Name : Shri Jagarnath Oraon

Age : 40 years

Phone : 06523-278535

Education : 10<sup>th</sup> standard

Address : Belagarha, Ghaghra (Block),  
Gumla (District), Jharkhand,

Land holdings : Rainfed: 1.5 ha

Livestock : 1 cow and 4 goats

Farming experience : 10Years

### Impacts

Survival of fruit plants during off-season is the major concern in rainfed areas and growing of vegetables enabled sizable income during initial stages of tree growth and also succeeded in improving the survival rate of planted mango seedlings.

### Economics

Shri Jagarnath has succeeded in earning an additional income of ₹ 4000 to 6000/ha (i.e., from 100 plants canopy area) within 40 to 45 days by a single crop. Handsome income compelled him to follow a vegetable crop calendar which will complete its life within 40 to 45 days.



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## Innovation : Use of "Noni" (Old Soil Dust) for better Wheat Yield in Moisture Stress condition

Focus area : Crop Production

During winter season, due to lack of irrigation facility, farmers were compelled to sow the wheat crop in poor moisture condition that affect the germination. Keeping in view this problem, dust fallen from walls of mud houses at the end of the rainy season which is called 'noni' in local language was collected and used as conditioner for better germination of wheat. Farmers use moist wheat seed in those fields where there is less moisture and chance of poor germination of wheat seed. He dipped the wheat seed in water, taken out the seed and kept them in jute sack for 4-5 hours, after that mixed *noni* in equal amount with wheat seed. Later, wheat seeds coated with '*noni*' were sown after field preparation.



Name : Shri Sant Kumar Sinha

Age : 45 years

Phone : 7321002392

Education : M.A

Address : Sakrorha, Modanganj (Block),  
Jehanabad (District), Bihar

Land holdings : Rainfed: 1 ha; Irrigated: 2 ha

Livestock : 4 cows

Farming experience : 15 years

### Impacts

Wheat seed sowing after coating with '*noni*' resulted in 80% germination as compared to 50% without coating. *Noni* acts as conditioner and also contains nutrients thus reduces the requirement of chemical fertilizers by about 25% in case of basal dose. This technique was adopted by around 100 farmers and was found to be beneficial.

### Economics

About 60% farmers involved in wheat cultivation are practicing this innovation under moisture stress situation and getting 30 to 32 q/ha yield as against 25 q/ha without coating, mainly due to good plant stand.



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## Innovation : Sugarcane-based Intercropping System

Focus area : Crop Production

Sugarcane offers unique potential for intercropping as the peak periods of growth of two crops do not coincide. The early maturing crop completes its life cycle before the grand growth of main crop-sugarcane. Cane is planted in wide rows and takes several months for canopy development during which time the soil, solar energy and much of the rainfall are under-utilized. Any intercrop must therefore mature and be harvested within 90-120 days to avoid adverse impact on the main crop. Shri Kailash Behera an innovative farmer started sugarcane intercropping. The productivity per unit area and time not only improved but also provided an option for better input management. Cane was planted at 1.2 m interval in a single row and chickpea was taken up inter rows



Name : Shri Kailash Behera

Age : 35 years

Phone : 9937918026

Education : 12<sup>th</sup> standard

Address : Kasotibali, Marshaghai (Block),  
Kendrapara (District), Odisha

Land holdings : Rainfed: 1 ha; Irrigated: 3 ha

Livestock : 2 cows and 10 goats

Farming experience : 10Years

### Impacts

Neighboring farmers of the area were positively influenced by the innovation and they started adopting the technology.

### Economics

Shri Kailash Behera recorded yield of sugarcane (125 t/ha) and chick pea (3 t/ha) with a cost of cultivation of ₹ 190250 and net returns with 2.9 of B:C ratio by using his own innovation of sugarcane base intercropping systems in comparison to sole sugarcane practice (99.5 t/ha, ₹ 47175 and 1.4).



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## Innovation : Pineapple based of Intercropping Systems in North-Eastern Regions

Focus area : Crop Diversification and Intensification

Smt Veikhochong Misao has innovated intercropping of turmeric and *Jhum* paddy in pineapple to generate additional income during the pre-bearing stage of pineapple. Pineapple was planted in double row spacing of 90 cm x 60 cm x 30 cm with nearly 45000 pineapple suckers/ha across the gentle slope of hillock. The space available between the two rows of pineapple as well as double row space was utilized through intercropping with Megha Turmeric-1 and *Jhum* paddy. Intercrop in the early stage of pineapple cultivation with Turmeric and *Jhum* paddy suppressed the weed growth and reduced the cost of weeding during the first year of planting. There was no competition among the crops. This practice reduced the soil erosion by providing more ground cover and protected the soil from direct action of the heavy and intense rain.

### Impacts

Intercrop in the early stage of pineapple cultivation with turmeric and *Jhum* paddy suppressed the weed growth and reduced the cost of weeding during the first year of planting. Seeing her success, other fellow farmers namely Shri Letthang (3.0 ha), Shri Setlal (2.5 ha), Shri Laljaseh Kuki (2.0 ha), Shri Otlal (1.0 ha) in the village also adopted the same model of pineapple based farming system. About 70 farmers from Moava village of Dimapur district also replicated the same model under VADI programme of NABARD.

### Economics

Smt Veikhochong Misao, used to get an annual average income of ₹ 1,25,000 but after intercropping of pineapple with turmeric and paddy she is now getting an additional income of ₹ 1,37,000 from turmeric and paddy.



Name : Smt Veikhochong Misao

Age : 32 years

Phone : +919615582641

Education : 10<sup>th</sup> standard

Address : Molvom, Medziphema (block),  
Dimapur (District), Nagaland

Land holdings : Rainfed: 4 ha

Livestock : 2 poultry birds

Farming experience : 10 years

Social appreciation/  
Recognition/  
Awards : Smt. Veikhochong Misao  
awarded with Best Farmers  
Award, 2011 in the North East  
Zone Regional Agri- Fair  
2010-11.

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## Innovation : Bt. Cotton-based Intercropping System

Focus area : Crop Diversification and Intensification

The area under pulses namely green gram and black gram has declined drastically mainly due to good income realized from cultivation of Bt. cotton in the state of Maharashtra. Shri Kayyum Azeez Shaikh developed an innovative intercropping system which involved planting of Bt cotton at 120 x 45 cm and two ridges were formed at 60 cm apart between two rows of cotton. Green gram and black gram were planted on four sides of two ridges as an intercrop. Rainfall during 2016 was just 327 mm as against average annual rainfall of 644 mm. Before planting, the field was ploughed once with tractor drawn mould board plough and then harrowed twice.



Name : Shri Kayyum Azeez Shaikh

Age : 34 years

Phone : 9404872620

Education : B.Com

Address : Shekta, Siddhanathwadgaon (Post),  
Gangapur (Taluk), Aurangabad (District),  
Maharashtra

Land holdings : Rainfed: 4.50 ha

Livestock : 1 buffalo, 2 cows, 2 bullocks,  
2 goats and 15 poultry birds

Farming experience : 15 Years

### Impacts

Now, around 200 farmers have adopted Shri Kayyum Azeez Shaikh's innovative intercropping system in his village. He made use of inter space between two rows of cotton very innovatively by growing short duration pulses with modified planting geometry.

### Economics

Shri Kayyum Azeez Shaikh's innovative intercropping yielded 6 q/ha of greengram and 5.36 q/ha of cotton while 5.75 q/ha of blackgram and 4.80 q/ha of cotton from two hectare area. The farmer could realize an additional income of ₹ 23500 from green gram and ₹ 58750 from blackgram.



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## Innovation : Covering of Banana Bunches with Non-woven Polypropylene

Focus area : Horticulture Crop Production

A protective cover for protection of banana bunch comprising a fibrous non-woven fabric exhibiting sufficient vapor permeability to alter or control the ripening of the banana. The transmittance of light to fruits is known to significantly affect the way it develops and ripens. Banana exhibits pronounced variation in the rate of ripening depending upon length of exposure to daylight. The fabric invention provides an improved form of protective cover for banana bunch which is particularly suited for use in controlling the in-situ ripening prior to harvest. The product specifications are 10 gsm onwards and tubular form (opened from both ends), 0.8m dia x1.5m or 0.8 m dia.x1.0m fabric and are available in rolls.



Name : Shri Khalilur Rahaman

Age : 32 years

Phone : 09547105154

Education : 12<sup>th</sup> standard

Address : Khagribari, Patlakhawa (Block),  
Cooch Behar (District), West Bengal

Land holdings : Rainfed: 3 ha; Irrigated: 1 ha

Livestock : 4 cows

Farming experience : 20 years

### Impacts

The use of protective cover has revolutionized the production of clean, spotless bananas and has been adopted by all the growers in the adjoining villages.

### Economics

After the harvest, Shri Khalilur Rahman noticed a significant improvement in the yield of banana as compared to traditional practice. He obtained 479 q/ha through his own traditional method as against 492 q/ha with help of the non-woven polypropylene covering to banana bunches.



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## Innovation: Relay Cropping of Vegetables and Paddy-Melon

Focus area : Crop Diversification

In the relay cropping of vegetables, a second vegetable crop of shorter duration is planted when the first one is about to be harvested and during third season when second vegetable enters fruiting phase. Shri Naewadeshwar Giri modified the principles of mixed and relay cropping and took three crops in same patch of land over a period of 8 months. Shri Giri evolved relay cropping of vegetables and paddy-melon systems. Sowing of brinjal in nursery was done by 15<sup>th</sup> August and transplanting by 15<sup>th</sup> September at 6x3 feet distance on permanent beds. Seedlings of tomato were raised in a separate nursery in last week of November and transplanting was done in between the rows of brinjal at a distance of 3 feet. The plant geometry was so maintained that there was no shading effect of brinjal on tomato. Cucumber and long melon was sown directly in between the plants of tomato at a distance of 2 feet by 25<sup>th</sup> February or when the ambient temperature was around 22-23°C. Sesbania was grown in the field by 25-30<sup>th</sup> May and it was incorporated in the field at 45 days duration irrespective of monsoon onset with supplemental irrigation. Short duration paddy was then taken in the field after puddling.

### Impacts

The relay cropping model reduces risk, enhances utilization of natural (land, water) and external (fertilizer, pesticide) resources. The practice has reduced the cost of cultivation and increased net returns from the same piece of land. The main advantage is continuous flow of vegetables to market and presently there are 50 farmers who are following the innovation of Shri Naewadeshwar Giri in his village.

### Economics

He has happy with increased system productivity of 7 to 10 t/ha and net profit of ₹ 100000/- to ₹ 150000 with relay cropping of vegetable with paddy.



Name : Shri Naewadeshwar Giri

Age : 60 years

Phone : 8292054096

Education : Graduate

Address : Affaur, Nagra (Block), Saran (District), Bihar

Land holdings : Irrigated: 2 ha

Livestock : 2 cows, 2 buffaloes and 1 calf

Farming experience: 16 Years

Social appreciation/ Recognition/ Awards : Felicitated by NHM for drip irrigation KVK for organic farming, Climate Resilient Technology Chairman of SHGs, Sanyasi Krishak Club, Member of Extension Council and research Council of RAU Pusa, Member of SAC of KVK Saran, Member Secretary of VCRM of NICRA



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## Innovation : Non-Conventional Chilli Cultivation Practices

Focus area : Vegetable Production

The chilli crop is raised as rainfed crop where the amount of annual rainfall is around 80-100 cm and well distributed. In Eastern parts of India especially Jharkhand where the rainfall received is around 80 cm, it is extensively cultivated as a rainfed crop during *kharif* season. Shri Raj Kumar Singh, a farmer of Koderma district developed an innovative cultivation practice to ensure off-season chilli cultivation. In this method chilli plants of fruit bearing stage are uprooted from medium land during June, roots are pruned to a certain extent and re-transplanted in the upland without any time gap. Uprooted chilli plants are established without additional irrigation with the available moisture in medium land. In the acute dry conditions, one life saving irrigation is provided. Uprooting of chilli plants is done after first picking; this unique method has helped him harvest off-season chilli to get higher market price.



Name : Shri Raj Kumar Singh

Age : 35 years

Phone : 09955383433

Education : 12<sup>th</sup> standard

Address : Lohadanda, Jahalga (Block),  
Koderma (District), Jharkhand

Land holdings : Rainfed: 3 ha

Livestock : 2 cows

Farming experience : 20 years

### Impacts

The new developed method ensured utilization of cultivable land (both medium and upland) throughout the year followed by harvesting of chilli as *rabi* and *kharif* crop. Uprooting of chilli plants from medium land during mid-June does not disturb *kharif* rice cultivation. There are 100 farmers who are following the non-conventional chilli cultivation practices in his village.

### Economics

Shri Raj Kumar Singh has recorded yield of 120 q/ha with his non-conventional chilli cultivation practices in his village. The overall economic benefit was ₹ 36000/- per ha under non-conventional chilli cultivation practice which translates to a return of ₹ 6.0 for every additional rupee spent.



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## Innovation : Gladiolus as Intercrop on Ridges in Sugarcane

Focus area : Crop Intensification

Sugarcane offers a unique potential for intercropping. To ensure the optimum productivity in an intercropping system, one must ensure that the peak periods of growth of two crops do not coincide, so that one quick-maturing crop completes its life cycle before the main period of growth of the other crop starts. Cane is planted in widely spaced rows and takes several months for canopy development and this period can be effectively used for intercropping. Any intercrop therefore must mature and be harvested within 90-120 days before the development of cane canopy. Muzaffarnagar is the main sugarcane growing area. Cost of cultivation of sugarcane is increasing day by day and net profit is decreasing. Gladiolus was introduced as an intercrop on ridges without disturbing the population of sugarcane and was found to be profitable. Gladiolus is planted in the month of October and the spikes are harvested up to February. The bulbs are left in the field for one month for hardening and removed by the end of March.



Name : Shri Dheer Singh

Age : 60 years

Phone : 9759847691

Education : Graduate

Address : Noonikhera, Ghatain (Post),  
Jansath (Block), Muzaffarnagar (District),  
Uttar Pradesh

Land holdings : Rainfed: 2.5 ha

Livestock : 2 cows, 22 buffaloes and  
2 bullock

Farming experience : 37 Years

### Impacts

Gladiolus as an additional intercrop may be planted in the month of October with autumn sugarcane and is feasible in the district because of marginal and small land holding. There are more than 100 sugarcane growers practicing this kind of innovation in their farms.

### Economics

This intercropping gave a net profit of ₹ 3.08 lakhs per ha as compared to ₹ 0.93 lakh of sole crop. The average yield of intercropped sugarcane was 1000 q/ha in addition to 150000 spikes, 75000 bulbs and 5 q bulblets of gladiolus from 1.0 ha land.



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## Innovation : Innovative and Sustainable Integrated Farming Systems at Hilly Region in Arunachal Pradesh

Focus area : Integrated Farming System

Arunachal Pradesh is entirely rainfed and the landholdings are small. Farmers practice subsistence farming for their livelihood. In order to maximize farm productivity, income innovative interventions through sustainable integrated farming system was adopted by Shri Nima Dorjee. He has introduced integrated farming system approach incorporating enterprises like crop production (maize, soybean, barley buckwheat, etc.) with horticulture fruits and vegetables (Tomato-Chranjeevi, Pea- VRP 22, Cabbage- Blue diamond, Cauliflower- H. aghani, Kiwi- bruno, Persimmon, Walnut, Guava- Allahabad safeda, L-49 and Black guava), livestock (piggery, dairy, fishery and poultry/ duckery).



Name : Shri Nima Dorjee

Age : 45 years

Phone : 8258827576

Education : 10<sup>th</sup> standard

Address : Sangti, Dirang (District),  
Arunachal Pradesh

Land holdings : Rainfed: 3 ha; Irrigated: 1 ha

Livestock : 3 cows and 5 pigs

Farming experience : 25 years

### Impacts

The system is becoming a role model for other farmers in the village and neighbouring villages owing to its sustainability, eco-friendly, employment generation capacity, improved livelihood and efficient management of natural resources. Construction of water harvesting tank enabled fishery and duckery besides critical irrigation to agriculture and horticulture crops.

### Economics

As compared to maize monocropping system, the innovation (comprising crop production, horticulture, livestock, poultry, piggery, fishery) has helped him to increase the annual income from ₹ 1,60,000/- to ₹ 3,52,000 per annum which is expected to improve further after maturity of fruit trees. The income was stabilized even during years of drought thus enhancing the adoptive capacity from multiple enterprises.



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## Innovation : Panicle Harvesting System in Rice Crop

Focus area : Crop Production System

Traditionally most of the farmers harvest rice by cutting rice about 3 to 4 inches height from ground level by sickle, bring home and threshing is done by bullock or by beating with stick or by own trampling. Shri Moidam is a innovative and progressive farmer in the Tirap district of Arunachal Pradesh. He harvested only the panicle portion of rice especially for summer rice, by sickle or by knife (small dao). The panicle is kept on basket made of bamboo on back. The practice is more quicker than traditional harvesting of panicle with straw. Cultivation practices of summer rice is similar with traditional cultivation practices except harvesting method. The innovation is modification of the traditional harvesting method of rice especially summer rice. The practical utility of the innovation is very high. Generally summer rice is cultivated in slope

of the hills of the district. It is very difficult to carry panicle with straw from field to home for threshing where there is no road or transport communication. Besides that no threshing is required and by beating with stick or by trampling paddy can be separated from panicle. Time consumption from harvesting to post harvest operation is very less as compared to traditional one. Retaining paddy stubbles in the field contributes to soil organic carbon improvements, covers soil surface and reduces soil erosion.

### Impacts

Generally harvesting time of summer rice is overlapped with monsoon rainfall. Grains of summer rice damage by sprouting itself in plant due to rain. As panicle harvesting is very less time consuming practice and bulkiness of panicle is very less as compared to harvesting with straw, can be dried easily on floor and can be overcome the sprouting problem of grains on plant itself. Thus yield loss in harvesting to post harvest operation can be minimized and quality of produce can be maintained. Organic matter content of the field is improved due to the retention of the entire rice plant except panicle by this practice.

### Economics

The system productivity increased from 2380 to 2740 kg/ha. and net profit from ₹ 4300 per ha with this innovated panicle harvesting with paddy crop with a benefit cost ratio of 1.72. The net return got improved due to reduced harvesting and transportation costs. The yield from the panicle harvesting plots are also high.



Name : Shri Hohan Moidam

Age : 62 years

Phone : 8974316302

Education : 4<sup>th</sup> standard

Address : Doidam, Deomali (Post),  
Tirap (District), Arunachal Pradesh

Land holdings : Rainfed: 1.5 ha

Livestock : 3 pigs

Farming experience : 43 Years

Social : Farmers representative in  
appreciation/ SAC meeting of KVK Tirap,

Recognition/Awards Arunachal Pradesh

Contact details for further information:

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## Innovation : Protective Cultivation in Poly House

Focus area : Vegetable Production

Erratic rainfall and continuous drought did not give sustainable yield and income from conventional crops like soybean, pearl millet, bengal gram. Therefore farmer Shri Subhash Gadge has diverted towards protective cultivation in poly house in his village. He erected poly house on 3000 sq.m area during June month and cultivated colour capsicum with drip system for irrigation management. Meanwhile he identified marketing linkages at Mumbai market. In order to minimize the cost of cultivation, he had made contact with wholesaler for pesticides and nutrient purchase, and purchased inputs at wholesale rate. He harvested 51 tons of colour capsicum during one year period. He also purchased vehicle for transport the produce to Mumbai. Normally, poly house is constructed on 1000 sq.m, hence irrigation water requirement is comparative very less than open field crops. Crop is cultivated under well controlled climatic condition; hence sustainability in crop yield is more. Similarly for erection of poly house, 50 percent subsidy has been given by state agriculture department and remaining amount is available through bank loan.



Name : Shri Subhash Vitthal Gadge

Age : 40 years

Phone : 9011043309

Education : 10<sup>th</sup> standard

Address : Pimpri Lokai, Rahata (Block),  
Ahmednagar (District), Maharashtra

Land holdings : Rainfed:1.6 ha; Irrigated : 0.4 ha

Livestock : 2 cows

Farming experience : 25 years

### Impacts

Shri Subhash Gadge has well established market linkages at Mumbai, he established poly house cultivators group and transport the produce of other farmers. This group marketing helps in continuous produce supply in market and higher rate. Similarly, purchasing inputs on large scale also results in additional saving on inputs cost. Group approach in cultivation, marketing, buying of inputs helps in sustaining the activity. Buyers also contact this group for purchase at village level. Now four another poly houses were erected in the same village and 30-35 in neighbouring villages.

### Economics

He got an average rate of ₹ 33 / kg. Gross income received during one year is ₹ 16 lakh and the cultivation cost is ₹ 5 lakh (excluding erecting cost of poly house). Poly house erection cost is about ₹ 9 lakh/1000 sq.m.



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## Innovation : Assured Income by Pomegranate Cultivation in Arid regions of Kutch

Focus area : Arid-Horticulture

Pomegranate can adopt itself to a wide range of climatic conditions and can grow up to 1800 m above sea level. The fruit tree grows best in semi-arid climate where cool winter and hot and dry summer prevail. Shri Ramesh Arjan Chavda is a young and progressive farmer having five ha irrigated land. He has adopted pomegranate cultivation under micro irrigation system (MIS). He initially installed MIS in five ha and planted pomegranate variety "Bhagva". He planted Bhagva variety of pomegranate in two phases. Initially, he planted in two ha of land with a distance 3.5 m x 3.5 m (total 1568 plants). Later, he has planted 924 plants of pomegranate in two ha of land during in the subsequent year. He harvested cotton, cluster bean, wheat and lucerne (fodder) intercrops during initial stage of pomegranate and increased his income.



Name : Shri Ramesh Arjan Chavda

Age : 28 years

Phone : 9979493564

Education : 10<sup>th</sup> standard

Address : Bhalot, Anjar (Taluk), Kutch (District), Gujarat

Land holdings : Rainfed: 6 ha; Irrigated: 5 ha

Livestock : 3 Milking Cows

Farming experience : 8 Years

### Impacts

Looking to success of this farmer, six farmers in this village and twenty eight farmers in surrounding villages have planted pomegranate in total 100 ha area. Area under pomegranate is increasing rapidly in the area.

### Economics

Pomegranate production was 61 q/ha (production from first plantation of 1500 plants) with market price of ₹ 49.50 per kg and total income from pomegranate was ₹ 3.02 lakhs. Likewise, intercrop production with Bt. cotton was 32 q/ha sold at ₹ 4250 per q yielded income of ₹ 1.36 lakhs and with cluster bean was 12.80 q sold at ₹ 3400 per yielded income ₹ 0.43 lakhs. He got a total income ₹ 4.81 lakhs from pomegranate + intercrop and the expenditure was ₹ 1.74 lakhs and total net returns were ₹ 3.07 lakhs. Earlier, no farmer in the village was having fruit crop plantation. Today, this farming model is rapidly spreading in the same and surrounding villages.



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## Innovation : Introduction of Ashwagandh Crop for Profitability in Semi-Arid Zone

Focus area : Medicinal Plant Production

Shri Rajendra Shirol Introduced a medicinal herb, Ashwagandh (*Withania somnifera*) suitable for drought prone areas of Northern districts of Karnataka, receiving less than 350 mm average rainfall. He has adopted appropriate package of practices for Ashwagandha crop with organic farming principles over a period of six years. Done many trials regarding exact spacing to be followed, date of sowing, plant population to be maintained and exact stage of harvesting of the roots to get maximum active alkaloids in the roots. The crop established very well under moisture stress situation and is more profitable compared to conventional crops of chickpea and *rabi* sorghum. Apart from cultivation, he also developed a market linkage by which now the produce is being sold to many Pharmaceutical Companies in India and abroad. The buyers are happy with consistency in quality and supplies.

### Impacts

Ashwagandha crop require little inputs and this crop cannot be browsed by the cattle. There is assured

buyback arrangement for the produce. The crop is best suited for farmers having big land holding in semi-arid zones. There has been spread of more than 500 ha of Ashwagandha crop in Gadag and neighbouring districts under the guidance of Shri Rajendra Shirol.

### Economics

When the Ashwagandh crop is compared with conventional crops like chickpea and *rabi* crops like sorghum under rainfed situation, farmer is getting a net income of ₹ 31000 per ha in Ashwagandha crop as against ₹ 16000 and ₹ 9000 per ha in chickpea and *rabi* sorghum respectively. Cost-benefit ratio in Ashwagandha crop is 2.74 against 1.08 and 1.53 in chickpea and *rabi* sorghum, respectively.



Name : Shri Rajendra Shirol

Age : 56 years

Phone : 09448934730

Education : B.Sc (Agri)

Address : Belavanaki, Ron (Taluk),  
Gadag (District), Karnataka

Land holdings : Rainfed: 3 ha

Livestock : 2 cows

Farming experience : 35 years

Social appreciation/  
Recognition/  
Awards : Best Medicinal Plant  
Cultivator Award from IIHR,  
Bengaluru.  
Regional Member of Spices  
Board, Cochin

Member of Technical Committee, National Medicinal  
Plant Board, New Delhi

President of Ashwagandha Farmers Association,  
Gadag district.

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## Innovation : Agri-Horti: Integrated Farming and Protected Cultivation

### Focus area : Integrated Farming System

Shri Hari Singh is practicing integrated farming with two horticulture crop + intercropping + protected cultivation in 1.28 ha area. They are latest spur type apple in top worked over traditional standard type + stone fruit apricot cultivation and constructed three poly houses of 40 m<sup>2</sup> each where off season vegetables, nursery production and other vegetables are being taken up. Apart from this, he has also built packing grading cum apple store house. A vermicompost unit is made exactly beneath the cow shed which make his work easier for making vermi compost. He has adopted several innovations in his farming by changing standard variety to spur type by chip, tongue budding and grafting. High yielding varieties of intercrops, regular fertilizer application, insecticide and pesticides spray in both vegetable and horticulture crops are being practiced by him.



Name : Shri Hari Singh

Age : 65 years

Phone : 9816684157

Education : 8<sup>th</sup> standard

Address : Lagga, Kiri (Tehsil),  
Chamba (District), Himachal Pradesh

Land holdings : Rainfed: 0.56 ha; Irrigated: 0.48 ha

Livestock : 4 Cows

Farming experience : 25 Years

### Impacts

Being a snow bounded area, agriculture is being practiced from march to December. During the lean period he grows nursery of different vegetables in the polyhouse. So that vegetable seedlings can be transplanted with rising temperature. Diversification of agriculture reduce the risk that crops face from harsh weather and in temperature fluctuations. Several farmers in the village and the farmers have shifted from traditional to integrated farming system.

### Economics

Under the farmers practices i.e., apple alone yield 800 kg/ha with net returns of ₹ 225000. Whereas, two horticulture crop + intercropping+ protected cultivation based system, recorded significantly higher yield of apple, tomato and cucumber with an aggregate returns of ₹ 450000. Due to the increased returns through his innovative integrated farming, other farmers have shown interest in the application of his innovations in their fields.



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## Innovation : Protected Cultivation of Capsicum in Snow Bound Temperate Region

Focus area : Vegetable Production

Capsicum (*Capsicum annuum* L. var. *grossum* Sendt) commonly known as sweet pepper / bell pepper or Shimla mirch is an important vegetable crop. Total weight of capsicum inside polyhouse is more than double compared to outside. Light plays an important role on yield in poly house. Shri. Dharmo Ram constructed three polyhouses (250 + 100 + 100 = 450m<sup>2</sup>). He is growing crops like capsicum which were not grown earlier and use drip irrigation and fertigation technique in his polyhouse. Raised nursery in the month of February and transplanting of 2000 plants in the first week of April and harvested 40 q capsicum. An average yield of 45q was observed. Drip irrigation was adopted in view of limited water availability in hill regions and water saving to the extent of 40% was observed.



Name : Shri Dharmo Ram

Age : 37 years

Phone : 9805105773

Education : 10<sup>th</sup> standard

Address : Padhruin, Kiri Tehsil (Block),  
Chamba (District), Himachal Pradesh

Land holdings : Rainfed: 0.56 ha  
Irrigated: 0.48 ha

Livestock : 2 cows

Farming experience : 15 years

### Impacts

Due to low temperature and snow he raises his nursery during December-March and seedling are transplanted with favourable temperature after winter. There are 22 farmers who have adopted this innovative technology and now they are raising vegetables like capsicum, tomato, and cucumber and earning profits.

### Economics

Shri Dharmo Ram recorded yield of 465 q/ha/year with expenses of ₹ 145000 per ha/year and he has earned net returns of ₹ 904700/- with his own innovative method of growing of capsicum under protective cultivation. He has improved the quality of produce for maintaining export standard and earned double the income. He is using polyhouse for many vegetables and got additional income.



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## Innovation : Crop Diversification – Drumstick Cultivation

Focus area : Crop Diversification and Intensification

Erratic rainfall and continuous drought did not give sustainable yield and income from conventional crops like soybean, pearl millet in Ahmednagar district of Maharashtra. Hence, farmers diverted toward fruit crops like drumsticks, pomegranate. Shri Santosh Bhosale, planted drumstick variety PKM-1 on 0.4 ha. area. He ploughed land till the fine tilth stage. Well decomposed FYM applied at 10 t/ha in last ploughing. Pits size of 50 cm x 50 cm were dug at a spacing of 4 meters. Shoots were nipped off when the seedlings are at 70 to 75 cm to facilitate side branches. Applied 80 grams of urea, 50 grams of SSP and 50 grams of MOP per palnt. Drip irrigation system installed for efficient use of available water. First crop was harvested one year after planting.



Name : Shri Santosh Ganpat Bhosale

Age : 27 years

Phone : 9890137550

Education : Diploma

Address : Nirmal Pimpri, Rahata (Block),  
Ahmednagar (District), Maharashtra

Land holdings : Rainfed: 1.2 ha; Irrigated: 1.6 ha

Livestock : 3 cows and 2 goats

Farming experience : 20 Years

### Impacts

Under rainfed condition, drumstick can be cultivated with limited water availability in light to medium soil. It gives much higher net income than conventional crops like soybean, pearl millet. It is one of the best option in drought prone area for sustaining the agriculture income. In his village more than 30 farmers have planted drumstick after seeing the performance in his field. Shri Santosh Ganpat Bhosale way of innovative cultivation of drumstick is now disseminated in more than 500 ha area in the district and seedlings are in huge demand.

### Economics

Total four tons of drumstick pods were harvested and sold in local market at an average rate of ₹ 40 per kg. Gross income is ₹ 1.60 lakh. Cost of cultivation is ₹ 45,000. The subsequent year he got yield of 4.5 ton and sold at the rate of ₹ 25 /kg and got gross income of ₹ 1.13 lakh, while cultivation cost is ₹ 32,000. It gives sustainable income under drought conditions.



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## Innovation : Protecting Vegetable Seedlings from Heat and Cold Stress

Focus area : Vegetable Production

Temperature fluctuations during summer make the vegetable crop susceptible to heat stress, prone to insects, pests and diseases and similarly, cold temperature during winter create favorable conditions for diseases. The tunnels offer protection to vegetables crops both in summer and in winter. The tunnel farming offers maximum crop yields, better maintenance of the fertility of land, controlled temperature and humidity, protection from wild animals and insects and better water conservation. Shri Sunil Minj built a tunnel structures which is inexpensive and relatively easy by using locally available material. It is made of bamboo sticks and wooden poles of 1- inch diameter. As single bamboo sticks are thin, combining two or three sticks bundled together provide a sufficiently strong enough to hang strings that support vegetable growth such as tomatoes, cucumbers and beans. A transparent plastic sheet is placed on the structure to allow sunlight during the day and is absorbed by the black sheet spread over the soil. This raises the temperature to desired levels. The plastic sheet on the soil serves three purposes: first it traps heat, second it reduces water loss and third it eliminates growth of weeds as seeds germinate from the holes made in the plastic sheet. During winter and summer times, the roof may be covered with leaves or locally available crop residues to protect from cold weather. During autumn and spring, the structure is left without protection facilitating aeration.



Name : Shri Sunil Minj  
Age : 30 years  
Phone : 8292814944  
Education : 10<sup>th</sup> standard

Address : Mardanpur, Muktama (Post),  
Chatra (Block & District), Jharkhand

Land holdings : 7 ha  
Livestock : 2 cows and 2 buffaloes  
Farming experience : 7 years

### Impacts

The innovative tunnel provides protection from heat and cold waves and hail storm, reduces the impact of vegetable crops, crop cultivation throughout the year, provides opportunities for crop diversification, household income for women and less labour requirement. Presently, all vegetable growing farmer of his village are adopting Shri Sunil Minj innovated tunnels for protecting vegetable seedlings.

### Economics

The cost of construction of tunnel is ₹ 150000 per ha and the labour cost is about ₹ 50000 per ha. He has invested in various specialized pieces of equipment to lay mulch, build tunnels and fumigate. The overall economic benefit was ₹ 500000/- per harvest of tomato cauliflower capsicum, Chili under innovated tunnels protect the seedling from unfavorable weather condition during rainy and winter season. The benefit which translate to a return of ₹ 2.5 for every rupee spent.



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## Innovation : Improved Intensive-mixed Farming System for Multiple Benefits

Focus area : Integrated Farming System

Shri Nim Tshering Lepcha involved in traditional way of agricultural farming in his 2 ha area. He is cultivating vegetables which are prone to vagaries of climate such as heavy rainfall, scarcity of water during winter season especially during December to March. Due to water scarcity, his cardamom field suffered a lot. Existing practices led to low farm income. A water harvesting structure with dimensions of 5 m x 4 m x 1.5 m (capacity of 30,000 litres) was designed and constructed by him in his field. Shri Lepcha has used this structure to meeting the water requirement of cardamom crop through gravitational sprinkler irrigation system with self designed bamboo and polyvinyl pipe. He made the bamboo poles at a distance of 20 feet in his large cardamom field and standing vegetable crops and the then placed ½” pipe which was connected through water harvesting structure Jalkund. Small holes on pipe were made at 10 feet distance for inserting sprinkle pipe with nozzles. The crops were sprinkled at critical irrigation period. In addition to cardamom, he irrigated paddy (0.25 ha) and vegetables (0.25 ha).

### Impacts

He integrated all the components like livestock (dairy cattle, goat, backyard poultry viz. Vanaraja and local, broiler poultry, pigs; crops, vegetables and spices) so that the waste of a component is used as input in another component in a scientific manner. Moreover, he judiciously uses water of water storage structure through gravitational sprinkler irrigation system in his agricultural field and feeding and watering of his livestock's during the lean period. Shri Lepcha is now a role model not only in his village but also for the entire farming



Name : Shri Nim Tshering Lepcha

Age : 57 years

Phone : 09434447310

Education : 5<sup>th</sup> standard

Address : Lower Nandok, Ranipool (Post),  
East Sikkim (District), Sikkim

Land holdings : Rainfed: 1.5 ha; Irrigated: 0.5 ha

Livestock : 3 dairy cows, 2 calves, 4 goats,  
2 pigs, 100 backyard poultry  
(Vanaraja), 15 desi poultry birds  
and 100 broiler poultry per  
batch

Farming experience : 12 Years

Social appreciation/  
Recognition/  
Awards : Progressive farmer on the 40th  
Foundation Day of ICAR  
Research Complex for NEH  
Region, Sikkim Centre, Tadong  
during 2015. His success story  
has been telecasted by DDK Gangtok, DD Kisan, New  
Delhi, Bloomberg News channel and printed local  
Nepal and English news paper.

community of East Sikkim. Farmers from other villages are motivated by the success of this farmer and headmen of neighbouring villages are encouraging farmers to implement similar model in their villages.

### Economics

He has earned ₹ 415050/ha/year from his improved intensive-mixed farming with B:C ratio of 4.2 as compared to ₹ 274432 and B:C ratio of 2.95 with old practice.

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**Innovation : Introduction of Inter Cropping Maize with Okra fetches Additional Income**  
**Focus area : Crop Diversification and Intensification**

Maize (*ZeamaysL.*) which ranks as the third most cultivated crop in Meghalaya with a national average yield estimated at 1.7 t/ha per annum. Over 60% of the okra and 75% of the maize grown in Meghalaya are produced under intercropping systems. Intercropping generally not only minimizes risks due to crop failure under adverse environmental conditions but also gives a higher total return per unit area of land. Intercropped okra (var: *Arkaanamika*) with maize (RCM-76) in the ratio 1:1 with a proper spacing, she used the available natural streams for irrigation purpose through pump and buckets. Fruits were harvested 5-6 days after flowering in almost every alternate day. She applied FYM at 20 t/ha, spacing- 60x40 cm and seed rate-25 kg/ha for maize.

**Impacts**

Okra was grown as an intercrop in the maize based farming system in the area of 0.13 ha. The yield of okra was recorded to be 91.05 q/ha. This innovative practice of intercropping okra with maize based farming system motivated the farmers to take up this intervention not only with okra but with other crops as well. In addition to this weed infestation at the base of maize was found to be low and the residue left of okra act as a mulch and organic matter to the standing crop. Weed competition was comparatively less in relation to sole cropping, water saving and organic matter addition to the soil. Around five farmers have adopted this innovation not only with this particular crops but with some other crops.

**Economics**

Smt. Pronilla Sangma harvested 91.05 and 37.8 q/ha with 1:1 ratio of okra-maize intercropping system and total net returns of ₹ 99205 as compared to sole crops of maize and okra with 49.5 and 22.0 q/ha, respectively, with total net returns of ₹ 46973.



Name : Smt. Pronilla Sangma  
Age : 51 years  
Phone : 8014779403  
Education : 10<sup>th</sup> Standard

Address : Marapara, Kherapara (Taluk),  
West Garo Hills (District), Meghalaya

Land holdings : Rainfed: 4.98 ha

Livestock : 21 Chickens, 8 Goats and  
4 cattle

Farming experience : 32 years

Social : President of Village Self Help  
appreciation/  
Group Federation  
Recognition/Awards



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## Innovation : Innovative Apple based Production System with Improved Practices

### Focus area : Crop Diversification

Though at present the economy of the farmers in tribal district of Kinnaur is mainly based on apple but with the change in climate, the crop may not be so remunerative in the years to come because of less severe winters and scanty snowfall, which will ultimately hinder with chilling requirement and also the availability of irrigation water as monsoon rains are generally not received. Therefore, an integrated system of farming will be more profitable and sustainable under such conditions. Apple based production system traditionally consists of crops like (apple-rajmash-buckwheat). But, Shri Tara Chand started apple based production system with improved practices like seedling grafted plants, tissue cultured apple plants and rootstock grafted plants are about 500, 300 and 100, respectively. Seed rates of rajmash and buck wheat was about 100 and 65 kg/ha, respectively. Method of sowing was line sowing in rajmash at 45x15 cm and thinning of plants in buckwheat.



Name : Shri Tara Chand

Age : 40 years

Phone : 9816511219

Education : Post Graduate

Address : Telangi, Khwangi (Post), Kalpa (Taluk), Kinnaur (District), Himachal Pradesh

Land holdings : Rainfed: 0.8 ha; Irrigated: 2 ha

Livestock : 4 cows, 35 sheep and 2 dogs

Farming experience : 20 Years

Social appreciation/ Recognition/ Awards : 1. President of VCRMC since 2014 onwards

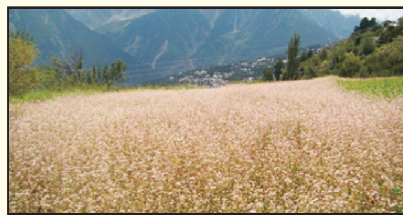
2. Member of local religious group representing the village to look after all the affairs of local deity Kothi Devi

### Impacts

Two farmers of the village viz., Shri Sudershan Negi and Shri Bhupender Negi have also adopted the innovation. As seeing is believing, after assessing the yields and per unit returns of the farmer under reference, more and more farmers are following the integrated system. The innovative system of farming will be helpful in maintaining the soil fertility and texture through inclusion of a leguminous crop. By adopting the innovative technology the farmer is expecting a quality produce from apple plantation that will fetch more remunerative prices. Line sowing in rajmash is saving the quantum of seed requirement.

### Economics

After introduction of innovative apple based production system with improved practices, his net return has increased from ₹ 602460/- by practicing only apple based production system with traditional practices (apple-rajmash-buckwheat) to ₹ 713800/- which is expected to increase more after attaining maturity/ harvesting stage of the fruit trees in near future. He got ₹ 2.2 for every additional rupee spent on the input cost for this kind of innovative apple based production system with improved practices.



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## Innovation : Cultivation of Hybrid Napier Grass for Feeding Livestock

Focus area : Fodder Production

Shri Madan Murary Prajapati is an innovative farmer and following practice of his innovation i.e., planting method: One root-slip or a stem cutting possessing at least two nodes are planted in a single hole or spot. A small portion of root slip or upper node of stem cutting should remain with the soil level. Stem cuttings should preferably be planted vertically, slantingly or horizontally. He used a spacing of 50 x 50 cm, preferably during rainy season but can be planted round the year if good practices are observed. At the time of land preparation farm yard manure (FYM) or compost is applied at the rate of 52.5 q/ ha each time after harvest of green fodder to stimulate regeneration of the grass. The first cut is ready in 60 days and subsequent cuttings are taken approximately at an interval of 30 – 45 days. A stubble height of 5 – 8 cm is left during harvesting of the green fodder.



Name : Shri Madan Murary Prajapati

Age : 55 years

Phone : ---

Education : 4th standard

Address : Kachakani, Tezpur (Taluk), Sonitpur-784501, Assam.

Land holdings : Rainfed: 1 ha; Irrigated:3 ha

Livestock : 6 cattle and 3 goats

Farming experience : 35 Years

Social appreciation/ Recognition/ Awards : Recognized by KVK for his innovation in fodder cultivation using farm yard manure and compost

### Impacts

The quality of the silage or hay remains more or less the same as green fodder. Other beneficial attributes of the grass variety includes: shorter growth period, ability to grow in closer spacing, ability to prevent soil erosion, improve soil health through addition of higher amounts of organic residues in the soil, high persistency and regeneration capacity thereby reducing the need for frequent planting and tillage, wider adaptability with capacity to grow under stress conditions, ability to provide regular income and employment for the farmers as it can be harvested 6-8 times in a year, storage, transport, processing and conservation is relatively easy and requirement of minimal inputs for planting and hence lower cost of cultivation.

### Economics

The hybrid Napier (Var. Co-3) yield was 72,625 kg/ha/year with six cuts and the expenses incurred was ₹ 16,550 ha/year. The net return was 46,340 ha/year under innovative cultivation. As a result of adopting innovative growing like varietal intervention, Shri Madan Murary Prajapati has achieved a 40% higher yield of hybrid Napier with improved innovative practices.



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## Innovation : Mobile Sprinkler for Supplemental Irrigation in Small Onion

Focus area : Crop Production

Shri T. Paneerselvam is a marginal farmer from Tamil Nadu and used his innovations for removal of dew drops in onion leaf sheath through rope/mobile sprinkler. Earlier, farmers are spraying pesticide (Monocrophos or curacron at 2 ml/litre of water) for the management of tip drying in onion. But, this new innovation is very good methods and cost effective with less adverse effects. Mobile sprinkler was purchased as one of the Custom Hiring Implement and handed over to Thalamalaiyan group in Vadavathur village of Namakkal District. He is one of the member of this group and also in charge for operation of mobile sprinkler in farmers field on cost basis. Area coverage with mobile sprinkler is about 0.4 ha/ hour and modification of recommended practice.



Name : Shri T. Paneerselvam

Age : 29 years

Phone : 9994670112

Education : 12<sup>th</sup> standard

Address : Jambumadai, Vadavathur (Post),  
Senthamangalam (Taluk),  
Namakkal (District), Tamil Nadu.

Land holdings : Rainfed: 1.5 ha; Irrigated: 1.0 ha

Livestock : 2 cows and 10 desi birds

Farming experience : 12 years

### Impacts

After Shri T. Paneerselvam innovation, forty numbers of farmer practiced the mobile sprinkler technology against tip drying due to dew drops in an area of 51 ha. Shri T. Paneerselvam realized that temperature and light intensity and quality can modify the onion bulbing response. High temperatures and bright days can “compensate” for some day length, causing onions to bulb sooner than they would otherwise. Overcast, cool temperatures delay bulbing. Time of bulbing is an important factor in determining onion bulb size. Early bulbing contributes to small bulb size, with delayed bulbing resulting in larger size. Shri T. Paneerselvam’s innovative ideas of mobile sprinkler is most effective to overcome the above problems. Now, there are 200 farmers following the same innovative methods to tackle in the tip drying in onion crop.

### Economics

Shri T. Paneerselvam has recorded 700 kg/ha extra yield and less expenses of ₹ 39202 as compared to farmers’ spraying pesticide (Monocrophos or curacron @ 2ml/litre of water) to manage the tip drying in onion. Highest net return of ₹ 46000 was under the management of tip drying in small onion due to dew drops by using mobile sprinkler as compared existing practice.



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## Innovation : Stem Applicator for the Management of Sucking Pests in Cotton

Focus area : Integrated Pest Management

Management of sucking pest in cotton by stem application of pesticides is not only reducing the cost of cultivation but also enhance the efficacy of pesticides against sucking pest. Bio control agents like parasites and predators will not be harmed, thus, maintaining ecological balance and encourage natural enemies to devour the sucking complex. Upon habituating the farmer with the technique of “STEM APPLICATION” thrice at 20, 40 and 60 DAS during the crop season 2013-14, irrespective of receipt of rainfall, he could find the efficacy of pesticide application through this technique. He is continuously practicing the technique of stem application by mixing insecticides as per recommendation (20ml monocrotophos + 80ml of water (or) 35ml of imidacloprid + 700ml of water).



Name : Shri Ramulu Killari

Age : 60 years

Phone : --

Education : Illiterate

Address : Sirusuwada, Kotturu (Taluk),  
Srikakulam (District), Andhra Pradesh

Land holdings : Irrigated: 0.5 ha

Livestock : 2 cows

Farming experience : 50 years

Social : Progressive Farmer

appreciation/  
Recognition/ Awards

### Impacts

Sirusuwada village of Kotturu mandal was frequently prone to excess & erratic rainfall received during monsoon season which frequently interferes with spraying operation. Even after successful completion of pesticidal spray, sudden receipt of rainfall within 2 hours after completion of spraying is resulted in washout of the pesticide from the crop canopy, leading to wastage of spraying operation. While in case of stem application technique, the pesticide will get absorbed within a short period. Even though, this operation is interrupted with rainfall, as very little quantity of pesticide will be lost in this operation. Farmer could able to save Rs 4140/-per ha.

### Economics

Ramulu Killari recorded yield of 220 q/ha with his innovative practices as compared to 203 q/ha under farmer practices with expenses of Rs. 30,984 and 35,123 and per ha/year and he has earned net returns of Rs. 59,216 and 48,107/- respectively.



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# **Livestock, Poultry & Fishery Production**







## Innovation : Low Cost Pig Housing System

Focus area : Low Cost House

Shri Munindra Phukon rears indigenous and improved pig breeds in low cost bamboo-based pig pens with concrete flooring to minimize pig diseases. In contrast to the traditional pig rearing practice his housing system has proved to be better especially in terms of minimizing the incidence of endemic pig diseases. Shri Munindra Phukon rears indigenous and improved pig breeds like T and D (Tamworth and Desi), 50% Hampshire 50% indigenous in low cost bamboo-based pig pens. The concrete floor was constructed with a slope to facilitate easy cleaning and drainage of effluents. The pig pens have wooden and concrete feeding troughs that are used for routine feeding. The roof of pens was constructed with galvanized iron sheets for ensuring durability whereas the side walls with strong bamboo slats to facilitate proper ventilation. These pig pens offer around 8 meter square of covered area per adult pig whereas an area of equal dimension is preserved as open-yard area for individual pigs.



Name : Shri Munindra Phukon

Age : 40 years

Phone : --

Education : 8<sup>th</sup> standard

Address : Bhalukjharoni, Tezpur (Taluk),  
Sonitpur-784026, Assam.

Land holdings : Rainfed: 1.2 ha; Irrigated: 4.1 ha

Livestock : 30 pigs, 50 poultry birds and  
2 cattles

Farming experience : 14 years

Recognized by KVK  
Sonitpur, Napam, Sonitpur,  
Assam, for his innovations in  
pig farming.

### Impacts

The improved pig housing system adopted by the farmer is animal-friendly and profitable. Prolonged exposure of improved pig breeds to bright sunshine may cause pigs to become overheated even during moderate weather. Shade helps in preventing deaths and increasing production efficiency of the pigs during hot weather. Concrete flooring of the pig pens is an environment-friendly approach and facilitates easy cleaning and maintenance of hygiene and sanitation in the pig pens. Maintenance of hygienic environment in and around the pig sty greatly reduces the incidence of endemic diseases in swine and thereby assures greater economic benefit.

### Economics

Shri Munindra Phukon with his investment of ₹ 37,000 initially could earn ₹ 92,500 in the first year itself.



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## Innovation : Improving Livelihood by Konkan Kanyal Goat Unit

Focus area : Livestock Management and Production

They are native to the Konkan region of Maharashtra, and are reared mostly by the Dhangar and Maratha communities for meat. These goats are mainly black with a white marking in a specific pattern—the ventral surface of the body is white and the legs have white 'stockings'. Konkan Kanyal goats have bilateral white strips from nostrils to ears; a flat and broad forehead; flat, long drooping ears; backward, straight, pointed, cylindrical horns; white muzzle and long legs, laterally black, medially white from knee to the fetlock joint. The body weight of adult bucks and does averages 35 and 30 kg respectively. Konkan Kanyal goats are regular breeders and breed round the year, with a twinning percentage of about 66%. Two units of 5 female goats + 1 male goat size are collected from Dr. BSKKV, Dapoli by Shri Chandrakant Vishnu Salvi. Initially, performance of unit was found to be satisfactory with no mortality. It has high mortality in high rainfall areas like Konkan region. Alternatively, Shri Chandrakant Vishnu Salvi an innovative goat rearing farmer selected Konkan Kanyal breed for heavy rain conditions and hilly tracts with semi-intensive feeding method. The unit is running well by Shri Salvi and current size is 17 female goats + 4 male goats.



Name : Shri Chandrakant Vishnu Salvi

Age : 36 years

Phone : 09209033817

Education : 7<sup>th</sup> Standard

Address : Haral, Rajapur (Block), Ratnagiri (District), Maharashtra

Land holdings : Rainfed: 0.25 ha;  
Irrigated: 0.04 ha

Livestock : 1 pair bullock, 21 goats,  
5 poultry birds

Farming experience : 20 years

Social : Smart Farmer certificate by  
appreciation/ KVK.

Recognition/ Awards

### Impacts

Shri Salvi has started innovatively keeping of the Konkan Kanyal goat unit of five females and one male. He made shelter on raised platform with the use of locally available bamboo and wood material. Later on after three years, the unit size was recorded as 17 females and 4 males.

### Economics

Shri Chandrakant Vishnu Salvi' income got doubled due to adoption of innovative rearing of Konkan Kanyal goat with locally available resources. An average two male (Konkan Kanyal goat) sold in a year at the rate of ₹ 18,000/- as compared to an average rate for male local goat is ₹ 9,000/-.



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## Innovation : Use of Chopped Raw Onion for the Control of External and Internal Parasites in Cattle

Focus area : Livestock Protection

Livestock suffer from infestation of different parasites depending on the location and feeding practices. Others may have occasional clinical diseases associated with parasites but on most occasions, economic losses are high enough and need control. Shri Koshal Kumar, a progressive farmer has been feeding cattle with a little quantity of raw onion (cut pieces) twice at an interval of four weeks and then after six months for control of external and internal parasites like ticks, mites, leaches, etc. According to him it is an effective method to control these parasites.

### Impacts

It is harmless to the cattle and also good for enhancing milk productivity. According to Shri Koshal Kumar, it is cost effective as money spent on the purchase of medicine for the control of external and internal parasites is saved. The population of parasites (ticks, mites, etc.) is high during winter season and very extreme during with higher humidity in Bihar or eastern India. In such situations, use of onion which is available in every household can control these parasites. About 30-35% dairy farmers have adopted this practice as they find it more economical and easier.

### Economics

The cost of medicine is about ₹ 100/vial (10 ml vial) as compared to negligible for onion. As per his opinion this is the most economically proven and viable method of treatment.



Name : Shri Koshal Kumar

Age : 45 years

Phone : 8409351923

Education : 10<sup>th</sup> standard

Address : Sakrorha, Modanganj (Block),  
Jehanabad (District), Bihar

Land holdings : Rainfed: 1.5 ha; Irrigated: 6 ha

Livestock : 15 cows, 6 buffaloes and  
20 goats

Farming experience : 15 Years



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## Innovation : Innovative and Modified House for Rabbit Rearing

Focus area : Livestock Management

The cost of construction of rabbit rearing house as recommended is difficult and not affordable by small and marginal farmers. Hence, the farmers of Tirap district developed a low cost rabbit rearing house and cage to save labour and time as well as to earn more profit. This low cost bamboo house with thatch roofing and bamboo cage for rearing of rabbits is made from locally available materials. The structure remains at least for 3 to 4 years and could be utilized for rearing the rabbits in a scientific manner. The modified system of rabbit rearing saved labour and time besides high profit as compared to recommended method.



Name : Shri Techhi Bida

Age : 36 years

Phone : 09436229537

Education : Degree

Address : Deomali, Tirap (District),  
Arunachal Pradesh

Land holdings : Rainfed: 1 ha

Livestock : 10 pigs and 5 poultry birds

Farming experience : 20 years

### Impacts

The modified system of rabbit rearing was adopted by all the small and marginal farmers of the locality in the district and also got disseminated to the adjoining villages.

### Economics

Shri Techhi Bida has invested ₹ 900 per unit for seven rabbits in each cage. The cost incurred was ₹ 4600 with net return of ₹ 16150 per unit. The net return per rupee investment was recorded with 3.6 in the cage compared to 2.51 in the house. The farmer's innovation of low cost rabbit rearing method saved about 15% of labour and 50% time compare to recommended housing.



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## Innovation : Low Cost Broiler Brooding System

Focus area : Poultry Management

The brooding period – the first 14 days of the broiler's life is the most sensitive period because the bird is changing from an immature thermo regulation system to a mature one. Litter temperature is the most important because day-old chicks are extremely dependent on floor contact to help regulate the changing temperatures. The ratio of body surface to body mass is large in the day-old chick and it decreases with age, so the young chick will therefore lose heat faster than an adult bird. Low cost brooding system of broiler was made by Shri Ghono Das with locally available material like bamboo, which is cheaper compare to the brooders available in the general market.

This practice is simple with very minimal cost and can be maintained effectively with little skill. The structure could be used 3 to 4 years without any recurring expenditure. It is also eco-friendly.

### Impacts

This practice of brooding system could be used widely among the farming communities with little investment and semi skill persons having expertise in working with bamboo can be engaged locally. Poultry growers can easily adopt for better management of their farm.

### Economics

The cost incurred for production of a unit was ₹ 2600 with net return of ₹ 15000 per unit. The net return per rupee investment recorded was 4.5 with brooding system compare to 3.51 in the recommended practice.



Name : Shri Ghono Das

Age : 60 years

Phone : 09089554253

Education : 5<sup>th</sup> standard

Address : Napatia, Chongkham (Post),  
West Siang (District), Arunachal Pradesh

Land holdings : Rainfed: 1 ha

Livestock : 300 poultry birds

Farming experience : 45 Years



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## Innovation : Modified Poultry Cage

Focus area : Poultry

Shri Jomon Xavier, a known poultry farmer of the village faced many constraints in his farming due to flood during monsoon period. He followed improved housing of poultry - slatted floor to overcome the flood conditions. He modified the cage to house more number of birds. He partitioned the cage into small racks with the available low cost material. The well aerated slatted floor was divided into two small racks where he accommodated small chicks which need less space and more warmth and in the lower racks the layer chicks. Thus, he could easily manage and started the sale of chicks after proper vaccination which in turn brought additional income for him.

### Impacts

With the modification of the cage he could manage the poultry birds of different ages. Thus he could establish layer nursery which solved the problem of availability of good quality chicks with proper vaccination in the locality which in turn reduced the mortality rate of chicks in the area. Farmers started to construct similar cages on their own and the technique has spread to the entire village and also in nearby villages.

### Economics

Increase in weight (2.0 kg/per bird) and 200 eggs/per bird/year were recorded in modified poultry cage compare to lower body weight of 1.40 kg/per bird and 52 eggs/per bird/year in case of local practice.



Name : Shri Jomon Xavier

Age : 52 years

Phone : 9847492107

Education : 10<sup>th</sup> Standard

Address : Thundiyl, Mithrakeri (Post)  
Veliyanad (Block), Alapuzha (District),  
Kerala

Land holdings : Rainfed: 2.5 ha; Irrigated: 5.3 ha

Livestock : 200 poultry birds

Farming experience : 30 years

Social : Smart farmer award by  
appreciation/  
recognition/Award  
NICRA



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## Innovation : Fodder Management by Silage Making

Focus area : Entrepreneurship Development

Silage preparation is one of the important methods for storage of green fodder for dairy animals and it is necessary to adopt on large scale to cope with situations like drought or heavy rainfall or scarcity of fodder. Availability of nutritious fodder throughout the year is very essential for profitable dairy farming. The surplus forages of two seasons i.e., rainy and winter season could easily meet the deficit in the succeeding lean periods of fodder supply. Silage is the preserved green fodder in succulent form under air tight condition. Ensiling is a process which involves the conservation of green fodder crops, grasses and the storage over long period. Good quality silage is yellowish-green in colour with a pleasant vinegar smell. Dairy is the major allied enterprise in

the village Nirmal Pimpri. Green fodder shortage after January is a common feature every year in rainfed areas. Shri Santosh Nirmal prepared silage first time in the year 2011 and later on 20 silage bags to meet green fodder shortage during summer. Now he started silage making and selling as a business enterprise and sold more than 150 silage bags (75 tons) in neighboring five to six blocks at ₹ 5-6/kg.

### Impacts

About 311 farmers prepared 619 tons of silage and saved ₹ 307284 on green fodder in the village Nirmal Pimpri. KVK supplied 3500 silage bags to more than 800 farmers in neighboring 50-60 villages.

### Economics

Silage preparation saves ₹ 620 per ton on green fodder besides silage feeding increases milk production by 10-12% and fat by 0.5%. The technology has been widely adopted by the farmers and 10 farmers started sale of silage as business. They are preparing silage and selling at ₹ 5/kg to the farmers.



Name : Shri Santosh Nivrutti  
Nirmal  
Age : 37 years  
Phone : 98964074  
Education : Diploma in vet. Science

Address : Nirmal Pimpri, Rahata (Block),  
Ahmednagar (District), Maharashtra

Land holdings : Rainfed: 1.6 ha;  
Irrigated: 0.4 ha

Livestock : 7 cows and 30 goats  
300 poultry birds

Farming experience : 17 Years



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kvkahmednagar@yahoo.com; <http://www.kvk.pravara.com/>





## Innovation : Diversification in Backyard Poultry

Focus area : Livestock Production

Shri Shinde adopted different innovative livestock management practices in his farm. Earlier, local poultry breeds having low egg laying capacity and low weight gain were reared which could not give desirable income to sustain livelihood. He brought a new breed of Kaveri around twenty in number. He has adopted “Kaveri” poultry breed with innovative methods of feeding and shelter at his farm. The shelter was constructed according to local weather and adopted improved practices by consulting veterinary officer. The initial size of the unit was 5 birds and the current size is 20 birds. Kaveri has egg laying capacity of 180 eggs per year. In this case, Shri Shinde got higher weight gain of birds and good number of egg production as well. He also got a good market for selling both the eggs and birds for meat purpose which fetches good returns.



Name : Shri Atmaram Laxman Shinde  
Age : 52 years  
Phone : 07588129021  
Education : 4<sup>th</sup> Standard

Address : Haral, Rajapur (Block),  
Ratnagiri (District), Maharashtra

Land holdings : Rainfed: 0.20 ha

Livestock : 3 buffaloes, 7 goats and  
20 poultry birds (Kaveri)

Farming experience : 35 years

Social : Smart Farmer certificate  
appreciation/  
Recognition/Awards

### Impacts

The backyard poultry contributes to income by way of both eggs and meat. It is a main source of income to some of the farmers family. As good results were observed in this case. A total of 93 farmers adopted rearing of Kaveri poultry birds in an innovative and diversified manner.

### Economics

Higher body weight of 1.70 kg/per bird and 168 egg/per bird/year were recorded by Kaveri bird whereas lower body weight of 1.40 kg/per bird and 52 egg/per bird/year by local breed. Gross income is higher with Kaveri breed (₹ 1769) as compared to local breed (₹ 766).



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## Innovation : Eco-friendly Shelter House for Small Ruminants and Poultry

Focus area : Livestock Management

Losses of small ruminants on account of predation and climatic variations are a major cause of mortality, and could be avoided through appropriate housing and shelter, which is seldom accorded priority. Most shelters do their utmost to give protection against dogs. Smt Kabita Behera is an innovative farmer in her village, taken up innovative shelter for small ruminants, cleaner and healthier for animals. Degradable polythine sheets replaced by biodegradable wire net. Heat generation inside the shelter is reduced and improved ventilation is provided. She constructed low cost effective shelter, costing ₹ 2000/- the roof tiles, wooden planks and wooden log etc., were used. The material used are bricks, cement, angle iron, galvanized iron sheet for roofing, etc.



Name : Smt Kabita Behera

Age : 40 years

Phone : --

Education : 5<sup>th</sup> standard

Address : Kasotibali, Marshaghai (Block),  
Kendrapara (District), Odisha

Land holdings : Rainfed: 1 ha; Irrigated: 2 ha

Livestock : 2 cows and 25 goats

Farming experience : 5 Years

### Impacts

Smt Kabita Behera's innovative and eco-friendly shelter for small ruminants addresses several issues of protection health and hygiene. Now, nearly 100 farmers have adopted the innovative and eco-friendly house to their livestock in her village.

### Economics

The overall economic benefit was ₹ 25000 per unit of 10 goats with this innovative practice. The additional cost incurred due to the application of this practice was ₹ 10000/- and the benefit was ₹ 15000/-. Thus, she got a considerable benefit by adopting her own innovative and eco-friendly shelter house for small ruminants. She is very happy and continues to apply this innovation to other livestock also.



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## Innovation : Low Cost Duck House

Focus area : Poultry Management

It is important to keep the ducks safe from other animals and predators. The poultry and ducks are integral part of the subsistence farming and contributes towards nutritional security and additional income generation. But in many cases permanent housing for duck and poultry is not affordable due to lack of space and financial reasons. A very low cost duck/poultry house fabricated by Smt Beraful Bibi of Ganivan (Via-Pahari), Chitrakoot (District), Uttar Pradesh has become a boon for the farmers. The house (2.5 x 4.0) prepared with clay mud and straw can shelter eight to 10 birds and protect them from predation. Few small holes are kept in each wall which helps in better aeration inside the

room. A small inbuilt food pocket is kept inside the wall just beneath the entrance. A thatched roof is prepared with locally available materials in the shape of a triangle to protect the birds from rain during night. In the case of attacks by wild animals, a fencing of wire is prepared with a small wooden gate.

### Impacts

As construction of duck house involves low cost, affordable to all the villagers. The birds remain safe in all the season and egg laying birds/ducks can be hold back in the duck house to get the laid eggs. Feed can also be provided at a particular interval to maintain the body weight of the birds. All above, more return can be obtained from rearing of birds/ducks in such houses. Nearly, 50 households in the village are practicing her innovative low cost duck house effectively.

### Economics

She has used locally available soil/mud for construction of duck house. She has got higher net benefits about 20% as compared to without duck house.



Name : Smt Beraful Bilbi

Age : 38 years

Phone : 05198-290405

Education : 6<sup>th</sup> Standard

Address : Ganivan (Via-Pahari), Chitrakoot (Dist.),  
Uttar Pradesh

Land holdings : Rainfed 1 ha

Livestock : 2 cows and 20 duck birds

Farming experience : 10 years

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## Innovation : Modified Poultry Housing

Focus area : Poultry Management

Shri Lepcha reared broiler poultry 200 numbers per batch in a house measuring 30 ft. × 12 ft., which is made with locally available materials with the guidance of the specialist of Animal Science, KVK East Sikkim. He modified his house by making battery tier system of housing with the locally available low cost materials (bamboo) basically for maximum utilization of space inside the house for rearing more numbers of birds at a time. After 2 years of rearing broiler poultry in deep litter housing, Shri Lepcha modified his poultry house by making tier system of housing with locally available bamboo. He made 2 rows inside the house having a middle passage between the rows. In each row, he made 2 tier measuring 28 ft. × 4 ft. = 112 sq. ft. in each tier. He made a total of 4 tiers inside the house having capacity of 300 numbers of broiler poultry birds at a time. Specification and measurements of modified broiler poultry house are: locally available materials (bamboo) height of the side wall (12 ft.), roof (GI sheet), length of the poultry house (30 ft.), width of the poultry house (12 ft.) no. of rows in house (02 nos.), no. of tier in each row (02 nos.), width of the middle passage (4 ft.), length of the each tier (30 ft.), width of the each tier (4 ft.), area of each tier (28 × 4 feet = 112 sq. ft.), total area in 4 tier (112 × 4 feet= 448 sq. ft.) and capacity of rearing broiler poultry birds in all 4 tiers: 300 birds.



Name : Shri Tashi Lepcha

Age : 36 years

Phone : 09593787262

Education : 5<sup>th</sup> standard

Address : Upper Nandok, Ranipool (Post),  
East Sikkim (District), Sikkim

Land holdings : Rainfed: 12 ha

Livestock : 1 dairy cow, 15 desi poultry  
birds, 300 broiler poultry per  
batch

Farming experience : 7 Years

### Impacts

Shri Lepcha became a role model for rural youths as a potential agro-entrepreneur who ensure a sustainable livelihood security for a farm family by scientific broiler poultry production. Shri Lepcha also played a key role in horizontal spread of technology and by understanding the benefit of this modified housing system for broiler poultry a total of 3 nos. of farmers of the Nandok village has constructed this type of poultry house. The farmers from other nearby villages are motivated by the success of this farmer and headmen of neighbouring villages are encouraging farmers to implement similar model in their villages.

### Economics

Increase body weight of 2.0 kg/per bird and 200 egg/per bird/year were recorded by modified poultry cage whereas lower body weight of 1.40 kg/per bird and 52 egg/per bird/year by local practices. Gross income is almost higher than the double with modified poultry cage (₹ 84966) as compared to local practices (₹ 77621).



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## Innovation : Improving Fodder Production with Harvested Water in Drought Prone Regions

Focus area : Fodder Production

Donapati Siva Shankar Reddy has taken up *in-situ* moisture conservation and constructed a farm pond for growing improved fodder varieties of Napier Bajra and Lucerne. He is using the harvested water for fodder production by way of sprinkler irrigation. He has started with 20 cows and now he has about 100 HF cross bred cows and feeding them with improved fodder varieties. He started cultivation of Lucerne to reduce the cost of concentrates. Foggers were installed to mitigate the heat stress during summer. He is conserving the harvested fodder by way of silage and utilizing it during the lean season in this perennially drought prone region of Andhra Pradesh. The area under improved fodder with CO-4 in the village has increased to 180 acres and lucerne in an area of 40 acres in the village. He has purchased total mixed ration machine to utilize the available feed effectively.



Name : Shri Donapati Siva Shankar Reddy

Age : 38 years

Phone : --

Education : Illiterate

Address : Yagantipalle, Banaganapalle (M), Kurnool District, Andhra Pradesh

Land holdings : Irrigated: 12 ha; Rainfed : 6

Livestock : 25 cows; Small ruminants: 150

Farming experience : 50 Years

Social appreciation/ Recognition/ Awards : Received best farmer award in the field of dairy from Govt. of A.P. during Sankranti Sambaralu-2015.

### Impacts

The area of improved fodder with CO-4 in the village has increased to 180 acres. Other farmers adopted cultivating lucerne during rabi.

### Economics

Total mixed ration machine was purchased to overcome the labour problem in animal feeding and also to utilize the available feeding ingredients affectively. By doing so he has reduced the cost of feeding by ₹ 25/day/animal and ₹ 10/kg/animal/day through supplementing lucerne in the feed.



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## Innovation : Fish Farming as Community Approach

Focus area : Fishery Farming

Shri Udai Singh is a progressive farmer of Palamu district. He purchased spawn of fish such as Katla, Rehu, Mrigal and grass carp in a small Dobha. He transferred fingerlings at Malay Dam. They are maintaining the pond for rearing fish and reared them up to fingerling stage. With the help of KVK a committee has been formed. There are seventy one families involved in his village and he is active member of the committee. He purchased spawn of fish such as Katla, Rehu, Mrigal and grass carp from Ramsager, West Bengal and got production of fish of 15-20 quintal per season.



Name : Shri Udai Singh

Age : 43 years

Phone : 09431507690

Education : 10<sup>th</sup> standard

Address : Murma, Satbarwa (Block),  
Palamu (District), Jharkhand

Land holdings : Rainfed: 1 ha

Livestock : 12 cows

Farming experience : 10 Years

### Impacts

Shri Udai Singh has created a group with around 5-6 neighbour villages where ponds are available to rear or grow fishes. These groups learned techniques which were adopted by Shri Udai Singh' community based approach for marketing mechanisms, breeding techniques and scientific approaches for rearing and harvesting of the fishes from their community ponds.

### Economics

This fish farming as community approach reported higher net returns of ₹ 35000 per catch and sale of fish as compared to just ₹ 10000 per catch in traditional approaches.



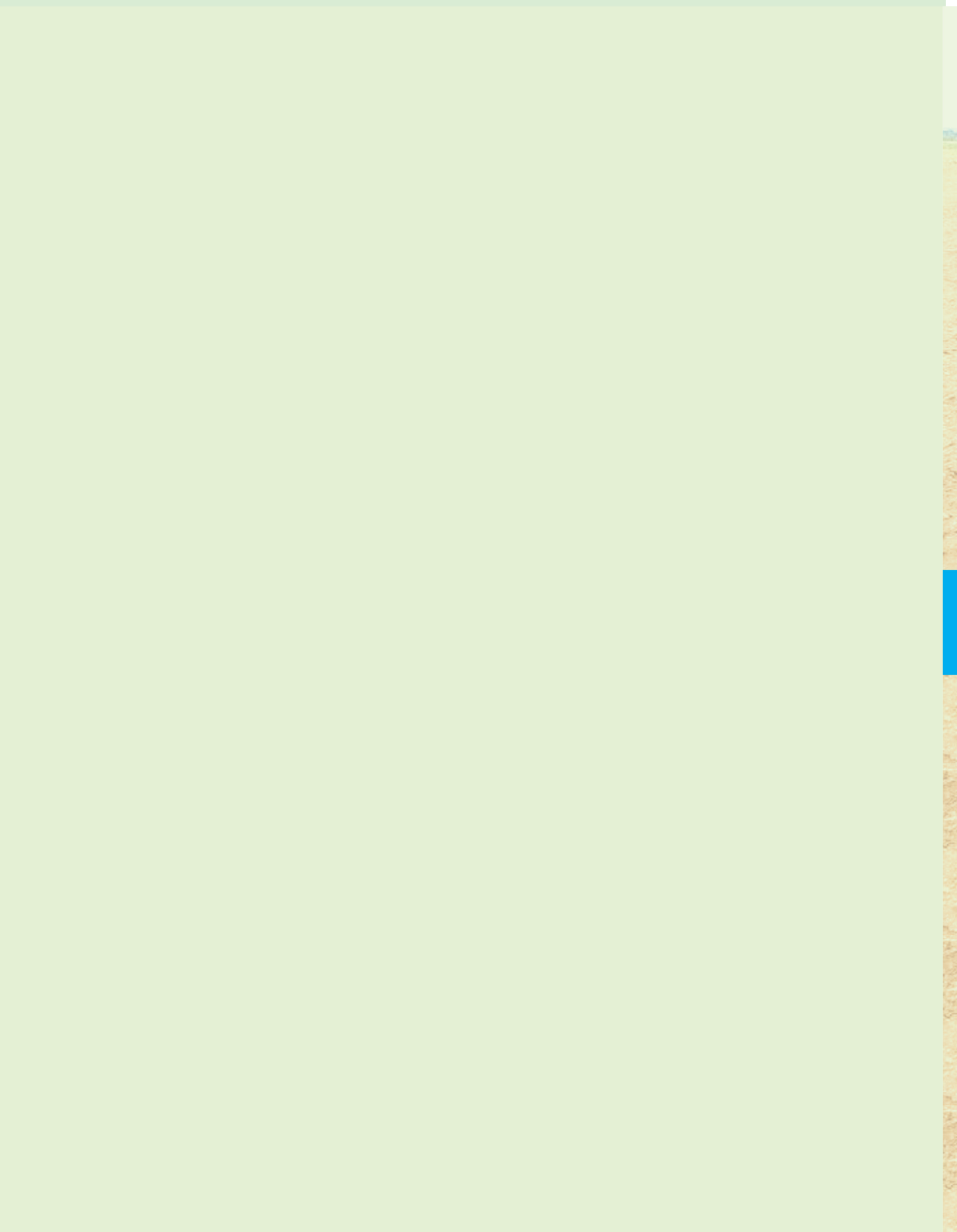
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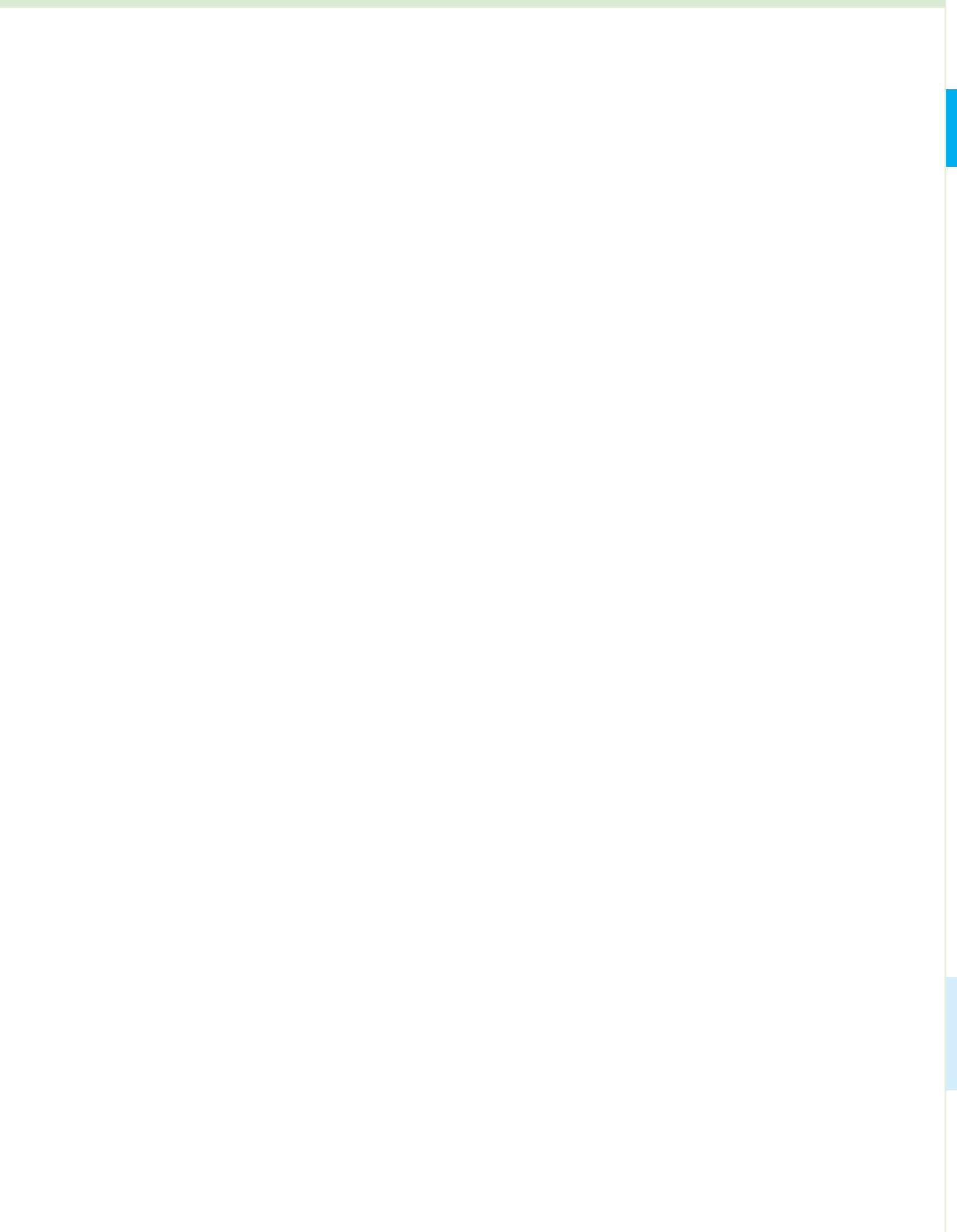






# Farm Implements & Machinery







## Innovation : Cycle Mounted Sprayer for Vegetable Crops in Open and Net House

Focus area : Farm Machinery

In 2013, Shri S. Jinder Singh developed an innovative sprayer for vegetable crops in open and net house, that can be fitted on cycle. This ordinary knapsack spray pump is operated through the rotation of cycle that is synchronized with the movement of bicycle, thus reducing the labour and time required for spraying. He is using his bicycle fitted with sprayer for vegetables like carrot, beetroot, leafy vegetables, etc., for spraying insecticides or herbicides. It can be separated out and can be used for other purposes separately like bicycle for transportation and sprayer for manual spraying. We can adjust it according to the height of the crops especially for some of the vegetables which are very difficult for manual spraying. This innovation can reduce drudgery involved while spraying pesticides.

### Impacts

The uniformity in application is governed by uniformity in the speed of bicycle. We can also enhance the speed of the application and efficiencies at field level. Demand for his innovation is now higher in his surrounding villages. Presently, around 100 farmers are using this innovation in their fields.

### Economics

The device is economically feasible for the small famers where vegetable growing is predominant and there is significant saving in cost of labour. As such he incurred a total expenditure of ₹ 2500/- for the entire unit.



Name : Shri S. Jinder Singh

Age : 50 years

Phone : 9914736803

Education : 10<sup>th</sup> standard

Address : Sandhuan (Village & Post),  
Chamkaur (Taluk), Roopnagar- 140112,  
Punjab.

Land holdings : Land owned : 0.75 ha  
Land leased : 0.45 ha

Livestock : 3 buffaloes

Farming experience : 36 years



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## Innovation : Low Cost Bird Scaring Device

Focus area : Farm Implement

It helps to drive away the birds which otherwise feed on crops like pomegranate, tomato, sunflower, jowar, bajra, foxtail millet, etc. It does not harm the birds but scare them away from the crop field. Farmers are generally advised to use bird nets which are costly and their affordability is an issue. Killing can easily be avoided by adopting this simple sound making device. It can even scare squirrels, monkeys and pigs but needs further verification. It consists of two poles of four feet length and three inches thickness, preferably bamboo, two iron rods with four bolts and four nuts, one table fan wing (can be obtained from old hardware shop), one dafli (musical instrument), one old cycle tube, and old micro tube (used in drip irrigation). Fit the iron rods to the poles with a gap of 3.5 feet. Fit the fan to the top rod. Fit two bolts and nuts on bamboo poles six inches below the top rod after fitting fan. Fit another set of two bolts and nuts eighteen inches below this set of bolts on the bamboo poles. Make four equal pieces of cycle tube and tie these cycle tube pieces onto these bolt-nut system one each and allow them to dangle. Now, tie the dafli on four points so that it gets suspended in the centre. Once this step is over, now we can make hole each on the periphery of the fan wings. Insert the micro tube piece into these holes separately (three pieces).

### Impacts

This is the basic structure of the device. This whole thing can be tied at any suitable height looking into the wind direction and speed. Even a speed of 5-7 km per hour is sufficient to operate the device. With the blowing wind, the fan starts rotating and the micro tube would start to beat the dafli continuously. This sound in tandem will keep any bird or animal at bay. This device can be used to avoid bird menace in agriculturally and horticultural important crops. Presently, there are 50 farmers who are using in his surrounding villages.

### Economics

Cost of the whole unit is about ₹ 2000 and around 4 units per ha would be sufficient to scare away the birds.



Name : Shri Ravi M B  
Age : 36 years  
Phone : 9980998890  
Education : 12<sup>th</sup> standard

Address : Siddanuru, Anagodu (Post)  
Davanagere (Taluk & District), Karnataka

Land holdings : Rainfed: 1 ha; Irrigated: 2.5 ha

Livestock : 3 crossbred cows

Farming experience : 20 Years

Social appreciation/  
Recognition/  
Awards : Best farmer award from  
Karuna Jeeva Kalyana Trust,  
Davanagere in 2016



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## Innovation : Indigenous Motor Operated Paddy Thresher

Focus area : Farm Machinery

In rice farming system, threshing of paddy is a very tedious and labour consuming operation. Introduction of paddy thresher has lessened the drudgery of paddy cultivation. Designed by Shri Dilip Kumar Mahato, from Berahatu, which is a major rice producing district in Jharkhand. For threshing paddy, farmers here mainly depend on cattle even though it is time consuming and not very efficient. Threshers though available are beyond the reach of the most due to their cost. Few years back, Jharkhand Government provided some manual paddy threshers to farmers in the region. These threshers had a lot of maintenance issues and needed regular upkeep. Sri Dilip Kumar Mahato developed electric motor/ diesel engine operated paddy thresher requires five HP motor can be an alternative to manual threshing. The paddy thresher can be operated with an electric motor or diesel engine. The paddy thresher is made using quality grade steel that ensures optimum performance for longer period of time.



Name : Shri Dilip Kumar Mahato

Age : 26 years

Phone : 9939307434

Education: 12<sup>th</sup> Standard

Address : Berahatu, Ulda (Panchayat),  
Ghatsila (Block),  
East Singhbhum (District), Jharkhand

Land holdings : Rainfed: 4 ha; Irrigated: 1 ha

Livestock : 10 cattle, 25 poultry birds,  
2 goats, 8 ducks and 2 buffaloes

Farming experience : 6 years

### Impacts

Need just one person to operate and thresh paddy ten times faster than four draft animals. It can also be used to thresh moist crop. Another feature of the thresher is that it retains the complete straw and does not chop it. The paddy thresher is easily repairable and can be used for both commercial and domestic purposes. The average feed rate of the machine is 400 kg/hr which can go up to 600 kg/hr. The performance details are: threshing efficiency (96.6%), cleaning efficiency (89.1%), broken grain proportion (0.62%), spilled grain proportion (0.28%), blown grain proportion (0.40) and unthreshed grain proportion (1.6%). Now, all local farmers are using his machine for threshing of paddy.

### Economics

Shri Dilip Kumar Mahato was able to sell more than 15 units per year in different districts of Jharkhand and earning a decent profit.



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## Innovation : Innovative Device to Plant the Seedlings at Exact Locations in SRI Method

Focus area : Farm Implement

One of the important aspect of ‘System for Rice Intensification,’ method, popularly called as SRI, is to plant the seedlings at optimum spacing. During the initial stages of SRI introduction, a lengthy rope was used for marking the position of seedlings. Two labourers used to hold the rope at the ends on either side of the field bunds and walked across the field, while another person made markings on the field for planting. But this system didn’t become popular because the line of planting was not straight due to naturally occurring slopes or partition in the fields. The line of planting also used to get altered. Physical labour requirement was also more for this work. Considering the demerits of rope marking, an iron roller marker was introduced. It requires two labourers to pull the iron marker which has pegs on it to mark the place of planting. The rolls are fitted in such a way to mark locations at 25 cm. But this didn’t prove to be easy, the main reason being the roller was heavy in weight and farmers found it difficult to pull it in the slushy, water laden fields. The marking was also not visible. A low weight triangular pointer with three straight bamboo/casuarina sticks or polyvinyl chloride pipes was introduced. These three lengthy sticks tied with small sticks (25 cm length), or 6 mm iron rod fitted with half an inch triangular shape pipe holder with 60° angle in each corner. For convenience, ten feet sticks (three numbers) are sufficient for planting by two labourers,” explains Shri K Kathiresan.



Name : Shri K Kathiresan

Age : 50 years

Phone : 8901040357

Education : 10<sup>th</sup> Standard

Address : Vettaithidal, Karunavoor (Post),  
Mannargudi (Taluk),  
Thiruvarur (District), Tamil Nadu

Land holdings : Rainfed: 2 ha; Irrigated: 1 ha

Livestock : 2 cows

Farming experience : 36 years

### Impacts

Six points are marked on the lengthy sticks at the spacing of 25 cm to point the exact place for planting the seedlings. The device helps farmers to plant the seedlings at the exact location without any confusion and at the same time maintain appropriate space between seedlings. The device is presently being used by farmers in Tanjavur, Ambasamudram, and Tirunelveli districts.

### Economics

The benefits obtained through this device are in terms of saving on cost of labour and time. The overall benefit was ₹ 1500/ha. He obtained yield of 7 t/ha as against 5 to 6 t/ha in traditional method of SRI.



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## Innovation : Wooden Marker for SRI Techniques Using Local Materials

Focus area : Farm Implements

SRI (System of Rice Intensification) method of cultivation of paddy is being adopted in many states in India and the response from farmers has been overwhelming. Farmers who adopted SRI are facing problems in maintaining planting distance. The marker available is heavy in handling and costly. It is labour intensive and time consuming. Shri Naresh Kisku is an innovative farmer has designed and developed a wooden marker for SRI technique using local materials. It is light, low cost and women friendly. It comprises of wooden logs of *sal* tree of ten feet length having 2.5 inch diameter. Eleven number of pegs, distance between pegs is about 10 inch, and length of

handle (bamboo) is about 7 ft. Bamboo is inserted which acts as handle is fixed with two pegs in the middle of the marker and is used as a puller. The total cost is only ₹ 150 and the approximate weight of the marker is 5 kg and is very light to pull so that it can also be used by women farmer.



Name : Shri Naresh Kisku

Age : 43 years

Phone : 9955386934

Education : 10<sup>th</sup> Standard

Address : Gorgora, Jamshedpur (Block),  
East Singhbhum (District), Jharkhand

Land holdings : Rainfed: 3 ha

Livestock : 2 cows

Farming experience : 20 years

### Impacts

The technique has been disseminated and is being used by 50 farmers in his village.

### Economics

The cost of marker for SRI cultivation is about ₹ 1500/- but in case of Shri Naresh Kisku innovated wooden marker for SRI is just ₹ 150/-, it is ten times less than the recommended one.



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## Innovation : Modification of Rotavator for Efficient Operation

Focus area : Farm Machinery

Modification/improvement of rotavator in the name of Tornado by Shri Binay Krishna Dey, a farmer-cum-mechanic-cum-tractor driver of South 24 Parganas, West Bengal made agricultural operation efficient and low-cost affair. In the modified rotavator, chain system is developed with both side power tiller. A complete set of 8 pinions is used in the rotavator which results into less friction, less power to drive, reduction of fuel consumption and enhancement in durability of the implement. The main outcome of this modification is to withstand the soil resistance without structural failure and at the same time blade life is increased.



Name : Shri Binay Krishna Dey

Age : 60 years

Phone : 03216211078

Education : 10<sup>th</sup> standard

Address : Kumarthuba, South 24 Parganas,  
West Bengal

Land holdings : Rainfed: 3 ha;  
Irrigated: 1.5 ha

Livestock : 2 cows

Farming experience : 40 Years

### Impacts

In a district like South 24 Parnagas of West Bengal with intensive agriculture in practice, the farmers had to go for power tiller for agricultural operation. Modified rotavator has reduced the number of operations and saved time. The consumption of fuel is also substantially reduced making the tillage operation a low-cost practice.

### Economics

In terms of time, 20-25% of operational time is reduced and cost of seed bed preparation reduced up to 25% by using modified rotavator.



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## Innovation : Power Tiller Attached Mobile Water Pump

Focus area : Farm Implement

Loss of pumpsets due to thefts are frequent in thinly populated hilly areas. The power supply to each corner of hilly areas is another major issue. So, Sri Arbit Marak has developed power tiller attached mobile water pump. The water pump attachment is fitted with power tiller by using a V- belt which is operated through the power tiller. The delivery pipe is connected to the pump for discharge of water with the start of power tiller engine. The mobile water pump is very easy to carry, operate and economical.

### Impacts

Resource conservation and management with ease to carry in remote area is the need of hour. Timely supply of adequate water to the paddy field leads to increase in crop productivity. The innovation can be used in remote areas where carrying of normal big size pump is not possible.

### Economics

The power tiller attached mobile water pump consumes one litre of diesel in 105 minutes compared to 60 minutes by normal pump (5 HP) thus there is a saving in fuel with similar irrigation efficiency.



Name : Shri Arbit Marak

Age : 59 years

Phone : 09089554253

Education : 12<sup>th</sup> standard

Address : Morokgre, Gambegre (Post),  
West Garo Hills (Post), Meghalaya

Land holdings : Rainfed: 1 ha; Irrigated: 0.5 ha

Livestock : 4 pigs and 10 poultry birds

Farming experience : 35 Years



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## Innovation : Automatic Spray Pump for Fruit Orchards

Focus area : Farm Machinery

Shri Gurraj Singh of Kotkapura, Faridkot district modified the rotor pump sprayer according to his need for spraying in Kinnow Orchard. He has installed the spray pump on 1500 liter capacity tank. The tank has been kept in a manner so that it trail behind the tractor in the same way as the trolley. High pressure spray pump of Sigma Company was used for pumping liquid, so as to pump the liquid easily to higher heights. Korean guns were attached ahead of the pump (for the purpose of nozzles) to spray the chemicals in very fine mist form on the plants. This innovation helped him in saving of 50% of water and chemicals in comparison to rotor pump used for spraying.



Name : Shri Gurraj Singh

Age : 65 years

Phone : 8901040357

Education : B. Sc.

Address : Duareana, Kotkapura (Block),  
Faridkot (District), Punjab

Land holdings : Irrigated: 10 ha

Livestock : --

Farming experience : 40 Years

### Impacts

He was using 400 litre drum with rotor pump and guns of Sigma Company but after adopting this new spray pump having Korean guns he is able to cover one hectare with 200 litre of water. This has not only saved water and chemical but also the labour hours in spraying. This is because of the nozzles that produce very fine mist and cover the plant thoroughly. This helped in controlling the diseases, insects and pests more precisely. As a result the orchard was free from diseases and insects and pest, and is now getting better returns than earlier from the same orchard. Now, there are about 50 Kinnow growing farmers who have adopted his innovative method of spraying.

### Economics

He incurred an additional expenses of ₹ 100,000 per ha, while there was an increase in net income by 200%.



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## Innovation : Low Cost Turmeric Grinder

Focus area : Agri-Industry

A low cost turmeric grinder designed by Shri Binay Kumar Dey of South 24 Parganas district of West Bengal has become handy for the small scale entrepreneurs. It is new type of turmeric grinder operated through 5 HP motor having six blades at a speed of 600 rpm. The blades slice the dry turmeric into tiny pieces and later powder. The grinder has two chambers one for slicing turmeric and another for accumulating turmeric powder it. A speed adjustable blower is fitted between the chambers for transfer of turmeric powder from one chamber to another and the small pieces of turmeric into the grinding chamber again. It combines all the operations like grinding,

classifying and conveying in one single unit. The grinding machine consists of an encased rotor carrying swing hammers, whizzer classifier for fineness regulation and pressure gradient creator mounted on a solid shaft. Raw material to be pulverized enters the crushing chamber through the hopper or the automatic rotary feeder. The impact of the hammers on the feed material against the liner plates reduces it into fine powder.

### Impacts

South 24 Parganas district of West Bengal is known for its potential in relation to production and marketing of spices powder, turmeric is the most important one. Grinding of turmeric at household level generates substantial amount of heat, deteriorates the quality and sometimes large particles gets mixed with the powder due to defective or broken sieve. The developed grinder has helped in improving the quality of powder, producing more quantity and reducing drudgery in grinding operation.

### Economics

He is cultivating turmeric in 8 ha of land and getting ₹ 10 lakh per year as net profit. He is also getting an additional ₹ 1.0-1.5 lakh per year from production of turmeric powder from his produce and providing employment to 10 persons.



Name : Shri Binay Krishna Dey

Age : 60 years

Phone : 03216211078

Education : 10<sup>th</sup> standard

Address : Kumarthuba, Habra (Block),  
South 24 Parganas (Dist.), West Bengal

Land holdings : Rainfed: 3 ha

Livestock : 2 cows

Farming experience : 40 years



Contact details for further information:

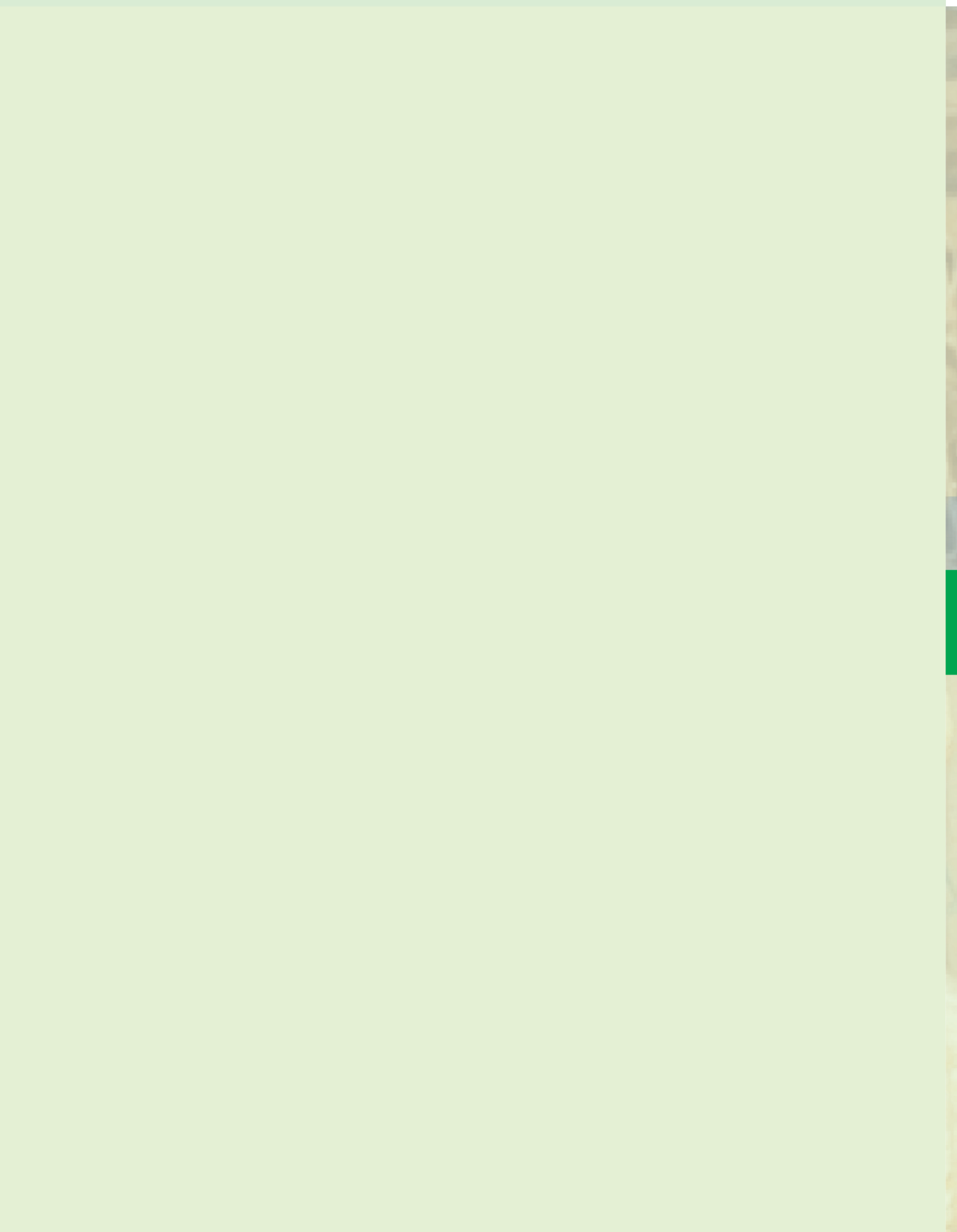
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nimpithkvk@rediffmail.com; <http://www.nimpithrkashram.org/>

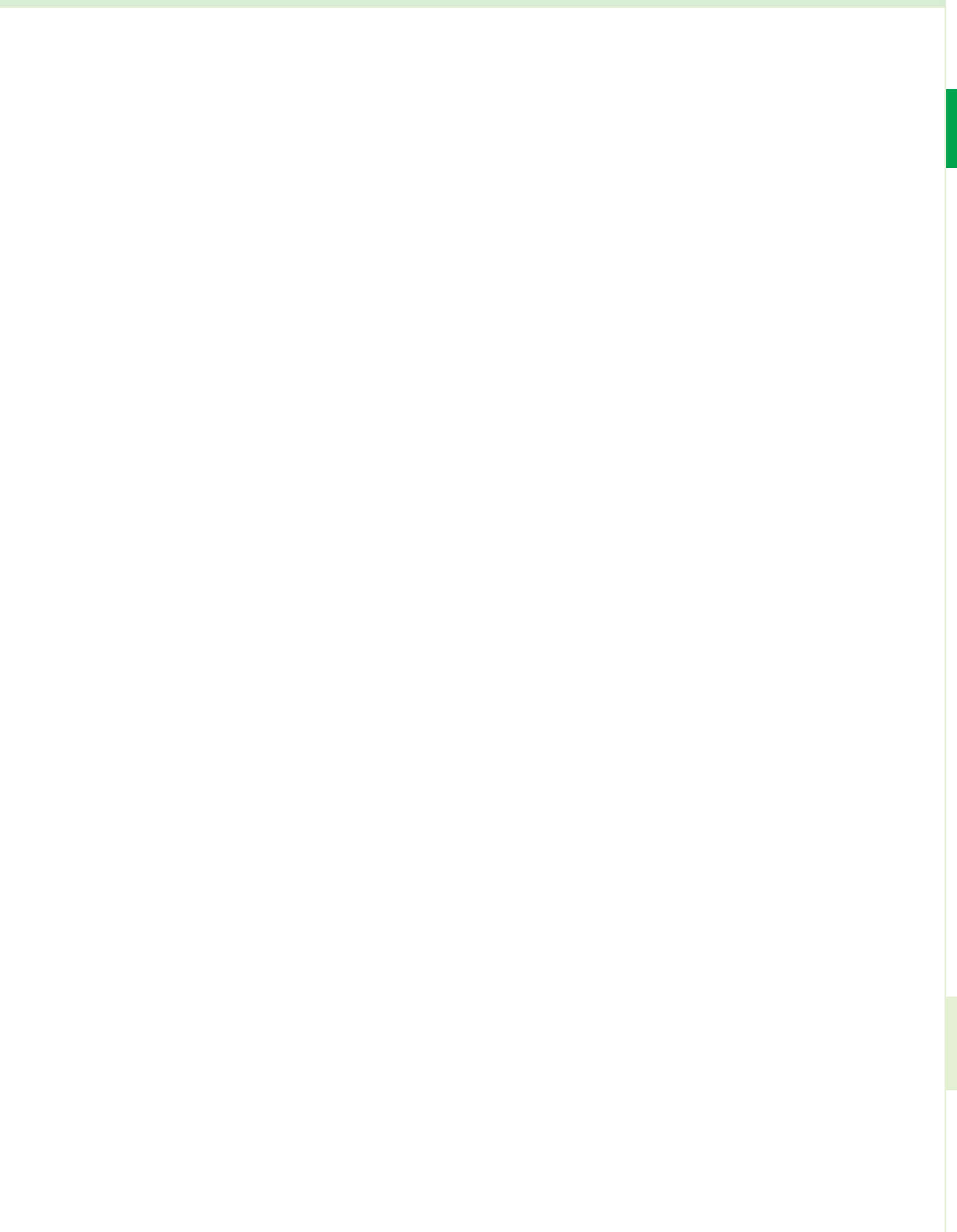






The image is a composite of two photographs. The top photograph shows the interior of a traditional wooden structure, possibly a drying rack or a storage area, with numerous wooden beams and a thatched roof. The bottom photograph shows a woman with grey hair, wearing glasses and a dark sari with white polka dots, standing in a similar structure. She is working with several large, round, woven baskets hanging from a wooden frame. The baskets appear to be made of natural fibers and are filled with a light-colored material, possibly a type of food or craft material. The overall scene suggests a traditional craft or food processing activity.

# Livelihood Innovations



## Innovation : Wild Lemon Grass as Insect Pest Repellent

Focus area : Pest Management

Lemongrass, *Cymbopogon citratus*, is a perennial grass in the family Poaceae grown for its fragrant leaves and stalks which are used as flavoring agent. Lemon grass can reach a height of 1.8 m (6 ft) and will grow for several years; typically its economical lifespan is four years. Lemon grass was spread over the entire field to control stem borer in particular and flies (aphids in bund areas). By using wild lemon grass, insects like stem borer in particular, flies and aphids were repelled. Lemon grass which is readily available enables the farmers to manage pest occurrence since bio-control agents are not easily accessible. Grass is either put in the soil or spread in the field and on bunds. Time of application is May-June.

### Impacts

The grass grows in dense clumps with stiff stems and slender blade-like leaves which droop towards the tips.

The climatic conditions are highly favorable for lemon grass production and can be utilized efficiently for integrated pest and nutrient management as it acts as mulch too. Lemon grass also helps in control of soil erosion as the area receives incessant heavy rainfall. Presently, there are 100 farmers who have adopted mulching of lemon grass in his village.

### Economics

Shri Vezokho Epao higher net returns of ₹ 42,000/ha by using the wild lemon grass as compare to farmers' practices (₹ 31,000/ha).



Name : Shri Vezokho Epao

Age : 49 years

Phone : 8732814767

Education : 9<sup>th</sup> standard

Address : Thipuzu, Rihuba (Post),  
Pfutsero (Taluk), Phek (District),  
Nagaland

Land holdings : Rainfed: 2.0 ha

Livestock : 5 pigs

Farming experience : 30 years

Social : Village council

appreciation/  
Recognition/ Awards



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## Innovation : Fermented Castor Solution Traps Pests of Sugarcane

Focus area : Plant Protection

Similepur village in Gonda district is well known for sugarcane cultivation. But the farmers face a recurring problem of pest called white grub (*Phyllophaga spp.*) that makes it difficult for them to harvest a good yield. Managing the pest is difficult for the groundnut cultivators as the grub lives in the soil and completes its lifecycle in a year. It feeds on the root system of the crops and the plants wither and die. Annually nearly 40% of crop loss is being reported from this region. Chemical control measures didn't prove to be a long-standing solution for this and the pest keeps recurring. Five liter mud pots were buried till the neck at different places in the field. About 5 kg of castor seed was

pounded and mixed in five liters of water. The solution was undisturbed and kept in a plastic drum for 10 days. On the 11<sup>th</sup> day, two liters of this liquid was poured in all the buried pots and were filled till the neck portion. The odour that comes out from the pots attracts the pest towards it.

### Impacts

Myrada did an extensive study on this indigenous technology over a period of four years and found that about five pots suffice for an acre. Though the farmer developed this concept, today nearly 300 farmers in the region follow this for their groundnut, sugarcane and cotton crops.

### Economics

If farmers use the conventional methods they need to spend anything from ₹ 1000 to 1500 for buying chemicals. This method is found to reduce the plant protection expense by 80% since the cost of the entire process comes to ₹ 200-250. Moreover there was 80% reduction in white grub and rhinoceros beetle pest population and it was reflected in terms of yield increase by 35-40% in sugarcane and groundnut crops with use of castor traps.



Name : Shri Ramjit Singh

Age : 40 years

Phone : 09125079922

Education : BA, LLB

Address : Smilepur, Begumganj (Post),  
Belsar (Block), Gonda-271402 (Dist.),  
Uttar Pradesh

Land holdings : Rainfed: 10 ha

Livestock : 8 cows & 3 buffalos

Farming experience : 20 years

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[Unsingh7777@gmail.com](mailto:Unsingh7777@gmail.com); <http://gonda.kvk4.in/>



## Innovation : Mushroom Cultivation over the Pond

Focus area : Mushroom Production

Smt Maniyamma is a well-known farmer in the village who depends mainly on farming for her livelihood. She has small land holding in which there is a pond. She started an integrated duck & fish unit and introduced many such interventions in her homestead. Due to the lack of space for making a mushroom shed, she constructed a shed above the pond on poles similar to duck shed. She used low cost bamboo and arecanut poles to erect the shed above the pond. A small shed was constructed on the poles with bamboo and covered the roof with coconut leaves. Since the shed was constructed over the pond, it ensured a cool atmosphere and retained moisture within the shed which is essential for mushroom cultivation.

### Impacts

The favourable conditions within the shed over the pond enabled her to cultivate mushroom throughout the year even in the summer season and fetched good

income. Mushroom cultivation over the pond at village Aruparayil is now known as “Mushroom village” as there are over 26 mushroom cultivation sheds over the pond managed by group of women farmers.

### Economics

Smt Maniyamma Thankappan is earning currently around ₹ 25000 per year from mushroom cultivation over the pond (50 kg of mushroom in 3 months selling at an average price of ₹ 200/- to ₹ 300/-). The initial investment for the structure over the pond was about ₹ 3000.



Name : Smt Maniyamma  
Thankappan

Age : 60 years

Phone : 9746119270

Education : 10<sup>th</sup> standard

Address : Aruparayil, Muttar (Post),  
Veliyanad (Block), Alapuzha (District),  
Kerala

Land holdings : Rainfed: 2.5 ha; Irrigated: 5.0 ha

Livestock : 30 poultry birds

Farming experience : 40 years

Social appreciation/  
recognitions/  
Awards : Smart farmer award by  
NICRA KVK for integrated  
farming system.



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## Innovation : Adoption of Drought Mitigation Technologies

Focus area : Risk Minimization

*In-situ* water harvesting plays an important role for conserving moisture and in making the moisture available for the crop for longer period in this perennially drought prone region of Kurnool district of Andhra Pradesh. Opening of conservation furrows in pigeon pea for *in-situ* water conservation is one of the innovation adopted. Cultivation of short duration drought escaping varieties of setaria, pigeon pea and chick pea is another innovation of the farmer. Intercropping of setaria + pigeon pea (5:1) and pigeon pea + castor (1:1) was adopted to minimise the impact of drought. He practiced frequent inter-cultivation to reduce the evaporation losses. He has understood the climate vulnerability in the village and implemented possible best practices such as intercropping, in-situ conservation measures etc to mitigate the drought effectively and to reduce its impact. The practice of cultivating drought escaping varieties was well spread to neighbouring villages also and several farmers are adopting these practices.



Name : Shri Bhanumukkala Siva Shankar Reddy

Age : 42 years

Phone : 9441586478

Education : -

Address : Yagantipalle, Banaganapalle (M), Kurnool District, Andhra Pradesh

Land holdings : Irrigated: 4; Rainfed: 8 ha

Livestock : --

Farming experience : 30 years

### Impacts

The practice of drought tolerant cultivars was adopted by many farmers in the village and also the adjacent villages. The short duration drought tolerant cultivars of setaria (Suryanandi, SIA 3085, etc.) are providing opportunities for rabi cropping which is otherwise monocropped. The intercropping of pigeonpea + setaria is also adopted by large number of farmers in the village and this practice is also spreading fast.

### Economics

Due to adoption of these innovative technologies against drought mitigation he got 15 to 20% yield advantage, thus contributing to enhanced net returns and minimized risk during drought.



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## Innovation : Enhancing Income by Value Addition

Focus area : Livelihood Improvement

Shri Raghuveer Singh Yadav belongs to Village Kharag of Datia district in Madhya Pradesh. He has 29 acres of land and generally grows traditional crops. He has total 30 milch animals including 25 buffalos and 5 cows having production of 120 liter milk/day. He adopted breed up-gradation in buffalos for enhancing the milk production and added value to milk through paneer production. Shri Raghuveer Singh sell 50-60 kg paneer every day in nearby Jhansi market. During the festivals and marriage season the demand will be still high. Initially he used to sell milk to the dairies situated nearby the villages and in the adjoining city, Jhansi and use to earn ₹ 90000/month with net profit of ₹ 40000/month. Later he started adding value to milk and preparing paneer to increase his income.



Name : Shri Raghuveer Singh Yadav

Age : 55 years

Phone : 9617951947

Education : High School

Address : Village Kharag Block Datia,  
Distt. Datia (M.P.)

Land holdings : Irrigated: 2 ha; Rainfed: 6 ha

Livestock : 2cows

Farming experience: 40 Years

Social appreciation/  
Recognition/ Awards : Climate Smart farmer Award  
from ZC Unit zone -7, ICAR

### Impacts

Shri Raghuveer Singh Yadav enhanced his income significantly by value addition. Now one of his son has adopted this method and purchasing milk from the adjoining villages and preparing paneer. Various shop owners from Jhansi gives them work on demand basis and also hire them to prepare paneer during the season when demand is more.

### Economics

Initially he started in 2013-14 and prepared 12 kg of good quality paneer with half of his milk and sold in Jhansi city at the rate of ₹ 200/kg. On the basis of quality of his product, demand increased within one year and started production of paneer not only from the milk produced at his farm but also from other farmers and produced up to 50-60 kg and gross income increased up to ₹ 150000/ month with a net profit of ₹ 60000/ month.



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## Innovation : Value Addition to Paddy Straw in a Productivity way

Focus area : Value Added Products in Agriculture

By the end of October every year, farmers of Jharkhand burn the straw of paddy for land preparation for the next crop. In this process, they damage soil quality and cause heavy pollution. Making articles from straw is one of the alternatives to avoid burning of paddy straw. Paddy straw can be utilized in different ways as shown by Smt Sunita Kumari of Jehanabad district, Bihar. Paddy straw has been used in an innovative way to prepare idol or structure of historical importance. In this method, paddy straw is bundled and soaked in water for 10-15 minutes. After taking out straw from water, individual straw is ironed to get the required stiffness. Straw of basmati rice and other improved varieties is more suitable for this purpose. After drying, the straw is pasted on the backside of big piece of paper. Desired design is made on front side of the paper and according to the design the straw is cut. Generally colour paper is used as background of the picture.



Name : Smt Sunita Kumari

Age : 40 years

Phone : --

Education : 8<sup>th</sup> standard

Address : Tebta, Makhdumpur (Block),  
Jehanabad (District), Bihar

Land holdings : Rainfed: 10 ha

Livestock : 2 cows

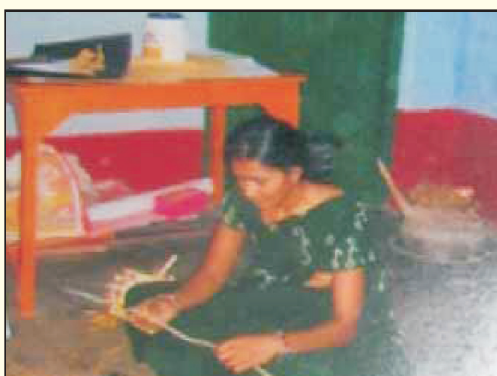
Farming experience : 10 years

### Impacts

This innovation doesn't include any additional cost except human labour. Even the rotten and old straw can be used for preparing various structures. To further minimize the cost, the bark of wood can also be used in place of colour paper. Many other ladies are inspired by Smt. Sunita Kumari and taken an initiative at their homes as a small business enterprise. The survey showed a decline of around 21% of crop burning practice in the past three years.

### Economics

Smt Sunita Kumari is earning around ₹ 5000/- per month at home by making articles from paddy straw. She has plans to expand her business in a larger way for providing jobs to others in her village.



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## Innovation : Cultivation of Vegetables under Ridge and Furrow Method in Flood Prone Regions

Focus area : Livelihood Improvement

Shri Vada Laxman Rao has taken up cultivation of vegetables with ridge and furrow method which reduce damage due to inundation and also acts as *in-situ* moisture conservation practice. He has also taken up zero till maize cultivation after paddy. He has observed reduction in the number of tillage operations and also reduction in number of irrigations due to zero tillage.

With ridge and furrow method, plant mortality reduced due to reduction in the duration of water stagnation. Crop yield increased by 19%. Due to the higher market price, farmers are interested to grow maize instead of blackgram with zero till method and the net returns are more when compared to blackgram in rice fallows. Cropping intensity can be increased with available water with this technology.



Name : Shri Vada Laxmana Rao

Age : 50 years

Phone : 9542143501

Education : 5<sup>th</sup> Standard

Address : Sirusuwada, Kotturu Mandal, Srikakulam, A.P.

Land holdings : Irrigated: 1.0 acre;  
Rainfed: 0.8 acre

Livestock : --

Farming experience : 25 years

Social : Farm Innovator by CRIDA in  
appreciation/ 2017

Recognition/ Awards

### Impacts

Vegetables yields are low due to flower drop, infestation of pest and diseases and high mortality of plants during cyclone period due to excess moisture. Cultivation of vegetables with ridge and furrow method reduces the damage due to inundation and also acts as *in-situ* moisture conservation measure. Cultivation of maize under zero tillage by utilizing residual soil moisture after *kharif* paddy results in saving of two irrigations, fuel and energy used for ploughing and net returns are more when compared to blackgram in rice fallows. Several farmers in the village got convinced about this technology and the technology was adopted by 30 farmers in the village.

### Economics

Net income increased by ₹ 11750/acre in case of brinjal, ₹ 7000/acre in case of bhendi under ridge and furrow method. Cost of cultivation reduced by ₹ 3000/acre compared to normal maize cultivation in case of zero till maize. Two irrigations were saved and net income of farmers increased by ₹ 5200/acre compared to normal maize.



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## Innovation : Improved Coating of Grain Storage Structure- Improved *Duli*

Focus area : Indigenous Grain Storage Structure

Insect pests and rodents have been considered as major problems in storage. Application of cow dung and mud as plastering material inside and outside of the *Duli* is being taken up. A sliding door towards the lower part of the *Duli* and a cover at the top are the specialty of this storage structure. Coating the outer wall with 'Salkoat' or 'Indrakoat', minimizes moisture absorption by grains, the structure becomes stronger, making an outlet towards the lower part of the outer wall of *duli* with a sliding door. In Assam, bamboo structure plastered both inner and outer side with cow dung and mud to lessen the moisture absorption. It has a sliding door towards the lower part of the *Duli* and a cover at the top which reduces drudgery in taking out the grains and keeps the grains air tight and away from rodents and other pests.



Name : Smt Hazara Khatoon

Age : 29 years

Phone : 03712-267089

Education : 10<sup>th</sup> standard

Address : Kachakani, Tezpur (Block),  
Sonitpur-784501, Assam

Land holdings : Rainfed: 1 ha

Livestock : 2 cows

Farming experience : 10 years

### Impacts

While filling the grains in the *duli* neem leaves or Bihlongoni leaves (A type of wild fern) are placed in layers to protect them from insect pest infestation. The extent of insect infestation got reduced significantly due to this improved structure.

### Economics

A thousand kg capacity *duli* costs ₹ 1500/. *Duli* is a kind of innovative structures have demonstrated in many KVKs of Assam. Farmers are now very much aware about this kind of innovation. Because, in Assam is growing huge bamboo, this kind of entrepreneurship is easy and making many articles out of this bamboos. So, farmers have more aware about construction of this *Duli* in their localities. Life of the *Duli* has five to six years without maintainance and with maintainace it can be extended up to ten years.



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## Innovation : Sericulture-A boon for Dryland Farmers in Drought Prone Regions

Focus area : Sericulture

He was earlier growing paddy (0.8ha), rainfed cotton (6.4 ha) and pigeonpea (0.8ha). In 2011 his gross annual income from 8ha of land was Rs.4.41 lakh with a cost of cultivation of ₹ 2.65 lakh. He later started sericulture to enhance income and to use the limited water efficiently and to reduce the risk. The size of the unit established is 50'x22'x15' and mulberry cultivation was taken up in 0.8 ha with drought tolerant variety S-13.

### Impacts

Shri Krishna Reddy found that sericulture is more remunerative than agriculture and horticulture as mulberry could survive under severe drought conditions and gave more income than any other crop. His son who is an unemployed graduate is assisting him in managing the enterprise and only two labourers are engaged for rearing and cocoon harvesting.

By seeing his income from sericulture enterprise, 10 more farmers have established sericulture enterprise in his villages.

### Economics

He reared 1950 dfls per year and harvested 7 crops in a year with an average yield of 80 kg cocoons per 100 dfls and the total cocoon harvested was 1615 kg. He incurred an expenditure of ₹ 84,000 and earned a net income of ₹ 4,21,893 per annum exclusively from sericulture enterprise inspite of severe drought.



Name : Shri SN Krishna Reddy

Age : 58 years

Phone : 08683-237443

Education : 4<sup>th</sup> standard

Address : Nandydagudem, Atmakur (Block),  
Nalgonda (District), Telangana

Land holdings : Rainfed: 8 ha

Livestock : 2 cows

Farming experience : 35 years

Social : NICRA progressive farmer  
appreciation/  
Recognition/Awards



Contact details for further information:

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## Innovation : Captive Rearing of Fish Seed

Focus area : Fish Farming

Farmers are facing difficulties in procurement of quality stock in required quantity and the transportation of fish seed leads to poor survival and increased cost on fingerling size seed. Due to the variability in rainfall there is uncertainty in the availability of water in tank which results in uncertainty in the release of fish seed in time. To overcome these constraints rearing of early stage fish seed (spawn/fry) to fingerling stage is done in captive condition which reduces the cost on seed.

### Impacts

The pond preparation was done by ploughing and fertilisation, removal of weeds and followed by fry stage fish seed duly following acclimatisation process. Feed management, regular sampling is done to monitor growth and health. The fry stage seed reared for 28 days until it reaches fingerling size.

### Economics

Through his innovation, the farmers realised the reduction in cost of seed upto ₹ 10,500/- due to improved survival in seed rearing and reduced loss of fish seed during transportation from long distances.



Name : Shri Sanyasi  
Age : 50 years  
Phone : 9492035636  
Education : 10<sup>th</sup> standard

Address : Sirusuwada, Kotturu (Taluk),  
Srikakulam (District), Andhra Pradesh

Land holdings : Rainfed: 5 ha

Livestock : 2 cows, 3 buffaloes and 7 goats

Farming experience : 35 years

Social : NICRA progressive farmer

appreciation/  
Recognition/ Awards



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## Innovation : Water Harvesting and Livelihood Diversification

### Focus area : Fish and Fodder Production

He has constructed a farm pond and taken up fish rearing in farm pond and water used for irrigation purpose in different crops in critical period. He has first introduced crops like turmeric, sugarcane and onion crops in Nacharam village. He maintains backyard poultry and farm machinery. Practicing silage making to feed the cattle during the summer season.

### Impacts

He has constructed one farm pond and lifted water from the check dam into farm pond and this was used for irrigation in critical period of crops. Efficient utilization of farm machinery in his farm inspired other farmers in Nacharam village. There are 50 farmers who are following Shri Satyanarayana's innovative ideas in his village.

### Economics

Shri Satyanarayana could earn a net return of ₹ 150000/- due to mix of improved and different farm enterprises at his farm.



Name : Shri Devabaktini Satyanarayana

Age : 52 years

Phone : 9492771446

Education : 10<sup>th</sup> standard

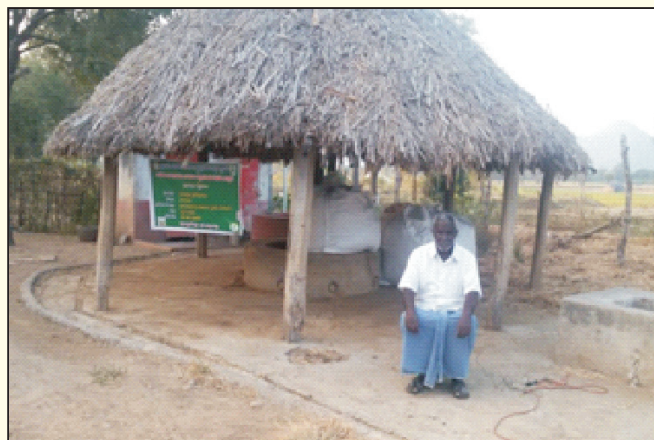
Address : Nacharam, Enkoor (Mandal), Khammam (District), Telangana

Land holdings : Rainfed: 3 ha; Irrigated: 3 ha

Livestock : 6 buffaloes

Farming experience : 22 years

Social appreciation/ Recognition/ Awards : Best farmer award received from CRIDA, Hyderabad



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## Innovation : Low Cost and Scientific Pisciculture

Focus area : Pisciculture

Shri Pradeep Pradhan was involved actively in crop production started focusing on pisciculture along with crop production for additional income. He is practising scientific pisciculture in 0.4 ha. Pond preparation with liming at 2.0 q/ha followed by application of raw cow dung at 2.5 t/ha. After pond preparation, he stocked yearlings of Catla/ Rohu/ Mrigal at 5000 nos./ ha, at a ratio of 3:4:3 with artificial supplementary feeding (floating fish feed) at 1% of body weight on daily basis. He was using yearling as the water table decreased in January and also mortality of fish in summer due to high temperature. Application of CIFAX was done at 1lt/ha as disease preventive measure before onset of winter.

### Impacts

Number of farmers of nearby villages also visited Shri Pradeep's pond and observed innovative practices of rearing fishes in his small farm pond and got motivated by seeing the result he got from his pond. There are 15 numbers of farmers who adopted the same innovation in an area of 10.0 ha.

### Economics

By adopting this innovation Shri Pradhan got fish yield of 32 q/ha within a period of 7 months with a net profit of ₹ 1,60,000/ha.



Name : Shri Pradeep Pradhan

Age : 40 years

Phone : -

Education : 10<sup>th</sup> standard

Address : Copora, Jagannathprasad (Post),  
Ganjam (District), Odisha

Land holdings : Irrigated: 2 ha; Rainfed: 3 ha

Livestock : 2 cows

Farming experience: 25 years

Social : Farm Innovator by CRIDA in  
appreciation/ 2017

Recognition/ Awards



**Contact details for further information:** **Dr. Pashant Kumar Panda**, Programme Coordinator  
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## Innovation : Green Fodder Production (Lucern) with Harvested Water

Focus area : Fodder Production

Agriculture is the main occupation of the tribal farmers of Nandurbar district. Low income from farming occupation due to low land holding and frequent drought situation. Livestock is the integral part of the tribal farmers. The tribal farmers rear bullocks up to 2-3 years and utilize for farm operations. Due to undulating topography, it is not possible to carry farm operations with big bullock. After that these farmers have to sell bullocks. Rearing and selling of bullocks is secondary income generating activity for these farmers. Due to scarcity of green fodder in summer season, growth of bullock gets affected which leads to reduced income from sale. She took initiative in construction of temporary sand bag structure with the involvement of neighbouring farmers. The harvested water was utilized for production of green fodder.



Name : Smt. Tetibai Kushal Pawara  
Age : 42 years  
Phone : -  
Education : -

Address : Umrani, Dhadgaon (Post),  
Nandurbar (District), Maharashtra

Land holdings : Irrigated: 0.4; Rainfed: 0.4 ha

Livestock : 2 cows and 4 goats

Farming experience: 30 years

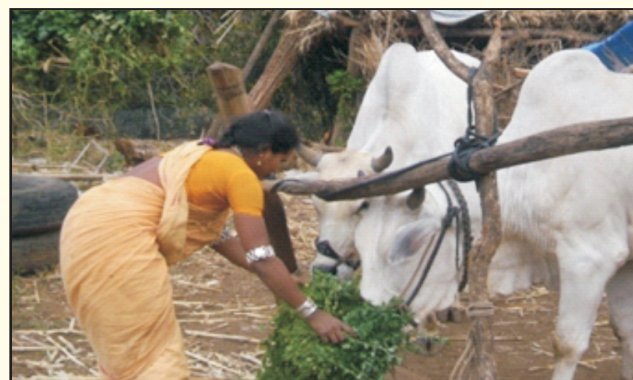
Social : Progressive Farmer  
appreciation/  
Recognition/ Awards

### Impacts

As the land holding of the tribal farmers is low, the farmers were not keen to spare land for fodder purpose at the initial phase of the intervention. But after seeing this successful intervention, now the farmers made up their minds to spare land for fodder. Now the farmers are demanding seed of fodder. This intervention of fodder production is getting popular among farmers. About 20-27 farmers are cultivating green fodder on 2-3 guntas by each farmer.

### Economics

The demand for green fodder in dry season is high and fetches ₹ 10 per bundle. She earned ₹ 10000 by selling the extra fodder after fulfilling the need of her own bullocks.



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## Innovation : Livestock as an Enterprise for Sustaining Livelihood

Focus area : Integrated Farming System

He has constructed a low cost night shelter for poultry birds to prevent the birds from heat stress and predators. He designed goat shed with locally available materials to provide shelter during extreme weather condition especially during summer and monsoon season. He started cultivating mixed fodder, he is able to rear the livestock with balanced ration at low cost. In his farm he preserved the dry fodder storage bank by putting aluminium sheet over the fodder.

### Impacts

In his village more than 40% of the poultry farmers, 70% of the goat farmers adopted housing management. 60-70% of the farmers cultivated green fodder for their livestock. Majority of the farmers (90%) preserved their fodder for feeding their livestock.

### Economics

By adopting the night shelter chick mortality reduced to 2 to 3% from 10 to 20%. The goat shelter helped to keep more number of kids and increased the income by ₹ 10,000/-year. By cultivating the fodder, purchase of concentrate feed got reduced thus ₹ 5,000/month was saved.



Name : Shri C. Sowndharasan

Age : 23 years

Phone : 9668871634

Education : Degree (BE)

Address : Vadavathur, Senthamangalam (Taluk),  
Namakkal (District), Tamil Nadu

Land holdings : Irrigated: 2 ha

Livestock : 2 cows

Farming experience : 10 years

Social : Climate Smart farmer Award by  
appreciation/ CRIDA in 2017

Recognition/ Awards



Contact details for further information: **Dr. N. Akhila**, Programme Coordinator  
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namakkalkvk@gmail.com; [http://www.tanuvass.tn.nic.in/kvk\\_nkl.html](http://www.tanuvass.tn.nic.in/kvk_nkl.html)



## Innovation : Multiple Enterprises as a Drought Mitigation Strategy

Focus area : Livelihood Improvement

Agricultural land in D Nagenahalli is having slopes resulting in significant runoff causing soil erosion. Levelling of sloppy land reduces the soil erosion. He has constructed a farm pond to harvest the rainwater which was used for critical irrigation. Finger millet, ML-365 is a drought tolerant and short duration and high yielding variety. Red gram BRG-2 is also short duration and high yielding variety. One acre of sloppy farm land was leveled which in turn reduced the soil erosion during heavy rains. Farm pond of size 20 m x 15 m x 3 m was dug with a water storage capacity of 900 cu m. The stored water was used for critical irrigation of crops in 0.75 acre and irrigation of paddy in 0.25 acre. He has cultivated Aster as the second crop because of the availability of water. Finger millet ML-365 and Red gram BRG-2 crops gave more yields compared to that of local variety.



Name : Shri Venkatappa

Age : 47 years

Phone : 8375343593

Education : 7<sup>th</sup> Class

Address : D.Nagenahalli, Anupanahalli Post  
Koratagere Taluk, Tumakuru District  
Karnataka – 568 104

Land holdings : Irrigated: 0.25 ha;  
Rainfed: 1.75 ha

Livestock : --

Farming experience : 10 Years

### Impacts

In the village about 40 farmers have adopted farm pond technology and about 45 acres was provided with critical irrigation.

### Economics

With leveling, the yield of groundnut has increased from 700 kg/ha to 900 kg/ha compared with no leveling. The net income has increased from ₹ 12000 to ₹ 22500 per ha. The yield of finger millet variety ML-365 was higher (2800 kg/ha) in comparison to the local finger millet variety (2100 kg/ha). The net income has increased from ₹ 9500 to ₹ 21000 per ha. Paddy was irrigated in 0.25 acre which was used for domestic consumption. Aster grown in 0.75 acre during *rabi* using harvested water from pond resulted in yield of 18 q and earned extra income of ₹ 22000/-.



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## Innovation : Efficient use of Irrigation Water Improved Returns in Drought Prone Areas

Focus area : Livelihood Improvement

Shri Selvaraj used to cultivate only 2 acres of land and the remaining land was left fallow as his bore well was not functional throughout the year. After the renovation of near by Aaiyiramkuttai community pond, he is cultivating crops like onion, fodder crops, maize, groundnut, green gram, cucurbitaceous vegetables, annual moringa etc., and now he extended the cultivated area to 5 acres. He adopted sprinkler irrigation method for fodder (CoFs-29, red sorghum, Bajra Napier), groundnut and onion cultivation. He reported more than 30% water has been saved when compared to flood irrigation. Foliar spray of PPFM (Pink Pigmented Facultative Methylophs) was used in his onion field @ 10 days interval. Semi spreading medium duration (120-130 day) Groundnut var. Co-6 was adopted which can withstand drought condition. He has adopted short duration green gram cultivars so as to maximize production from the limited water.



Name : Shri Selvaraj  
Age : 35 years  
Phone : 9791887533  
Education : HSC, ITI

Address : 3/40, Jambumadai, Vadavathur village  
Erumapatti Block, Namakkal District

Land holdings : Irrigated: 2.58 ha;  
Rainfed: 0.4 ha

Livestock : 5 cows and 12 goats

Farming experience : 10 years

### Impacts

Four farmers adopted sprinkler irrigation by seeing the results from his field in an area of 15 acres. Foliar spray of PPFM (Pink Pigmented Facultative Methylophs) was taken up in onion field at 10 days interval resulted in improving yield up to 20% with less water.

### Economics

Drought tolerant semi spreading groundnut (CO-6) variety produced more pod (850 kg/acre) under sprinkler irrigation method and earned a net income of ₹ 36,000/acre. Short duration green gram (CO-8) produced yield of 300 kg/acre resulting a net income of ₹ 12,000/acre. Yield obtained from small onion (Co-4) was 6 tones/acre and net income of ₹ 64, 000/acre was realized in 90 days. He reported more than 30% water has been saved by use of sprinkler compared to flood irrigation.



Contact details for further information:

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namakkalkvk@gmail.com; [http://www.tanuvastn.nic.in/kvk\\_nkl.html](http://www.tanuvastn.nic.in/kvk_nkl.html)





## Innovation : Integrated Farming Systems Based on Harvested Rain Water in Arid Regions of Kutch

Focus area : Livelihood Improvement

Shri Jakhubhai Chavda had taken an initiative to maximize their farm income with existing sources. Initially he had leveled his land and also prepared farm pond for rain water harvesting in his field and then installed micro irrigation system (MIS) in their field. He had covered their total 24 acres of land under MIS. He has established Integrated Farming System model in which he had included crop like Bt. cotton, castor, green gram, sesamum and horticultural crops like, pomegranate and chilli with livestock. He also promoted other farmers of Bhalot and surrounding villages to develop IFS model. He also adopted integrated pest management approach for the pest and disease management in his farm.



Name : Shri Jakhubhai  
Majabhai Chavada

Age : 43 years

Phone : 9177546599

Education : 7<sup>th</sup> Class

Address : Bhalot, Ta. Anjar, Dist. Kutch (Guj.)

Land holdings : Irrigated: 22 ha; Rainfed: 2 ha

Livestock : 3 Nos.

Farming experience : 10 Years

Social : Awarded as best farmer in  
appreciation/ NICRA project.

Recognition/ Awards

### Impacts

Earlier, there was not a single set of MIS in the village before five years. Today total 87 farmers have adopted MIS in 107 ha. in the village. Earlier, there was not a single fruit crop plant planted in the village. Today, 12 farmers have planted pomegranate in 53 acres and 3 famers have planted high value crop of datepalm in 3.5 acre land. Now all the farmers had adopted approach of IFS model with cultivation of horticultural crop like pomegranate with livestock. More than 35 farmers constructed animal shed for heat stress management of their livestock. Earlier, no milk collection center was there in the village. No milk was marketed. Today 400 lit. of milk is collected. Thus, the major impact on other farmers is that their awareness has increased and extended their co-operation for community work. Even nearby village farmers have started this type of work after looking to the success of work in Bhalot village. Bagada, Waghura, Lifra, Fachariya are the major surrounding villages where farmers have started rainwater harvesting work and adopted MIS.

### Economics

Farmers have realized the importance of the innovations taken up by the farmer and other farmers are following them. The net returns improved significantly. During last 5 years more than 80 hectare new agricultural land is developed. Earlier it was waste land, now farmers themselves started developmental activities due to improvement in economic condition.



Contact details for further information:

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## Innovation : Adoption of Integrated Farming Systems to Reduce the Impact of Drought

Focus area : Integrated Farming Systems

He is practicing *in-situ* moisture conservation in cotton for the past 2 years and getting good yield by conserving the soil and water. He is having one bore well (150 ft) and using it for critical irrigation to the cotton and paddy crop and getting higher yields. He has grown WGL- 44 Siddi variety of paddy and taken up improved variety of green gram MGG- 295 and pigeonpea WRG-65. He is having dairy animals and getting a milk yield of 10 lit/day and earning ₹ 500/day. He has overcome the problem of drought by providing critical irrigation to crops and thus stabilized yields and returns. Some of the farmers in the village started following him after looking at the performance of some of the new varieties of crops.



Name : Shri Rama Krishna

Age : 25 years

Phone : 9177546599

Education : 7<sup>th</sup> Class

Address : Nacharam village, Enkoor Mandal  
Khammam District, Telangana

Land holdings : Irrigated: 3 ha; Rainfed: 2 ha

Livestock : 4 Nos.

Farming experience : 10 years

### Impacts

The yield levels of the introduced varieties are higher and farmers took notice of the performance and 55 farmers in the village adopted these cultivars in an area of 60 ha.

### Economics

He has got a net income of ₹ 26,000 from paddy alone. The yield levels of green gram and pigeonpea were higher up to 25% in comparison to the traditional varieties.



**Contact details for further information:** **Dr. Hemantha Kumar**, Programme Coordinator  
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info@kvkwyra-angrau.org



## Innovation : Flower Cultivation as an Enterprise in Drought Prone Regions

Focus area : Livelihood Improvement

Farmers generally experience low net returns by growing field crops like maize and cotton. Abhilash Kumar has adopted raised bed, drip irrigation systems for flower crops in Ranga Reddy district of Telangana. The innovation is raised bed chrysanthemum cultivation with drumstick as intercrop for high net returns. Followed drip and soil test based fertigation schedule for high water and fertilizer use efficiency, micro nutrient foliar sprays in critical periods. He has used bio-products like Azatobactor, PSB, KMB, ZSB, Trichoderma, Pseudomonas and metarhizium for effective utilization of nutrients. He also learnt skill in vegetative propagation methods (stem cuttings with rooting hormone treatment), established nursery and supplied to 185 farmers in different parts of the state and other states. Apart from drumstick and flower production, farmer has also started commercial sale of the planting material which fetched him good returns.



Name : Shri Abhilash Kumar

Age : 27 years

Phone : 9948943066

Education : Intermediate

Address : S/o K. Mutyamaiahgoud  
H.No.2-19, Ramachandra Guda Vill.,  
Mahaeshwarm Mdl., Rangareddy Dt.

Land holdings : Irrigated: 6.0 ha;  
Rainfed: 2.0 ha

Livestock : 7 Nos.

Farming experience : 10 years

### Impacts

Department of Horticulture, Govt. of Telangana and Sri Konda Laxman Telangana State Horticulture University, Rajendranagar notified the quality of nursery.

### Economics

Around 295 farmers along with department officials visited his field during this year. About 88 farmers are adopting this technology covering an area of 125 acres in coordination with him. Through nursery supplied quality seedlings (₹ 4.25 lakhs) to 185 farmers from different parts of the state. He could earn ₹ 10.625 lakhs. In total from 8 acres of land farmer earned ₹ 28.57 lakhs net returns in this year (2016-17) both from crop and nursery.



**Contact details for further information:** **Dr. V. Maruthi**, Principal Scientist & Head  
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ICAR-CRIDA, Hayathnagar Research Farm,  
Hayathnagar-501 505. (O) 040-24200732





## Innovation : Integrated Farming Systems for Minimizing Risk and Enhancing Productivity

Focus area : Integrated farming system

Integrated farming system with millets like ragi, bajra, jowar, seasonal crops, horticulture (vegetables, green leafy vegetables), with drip irrigation and dairy with 10 buffaloes and poultry are being taken up to diversify income from multiple sources so as to minimize risk and to enhance productivity and profitability during the years of favorable rainfall conditions. She is cultivating vegetables like beet root, carrot, onions and green leafy vegetables for maximizing income during the years of good rainfall and during periods of water availability. She is also growing Azolla to supplement more nutritious feed to the animals.



Name : Smt. Chintapalle Sahithi

Age : 28 years

Phone : --

Education : S.S.C.

Address : Gaddamallaiahguda village,  
Yacharam Mdl., Ranga Reddy Dt.

Land holdings : Irrigated: 2.5 ha;  
Rainfed: 8.5 ha

Livestock : 10 buffaloes

Farming experience : 10 years

She is cultivating improved varieties of fodder crops and has improved the milk production from 3-4 litres/animal to 5-7 litres /animal. Integrated farming system with seasonal crops, horticulture (vegetables, green leafy vegetable), with drip and Dairy (10 buffaloes) and poultry, inter cropping has minimized risk during low rainfall years and maximized income during the years of favorable rainfall.

### Impacts

She has increased income from the farm to several folds and has multiple sources of income. More than 15 farmers in the villages bought chaff cutter and almost all the farmers started growing green leafy vegetables.

### Economics

Use of integrated farming provides continuous income and also stability to farm families in the event of crop failure. She earned about ₹ 2,50,000/- from sale of milk this year i.e. 2016-17 & ₹ 2,00,000/- from green leafy vegetables.



**Contact details for further information:** **Dr. V. Maruthi**, Principal Scientist & Head  
Krishi Vigyan Kendra - Ranga Reddy District  
ICAR-CRIDA, Hayathnagar Research Farm,  
Hayathnagar-501 505. (O) 040-24200732



## KVKs involved in the Technology Demonstration Component

S.No	State	Distrcit	Vulnerability
<b>ATARI Zone I</b>			
1.	Haryana	Sirsa	Drought & Heat wave
2.	Haryana	Yamunanagar	Frost/ Cold wave/ Cold stress
3.	Punjab	Bathinda	Drought & Heat wave
4.	Punjab	Fatehgarh Shaib	Frost/ Cold wave/ Cold stress
5.	Punjab	Ropar	Frost/ Cold wave/ Cold stress
6.	Punjab	Faridkot	Heat wave and High temperature stress
7.	Himachal Pradesh	Hamirpur	Drought
8.	Himachal Pradesh	Chamba	Water stress & Cold Stress
9.	Himachal Pradesh	Kinnaur	Water stress & Cold Stress
10.	Himachal Pradesh	Kullu	Water stress & Cold Stress
11.	Jammu& Kashmir	Kathua	Drought
12.	Jammu& Kashmir	Phulwama	Frost/ Cold wave/ Cold stress
13.	Jammu& Kashmir	Bandipora	Frost/ Cold wave/ Cold stress
<b>ATARI Zone II</b>			
14.	A&N Islands	Port Blair	Flood/Cyclone/High Rainfall
15.	Bihar	Aurangabad	Drought
16.	Bihar	Banka	Drought
17.	Bihar	Jehanabad	Drought
18.	Bihar	Nawadah	Drought
19.	Bihar	Buxar	Drought & Flood
20.	Bihar	Saran	Drought & Flood
21.	Bihar	Supaul	Drought & Flood
22.	Jharkhand	Godda	Drought
23.	Jharkhand	Koderma	Drought
24.	Jharkhand	Chatra	Drought & Heat wave
25.	Jharkhand	East Singhbhum	Drought & Heat wave
26.	Jharkhand	Gumla	Drought & Heat wave
27.	Jharkhand	Palamau	Drought & Heat wave
28.	West Bengal	Coochbehar	High Rainfall
29.	West Bengal	Malda	Flood/High Rainfall
30.	West Bengal	South 24 Parganas	Flood/Cyclone/High Rainfall



### ATARI Zone III

31.	Arunachal Pradesh	Tirap	Frost/ Cold wave/ Cold stress
32.	Arunachal Pradesh	West Kameng	Water stress & Cold Stress
33.	Arunachal Pradesh	West Siang	Water stress & Cold Stress
34.	Assam	Dhubri	Flood
35.	Assam	Cachar	Flood/High Rainfall
36.	Assam	Dibrugarh	Flood/High Rainfall
37.	Assam	Karbi-Anglong	Drought
38.	Assam	Sonitpur	Flood/High Rainfall
39.	Manipur	Imphal East	Drought
40.	Manipur	Senapati	Drought
41.	Manipur	Ukhrul	Frost/ Cold wave/ Cold stress
42.	Meghalaya	Ribhoi	Drought
43.	Meghalaya	West Garo Hills	Drought
44.	Meghalaya	Jaintia Hills	High Rainfall
45.	Mizoram	Serchhip	Cold wave & Hail storm
46.	Mizoram	Lunglei	Water stress & Cold Stress
47.	Nagaland	Mon	Cold wave & Hail storm
48.	Nagaland	Dimapur	Drought
49.	Nagaland	Mokokchung	Drought
50.	Nagaland	Phek	Drought
51.	Sikkim	East Sikkim	Water stress & Cold Stress
52.	Tripura	West Tripura	High Rainfall
53.	Tripura	Dhalai	Drought

### ATARI Zone IV

54.	Uttar Pradesh	Chitrakoot	Drought
55.	Uttar Pradesh	Hamirpur	Drought
56.	Uttar Pradesh	Jhansi	Drought
57.	Uttar Pradesh	Sonbhadra	Drought
58.	Uttar Pradesh	Kaushambi	Drought and salinity
59.	Uttar Pradesh	Pratapgarh	Drought and salinity
60.	Uttar Pradesh	Bahraich	Flood
61.	Uttar Pradesh	Gonda	Flood
62.	Uttar Pradesh	Gorakhpur	Flood
63.	Uttar Pradesh	Kushinagar	Flood
64.	Uttar Pradesh	Maharajganj	Flood
65.	Uttar Pradesh	Baghpat	Heat wave and High temperature stress
66.	Uttar Pradesh	Muzaffarnagar	Heat wave and High temperature stress





67.	Uttarakhand	Tehri Garhwal	Cold wave & Hail storm
68.	Uttarakhand	Uttarakashi	Cold wave & Hail storm
<b>ATARI Zone V</b>			
69.	Andhra Pradesh	Anantapur	Drought
70.	Andhra Pradesh	Chittoor	Drought
71.	Andhra Pradesh	Kurnool	Drought
72.	Andhra Pradesh	Srikakulam	Flood/Cyclone
73.	Andhra Pradesh	West Godavari	Flood/Cyclone
74.	Telangana	Nalgonda	Drought
75.	Telangana	Khammam	Drought
76.	Maharashtra	Ahmednagar	Drought
77.	Maharashtra	Amravati	Drought
78.	Maharashtra	Aurangabad	Drought
79.	Maharashtra	Buldhana	Drought
80.	Maharashtra	Jalna	Drought
81.	Maharashtra	Pune	Drought
82.	Maharashtra	Nandurbar	Drought
83.	Maharashtra	Ratnagiri	High Rainfall
<b>ATARI Zone VI</b>			
84.	Gujarat	Banaskantha	Drought
85.	Gujarat	Rajkot	Drought
86.	Gujarat	Amreli	Drought and salinity
87.	Gujarat	Valsad	High Rainfall
88.	Gujarat	Kutch	Scaty and Erratic rainfall
89.	Rajasthan	Barmer	Drought
90.	Rajasthan	Bharatpur	Drought
91.	Rajasthan	Jodhpur	Drought
92.	Rajasthan	Jhunjhunu	Heat wave and cold wave
93.	Rajasthan	Kota	Scaty and Erratic rainfall
<b>ATARI Zone VII</b>			
94.	Madhya Pradesh	Balaghat	Drought
95.	Madhya Pradesh	Chhatarpur	Drought
96.	Madhya Pradesh	Datia	Drought
97.	Madhya Pradesh	Guna	Drought
98.	Madhya Pradesh	Jhabua	Drought
99.	Madhya Pradesh	Morena	Drought
100.	Madhya Pradesh	Ratlam	Drought
101.	Madhya Pradesh	Satna	Drought



102.	Madhya Pradesh	Tikamgarh	Drought
103.	Chhattisgarh	Bilaspur	Drought
104.	Chhattisgarh	Raipur	Drought
105.	Chhattisgarh	Dantewada	High Rainfall
106.	Odisha	Ganjam	Drought
107.	Odisha	Jharsugda	Drought & Flood
108.	Odisha	Sonepur	Drought & Flood
109.	Odisha	Kendrapara	Flood/Cyclone/High Rainfall
110.	Odissa	Kalahandi	Drought

#### ATARI Zone VIII

111.	Karnataka	Davanagere	Drought
112.	Karnataka	Gadag	Drought
113.	Karnataka	Gulbarga	Drought
114.	Karnataka	Kolar	Drought
115.	Karnataka	Tumkur	Drought
116.	Karnataka	Belgaum	Drought
117.	Kerala	Alleppey	Flood
118.	Tamilnadu	Namakkal	Drought
119.	Tamilnadu	Ramanathapuram	Drought
120.	Tamilnadu	Thiruvarur	Drought & Flood
121.	Tamilnadu	Villupuram	Drought





**Innovative Farmers Felicitated on CRIDA Foundation Day (April, 2016)**







## Innovative Farmers Felicitated on CRIDA Foundation Day (April, 2017)









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