

Farmers Innovation

Fostering Convergence



ICAR-Agricultural Technology Application Research Institute, Zone-II

Jodhpur - 342 005, Rajasthan, India

(ISO 9001-2015 Certified Institute)

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उप महानिदेशक (कृषि प्रसार)

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Foreword

Innovation is significant key for augmenting agricultural production and productivity which is defined as a "new idea, device or method". However, innovation is also viewed as application of better solutions to meet new requirements, unarticulated needs, or existing market needs. This is accomplished through more-effective products, processes, services, technologies, or business models that are readily available. The spirit of innovations is embodied in the ability to work within limited resources to build something valuable. Farmer led innovations have brought out much transformation in agricultural sector in some regions of the country but these have not been given much scientific credence.

Farm Innovators have been leaders in bringing innovation and technology to other farmers and have been continuously improving available technologies for more efficient and cost effective farming, which resulted in numerous innovations over the generations and helped in improving farming practices ensuring better livelihood options. Farm innovators farmer to farmer extension in association with KVKs.

I am happy that ICAR-Agricultural Technology Application Research Institute, Zone-II, Jodhpur (Rajasthan) has initiated documentation of farmers' innovations in diverse areas of agriculture like crop production, horticulture, engineering, plant protection, poultry, animal husbandry etc., across Rajasthan, Haryana and Delhi states.

(A.K. Singh)

डॉ. सुशील कुमार सिंह
निदेशक

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Preface

Growth of agricultural sector is led by innovation at various levels. While working under a wide range of ecological, climatic, economic and socio-cultural conditions, numerous innovations have been generated by farmers'/farm women. However, such farmer-led innovations have received little attention. Various farm innovations such as crop varieties, new farm implements in addition to low cost technologies for processing and value addition are evolved with the efforts of grassroots' innovators. Despite these, the innovations led by farmers have neither been institutionalized nor properly recognized. In order to promote the farmers-led innovations and popularize them, it is necessary to document and up-scale them.

KVKs are focusing towards local innovations, encouraging grassroots innovators through recognition to their innovation at various platforms and documenting their work in form of case studies and success stories. Many farmers led innovations have been identified in Rajasthan, Haryana and Delhi which can be helpful for further dissemination among other farmers in the zone . In order to scale-up valuable farmer- led innovations, it has become necessary to identify the potential farmers-led innovations, followed by their validation and refinement. This necessitates “bottom up” approach with farmers' participation in reorienting research and outreach programmes. Innovative technologies identified in one region need to be popularized in similar eco-regions elsewhere, through publication, documentation and dissemination of - Success Stories.

Keeping this in view, to recognize farm innovators, documentation of successful case studies of farmer led innovations has been done. We are sure that this attempt will bring enthusiasm among the farm innovators and helps indissemminating these innovations to other farmers.

I appreciate the efforts of scientists of ICAR-ATARI, Jodhpur and KVKs of Zone-II for compiling this important publication. I am also thankful to Dr Rashmi Singh Dr M S Nain and Dr J R Mishra of IARI, New Delhi for collaborating in editing this publication and providing standardized tool developed under their research project to document these success stories.


(S.K. Singh)

Contents

S.No.	Innovators	Page No.
	<i>Foreword</i>	
	<i>Preface</i>	
1.	Standardization of spacing in garlic: An innovative and acceptable intervention	1
2.	Ratooning of Okra resulting in early fruiting	2
3.	Intercropping of water melon with sweet corn: A profitable venture	3
4.	Backyard poultry has improved economic condition	4
5.	Mushroom cultivation: profitable self employment based enterprise	5
6.	Modified mushroom house for early and late season mushroom production	7
7.	Mushroom cultivation as source of income	9
8.	Income generation through value addition of spices	10
9.	Value addition enterprise and bakery : Income generation through value addition of soybean	11
10.	Water saving through innovative watering method in vermicomposting	13
11.	Cultivation of Rose : A lucrative enterprise	14
12.	Development of peeling machine of Safed Musli	15
13.	Intercropping of Bitter Gourd and Maize	16
14.	Mass queen bee rearing and multiplication of honeybee colonies	17
15.	Cucurbits cultivation in low tunnel technology with mulching has change fortune of family	18
16.	Sadabhahar mango variety ensures availability of mango round the year	20
17.	Sustainable income generation through integrated agriculture	22
18.	Diversified farming system improved livelihood of tribal farm women	24
19.	Improvement of farmer through integrated and need based technological interventions empowered farmer	26

20.	Organic pot making machine – low cost and affordable innovation	27
21.	Rose farming: An alternate source of income	28
22.	Date palm cultivation has changed life style of farmer	29
23.	Organic pomegranate production through automization	31
24.	High density pomegranate plantation enhances profit under hard conditions	33
25.	High density fruit cultivation with timber trees	35
26.	More remuneration through high density fruit cultivation	37
27.	Seed sufficiency through seed production of farmers preferred varieties	39
28.	Enhancement of productivity of paddy through transplanting	41
29.	Cultivation of sugarcane through single bud technique : More profitable and remunerative	43
30.	Multipurpose machine for juice extraction and value addition to medicinal crops as profitable venture	45
31.	Success through bee keeping and bee products	46
32.	Heating devices for brooding of chicks : Low cost technology	48
33.	Gainful employment by bee keeping	49
34.	Utilisation of baren land by establishing Ber orchard	50
35.	Enhancement of income through value addition in Aonla	51
36.	Carrot washing equipment for better price	53
37.	Intercropping in Strawberry for higher return	55
38.	Substantial income generation through value addition	57
39.	Intercropping for higher returns	58
40.	Fish breeding in low cost innovative structure	60
41.	Locally procured concentrate for milch buffaloes	62
42.	Bee keeping is best option of ancillary activity	63
43.	Sustainable milk production of crossbred cows and buffaloes during summer	65
44.	Direct Seeded Rice: A cost effective & water saving technology	66
45.	Use of mulching to conserve moisture and efficient weed management	69

Standardization of spacing in garlic: An innovative and acceptable intervention

1. Thematic area: Horticulture

2. Profile of innovator: **Sh. Lalit Galav** S/o Sh. Vishanu Galav
Village: Sorkhand kalan, Post: Anta
District: Baran (Rajasthan)
Mobile No.: 8890858483
Age: 40 years
Education: B.Sc
Land holding: 2 ha.



3. Problem/challenge addressed: The average rainfall of Baran district is 900 mm and soil is mostly clay & clay loam. Sri Lalit Galav has 2.00 has cultivable land. Use of high seed rate in garlic and maintaining proper spacing is the major problem for the production of marketable bulb size.

4. Description of innovative practice/technology: Development of innovative drum with spike like structure helped to sow garlic seed with proper spacing, which has resulted proper utilization of sunlight and nutrient uptake.

5. Practical utility: The technology has been found in getting 'A' grade size of bulb fetching higher market prices. Application of pesticide and herbicide has become easier.

6. Economics/Profitability of innovative practice/ technology (costs and return) (per intervention or area or household): The market price of 'A' grade garlic is 10 percent higher than the normal sized garlic. The cost benefit ratio is 1:3.01. The shelf life of bulb is also found to be more than under sized bulbs.

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: This machine is utilized on the custom hiring basis. This innovation has been spread in 2500 ha acre area in the district since last three years.



नवीन विकसित यंत्र से लहसुन बीज रोपण



अटारी जोधपुर, केवीके वैज्ञानिकों एवं आकाशवाणी टीम का लहसुन उपज अवलोकन



नवीन विकसित यंत्र से बोने के बाद लहसुन उत्पादन

Ratooning of Okra resulting in early fruiting

1. Thematic area: Natural Resource Management

2. Profile of innovator: **Sh. Mahaveer Suman** S/o Sh. Chaturbhuj Suman
Village: Nagda Ki Jhopadia, Post: Anta
District: Baran (Raj.)
Mobile No.: 9799555962
Age: 40 years
Education: 10th
Land holding: 1.2 ha



3. Problem/ challenge addressed: The average rainfall of the district is 900 mm. The soil type is clay & clay loam. It is very difficult to sustain with 1.2 ha land. Ratooning of okra is one of important management practice to get earlier fruiting of the vegetable, fetching higher prices in the market .

4. Description of innovative practice/technology: Ratooning of okra is done after the last picking of okra i.e. in the month of June. The pruning of main branch of okra is done with the help of knife above 20 cm from the ground level, which increase the number of lateral branches and flowering starts immediately after the initiation of new shoots.

5. Practical utility: Fruit shoots are juvenile in nature. Hence, pruning enhances one month early fruiting fetching higher prices in the market during monsoon months when the vegetable's availability in the market is low.

6. Economics/Profitability of innovative practice/ technology (costs and return) (per intervention or area or household): 30 days early fruiting. The cost of seed as input is fully solved by Rs. 18000. Cost benefit ratio was found 1:4.3. This technique reduces 30 days duration of okra.

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: Seeing the benefits accrued due to adoption of this innovation, 20 farmers of the village also adopted technology of early fruiting for Okra growing it throughout the year after protecting farm of one hectare by fencing with financial support of KVK in participatory mode.



ड्रीप पद्धति से मिर्च की खेती



सब्जी प्रतियोगिता में कुलपति द्वारा सम्मान

Intercropping of water melon with sweet corn: A profitable venture

- 1. Thematic area:** Natural Resource Management
- 2. Profile of Innovator:** **Sh. Rammehar** S/o Sh. Ramnarayan
Village & PO: Dhanesri, Block: Badhra,
District: Bhiwani
Mobile No.: 09812931379
Age: 43 years
Education: 10+2
Land holding: 3.00 ha (Own) 2.2 ha (Leased in)



- 3. Problem/ challenge addressed:** Sandy loam soil of farm which is characterized by water scarcity and low productivity of crops like Pearl millet, Cluster bean, Mustard, Barley and Gram. Low yield of field crops is the major concern and also responsible for less farm income.
- 4. Description of innovative practice/technology:** Establishment of biogas and vermi compost units, inter cropping of water melon with sweet corn and use of mulch have improved soil fertility status which resulted higher yield and remunerative.
- 5. Practical Utility:** With Biogas unit, he is able to avoid the dependency on LPG. Pollution free slurry of biogas plant is used to prepare vermi compost. Use of vermi compost improved nutrient level of soils. Intercropping of water melon with sweet corn has increased the income of the farmer.
- 6. Economics/Profitability of innovative practice/ technology (costs and return) (per intervention or area or household):** Cost : Rs. 125000/ ha; Return: Rs. 312000 / ha; Profitability : Rs. 187000 / ha
- 7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting:** Initially 10 farmers in the village/cluster were adopted this technology. Subsequently, 13 more farmers from Badhr block adopted this technology.



Visit of Hon'ble Vice chancellor of CCSHAU Hisar at Watermelon field of Sh. Ramehar



State level Award commendation of Sh. Ramehar for his contribution in diversification

Backyard poultry has improved economic condition

- 1. Thematic area:** Livestock
- 2. Profile of innovator:** **Sh. Goutam Choudhary**
 Mobile No.: 9672620576
 Age: 25
 Education: Graduate
 Land holding: 6.25acres



3. Problem/ challenge addressed: Traditional farming (crop based) was not fulfilling requirements of family so he started backyard poultry farming to enhance overall profits.

4. Description of innovative practice/technology: He has started backyard poultry with local breed of poultry. Comparing the various breeds, he brought Kadaknath breed from Madhya Pradesh for establishment of a poultry unit.

5. Practical utility: Better utilization of house wastes and material for feeding and management of backyard poultry to reduce input cost.

6. Economics/Profitability of innovative practice/ technology (costs and return) (per intervention or area or household):

Source	Cost of production (Rs)	Gross income (Rs)	Net income (Rs)	Cost-benefit ratio
Agriculture	2,94,000	5,15,100	2,21,100	1.75
Backyard poultry farming	1,12,000	2,10,000	98,000	1.87

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: Initially started Kadaknaath poultry in backyard poultry. Now started Mother unit for providing chabro poultry chicks to BPL Family under LIT Scheme. Majority of farmers/youth get motivated and presently 100 farmers adopted backyard poultry in the cluster.



Kadaknath poultry breed at backyard poultry farm



Chabro chicks at backyard farm

Mushroom cultivation: profitable self employment based enterprise

- 1. Thematic Area:** Mushroom Farming
- 2. Profile of innovator:** **Smt. Gayatri Devi Rathore**
W/o Sh. Kalu Singh Rathore
VPO: Talwara Jhil, Tehsil: Tibbi
Dist. Hanumangarh (Raj.)
Mobile No. 9460266301
Age: 39 year
Education: Secondary School
Land: 8 Acre



3. Problem Addressed: Smt. Gayatri Devi told that net profit was very low in traditional farming including cultivation of wheat, mustard, cluster bean, cotton and paddy. Due to climate vagaries, infestation of pest and diseases, she was not able to manage crop production.

4. Description of innovative practice/technology: Smt. Gayatri Devi has started the cultivation of Button mushroom in 2014 with 100 qt. wheat straw for compost making which is new innovation in district after getting training on mushroom cultivation from the Krishi Vigyan Kendra, Hanumangarh-I. In this year, she produced 80 quintal button mushroom of Rs. 12.80 lakh. During the year of 2015-16, she prepared compost from 600 quintals wheat straw and 187 quintal button mushroom and earns Rs 28.00 lakh from the sale of mushroom. The farmers of the district, after harvesting with combine burn paddy stubble. With the burning of the straw, the environment is also polluted. The straw can be used in mushroom production.

5. Practical utility: She gives job to other land less labourers. Cost of cultivation is not high and gross income as well as net income has been increased through mushroom cultivation.



Compost making for Button Mushroom at Smt. Gayatri Devi Rathore Mushroom Farm



Casin work done by Smt. Gayatri Devi Rathore

6. Economics profitability of innovative practice/technology(Costs and return) (per intervention or area of household)

Year	Cost of production in lakh	Gross income in lakh	Net income in lakh	B:C ratio
2014-15	4.00	12.80	8.80	3.20
2015-16	7.50	28.00	20.50	3.73
2016-17	9.30	38.50	27.20	4.14

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: 30 farmers have adopted this innovation and started the Mushroom cultivation. Many youth and district officials visited this innovative farm and she is proving inspirational to other farmers of the region



Spawning in compost for button mushroom



Grading and packing of button mushroom



Received Danik Bhaskar Women Award from Honrable Chief Minister Smt. Vasundera Raje Scindia

Modified mushroom house for early and late season mushroom production

1. Thematic area: Secondary agriculture

2. Profile of Innovator: **Sh. Vijender Malik** S/o Sh. Ved Pal Malik
VPO: Mokhra Khas, Distt.: Rohtak (Haryana)
Mobile No.: 98122 94965
Age: 36 years
Education level: Graduate
Size of land holding: 1.5 acres



3. Problem / challenge addressed: Soil of his farm is low in organic carbon, medium in available phosphorus and medium to high in potash. He has decided to select another agriculture based enterprise for employment and income generation. Thus, he started mushroom cultivation. Under natural conditions, favorable season for mushroom production is shortened; due to high temperature up to December and abrupt rising of temperature in the month of Feb., resulted poor yield of mushroom.

4. Description of innovative practice / technology: The innovative technology is based on the idea of lowering down the temperature of mushroom accompanied with high humidity in the months of Nov.-Dec. and Feb.-March, so as to maintain favorable conditions for mushroom production over a longer period of time. For this, a desert cooler of size 53" x 33" x 72" (L x b x h) has been installed in a mushroom house of 22' x 45' size. The temperature and humidity of mushroom house are maintained through the duct system passing through the mushroom house and connected with desert cooler.

5. Practical utility: The innovation has provided favorable conditions for at least 2 months for mushroom production i.e. from October to March as compared to November to February. under natural conditions. Early and late crop of mushroom fetches higher prices in the market.



External view of Mushroom house fitted with Desert cooler

6. Economics / Profitability of innovative practice / technology (costs and return) (per intervention or area or household):

Year	No. of units	Gross cost (Lakh)	Gross income (Lakh)	B:C ratio
2016-17	4 (22' x 65') Without Cooler & Duct system	3.10	4.65	1.50
	2 (22' x 45') With Cooler & Duct system	2.50	5.00	2.00

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: The KVK scientists are in regular contact of Sh. Vijender Malik, Ex trainee of KVK, Rohtak. Sh. Vijender Malik successfully applied this innovation in 2016-17. The mushroom growers of district Rohtak are ex-trainers of KVK. KVK is also organising visit programme at the trainee unit for learning and its dissemination among other farmers as well as trainers.



Internal View of Mushroom house fitted with Duct System



Insulated roof of Mushroom house

Mushroom cultivation as source of income

- 1. Thematic area:** Secondary Agriculture
- 2. Profile of innovator:** **Sh. Gaurav Vashisth** S/o Sh. Mukut Bihari
Vill.: Dingalheri, Post: Tauru, Distt.: Nuh, Haryana
Mobile No.: 8607221404
Age: 25 years
Education: Graduate (B. Tech.)



3. Problem/challenge addressed: In present scenario especially in peri-urban area of Gurugram district the decreasing agricultural land and steep rise in land costs, farmers are moving towards other agriculture related vocations. Mushroom production is one such sector where more income can be generated from less land and is also highly in demand by the consumers of Delhi and National Capital Region.

4. Description of innovative practice/technology: Hi-tech mushroom production unit was developed using iron racks in multilayer system inside the well ventilated rooms.

5. Practical utility: Mushroom production is a better income generating option where land is limited. It gives higher income with improvement of family members.

6. Economics/Profitability of innovative practice/ technology (costs and return) (per intervention or area or household): Initially, Sh. Gaurav Vashisth sold button mushroom in the nearby local areas and market but later as he established hi-tech button mushroom unit. He decided to sell the mushrooms in Subji Mandies of Gurugram, Rewari and Bhiwani. This led to a increase in the profits i.e., net profit of Rs. 20000-25000/- and annually income reached up to 2.5 - 3.0 lakhs.

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: Sh. Gaurav Vashisth is a successful grower of button mushroom and he is encouraging other persons to adopt this vocation. Now, he has proved to be a role model for other farmers in the area.



Compost making process



Compost making process



Harvested Button Mushroom



Button Mushroom packaging

Income generation through value addition of spices

- 1. Thematic area:** Value Addition and Horticulture
- 2. Profile of innovator:** **Smt. Khusboo** w/o Sh. Bhim Singh
Vill.: Sakatpur, Distt.: Gurugram, Haryana
Mobile No.: 844752567
Age: 28 years
Education: Graduation



3. Problem/challenge addressed: Smt. Khusboo and her husband Sh. Bhim are well educated. Due to unemployment, they decided to start their own business. With technical supports and assistance of KVK, Gurugram and an NGO, SETU- the Bridge, Sh. Bhim, formed a Self Help Group, Technical backup was provided by KVK on processing, packaging and marketing of spices.

4. Description of innovative practice/technology: Initially, group started with marketing of spices like powdered coriander, red chilli and turmeric and garam masala. Later, they added other spices like chat masala, subji masala, chicken masala, meat masala, paneer masala, raita masala, kasuri methi, roasted cumin seeds powder and many more. The group has named their small scale industry as “Khusboo Masala Udyog”.

5. Practical utility: Smt. Khusboo is now earning and contributing to her family income which has raised the status of her family in the village. The earning of the SHG has increased the lending capacity of the group to its members and thus enhanced the micro-credit system among the community. Women members have gained confidence and have been able to dodge many social taboos leading to higher empowerment

6. Economics/Profitability of innovative practice/ technology (costs and return) (per intervention or area or household): She started work in Dec, 2013 and processed 279.65 kg of spices and earned Rs. 44631.2 in one month. In year 2017, the turnover of Khusboo Masala Udyog reached more than 20 lakhs with a net profit of 20 to 30 per cent (amounting to Rs. 4-6 lakhs annually) and has also taken the GST number of their enterprise.

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: The success of “Khusboo Masala Udyog” is encouraging other persons in the district to take up this activity as an enterprise. As all the members of the group belong to SC category and need an upliftment. Their work is setting an example in their society and motivating others. She is playing a very strong role in making women aware of their potential and become a productive citizen of this country.



Awards and recognition by different organizations

Value addition enterprise and bakery : Income generation through value addition of soybean

1. Thematic area: Ancillary activity

2. Profile of innovator: **Smt. Pooja Sharma** W/o Sh. Manoj Kumar
Village: Chandu, Post: Budhera
District: Gurgaon, Haryana
Mobile No.: 9992029845
E-mail: poojavashistha16@gmail.com
Age: 40 years
Education: 12th



3. Problem/challenge addressed: In present context of decreasing agricultural land and agriculture seemingly not giving sufficient profits, women of the family are required to take equal part in earning for the family. Smt. Pooja has adopted value addition enterprise to become financially independent. She has also mobilized other women of the village to set up a flourishing value addition enterprise and a bakery

4. Description of innovative practice/technology: Soybean is a highly proteinous food. It contains trypsin inhibitor that inhibits the activity of trypsin (protein digesting enzyme) and thus adversely affects the digestion of protein in the body. PUSA soynut is processed in a way so as to reduce the trypsin inhibitor up to 90%. Smt. Pooja Sharma adopted IARI technology of making soynut and started their enterprise through self help group.

The soynut product was widely accepted among children, teenagers, adult men and women. However old age population found it difficult in chewing. She prepared soynut powder for this age group, which gave her a new idea to prepare nutritious soy health powder for children. She added some powdered sugar and chocolate powder to this soynut powder and prepared “bournvita” or “horlicks” type powdered mixture named as “Soy health powder”. Recently she has set up a bakery unit for biscuit making with collaboration of multinational company of Mumbai.

5. Practical utility: Smt. Pooja Sharma has adopted technology and contributed to her family income which has raised the status of her family in the village. Other farmers have been motivated for health and importance of innovative enterprise. This group has created impact on other women in the village



Soynut in packed jars ready for marketing

6. Economics/Profitability of innovative practice/ technology (costs and return) (per intervention or area or household): Initially, she marketed product in Schools, Gyms and directly to customers through various fairs organized at national as well as state level. During 2014, she earned a net annual profit of Rs. 15,000.00 from sale of soynut only. Later on, she added other products like processed soy and pearl-millet flour, pearl-millet dalia, maize dalia and flour, nutritious soy health drink, pearl-millet biscuits and other savory snacks from soybean and pearl-millet. In the year 2015, this profit increased with a net profit of Rs. 70 to 80 thousand annually. The benefit reached more than Rs. 2 lakhs in year 2017.

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: The successful marketing of soynut by Smt. Pooja Sharma has encouraged other persons to take up this activity as an entrepreneur. Smt. Pooja Sharma has also added 10 more women from BPL (Below Poverty Line) group to her own SHG support their family. She is playing very strong role in making women aware of their potential and become a productive citizen of this country. Presently four entrepreneurs and one more SHG has taken up the soy nut production as entrepreneurial activity.



Awarded by Hon'ble Agriculture Minister

Water saving through innovative watering method in vermicomposting

1. Thematic area: Natural Resource Management

2. Profile of innovator: **Sh. Banwari**
VPO: Nangal Pathani, Block: Jatusana
Distt.: Rewari (Haryana) 123302
Mobile No.: 9416371817
Age: 49
Education: Middle passed
Size of land holding: (1.5 acres)



3. Problem/challenge addressed: Water is important and limited input in agriculture. Vermi compost requires a level of mixture for quality manure. Non-judicious use of water reduces the quality of vermi compost and wastage of water. The method developed by this innovative farmer has resulted in reduction in water application.

4. Description of innovative practice/technology: He uses underground pipe line from the source of water and irrigated the beds with sprinkle nozzles. He has divided the total area in two halves and produces here batches of vermi compost every year. The water passes through nozzles and irrigates the beds twice in a day

5. Practical utility: Irrigation through sprinkle nozzles to vermi beds resulted time saving, labour saving & water saving with higher production of vermi compost per unit.

6. Economics/Profitability of innovative practice/technology (costs and return) (per intervention or area or household):
Time saving- 40%; Labour saving- 30%; Water Saving- 40%

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: Farmers of Rewari district started vermi compost production. Now-a-days more than 40 farmers in the nearby areas have adopted vermi composting technology.



Sprinkler system in vermi compost unit



Interaction with scientist regarding sprinkler irrigation in vermi compost unit



Sieving & packing of vermi compost

Cultivation of Rose : A lucrative enterprise

1. Thematic area: Horticulture

2. Profile of innovator: **Sh. Devi Lal Jat**

Village Ghodakhera, Tehsil: Dungla

District: Chittorgarh (Rajasthan)

Mobile No.: 9001258482

Age: 31 years

Education: B.A.

Size of land holding: 4.0 ha



3. Problem/challenge addressed: Cultivation of traditional crops has found less remunerative and risk. Uncertainty always effect reduction of crops during Kharif and Rabi seasons. Cultivation of high value crops like rose cultivation gives better income with full improvement of family.

4. Description of innovative practice/technology: Sh. Devi Lal Jat adopted Rose (*Rosa bourboniana*) cultivation techniques in the year 2015 first time in Chittorgarh district. He bought desi rose plants and planted them in his own farm with the spacing of 3x1 metre. He uses drip irrigation for cultivation of roses. He is selling flowers, dry leaves of rose in market.

5. Practical utility: Flower cultivation of rose has been found remunerative, higher profits / returns per ha. in comparison to traditional farming.

6. Economics/profitability of innovative practice/technology (cost and return) (per intervention or area or household): Gross return: Rs 627500 per ha; Net return: Rs. 522500 per ha; Cost of cultivation: Rs 105000 per ha; B:C ratio: 6.07

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: Cultivation of rose (*Rosa bourboniana*) in the region was initiated by Sh. Devi Lal Jat first time. Now more than 100 farmers in the district have approached him for planting material of rose.



Dry leaves of rose



Gulkind making

Development of peeling machine of Safed Musli

1. Thematic area: Post Harvest Management

2. Profile of innovator: **Sh. Jagdish Chandra Prajapat**

Village: Bangreda Mamadev, Tehsil: Nimbahera

District: Chittorgarh (Rajasthan)

Mobile No.: 9784943055

Age: 39 years

Education: 8th

Size of land holding: 5.0 ha



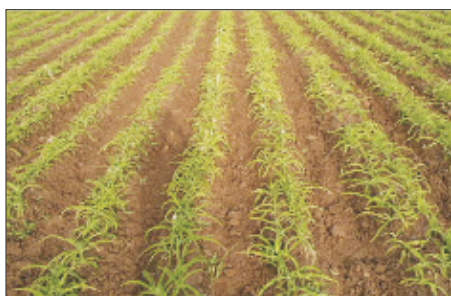
3. Problem/challenge addressed: Manual peeling of safed musli is a costlier and tedious job. Hence Sh. Jagdish chandra Prajapat has developed a safed musli peeling machine.

4. Description of innovative practice/technology: Mr. Jagdish Chandra Prajapat is a small farmer. He is doing farming in his own land in Bangreda Mamadev village of Panchayat Samitee Nimbhaheeda district Chittorgarh. He has only 5.00 ha land on which he is doing farming of medicinal crop safed musli and other crops. He got the information about training programme of Krish Vigyan Kendra, Chittorgarh on medicinal plants. He participated in training programme acquainted with knowledge and skills about cultivation of medicinal plants. His village is near Neemach which is a famous mandi for medicinal plants. He visited the Neemach mandi and saw the market of safed musli. He has motivated to grow safed musli for handsome market price. He has developed a machine for peeling of safed musli.

5. Practical utility: Safed musli peeling machine saves labour as well as discarded roots are also peeled by machine.

6. Economics/profitability of innovative practice/technology (cost and return) (per intervention or area or household): Gross returns: Rs 13.0 Lakhs per ha; Net return: Rs. 10.80 lakhs per ha; Cost of cultivation: Rs 2.2lakhs per ha; B:C ratio: 4.90

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: Cultivation of safed musli is an initiative undertaken by him for the first time in the area. Now more than 40 farmers in the district and of nearby M.P. region started cultivation of safed musli. They approached him for planting material. Peeling machine has become popular amongst grower of safed musli in Chittorgarh.



View of safed musli field



Safed musli peeling machine



Manual peeling of safed musli

Intercropping of Bitter Gourd and Maize

1. Thematic area: Natural Resource Management

2. Profile of innovator: **Sh. Nand Lal Dhakar**
Village: Jaisinghpura, Post: Palka
District: Chittorgarh (Rajasthan)
Mobile No.: 9784690995
Age: 43 years
Education: B.A.
Size of land holding: 5.00 ha



3. Problem/challenge addressed Irrigated: In the present scenario, cultivation of crops alone is the low profit enterprise and rural youth are migrating towards cities in search of job. KVK motivated youth and farmers for adoption of new agricultural technology for income enhancement.

4. Description of innovative practice/technology: After training on vegetable cultivation at KVK, Chittorgarh Mr. Nand Lal Dhakar decided to adopt vegetable cultivation as it gives more remuneration. During summer months, price of bitter gourd remains very high as only limited farmers cultivate bittergourd. Absence of staking, farmers harvest less due to rotting of fruits as they remained on soil and remains in touch with moist soil. To overcome this problem, innovative idea came in his mind that bitter gourd can be trained on maize plant. He decided to cultivate bitter gourd as main crop with maize as intercrop in zaid season for green maize cobs. Sowing of maize in the last week of February at a spacing of 60 (R-R) X 30 (P-P) cm instead of recommended spacing 60 (R-R) X 25 (PP) cm. In between rows of maize, Bitter gourd seeds were dibbled in the month of March, 2015 by keeping spacing 60 cm (R-R) X 120 (P-P) cm. The bitter gourd plants were trained on maize crop. Green cobs were harvested in mid of May and bitter gourd fruit picking was started in first week of May. By this technology, he harvested green cobs of maize worth Rs. 19500/- and quality bitter gourd worth Rs. 48000/- from 0.2 ha land. This technology not only reduced cost of cultivation by reduction in labour but also gave quality produce and additional income.

5. Practical utility: During summer months the price of bitter gourd remains very high as only limited farmers cultivate bitter gourd due to problem of staking. Hence this innovation resulted in higher income for farmers.

6. Economics/profitability of innovative practice/technology (cost and return) (per intervention or area or household): Gross return: Rs 287500 per ha; Net return: Rs. 237500; Cost of cultivation: Rs 50000 per ha; B:C ratio: 4.75

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: Twenty seven farmers of adjoining 10 villages also adopted this technology. Scientists from Agriculture University also visited for validation of this technology.



Bitter gourd + Maize cultivation



Bitter gourd + Maize cultivation

Mass queen bee rearing and multiplication of honeybee colonies

- 1. Thematic area:** Beekeeping
- 2. Profile of innovator:** **Sh. Narendra Kumar Malav**
Village: Dhangawad, Post: Haripura Manji
Teh.: Digod, Via: Simliya, Dist.: Kota (Rajasthan)
Mobile No. 8947863978
Age: 42
Education Level: 10th
Size of land holding: 1 acre



3. Problem/challenge addressed: Many beekeepers utilise division method for producing bee-queen, which is a slow and time consuming method. It is not suitable for commercial beekeeping.

4. Description of innovative practice/technology: The technique to produce several queen bees in a single colony is termed as modern method of mass queen rearing. In this method, larvae of 12 to 24 hours old are grafted in a frame holding wax queen cell cups in a queen less colony. The queen cells are sealed in 10 to 12 days. Before emergence of queen, each queen cells are covered with queen cage or queen protector so that the hive bees don't tear off queen cells. The new queen is then placed in another colony.

5. Practical Utility: Beekeepers are required to replace queen bee every year for producing more offspring and also to maintain colony strength. To harvest maximum benefits from apiary, some rear extra queen as reserve stock so that may be used as and when required as well as for sale to diversify the beekeeping enterprise.

6. Economy/ profitability of innovative practice/ technology (cost and return): One expert beekeeper chose bees and some mass queen. One queen bee cost is Rs. 500/- so it enhances the maximum profit from rearing of queen bees without any extra expenditure.

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: This innovation has been accepted by farmers of neighbouring villages. More than 68 farmers visited and interacted on this innovation. 13 farmers have initiated action to establish mass queen bee rearing in adjoining villages.



Cleaning of honey bees from box racks



Collection of bees for mass queen rearing and multiplication of colonies.



Discussion of honey process equipment with Hon'ble Agriculture Minister Dr. Prabhulal Saini

Cucurbits cultivation in low tunnel technology with mulching has change fortune of family

1. Thematic area: Natural Resource Management

2. Profile of innovator: **Sh. Jaiprakash Gahlot** S/o Sh. Rambhrose Gahlot
VPO: Arjunpura, Teh.: Ladpura, Kota
Mobile No.: 9414017418
Age: 40 yrs.
Education: B.A.
Land size: 4.00 ha



3. Problem/ challenge addressed: Cultivation of seasonal vegetables is gradually becoming less profitable as compared to off season cultivation.

4. Description of innovative practice/technology: Off season cultivation of bitter gourd and sponge gourd in low tunnel with drip and mulching techniques has been found remunerative. Sh. Jaspal Gahlot has developed mulching technique to retain moisture quality vegetable production.

5. Practical utility: Farmer got 2-3 times higher returns in the month of February for sell of bitter gourd and low tunnel technology reduces weed infestation and mulching techniques has helped in water saving in sponge gourd as compare to seasonal cultivation of these vegetables.



Low tunnel view of farmer field



Bitter gourd crop view in low tunnel and mulch technology



Sponge gourd crop view with special trained system

6. Economics/Profitability of innovative practice/ technology (costs and return) (per intervention or area or household): 1:6.80 B:C ratio observed in new technology as compare to seasonal cultivation 1:3.62 B:C ratio.

Name of Technology	Cucurbits cultivation in low tunnel technology with mulching
Crop	Bitter gourd
Productivity (q/ha)	180
Average sale price (Rs/kg)	40/-
Cost of Cultivation (Rs/ha)	92200/-
Gross return (Rs/ha)	720000/-
Net Return (Rs/ha)	627800/-
B:C ratio	1: 6.80

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: Off season cultivation of cucurbits is more profitable and 8-10 farmers adopted this technology in Arjunpura village.



**Received Innovator Farmer Award from
Smt. Vashundhara Raje Hon'ble Chief Minister of Raj.**

Sadabahar mango variety ensures availability of mango round the year

1. Thematic area: Horticulture-Fruit

2. Profile of innovator: **Sh. Srikishan Suman** S/o Sh. Mathuralal
VPO: Giradhpura, Teh.: Ladpura, Kota
Mobile No.: 9829142509
Age: 45 yrs.
Education: Hr. Secondary
Land size: 2.00 ha



3. Problem/ challenge addressed: Mostly plants of mango are tall and semi-tall in nature and these varieties could not be transplanted in pots. Alternate bearing is one of important cause of unavailability of mango.

4. Description of innovative practice/technology: In year of 2000 Mr. Sh. Kishan Suman identified this round year bearing variety in his orchard. He learn about propagation techniques of mango and grafted these scion on desi fruit stock. This variety has good flavor and taste like Alphonso. Now he is developing thousands of plants per year and plants are being sold @ 1000 per plants.



Sadabahar Mango view of farmer field



Sadabahar Mango view in pot



Innovator farmer receiving award from Sh. Radha Mohan Singh
Hon'ble Agriculture Minister, Govt of India.

5. Practical utility: Due to its round year bearing habit. Consumers can get fresh mango in all season. With this special character farmer fetches good price in the market.

6. Economics/Profitability of innovative practice/ technology (costs and return) (per intervention or area or household): Due to its bearing habit it has become popular among farmers.

Name of Technology:	Selection of Sadabahar Mango
No. of Plants developed per year	1500
Average sale price (Rs/Plant)	1000/-
Cost of Production (Rs/plant) with permanent asset value	1,72,500/-
Gross return (Rs/ha)	1500000/-
Net Return (Rs/ha)	13,27,500/-
B:C ratio	1:8.69

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: It has become popular variety for nutritional garden purpose.



News coverage of farmer



Sustainable income generation through integrated agriculture

1. Thematic area: Integrated Farming System

2. Profile of innovator: **Sh. Jivan Lal Patel** S/o Sh. Kodar Patel
Village: Bujada, Post: Karoli, P.S.: Bichhiwada
Distt.: Dungarpur (Rajasthan) 314 804
Mobile No.: 8696260877
Age: 44 years
Education Level: 12th
Land Holding: (12.5Acre)



3. Problem/ challenge addressed: Bujada village is a place of medium rainfall, high elevation and having sandy loam soil. Traditional cultivation of crops is not sufficient for sustainable livelihood of the villages. Hence, adoption of IFS can meet the demand of families with full employment and higher farm incomes .

4. Description of innovative practice/technology: Integrated farming system (Field crops+ vegetable cultivation+ dairy farming +commercial poultry farming + Azolla unit for poultry feed+ Vermicomposting)

5. Practical utility: The innovations of location specific integrated farming system, (Field crops+ vegetable cultivation) integration with dairy farming, vermicomposting, commercial poultry farming and azolla unit for poultry feed gives good remunerations.

6. Economics/Profitability of innovative practice/ technology (costs and return) (per intervention or area or household): During 2012-13, net income from traditional cultivation of crops, vegetables and dairy farming was 2.80lac which has been increased upto 18.96 in 2016-17 due to adoption of Integrated farming system model (Field crops+ vegetable cultivation+ dairy farming +commercial poultry farming + Azolla unit for poultry feed+ Vermicomposting).



Dairy unit



Milk Collection centre

Hon'ble VC MPUAT, Udaipur visited vermi compost unit and Azolla unit

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: Due to the efforts of Sh. Jivan lal Patel, nearly 150-200 farmers of village and in adjoining villages adopted integrated farming system module (IFS) and started vegetables + poultry + dairying + vermicomposting + crop production. More than 15 groups of Intra, Inter district and inter-state progressive farmers, officials, public leaders, trainers and trainees visited his farm.



Hon'ble VC MPUAT, Udaipur Visited commercial poultry Unit

Diversified farming system improved livelihood of tribal farm women

1. Thematic area: Integrated Farming System

2. Profile of innovator: **Smt. Shanta Patel** W/o Sh. Suresh Patel
Village: Mada Temba, Tehsil: Dungarpur
Distt.: Dungarpur (Raj.) 314 001
Mobile No.: 9460020435, 9602120165
Age: 33 Years
Education Level: 10th
Land Holding: (17.3 Acre)



3. Problem/ challenge addressed: **Climate-** Semi-humid average minimum and maximum Temp. of the zone ranging 11-26°C and 21.8-46°C, respectively. Rainfall in range of 550 to 964mm and average is 802mm. Soil of the zone is red, medium black, and mix red sandy soils are found predominant. Soil erosion is the serious problem in the zone. Fertility of soils is low in organic carbon (0.47%) and medium in P (28kg/ha) and K (271kg/ha).

Problems: 1. Marketing of vegetables & tuber crops; 2. No processing and value addition facility of vegetables and tuber crops; 3. No facility of cold storage; 4. Small land holdings in the district

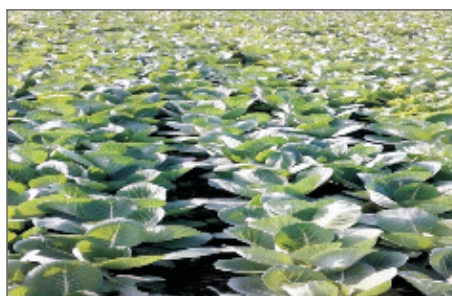
4. Description of innovative practice/technology: IFS model developed (field crops+ vegetables+ dairying). Modified the cultivation technology of vegetables like 1. In Tomato+(Coriander+ palak as intercrop), 2. In Brinjal+(Coriander as inter crop), 3. In Cauliflower + (beet root+radish as intercrop), 4. In turmeric +(Coriander as intercrop) and 5. In Okra+(palak as inter crop). (Photos attached)



Maize, Variety –DKC 7074



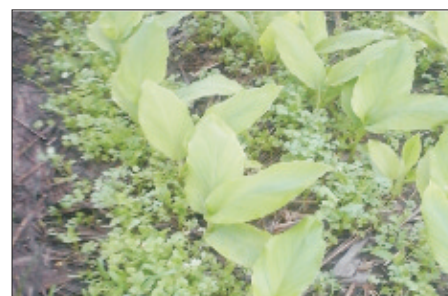
Raise Bed Nursery of vegetables



Cabbage cultivation



Brinjal (+coriander intercrop) cultivation



Turmeric (+Coriander intercrop) cultivation



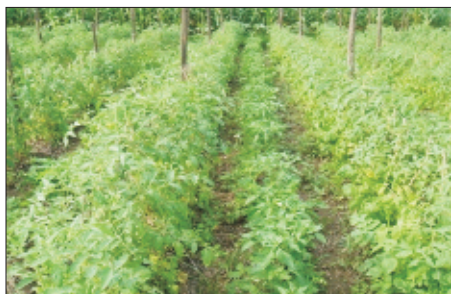
Tomato cultivation with mulching



Tomato(+coriander intercrop)cultivation



Farm visit of District Collector, Dungarpur



Tomato cultivation



Tomato grading and Packaging

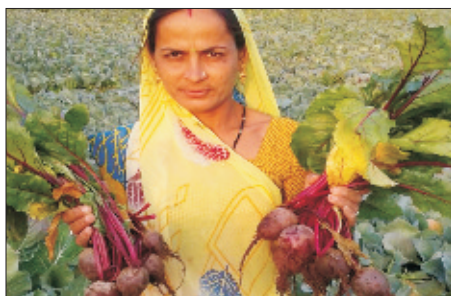


Turmeric (+Coriander+palak intercrop) Cultivation

5. Practical utility: Topology of most part of the zone is undulated, hilly terrain and characterized by runoff of water. The climate of the Dungarpur district is congenial for cultivation of vegetable and tuber crops. By the adoption of innovations, maximum use of land and water within a period of time, less weed infestation, higher profit with regular income and round the year employment generation has been assured. This innovation is location specific and acceptable to majority of farmers. 1. Tomato+ Coriander/palak as intercrop in rows 1:1, 2. Brinjal +Coriander as inter crop in rows 1:1, 3. Cabbage + beet root+ radish as intercrop in rows 4:1:1, 4. Turmeric +Coriander as intercrop in rows 1:1 and 5. Okra+ palak as inter crop in rows 1:1. Integration with field crops and dairy farming gives good remunerations.

6. Economics/Profitability of innovative practice/ technology (costs and return) (per intervention or area or household): In the year 2012-13 the net income from traditional cultivation of crops, vegetables and dairy farming from 17.5 acre was Rs.2.41 lac which has been increased in 2016-17 upto Rs.16.50 due to adoption of Integrated farming system(Field crops+ vegetable & tuber crops cultivation+ dairy farming)

7. Potential: Acceptance level, horizontal spread of innovation and number of farmer adopting The farmers of village realized the importance of IFS and 125-150 farmers in adjoining are practicing IFS. More than 25 groups of Intra, Inter district and inter-state progressive farmers, officials, public leaders, trainers and trainees visited to see model of Integrated Farming System.



Cabbage (+Beet root+radish intercrop) cultivation



Plastic mulching watermelon cultivation



Jersey cow in dairy farming

Improvement of farmer through integrated and need based technological interventions empowered farmer

1. Thematic area: Integrated Farming System

2. Profile of innovator: **Sh. Liyakat Ali** S/o Sh. Shamir Khan
 Village: Dondari, District: Sawai Madhopur (Raj.)
 Mobile No.: 9829621865
 Age: 55 Year
 Education: Xth
 Land holding: 5.0 ha.



3. Problem/ Challenge addressed: Farmer follows both diversification and intensification in following manner.

4. Description of innovative practice/ technology: Low productivity of cereals, pulses and oilseed crops has impacted on farmer perception towards inclusion of other options for augmentation of income.

1. Diversified 3.5 ha in Guava orchard
2. Field Crops 1.0 ha
3. Vegetable 0.25 ha
4. Nursery 0.15 ha
5. Farm Pond (Fisheries) 100X100 = 10,000 sq. feet
6. Backyard Poultry farming (100 birds)

These innovations technologies have been started during 2010-11 and income from guava orchards has been started from 2015-16

5. Practical utility: These innovative technologies have provided platform for demonstration of orchards, crops, fisheries and poultry farming through diversification. Self-employment for own family members and other members has been created. Adoption of diversification model has helped in enhancement of income with optimization of resources.

6. Economics/profitability:

SN	Enterprise	Average Income/year (in lakhs)
1	Guava orchards	18.00
2	Nursery (sapling)	1.0
3	Vegetable	0.50
4	Poultry (100 birds)	0.50
5	Fisheries	1.0
6	Field crops	1.0
	Total Income	22.00

7. Potential: 300 farmers have planted guava plants in 168.00 ha area in nearby villages.

Organic pot making machine – low cost and affordable innovation

1. Thematic area: Natural Resource Management

2. Profile of innovator: **Sh. Vardi Chand Patel**
Village Post: Boojhra, Tehsil: Girva
Udaipur (Rajasthan)
Mobile No.: 9352501370
Age: 51 years
Education level: 10th
Size of land holding (acres): 9 acres (family owned)
0.5 acres (self owned)



3. Problem/ challenge addressed:

- Indiscriminate use of plastic containers for plants by nursery growers.
- Pots made of Cement/ Asbestos/ Plastic are costly. Alternate materials for pots making machines are needed for utilization of available resources with low cost are required.

4. Description of innovative practice/technology: Mould based Pot making machine developed by farmer. Design of machine has been developed by farmer himself. The design is based on a mould. The cost of machine is Rs 6000/-. The pots are made up from 80% cow dung plus 10% sand and 10% sawdust. The size of pots are ½ ft, 1 ft, 1.5 ft and 2 ft height.

5. Practical utility: This technology promotes organic product in preparation of pots. It is new, easy and doesn't require large monetary investments. It provides alternative for use of plastic and provides another productive use of cow dung.

6. Economics/ Profitability of innovative practice / technology (costs and return) (per intervention or area or household):

Income (Rs)	:	1,00,000/- (5000 pots x Rs. 20/-)
Expenditure (Rs)	:	30,000/- (Including labour)
Benefits (Rs)	:	70,000/-
B:C Ratio	:	2.33:1

Potential Acceptance level, horizontal spread of innovation and number of farmer adopting: Looking performance of low cost technology, five machines have been purchased from College of agriculture, MPUA&T, Udaipur. Eight farmers have purchased this low cost machine and are actively involved in preparation and marketing of organic pots in the district.



Pot making machine

Rose farming: An alternate source of income

1. Thematic Area:

Floriculture (Horticulture)

2. Profile of innovator:

Sh. Bhajan Lal Saharan S/o Sh. Om Prakash
 Village: 5 HLM Jakhrawali, Tehsil: Pilibanga
 Distt.: Hanumangarh (Raj.)
 Mobile No.: 9166975430
 Age: 34 year
 Education: Secondary
 Land Holding: 34 Acre



3. Problem Addressed: Due to different climate vulnerability viz., uneven rainfall, aberrant increase of temperature, hot weather, cold wave, etc., farmer was not able to fetch remunerative price from cultivation of cereals, oilseeds, cotton, etc. There was wide variation in productivity of crops year after year. After 3-4 years of cultivation of rose, he received more remuneration in comparison to cultivation of crops. He has also increased four times area under rose cultivation (4.00 ha).

4. Description of innovative practice/technology: Innovator started cultivation of Rose in 2007 with 1.60 ha land which is the first introduction in district.

5. Practical utility: Cost of cultivation is not much and gross income as well as net income has sharply increased with rose cultivation.

6. Economics profitability of innovative practice/technology(Costs and return) (per intervention or area of household):

Economics from traditional crops:-

Cost of cultivation (Acre)	G. income (Acre)	Net income (Acre)	B:C Ratio
40000	84000	44000	2.1:1
Rose cultivation			
135000	340000	205000	2.5:1

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: Total 20 farmers of the area have adopted this innovation and started cultivation of Rose. Many of the district officials visited rose cultivation farm of innovative farmer.



Date palm cultivation has changed life style of farmer

- 1. Thematic area:** Horticulture
- 2. Profile of innovator:** **Sh. Sadula Ram** S/o Sh. Magha Ram
Tanka Station, Village: Alamsar
Teh.: Chohatan, Distt.: Barmer
Mobile No.: 7014700933
Age: 57yrs
Education: 8th
Land holding: 10 ha



3. Problem/ challenge addressed: The average rainfall of the district is 277 mm and the soil is sandy to sandy loam type with high pH and EC. Erratic rainfall with long dry spell is not able to support the commercial cultivation of many crops requiring assured irrigation

4. Description of innovative practice/technology: In this arid terrain to fulfill the requirement of nutrition and for screwing up his financial status along with fame among farming community he started Datepalm cultivation.. At the initial stage he planted Barahi cultivar of same fruit crop in 2 ha. area, where he notified that such kind of new technology might be lucrative in coming years. Ground water is the only source for irrigation and even the quality of water is saline in nature. In this harsh climatic region with erratic rainfall cultivation of date palm with drip irrigation has a maximum survival rate. After observing the performance of Date palm orchard he extended the area from 2 ha to 4 ha. with cultivars viz. Medzool, Aljwah, Nagel, Fard and 169 .

5. Practical utility: Date palm is the most suitable horticulture crop which can survive under high temperature as well as saline water.



6. Economics/Profitability of innovative practice/ technology (costs and return) (per intervention or area or household): As Sadula Ram is the pioneer in date palm cultivation with good quality fruit, Seol date farm is well known name in the district as well as in adjoining districts.

Parameter	Date palm cultivation
Av. Yield	25700 kg
Av. Selling price	62
Cost of cultivation	Rs.504000/-
Av. Income	Rs.1590000/-
Net profit	Rs.1086000/-
B:C Ratio	3.15

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: After seeing the performance of Seol Date Farm more than 70 ha. area in Barmer district is under date palm cultivation.



Organic pomegranate production through automization

1. Thematic area: Horticulture

2. Profile of innovator: **Sh. Kamal Mehta**
Bagto ki gali, Barmer
(Rajasthan) 344001
Mobile No: 9414106225
Age: 35
Education: Graduate
Land holding: 20 ha



3. Problem/ challenge addressed: The average rainfall of the district is 277 mm and the soil is sandy to sandy loam type with high pH and EC. Erratic rainfall with long dry spell are major causes of low productivity of crops. Moreover, only kharif bajra, mothbean, mungbean, sesame, culsterbean, etc. are cultivated under dryland rainfed agro-ecosystem No assured source of irrigation.

4. Description of innovative practice/technology: Drip irrigation method is one of the methods for increasing the water use efficiency, but this innovative farmer adopted atomization in drip irrigation system. It facilitates the farmer for fertigation which automatically cut the water supply after saturation of soil.

Pomegranate fruit crop generally face pollination problem little bit, for getting rid of such problem honey bee species *Apis mellifera* was brought and reared in orchard for pollination so that more no. of fruits can be obtained. *Apis mellifera* used first time in Barmer district for pollination and it was found best pollinator than wild bees.

5. Practical utility: Apiculture in pomegranate orchard has increased the fruit setting as well as additional income through selling of honey produced from orchard. Fully automated drip irrigation system facilitates to utilize water efficiently.



Honey bee box and Orchard visit Dr. S. K. Singh, Director, ATARI and Dr. B.S. Bhimawat, Ex. DEE AU, Jodhpur

6. Economics/Profitability of innovative practice/ technology (costs and return) (per intervention or area or household): By adopting the fully automated drip irrigation system and honey bee for pollination, an increase of 15-20% production along with quality fruits. Farmer obtained remunerative price from pomegranate cultivation.

Parameter	Pomegranate cultivation
Av. Yield	72 ton from 6000 bearing plants (20.00 ha)
Av. Selling price (Rs.)	45/ kg
Cost of cultivation (Rs.)	857143/-
Av. Income (Rs.)	3240000/-
Net profit (Rs.)	2382858/-
B:C Ratio	3.78

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: After seeing the performance 5-6 fellow farmers have shown their interest to adopt same technology in coming years.



Orchard with Drip and Mulching

High density pomegranate plantation enhances profit under hard conditions

- 1. Thematic area:** Horticulture
- 2. Profile of innovator:** **Sh. Babulal Soni**
Junameetha Kheda Teh.: Sindhari
Dist.: Barmer (Raj.)
Mobile No.: 9413028811
Age: 51 yrs
Education: 8th
Land holding: 07 ha



3. Problem/ challenge addressed: The average rainfall of the district is 277 mm and the soil is sandy to sandy loam type with high pH and EC. Erratic rainfall with long dry spell are major causes for low production of crops.

4. Description of innovative practice/technology: Babu Lal Soni previously was a gold merchant, as he came into touch with KVK, he turned in to a farmer. He purchased a piece of land which was full of sand dunes having height of 30-50 feet. Then he made contours for cultivation of pomegranate, farmer achieved success in producing two major varieties of pomegranate viz. Bhagwa and super bhagwa in 5ha of land. For getting higher yield farmer practiced good management tactics. He precisely made strategies for high density pomegranate plantation 3X3 m, use of Integrated Nutrient Management and Integrated Pest Management which drastically reduced the cost of cultivation and fetched the good returns.

5. Practical utility: Farmers are using crop geometry of 5X5 m which covers less no. of plants but high density planting covers more no. of plants which provides more yield and much returns



High density orchard with contour

6. Economics/Profitability of innovative practice/ technology (costs and return) (per intervention or area or household):

Parameter	High density pomegrnate cultivation
Av. Yield	55550 kg
Av. Selling price	42
Cost of cultivation	740667
Av. Income	2333100
Net profit	159243
B:C Ratio	3.15

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: On observing the current status, farmers of same and nearby villages have opted with high density planting technology. Six farmers have planned to establish pomegranate orchard in 60 ha area in the adjoining villages.



Packaging and Branding

High density fruit cultivation with timber trees

1. Thematic area: Horticulture

2. Profile of innovator: **Sh. Gordhan Singh**
Village: Chelawas, Teh.: Marwar Junction
Dist. Pali (Raj.)
Mobile No.: 9929825265
Age: 31 years
Education level: M.Sc.
Size of land holding (acres): 24



3. Problem/ challenge addressed:

- Low income from cereal crops
- Rainfed farming situation and salt affected soil
- Undulated land and heavy weed infestation.



Pomegranate and sagwan cultivation under drip irrigation



Vegetable seedling planting innovative equipment



Pomegranate fruits for selling



Hydroponic unit

4. Description of innovative practice/technology:

- Hydroponics for tomato and strawberry
- Introduction of dragon fruit (Hylocereus undatus)
- Cultivation of pomegranate intercropped with sagwan (Tectona grandis)
- Innovation in vegetable planting equipment
- Innovation of drip irrigation folding equipment
- Cultivation of strawberry under drip irrigation and mulching
- Intercropping wheat in date palm



5. Practical utility:

- Adoption of drip irrigation technology under pomegranate and sagwan orchard led to water conservation
- Mulching of plastic sheet for management of heavy weed infestation and loss of water

6. Economics/Profitability of innovative practice/ technology (costs and return) (per intervention or area or household):

Cost of cultivation of pomegranate	Rs. 1,15,000/-per acre
Gross income	Rs. 6,05,000/-
Net income	Rs. 4,90,000/-
B:C ratio	5.26

Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: Farmers of same and nearby villages have visited at Farmer's Field. This model has been rated as more remunerative, affordable, acceptable and adoptable. More than 38 farmers have initiated to start cultivation of high density orchards



Nursery unit at own farm

More remuneration through high density fruit cultivation

- 1. Thematic area:** Horticulture
- 2. Profile of innovator:** **Sh. Arjun Singh**
Bhagwanpura, Teh.: Marwar Junction
Dist. Pali (Raj.)
Mobile No.: 8094226673
Age: 30 years
Education level: M.Sc.
Size of land holding (acres): 12



3. Problem/ challenge addressed:

- Low income from cereals and other traditional crops
- Rainfed farming situation and salt affected soil
- Undulated land and heavy weed problem

4. Description of innovative practice/technology

- Cultivation of pomegranate and sagwan
- Introduction of vegetables along with fruits under mulching
- Intercropping of chickpea in pomegranate orchard
- Installation of CCTV for watch and ward of orchard

Practical utility:

- Adoption of drip irrigation technology for water saving.
- Employment has been generated.
- Long term profit from Sagwan tree.



Pomegranate and sagwan orchard



Good bearing of pomegranate at own farm

Economics/Profitability of innovative practice/ technology (costs and return) (per intervention or area or household):

Cost of cultivation of pomegranate	Rs. 84,500/-per acre
Gross income	Rs. 5,78,300/-
Net income	Rs. 4,93,800/-
B:C ratio	6.8

Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting:

- Trained 51 farmers in nearby village.
- Horizontal spread of technology among 18 farmers of 10 adjoining villages.



Graded pomegranate fruit



Rotovator for field preparation

Seed sufficiency through seed production of farmers preferred varieties

- 1. Thematic area:** Secondary Agriculture
- 2. Profile of innovator:** **Sh. Govind Ram**
Village: Sari ki Dhani, Teh.: Rohat
Dist. Pali (Raj.)
Mobile No. : 9829275956
Age: 52 years
Education level: 12th
Size of land holding (acres): 50



3. Problem/ challenge addressed

- Non availability of improved seeds
- If available the seeds are very costly
- Usually there is mixture of varieties and contaminants in market sold seeds.
- The improved seed are not locally available and farmers travel too far to procure improved seeds
- It is also not sure whether the variety suits agroclimatic zone of farmer but farmers have to procure what so ever is sold by the dealer.
- The farmer usually lacks knowledge about other package and practices required along with improved seeds supplied by dealers.

4. Description of innovative practice/technology

- Seed production and formation of farmers producer organization
- Linkage with (RSSC) Rajasthan state seed corporation and seed hub project of CAZRI.



Inspection of seed by Seed hub project team



Chickpea seed for selling

- Equal profit sharing amongst all group members.
- Innovation of traditional seed storage technique and seed grading and packaging.

5. Practical utility

- Adoption of seeds supplied by MrGovind Ram and horizontal spread of improved technology leading to increase in production and productivity in nearby 80 villages.

6. Economics/Profitability of innovative practice/ technology (costs and return) (per intervention or area or household)

Cost of cultivation of seed (ha)	Rs. 65,200/-per acre
Gross income (ha)	Rs. 2,64,500/-
Net income (ha)	Rs. 1,99,300/-
B:C ratio	4.0

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: This seed production model has been recognized and 28 farmers of Pali district have initiated for farm seed production society(ies) for large scale seed production to ensure seed sufficiency of farmer preferred varieties at panchayat level.



Store of moong and chickpea seed at own storage unit



Innovation modern thresher

Enhancement of productivity of paddy through transplanting

1. Thematic area: Natural Resource Management

2. Profile of innovator: **Sh. Dharampal Tyagi**
 Village: Badshahpur, P.O.: Kheri Kalan
 Distt.: Faridabad
 Mobile No.: 09313032710
 Age: 55 Years
 Education: Matriculation
 Landholding: 18 (Own Land and 9.2 leased land)
 Farming Experience: 37 Years



3. Problem/ challenge addressed: Conventional method of transplanting (3-4 plants per hill plantation gives 14 - 26 tillers) and yielded 45- 50 qtls/ per hectare. More quantity of seeds was used in paddy nursery.

4. Description of innovative practice/technology: Sh. Dharampal adopted an innovative method of rice cultivation by transplanting of single plant (per hill) of 24-26 days old seedling at 5x5 inches spacing . With this technique he obtained 32-36 tillers per plant and 5.0 q/ha more yield (50-55 qtl /ha) as compared to conventional method of transplanting of paddy. Application of Improved Agronomic Management has been found profitable using fewer resources for optimum production.

5. Practical utility: By transplanting of single plant (per hill) of 24-26 days old seedling at 5x5 inches spacing ,the farmer obtained 5-10 qtl. more yield from one ha as compared to yield with conventional method of transplanting.

He is producing breeder seeds himself which he passes on to contract farmers for further production of foundation seeds. Thus he provides a leadership role in production of quality seeds of major cereal crops by other farmers of his farm.



Farmer's Paddy Field Visit by IARI Scientists.



News of visit Mike Johanns, Secretary of Agriculture, Usda visited my farm in the Year 2006

6. Economics / Profitability of innovative practice/ technology (costs and return) (per intervention or area or household):

Cost of Paddy cultivation by transplanting of single plant technique	Rs. 18,000/- per acre
Gross income	Rs. 65,000 - 70,000/- per acre
Net income	Rs. 47,000 - 52,000/- per acre
B:C ratio	3.6 - 3.8

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: The farmer invited KVK Scientists to visit the paddy field and the same was conducted by KVK Scientists. By seeing the yield performance with this method, 70 - 90 paddy farmers are practising this method of paddy transplanting in the operational area of KVK Faridabad.



Visit by KVK Scientists to the Paddy Field of the Farmer Cultivation by Transplanting of Single Plant Technique

Cultivation of sugarcane through single bud technique : More profitable and remunerative

1. Thematic area: Natural Resource Management

2. Profile of innovator:

Sh. Mukesh Yadav

Village: Manjhawali, P.O.: Tigaon

Distt.: Faridabad

Mobile No.: 9350234045

Age: 42 Years

Education: Graduation

Land holding: 20 Acres (Self) and 180 acres on lease.

Farming Experience: 20 Years



3. Problem/ challenge addressed: More quantity of sugarcane buds are used and yield is also found low. Water requirement is more in production/cultivation of sugarcane

4. Description of innovative practice/technology: Farmer planted sugarcane crop with single bud method during 2011-12 first time. He adopted an innovative technique to cultivate sugarcane crop through single bud method in order to achieve higher yield and reduce seed quantity. In this technique he levelled the field with help of laser leveller which he had purchased from Dubai in 2005 prior to planting the crop. He prepared the furrows with help of self designed / developed sugarcane ridger. He has taken one third portion of main cane set and then he cut the main cane set into smaller size cane sets having only single bud. After having complete cane treatments for disease management, he planted these cane sets into furrows at a spacing of 4 ft. row to row and one ft. plant to plant resulting in 10000-11000 plants of sugarcane in one-acre field (265 x 165 ft. Area). With use of this single bud technique, he increased number of plants per acre. Water saving was also done up to 30 per cent by levelling field with Laser leveller and furrow irrigation method / technique.

5. Practical utility: The yield obtained by the farmer was 700 q /acre as compared to 300 q/ acre by planting sugarcane with conventional method. This technique may be very useful to other sugarcane growing farmers



Sh. Mukesh Kumar treating cane for disease control before planting the single buds in the furrows



Sugarcane Crop through Single Bud Cultivation

who were practicing the conventional method of sugarcane cultivation. By seeing yield performance with this method, many sugarcane growers of area are willing to adopt and have adopted this technique.

6. Economics/Profitability of innovative practice/ technology (costs and return) (per intervention or area or household):

Cost of cultivation through single bud technique	Rs. 30,000/- per acre
Gross income	Rs. 1,05,000 - 1,30,000/- per acre
Net income	Rs. 75,000 - 1,00,000/- per acre
B:C ratio	3.5 - 4.3

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: Farmer invited KVK Scientists to visit Single bud cultivation sugarcane fields and same was conducted by KVK Scientists. By seeing the yield performance with this method, 70 - 80 sugarcane farmers of 25-30 villages are practising this method of single bud of cultivation of sugarcane in operational area of KVK Faridabad.



Receiving IARI Fellow Farmer Award



Multipurpose machine for juice extraction and value addition to medicinal crops as profitable venture

- 1. Thematic area:** Value Addition
- 2. Profile of innovator:** **Sh. Dharmbir Singh** S/o Sh. Ramswaroop
Village Damla, Yamunanagar-135004
Mobile No.: 9896054925
Age: 56
Education level: Matric
Land holding: 2 acre



3. Problem/ challenge addressed: Low farm income and unemployment.

4. Description of innovative practice/technology: After matriculation Sh. Dharmabir went to Delhi in search of employment. He was inspired from the benefit of value addition activity. After getting technological knowhow, exposure visits and trainings from KVK Yamunagar, he finally started cultivating high value medicinal crops in 1996. With passage of time, he got confident enough and ventured into value addition by processing his own farm produce. He devised and developed multipurpose juice extraction machine himself, for which he was awarded at several national and international platforms. Now, Sh. Dharambir is cultivation basil (tulsi), stevia and aloe vera at his farm. Besides, he also buys kinnow, strawberry, guava and mango from nearby farmer and sells them after processing.

5. Practical utility:

- Low cost machine for large scale juice/pulp extraction.
- This machine can process 5-500 kg product per hour depending upon the requirement.
- He is getting orders from Africa and Japan as well.

6. Economics/Profitability of innovative practice/ technology (costs and return) (per intervention or area or household):

1. Currently 6000 farm women are actively involved in value addition using his machines which is expected to cross 25000 mark in coming years with more adoption of technology.
2. He is also providing training to fellow farmer in the sphere of value addition.

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: The technology/machine has been adopted at large scales. He was awarded by His Excellency President of India, for his services towards benefit of farmers. He also got appreciation award by National Innovation Foundation. Besides that, he is also featuring in new Bollywood movie “Padman” reflecting upon his innovation in the field of agriculture. He has trained more than 128 farmers of adjoining districts of Haryana state.



Value added Aonla Ladoo

Success through bee keeping and bee products

1. Thematic area: Value addition and subsidiary agriculture activities

2. Profile of innovator: **Sh. Subhash Kumar** S/o Sh. Samay Singh
Village: Hafijpur, Block: Radaur
Yamunanagar
Mobile No.: 9355665520
Education level: B.P. Ed
Age: 51
Size of land holding: 10 acre



3. Problem/ challenge addressed: Low economic viability and sustainability of sole farming without subsidiary income

4. Description of innovative practice/technology: Earlier Sh. Subhash used to practice conventional farming by cultivating rice-wheat on his 10 acre farm. The farm production was uneven depending upon weather conditions while net returns were meager particularly during glut period in sole cropping which was further declining with time. After getting training from KVK Yamunanagar, Sh. Subhash, tried for bee keeping. After getting success in production, he decided to add byproducts of bee and honey to further increase and stabilize the income. He collected bee propolis, bee venom, bee wax and bee pollen in addition to the natural and comb honey he was collecting earlier. Now he is technically sound in rearing the honey bees, breeding them and collecting all the byproducts. He is now also imparting training to other farmers in district as well as in other states.

5. Practical utility: Sh. Subhash started bee keeping initially with only 6 boxes and now has progressed to 1700 boxes, besides venturing into byproducts, by which he is earning around 20-25 lakhs/annum. He is providing employment to 12 village youths as the helping hands in his enterprise. He has provided training to around 1200 people out of which 16 have already started Bee keeping as profession.

6. Economics/Profitability of innovative practice/ technology (costs and return) (per intervention or area or household):

Sh. Subhash is earning net profit of 20-25 lakhs/annum from bee keeping and by selling its allied products



Sh. Subhash with his Honey Products during Kisna Mela at Haryana Agricultural University

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: Bee keeping and bee products have increased profitability for Sh. Subhash. However marketing is still a problem which if solved will improve net income further. Due to high economic viability and sustainability of this enterprise, 16 farmers have started bee keeping as a profession after getting training from Sh. Subhash.



Farmer getting hands on training on bee keeping at Sh. Subhash Farm

Heating devices for brooding of chicks : Low cost technology

- 1. Thematic area:** Livestock, Machinery
- 2. Profile of innovator:** **Sh. Charan Dass**
VPO: Nagla Jattan, Block: Barara
District: Ambala - 133102
Mobile No.: 9812275012, 9416224168
Age: 42 Years
Education: Graduate
Size of land holding (acres): 2 acres



3. Problem/ challenge addressed: An optimum temperature is required to brood the chicks in brooder house. If the number of chicks are more (8000-10000), it is costly to put number of brooder and maintain temperature within brooder as cost of electricity is higher.

4. Description of innovative practice/technology: Sh. Charanjeet Singh prepared a desi method/tool to maintain temperature called Bukhari on low cost basis and more effective than market Bukhari.

For making Bukhari, he took diesel/petrol iron drum and made a hole on upper side to fix a metal pipe to pass the smoke outside and one big hole at the bottom side of drum for firing the woods. He used small pieces of woods/its burada/powder inside the drum and burnt it to maintain the temperature of the chick's house.

5. Practical utility: It was observed that this Bukhari started heat early as compared to Bhukari available in market and covered maximum area of house and duration of heating was also more as compared to market Bukhari.

6. Economics/Profitability of innovative practice/ technology (costs and return) (per intervention or area or household):

Manufacture & operational cost of one Bukhari is approx. Rs.1600-1800/-for one thousand birds (chicks) for brooding chicks.

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: Acceptance level is very high - 90% poultry farmers using this device as it is much cost effective in the nearby villages of Ambala district.



Poultry Farm of Sh. Charanjeet Singh



Innovation (Brooding of Chicks)

Gainful employment by bee keeping

- 1. Thematic area:** Bee Keeping
- 2. Profile of innovator:** **Sh. Babulal**
VPO: Khillora, Tehsil: Ramgarh
Distt: Alwar
Mobile No: 9982926702
Age: 50 Years
Education: 10th
Land: 2Acre



3. Problem/ challenge addressed: Alwar district is bowl of Mustard production. More than 2.5 lakhs ha area is under cultivation and there is tremendous opportunity for apiary . It also helps in enhancement of mustard production through pollination

4. Description of innovative practice/technology: Sh. Babulal received training first from KVK Alwar thereafter he initiated his work with 50 boxes which cost him Rs.1.30 lac. Within three years his boxes increased to 77 in numbers. At present he harvests 30 kg honey per box per year. On spot purchase is done by the traders from UP, Haryana, Punjab, Dabur, Patanjali etc. at the rate Rs.100-110 per kg which fetches 4.5 lac net return.

5. Practical utility: Provides employment to unemployed persons, Landless person can also opt this profession as source of income.

6. Economics/Profitability of innovative practice/ technology (costs and return) (per intervention or area or household): Total expenditure on 77 bee hives is Rs.47375/- and net profit per year is Rs.239175/- and BC Ratio is 5.05.

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: Acceptance level is high Sh. Babulal is pioneer in rearing of bee keeping in the area and has created motivation among others of the nearby area which horizontal spread of 15 bee keepers also started this important income generating enterprise.



Utilisation of baren land by establishing Ber orchard

1. Thematic area: Horticulture based (Natural Resource Management)

2. Profile of innovator: **Sh. Hardayal Singh**
VPO: Shekhambas, Via: Navgaonr
Tehsil: Ramgarh, Distt.: Alwar
Mobile No: 9982417419
Age: 54 Years
Education: Literate
Land: 5 Acre



3. Problem/ challenge addressed: Undulated topography and poor soil physical, chemical and biological properties, farmer did not utilize waste/barren land for cultivation of crops.

4. Description of innovative practice/technology:

1. Layout of ber orchards variety Gola with spacing of 8m X 8m distance accommodating 98 trees per acre was done in 2011-12. Each tree yields 100 kg fruits, providing 9800 kg fruits per acre.
2. The produce is sold in open mandies @ average Rs. 20 per kg thereby farmer obtained Rs. 117600.00 per acre during fourth year and Rs. 1470000 during Fifth year

5. Practical utility: Ber orchards can be easily established in waste/barren land under undulated topography. Thereby farmer has taken initiative for establishment of Ber orchard.

6. Economics/Profitability of innovative practice/ technology (costs and return) (per intervention or area or household): Ber orchard was established in 1 acre at village. where 98 trees of ber Var. Gola was planted in 1 acre field.

The initial expenditure incurred to layout orchard was Rs. 8410 per acre. The plants gave negligible bearing up to three years, but the mustard was adopted within ber trees in Agro-Horti system during initial three years.

In the 4th year the expenditure incurred per acre of orchard was Rs. 20,500 and gross income of Rs. 1, 17,600 was generated whereas the net income obtained was Rs. 97,100.

In 5th year cost of cultivation as well as yield per acre were increased when the trees are grown up. The expenditure per acre basis was Rs. 22,850 and gross income from fruit was Rs. 1, 47,000 with net income of Rs. 1, 24,150.

During 4th and 5th year the benefit cost ratio on net return basis were 4.73 and 5.43 respectively.

Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting:

Acceptance level have been found as high Sh. Hardayal is pioneer in successful establishment of ber orchards on baren land of Shekhambas motivated and inspired farmers of the nearby villages resulting in a horizontal spread of orchards in 25 ha. area including 40 farmers which improved socio - economic of farming community.

Enhancement of income through value addition in Aonla

1. Thematic area: Ancillary Activity / Secondary Agriculture

2. Profile of innovator: **Sh. Dharam Dev**
VPO: Paharwas, Via: Bibirani
Tehsil: Kotkasim, Distt.: Alwar (Raj.)
Mobile No.: 8875419081
Age: 54 Years
Education: Intermediate
Land: 5 Acre



3. Problem/ challenge addressed: Aonla plantation has been done on large scale especially in Rajasthan from last 20 years. Now Aonla orchards have become unprofitable and 8-10 per cent farmers eradicated whole Aonla plants. Looking medicinal value, farmer has established value addition unit and farmer gets extra price.

4. Description of innovative practice/technology:

1. Layout of aonla orchards with spacing of 8m X 8m distance accommodating 98 trees per acre. Each tree yields 100 to 150 kg fruits, providing 9800 to 14625 kg fruits per acre.
2. The produce is sold in open mandies @ Rs. 6 per kg and expenditure incurs towards picking, grading, packing and transport, thereby provide Rs. 39200 to Rs. 58500 per acre.
3. After processing and marketing produce as Aonla Murabah, Aonla Candi, Aonla Syrup, Aonla Pachak, Aonla Kesh Nikhar etc. the cultivator gets a net profit of Rs. 3.08 to 3.57 lakh per acre.

4. Practical utility: The land of village was unfertile and undulated .After establishment of aonla orchard, huge production of aonla was obtained but cost of aonla production include several expenditures viz. picking, grading and packing of fruits in poly bags and transporting to mandies, whereas sale price remains substantially low. The profession could not suit to Sh. Dharm Dev Yadav up to his expectation. He approached



to Krishi Vigyan Kendra, Alwar-I he has been suggested to establish an aonla processing unit. The unit was established in 2009 where fruits from his own orchard (17.5 acre) were processed. His product is now being appreciated with high gains of Rs. 2.85 to Rs. 3.57 lakh/acre after processing and marketing value added products.

5. Economics/Profitability of innovative practice/ technology (costs and return) (per intervention or area or household): B:C ratio obtained is much higher than the field crops.

6. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: Acceptance level at initial stage is low due to involvement of finance and marketing. Now 27 farmers of neighbouring villages have initiated establishment of this enterprise.



Carrot washing equipment for better price

1. Thematic area: Post Harvest Management

2. Profile of innovator: **Sh. Pokar Ram**
Churu (Rajasthan)
Mobile No: 8619903231
Age: 35 Years
Education: 10th
Land: 15.6 Acres



3. Problem/challenge addressed: Development of washing machine of carrot has following positive points :

1. Reduced the time taken in carrot washing.
2. Reduced cost of carrot washing.
3. Enhanced the quality of washing which helped in getting more prices.

4. Description of innovative practice/technology:

- This equipment has rectangular Angle Iron frame fitted cylindrical sieve
- One rectangular window is fitted in cylindrical sieve for inlet and outlet of carrot

5. Practical utility:

1. This equipment has not only reduced cost and time spent in carrot washing but also improved the quality of washing by removing the fine hair roots and soil particles found on carrots.



Carrot Washing Equipment

2. It has reduced drudgeries of washing up to 50%
3. Price of carrot in the market is increased.
4. Machine can be hired by farmers on custom basis.

6. Economics/profitability of innovative practice/technology (costs and return) (per intervention or area or household):

1. Carrot washing Equipment: Cost in Rs : 8,000
2. Payback period of this machine will be 160 hours

(one labour working for 8 hours can clean 2 quintals carrots while by using this machine in same time he can wash 4 quintals if we assume labour charge Rs. 400 for 8 hours machine will pay its cost after working 160 hours.)

7. Potential : Acceptance level, horizontal spread of innovations and number of farmer adopting: This equipment has been used by 15 farmers of same and adjoining villages. Around 34 farmers of adjoining villages have placed order for procurement of carrot washing machine.



Carrot Washing Equipment

Intercropping in Strawberry for higher return

1. Thematic area: Horticulture

2. Profile of innovator: **Sh. Bhupender Singh**
VPO: Digrota, Distt. Mahendergarh
Mobile: 9416237612
Age: 61 Years
Education: Matric
Size of Land Holding: 6.0 Acre



3. Problem/ challenge addressed: Traditional cropping systems viz pearl millet-mustard, cluster bean-wheat proved to be less profitable. Shifting to strawberry cultivation provided comparative better returns but higher cost of cultivation. To make enterprise more profitable farmer standardized technique of inter cropping.

4. Description of innovative practice/technology: Bhupender Singh started cultivation of strawberry in 2013. Low benefit cost ratio due to higher cost of cultivation compelled him to think of some innovation. High cost of seedlings was one of the factors for high cost of cultivation. The farmer took initiative of producing seedling at its own. The technology developed in producing seedling is very cost effective. To increase benefit cost ratio of enterprise, he generated idea of utilizing interplant space. He thought of relay cropping chilli and muskmelon in strawberry. The innovation increased benefit cost ratio significantly.

5. Practical utility: Innovation has helped farmer to produce higher profit than sole cropping of strawberry. The problem of marginal or poor returns with adoption of traditional cropping system and sole strawberry cultivation has been addressed well. The additional return of Rs. 2.5 lakh are being obtained with generation and adoption of innovation over previous practices.



Cultivation of strawberry.

6. Economics/Profitability of innovative practice/ technology (costs and return) (per intervention or area or household): Net returns of Rs. 2.0 lakh/ acre and BC ratio of 1.8 obtained by the farmer by cultivation of some crop of strawberry. Innovation through intercropping, relay cropping has provided the farmer net returns of Rs 4.5 lakh per acre and BC ratio of 2.03 which are significantly higher than the previous practice.

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: Since cultivation of strawberry is undertaken by seven number of farmers, adoption of innovation by the farmer will take some time under horizontal spread.



Chilli intercropped with strawberry.

Substantial income generation through value addition

- 1. Thematic area:** Value Addition
- 2. Profile of innovator:** **Smt. Banarasi Devi** W/o Sh. Rajender Kumar
VPO: Bawania, Distt.: Mahendergarh
Mobile No.: 8814058232
Age: 50 Years
Education: Primary
Size of Land Holding: 1.5 acre



3. Problem/ challenge addressed: Income obtained from small land holding was not sufficient to meet out expenses incurred on domestic needs. Adoption of technology / innovation was, therefore required to meet out expenses and improved livelihood standards.

4. Description of innovative practice/technology: Smt. Banarasi Devi was in search of some enterprise which can provide her substantial income. She thought of making income by utilizing wild growing underutilized cucurbits locally known as KACHARI (Cucumis melo subsp. agrestis var. agrestis). Taking into consideration of growing demand for products of kachari among urban people, Banarasi Devi decided to take up the enterprise as income generating source. She started preparing pickle, Chatuni, powder of kachari. She has been able to generate substantial income by sale of products of kachari.

5. Practical utility: The innovation has improved economic status of woman who once used to live in hand to mouth situation. The idea of utilizing underutilized locally available wild foot kachari has brought significant effect in her life.

6. Source of information: The innovation is product of the woman's mind itself. Low investment capacity forced the lady to think of cheaper sources of income

7. Economics/Profitability of innovative practice/ technology (costs and return) (per intervention or area or household): Substantial income viz. Rs. 65000 per annum is being generated by sale of products of kachari. Net returns of Rs. 140 / kg of product are being obtained by the women. The benefit cost ratio worked out is 3.3.

8. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: The innovation has been taken up by self help groups working in the district. The groups are generating sizable income. The innovation has got recognition among the rural masses. Self Help Group consists of 14 farm women is actively involved in same profession for obtaining more remunerative price.



Entrepreneur with products of Kachri



Kacheri Pickle

Intercropping for higher returns

- 1. Thematic area:** Natural Resource Management
- 2. Profile of innovator:** **Sh. Dhrinder** S/o Sh. Tek Chand
VPO: Bawania, Distt.: Mahendergarh
Mobile: 9416702541
Age: 39 Years
Education: Post Graduate
Size of Land Holding: 4.0 acre



3. Problem/ challenge addressed: Cultivation of pearl millet, cluster bean, mustard and wheat crops did not prove as profitable enterprise. To get better returns by utilizing available resources, adoption of horticulture crops was thought one of the options. The farmer established kinnow orchard and made significant returns. However, to make enterprise more profitable, the farmer thought of taking intercrops in orchard.

4. Description of innovative practice/technology: Dhirender Singh established kinnow orchard in 3.5 acre in 2009. Also adopted drip irrigation system. He was able to obtain net returns of Rs 1.05 lakh/ acre. Though better returns than traditional crop production system were obtained, yet he was desirous to get more returns from the enterprise. An idea of cultivating intercrops (vegetable crops) came into his mind. He started cultivation of bottle gourd, muskmelon, chilli, brinjal in interspaces of kinnow orchard. The farmer was able to obtain additional returns than sole cropping of orchard. The innovation of utilizing interspaces by cultivation of vegetable crops increased the returns significantly.



BED preparing for sowing of bottlegourd and muskmelon as intercrops

5. Practical utility: The innovation has been helpful to the farmer in getting better returns without affecting the resources adversely. The problem of low profitability from previously adopted cropping pattern was taken care.

6. Economics/Profitability of innovative practice/ technology (costs and return) (per intervention or area or household): Net returns of worth Rs. 1.05 lakh/acre with BC ratio 6.25 were obtained from kinnow orchard. Cultivation of intercrops (Bottle gourd, muskmelon, peas, chili and brinjal) provided additional returns of Rs. 2.60 lakh/ acre

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: Kinnow cultivating farmers have come forward for cultivation of intercrops for better returns. 16 farmers from same village and 23 farmers of adjoining villages have assured that same will be started in fortnight of July 2018.



Irrigation pond fitted with drip irrigation system

Fish breeding in low cost innovative structure

1. Thematic area: Fishery

2. Profile of innovator: **Sh. Bhure Khan** S/o. Sh. Rahman Khan
Village: Deoligaon, Tehsil: Deoli
District: Tonk, Rajasthan
Mobile No.: 9829471402
Age: 74 Year
Education level: 9th Standard
Size of land holding (acres): 6.5 acres



3. Problem/ challenge addressed: Non availability of fish culture in Rajasthan conditions mostly farmers depend on Andhra Pradesh fish culture for fish farming.

4. Description of innovative practice/technology: Fish Breeding programme with rearing of fish in innovative self-made low cost structure in the district was initiated . First time fish breeding programme was taken by him for Catla, Rohu and mirgal (Naren), Indian common carp, grass carp and silver carp exotic species in Tonk district situations.

5. Practical utility: Initially in the year 2011 when he came in contact with Fisheries Department in a training programme which brought enthusiasmin him for fish farming at own field. But he faced problem for spawn/fingers culture for farming as it was being supplied from Andhra Pradesh. Then decided for fish farming and started to work on it. At that time, fish breeding centre of the district supplied fish culture to farmers for fish farming and also provided trainings to interested farmers on their field.



Breeding tank artificially made for natural fish matting



Collecting fish from pond for inducing breeding hormone for natural breeding

6. Economics/Profitability of innovative practice/ technology (costs and return) (per intervention or area or household): By breeding techniques and farming he earned Rs. 5-7 Lakhs/Year using low cost structure or self-made to facilitate to farmers.

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: Breeding and rearing techniques adopted by him is widely accepted by the farmers and dependency for spawn is fulfilled by him in the district. More than 28 fishery based entrepreneurs have purchased spawn during year 2017 from him.



Inducing hormone in the fish on weight basis



Grasping of fish to avoid to escape at time of injecting



Male fish after injecting hormone in breeding tank

Locally procured concentrate for milch buffaloes

- 1. Thematic area:** Livestock
- 2. Profile of innovator:** **Sh. Shivdyal Gurjar** S/o Sh Ram karan gurjar,
Near police choki, Jhilay Road
Newai, Tonk, Rajasthan - 304021
Mobile No.: 9829788586
Age: 48 Years
Education level: High School
Land Holding (acres): 10 Acres



3. Problem/ challenge addressed: Poor milk production, Low body weight, Abnormal heat cycle and heat period in dairy buffaloes are major challenges

4. Description of innovative practice/technology: Preparation of balanced concentrates mixture with the utilization of cereals grain, pulses and oil seed and mixed 1% area specific mineral mixture, then boiled it. After boiling the same is kept in cool place for two hours and concentrate is used for feeding of buffaloes.

5. Practical utility: It is pure and fresh balanced concentrates and components are adjustable, according to the health and lactation stage of the animal. There is no chance to generate storage damage through fungus and other factors.

6. Economics/Profitability of innovative practice/technology (costs and return) (per intervention or area or household): By producing local level concentration the amount Rs. 12045/annum per animal could be saved and availability of pure and concentration is ensured at village level.

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: 150 numbers of nearby farmers are adopting low cost and fresh concentration preparation method. Horizontal spread over 12 neighbouring villages has been reported by farmer.



Bee keeping is best option of ancillary activity

- 1. Thematic Area:** Ancillary Activity
- 2. Profile of innovator:** **Sh. Ajit Singh** S/o Sh Sukhdev Singh
VPO: Bhagatpura, Tehsil: Sangaria
District: Hanumangarh (Raj.)
Mobile No.: 9460753307
Age: 30 Years
Education: Middle pass youth farmer



3. Problem Addressed: From traditional crop cultivation net profit was low and B:C ratio was also low. Generally farmers grow seasonal crop like wheat, mustard, clusterbean, cotton etc. Flora for beekeeping is easily available during winter and summer seasons from mustard, mango, neem plants. But utilisation of flora is very negligible.

4. Description of innovative practice/technology: Ajit Singh started beekeeping with 100 hives in 2014 after getting training on beekeeping from the Krishi Vigyan Kendra, Hanumangarh-I. He processed & packed it for sale and extended colonies for self use and to provide to other beekeepers. Now a day, Ajit Singh have 400 hives and earn Rs. 24,00,000 gross income. He also noticed increase in yield of the crops in which he put bee hives. upto 20%.



honey extraction from bee hives



working with honey bees on farm

5. Practical utility: Bee keeping proves self-employment as well as employment to others. Pollination has improved productivity of different cross pollinated crops like mustard and pigeonpea.

6. Source of information: Motivation and training given by KVK hanumangarh-1 and technology backstopping by CCSHAU, Hisar and PAU, Ludhiana

7. Economics profitability of innovative practice/technology:

Year	Cost of production in lacs	Gross income in lacs	Net income in lacs	B:C ratio
2014-15	3.83	11.30	7.47	2.95
2015-16	5.49	18.50	13.01	3.37
2016-17	6.43	24.00	17.57	3.73

8. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: 300 youth farmers adopted this innovation and started beekeeping. Many youth and landless youth of the district have joined this profitable venture for whom Sh. Ajit Singh act as role model .



inspection of super bee box at farm



inspection of bee box at farm

Sustainable milk production of crossbred cows and buffaloes during summer

- 1. Thematic area:** Livestock
- 2. Profile of innovator:** **Sh. Sukhvinder Singh** S/o Satnam Singh
Village: Alfa Nagar, Telara
Dist.: Bundi
Mobile No.: 09414175227



3. Problem/challenge addressed: Decreasing trend in milk production during summer season is the major challenge.

4. Description of innovative practice/technology: The foggers are installed in animal shed and mist cooling was provided by timer in summer months to Cross bred cattle and Buffaloes.

5. Practical utility: The milk yield can maintain in summer months by providing comfortable environment to animals through saving animals by adverse effect of heat stress.

6. Economics/Profitability of innovative practice/ technology (costs and return) (per intervention or area or household): Cost of installation of Fogger for animals is Rs 800/Month/Animal. It can maintain milk yield 3 liter/animal/day. The cost is Rs. 2700/animal/Month. Hence, net profit is Rs. 2100 per animal/month.

7. Potential: Acceptance level, horizontal spread of innovation and number of farmer adopting: Two another farmers adopted this technology in village and 18 farmers of neighboring villages visited at site.



Foggers in animal shed of crossbred cows and murrah buffaloes

Direct Seeded Rice: A cost effective & water saving technology

- 1. Thematic area:** Integrated Crop Management
- 2. Profile of innovator:** **Sh. Sitaram Prajapat** S/o Shri Dolat Ram Prajapat
Village: Bherupura Ojha
Tehsil and Distt. Bundi (Rajasthan)
Mobile No.: 9784369177



3. Problem/ challenge addressed: The traditional transplanted system of rice cultivation is being practiced by the farmers. It requires heavy amount of labour in raising, uprooting of seedlings, puddling and transplanting in main field leading to a substantial rise in the production cost. The transplanted rice is harvested upto second week of November which tends towards late sowing of wheat and a substantial decline in wheat yield

4. Description of innovative practice/technology: Direct seeding is an alternative rice cultivation technology. It can reduce labour and energy requirements for crop establishment and the demand for irrigation water. It offers faster and easier planting, reduces labour requirement, earlier crop maturity by 7-10 days, more efficient water use and higher tolerance of water deficit, less methane emission and often higher profit in areas with an assured water supply. In order to check the declining water table, a new technique of direct-seeding is now fast replacing traditional transplanted rice in areas with good drainage and irrigation facilities.

5. Practical utility:

- It reduces labour requirement to the extent of 40% and saving water up to 60% though avoiding nursery raising, puddling and transplanting in main field.



Robust growth of paddy at tillering stage



Initial seedling stage of direct seeded rice

- More than 60% energy /diesel requirement reduced due to elimination of water needed for raising nursery, puddling of main field.
- Under DSR, transplant injury is avoided and establishes earlier than transplanted rice with more growth and attains physiological maturity earlier. Therefore, exposure to late-season drought is avoided.
- Early maturity (7-10 days) of DSR paddy enhance scope of timely sowing succeeding wheat crop are the additional advantages
- It helps to check deleterious effect on soil structure by avoiding puddling and reduces drudgery to farm women by eliminating transplantation.

6. Economics/Profitability of innovative practice/ technology (costs and return) (per intervention or area or household):

Comparative economic of transplanted and direct seeded rice (Rs. per hectare)

S.No.	Details of cost components	Transplanted	DSR	Saving in DSR (%)
1	Variable cost			
i	Nursery raising	1900	-	100
ii	Puddling expenses	2900	-	100
iii	Manual transplanting	6750	-	100
iv	Preparatory tillage	1440	2160	-33
v	Irrigation	6000	3000	50
vi	Weed management	850	4350	-411
	Total variable cost	19840	9510	52.06
2	Average yield	44.78 (q/ha)	42.57 (q/ha)	-5.05
3	Cost of cultivation (Rs/ha)	41580	31250	24.84
4	Net return (Rs/ha)	51968	58215	12.02
5	B C Ratio	2.25	2.87	27.56

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting

- DSR technology is better as compared to conventionally transplanted because farmers get more money in his pocket.
- DSR has viable alternative to overcome problem of labour, energy and water shortage.
- In DSR technology, water use efficiency and productivity may increase.

- 7-10 day early paddy in DSR harvest have opportunity to timely sown of wheat crop
- Environmental friendly techniques as it eliminate methane emission, check ground water table depletion, less fuel (energy) consumption either pumping of irrigation water /or reduced tractor operations
- Krishi Vigyan Kendra, Bundi has been conducted 130 FLDs at farmers field on paddy covering an area of 52.0 ha from the year 2011 to 2017. KVK also conducted on farm trial on to assess the feasibility of direct seeded rice for two consecutive year at farmers field with the active involvement of farmers. In this context, farmers of the Bundi district have adopted DSR technology because of reduced cost of cultivation and easy to handling.
- Presently 5-10 per cent of paddy area in the district diverted to direct seeded paddy.



Flower initiation and enter into reproductive stage



Direct Seeded Rice technology at physiological maturity stage

Use of mulching to conserve moisture and efficient weed management

- 1. Thematic area:** Natural Resource Management
- 2. Profile of innovator:** **Sh. Durgalal Saini** S/o Sh.Kishna Saini
Village: Mangali Khurd Hindoli
Dist: Bundi
Mobile No.: 9784831993



3. Problem/ challenge addressed: Infestation of different weed flora affects on growth as well as yield of crops/vegetables. Moisture stress is another challenge in enhancing yield of crops/vegetables.

4. Description of innovative practice/technology: Mulching is essential for covering the soil/ground to make more favorable condition for plant growths, development and efficient crop production. It prevents direct evaporation of moisture from the soil and thus limits the water losses and soil erosion over the surface. The suppression of evaporation also has supplementary effects. It prevents rise of water containing salt.

5. Practical utility: It prevents direct evaporation of moisture from the soil and thus limits the water losses and conserves moisture. Mulch can facilitate fertilizer placement and reduce the loss of plant nutrient through



Mulching in chilli

hatching. Mulching can provide a barrier to soil pathogen. Prevents weed growth and maintain more even soil temperature. Protects the soil from erosion. It reduces compaction from the impact of heavy rains and keeps fruits and vegetables clean.

6. Economics/Profitability of innovative practice/ technology (costs and return) (per intervention or area or household): 20 to 30 % yield enhancement, Net Return Rs: 60000/ha to 65000/ha

7. Potential : Acceptance level, horizontal spread of innovation and number of farmer adopting: 10 percent farmers are adopting technology in Hindoli block of Bundi district. Farmers of neighboring districts visited and have fully convinced with efficacy of this innovation.



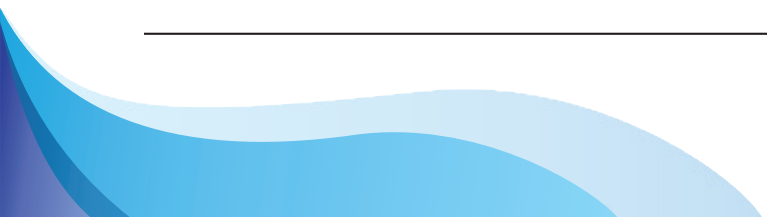
Mulching in chilli



Mulching in bitter gourd



NOTES





हर कदम, हर डगर
किसानों का हमराफर
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