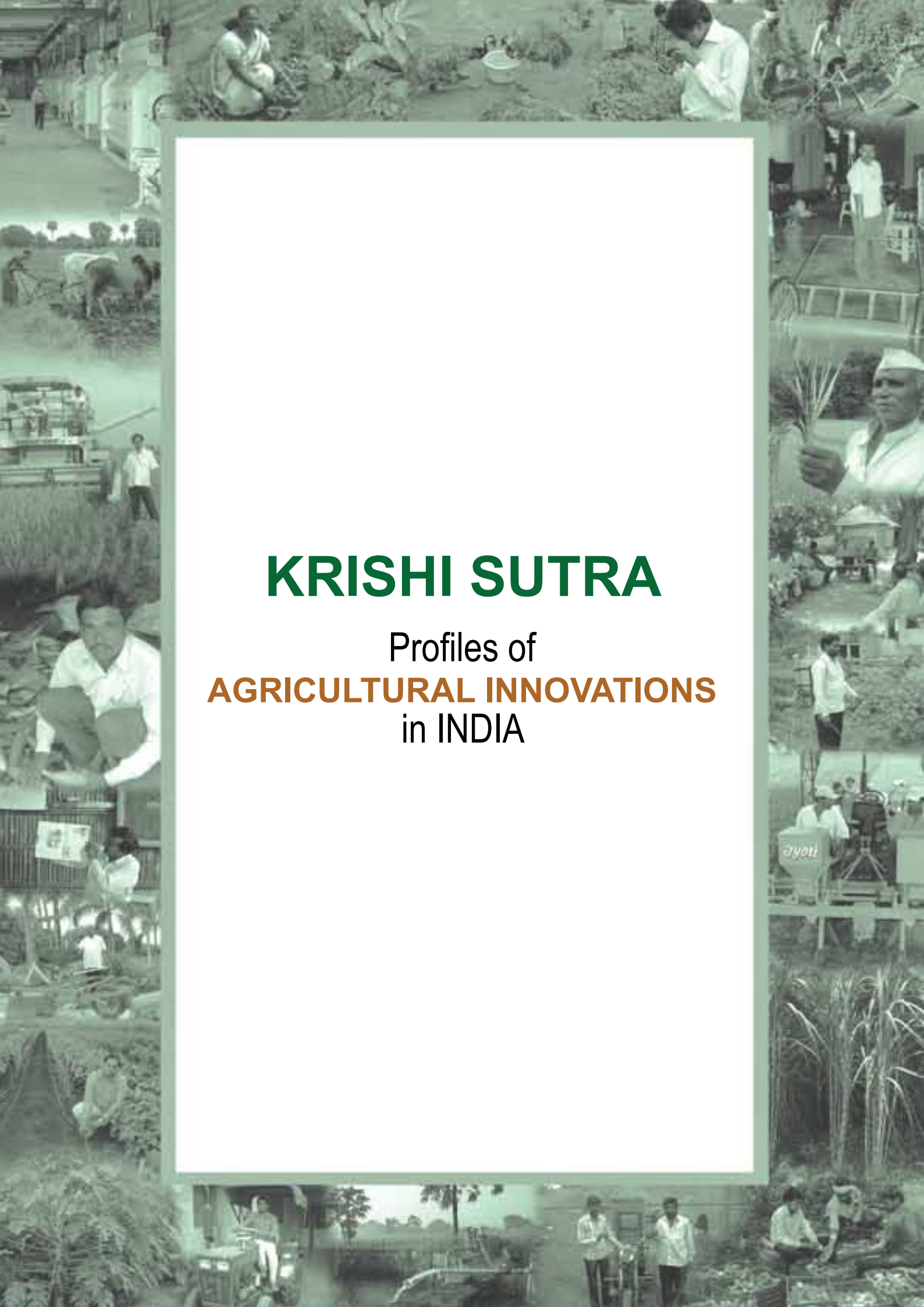
KRISHI SUTRA

Profiles of **AGRICULTURAL INNOVATIONS** in INDIA



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Profiles of
AGRICULTURAL INNOVATIONS
in INDIA

शरद पवार
SHARAD PAWAR

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कृषि एवं खाद्य प्रसंस्करण उद्योग मंत्री
भारत सरकार
MINISTER OF AGRICULTURE &
FOOD PROCESSING INDUSTRIES
GOVERNMENT OF INDIA

28 DEC 2011

MESSAGE

India's agriculture sector occupies a special place in the country's economy and has several unique characteristics which are unparalleled in the world. No other country has over 600 million people actively engaged in agricultural activities. India's farmers work in every known agro-climatic zone, from snow-covered alpine meadows high in the Himalayas to deserts and coastal plains. The entire range of cultivation technologies, from shifting cultivation in the north-east to hi-tech precision farming in irrigated zones, coexist side by side. India's farmers have shown remarkable resilience and ability to adapt to their natural resource endowment and the challenges posed by rapidly developing technologies and changing market demand.

I believe that despite the enormous stress on the natural environment and periods of stressful market conditions, Indian agriculture has survived and thrived primarily due to the innate creativity and intrinsic innovative capacity of its farmers. Defying the lack of material and technical resources and inadequate access to information, farmers in India have married traditional wisdom with modern science and found local, cost-effective solutions to the challenges of agriculture.

In this context I am very pleased to launch this volume of stories of local successes in agriculture. The 100 case profiles in this collection testify to the ability of farmers and entrepreneurs to successfully overcome the many constraints facing the sector. It is heartening that the majority of the cases involve innovations by farmers themselves. They have proven, through concrete action, that innovative thinking is not the preserve of highly trained scientists and researchers alone.

I compliment SFAC on putting this compilation together and recommend that it should be circulated widely, preferably translated into regional languages, and made accessible to the largest number of farmers, entrepreneurs, researchers, administrators and policy makers. The stories in this collection should inspire others and challenge them to undertake similar efforts at finding creative solutions to challenges in agriculture. Policy makers too should read these case profiles carefully and explore how some of these ideas can be replicated on a wider scale.

(SHARAD PAWAR)

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कृषि मंत्रालय
कृषि एवं सहकारिता विभाग
Government of India
Ministry of Agriculture
Department of Agriculture & Cooperation

MESSAGE

India's success in agriculture is the outcome of a close and continuing partnership between the government on the one hand and millions of farmers on the other. Innovation and research supported by the government could not have succeeded until it was tested and widely absorbed by farmers, helping the country to achieve self-sufficiency in food in the process. It is the basic strength and creativity of our farmers that has made India the agriculture powerhouse that it is today.

However, innovation is a two-way street, especially when we are dealing with natural resources management. Even though we have a large and sophisticated agricultural research system manned by highly qualified scientists and researchers, they depend on the wisdom and knowledge of our farming community to adapt technology to local needs and conditions. It is a fact that informal information sharing networks among farmers, the preservation of bio-diversity, seed exchange, pooling of human, animal and other resources and collaboration in sharing of water and other natural goods are key strategies adopted by farmers in different parts of the country in the course of the pursuit of agriculture based livelihoods. Capturing these many strategies, practices and norms is indeed an important goal for policy makers so that both the research agenda as well as agricultural programmes could be better designed.

The present volume documenting 100 agri innovations is a welcome first step in this direction. SFAC has done well to investigate innovations across the spectrum of agriculture, as it provides a brief though important glimpse of the dynamism and creativity of our farm sector. I am truly impressed with the ability of many of the innovators, who are farmers themselves, to think out-of-the-box and come up with simple but effective solutions which are also cost-effective.

I hope that wide circulation of this collection will inspire many others to put on their thinking caps and apply their creativity to the challenges of agriculture. I am especially pleased to see that the overwhelming majority of innovators are young men and women, disproving causal talk of youth turning away from agriculture. An outstanding challenge is the upscaling and conversion of many of these ideas into successful business models. I hope SFAC, in partnership with financial institutions, will address this aspect too as a follow-up to the publication of this report.

(P.K. Basu)

Date: December 28, 2011

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INTRODUCTION

Innovation is intrinsic to agriculture. Ever since humans discovered the technique of multiplying wild seeds into food and other products, an unbreakable relationship between agriculture and creativity was born. Marrying the potential of natural resources such as land and water to animal and human labour, timing various practices from ploughing to weeding, nourishing friendly bacteria in the soil and deflecting insect and winged pests and ultimately bringing in the harvest to process and store the crop to feed the family calls for enormous and almost daily innovation and near-perfect decision making. Millions of farmers all over the world go about these complex daily tasks with a matter-of-fact attitude and little fuss; yet on closer scrutiny it is amazing how perfectly a system with so many intangible factors and players actually works.

The spirit of innovation is on display in India's agriculture sector more than anywhere else the world. With a population of over 600 million people being supported by the sector, and given the spectrum of well-known constraints challenging its performance, the successes of India's agriculture are the greatest testimony to the immense creativity and innovative and enterprising spirit of its farmers. While significant steps have been taken in the past few decades with resolute state action to address a variety of risks in agriculture, it is the resilient and adaptive attitude of its agriculturists that ensures the dynamism of India's farm sector.

This collection of 100 profiles of creative practices in agriculture is a small attempt to document and disseminate a few specific examples of innovations in agriculture. The focus is on individual farmers and entrepreneurs and simple, cost-effective yet imaginative solutions to common problems faced by the farming community. These 100 profiles represent only a small fraction of hundreds, possibly thousands of similar practices developed locally. Admittedly, the coverage is limited to a few regions and states. This is far from being a comprehensive or authoritative compendium of innovations in agriculture. We were dependent on word-of-mouth information networks and virtually no published information.

However, we see this as one of a series of similar publications in the coming months and years. The publication and circulation of report is expected to trigger a flow of information from across the country on local innovations and creative solutions, which can be documented in subsequent volumes. More importantly, many of the innovations reported are suitable for upscaling and wider replications, a task which state governments, NGOs, research bodies, private sector companies, entrepreneurs, banks and other stakeholders including the media can take up.

Perhaps more than any other group, this report is targeted at the farming community itself, through the agency of farmer groups, federations, associations and similar institutions. To this end, regional language versions of this report will be circulated shortly, so that these solutions are accessed by farmers in every part of the country, discussed, criticized, adapted or rejected as they deem fit.

Both Her Excellency The President of India and the Hon'ble Prime Minister in recent times have spoken of the need to foster innovation and encourage out-of-the-box thinking to take India forward. This volume is a small contribution towards recognizing the enormous pool of innovation in agriculture and is dedicated to these and countless other farmers and entrepreneurs who keep the sector thriving.

AGRICULTURE EQUIPMENT

THEME OF INNOVATION

Modified Rice Drum Seeder for Better Crop Management and Higher Harvest Yield

FOCUS AREA

Agriculture Equipment

DETAILS OF INNOVATOR

Name	Shri Laxman Baburao alias Bal Dalvi
Experience	35 years
Region of operation	Maharashtra
Turnover	Not disclosed. Profit: Rs. 30,000–40,000
Volume	30–40 units
No. of employees	2
Contact details	At Vadap, Post Gourkamat, Taluka Karjat, District Raigad, Maharashtra Phone: 02148 226617, 09273187434 (Mobile), Email: niliagromachines@yahoo.co.in

BUSINESS MODEL

A total of 50 Drum Seeders were manufactured by the Farmer under the guidance of Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth University Scientists and sold in nearby villages. He sells each drum at a price of Rs. 3500 and makes a profit of nearly Rs. 1000 per drum. In a year, he is able to sell 30 to 40 machines which earn him a profit of around Rs. 40,000. He depends on word-of-mouth publicity for his product. One of the prototypes of this equipment is also showcased at Konkan Krishi Vidyapeeth University.

INNOVATION DETAILS

Modifications were done in DRR Rice Drum Seeder (designed by Directorate of Rice Research, Hyderabad). The modified equipment sowed 4 lines at a time, using tyres of a cycle instead of the steel wheels. This reduced the weight considerably and made the equipment much more navigable and easy to use. It has a 9 inch line and a hole 2 inches above that.

IMPACT OF INNOVATION/TECHNOLOGY

The modified drum seeder was designed during May, 2009 and put to use in his own village Vadap on an area of 3 hectares during June, 2009, besides area of 12 hectares in nearby villages viz. Sapele, Gaurkamat, Salokh, Ashivali, Dahigaon, Posari. Currently, farmers in nearby villages have sown rice with drum seeder on an area of more than 250 acres. It increases the yield of rice per acre from 15 tons to 18 tons, therefore saving Rs. 3000 per acre.

RECOGNITION/AWARDS

Chairman of Rajnala Rice Seed Production and Nursery Cooperative Society, Vadap, Taluka Karjat.

ISSUES

The major hurdle to scaling up of operations is of marketing and publicity. Shri Laxmanrao claims that once made aware of its benefits, farmers have readily adopted this modified drum.

PRODUCT VIEW

THEME OF INNOVATION

Cost Effective Shade Net House

FOCUS AREA

Agriculture Equipment

DETAILS OF INNOVATOR

Name	Shri Jagnnath Gangaram Tayade
Experience	27 years
Region of operation	Maharashtra
Turnover	Approx Rs. 12 lakh
Volume	Not disclosed
No. of employees	20 people
Contact details	At Post Ladsavangi, Taluka & District Aurangabad Maharashtra Mobile: 09421313616

BUSINESS MODEL

He mostly depends on word-of-mouth publicity. He also gives lectures in Farmer Meets (Krishi Vibhag Shetkari Mela).

INNOVATION DETAILS

Shade net house was developed by Shri Jagannath Tayade from locally available material. Total height of the shade net house is 6m from centre place, the length is 36 m and it is 24 m wide. This shade net house requires wire ropes which are comparatively cheap and locally available. The design is such that there are negligible obstacles within the shade net which facilitates smooth intercultural operations and easy movement of labour as compared to the popularly used design. The material used in shade net is plastic and the towers are made up of iron.

IMPACT OF INNOVATION/TECHNOLOGY

This type of shade net house is suitable for growing even tall crops like capsicum, tomato, chili, etc. It can sustain wind speed up to 80 km/hr and is economically viable as the total cost required to construct is Rs. 60,000 which is 30% lesser than the recommended technology. The added advantage of this design is that rain water drains easily due to doom shape structure. About 15 farmers have adopted this type of structure on 0.10 hectares each and are producing seeds capsicum and tomato. It increases the production by 10 times and also enhances the quality of soil. In terms of time, 5 hours per day is saved by using this technique. This technique is easy to install and gives more productivity in adverse environments also.

RECOGNITION/AWARDS

Various awards and recognitions from:

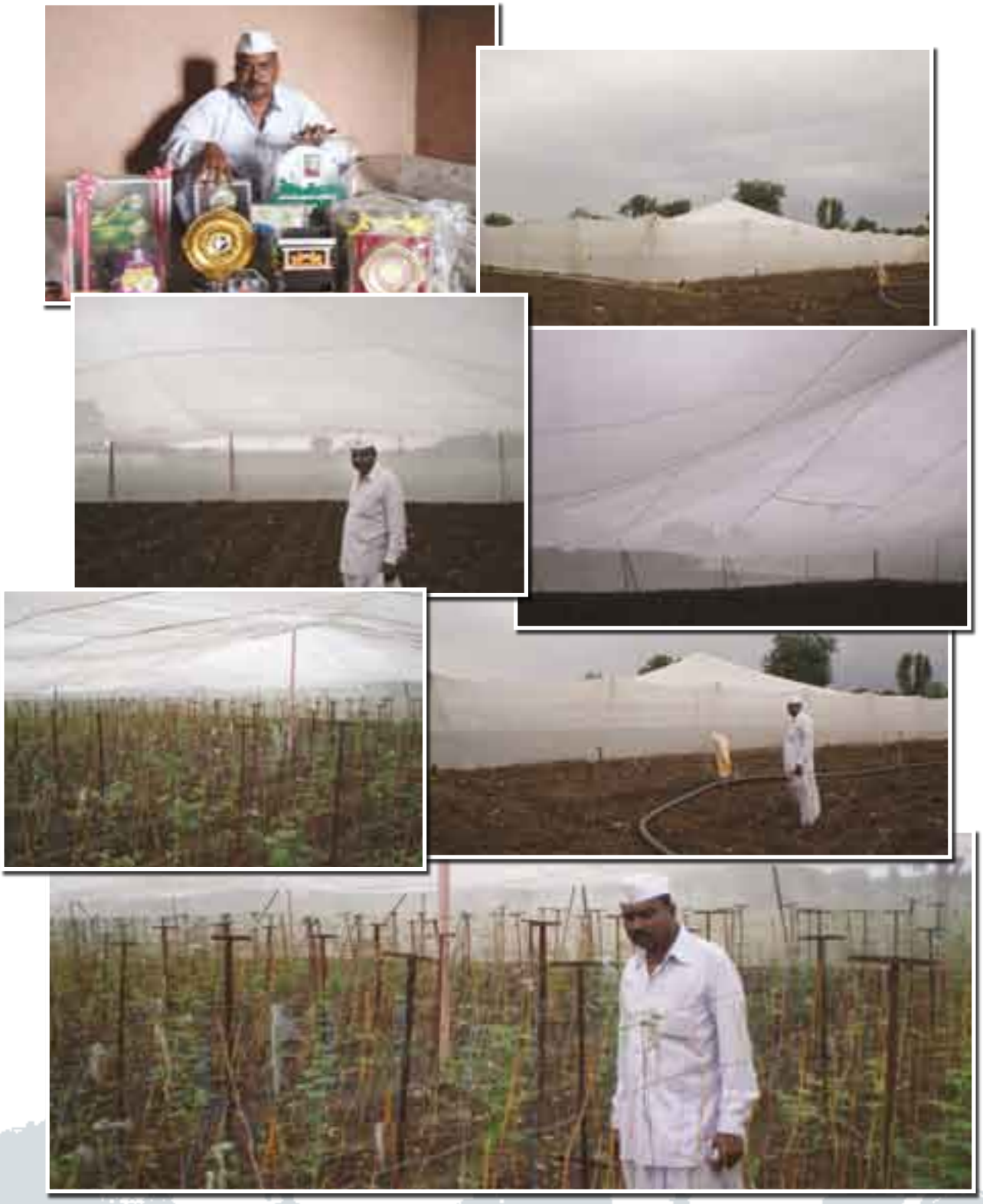
- Aurangabad Zila Parishad
- Vasantrao Naik Pratisthan
- Aketa Seva Sansthan
- Satineth Setkari Maharashtra Government
- Krishi Ratna Bharitiya Krishi Samaj
- Maha Agro Puraskart

ISSUES

To install this shade net, skilled labourers are required which are not readily available in the local area.

The awareness among farmers is also an issue with which the innovator has to deal with.

PRODUCT VIEW



THEME OF INNOVATION

Biogas Plant

FOCUS AREA

Agriculture Equipment

DETAILS OF INNOVATOR

Name	Mr. Amrut Mutha
Experience	25 years
Region of operation	Maharashtra
Turnover	Not disclosed
Volume	Not disclosed
No. of employees	8
Contact details	At Post Rastapur, Taluka Nivasa, District Ahmednagar, Maharashtra Mobile: 09970151001

BUSINESS MODEL

Mostly publicized through word-of-mouth. Free consultation to visiting farmers.

INNOVATION DETAILS

The innovator produces 15 kw of electric energy by using cattle dung as a feed for the plant. The energy produced is used to successfully run a 26 hp motor. It is a three phase biogas production unit. This has led to twin benefits as the dairy farming and agriculture aspects have been integrated as a business resulting in cost optimization and a self sustaining model. Usage of biogas as a fuel has benefitted in ways more than one: the cleaning of the cattle area is automatically taken care of due to supply of this dung into the biogas plant, thereby preventing worm and pathogen build up – also, requirement of collecting wood for fuel is no longer there, resulting in less labour requirement.

IMPACT OF INNOVATION/TECHNOLOGY

This plant is giving the innovator a profit of Rs. 6 lakh per year. With a benefit of easy installation, it also reduces the labour requirements. Also, since skilled labourers are required, therefore he also imparts these skills training to the labourers.

RECOGNITION/AWARDS

- Enterprise International Award Pune
- Vishweswarya All India Engineers Award

ISSUES

Skilled labourers are required for the execution of the plant which is difficult to get.

PRODUCT VIEW

THEME OF INNOVATION

Fine Cleaner Grader for Spices and Grains

FOCUS AREA

Agriculture Equipment

DETAILS OF INNOVATOR

Name	Mr. L D Patel
Experience	40 years
Region of operation	Gujarat
Turnover	Approx Rs. 1.25 crore (Overall)
Volume	Not disclosed
No. of employees	35
Contact details	Goldin Engineering Company, Last Lane, B.I.D.C. Estate, Gorwa, Vadodara – 390016 Phones: 0265 2291540, 2284120, Email: goldin1971@yahoo.com Website: www.goldinindia.com

BUSINESS MODEL

Manufacturing of machines, marketing and selling with lifetime maintenance service.

INNOVATION DETAILS

This equipment is used for fine cleaning. It can be only used after some pre-cleaning. The output it gives is very pure, removing all oversized and undersized grains, giving a very uniform size. This is mainly used for spices and food grains. This is totally closed environment equipment and hence gives dust-free uniform sized grains which make them more sellable at the retail level. It is capable of removing impurities which are very closely attached to the grain - at the same it doesn't waste good quality grain by passing it out along with dirt.

The cost of equipment ranges between Rs. 2 lakh (0.01 tons/hour) to Rs. 5 lakh (1 ton/hour) with almost zero maintenance.

IMPACT OF INNOVATION/TECHNOLOGY

This machine gives uniform sized, dust free grains. Such purity is essential to export food grains. This throughput rate is almost impossible to replicate manually (manual rates are around 1 kg/hour against 1 ton/hour managed by this machine). Also, grading according to sizes is almost impossible manually. Therefore this equipment is crucial in achieving export standard grain.

RECOGNITION/AWARDS

- ISO 9001:2008 certified

ISSUES

They haven't faced any major issues as such. They take continuous feedback from clients and improve the performance of the future products.

PRODUCT VIEW

THEME OF INNOVATION

Pulses/Dal Miller

FOCUS AREA

Agriculture Equipment

DETAILS OF INNOVATOR

Name	Bhaagyarekha Enterprises
Experience	55 years
Region of operation	Maharashtra
Turnover	12 crore
Volume	Not disclosed
No. of employees	68 people
Contact details	Mr. Girish Maheshwari, 3872/1, Solapur Road, P.B. No. 86, Barsi, Solapur - 413401, Maharashtra Phones: 02184 222528/325528

BUSINESS MODEL

He does in-house R&D but does not wish to disclose details. However he is willing to share information with research bodies.

INNOVATION DETAILS

The process of dal milling mainly involves two processes i.e. removal of husk and splitting it into cotyledons (two parts). Removal of husk (seed coat) reduces roughage, improves storability, cooking quality, palatability and digestibility. The bondage of husk with cotyledons is strong and the strength of bondage varies in each variety of pulses. Forced dehusking and splitting cause's heavy processing losses. Outermost 5% layer of dal contains 40% of total protein. A sizable part from this high value protein concentrated area of cotyledons is converted into powder and broken. It goes with husk powder (chuni), which is used as cattle feed, and this also creates the problem of acute dust pollution. On account of this, the economic viability for dal miller also becomes unfavourable and the pulse grower (farmer) also gets less value for his produce.

The new technology developed for dal milling results in higher yield, shorter process time and reduction in processing expenses. The dal obtained by this process system is better in protein value, appearance, cooking quality and shelf life. Irrespective of external climatic conditions, the quality of dal is consistent round the year. No chemical is being used and the process is fully automated and totally hygienic. The area required for land and building is also lesser.

IMPACT OF INNOVATION/TECHNOLOGY

Output of dal compared to the previous technologies is increased by 3 to 5%. The protein rich 1st quality dal (parka) is increased to 78% of total, up by 20% from the current 55–58%. Thus providing more nutritious dal for consumption. At present, conversion of raw pulses (tour, moon, rued, etc.) into dal takes around 5–7 days; by using this equipment, process time is reduced to 2 days. Thereby saving on valuable capital, space and fluctuations in the rate. For processing raw pulses into dal, millers use edible oil, which is a commodity in shortage. With this new technology there is a 60–80% reduction in the consumption of oil. This process also reduces electricity and

fuel consumption by 35–50%. Completely dehisced grain (goat) is attained in 'single' post oil rolling operation. By eliminating repetitive rolling (scrubbing/scratching) process, dust pollution is almost nil. The dal obtained by this process system is very superior on all aspects; such as sharp edges, colour, shining, appearance, cooking quality and protein value.

RECOGNITION/AWARDS

None

ISSUES

The Dal milling industry was very sceptical in adopting this new technology – but has shown more acceptability lately.

PRODUCT VIEW

THEME OF INNOVATION

Advanced Farm Field Tools

FOCUS AREA

Agriculture Equipment

DETAILS OF INNOVATOR

Name	Shri Jayavant H Wadekar
Experience	15 years
Region of operation	Wada, Thane Maharashtra
Turnover	Not disclosed
Volume	1000
No. of employees	5
Contact details	A P Wada, District Thane-421303 Phone: 02526-650355, Mobile: 09226728101

BUSINESS MODEL

Mr. Wadekar has farming experience of more than 15 years. He runs a small scale workshop and has developed some user friendly farm operation tools. Every month he sells 20 to 40 units of each tool costing in range of Rs. 25 to 60.

INNOVATION DETAILS

Traditional farm field tools cause many physical injuries. They have handling problems like slipping from hand, more force requirement, have less life and require more maintenance. In order to overcome these problems and attain actual requirement of tools for rice farming the farmer has developed some of them. The steel used is of better quality with higher strength. These tools are less in weight as compared to traditional tools.

IMPACT OF INNOVATION/TECHNOLOGY

The tools are easy in handling and require lesser effort while operating. Manual working speed is increased considerably saving lot of time. As the tool is assembled, any broken part can be replaced easily instead of replacing the tool.

RECOGNITION/AWARDS

None

ISSUES

The farmer seeks help in marketing these tools. He is giving many of his tools to farmers at free of cost so as to advertise.

PRODUCT VIEW








THEME OF INNOVATION

Kranti Spray Pump

FOCUS AREA

Agriculture Equipment

DETAILS OF INNOVATOR

Name	Shri Mohan Lamb
Experience	48 years
Region of operation	Maharashtra
Turnover	Not disclosed
Volume	550 per year
No. of employees	4
Contact details	At Post Chinchpur, Taluka Dharur, District Beed Maharashtra Mobile: 09689984518

BUSINESS MODEL

One of each pump costs around Rs. 1300. He also provides one year free maintenance for the pump and after one year he charges accordingly. Shri Mohan Lamb also provides free consultation to the farmers.

INNOVATION DETAILS

The traditional knapsack sprayer is very inefficient and cumbersome to use. It is unable to sustain the required pressure and consequently results in more number of strokes, more time and labour. The twin nozzle system was recommended by various Govt. agencies to reach the desired pressure but it resulted in inefficient spraying.

Shri Mohan Lamb has attempted to solve all these problems by designing a three gear sprayer known as "Kranti Spray". It has a low cost filtration unit and is easy to repair and maintain. The spray has a prolonged handle and a larger pressure chamber and a lance with double nozzle.

IMPACT OF INNOVATION/TECHNOLOGY

This Kranti Spray Pump is fast gaining popularity amongst the farmers. Till date, it has been purchased by more than 300 farmers and is being used by around 1000 farmers. It has low maintenance and is user friendly. It also saves on material cost by increasing efficiency of spraying. The sale of this equipment has resulted in an additional income of Rs.12,000 for the farmer. This pump saves about 3 hrs per day and increases area of application by 5 acres per day which increases profit by 30–40%. Labor requirement is reduced by 50%. A normal pump irrigates up to 2 acres of land whereas kranti pump irrigates up to 4 acres of land in the same time. Water usage is reduced up to 30–40%. As spraying from this pump is very efficient it leads to 30 to 40% savings of pesticides or insecticides.

RECOGNITION/AWARDS

None

ISSUES

Availability of raw materials and their supply, Financial support.

PRODUCT VIEW

THEME OF INNOVATION

Sub Soiler for Better Ploughing of Fields for Sugarcane

FOCUS AREA

Agriculture Equipment

DETAILS OF INNOVATOR

Name	Regional Sugarcane Research Station (RSRS) Navsari Agriculture University
Experience	Not applicable
Region of operation	Gujarat
Turnover	Not applicable
Volume	Not applicable
No. of employees	Not applicable
Contact details	Regional Sugarcane Research Station (RSRS) Navsari Agriculture University Navsari, Gujarat Phone: 02637 282136, Email: sugarnau@gmail.com Dr. D. U. Patel (09725055214), drdhansukhpatel@yahoo.in Dr. S. C. Mali (09725018791), drshaileshmali@yahoo.in

BUSINESS MODEL

They produce and sell sub soilers to cooperatives and association of farmers. The selling price of product ranges between Rs. 10,000 to Rs. 12,000. The product is marketed by Navsari Agriculture University (NAU) & Regional Sugarcane Research Centre (RSRS).

INNOVATION DETAILS

This equipment is used to plough deeper in the field. It can be attached to the tractor. Traditionally, the normal plough used by the farmers is not able to plough deep enough. Deep ploughing enables better seepage and drainage. Sugarcane and paddy are water logging crops. Water logging degrades soil health. The rainwater washes down essential salts from the soil. Ploughing deep also results in a deep rooted system which enables crops to extract more nutrients from the soil and also holds the soil together preventing erosion.

IMPACT OF INNOVATION/TECHNOLOGY

This equipment loosens the soil while ploughing and breaks away the hardness of the soil. Other conditions remaining same, a field ploughed with this equipment results in about 10–15% greater yield than a field ploughed with a regular plough. This translates to about 15 to 20 tons per hectare (or Rs. 37,500 to Rs. 50,000 per hectare).

RECOGNITION/AWARDS

None

ISSUES

None

PRODUCT VIEW

THEME OF INNOVATION

Innovative Spray Pump with Dual Media Spray

FOCUS AREA

Agriculture Equipment

DETAILS OF INNOVATOR

Name	Shri Boraste Sampatrao V
Experience	6 years
Region of operation	Maharashtra
Turnover	1 crore per year
Volume	200 pumps per year
No. of employees	15
Contact details	Pimpalgaon, Opp National Highway, Nasik Mobile: 09923588535

BUSINESS MODEL

Production and sale of spray pumps. He also provides free consultation and maintenance for 1 year.

INNOVATION DETAILS

Mr. Sampatrao manufactures spray pumps which can be used for all types of crops. The systems have an attached chemical tank and dust fan, enabling spraying of both types of media. The spray pumps can be attached to a tractor. They are available with a tank capacity ranging from 200 to 1000 litres. The spray pumps can be used for all crops but are mainly designed for pomegranate and grape. The systems have an attached chemical tank and dust fan, enabling spraying of both types of media.

Apart from offering the option of using both types of spray materials – liquid and powder, this leads to substantial increase in efficiency.

IMPACT OF INNOVATION/TECHNOLOGY

Using this pump will enable farmer to cover more than 20 acres in a day. This tremendous speed leads to savings in terms of time and labour. It saves about 6 man-hours per day. It eventually translates to a labour saving by almost 50%. It also results in other cost savings to the tune of Rs. 160 per acre. It also requires very low maintenance.

The uniformity of spray has resulted in export quality fruits and has resulted in growth of a large number of cold storage and wine factories in the vicinity of the village. This pump leads to cost savings up to 30 to 40%.

RECOGNITION/AWARDS

None

ISSUES

The main issue Mr. Sampatrao faces is the shortage of quality (ITI Grade) manpower. These skilled labourers are in short supply. One of the biggest challenges is to maintain the quality constant across all outputs. He has invested good amount of time and effort in R&D activities.

PRODUCT VIEW

THEME OF INNOVATION

Power Operated Farm Implements

FOCUS AREA

Agriculture Equipment

DETAILS OF INNOVATOR

Name	Shri Ishabhai Hari Madviya
Experience	4 years
Region of operation	Gujarat
Turnover	Rs. 14 lakh
Volume	12 pumps per year
No. of employees	5
Contact details	At Post Sandarda, Taluka Mahuwa, District Bhavnagar, Gujarat Mobile: 09924314140

BUSINESS MODEL

The innovator sells the pump in the market at a price of Rs. 1, 20,000 per pump. He also gives lease of the product at Rs. 30 per hour.

INNOVATION DETAILS

He has created a motorbike operated spray machine for spraying chemicals and powder at a uniform rate. It is an economical alternative for the small farmers specifically. It allows them to cater to their small farm size requirements at a low investment cost and involves easy maintenance. Earlier, small farmers could not afford the costlier alternatives due to the high investment involved and also because such equipments don't fit in with their farm size criteria, thereby becoming an unviable expenditure.

IMPACT OF INNOVATION/TECHNOLOGY

This pump increases the area of application by 25 acres per day and results in a profit of Rs. 8000 per acre. It reduces the labour requirement by one eighth; saves time up to 8 hours per day and reduces the water usage by 100 litres per acre. This innovation has impacted the small farmer community in a focused manner. The local farmers' awareness for this product has also increased lately and has the potential to generate employment for skilled labour wherever replicated.

RECOGNITION/AWARDS

None

ISSUES

He is doing self publicity from home as people are skeptical to use this pump. Availability of spare parts is problem. As the pump works on electricity, that sometimes creates problems when the power is not available.

PRODUCT VIEW

THEME OF INNOVATION

Open Top Green House

FOCUS AREA

Agriculture Equipment

DETAILS OF INNOVATOR

Name	(ARTI) Appropriate Rural Technology Institute
Experience	10 years
Region of operation	Maharashtra
Turnover	Not disclosed
Volume	Not applicable
No. of employees	1
Contact details	Ganesh Nagar (Algudewadi), Phaltan Baramati Road, Taluka Phaltan, District Satara - 415523 Maharashtra, Phone: 02166 225200

BUSINESS MODEL

Making such Green Houses using local materials costs only Rs. 30 per m^2. Training for this technology has been given to many farmers. ARTI charges Rs. 750 per day as training fee and Rs. 1500 as consultation fee with additional travelling expense for this as well as other technologies. Approximately 250 farmers have registered for the training as of now. DST (Department of Science and Technology) has also funded this project. ARTI is also involved in many technological innovations which helps farmers in their growth.

INNOVATION DETAILS

This is a Green House model for Indian varieties of vegetables and other crops. Conventional closed top Green Houses have been mostly found to be good for exotic vegetables only. Basic idea is to provide excess CO_2 in the morning and good sunshine throughout the day. Indian local varieties of vegetables and crops need good amount of sunshine for growth. So the production of these becomes difficult in closed top Green Houses.

For installing these open top Green Houses, the field should first be divided into individual parcels of 10 m X 10 m and plastic barriers should be erected along the borders of these parcels of land using bamboo poles as supports. The reason behind dividing the land into small segments is to reduce the Venturi Effect of high velocity winds blowing over the field. Before constructing the Green House structure, it is imperative to make the permanent raised beds because transporting the material for making these beds would be difficult after the barriers have been raised.

IMPACT OF INNOVATION/TECHNOLOGY

Yield has increased by 1.5 to 2 times compared to conventional growth. Also, because raised beds do not require ploughing, harrowing etc., therefore no time is lost on land preparation between two crops as well as ensuring that there is less requirement of labour.

RECOGNITION/AWARDS

None

ISSUES

Low availability of skilled labour. Polythene deteriorates after 2 years, hence needs replacement. Alternatives to the polythene are currently being explored.

PRODUCT VIEW

THEME OF INNOVATION

Trishul Tractor

FOCUS AREA

Agriculture Equipment

DETAILS OF INNOVATOR

Name	Haresh Bhai Patel
Experience	10 years
Region of operation	Gujarat
Turnover	Rs. 6,90,00,000 per year
Volume	300 tractors per year
No. of employees	40
Contact details	Trishul Tractors Pvt Ltd Ghogha Vadar Road, Gondal Rajkot Mobile: 09879225000

BUSINESS MODEL

The innovator sells these tractors at Rs. 2,30,000 per tractor. He also provides free maintenance service for 1 year. He works with partnership with five other people. He has his own marketing channel through which he publicizes his product and has appointed dealers in different districts. He also attends "Kisan Mela" in Rajkot, Ahmedabad and Junagadh.

INNOVATION DETAILS

Mr. Haresh Bhai Patel sensed the need of farm mechanization for small & medium farmer and the difficulty faced by them in owning a regular Tractor. With this aim, he developed a small sized tractor which could do most of the things that a regular tractor would do and yet be economical for use on small sized farms. The new model is even well equipped with modern and hi-tech features such as Automatic Draft Control Hydraulic System. He has introduced a 10 hp tractor for small farmers. This tractor is fuel efficient and also economical. It suits mainly the small farmers and horticulture developers as it has a high capacity of catering to 1 acre per hour despite its small size. This mini tractor can work as a reversible plough, cultivator, chisel plough, raft, loader, thresher, trailer and also as a generator set. This tractor is tested from CFMTTI (Central Farm Machinery Training & Testing Institute).

IMPACT OF INNOVATION/TECHNOLOGY

This small tractor has bridged a gap between the requirements of small farmers and farm mechanization. The surge in demand is a testimony to its effectiveness. The small farmers can now opt for this tractor instead of manual labour, resulting in time savings of up to 5 hours per day.

RECOGNITION/AWARDS

None

ISSUES

The demand of this tractor is around 3000 per year but they able to manufacture only about 300 tractors due to financial constraints.

PRODUCT VIEW








THEME OF INNOVATION

Mini Tractor

FOCUS AREA

Agriculture Equipment

DETAILS OF INNOVATOR

Name	Captain Tractors Pvt. Ltd.
Experience	17 years
Region of operation	Rajkot
Turnover	Rs. 30 crore (mini tractor), Rs. 35 crore (Overall)
Volume	1200
No. of employees	150
Contact details	Veraval (Sharpar) East, Padavla Road, Taluka, Kotda Sangani Rajkot - 360024, Gujarat, India, Phone: 02827 252547

BUSINESS MODEL

The unit has an installed production capacity of 4500 Units. The selling price of a mini tractor is Rs. 2, 50,000. The company successfully sold 1200 mini tractors in Indian market last year and generated revenue of Rs. 30 crore.

INNOVATION DETAILS

Captain Tractors Pvt. Ltd., previously known as Asha Exim Pvt. Ltd., was established in 1994 by farmers Mr. G.T. Patel and Mr. M.T. Patel of Rajkot. The company started developing a Mini Tractor in 1998 which could be afforded by small and medium farmers. Its latest model has all the basic features and characteristics of bigger or higher H.P. modern tractors. It is small in size but capable of performing all cultivation operations normally performed by higher H.P. tractors like land preparation, sowing, inter-cultivation, irrigation, harvesting, post harvesting operation and transportation. The weight of the tractor is 845 kg without standard ballast. The dimensions include length: 2286 mm, width: 1016 mm/1168 mm, height: 1955 mm (with exhaust pipe), wheelbase: 1550 mm, ground clearance: 260 mm, track width: 812 mm/965 mm (rear wheels) and track width: 902 mm (front wheels). The manufacturing plant is based in Rajkot which is well equipped with modern tools & equipments, quality control instruments, R&D facility and manned with trained and qualified engineers to ensure smooth production of the tractors. Captain Mini Tractor is claimed to consume nearly 40% less fuel compared to other tractors. The engine has been tested and certified by ARIA as per the pollution control norms.

IMPACT OF INNOVATION/TECHNOLOGY

Small tractors are a boon for small farmers – as, they bridge a very important gap between inefficiencies of manual techniques and unviable cost of using bigger tractors. A small tractor can be utilized up to 80% of its capacity on an average, while bigger tractors are useful only up to 20% of the full capacity for such small farmers.

RECOGNITION/AWARDS

- National award - 2008 for Best Entrepreneurship
- National award - 2008 for Best R&D Work

ISSUES

Small farmers are said to be less focused on quality of small tractors and more on price – they need to be made aware of benefits of long term durability.

PRODUCT VIEW

THEME OF INNOVATION

Mulch Laying Machine

FOCUS AREA

Agriculture Equipment

DETAILS OF INNOVATOR

Name	Prafull Bhai Patel
Experience	2 years
Region of operation	Gujarat
Turnover	Rs. 52,00,000 per year
Volume	80 machines per year
No. of employees	4
Contact details	Agri Business Corporation Raman Farm Vasad, Anand, Gujarat, Mobile: 09898069418

BUSINESS MODEL

The innovator sold about 80 machines last year at a price of Rs. 65,000 per machine. He provides free consultation to the farmers and also 1 year of free maintenance. He is right now in touch with many dealers in the state for the marketing of the machine A. He is also engaged in online marketing to increase the sale of his product.

INNOVATION DETAILS

He has innovated a cost effective mulch laying machine for getting more production in dry land and semi dry land. In these areas availability of water and labour is a problem. As an effective solution to the problem, mulch laying was adopted by many farmers in the region. However, this was a time taking process and required substantial amount of manual labour. This machine helps in mulch laying in a much easier manner. Mulch prevents weed growth and water evaporation – and which in turn has been seen to result in increasing the production by up to 30%. The overall cost of mulch laying has also been greatly reduced by the use of this machine. This machine is especially becoming popular among those farmers who don't have dependable sources of water.

IMPACT OF INNOVATION/TECHNOLOGY

This machine is very easy to maintain and results in saving of water by preventing evaporation through mulching which is very useful in dry areas. It reduces the labour requirement by one sixth and saves almost 4 hours per day.

RECOGNITION/AWARDS

- Kriska Ruska Award by State Government

ISSUES

The cost of the machine acts like an inhibitor for the farmers to adapt this technology. The innovator would like the government to consider providing some subsidy on this innovation.

PRODUCT VIEW

THEME OF INNOVATION

Modified Turmeric Grinding Process which Saves Material and Power

FOCUS AREA

Agriculture Equipment

DETAILS OF INNOVATOR

Name	Mr. V. V. Ghurye
Experience	30 years
Region of operation	Maharashtra
Turnover	Rs. 4.5 crore
Volume	12 units
No. of employees	Not disclosed
Contact details	Young Technocrats Pvt Ltd Plot No. 45, Sect 1-A, Cidco Industries, Airoli, Navi Mumbai – 400708 Phone: 022 26151023, 09819160599 (Mobile), Email: vasudevghurye@gmail.com

BUSINESS MODEL

The innovator mainly gets his business through recommendations of existing users. He also advertises extensively online and in trade magazines.

INNOVATION DETAILS

The conventional grinding process (by which over 80% of the turmeric is grinded) involves a hammer mill. The hammer mill is a very crude technology which crushes the turmeric fingers with high impact. This raises the temperature of the process (up to 80°C). It also requires a lot of maintenance as wear and tear in such a process is greater.

The innovator replaced the hammer mill by a pin-mill process. He designed the pin mill and integrated it into the process seamlessly. This process operates at low temperatures (doesn't go beyond 50°C). Also, this requires less maintenance and consumes significantly less power than the conventional process. The savings and the quality of product is far superior with the use of this equipment. He is currently selling this machine from Rs. 25 lakh (300 kg per hour model) to Rs. 75 lakh (1 ton per hour model) price range. The machine can be used for 24 hours.

IMPACT OF INNOVATION/TECHNOLOGY

The higher temperature in the conventional grinding leads to loss of oil and aroma from the powder. In the entire process there is a loss of about 9% (by weight) due to burning out of oil. This process has a weight loss of only about 2%. Thus a direct saving of about 7% of material. Assuming a modest capacity of 300 kg per hour operating only for 12 hours (against an average of 24 hours), it amounts to 252 kg saved in a day. Taking the price of turmeric powder to be Rs. 150 per kg, this translates to savings of about Rs. 37, 800 a year. Also, as the temperature is low, the natural ingredients, oil and aroma of the powder is maintained. This fetches a premium of 5 to 10% in the market. Apart from this there is a definite saving of about 30% in power as pin mill consumes lesser power than hammer mill. This product can potentially pay back the investment in less than a year.

RECOGNITION/AWARDS

None

ISSUES

One of the challenges of this process is that any presence of foreign particle (for e.g. iron nails) in the turmeric finger will lead to severe damage in the system. To counter this, he advises to use a magnetic separator before feeding the raw material into the system. The other challenge is that of publicity. Despite having a good product, it has not attained popularity in the market as yet.

PRODUCT VIEW

THEME OF INNOVATION

Multipurpose Automatic Seed Drill

FOCUS AREA

Agriculture Equipment

DETAILS OF INNOVATOR

Name	Dharti Agro Engineering
Experience	15 years
Region of operation	Maharashtra, Gujarat, Madhya Pradesh, Andhra Pradesh, Tamil Nadu, Karnataka
Turnover	Rs. 6.3 crore
Volume	1500
No. of employees	165
Contact details	Survey No. 35, Plot No. 6, Nr. Saurashtra Paper Board Mill, Behind Olympic Pipe Gondal Road, Shapar Rajkot - 360024, Gujarat, India Phone: 02827 252220

BUSINESS MODEL

The selling price of this automated seed drill is Rs. 42,000 and a total of 1500 seed drills were sold in last year 2010–2011 generating a revenue of Rs. 6.3 crore. Now, they are planning to expand the business to capture new markets in Bihar and UP. The market strategies include advertising and publicity through Agri-exhibitions, local newspapers and awareness programs, supply through registered dealers to ensure the maintenance services in a timely manner.

INNOVATION DETAILS

A seed drill mechanizes the process of sowing seeds – it embeds the seeds into the ground and then covers it. Using this equipment, the seeding rate also remains constant throughout the farm which ensures the regular size of the plants and so maintains the regularity in harvesting. Dharti Agro specializes in the seed drill product line and has made modifications to conventional seed drills for added benefits. The modifications incorporated in new automatic seed drill include changing the iron sheet material (much susceptible to rust) to fibre, changing the machine design to make it more user friendly, easy to operate and more importantly, it is now suitable for multiple crops. The equipment is manufactured in the specifications of 5 to 21 rows but 9 row seed drill has the highest demand in the market compared to other variants. The product has successfully captured the market in Maharashtra, Gujarat, Madhya Pradesh, Andhra Pradesh, Tamil Nadu and Karnataka.

IMPACT OF INNOVATION/TECHNOLOGY

The automated multipurpose seeder has reduced the labour cost and increased the operational efficiency. It has been observed that on an average the supply of seeds reduced from 25 kg to 20 kg per acre using this equipment, thus reduced the farm input costs.

RECOGNITION/AWARDS

None

ISSUES

In order to enable the small farmers for purchasing this automatic seed drill, government must provide the subsidy. Few state governments like Karnataka and Andhra Pradesh are extending 50% subsidy on purchasing this product, however in states like Maharashtra where there is no subsidy, the farmers do not have the means and incentives to buy such an automated and effective product. On the other hand, sometimes business also gets affected adversely due to selling the product on subsidy, because Government always purchases the product on lower rates and then big farmers also approach to buy this product on subsidy.

PRODUCT VIEW

THEME OF INNOVATION

Sugar Cane Stubble Cutting Machine

FOCUS AREA

Agriculture Equipment

DETAILS OF INNOVATOR

Name	Satishbhai Raojibhai Patel
Experience	5 years
Region of operation	Gujarat
Turnover	5.5 lakh through rent
Volume	1 machine
No. of employees	3
Contact details	Nava Rajuvadia, Rajpipla, Gujarat, India Mobile: 09825930112

BUSINESS MODEL

The cost of this instrument is Rs. 50,000. He assembles it by purchasing its spare parts from market. After using this tool, there is no additional labour required for cultivation. There is no subsidy for this tool from the government. He invested his own money to purchase the parts for it. He provides free consultation to other farmers. He gives this machine on rental basis to the farmers, till now it had been used by 60–80 farmers in over 100 days.

INNOVATION DETAILS

In Sugarcane crop, ratoon is which grows from the stubble left behind after harvesting. This enables the farmers to get three or four crops from one plantation, without replanting it again. Satishbhai has designed a tool that can help in cutting of the sugarcane crop in such a way that sugarcane can grow again in the same way as it was planted first time, without needing to put additional support for new crop. Previously by not cutting the crop properly, the ratoon quality of crop was not as good as first time crop plantation. However, after cutting sugarcane plant by this equipment, the growth of second crop was recorded same as the first crop. It cuts the sugarcane stem from the level of ground that helps in the development of healthy plant for next cultivation. The quality of second crop has especially improved significantly. The main benefit of ratooning is that the crop matures earlier in the season. Ratooning can also decrease the cost of preparing the field and planting the crop again. Ratooning gives a steady yield for three years.

IMPACT OF INNOVATION/TECHNOLOGY

The main drawback of ratooning is the labour requirement. This equipment has effectively reduced the requirement of labour. Also, it has encouraged more farmers to adopt ratooning technique due to this advantage.

RECOGNITION/AWARDS

None

ISSUES

Unavailability of skilled labour for manufacturing this equipment.

PRODUCT VIEW

THEME OF INNOVATION

Subsoiler for Deep Ploughing

FOCUS AREA

Agriculture Equipment

DETAILS OF INNOVATOR

Name	Bharatbhai Zaverbhai Patel
Experience	5 years
Region of operation	Gujarat
Turnover	5 lakh through rent
Volume	1 machine
No. of employees	3
Contact details	At Post Dhoran pardi, Taluka Kamrej, District Surat, Gujarat Mobile: 09824384304

BUSINESS MODEL

The cost of manufacture of this instrument is Rs. 25,000 per piece. Mr. Bharat Bhai does not manufacture it for commercial purpose. There is no government subsidy for it. He provides free consultation to other farmers about its assemble and usage. He provides this machine to farmers on rent and this machine had been used by 25–30 farmers in over 100 days.

INNOVATION DETAILS

After experience of many years, Bharat Bhai had designed the new kind of ploughing agricultural instrument. It helped in deep ploughing of the field. Bharat Bhai Patel manufactured this instrument locally. He designed it in such a way that it is easy to use with tractors and easy to assemble at any automobile shop. It ploughs very deep and helps the deep soil to come on top. Due to this there is increase in soil fertility. It has been shown to significantly improve the growth of plant.

IMPACT OF INNOVATION/TECHNOLOGY

This innovation of this new equipment has helped to reduce the erosion of soil. After ploughing by this the water goes deep inside soil, which helps recharge of water in the soil and thus there is a decrease in water requirement for the future crops. There is overall improvement in soil fertility and thereby an increase in yield of crop.

RECOGNITION/AWARDS

None

ISSUES

Financial constraints for the expansion of project.

PRODUCT VIEW

THEME OF INNOVATION

Improvements in the Implements of Seed Drill and Plough

FOCUS AREA

Agriculture Equipment

DETAILS OF INNOVATOR

Name	Mr. Abhaya Malaiya
Experience	20 years
Region of operation	Madhya Pradesh
Turnover	Rs. 3 crore
Volume	4000 per year
No. of employees	55
Contact details	Malaiya Agro Engineering, 14/A, Sector D-1, Sanwer Road Industrial Area, Indore, Madhya Pradesh, Mobile: 09893124686

BUSINESS MODEL

Malaiya agro engineering as a manufacturing unit also acts as a retail unit for their products. Demand for their products comes from mainly Andhra Pradesh, Karnataka and Maharashtra. They have two more retail units in Madhya Pradesh.

INNOVATION DETAILS

Fluted roller type seed drill was introduced in India in 1960 having all components made up of cast iron. As the usage of fertilizers increased, people started using seeds drills for broadcasting fertilizers in the crop as it leads to minimal amount of wastage. Increasing use of fertilizers led to rusting of the rollers in the seed drill making the machine not useful until the component was replaced. In 1988 Mr. Abhaya Malaiya came up with nylon rollers to be used in the seed drills, thereby solving the problem of rusting in the machines and making them useful even in monsoons. Due to the seed size of Kabuli channa, sowing required bigger slits and more power which was not possible in nylon. As a result, the innovator chose stainless steel which was also resistant to rusting. Cost savings were up to 20% by using this product as this product has a long life.

IMPACT OF INNOVATION/TECHNOLOGY

Due to the change of the material the overall product life was increased and it also became resistant to wear and tear.

RECOGNITION/AWARDS

None

ISSUES

The awareness of these modifications is low among the farmers - so they still use cast iron implements.

PRODUCT VIEW

THEME OF INNOVATION

Wire Spindle for Creeper Variety Plants

FOCUS AREA

Agriculture Equipment

DETAILS OF INNOVATOR

Name	Mr. Kallo Ghorse
Experience	14 years
Region of operation	Nearby villages
Turnover	Not applicable
Volume	Not applicable
No. of employees	Not applicable
Contact details	Village Milanpur, Post: Betul Bazar, District Betul, Madhya Pradesh Mobile: 08889705796

BUSINESS MODEL

He uses this equipment only on his farms and has not commercialized it. However, for other farmers interested in starting plantation of creeper variety vegetables or in the use of this equipment, he offers free consultation with the travel cost being borne by the farmers if travel is required.

INNOVATION DETAILS

It is basically a wire winding spindle completely operated manually. It consist of table on which roller is kept and a handle is attached to roller for rotation. All the parts are welded and made from MS angles and rods.

Different creeper variety plants like tomato, bitter gourd, bottle gourd etc. require support to grow. So usually an MS wire is fixed at either ends of a plantation line and the creeper plants are placed along this wire as support. However if the area is big, it is difficult to handle these wires. For such cases, the innovator came up with this simple innovation. The spindle equipment is attached to ground at one end of the plantation line and the wire is rolled out till the other end for tying up at a fixed support. The spindle can be locked to provide an optimum tension in the wire – this is especially useful for tensioning required from time to time when the wire begins to sag. When the plantation is over, the wire can be neatly rolled back and kept for next season. Overall, the equipment makes it very easy to manage the wire on the field and off the field.

IMPACT OF INNOVATION/TECHNOLOGY

Wire service life is increased and the practice of installing the wire and maintaining it on the field has resulted in about half the effort being required compared to earlier. On such equipment is said to last for about 10–15 years.

RECOGNITION/AWARDS

None

ISSUES

He is interested in commercializing this simple innovation but is not clear on how to market it.

PRODUCT VIEW

THEME OF INNOVATION

Engine Operated Sprayer

FOCUS AREA

Agriculture Equipment

DETAILS OF INNOVATOR

Name	Shri Mohan Singh
Experience	12 years
Region of operation	Punjab
Turnover	3 lakh per annum
Volume	Not applicable
No. of employees	1
Contact details	VPO Sadhra, District S.B.S. Nagar Nawanshahar, Punjab Mobile: 09463692244

BUSINESS MODEL

The manufacturing cost of this machine is approx. 45,000 per machine. The innovator has created only one such machine for his personal use. He has 13 acres of land in which he grows Kinu and deploys this machine.

INNOVATION DETAILS

It was conceptualized that if a long pipe is attached to pump it can be made versatile and can be run by small diesel engine making the tractor free for other farm operations. A 750 litre plastic tank was fixed on the frame having tyres attached on both the sides and hook for towing with the tractor. An ASPEE-HTP triplex plunger pump was used and was operated with 5.6 hp 3600 rpm Greaves diesel engine.

IMPACT OF INNOVATION/TECHNOLOGY

The sprayer has an auto tank filling option and manual winding reel for managing the spray pipe, which helps in increasing the overall efficiency of the machine. There is no wastage caused while spraying pesticide and insecticide by this machine. This machine helps in saving labour as well as time. Initially the farmer had 4 workers in his farm and now he only requires 1 which leads to cost savings. By making more such machines he can help farmers in reducing the labour cost and increasing the production.

RECOGNITION/AWARDS

None

ISSUES

The innovator seeks financial assistance for making more machines.

PRODUCT VIEW

THEME OF INNOVATION

Mushroom Compost Turning Machine

FOCUS AREA

Agriculture Equipment

DETAILS OF INNOVATOR

Name	Shri Jitender Malik
Experience	14 years
Region of operation	Haryana
Turnover	10–15 lakh per annum
Volume	Not applicable
No. of employees	4
Contact details	Village Seenkh, District Panipat, Haryana Mobile: 09813718528

BUSINESS MODEL

The innovator has manufactured only one machine which costs around Rs. 25 lakh. He grows mushroom in about 2.5 acres of land and has an additional income comes from cultivation of wheat. He uses this machine on his field.

INNOVATION DETAILS

Good quality compost is critical for a good harvest. The Mushroom Compost Turning Machine helps in breaking all the clots in compost. It throws inner layer outside and outer layer inside, and hence facilitates the escape of Ammonia. It also facilitates the expansion of the unit/trays leading to large scale mushroom production possible.

IMPACT OF INNOVATION/TECHNOLOGY

This machine turns 100q of compost material in 20 minutes substituting 50 labours per day, saving a lot of time and cost. Spray nozzles are used to evenly sprinkle water over the compost. High yield, better quality of mushroom can be achieved with a good quality of compost, reducing the chances of failure. The machine can be handled easily. The farmer has earned a profit of approx. Rs. 10 lakh.

RECOGNITION/AWARDS

None

ISSUES

The innovator is tied down due to both time and financial constraints. His is unable to market the machine and hence requires financial and manpower support.

PRODUCT VIEW

THEME OF INNOVATION

Modified Maize Shellar

FOCUS AREA

Agriculture Equipment

DETAILS OF INNOVATOR

Name	Shri Surjit Singh
Experience	20 years
Region of operation	Punjab
Turnover	Not disclosed
Volume	Not applicable
No. of employees	30–40
Contact details	Village Chagran, Tehsil & District Hoshiarpur, Punjab Mobile: 09815082477

BUSINESS MODEL

This machine costs around Rs. 400 and the innovator has not yet marketed his machine. He provides free consultation to farmers also he has formed many helping groups in the village for the farmers. He makes his income majorly through Maize crop along with other crops.

INNOVATION DETAILS

The farmer has modified the maize sheller by mounting it on a small stand, which has increased Its efficiency by 20%. The device is simple and handy and can remove maize grains from the maize cob easily and effectively. This tool is made of iron and other locally available accessories.

IMPACT OF INNOVATION/TECHNOLOGY

The modified maize sheller is economical, handy and efficient in working. Only a single person can operate this sheller. As maize is the major crop of the area, it is mechanized for shelling but this tool is gaining popularity amongst the marginal farmers and farm labourers who take their wage in the form of maize crop. It is a highly beneficial innovation for small farmers with marginal land holdings or the farmers who will be using maize for seed purpose.

RECOGNITION/AWARDS

- Rashtrapati Award
- Farmer Scientist Award

ISSUES

No issues

PRODUCT VIEW

THEME OF INNOVATION

Vermi Compost and Worm Separator

FOCUS AREA

Agriculture Equipment

DETAILS OF INNOVATOR

Name	Shri Amrik Singh
Experience	22 years
Region of operation	Punjab
Turnover	Not disclosed
Volume	15–20 per annum
No. of employees	30–40
Contact details	Village Chagran, Tehsil & District Hoshiarpur, Punjab Mobile: 09815082477

BUSINESS MODEL

Each machine costs about Rs. 14,000 with the motor. The innovator also provides free consultation to the farmers. He is selling the machine for last 3 years and has an additional income through farming and dairy products. He also has biogas plant in his farm.

INNOVATION DETAILS

The small machine developed by the farmer can separate vermi-compost from worms easily. The machine has meshes of different sizes and two separate outlets for vermi-compost and worms. Machine is simple in design, low cost as well as labour and time saving. It's made of iron, pulleys, small motor and other locally available material.

IMPACT OF INNOVATION/TECHNOLOGY

Effective and easy separation of vermi-compost from worms can be achieved by this machine. As this saves time and labour, it can help in promoting vermi-culture in the farming community. This concept is new and with its popularization, there is scope of its adoption by other farmers.

RECOGNITION/AWARDS

- State award in vermi-composting

ISSUES

No issues

PRODUCT VIEW

THEME OF INNOVATION

Modified Pulverizing Roller for Paddy

FOCUS AREA

Agriculture Equipment

DETAILS OF INNOVATOR

Name	Shri Avtar Singh
Experience	18 years
Region of operation	Punjab
Turnover	3 lakh per annum
Volume	15–20 machines per annum
No. of employees	3
Contact details	VPO Kangrod, District S.B.S. Nagar, Nawanshahar, Punjab Mobile: 09463180285

BUSINESS MODEL

This machine is used in the paddy season. Each machine costs about Rs.16,500 and till now the innovator has sold up to 300 machines. He earns a profit of Rs. 4000 on every machine he sells. His additional income comes from cultivation of wheat.

INNOVATION DETAILS

While observing pulverizing roller attachment to cultivator attached to tractor having cage wheel fixed to tyres, it was conceptualized that big size pulverising roller could be attached directly to tractor for better puddling and ease of operation. Accordingly, mild steel angle-iron was welded in four different sections on circular mild steel rectangular section with 50 mm mild steel axial shaft. Wooden bearings were used and mild steel frame was made for tractor hitching.

IMPACT OF INNOVATION/TECHNOLOGY

To reduce the time for cultivation operation and planking the machine has been modified with larger diameter roller. The lesser depth of penetration and increased area for churning of puddle has made the operation of machine more convenient. It comparatively takes lesser time and consumes fewer diesel in puddling operation.

RECOGNITION/AWARDS

None

ISSUES

The innovator is facing problems with lack of availability of skilled labour in the village.

PRODUCT VIEW

THEME OF INNOVATION

Sugarcane Bud Chipper

FOCUS AREA

Agriculture Equipment

DETAILS OF INNOVATOR

Name	Shri Roshanlal Vishwakarma
Experience	30 years
Region of operation	Madhya Pradesh
Turnover	4 lakh per annum
Volume	700 machines per annum
No. of employees	
Contact details	Village Mekh, Block Gotegaon, District Narsinghpur Madhya Pradesh Mobile: 09300724167

BUSINESS MODEL

The innovator developed this machine in 2005 and its starting cost was Rs. 250, the current price is about Rs. 1200. Shri Roshanlal depends fully on one to one publicity and Krishi vigyaan Kendra for marketing of his product. The innovator also does farming of sugarcane, wheat and various other crops.

INNOVATION DETAILS

Mr. Roshanlal has developed sugarcane bud chipper having a half moon shape and a sharp knife fitted which is fitted in iron handle with spring system. This machine is manually operated and very easy to use. By pressing the handle it separates sugarcane bud by chipper. This machine is also adjustable as per width of the sugarcane.

IMPACT OF INNOVATION/TECHNOLOGY

Sugarcane bud chipper is portable and simple to operate. The bud chipper can be used to separate 300–500 buds every hour. It requires 90% less seeds, 13 q of buds for sowing instead of 125 q as in traditional practice of sowing sugarcane. Raw material of seed after separating the buds can be utilized for making jaggery and sugar. Germination of sugarcane bud is 40 per cent higher as compared to traditional system of planting (30%).

RECOGNITION/AWARDS

None

ISSUES

The innovator is seeking financial help as to meet the demands of the machines.

PRODUCT VIEW

IRRIGATION

THEME OF INNOVATION

Wane Model for Efficient Water Management

FOCUS AREA

Irrigation

DETAILS OF INNOVATOR

Name	Dr. Dattatray Wane
Experience	35 years
Region of operation	Maharashtra
Turnover	Rs. 75,000–1 lakh
Volume	Not disclosed
No. of employees	1
Contact details	At Post Manori, Taluka Rahuri, District Ahmednagar Maharashtra Mobile: 09822274226, Email: dr.dattatrayvane@yahoo.in

BUSINESS MODEL

With the help of agricultural department, he gives lectures in different districts of Maharashtra. In the agricultural news daily AGRO1, his success story was published in 2007. Now he has started infrastructure consulting for which he charges for travel and a consulting fee Rs. 500–1000 per acre of farm.

INNOVATION DETAILS

Mr. Dattatray Wane adopted the drip and sprinkler irrigation technique as per the case in crops like onion, wheat, chickpea, sugarcane, thereby increasing the water use efficiency. He developed the Wane model for efficient water management and also developed a precision farming technique, and conducted farm trials & field experiments on his farm. He improved scientific methods of crop selection, rotation, planting etc. He also practiced scientific storage techniques and delivers lectures on water management – along with organizing field visits of farmers on his farm and guiding them. This has improved the Benefit: Cost ratio significantly for the farmers.

IMPACT OF INNOVATION/TECHNOLOGY

Due to continuous supply of water in soil, the yield of wheat is increased from 1.5 tons per acre to 2 tons per acre. Labour requirement is reduced to one sixth and it also increases the quality of soil. In case of wheat 30% of water is saved whereas 40% of water is saved in case of onions. It is very easy to install. Use of precision farming techniques has reduced drudgery.

RECOGNITION/AWARDS

- Director, Babu Rao Tanopwar Sugar Factory
- Village Sarpanch
- Member, Milk Co-operative Society and Water Management Society
- Sahyadri Krishi Sanman Award, 2008 by Mumbai Doordarshan
- Zee Samman (Krishi) Award, 2008 by Zee 24 Tas, Mumbai

ISSUES

Lack of skilled manpower is a constraint.

PRODUCT VIEW

THEME OF INNOVATION

Refined Drip Irrigation System

FOCUS AREA

Irrigation

DETAILS OF INNOVATOR

Name	Shri Vishwanath Tatyasaheb Patil
Experience	23 years
Region of operation	Maharashtra
Turnover	Approx Rs. 15 lakh
Volume	Banana-30 tons, Sugarcane - 400 tons
No. of employees	12
Contact details	At Post Ambap, Taluka Hatkanangale, District Kolhapur, Maharashtra Mobile: 09823183833

BUSINESS MODEL

The innovator provides free consultation to the farmers. He formed an agricultural scientist's forum in the village. He also formed Tatyasaheb Kore Krishi Vigyaan Shetkari Mandal in collabouration with NABARD and an Agricultural University. He provides 5 days training to the farmers every month and conducts farm visits for 100 farmers per month.

INNOVATION DETAILS

Shri Vishwanath Tatyasaheb Patil modified the existing drip irrigation system according to the needs of different crops. The spacing between drip lines and that between two drippers, the type of drippers, the diameter of the drip line and the rate of discharge of water were customized to suit different crops. It increased the yield and health of the soil. These modifications were made without disturbing the assembly and the required water pressure. It is best suited to crops like sugarcane, banana, soybean, groundnut, Bengal gram and vegetables where fertigation is relatively easier. The drip system is economically viable with cost of Rs. 62,000/hectare having a life of 10 years. Shri Vishwanath saw his net profit increase by Rs. 55,000/hectare.

IMPACT OF INNOVATION/TECHNOLOGY

This practice saves labour, is user friendly and easily adaptable. It utilizes water resources in a very efficient way and enhances production. It increases the area of application by 20 tons per acre in terms of sugarcane and 5 tons per acre in terms of banana. The success that he has achieved by the use of this system has prompted many farmers to come to him for advice and implement the same technology in their fields too.

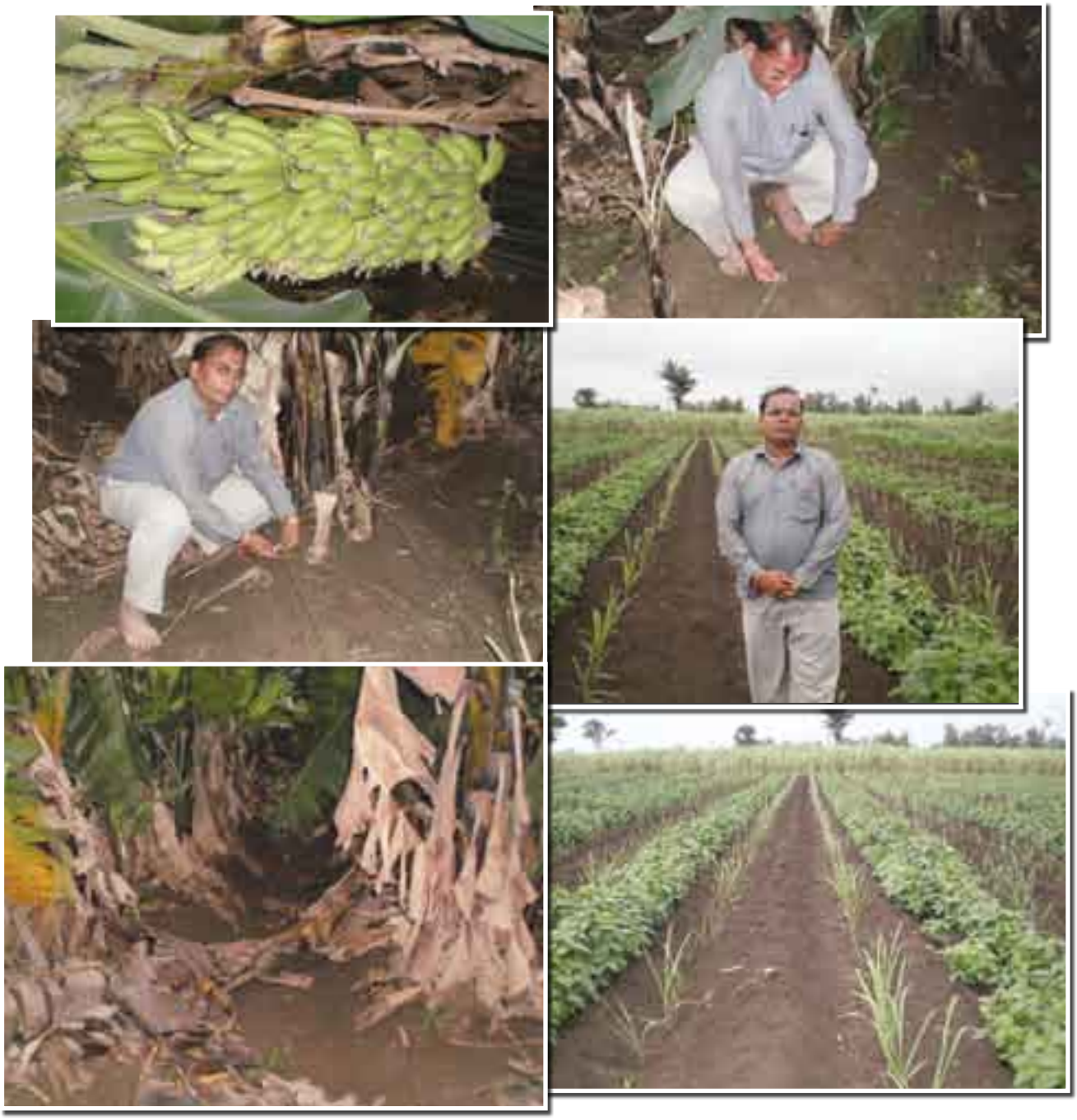
RECOGNITION/AWARDS

- Recipient of State level 'Oosbhushan' award for highest sugarcane yield in the state
- Vasantrao Naik Krishi Puraskar award
- Chhattrapati Shahu award for agriculture development
- President, Farmer Scientist Forum, KVK, Kolhapur
- President, Krishi Vigyan Mandal, Ambap
- Ex-member of extension advisory committee of MPKV, Rahuri

ISSUES

According to the innovator, the farmers are very reluctant to adopt such unconventional methods of farming and it is difficult to change their method of thinking.

PRODUCT VIEW



THEME OF INNOVATION

Alternate Spacing in Cotton for Cost Effective Drip Irrigation

FOCUS AREA

Irrigation

DETAILS OF INNOVATOR

Name	Shri Ghawate Arjun Sarjerao
Experience	43 years
Region of operation	Maharashtra
Turnover	Approx Rs. 13 lakh
Volume	Cotton on 16 acres
No. of employees	3
Contact details	Satana, District & Taluka Aurangabad, Maharashtra Mobile: 09422291285

BUSINESS MODEL

He provides free consultation to the farmers about this method. He has grown cotton 16 acres using this technique through which he has earned up to Rs. 13 lakh.

INNOVATION DETAILS

Shri Ghawate Arjun designed an innovative cotton plant spacing scheme in drip irrigation while keeping the plant population same as recommended. The recommended plant spacing for cotton is 90 x 60 cm, which requires 111 laterals per hectare. Instead, he practised a plant spacing of 180 x 30 cm which requires only 55 laterals per hectare.

IMPACT OF INNOVATION/TECHNOLOGY

This changed plant spacing i.e. 180 x 30 cm reduces the cost per lateral by about 50%. It also results in better aeration between two rows. As the spacing is wider, crops like green gram, black gram, soybean etc. can easily be intercropped with cotton. This gives additional income to the farmers, as well as improves soil fertility. This type of drip irrigation structure is also cost effective and gives a better crop yield (17 to 18% more) against the traditional practices. More than 400 farmers (corresponding to about 260 hectares) have successfully adopted this practice. It also reduced the labour requirements to one third.

RECOGNITION/AWARDS

None

ISSUES

Skilled labour is required for this practice which sometimes creates problems for the innovator.

Timely seed availability and fertilizer supply is also an issue for the innovator.

PRODUCT VIEW

THEME OF INNOVATION

Solar Powered Constant Move Central Pivot Irrigator

FOCUS AREA

Irrigation

DETAILS OF INNOVATOR

Name	Bright Star Electronics
Experience	35 years
Region of operation	Maharashtra
Turnover	Approx Rs. 50 lakh
Volume	Not disclosed
No. of employees	9
Contact details	Shri Padmakar Kelkar 43/2, Erandawana, Konark Udyog Premises, Off Karve Road, Pune - 411038 Phone: 020 25430768, Email: brightsrare@dataone.in

BUSINESS MODEL

Since 2004, he tried to market his product but was not successful due to high price of the machine. He also installed one of his machines in an Onion research centre. This machine is relatively big in size and costs about Rs. 15 lakh and irrigates up to 25 acres of land.

INNOVATION DETAILS

The machine has a centre pivot with number of spans or towers around it. There can be 3, 4, 5, 6 and up to 7 towers each of 90–130 feet long depending upon the size and shape of the farm. The water discharge can be modified by using different sprinkler combinations. Water is applied at this stationery pivot point. Coupler with rubber boot avoids leakage, while the whole water carrying structure is rotating. All towers have stable 'A' frame, 48 volts 100 Watt, geared DC Motor coupled to a heavy duty gear box, ultimately driving the wheels with tractor tyres. An extra 20 feet extended cantilever portion at the end towers covers extra area without adding any drive, frame and other components - making it cost effective.

The complete structure is installed at site with nuts and bolts. All the towers are coupled to each other with flexible leak proof coupler and can differ in all X, Y and Z planes by about 7.5 to 9 degrees misalignment without any structural instability. The controller stops the machine immediately if the misalignment goes beyond this point. Goose necks are provided at calculated predefined points, with heavy pendants that hold sprinklers. The length of the pendant can be adjusted to suit the crops, cropping patterns and crop conditions.

The distances and discharge through these sprinklers are decided such that there is even distribution of water throughout the covered area. The sprinklers require quite low water pressure, reducing the overhead on pump. A logic controller installed at the pivot point controls all the pivot operations. Generally the machine works on 60 volts DC nominal supply, but can operate safely between 52 to 70 volts.

IMPACT OF INNOVATION/TECHNOLOGY

Due to even distribution of water (80–100% above normal), yield is increased by 180–220%. By using this technology, pumping cost is reduced to a greater extent as well as 50% more water is saved. This method can

also be used for watering the plants during night times which again reduces the water requirements. Water can be applied either in large quantity with bigger intervals or in small quantity with small intervals suitable for particular crop depending on soil and atmospheric conditions. Water can be applied at any time of the year, even during the intermediate time after first shower during rainy seasons. All hilly, uneven portions of the field are also brought under cultivation which further increases the yield. This machine works on solar energy - thus no electric power is needed. Fertilizers and insecticides can also be applied in liquid form with water - it prevents degradation of soil. Life of one irrigator is more than 30 years. Variable speed drive makes it adaptable for convenient water management.

RECOGNITION/AWARDS

- Selection at Innovation 2008 by IIT Bombay Alumni Association, Pune
- Best Entrepreneur award at All India Unity Conference

ISSUES

- The main issue they are facing is the finance for the manufacturing of the machine
- Awareness about the benefits of the machine is also an issue for them
- Due to higher cost of the machine, small farmers cannot afford this without subsidy
- For past 2 years, he has not put efforts in marketing this.

PRODUCT VIEW

THEME OF INNOVATION

Irrigation through Innovative Wind Mill

FOCUS AREA

Irrigation

DETAILS OF INNOVATOR

Name	Mr. Kalu Bhai Gondliya
Experience	3 years
Region of operation	Nearby Villages
Turnover	Rs. 2,00,000
Volume	11 acres
No. of employees	1
Contact details	At Post Rajavadar, Taluka Mahuva, Bhavnagar, Gujarat, Mobile: 09979186981

BUSINESS MODEL

Mr. Kalu Bhai has been involved in irrigation of 5 acres land under agriculture and 6 acres land under horticulture for 3 years using the innovative wind mill for which he has got the subsidies of 50% from the Gujarat Energy Development Board. His annual turnover is Rs. 2 lakh from the agriculture only.

INNOVATION DETAILS

After realizing the problems like inadequate water supply, drastic fluctuation in ground water level and unavailability of electricity, Mr. Kalu Bhai was prompted to think of an innovative alternate solution to lift the water for irrigation and animals. Thus, he identified and decided to tap the wind power which was good enough in the region to solve this problem. He identified the demand and conceptualized the required wind mill pump and then contacted to government for receiving the fixed subsidy in order to install this eco-friendly renewable energy system for lifting the water for his farms which constitutes of 5 acres agricultural land and 6 acres horticultural land.

IMPACT OF INNOVATION/TECHNOLOGY

Due to adequate and timely water supply, an extra of 0.5 acre land is irrigated daily. The labour requirement is also reduced by 50%. The system is very easy to maintain. Since there is no electricity required to run the system, it is an eco-friendly method which provides 24 x 7 water supplies for irrigation. As a result, an increase of Rs. 4000 per year profit was also observed by the farmer.

Additionally, in order to increase the awareness of the village people in Soil, Energy and Environmental conservation, he has been conducting workshops in the village schools.

RECOGNITION/AWARDS

None

ISSUES

People often have disinclination to adopt this method due to the high cost involved in it. Moreover, it also requires skilled manpower to handle the project. But the spare parts are easily available.

PRODUCT VIEW

THEME OF INNOVATION

Cost Effective Drip Irrigation through Modified Spacing

FOCUS AREA

Irrigation

DETAILS OF INNOVATOR

Name	Mr. Naran Bhai Mori
Experience	3 years
Region of operation	Padarghada village (Borda, Kugbi)
Turnover	Rs. 25,20,000
Volume	70 acres land
No. of employees	45
Contact details	At Padarghada, Post Borda, Taluka Talauja Bhavnagar Gujarat, Mobile: 09426456588

BUSINESS MODEL

He has got a subsidy of 50% from the central government for the drip irrigation system. He manages 45 employees to operate the farms and to run this business, but has no partnerships. There is no marketing problem for the cotton produced from these farms because he also processes them in his cotton factory and also supplies to meet the local demand through his well established market linkages.

INNOVATION DETAILS

Currently, he owns 70 acres agricultural farmland and mainly grows cotton, groundnut and onion. Mr. Naran Bhai has been using drip irrigation in his farms for many years. But after he realized the low productivity and inefficient utilization of resources, he tried to modify the design on small scale to see the result of it. After a series of efforts, he altered the conventional spacing for his drip irrigation system which was earlier 4 x 1 ft to an optimum spacing of 6 x 2.5 ft. This was proved to be an effective method to lower the cost by reducing the seed requirement and other resources. The increased spacing ensured that the plants generated a greater number of flowers, thereby increasing the productivity. For example, the average productivity for the cotton has increased to 1300 kg per acre. On the other hand, the productivity normally achieved on these farms earlier was only 800 kg per acre.

IMPACT OF INNOVATION/TECHNOLOGY

After noticing the benefit out of this innovation, various large, medium and small land holding farmers are adopting this method. As a result of this innovation, the productivity has increased around 300 to 500 kg/acre while resulting in cost savings on inputs.

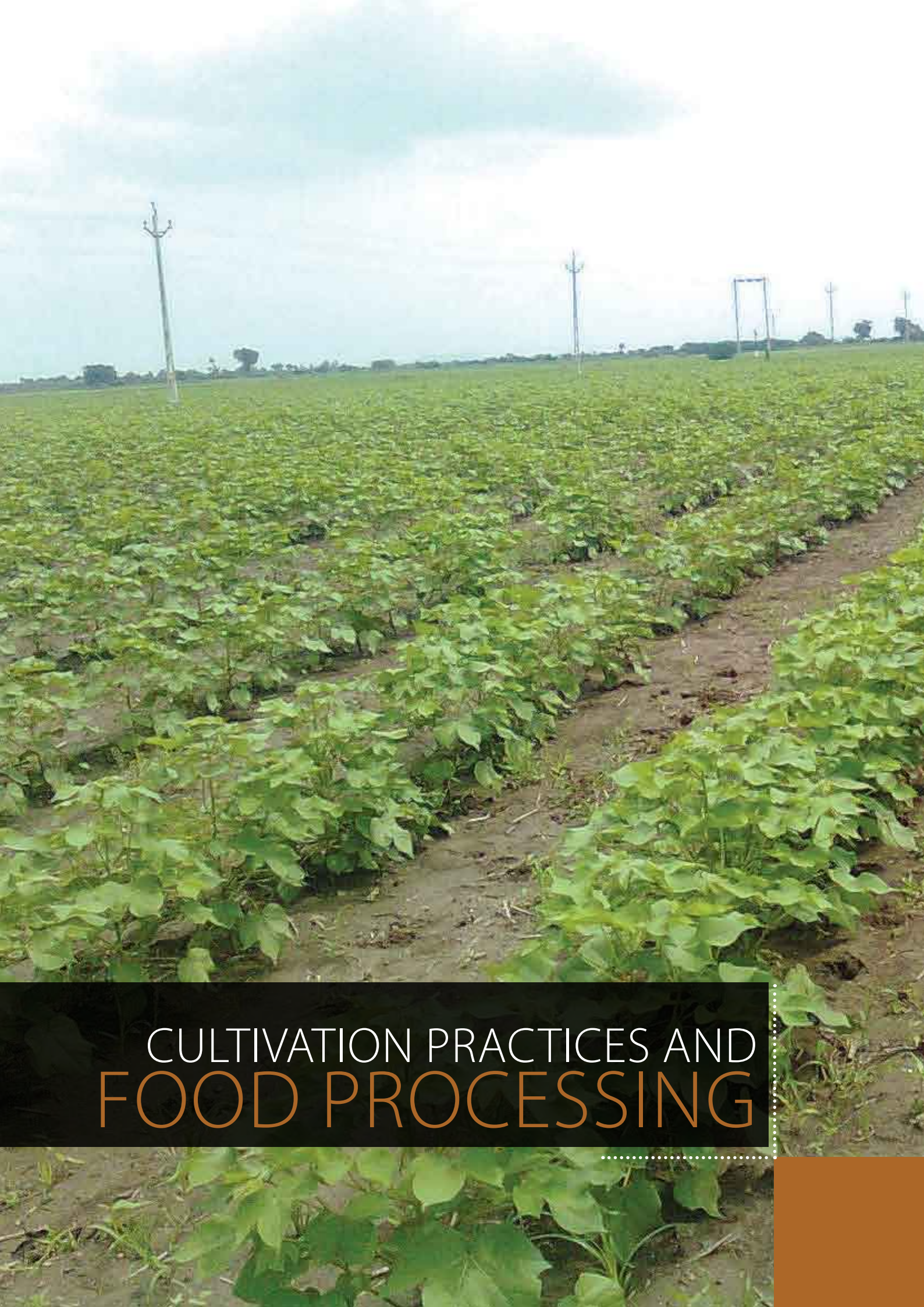
RECOGNITION/AWARDS

- Kruska Ruska Award by Talauja Taluka Agriculture Department
- Gujarat State Seed Corporation To – best Seed Grower

ISSUES

On the other hand, he is seeking for a loan of around Rs. 8 lakh for developing more land available in that region. There are also some other issues like labourers are not available at short notice and sometimes the crucial agri-inputs like Urea are not available in the region.

PRODUCT VIEW



CULTIVATION PRACTICES AND FOOD PROCESSING

THEME OF INNOVATION

Relay Cultivation and Organic Farming

FOCUS AREA

Cultivation Practices

DETAILS OF INNOVATOR

Name	Mahendra Bhai Goti
Experience	12 years
Region of operation	Bhavnagar
Turnover	Rs. 1.5 lakh per anum
Volume	3 tons per year
No. of employees	3
Contact details	Taluka Talaja, At Post Anida, District Bhavnagar, Mobile: 09879639737

BUSINESS MODEL

Provides free consultation. Sells the cotton at about Rs. 1200–1300 per Quintal at the local APMC market. Receives subsidy on Drip Irrigation through Govt. of Gujarat.

INNOVATION DETAILS

The farmer has developed a technique of relay farming. In this technique two or more crops of different durations are cultivated in the same field. When crop of shorter duration is harvested second vegetable gets better space to grow. When second vegetable enters fruiting phase, a third crop is planted. He has been cultivating cotton and some vegetable crops on his farm land. He also practices crop rotation which involves planting of different crops sequentially across seasons. The entire farming involves organic techniques (no chemical fertilizers) and inter-cropping (planting of a different crop in the space between planting lines of major crop) in order to have increased overall production at all times.

IMPACT OF INNOVATION/TECHNOLOGY

About Rs. 2500–3500 increase in profit per acre with 50% reduction in labor requirement. There has been an increase in productivity by about 2 Quintal per Acre with 2–3 hours being also saved on a day's effort. Drip irrigation results in water saving by 80% and the soil quality have also increased due to organic farming.

RECOGNITION/AWARDS

- Krushi Rushi Award (Junagarh University)

ISSUES

Public awareness about organic farming is a problem in this technique becoming popular. Also in need of loan for tractor purchase.

PRODUCT VIEW

THEME OF INNOVATION

Improving Pomegranate Production (Fertigation and Crop Protection Techniques)

FOCUS AREA

Cultivation Practices

DETAILS OF INNOVATOR

Name	Mr. Dilip Ahirekar
Experience	18 years
Region of operation	Maharashtra
Turnover	2.5 crore per annum
Volume	200 tons per annum
No. of employees	15–20
Contact details	Monika Gardens, B-3, Laxmi Nagar, Phaltan Mobile: 09822756192

BUSINESS MODEL

Mr Dilip Ahirekar has 35 acres of land in which he grows pomegranate and sugarcane. He earns maximum profits through production of pomegranate. He also gives free consultation to farmers on how to increase the productivity of the farm.

INNOVATION DETAILS

The farmer has developed a set of practices for pomegranate production including fertigation and crop protection. He has developed a mixture of fertilizer and certain techniques of application for it. Usually the pomegranate farmers gives 3–4 doses of fertilizers per year and in that only one dose is comprised of all essential nutrients. Instead of this, the farmer gives 5 doses every year. Each dose of this mixture comprises of NPK, Secondary nutrients, Micro nutrients mixed with neem powder.

IMPACT OF INNOVATION/TECHNOLOGY

Mr. Ahirekar has become the benchmark for highest productivity (10 tons per acre vs Indian average of 4.5 tons per acre) and quality (90% exportable A category) for pomegranate production. He has managed to get fruits which weigh over 1 kg per fruit and fetches 20% premium compared to any other farmer. His earnings are Rs. 7 lakh per Acre per Annum. All his fruits are picked up exporters from his farm where proper bidding takes place.

RECOGNITION/AWARDS

None

ISSUES

There is an issue with the availability of raw materials as well as labourers.

PRODUCT VIEW

THEME OF INNOVATION

Organic Farming in Drought Prone Areas

FOCUS AREA

Cultivation Practices

DETAILS OF INNOVATOR

Name	Patil Vishwasrao Anandrao
Experience	33 years
Region of operation	Maharashtra
Turnover	Rs. 8 lakh
Volume	Not disclosed
No. of employees	4
Contact details	Post Lohara, Taluka Pachora, District Jalgaon, Maharashtra Phones: 02596 272240, 0257 2233325, 09763475764 (Mobile)

BUSINESS MODEL

The farmer grows and sells his produce directly into an organic products shop in Jalgaon. He also sells the sugarcane in various districts of Maharashtra. He provides free consultation too to the farmers about this method.

INNOVATION DETAILS

The innovator is in organic farming and is practicing crop rotation, Inter/Mixed cropping patterns, Trap cropping for Insect and Disease management, Mulching, Integrated nutrient management, Green Manuring, and use of PSB, Rhizobium, Azotobactor etc. He has developed his own seed banks, evolved ITKs, and used Vermi Compost and earth worms. The innovator is also involved sheep and goat penning and recycling of agro bio mass through composting.

IMPACT OF INNOVATION/TECHNOLOGY

He has not only managed to maintain the crop yields, but also eventually increase it. This, after reducing the cost of production by about 40% (the cost of chemical fertilizers and pesticides was almost nil). Results of organic practices for Sugarcane and Mosambi were especially outstanding in terms of both - yield as well as quality. His harvest also attracted a higher market price. His farm has been recognised as an "organic farm" and has been certified by Eco-cert through Nisarg Sheti Mandal, Jamner. This mandal exports organic jaggery to Europe. He has also exported cotton to Japan.

A large number of farmers from Maharashtra and Madhya Pradesh and government officials visit this farm annually. This farm has proved that organic farming works for all crops and works better than conventional farming in drought prone areas. This method gives high profit where the investments are low. It reduces the irrigation time by 50% and helps to save water.

RECOGNITION/AWARDS

- Council Member of Bharat Krushak Samaj, New Delhi
- Member of Extension Council of Mahatma Phule Agricultural University, Rahuri (M.S.) from 2001 to 2005
- Krishi Bhushan Award & Gold Medal – 1997
- M.G. Ranga Award from ICAR 2006
- PadmaShri Dr. Appasaheb Pawar Agri Technology Award

ISSUES

The awareness of organic farming among farmers is not much. The innovator is also facing issues to get subsidy for drip water tank

PRODUCT VIEW

THEME OF INNOVATION

Productivity Enhancement in Cotton Cultivation using Farm Yard Manure and Space Optimization

FOCUS AREA

Cultivation Practices

DETAILS OF INNOVATOR

Name	Mr. Uka Bhai Zaver Bhai Jasani
Experience	7 years
Region of operation	Omer village, Sihor and Talauja region
Turnover	Rs. 2,10,000
Volume	4200 kg per year
No. of employees	4
Contact details	At Post Mota Surka, Taluka Sihar, District Bhavnagar, Gujarat Mobile: 09426925745

BUSINESS MODEL

A total of 4200 kg per year of cotton is produced by Mr. Uka Bhai and sold to the APMC market in Bhavnagar. He sells the cotton at a price of Rs. 5,000 per kg and makes a profit of nearly Rs. 20,000 per acre. He is ready to provide free consultation to others who are willing to adopt this practice.

INNOVATION DETAILS

A spacing of 4 x 1 ft is conventionally used by people. After several experiments on his own farmyard, Mr. Uka Bhai eventually came up with a perfect mix of Farm Yard Manure and chemical fertilizers and an optimized spacing of 5 x 1.5 ft in order to get higher productivity of cotton. Besides this, he used the hybrid variety F-1 for cotton production which further contributed to an increased productivity resulting in about 1400 kg per acre production.

IMPACT OF INNOVATION/TECHNOLOGY

By virtue of this innovation, an increase of 100 kg per acre in the cotton production has been observed. The soil quality is also improved by using the farm yard manure. In addition to this, a total of 30% reduction in labour requirement and 2 hours per day time saving is also being noticed - thus the system becomes easier to maintain. However, it does not change the water requirement because the flood irrigation method has to be followed.

Around 26 farmers have also adopted these practices after he achieved success. His credibility due to pesticide and seed distribution trade has also helped in people treating his advice on this innovation as credible.

RECOGNITION/AWARDS

None

ISSUES

Presently, many people are aware about this practice. There are no issues observed in the marketing, labour requirement, skills requirement and raw material availability which make this technique.

PRODUCT VIEW

THEME OF INNOVATION

Organic Farming through Dry Land Cultivation

FOCUS AREA

Cultivation Practices

DETAILS OF INNOVATOR

Name	Ramji Bhai Bechar Bhai
Experience	20 years
Region of operation	Village Pipal
Turnover	Rs. 3,50,000
Volume	7 tons per year
No. of employees	8
Contact details	Pipal At: Gadhda, Taluka Vallabhipur, District Bhavnagar Mobile: 09925263151

BUSINESS MODEL

Provides free consultation to other farmers. No external funding or partnership used till date.

INNOVATION DETAILS

The region is scarce in water supply, which was posing as major obstacle in agriculture. Hence this technique involves dry land farming along with organic farming to address this issue. In dry land farming sowing is done before monsoon season and then manures are added to retain water. Practices like Mulching are followed to reduce evaporation of water. Farm Yard Manure (FYM) is used for organic farming.

IMPACT OF INNOVATION/TECHNOLOGY

The productivity has risen by about 2 quintals per hectare along with about Rs. 5000 per acre increase in profit. The method has also ensured about 20% less labour requirement and significant saving on water usage. Approximately 3 hours per day of effort are saved using this technique. It has also increased the soil quality. Many local farmers from the village have adopted his techniques and this has resulted in large scale dry land farming in the region.

RECOGNITION/AWARDS

None

ISSUES

Almost same market rate for organic and inorganic product has been an issue because the productivity of organic technique is less. Also, people need to be made more aware of its benefits. Currently in need of about Rs. 3, 00,000 financial loans for total land development.

PRODUCT VIEW

THEME OF INNOVATION

Crop Diversification and Organic Techniques for Drought Prone Areas

FOCUS AREA

Cultivation Practices

DETAILS OF INNOVATOR

Name	Harjibhai Bhikhabhai
Experience	45 years
Region of operation	Gujarat
Turnover	Rs. 12 lakh
Volume	Cultivation 40 acres of land
No. of employees	20
Contact details	Post Malpara, Taluka Gadhada, District Bhavnagar, Gujarat, Mobile: 09327572297

BUSINESS MODEL

He provides free consultation to the farmers about his method.

INNOVATION DETAILS

Previously in this region, cotton was the main crop and it was dependent on pesticides and chemical fertilizers, resulting in higher cost of production. The region is also scarce in water. The chemicals began showing their effects in the long term, and the overall yield and health of the crops started to decline. The soil deteriorated in terms of fertility and other physical characteristics and became difficult for cultivation.

In order to solve this problem, Mr. Harji Bhai practiced Crop Rotation, and Inter/Mixed cropping patterns. He also developed his own Vermi-compost and earth worms. He also uses drip irrigation for effective irrigation. The quality of soil has improved significantly by crop rotation and diversification. Crop yields increase by 2 quintals per acre using crop rotation, thus increasing profit by Rs.17,500 per acre. This, after reducing cost of production by about 40% (the cost of chemical fertilizers and pesticides was almost nil).

IMPACT OF INNOVATION/TECHNOLOGY

Results of organic practices for oilseed and groundnut were especially outstanding in terms of both yield as well as quality. His harvest also attracted a higher market price. He was invited by various organizations to deliver lectures. His farm has proved that crop diversification works for all crops and works better than conventional farming in drought prone areas. This method gives high profit wherein the investments are low. It reduces the irrigation time by 60% and helps to save water.

RECOGNITION/AWARDS

- Sardar Bhallavbhai Krishi Sansthan Award
- Dharti Putra Award: Snatak Mitra Mandal Bhavnagar
- Innovative Farmer Award: State Co-operative Bank
- FCI Award- Vadodara by Montek Singh Ahluwalia
- Jhudna Fadna Fal prati puraskar from Lok Bharti Vidhyapeeth
- Krishi Pathdarshak Award by Bhulchand

ISSUES

Unavailability of skilled labour is a constraint. The market accessibility is said to be difficult. Also, the awareness among farmers is not much.

PRODUCT VIEW

THEME OF INNOVATION

Inter Cropping Onion with Cabbage

FOCUS AREA

Cultivation Practices

DETAILS OF INNOVATOR

Name	Mr. Davinder Singh
Experience	20 years
Region of operation	Punjab
Turnover	4 lakh per annum
Volume	Not disclosed
No. of employees	8
Contact details	V. P. O. Nakodar, District Jalandhar, Punjab Mobile: 09872440130

BUSINESS MODEL

Mr. Davinder Singh has got land holding of 0.72 hectares and along with cabbage and onion he also grows cauliflower, chilies, tomato, cucumber. The farmer earned a yield of 300 tons/hectare of cabbage. He provides consultation to other farmers about this technique without any charge.

INNOVATION DETAILS

The innovator developed a technology of intercropping cabbage with onion. In this practice, he transplanted cabbage in December and onion in the 2nd week of January. Seed rate for cabbage was 375 g/ha and for onion @ 2 kg/ha. The cabbage was transplanted on both sides of beds of size 2 feet. The onion was transplanted in between cabbage lines in lines 15 cm apart. He used only 30 kg/ha urea in two split doses of 15 kg each through the drip lines. He applied weedicides, and did only two manual weeding in the field.

IMPACT OF INNOVATION/TECHNOLOGY

Generally farmers grow cabbage and onion separately. With this technology there was no reduction in the yield of cabbage and in addition Mr. Davinder Singh obtained a yield of onion. By using this technique the farmer's income has got doubled and it also leads to one crop savings. This technique also results in seed and labour savings for the farmer.

RECOGNITION/AWARDS

- Surjeet Singh Dhillon Award from Punjab Agricultural University

ISSUES

The innovator is seeking financial aid.

PRODUCT VIEW

THEME OF INNOVATION

Permanent Raised Bed Techniques

FOCUS AREA

Cultivation Practices

DETAILS OF INNOVATOR

Name	Sanat Kumar Das
Experience	7 years
Region of operation	Maharashtra
Turnover	Rs. 5.5 lakh per year
Volume	Cultivation on 8 acres
No. of employees	8
Contact details	Govardhan Eco Village, Galtare, Hamrapur (PO), Wada (Taluka), Thane District-421303 Maharashtra, India, Mobile: 09930141781

BUSINESS MODEL

Funding for this project is received under tax benefit of 80G trust from promoters. Marketing of the products was done by displays about these products in public programs in Mumbai. He provides the free consultation to other farmers. These organic fruits, vegetables and medicinal rice are sold in Mumbai at 30–40 percent higher price in the market compared to other produce grown by using the chemical fertilizers and pesticides. Total annual profit ranges from Rs. 150 to Rs. 300 per sqm. depending upon the species under cultivation.

INNOVATION DETAILS

It requires lots of efforts to prepare the field for cultivation. It was costly and time consuming process. To save these efforts, Sanat Kumar Das introduced the concept of permanent raised beds. The preparation of land is an important task before crop cultivation. It requires human labour, tractor, energy and time. And this practice is repeated for every crop. So to save these efforts, he prepared these permanent beds by cow manure, leave compost and soil. These permanent beds are more fertile then the soil prepared by mechanical methods. Micro sprinkler are used to effectively use and save water. He has 20 indigenous cows for preparation of cow dung manure. Food for these cows is produced locally. Raw material is procured from farmers and NGOs. It is a one-time work to prepare the permanent beds and then it can be used for multiple times for cultivation. The cultivation of vegetable and medicinal varieties of rice is done on these permanent raised beds.

Permanent raised beds offer an effective alternative crop establishment method especially for rice-wheat cropping systems. Impacts of this are clearly visible in increase in soil quality and increase in profit by saving the input cost like labour charges, chemical fertilizers & pesticide cost and land preparation cost.

IMPACT OF INNOVATION/TECHNOLOGY

By permanent beds techniques, there is saving of efforts in land preparation. There is increase in yield by 50%. It has shown improvements in yield, water distribution and efficiency, efficient use of cow dung manure and reduced weed infestation.

RECOGNITION/AWARDS

None

ISSUES

Electricity is irregular.

PRODUCT VIEW








THEME OF INNOVATION

'Green Garden' - Total Project Development & Management for Cost Effective Organic Farming

FOCUS AREA

Cultivation Practices

DETAILS OF INNOVATOR

Name	Mr. Nitin Bhore
Experience	25 years
Region of operation	Pune
Turnover	Rs. 75 lakh
Volume	100 acres
No. of employees	15–20
Contact details	54, Shri Shivaji Housing Society, Senapati Bapat Marg, Pune - 411016 Email: bhorenitin@rediffmail.com, Mobiles: 09822604275, 09967042751

BUSINESS MODEL

As a consultant, he handles various private and government projects for cost-effective organic farming in India.

INNOVATION DETAILS

Mr. Bhore developed a capability to bring significant cost efficiency and develop market linkages for organic farming, and is now currently a consultant for organic farming. This cost efficiency is a critical advantage especially in the view of relatively low yields witnessed in organic farming techniques vis-à-vis chemical inputs based farming.

Before starting off as a consultant, he undertook organic farming himself for three years in an attempt to fine-tune the processes and costs, and marketing of the products. He cultivated select high yielding crop varieties under drip irrigation system on raised beds with mulch inter-crop on 100 acres of land in Pune district using the best organic farming practices. Across the three years, these included 20 Indian vegetables, 15 exotic vegetables, 25 fruits, 7 spices, 4 oilseed and some other crops. He generated revenue of Rs. 30 lakh for the first year. For the second year, he tried other crops and different techniques – generating revenue of Rs. 56 lakh. For the third year, the revenue grew further to Rs. 75 lakh. Mr. Bhore not only concentrated on the best organic farming practices but also established the market linkages simultaneously in order to meet the demand of organic commodities in the market. After this successful experience, he started his own business as a consultant. The important activities carried out in such projects include land development and plotting for better mobilization, mechanization of agriculture practices and inputs, scheduling of activities and sourcing from agencies for genuine organic products such as seeds, pesticides, fertilizers, micronutrients, bio-fertilizers, equipments and machinery. He has consulted various progressive farmers, farm house owners, NGOs and trusts for various aspects of organic farming. He has also worked in association with several units on planning, cultivation and procurement of the raw material in terms of annual supply, quantity, quality and right variety.

IMPACT OF INNOVATION/TECHNOLOGY

Mr. Bhore's suggested procedures can reduce the production cost by 30% and preserve the soil by reducing the soil erosion. Besides this, he has also been involved in rural community development. He has conducted various awareness programmes on 'multiple project opportunities' focusing on organic farming with an aim to improve the economic conditions of the farmers groups.

RECOGNITION/AWARDS

None

ISSUES

According to Mr. Bhore, it is essential to make people aware of the concepts of and benefits due to organic farming at the both forward and backward linkages. The consumers need to understand the produce from organic farming do not contain any preservatives or harmful chemical and thus, should give priority to buy them. Similarly, the farm producers need to adopt such practices which will not only tap the organic food market but also help them in preserving the soil quality and high productivity. Since organic farming benefits gradually, farmers need to be patient for the results to show those benefits. There is a big challenge to get genuine and certified organic farm inputs in the market, the lack of which sometimes lead to demoralization of the farmers.

PRODUCT VIEW

THEME OF INNOVATION

Rehabilitation of Wasteland by Organic Practices

FOCUS AREA

Cultivation Practices

DETAILS OF INNOVATOR

Name	Mr. Ashok Sanghavi, Mr. Bhaskar Save
Experience	40 years
Region of operation	Maharashtra, Gujarat
Turnover	Not disclosed
Volume	Not disclosed
No. of employees	Not disclosed
Contact details	Sanghavi Farms – Correspondence Office, 23A Central Chowpatty Bldg. Chowpatty, Mumbai, Phone: 022 23615184

BUSINESS MODEL

Farmer training is provided free of cost for visiting farmers. There is also a training centre that has been established in their farms at Valsad. Farmers are trained without any fee.

INNOVATION DETAILS

Mr. Bhaskar Save developed a set of organic farming techniques about 40 years ago in order to rehabilitate his farms that had turned into a wasteland owing to the extensive use of chemicals. Over a period of years, he fine tuned these techniques and witnessed a huge improvement in soil quality and productivity that was sustainable too. His techniques became famous among nearby farmers and many of them also started implementing the same in their own farms, especially those that had turned into wastelands. Mr. Ashok Sanghavi, a businessman, had come to know about his techniques and associated with him together in order to rehabilitate a wasteland he had purchased in Valsad (Gujarat). They used this land to conduct the techniques on a variety of crops.

The techniques basically consist of 6 main aspects:

Tillage by earthworms: Manual tilling is only conducted in the first year in order to clear the land from rocks and allow the roots to grow. After that, manual tilling is never used because it can damage existing roots – instead the soil conditions are kept optimum for earthworm population by keeping it moist and well supplied with organic matter.

Organic instead of chemicals: Only organic manure is used instead of chemicals. Most organic matter applied comes from internal sources: crop residues, leaves, weeds and especially biogas slurry – cow and poultry waste, municipal waste and even silt from ponds can also be used.

Direct nutrition for soil, not plants: Both organic manure and irrigation water are kept at a certain distance from the plants. Manure is not the food of the plants but of soil. These earthworms thrive in this soil environment and make the soil rich in humus, NPK, micronutrients and other vital substances. Humus enables the soil to absorb and retain moisture and prevents leaching of plant nutrients. Both moisture and plant nutrients are sucked by the roots and transported to the leaves. Trees are irrigated at a certain distance from their trunks. When plants are nourished this way, they develop strong roots.

No monocultures: Short life, medium life and long life plants with respectively short, medium and long root systems are planted together in such a way that following the development of the long life plants, the short life and medium life plants can be harvested. When starting a new orchard plot vegetables (short life plants), banana and papaya (medium life plants) and chikoo or coconut are planted together. After 3 months, vegetables are harvested, after two to three years banana is taken away and used as mulch, leaving full space to chikoo or coconut. Many other species of trees are interplanted in lesser numbers.

Natural pest control: Plants nourished this way are very healthy and develop strong resistance to diseases so that pesticides are generally not needed. Even then, some types of plants like sweet neem (curry leaves) help in controlling the pests. Other natural methods can be used, such as a mixture of one part of cow urine and eight parts of water to be sprayed on the plants. Also, dead weeds should not be removed as they protect the soil from strong radiation, prevents loss of moisture and provide additional manure.

Less labour: Due to less manual activities required and no requirement of chemicals application, the requirement of hard labour is greatly reduced under these techniques.

IMPACT OF INNOVATION/TECHNOLOGY

The impact of innovation has been significant – as is verified by the fact that they have set up a farmer training centre on their farms to demonstrate and educate the visiting farmers. The impact of these techniques on various crops have been substantial and widely covered by the media – for example, coconut plantations can give a production within 3 years instead of 7 years and similar effects have been observed in litchi.

RECOGNITION/AWARDS

- 1993: 'Person of the year Award' from 'Limca Book of Recorders' – Mumbai
- 2000: 'Jamnalal Bajaj Award' presented by the Hon. Shri Krishna Kant – Vice President of India for 'Organic Farming Science and Technology' and for 'Rural Development Work'
- 2008: 'State Krushi Award' from 'Krushi Vighnan Centre – Ahamadnagar'
- 2010: Received 'ONE WORLD Lifetime Achievement AWARD' from 'IFOAM – Germany'

ISSUES

The farmers have been forthcoming after witnessing the success that Mr. Save and Mr. Sanghavi have achieved for such a long time. However, they both feel that while there are numerous awards being given for their organic techniques initiative, there is no on-ground support from the government for encouraging organic farming. This is felt to be lacking and critical for popularizing these practices.

PRODUCT VIEW

THEME OF INNOVATION

Horticulture Farming on Hilly Terrain

FOCUS AREA

Cultivation Practices

DETAILS OF INNOVATOR

Name	Arun Gavit
Experience	14 years
Region of operation	Thane
Turnover	Not disclosed
Volume	7.75 acres
No. of employees	Not disclosed
Contact details	Vanvasi, AP Nahale Budruk, Taluka Jawahar, District Thane, Maharashtra Mobile: 09225862368

BUSINESS MODEL

His primary source of income is from mango trees, pineapple, flowers, guava, cashew, banana, vegetables and rice. Last year total income from all these sources was Rs. 3.12 lakh. He has got 100% subsidy on diesel engine, electric motor and pipes. On drip irrigation equipment, he has received 50% subsidy.

INNOVATION DETAILS

On hilly areas soil cover is very thin. Earlier practice here has been to cultivate Varai (an indigenous fine-grained rice variety) and other rice crops. However due to slopes of the hilly terrain, the productivity was very less. In fact, the yield only sufficed for the farmer's family consumption. With this leading to poverty, many of them migrated to the cities leaving behind their farming tradition.

Mr. Gavit realized that dependence on the traditional crops of rice would not solve the problem. Consequently, he collected information about various crops that can be traditionally grown or adapted in hilly regions. Flowers and nurseries became one of the main sustainable crops while there was also seasonal income from the fruit trees. Various mango varieties like Kesar, Hapus, Rajapuri, Totapuri, Neelam, Payari Malgao were planted on the slopes. The seeds for these varieties were also being prepared in the nurseries. Similarly, he planted 150 plants of Vengurla, 4 varieties of cashew, 30 local varieties of Guava, 30 Jambul trees of Bardoli variety. Vegetables are planted in summer and winter while rice is grown in rainy season.

IMPACT OF INNOVATION/TECHNOLOGY

Seeing the success another 43 farmers also have adopted the farming practice thereby reducing migration considerably.

RECOGNITION/AWARDS

- Awarded by BAIF

ISSUES

Need good market for products. Traders taking produce directly from farms are giving a very low price for the produce. On the other hand, due to the still weak financial position of most of the farmers, they can't afford to put efforts in reaching out to distant markets.

PRODUCT VIEW

THEME OF INNOVATION

Use of Sprinkler as a Cooler for Litchi Orchards

FOCUS AREA

Cultivation Practices

DETAILS OF INNOVATOR

Name	Mr. Sudhanshu Kumar
Experience	23 years
Region of operation	Bihar
Turnover	45 lakh per annum
Volume	For litchi - 50 tons per annum
No. of employees	10
Contact details	Vill. & PO Nayanagar, District Samastipur, Bihar-848208 Phone: 06275 223183, 09934917017 (Mobile), Email: sudhanshu5506@gmail.com

BUSINESS MODEL

Mr. Sudhanshu Kumar has 200 acres of cultivable land in which he has mango orchards, litchi orchards. Also he does farming of wheat and various other crops.

INNOVATION DETAILS

The innovator has litchi orchards in around 15 acres of land with approximately 1100 litchi trees. Usually the innovator installed 4 drips under each tree but then he realized the need of a system to control the microclimate for the proper growth of litchi. Along with existing drip system he installed 1 sprinkler under each tree. The sprinklers were not stopped for continuous 3–4 days when the warm winds used to flow. This system acted as a giant cooler with 1100 hundred micro sprinklers in the orchard.

IMPACT OF INNOVATION/TECHNOLOGY

Due to warm climate in the Bihar region, the litchi used to crack resulting in lower production. This system has resulted in profit of Rs. 5 lakh from 15 acres of litchi orchard. It also reduced the flower drop at a very early stage which resulted in high quality litchi. The innovator is able to achieve export quality fruits. Many farmers in the region have already started adopting this technology for their litchi orchads.

RECOGNITION/AWARDS

- Awarded with Kisan Bhusan Award
- Gram Phuskar Award

ISSUES

The innovator is facing many administrative issues related to his land.

In future he is planning to open a pack house to give better quality of litchi to the exporters for which he requires financial help.

PRODUCT VIEW

THEME OF INNOVATION

Mango Orchard (Seedling and In-situ Grafted Plants)

FOCUS AREA

Cultivation Practices

DETAILS OF INNOVATOR

Name	Mr. Vasant Phutane
Experience	37 years
Region of operation	Maharastra
Turnover	2 lakh per annum
Volume	25 quintals – 50 quintals
No. of employees	
Contact details	Samvaad, Rawala, Post Satnoor, Taluka Vrud, District Amravaati

BUSINESS MODEL

Mr. Vasant Phutane and has almost 10 acres of land under fruit trees. Approximately 6 acre of land has mango cultivation. Every year they earn a profit of about 1.5 lakh. They sell their mangoes in the local markets and also depend on mouth publicity.

INNOVATION DETAILS

Due to orange cultivation in this area the water table has sunk to a very lower level and for the packing of oranges, trees have been cut massively for the requirement of wood which has lead to imbalance in the ecosystem. In this condition only one crop can maintain the ecosystem and that is mango. The innovator planted 50 different varieties of mango in this orchard when people believed only in planting alpansho. Some of these varieties was very good in taste, colour, and shape and gave him good returns while some other was not up to the mark. Mr. Vasant then grafted the varieties which were not so good to produce a new variety. Right now he has 250 trees of mango in which half are grafted and others are of known varieties like rajapuri, dusheri, ratna.

IMPACT OF INNOVATION/TECHNOLOGY

Planting mango trees creates a balance in the ecosystem and mango is eco-friendly fruit. It brings up biodiversity in the region. Mango is type of tree which is very sustainable in also gives return in the long run. Many people have started realising its importance and come to visit this orchard.

RECOGNITION/AWARDS

None

ISSUES

Being the only mango orchard in the region it has to deal with many problems like parrots, monkeys. The innovator is financially weak to expand his plantation.

PRODUCT VIEW

THEME OF INNOVATION

Multicrop Pattern

FOCUS AREA

Cultivation Practices

DETAILS OF INNOVATOR

Name	Mr. Anand Singh Thakur
Experience	12 years
Region of operation	Madhya Pradesh
Turnover	5–6 lakh
Volume	Not disclosed
No. of employees	1 Permanent, 5–10 on daily wages
Contact details	Village Umariya Khurd, Post Doodhia, Tehsil & District Indore, Madhya Pradesh Mobile: 09301301901

BUSINESS MODEL

All the essential vegetables, fruits and grains, oil seeds, sugarcane are grown on the land round the year. He does not depend on the market for purchasing food ingredients. He gets majorly all the crops from his farm to meet the demands of his family and remaining is sold in the market, with well designed market chain by his farmer group (Parampara Organic Group) under organic tag. He earns a profit of approximately 1–1.5 lakh per year.

INNOVATION DETAILS

On 7 ha land instead of taking monocrop pattern market driven crop system, he designed the crop pattern to first meet his all own demand. It is one of the best examples of farmers' self-reliance. He grows 10–15 different vegetables, sugarcane, oil seed, corn, Wheat, all the horticulture produce like custard apple, Banana, Mango, lemon, date, Amla etc., cereals, medicinal plants, firewood trees, flowers etc. He does the farming in organic way. Over the years of farming practice according to his observation, 2–3 crops may fail, but in totality it does not affect his earnings. All season fruits and vegetable benefit the harvesting round the year to fulfill daily demand.

IMPACT OF INNOVATION/TECHNOLOGY

Many farmers visit his farm to consult for his innovative farming practice and get inspired. Organic farming reduces the cost of cultivation by 40%.

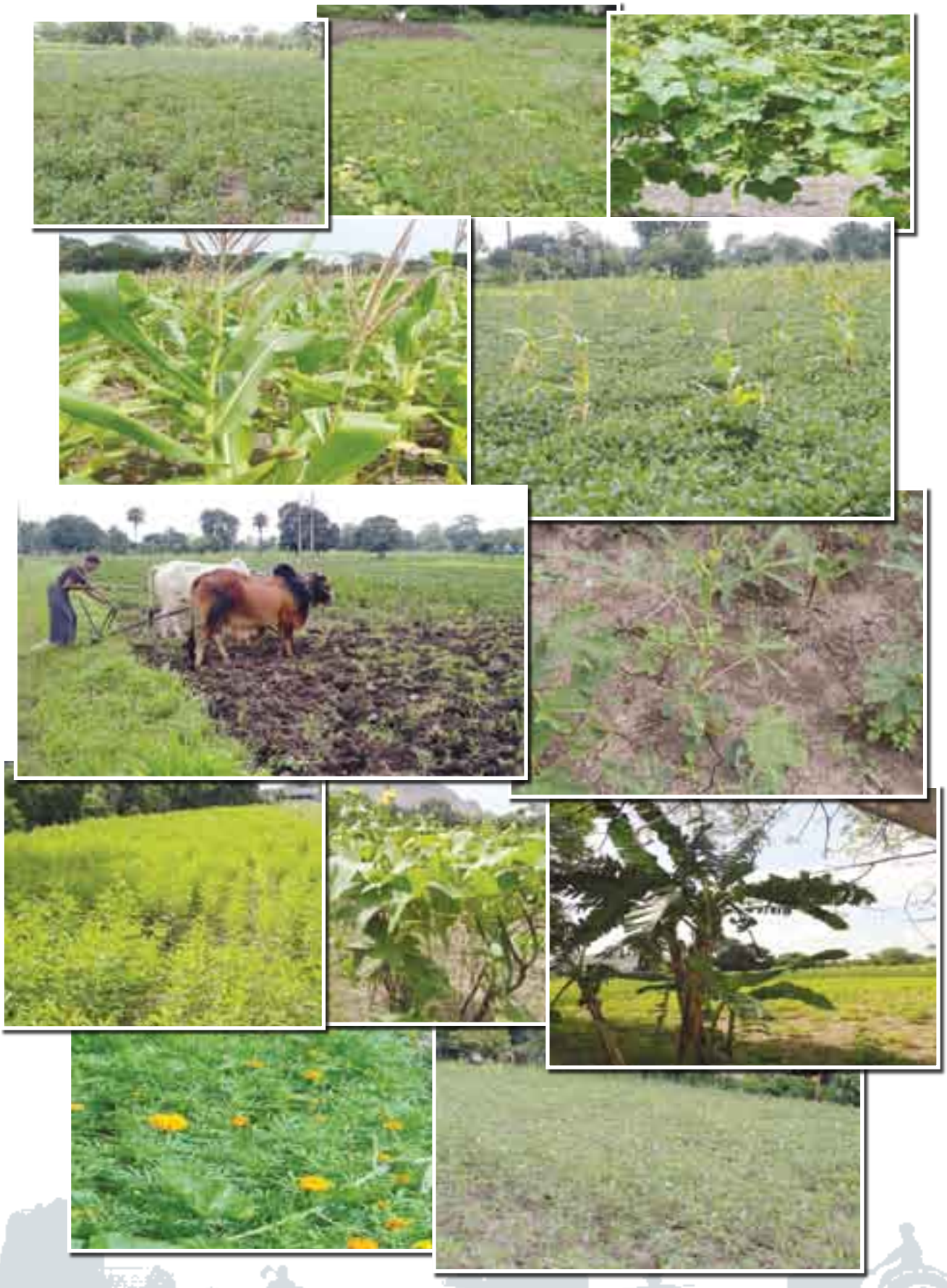
RECOGNITION/AWARDS

None

ISSUES

Electricity load shading. He is trying to send this message of farming to many farmers and want to know the different opportunity to show his creativity. Labour is also a major problem.

PRODUCT VIEW



THEME OF INNOVATION

Cold Water Rice Processing

FOCUS AREA

Crop Processing

DETAILS OF INNOVATOR

Name	V. P. Gangal
Experience	20 years
Region of operation	Raigad District
Turnover	
Volume	225 quintals per day
No. of employees	5
Contact details	At Post Janbhivali, Taluka Karjat, District Raigad Phone: 02148 226604

BUSINESS MODEL

Raw rice is engrossed from farmers at the cost of Rs. 900 per quintal and is processed inside the plant at a cost Rs. 125 per quintal. 300 quintal of rice is processed everyday and 20 to 30% weight reduction from raw rice is expected. Ratna is the major variety, which is being processed. The processed rice is sold at door step at the cost of Rs. 1600 per quintal.

INNOVATION DETAILS

Instead of boiling the raw rice with steam as general practice, in this procedure the rice is soaked in water in a vessel having capacity of 300 quintal per day for about 6 hour. After that the rice is kept on ground for next 6 hours to remove the excess water, and then is sent to the furness for roasting. The final moisture in the raw rice after roasting is examined by the experienced worker, and after ensuring the correct moisture and temperature rice is sent to the dehusking machine and further to 2 rice polishing mills. Most of the movement of raw rice is mechanized by conveyer belt. Final rice have 20% extra oil content and negligible broken grains of rice. Finally the polished rice is filled in 50 kg sacks and sold.

IMPACT OF INNOVATION/TECHNOLOGY

Mechanization of the process saves 50% of labour. Cold water soaking instead of steam causes 50% saving in electricity. 30 village farmers are being benefited by this process plant.

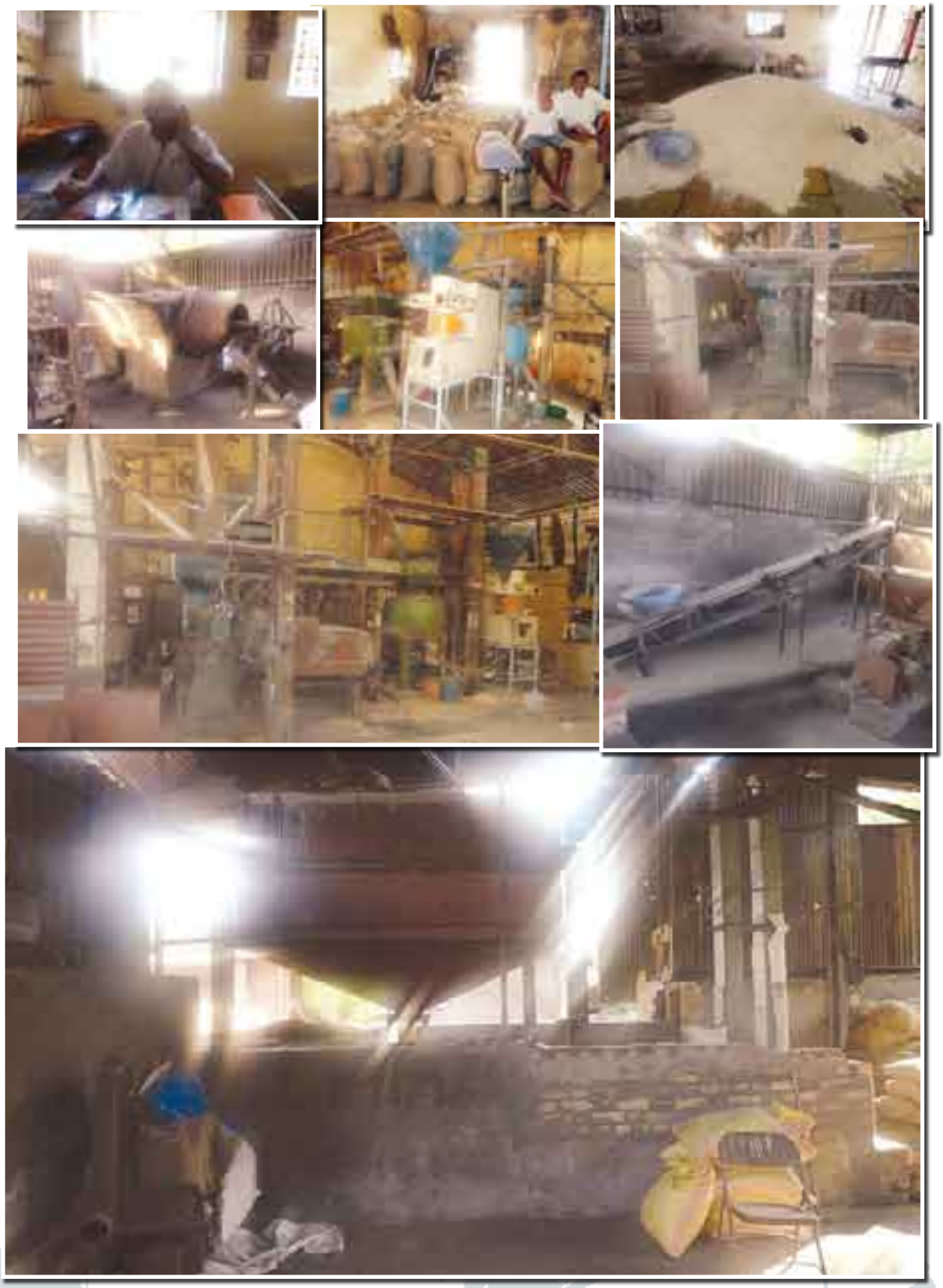
RECOGNITION/AWARDS

- Vasantrao Naik pratishthan award for the year 1995
- Star Maza TV interview

ISSUES

Electricity load shading is a major problem. Also labour working is not very much reliable because of frequent absentees. In such case replacement is very difficult.

PRODUCT VIEW



THEME OF INNOVATION

Small Farm Jaggery Gur Making Plant

FOCUS AREA

Food Processing

DETAILS OF INNOVATOR

Name	Shri Nagesh M. Swami
Experience	12 years
Region of operation	Maharashtra
Turnover	Rs. 1,10,500
Volume	700 kg Jaggery, 600 kg Kakavi
No. of employees	2 Male, 3 Female
Contact details	Shewade (Umbraj) Taluka Karad, District Solapur - 415109 Mobiles: 09822848432, 09423341861

BUSINESS MODEL

The innovator has a small Jaggery making plant for 1 acre of sugarcane farm. Jaggery is sold in market at the cost of Rs. 55 per kg. While Kakavi is sold at the cost of Rs. 120 per kg. The residue generated from this process is used as the green manure in the same farm as well used as fuel for process plant. Processing cost for plant per season is Rs. 30,000. The innovator markets his products through mouth publicity and every year 100% sale is achieved.

INNOVATION DETAILS

This small Jaggery making process plant is designed and run by Mr. Swami. The cost of setting up of the whole plant was Rs. 1, 22,000. The sugarcane used in the plant is grown by the innovator in his farm by organic farming therefore minimizing any input cost. The plant is designed in such a way that labour requirement is very less as the sugarcane crusher operates on power trailer. This small project does not have any government license. Orders are taken in advance for the next season. All the products are tested in laboratory for the content and quality. To increase the yield in his farm he uses row and column distance in sugarcane in farm so that more vegetables can be taken as intercrop. The yield from the farm is 30 tons per acre.

IMPACT OF INNOVATION/TECHNOLOGY

Organic sugarcane Jaggery and Kakavi have many health benefits as compared to market chemical processed jaggery. As no preservatives and stabilizers is used for this it saves lots of input cost. Many farmers visit this farm; Mr. Swami is consulting this design for many other farmers in the Maharashtra state. He is not taking any fees and doing this as social work. This is the best example of self reliance in the sugarcane farming.

RECOGNITION/AWARDS

None

ISSUES

Other farmers are very keen on getting profit; therefore they use excessive fertilizers and pesticides for making jaggery. He wants to appeal to the Government to make restriction on the use of pesticide and fertilizer and try this innovative farm project model which is environment and social friendly.

PRODUCT VIEW

THEME OF INNOVATION

Value Addition of Farm Produce

FOCUS AREA

Food Processing

DETAILS OF INNOVATOR

Name	Shri Nagesh M. Swami
Experience	12 years
Region of operation	Maharashtra
Turnover	Rs. 1,10,500
Volume	Chana Dal - 550 kg per year
No. of employees	5–10 temporary women
Contact details	Shewade (Umbraj) Taluka Karad, District Solapur - 415109 Mobiles: 09822848432, 09423341861

BUSINESS MODEL

Homemade dal has decent demand from the traditional cultured customers. These customers pay more money and purchase it in bulk. He sells dal at the cost of Rs. 50 to 55 per kg. Other organic products such as dried vegetables also have good demand. He sells his products from his home. His approach is not to go for complete profit oriented business rather he wants only the enough amount of money to maintain his family. He also provides consulting on this technique to many other farmers without any cost.

INNOVATION DETAILS

Mr. Nagesh Swami has only 3 acres of land. His family is dependent on this farm produce. So for increasing the income he started organic farm produce value addition work. Chana dal is major product that he produces from chickpea. It is made by processing on hand driven rollers. He designed these rollers by redesigning its input space, in such a way that rollers will produce the chana dal smoothly. Excess vegetables are dried in shed and are packed to sell in market. He produces all the farm input organically so that he minimized most of the cost on external input like chemical fertilizer and pesticide. His wife is also helping him to carry all the operations. They have kept all records of customer orders. It gives them idea for next season to grow more or less.

IMPACT OF INNOVATION/TECHNOLOGY

As the rollers are hand driven he saves the electricity for driving rollers as well as for dryers. He made a available job opportunity for female workers in that area to work on hand driven rollers. Many farmers visited this project and got inspired. This is best example of self reliance of small farmer. So saving the costly electricity.

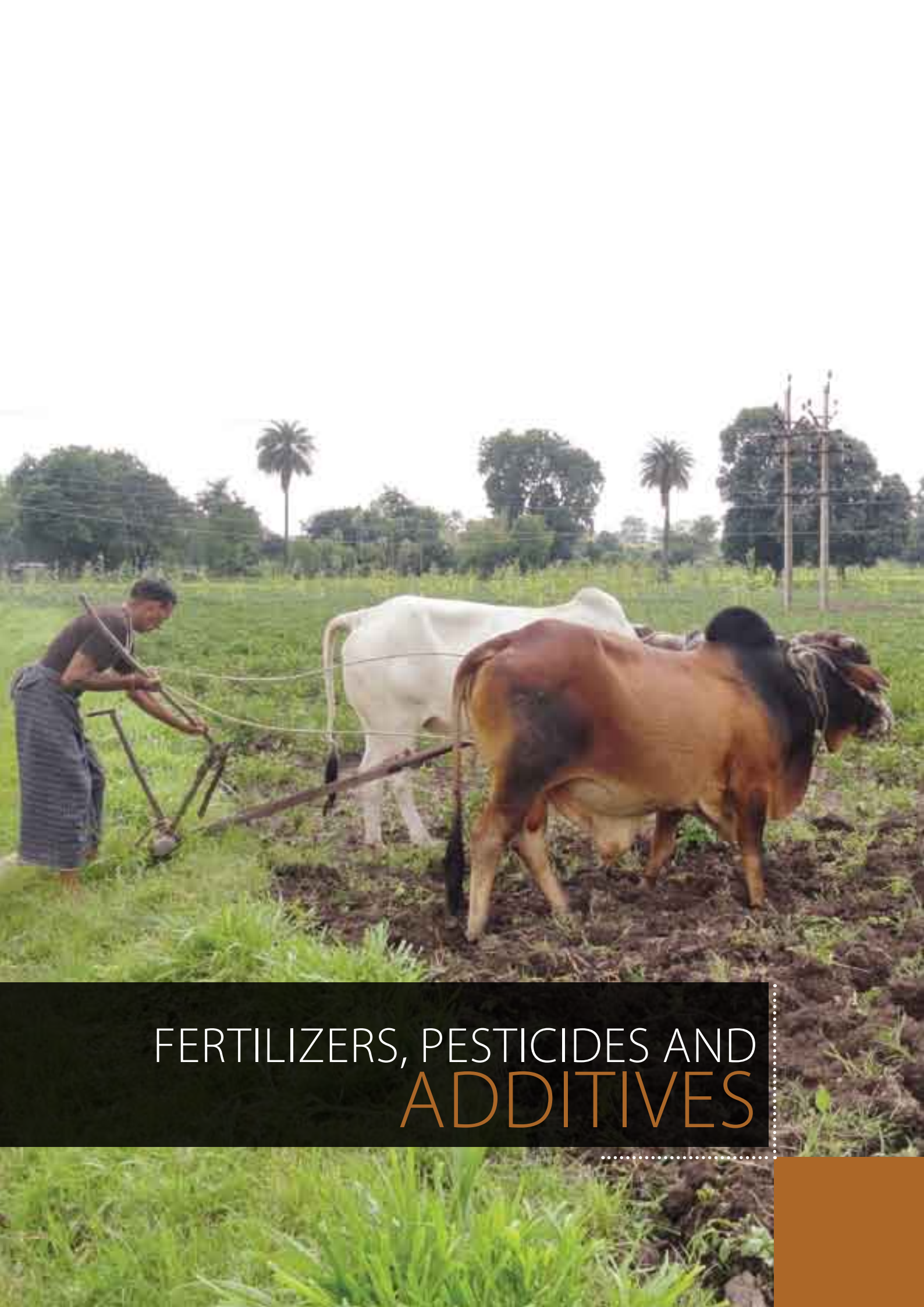
RECOGNITION/AWARDS

His wife was awarded as 'Progressive female farmer' in 2011.

ISSUES

The innovator is seeking financial help for the rollers as sometimes the demand is more so unable to meet all demand.

PRODUCT VIEW



FERTILIZERS, PESTICIDES AND ADDITIVES

THEME OF INNOVATION

Vermi Remediation of Infertile Soil Using Earthworms

FOCUS AREA

Fertilizers, Pesticides and additives

DETAILS OF INNOVATOR

Name	Dr. Suneet V. Dabke
Experience	9 years
Region of operation	Gujarat
Turnover	Rs. 15 lakh
Volume	Not disclosed
No. of employees	3
Contact details	FF/42, Hiravanti Complex, Opp. Aryakanya Vidhyalaya, Karelibaug, Vadodara (Baroda) Gujarat - 390018, Mobile: 09824091307, Email: svdabke@yahoo.com Website: www.conceptbiotech.in

BUSINESS MODEL

Concept Biotech undertakes, on turkey basis, the setting up of plants for solid waste management especially Industrial sludge generated from textile industry, oil refinery, dairy, distilleries, pulp and paper mills, food processing units, mushroom waste and other allied agriculture waste with the aim of treating toxic organic waste into non toxic manure.

INNOVATION DETAILS

The detrimental impact of rapid development in the chemical material industries in recent decades in the accumulation of large quantities of toxic pollutant in environment. Treatment & disposal options for such pollutant are very limited. Land filling, incineration of waste and fixation has been used. Disposal of inhibitory waste to landfills leads to their leaching and dispersal in the environment, while the incineration would lead to their conversion to gases as pollutant. Fixation or immobilization on the other hand requires the immobilized mass to be stored but these also suffer from the potential for leaching of the pollutant. All these directly or indirectly degrade the health of the soil.

Dr. Dabke developed a process of cleaning up of contaminated soil using earthworms (in 2005). He cleared the land of solid toxic waste, and then inoculated it with bacteria. He gave some nutrients to the bacteria to survive. Then, he planted green fodder on the land and followed it by mulching using a tractor. He then introduced earthworms on the soil (vermin-casting) as they increased the moisture retaining capacity of the soil. He then planted grass and introduced earthworms again. This cycle took about three years and at the end of it the health of soil had completely changed.

There were two major aspects of this technology:

(a) CULTURING OF BACTERIA: The bacteria were developed from vegetable waste (especially spinach, green vegetables). This waste was fermented and the bacteria were isolated from it. Some special type of fungi was added and then this bacterial solution was applied to the soil.

(b) CULTURING OF EARTHWORMS: The real expertise lie in using the earthworms for treating the toxic waste. The earthworms are not conditioned to breed in such toxic environment and hence managing their life cycle was critical. The earthworms were first acclimatized to the industrial/ toxic waste in a laboratory. These earthworms were then used in the field.

IMPACT OF INNOVATION/TECHNOLOGY

The results of this state of the art process have been outstanding. The contamination levels in the soil have reduced more than 60% within a year. The soil have transformed from toxic and infertile to really good health. The N-P-K content of the soil has increased to 1% each from almost zero before the treatment. The lead and other heavy metal content has reduced from 500 ppm to much acceptable 10 ppm. It has also reduced ground water contamination by about 10%.

RECOGNITION/AWARDS

- His first project was funded by Blacksmith (a US based NGO) and Asian Development Bank and was carried out on a GIDC land
- Was awarded the Best Eco Solution by CNN
- Recipient of the Full Bright Scholarship, US Government

ISSUES

No issues

PRODUCT VIEW

THEME OF INNOVATION

Vermicompost Process Design for Efficient Production

FOCUS AREA

Fertilizers, pesticides and additives

DETAILS OF INNOVATOR

Name	(ARTI) Appropriate rural technology Institute
Experience	10 years
Region of operation	Maharashtra
Turnover	Rs. 10,000 from 40 sq ft area per year
Volume	500 sq ft
No. of employees	1
Contact details	Ganesh Nagar (Algudewadi), Phaltan Baramati Road, Taluka Phaltan District Satara - 415523 Maharashtra, Phone: 02166 225200

BUSINESS MODEL

They sell organic fertilizers manufactured through vermicompost technique directly to farmers at the rate of Rs. 5 per kg.

INNOVATION DETAILS

Vermicompost techniques are gaining popularity as organic fertilizers manufactured from biomass through these techniques are a cost effective alternative to chemical fertilizers. ARTI has customized a vermicompost technique to create a more efficient production process.

After conducting trials, it was inferred that about 40 sq ft sized composting beds offered optimum production. These 40 sq ft beds are made from cement and bricks. All the boundaries are sealed with pest resistant medium. This is necessary because the compost material is likely to attract pests during the process. Beds are then filled with biomass and earthworms. The beds are also covered at the top in order to prevent sunlight from entering the compost bin. Appropriate moisture is maintained in the beds throughout the process. Approximately 400 to 500 kg vermicompost becomes ready after 3 months from each of the bins.

IMPACT OF INNOVATION/TECHNOLOGY

The availability of organic fertilizer from the institute has helped in encouraging organic farming in the region. Owing to simplicity of the technique, many farmers have shown interest in learning the technique and producing this on their own.

RECOGNITION/AWARDS

None

ISSUES

Care is needed to keep the level of moisture constant. Mechanization is being explored to reduce human intervention in the process.

PRODUCT VIEW

THEME OF INNOVATION

Research in Pomegranate Infections, Grapes Fruit Size

FOCUS AREA

Fertilizers, pesticides and additives

DETAILS OF INNOVATOR

Name	Shri Bhagwan Nane
Experience	13 years
Region of operation	Maharashtra
Turnover	Rs. 25,60,000
Volume	1,100 litres
No. of employees	5
Contact details	At Post Wadiak, At Pule, Taluka Kalwan, Nashik, Mobile: 09423255024

BUSINESS MODEL

Provides free consultancy and after sales support. No partnership involved. The fungicide is priced at around Rs. 580 per litre while the growth regulator is priced at around Rs. 3200 per litre.

INNOVATION DETAILS

He has conducted extensive research in the pomegranate, grape and tomato diseases. The main focus of his research has been in increasing the size of grapes and in countering the oily spot disease in pomegranates. This research has led to the creation some potent formulations for the control of these diseases on the fruits – resulting in not only preventive capabilities, but also curative.

The products are a fungicide and a bactericide for Pomegranates and a growth regulator chemical for Grapes. Both types of products have been extensively tested in farms around Nashik. The chemicals for pomegranate have been tested even for curative properties of oily-spot disease successfully. The products are currently being considered for registration with the Central Insecticide Board (CIB). He has also set up his own manufacturing unit.

IMPACT OF INNOVATION/TECHNOLOGY

The diseases in grapes and pomegranates had greatly troubled the farmers in the area. These formulations have effectively helped them to fight the diseases in a very cost effective manner. Apart from generating employment to the youth in the area, the farmers in the area have also established a strong belief in his products.

RECOGNITION/AWARDS

None

ISSUES

He is worried about the knowledge of the formulations being passed on to other companies even before the product gets approval from the Central Insecticides Board & Registration Committee (CIBRC). He has also cited much difficulty in getting the products registered with the CIBRC.

PRODUCT VIEW

THEME OF INNOVATION

Organic Solution to Pests, Fungus and Viral Diseases – ECOGOLD 999 PLUS

FOCUS AREA

Fertilizers, pesticides and additives

DETAILS OF INNOVATOR

Name	Mr. Pradeep Bhatia
Experience	47 years
Region of operation	Maharashtra
Turnover	120 crore
Volume	Not disclosed
No. of employees	Not disclosed
Contact details	Metro Exporters Pvt Ltd, 132, Kakad Chambers Dr. Annie Besant Road, Worli, Mumbai - 400018 Phone: 022 24916500/6530, Emails: kamdar@metroexporters.net pradeep@paksagro.com

BUSINESS MODEL

Paks Agro produces and markets this crop protector in local markets. They distribute it via various agents in the rural areas. It is exported by Metro Exporters Pvt Ltd.

INNOVATION DETAILS

This is an organic crop protectant spray which gives us one integrated solution to manage and prevent pests, fungus and viral diseases. It altogether solves the need to use any kind of chemicals while farming in a remarkably effective manner. It totally replaces synthetic pesticides and optimally balances pesticidal strength with low phytotoxicity. It has a unique combination of physical properties like low surface tension (for better surface coverage and easier automation), low volatility (for longer adherence to leaf surfaces and minimal drift in aerial applications) and low water solubility (to resist rain wash off). This spray further increases efficiency of certain chemical pesticides by modifying leaf and insect surfaces to promote further better penetration without harming the plant.

IMPACT OF INNOVATION/TECHNOLOGY

It is successful in controlling in powdery mildew, rose black spot, citrus greasy spot, citrus sooty mould, dowry mildew, botrytis etc. Using this spray reduces the no of sprays to be used by the farmers as it simultaneous controls various pests and diseases.

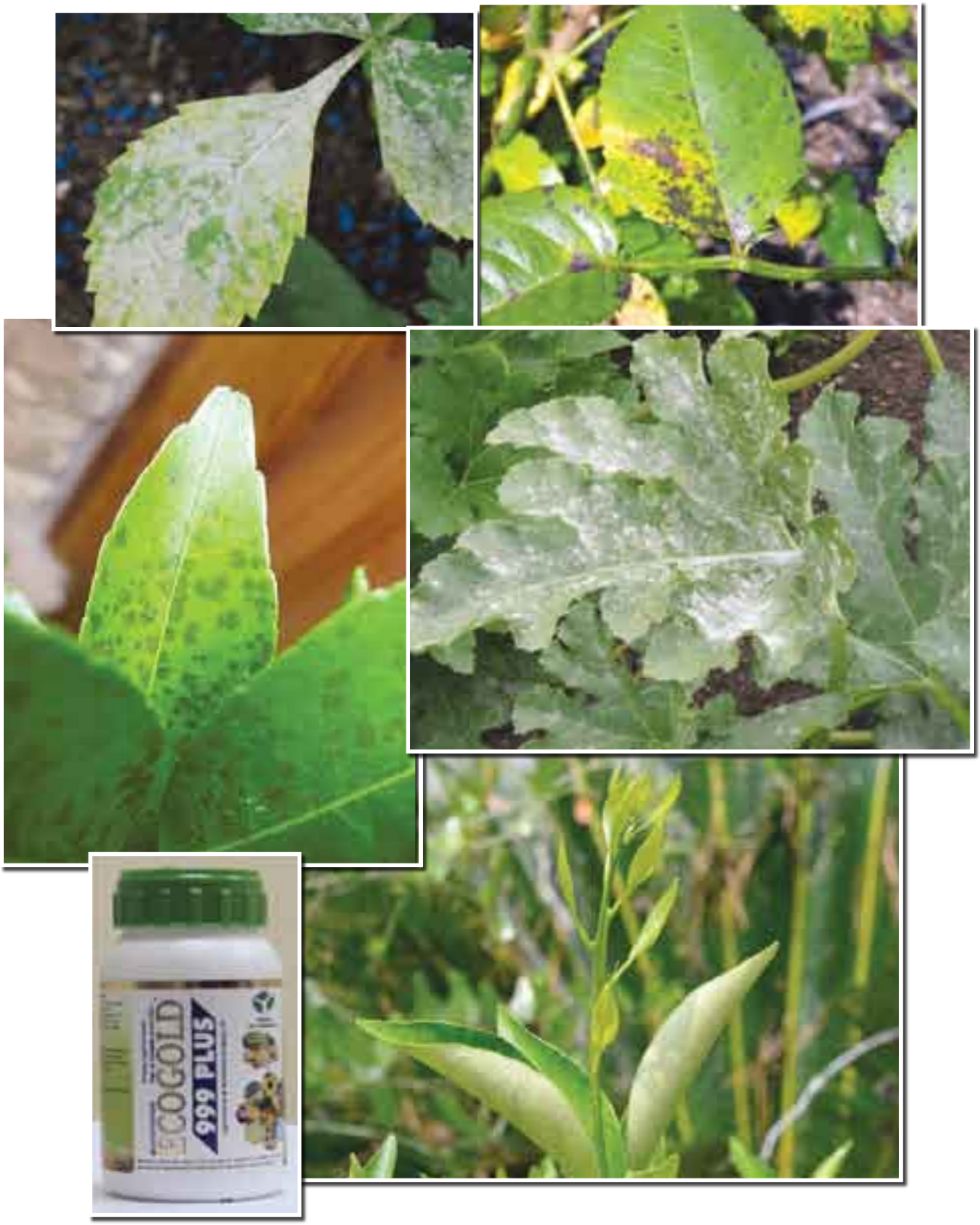
RECOGNITION/AWARDS

None

ISSUES

The biggest issue this product faces is in distribution in rural areas. It is very difficult to compete with large established pesticide companies who have very elabourate networks in the rural areas.

PRODUCT VIEW



THEME OF INNOVATION

Easy-to-prepare Organic Pesticide

FOCUS AREA

Fertilizers, pesticides and additives

DETAILS OF INNOVATOR

Name	Mr. Anand Singh Thakur
Experience	10 years
Region of operation	Nearby villages
Turnover	Not disclosed
Volume	Not disclosed
No. of employees	Not disclosed
Contact details	Village Umariya Khurd, Post Doodhia, Tehsil & District Indore, Madhya Pradesh Mobile: 09301301901

BUSINESS MODEL

Not commercialized yet. Provides free consultation to farmers.

INNOVATION DETAILS

It is a decoction of different types of leaves and other bio-materials. The components used are 1 kg leaves each of Neem, Pongamiya, Custard apple, Ipomia, and Caiotropsis gigantia (commonly known as Mader) + 250 gm Garlic (mashed) +10 litre water + 10 litre Cow urine. This is boiled until the volume is half of the total quantity (approx. 10 litre) and filtered. This decoction of 10 litres is dissolved in 600–700 litres of water and applied (sprayed) on about 1 hectare. If all the inputs are available on farm the cost of making organic pesticide is almost nil. Per acre savings of Rs. 2000 to 2500 on chemical pesticide can be attained if this is used. Annual saving on chemical pesticide is about Rs. 32,000. 20 to 30% more sale price achieved on the sale of products from this farm due to the disease free and healthy produce.

IMPACT OF INNOVATION/TECHNOLOGY

Nearby farmers have started using this organic pesticide. More than 40 acres of land is under this pesticide use. The use of this organic pesticide is said to be harmless for some beneficial insects and it also helps the farmer to reduce the cost of cultivation.

RECOGNITION/AWARDS

None

ISSUES

Wants technical information on building a manufacturing plant to do commercial production. Process of resistance to pest is slow - so patience of farmers is needed till the effects are noticed.

PRODUCT VIEW

THEME OF INNOVATION

Leaves Decoction for Bio-pesticide

FOCUS AREA

Fertilizers, pesticides and additives

DETAILS OF INNOVATOR

Name	Shri Anand Singh Thakur
Experience	10 years
Region of operation	Madhya Pradesh
Turnover	Rs. 1.5 lakh to 2 lakh per annum
Volume	40 litres for 17 acres
No. of employees	1
Contact details	Village Umariya Khurd, Post Doodhia, Tehsil & District Indore, Madhya Pradesh Mobile: 09301301901

BUSINESS MODEL

Shri Anand Singh is making this bio-pesticide for his use in the land where he grows potato, wheat and other crops. He also gives demonstrations to other farmers in a 3 day meet of Bhartiya Kisan Sang. Many farmers visit his farm and he provides consulting to them.

INNOVATION DETAILS

Shri Anand Singh Thakur has developed a bio-pesticide from easily available materials in farm like leaves and cow urine. It is decoction of 5 different types' leaves and other bio-materials. Five different types of leaves used are of Neem, Pongamiya, Custard apple, Ipomia, and Caiotropsis gigantia (Commonly known as Madar) in the quantity of 1 kg each mixed with 250 gm garlic, water and cow urine. This mixture is then boiled till only half of the total quantity remains and then filtered.

IMPACT OF INNOVATION/TECHNOLOGY

This decoction is very simple to prepare and use. All the components are easily available at village level free of cost, therefore reducing the cost of cultivation. This bio-pesticide is very effective for controlling the insect-pest (sucking pest, leaf feeders, etc.) of soybean and other crops. The use of this bio-pesticide does not harm beneficial insects. Due to the use this pesticide the yield of wheat increased from 10 quintals to 11 quintals. It also enhances weight and gives shine to the grains. Use of this bio-pesticide leads to a savings of water up to 20%.

RECOGNITION/AWARDS

- Highest Soyabeen productivity achiever in 2003

ISSUES

Farmers are not ready to make this pesticide at home when chemical pesticides are available in the market as they not aware of its benefits.

PRODUCT VIEW

IT & MOBILE APPLICATIONS

THEME OF INNOVATION

mKRISHI: Mobile Agro Advisory Services

FOCUS AREA

IT & Mobile Applications

DETAILS OF INNOVATOR

Name	Dr. Arun Pande – Head, TCS Innovation Labs
Experience	2 years
Region of operation	Punjab, UP, Maharashtra, Gujarat, Andhra Pradesh Tamil Nadu, Rajasthan
Turnover	Not disclosed
Volume	Not disclosed
No. of employees	20
Contact details	9th Floor, Nirmal Building, Nariman Point, Marine Lines, R N Goenka Marg Nariman Point, Phone: 022 67788035

BUSINESS MODEL

Large numbers of mKRISHI articles are available on the internet. Similarly several case studies have been published in Newspapers and magazines. TCS also sends concept notes to companies explaining how mKRISHI could help them in meeting their strategic goals. Both organizations make certain investment to see the benefits in the field before commercial arrangement is signed. Typically, TCS reaches farmers through stakeholders such as agriculture input companies, agriculture universities, cattle and poultry industries, rural banks, insurance companies etc. TCS is the primary source for funding the projects.

INNOVATION DETAILS

mKRISHI is an innovative platform based on Sensor and Mobile Phone Technology to offer personalized and integrated services to farmers. It is an innovation that allows farmers to send queries in their local languages through a mobile phone and provides personalized responses with advice or relevant information in these languages. It also helps uneducated farmers by allowing them to use the services by means of a voice SMS. mKRISHI uses multiple technologies and has effectively demonstrated about the use of soil, crop and weather sensor technology to deliver personalized advice. The platform also brings farmer's stakeholders together, thus enabling integrated services.

One of the highlights of the innovation is disease prediction. It uses the concept of human participatory sensing in using disease prediction model which involves the crop based on several sensor data such as humidity, temperature, leaf wetness. The composite risk calculated by several models, if exceeded certain threshold, triggers the application on farmer's handset automatically. Through this application farmers are asked several questions in local language, related to symptoms they observe in the field. With simple "yes" and "no" answers, experts get a risk index from the field. If both indices match, expert is comfortable in giving advice to farmers on preventive measures.

IMPACT OF INNOVATION/TECHNOLOGY

Increase in yield is due to identification of right fertilizer (e.g. with proportion of Nitrogen Phosphorous and Potassium in the ratio of NPK 13–0–45 instead of 19–19–19). Approx. 1.5 q/acre increase (Rs. 4000).

Market prices have been made available so that farmers can choose 'where and when' to sell their produce and 'at what price'. This leads to the improvement in the bargaining power of small and medium farmers. Current pricing information for NLDEX, future prices and global rates are also available now.

Banks and insurance companies can use mKRISHI platform, enabling more rapid loan payments to farmers and developing more personalized insurance packages respectively. This has led to savings be it, time or money.

RECOGNITION/AWARDS

- Qualcomm's Wireless Reach Grand Prize 2007
- Golden Peacock Technology Innovation Award 2008
- Wall Street Journal Technology Innovation Award 2008
- Nasscom's Top 50 Innovations for the Year 2008
- India Innovation Initiative (i3) Awards 2009
- Nasscom Social Innovation Honours 2010
- Business in the community excellence award (BiTC) Big Tick
- Aegis Alexander Graham Bell Award 2010
- e-INDIA Best Private Sector Initiative of the Year Award 2010.

ISSUES

Basic challenge is the time required for commercial partners to realize the benefits. Farmers are not used to paying for services. But farmers also need to be convinced to relate services to benefits. The challenge is to create village entrepreneur/producer companies who would provide services to 1000 to 5000 farmers and earn good revenue as second source of income.

PRODUCT VIEW

THEME OF INNOVATION

Reuters Market Light (RML): Personalized Micro Agri Information Service for Farmers through Mobile Phones

FOCUS AREA

IT & Mobile Applications

DETAILS OF INNOVATOR

Name	Thomson Reuters
Experience	Operational since 2007
Region of operation	17 states across India
Turnover	Not disclosed
Volume	More than half a million active consumers
No. of employees	Not disclosed
Contact details	Reuters Market Light Peninsula Club, Ground Floor, Peninsula Corporate Park, Ganpatrao Kadam Marg Lower Parel (West) Mumbai - 400 013, Phone: 022 67431583 Email: amit.mehra@thomsonreuters.com

BUSINESS MODEL

Besides having an in-house team of several hundred content professionals and rural market reporters across India, RML has partnerships with leading agricultural universities, agri research institutions, public and private sector weather forecasting agencies and other relevant rural/agri information sources for generating relevant, accurate and actionable content. For generating awareness and reaching the rural consumers in geographically remote rural locations, RML has a sales & distribution team that engages with hundreds of RML distributors and retailers in most major agricultural regions of India. RML also has distribution partnerships with reputed channel partners that have a strong retail presence in rural India.

INNOVATION DETAILS

Reuters Market Light (RML) is a pioneering and UN award-winning business of Thomson Reuters that offers a highly personalized agri micro-information service over mobile phones to the farming community. The service is delivered as SMS over any operator or mobile phone. RML's information covers crop prices on daily basis, localized weather forecast, crop advisory, news & information relevant for the farming community. RML helps farmers achieve better yields and secure better prices by disseminating timely, accurate and personalized information across their key regions. Farmers receive crop advisory as per the stage of the crop cycle, taluka specific weather forecasts, local market price information, local and international commodity information and any other agri-rural information relevant to the farming community direct to their mobile phones, in their own language, as per their individual preferences. The decision-enabling nature of the information has a direct impact on the livelihood of farmers. Since 2007, RML has reached several million farmers in over 30,000 villages across India either through direct mobile phone activation or through sharing with other farmers.

IMPACT OF INNOVATION/TECHNOLOGY

RML service reduces farmers risk, increases their income and enhances the country's food security. Independent research carried out by ICRIER states that farmers' incomes increase by up to 25% per crop cycle by using RML agri

information. Some farmers have individually made as much as Rs. 4,00,000 on using the service that costs only Rs. 999 for 12 months. Studies carried out by USAID – ACDI/VICA have highlighted major shifts in information sourcing behaviour of farmers after using RML service. Prior to using RML service, more than 90% of the farmers relied on fellow farmers for their agri information needs. After using the service, 80% of the farmers started relying on the accurate and actionable information provided through the mobile phone service. The farmers felt empowered due to the information available to them and started sourcing more information (even beyond that delivered to them through RML service) by directly calling the commission agents in the mandi. Farmers also began seeking information from retailers when demonstrations were done for new products during different training programs.

RECOGNITION/AWARDS

Awards

- World Business and Development Award (WBDA) by the United Nations Development Program in 2010
- Financial Times – Just Means Social Innovation Award in 2010
- RMAI Rural Marketing Awards 2010
- mBillionth Award South Asia 2010
- Coffey International Award 2010

Recognition

- Four page write-up in Dr. C.K. Prahalad's 'Fortune at the Bottom of the Pyramid'
- Mention in Nandan Nilekani's 'Imagining India'
- Featured as a case study in the Accenture Report – 'Masters of rural markets: The Hallmarks of High Performance'
- RML was showcased at the World Economic Forum in Cape Town
- London Business School case study: A 20-page case study which showcases RML as a strategic business model innovation
- RML was taught as a case study at the Cambridge University as part of the Business and Poverty Leadership Program
- All Leading media have featured RML including BBC, the Economist, Financial Times, Economic Times, New York Times, International Herald Tribune, Fox News, the WSJ, USA Today, Times of India, Business Standard, CNBC and ET Now

ISSUES

The key challenges for mass scale up of mobile agri information services are:

1. Creating personalized and actionable content: Most of the agri content available in India is outdated, inaccurate or else is suitable for mass audience rather than for individual farmers. Creating personalized, accurate and actionable agri content requires a large investment in terms of resources and time. On-ground presence of in-house content teams is essential in all regions being covered to create timely content that can be useful and beneficial to farmers. Establishing such large teams spread out across remote rural locations across India is a major challenge.

2. Setting up distribution network in rural locations: Since such farmers are often present in remote areas, there are distribution and logistical challenges involved in reaching them at a reasonable cost. This calls for lean and innovative business models that harness win-win collaborations with various channel partners.
3. Creating awareness: Experience has shown that farmers need at least six-months of funded subscription support to harness the benefits of at least one full crop season. This allows them to then make an educated decision about whether to continue the services. Creating public-private partnership models with government agencies, NGOs, development funding agencies and CSR initiatives of private sector can effectively bridge this awareness gap.

PRODUCT VIEW

THEME OF INNOVATION

ERP Software for Efficient Farm Management

FOCUS AREA

IT & Mobile Applications

DETAILS OF INNOVATOR

Name	Shivrai Technologies Pvt Ltd
Experience	9 years
Region of operation	Maharashtra
Turnover	Revenue of Rs. 2.5 crore from product sale and services
Volume	100+ software licenses last year
No. of employees	25–30
Contact details	Omkar, Plot No. 14, Sevanand Society, Walwekarnagar Satara Road, Swargate, Pune Phone: 020 24216370

BUSINESS MODEL

Currently they are in technical partnership with Microsoft and Intel. Revenue is generated through product sale and AMC including technical support and software upgrades. They are looking forward to partner with agricultural institutions and NGOs to take this product at next level.

INNOVATION DETAILS

FarmERP minimizes the farm data management worries, saves money, saves time, optimizes resources, improves management skills and supports quick decision making. And most importantly it is offered in regional language. FarmERP V2.1 is the most advanced version of FarmERP software solution which is an outcome of collective efforts of agriculture, food supply chain and IT industry experts. In near future, it will be made available over mobile devices which will help Indian farmers in taking farm related decisions.

FarmERP is an outcome of rigorous efforts put in by agriculture and IT industry experts. Use of FarmERP software suite leads to successful farm and farmer data management with additional benefits of cost and time saving. It increases user readiness to take on the global competition. Record keeping and decision making are two important functions which will be taken care of by FarmERP. For analysis and to gain better profits farmers can keep the records of various activities done on the farm with all minute details. FarmERP software suite provides the facility to record each and every such activity with minute details, and generating auditor and user-friendly reports. Use of FarmERP also improves farm management skills and supports decision-making. FarmERP Mobile helps farmer to take on farm decisions with the help of agricultural calculators, schedulers, content and utilities provided over mobile phone devices.

IMPACT OF INNOVATION/TECHNOLOGY

FarmERP provides Good Agricultural Practices (GAP) for various crops in form of crop schedules which can be customized by the farmer as per his/her regional conditions. Adoption of this GAP related knowledge leads to increase in farm production. It encourages science based agriculture and use of nutrients for all crops can be analyzed through MIS reports to take specific decisions to improve soil quality.

The farmer also gets a complete control over stock information. This information is helpful in optimization of on farm resources and drastically reduces the operational costs, increases productivity as well as profits. It also increases farmer's negotiating power in case of exports as well as increases the credit-worthiness of growers for the financial institutions.

RECOGNITION/AWARDS

- Felicitated by Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli for contribution in applying ICT for community development.
- Felicitated by Mahatma Phule Krishi Vidyapeeth, Rahuri for contribution in applying ICT for community development
- Winner of The Manthan Award 2005 - GOLD 'E-Learning' Category.
- Winner of The Manthan Award South Asia Pacific2009 'Mobile Content' Category for "FarmERP Mobile – Grape Pesticide Selector

ISSUES

Reaching to progressive farmers remains a challenge as it requires huge spending on advertisement campaigns and publicity.

Public awareness in this regard is extremely low. Culture of keeping records in farming, either manually or using systems, is not largely seen in India.

PRODUCT VIEW

THEME OF INNOVATION

Traceability and Farm Management

FOCUS AREA

IT & Mobile Applications

DETAILS OF INNOVATOR

Name	CropEx Technology Solutions Private Limited
Experience	1 year
Region of operation	Haryana, Karnataka
Turnover	Not disclosed
Volume	5000 Farms by year end
No. of employees	8
Contact details	No. 83, Talakaveri Layout, Basavanagar, Off Old Airport Road, Marthahalli, Bangalore - 560037, Phones: 080 22715409, 25227581 Krishna Kumar: 09986079552 (Mobile), Kunal Prasad: 07829149000 (Mobile)

BUSINESS MODEL

Individual farmers are provided a window to showcase their produce which is available on the online platform for sale with online traceability. The farmers are profiled on web-platform and thus they are connected to all the stakeholders (Retailers, Financial Institutions etc.) and provide rating based on their crop to get considered by them. Retailers, corporates and sourcing agencies can utilize our platform to buy traceable produce directly from farms.

Revenue Model:

1. Corporates are charged as per usage of the platform for traceability and monitoring of their contract farms
2. Independent farmers are charged a nominal registration fee
3. Buyer (corporates, exporters, retailers) are charged a small percentage as service charge

INNOVATION DETAILS

CropEx is a technology based company providing online platform for real time farm management and traceability. The platform captures the entire life cycle of the crop and provides real time information on the crop health, pest, harvesting details and many more on a real time basis. The crop projections can help in efficient planning and management of supply chain highlighting availability, quality and quantity well mapped to demand. Right information at the right time saves wastage, brings higher returns for farmers and retains freshness in the produce to command premium pricing.

The innovation would serve multiple purposes helping all the stakeholders in the agri value chain. Farmers would be able to get higher returns and better market linkages with assured returns. Additionally, farmer community's awareness is supplemented on best agriculture practices and recent developments, efficient resource management, local employment generation, pest management, certifications etc. Corporate stakeholders would be able to manage their contract farms better and provide traceability to their products - thereby helping them reach to newer geographies. Retailers can brand their produce as safe and traceable and find new market opportunities. The online application is also connected with Android platform mobile apps which would ensure efficient data entry from field and better tracking and management of field resources on real time basis.

IMPACT OF INNOVATION/TECHNOLOGY

For Farmers: Trade can happen efficiently and farmers can get higher returns by direct marketing and due to the added value of providing traceable produce. Traceability of their produce will provide them more visibility in national and international markets. The online platform can also connect them to institutions for financial loans based on the platform's rating system.

For Corporate Stakeholders: The platform enables corporate stakeholders to ensure higher availability and position them in the global map having a traceable solution. It also helps them in effective decision making and well connected with Mobile and GPS technology to collect farm activities remotely and timely on real time basis. This will ensure increased productivity, improved resource management, reduced supply chain losses and penetration in newer exports markets which demand traceability.

RECOGNITION/AWARDS/CUSTOMERS

Recognition:

- CNBC TV 18 – Recognized and featured in Young Turks program, A platform for young entrepreneurs
- Microsoft Bizspark Startup
- Tech Spark – Award of Excellence – The top 20 startups among 400 entries across India

Customers Acquired:

- Bhari-Delmote (FieldFresh)
- Bharti-Walmart
- Omniactive

Projects running In Karnataka (Chikballapur, Hassan) and Punjab, Himachal Pradesh and Haryana:

- Working with Bharti-WalMart to provide Online Traceability and Online Farm Monitoring to their farmers (Contract Farming)
- Working with Bharti-Delmonte (FieldFresh) to provide Online Traceability and Online Farm Monitoring facility to their farmers (Contract Farming)
- Working with Omniactive to provide Online Traceability and Online Farm Monitoring facility to their farmers (Contract Farming)

ISSUES

Major issues faced are infrastructure (internet & power), inhibitions of stakeholders towards adoption of new technology and availability of skilled resources. They are currently investing in technology which can overcome the infrastructure barrier. They are also training the local people to use the technology and helping generate employment in rural areas.

PRODUCT VIEW

THEME OF INNOVATION

An IT Solution for the Watershed Management Programs – Watershed A to Z

FOCUS AREA

IT & Mobile Applications

DETAILS OF INNOVATOR

Name	Mr. Bhushan Ambadkar
Experience	7 years
Region of operation	Maharashtra
Turnover	Rs. 3 lakh
Volume	25 units sold till date
No. of employees	Not disclosed
Contact details	Software Institute for Rural Development
	Vandan, 30, Shivaji Hsg. Society, Near Convention Centre, Senapati Bapat Marg Pune – 411016, Phone: 020 65240715, 09850037817 (Mobile) Email: bhushan.ambadkar@sirdpune.com, Website: www.sirdpune.com

BUSINESS MODEL

Mr. Bhushan has got a majority of his sales through his networking amongst NGOs which work on watershed management. He also gets some leads through his website.

INNOVATION DETAILS

Watershed management can result in huge benefits to the local farming population as it would reduce the dependence on irrigation and prevent the crop from the vagaries of excessive rainfall. It would also result in long term increase in soil health, as it would manage erosion better. Every watershed project requires run-off calculation, run-off budgeting. This is followed by preparation of Action Plan. Once the types and number of treatments is finalized, each structure requires detailed estimation to understand the implication of the project.

Watershed A to Z software is used to do run-off calculation, run-off budgeting and cost budgeting of the watershed as well as drawing of contour maps, L-section and cross section. The best aspect of the software is that it does these without using the expensive AUTOCAD software. Detailed estimation of every land and drainage line structure can be done in few days instead of 4 to 5 months when done manually.

IMPACT OF INNOVATION/TECHNOLOGY

This software simplifies the work by the automated design and estimates. This eliminates undue delay in vetting of detailed scheme reports and hence saving in manpower and time. Along with uniformity and accuracy in reports prepared, substantial cost and time saving is the main advantage of this software. Other than these the interface they have prepared is user friendly. It saves substantial costs (in the range of Rs. 60,000 to Rs. 70,000 per project) in preparation of estimates and also gives more accurate reports. It would overcome the difficulties faced by several offices on account of great shortage of technical manpower to carry out this critical work.

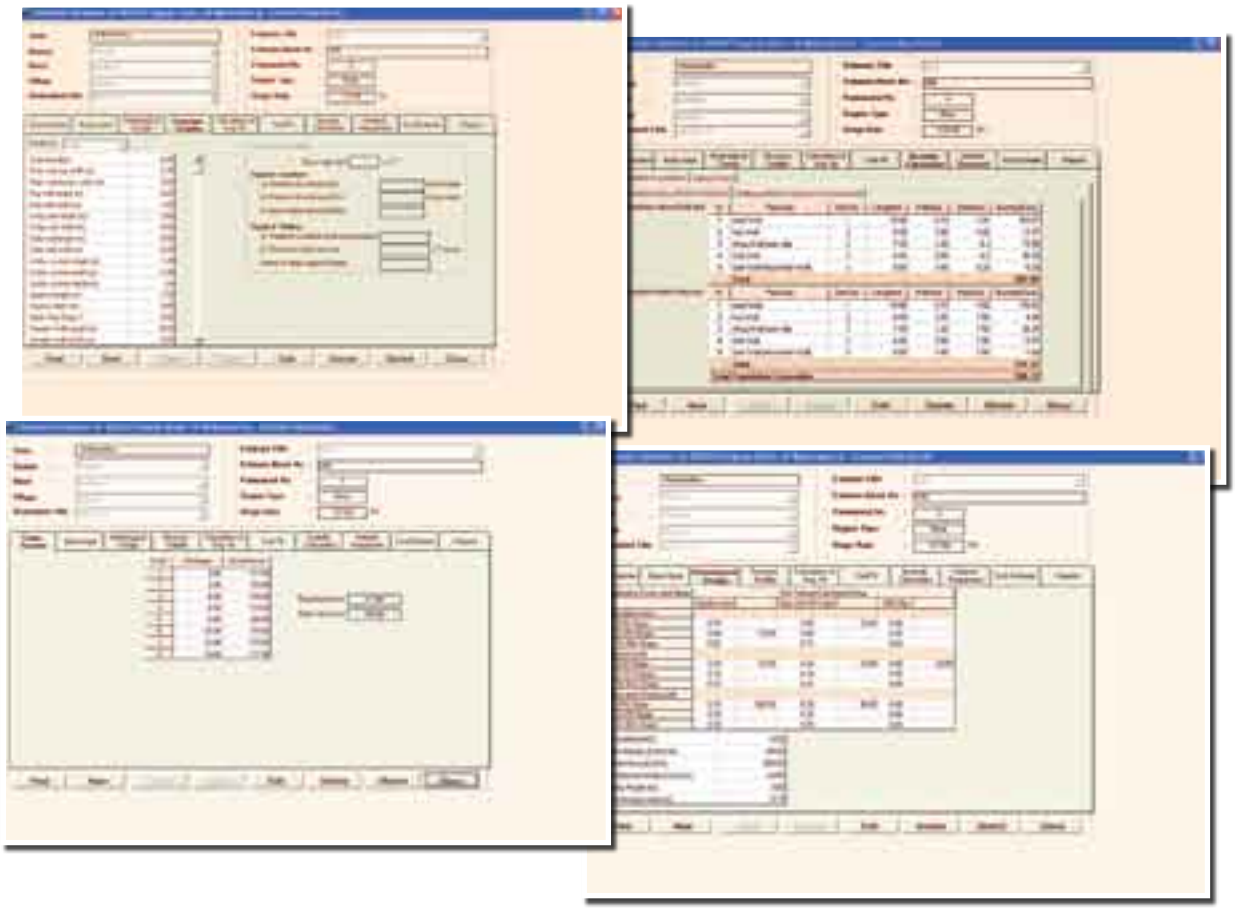
RECOGNITION/AWARDS

None

ISSUES

The main challenge and ultimately the biggest limitation in this venture has been that the major target customer of this software i.e. the NGOs which work on watershed management in rural areas are not tech savvy. There is also a need for greater support from government.

PRODUCT VIEW



THEME OF INNOVATION

Nano Ganesh

FOCUS AREA

IT & Mobile Applications

DETAILS OF INNOVATOR

Name	Ossian Agro Automation
Experience	14 years
Region of operation	Maharashtra
Turnover	Rs. 6,90,00,000 per year
Volume	10,000 units sold till now
No. of employees	16
Contact details	305, Munisuvrat Avenue, 3rd floor, 1089 Shukrawar Peth, Shivaji Road Swargate Corner, Pune - 411 002, Phone: 020 24472277

BUSINESS MODEL

The innovator provides free consultation to the farmers. For marketing purposes he goes to various exhibitions to showcase his product. He has launched various campaigns in villages to increase the awareness among farmers.

INNOVATION DETAILS

Nano Ganesh is a GSM Mobile based remote control system exclusively for the use with water pump sets in agriculture areas. The need of Nano Ganesh arose from the routine problems faced by the farmers in operating the pumps. There are fluctuations in power supply, difficult terrain, fear of animals on the way to pumps, hazardous locations of the pumps along the river or water storage beds, shock hazards, rains etc.

A Nano Ganesh Instrument is connected to the existing starter. A farmer has to simply dial a number dedicated for a Nano Ganesh set and then punch his on or off code for the control of the pump set. It can be connected to any existing electrical starter and motor pumps. Hence, there is no necessity of replacing the pumping set. For higher HP pumps, it can be connected along with the protection systems. With the help of Nano Ganesh mobile modem a farmer can control and monitor the water pump from any distance. He can check an availability of power supply at the pump end. Can also acknowledge the on/off status of the water pump. In some models, a farmer gets an alert call if there is a theft attempt of the cable or pump. It has unlimited range of operation with a provision of memory for storing on/off commands.

IMPACT OF INNOVATION/TECHNOLOGY

Being able to remotely control farm equipments is a tremendous benefit that technology of the future aims to provide. This is a step in that very direction.

RECOGNITION/AWARDS

- Best mobile application in the world in the emerging market by Forum Nokia
- Nominated for the Global Mobile Award, 2010 in the Mobile World Congress
- Mr. Engineer from The Institution of Engineers, Pune
- Parkhe Award from MCCIA, Pune
- Wantrapreneur Award from Villgro

ISSUES

Making the technology available to farmers at low cost is a challenge. Farmers take around 2 to 3 years to get assured of this product which hugely increases the marketing and sales activities cost. After sale support for repairing the same at a local level is also a current problem that the innovator is trying to solve.

PRODUCT VIEW

THEME OF INNOVATION

Fresh-N-Daily - Online Veggie Store

FOCUS AREA

IT & Mobile Applications

DETAILS OF INNOVATOR

Name	Mr. Vikas Chauhan
Experience	10 months
Region of operation	Maharashtra
Turnover	Not disclosed
Volume	40–50 orders per day
No. of employees	10
Contact details	A-337, Antop Hill Warehousing Complex, VIT College Road, Wadala (East) Mumbai - 400 037, Mobile: 09833932608

BUSINESS MODEL

Mr. Vikas Chauhan started the online vegetable store in December 2010. Currently they are catering up to 40–50 orders per day. The delivery areas are Wadala, Sewri, Prabha Devi and Powai.

INNOVATION DETAILS

The online portal provides all kinds of vegetables, fruits, exotic vegetables as well as grocery. The customer orders his requirements through website or via phone. The last order for a day is taken by 10 pm. All the orders received are processed and the delivery happens next morning. The packaging is done in their warehouse. There are 2 shifts in a day when the orders are delivered to the customers. They follow cash on delivery system.

Providing such a platform for the urban people helps in saving their time. Being an online store, their cost vis-à-vis a retail chain is much lower. The structure is lean with low overheads. Their pricing is quite competitive. They have received good response from the nearby localities.

IMPACT OF INNOVATION/TECHNOLOGY

In cities where the schedules are hectic, such online initiatives have found favour with the people. Also, being cost effective, it is bound to grow at a rapid place.

RECOGNITION/AWARDS

None

ISSUES

People in India are used to buying fruits and vegetables from the local cart vendor where they can see and feel the product during the process of purchase. Shift is consumer buying pattern therefore is a challenge. Quality perception varies between customers. It is difficult to meet and satisfy the needs of every customer especially since the product is not available to the customer while ordering.

PRODUCT VIEW

THEME OF INNOVATION

Shopveg.in - Online Vegetable and Grocery Store

FOCUS AREA

IT & Mobile Applications

DETAILS OF INNOVATOR

Name	Mr. Kaushik Mandal
Experience	5 months
Region of operation	Mumbai
Turnover	Not disclosed
Volume	Not disclosed
No. of employees	8
Contact details	Mobile: 09022144531

BUSINESS MODEL

Mr. Kaushik along with his other 3 partners initiated this online store on 15th August 2011. The project is right now in the testing stage covering only one area for delivery purposes in Mumbai and they are planning to extend on a higher scale by December.

INNOVATION DETAILS

Providing good quality food items at a reasonable price was the idea behind this innovation. They have also incorporated an idea of customized food basket in which the customers can select the weekly basket with their requirements on a weekly basis. The customers can also keep track of their weekly and monthly expenses. ShopVeG aims to integrate the latest technologies in web/mobile-commerce to give their users a unique experience of the retail industry. They procure the vegetables on a daily basis from APMC market and for other things they have tie-ups with various vendors.

IMPACT OF INNOVATION/TECHNOLOGY

Such online initiatives have found favour with the people as the quality they give is very high. Also it will curb the business of middlemen which will result in proper pricing of vegetables.

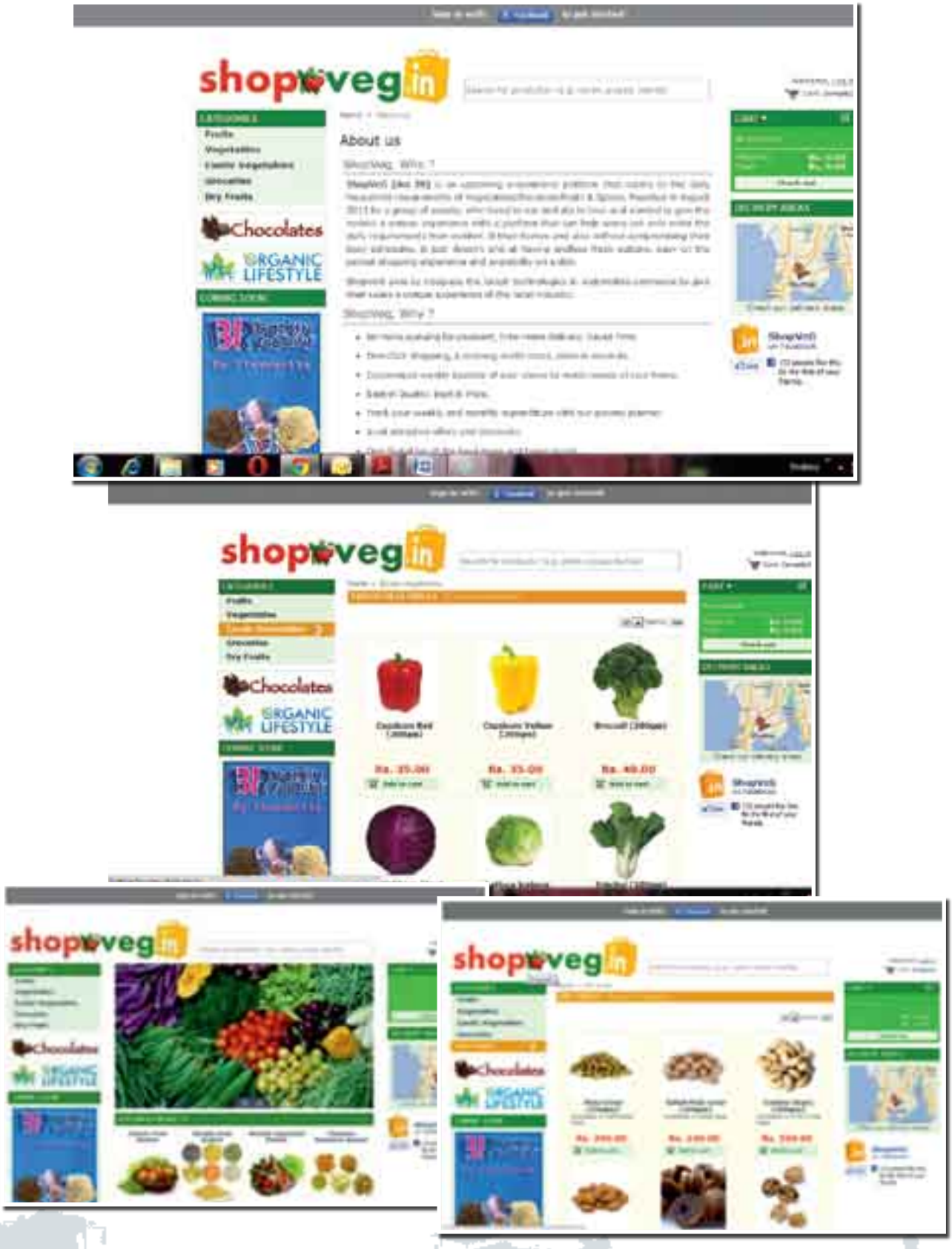
RECOGNITION/AWARDS

None

ISSUES

The innovator thinks that the vegetable market is not organized properly and they have problems in procurement of the vegetables.

PRODUCT VIEW



FRUITS & VEGETABLES

THEME OF INNOVATION

Annona 2, NMK 1– High Yielding Custard Apple Selections

FOCUS AREA

Fruits & Vegetables

DETAILS OF INNOVATOR

Name	Shri Navnath Malhari Kaspate
Experience	32 years
Region of operation	Maharashtra
Turnover	Rs. 3 lakh per bigha (Rs. 12 lakh per hectare)
Volume	25 tons
No. of employees	25 people
Contact details	At Post Germane, Taluka Barshi, District Solapur, Maharashtra Mobile: 09822669727, Email: nmkaspate@yahoo.com

BUSINESS MODEL

Shri Navnath Malhari Kaspate runs a nursery where he produces seeds of these varieties. He sells them at very reasonable price in the open market. He has 3 farms across the taluka. He also has tied up with exporters and currently exports to middle east. He also provides free consultation to the farmers.

INNOVATION DETAILS

The innovator has been farming custard apples since past 18 years. He developed two selections from his custard apple museum: Annona 2 & NMK 1. These selections possess high storage capacity for mature fruits with quality pulp. They have 3 to 4 times more seeds as compared to the local variety. He promoted 10 x 15 feet planting distance in medium soils compared to 16 x 16 feet that was recommended by State Agricultural University for development of microclimate in orchard for enhancing pollination.

IMPACT OF INNOVATION/TECHNOLOGY

These selections can be adapted in all types of soils with a planting distance of 10 x 15 feet. These fruits were very attractive in colour and size and also had less seeds per fruit. These enhanced qualities fetch higher price (120–150% of the market prices) in the market for the farmers. The fruits also remain in good condition for about 20–25 days on the plant itself. This enables the farmers to adjust the harvesting time according to the market demand and availability of cargo facilities.

The most remarkable aspect of this variety is that they mature during the off season. Consequently the farmers get much higher price (Rs. 2 to 3) than the traditional season price. Also, these varieties have very high keeping times and are thus ideal for exports. The older varieties had to be exported by air as they used to have very short keeping times. NMK I has a keeping time of about a month and thus can be exported through sea and has a price advantage over the other varieties. Also, 80% of the fruits are uniform in size and thus get a good price in the export market.

The productivity of existing varieties with traditional cultivation is about 10 tons per hectares where as the productivity of these selections is about 15–19 tons per hectares with 70–80% grade-1 fruits. The cost benefit ratio is 4:6.

About 800 farmers from 9–10 districts of Maharashtra have gained benefit from these selections which has led to an increase of more than 800 hectares of custard apple farming in Solapur district and approximately 450 hectares in the adjoining districts during the last 8–10 years. This variety reduces the cost by Rs. 2, 50,000 per acres and also saves time up to 2 hours per day.

RECOGNITION/AWARDS

- President of Maharashtra State Custard Apple Production, Training and Research Board, Pune
- Director of Solapur Grape Growers Association, Solapur
- Vasantrao Naik Krishi Samman

ISSUES

The selections are sporadically affected by fruit flies. The innovator is currently exploring several preventive measures but is yet to find success.

PRODUCT VIEW

THEME OF INNOVATION

Cultivation of Exotic and Foreign Vegetables in India

FOCUS AREA

Fruits & Vegetables

DETAILS OF INNOVATOR

Name	Mr. Murlidhar Gunjal and Mrs Vanita Gunjal
Experience	25 years
Region of operation	Maharashtra
Turnover	Net Profit - Rs. 3.6 lakh per year
Volume	54 tons per year
No. of employees	13
Contact details	At Post Kandli, Taluka Junner, District Pune, Maharashtra, Mobile: 09860226085

BUSINESS MODEL

They provide free consultation to the farmers about this method. Regions of operation also include Bangalore, Lucknow and Banaras. In total they cultivate about 25 different types of vegetables and spices with a sale of around 30–120 kg per year. They have tied up with a hotel chain to supply these vegetables on contractual basis.

INNOVATION DETAILS

While searching market for traditional vegetables, they got an idea of cultivating Chinese vegetables. They searched some literature on Chinese vegetables and found demand of this vegetable in Five Star Hotels in Mumbai. Based on the demand, started cultivation of different exotic vegetables such as parsley, red cabbage, broccoli, leek, cherry tomato, etc. and achieved sustainable income from farming. They developed markets for these vegetables, and sold produce very effectively. Exotic vegetables market is growing at the rate of 15 to 20% per annum and is increasing day by day since India is importing more than 85% exotic vegetables. This innovative farmer couple is growing 25 vegetable varieties in 2.2 hectares with an expenditure of Rs. 6,250 per day per hectare and obtained earnings Rs. 8,750 per day per hectare. Skilled labour is required for cultivation of these vegetables.

IMPACT OF INNOVATION/TECHNOLOGY

Demand-driven exotic vegetables production is suitable for the farmers as they have assured market through contract with consumers. In tying up with hotels for sustained supply, they have demonstrated a very good example of a farmer building forward linkages himself and eliminating the need for having too many intermediaries in the supply chain. Presently, a group of 100 farmers is cultivating these exotic vegetables from different villages in the vicinity.

RECOGNITION/AWARDS

- Dr. N. G Ranga Award from ICAR for diversified farming

ISSUES

Skilled labourers are required for the cultivation of exotic vegetables, which are difficult to get.

They are facing issues regarding finance as they are not able get loans. Also, availability of seeds sometimes becomes an issue.

PRODUCT VIEW

THEME OF INNOVATION

High Yielding Disease Resistant Variety of Sugarcane – CON 05071

FOCUS AREA

Fruits & Vegetables

DETAILS OF INNOVATOR

Name	Regional Sugarcane Research Station (RSRS) Navsari Agriculture University
Experience	Not applicable
Region of operation	Gujarat
Turnover	Not applicable
Volume	Not applicable
No. of employees	Not applicable
Contact details	Regional Sugarcane Research Station (RSRS) Navsari Agriculture University, Navsari, Gujarat Phone: 02637 282136, Email: sugarnau@gmail.com Dr. D. U. Patel (09725055214), drdhansukhpatel@yahoo.in Dr. S. C. Mali (09725018791), drshaileshmali@yahoo.in

BUSINESS MODEL

They produce and sell breeder seeds to cooperatives. The product is marketed by Navsari Agriculture University (NAU) & Regional Sugarcane Research Centre (RSRS).

INNOVATION DETAILS

Sugarcane farming in Gujarat was very disease prone with average yields. The scientists Dr. D. U. Patel & Dr. S. C. Mali realized that and worked towards developing a disease free high yielding variety of sugarcane, which they named as CON 05071. This variety is non flowering, good ratooner with high sugar content (approximately 11.5%). This variety is also largely pest resistant, thus very popular with the farmers. The average yield earlier was around 80 tons per hectare, while this variety gives a minimum yield of around 150 tons per (some farmers have attained up to 250 tons per hectare). The shift-over from other varieties to this has been gradual but has currently established itself well in the sugarcane farming sector of Gujarat.

IMPACT OF INNOVATION/TECHNOLOGY

This variety has revolutionized sugarcane cropping in Gujarat. It is currently occupying 16% of the entire area under sugarcane cultivation in Gujarat. This variety has increased farmer profits by more than 40%.

RECOGNITION/AWARDS

- Vasantdada Patil Memorial Prize for the best research paper by Deccan Sugarcane Technologists Association (DSTA), 2009

ISSUES

The only issue this crop faces is that can be grown only in water logged condition.

PRODUCT VIEW

THEME OF INNOVATION

A New Variety of Mango – Neelphonso

FOCUS AREA

Fruits & Vegetables

DETAILS OF INNOVATOR

Name	Aspee College of Horticulture, Navsari Agriculture University
Experience	Not applicable
Region of operation	Gujarat
Turnover	Not applicable
Volume	Not applicable
No. of employees	Not applicable
Contact details	Aspee College of Horticulture, Navsari Agriculture University, Navsari, Gujarat Phone: 02637 282028

BUSINESS MODEL

The product is marketed by Navsari Agriculture University (NAU).

INNOVATION DETAILS

This variety has been developed by carefully crossing two popular varieties of mango – Neelum and Alphonso. This variety exhibits moderately vigorous growth and thus more trees per hectare (200% more than Alphonso) can be planted than compared to Alphonso (which has highly vigorous growth). The average yield is about 50 to 60 kg/tree. (Just for comparison, the average yield of Kesar is 100 kg/tree and that of Alphonso is 90 kg/tree). The average weight of the fruit is about 200 g. The fruit pulp is fibreless, and the taste is similar to Alphonso. Fruit ripens in the month of June-July. It has high shelf life and good sugar content of about 14.58%. This variety also ripens late and thus has a natural window after the traditional season of Alphonso gets over. Thus it has a natural good demand. Also the yield per hectare is greater than Alphonso even though yield per tree is less (because more trees can be grown per hectare). This variety is also free of the spongy tissue problem which is faced in Alphonso.

IMPACT OF INNOVATION/TECHNOLOGY

Alphonso is an irregular bearer. Therefore yield differs from plant to plant, place to place and year to year. There are too many variables and thus involves some risk. This variety developed (Neelphonso) is a regular bearer and is not affected by spongy tissue problems. Thus it is a much safer investment from a farmer point of view. It is being suggested that in the coming years this variety would have very good demand in the local and export markets.

RECOGNITION/AWARDS

None

ISSUES

None

PRODUCT VIEW

THEME OF INNOVATION

Cultivation of Nontraditional Varieties of Coconut

FOCUS AREA

Fruits & Vegetables

DETAILS OF INNOVATOR

Name	Shri Chandubhai Balabhai Desai
Experience	20 years
Region of operation	Gujarat
Turnover	Rs. 96,000 per year
Volume	12,000 per year
No. of employees	4
Contact details	At Post Mahuwa, Taluka Mahuwa, District Bhavnagar, Gujarat Mobile: 09913605781

BUSINESS MODEL

The innovator sells the cultivated coconut in the market at the price of Rs. 8 per coconut. He also provides free consultation to the farmers in the district about cultivation of nontraditional varieties.

INNOVATION DETAILS

The innovator cultivates the nontraditional varieties of coconut like BT, Bona and Desi. The challenge for him was to cultivate coconut when no one else had done that in this region. This region is traditionally a cotton cultivating belt. However, he changed the cultivation pattern and concentrated on fine tuning the cultivation techniques in order to be able to grow coconut there. Today, the coconut cultivation is a profitable enterprise for him and the productivity almost as much as the traditional coconut cultivating regions like Kerala and Tamil Nadu.

IMPACT OF INNOVATION/TECHNOLOGY

By growing these varieties of coconuts, the production of coconuts got increased by 500 coconuts per bigha. These varieties also increase the soil quality and also increase the profit margin by Rs. 25,000 per acre. It also reduces the labour requirement by 50% and saves time by 4 hours per day; saves water up to 30%.

In the larger picture, helped create a coconut market in the region at the taluka level. Seeing the coconut market doing well in this taluka, more farmers from the region are opting for coconut cultivation.

RECOGNITION/AWARDS

None

ISSUES

The awareness among the farmers to adopt this kind of farming is a problem. The innovator is financially weak and needs a loan for better plantation.

PRODUCT VIEW

THEME OF INNOVATION

Horticulture Development For Sweet Corn and Pomegranate

FOCUS AREA

Fruits & Vegetables

DETAILS OF INNOVATOR

Name	Bhagvan Bhai Ravji Bhai Jagdiya
Experience	4–5 years
Region of operation	Bhavnagar
Turnover	Rs. 3,75,000
Volume	6 tons Sweet Corn, 5 tons Pomegranate
No. of employees	4–5
Contact details	At Vartej, District Bhavnagar Mobile: 09904440319

BUSINESS MODEL

Provides free consultation. Produce sold in APMC Bhavnagar. Sweet corn sold at Rs. 12.50 per kg and Pomegranate at Rs. 60 per kg.

INNOVATION DETAILS

The innovation involves horticulture development for sweet corn and pomegranate. A hybrid variety (not disclosed) is used for sweet corn and Bhagwa variety for Pomegranate. Drip irrigation is also used. Traditionally, this region was not used for cultivation of these two crops. The motivation for him to go for these two products was driven by two factors. One was to capture the great demand of sweet corn in big cities like Ahmedabad and Rajkot where tourists flocked for temples and places like Dwarka and Somnath. Other was to produce export quality pomegranate which can be easily exported from the port at Porbandar. Towards this goal, he tried the various varieties of sweet corn and pomegranate that can be grown here with a little customization of the cultivation practices and finally selected these two varieties.

IMPACT OF INNOVATION/TECHNOLOGY

Has resulted in about 30% reduction in labour requirement and about 3 hours saving on day's effort compared to earlier crops. This technique has also increased productivity by 1 ton per acre and profits by Rs. 65,000 per acre. Drip irrigation has caused about 80% savings on water usage. He usually organizes small farmer meetings at his home to offer free advice – this has led to a lot of farmers taking his guidance in going for these two crops.

RECOGNITION/AWARDS

None

ISSUES

Skilled labour required and is not easy to get. Sometimes forest animals enter the farms which is a problem. Require loan of about Rs. 2,00,000 for land development.

PRODUCT VIEW

THEME OF INNOVATION

Custard Apple Farming in Sugarcane Cultivation Belt

FOCUS AREA

Fruits & Vegetables

DETAILS OF INNOVATOR

Name	Pandurag Sitaram Kale
Experience	11 years
Region of operation	Maharashtra
Turnover	Rs. 1.25 lakh
Volume	5 acre of land
No. of employees	4 employee during season for 3 months
Contact details	At Post Khadaki, Taluka Daund, District Pune Mobile: 09860093267

BUSINESS MODEL

Market rate varies from Rs. 20 to 30 per kg.

INNOVATION DETAILS

Hyderabad selection variety is used. Government has also given subsidy for cultivation of this fruit. The distance between the trees is kept at 15 ft. The entire farm is under drip irrigation. Organic fertilizers have been used and have shown good results in terms of the size of fruit. 900 custard apple plants have been planted in 5 acre of land. The trees now have age of 11 years. Each tree gives approximately 50 kg of fruits. Earlier, the dominance of sugarcane farming in the region was getting affected due to extensive requirement of water. People of the region started to look for alternatives and Mr. Kale came up with the vision to start The cultivation of custard apple crop in this traditionally sugarcane dominated belt has resulted in lesser requirement of water for farming.

IMPACT OF INNOVATION/TECHNOLOGY

Fixed income for 4 months in year. Water requirement is reduced to 50 to 60 percent as compared to conventional sugarcane crop. Labour requirement increases during harvesting and farm preparation hence increase in employment.

RECOGNITION/AWARDS

None

ISSUES

Electricity is irregular and costly. Labour shortage during harvesting.

PRODUCT VIEW

THEME OF INNOVATION

Developing Standard Operating Process for Avinash Variety of Tomato

FOCUS AREA

Fruits & Vegetables

DETAILS OF INNOVATOR

Name	Ashok Patil Tavare
Experience	10 years
Region of operation	Maharashtra
Turnover	Not disclosed
Volume	2 acres
No. of employees	1 permanent and 4 temporary
Contact details	At Post Malegao Khurd 29B, Taluka Baramati, District Pune, Maharashtra Mobile: 09767735151

BUSINESS MODEL

The product is sold at the local market and fetches about Rs. 10 to 16 per kg. Mr. Ashok also arranges farmer meetings.

INNOVATION DETAILS

The farmer adopted Avinash variety of tomato farming as it is a heavier fruit with greater shelf life. He experimented and has successfully designed a plantation criterion for the respective tomato variety. Distance kept between two beds is 3 ft. 4 rounds of fertilizer and 5 rounds of pesticides are applied for each batch. Distance between the two beds is kept as 3 ft while distance between the two plants is maintained at 1 ft. As the fruit size and weight are significant, a wooden stick is fixed near the plant for support. Whole farm is under drip irrigation and drip installation has cost around Rs. 40,000 per acre. After planting, the production starts after 3 months and continues for next 3 months. 25 tons of production is assured per acre if proper care is taken.

IMPACT OF INNOVATION/TECHNOLOGY

The better fruit size and longer shelf life have demonstrated a much better alternative to regular tomato varieties in the region. Other farmers are also becoming more aware of such new varieties and are motivated in practicing them on field.

RECOGNITION/AWARDS

None

ISSUES

There is a problem of 'Karapa' pest. Hence preventive spraying of pesticide is a must.

PRODUCT VIEW

THEME OF INNOVATION

Jhaar Karela - A Selection of Wild Bitter Gourd

FOCUS AREA

Fruits & Vegetables

DETAILS OF INNOVATOR

Name	Shri Dalip Singh
Experience	32 years
Region of operation	Punjab
Turnover	4 lakh per annum
Volume	300–250 kg per year
No. of employees	2
Contact details	Village Kothe Ramsar, Post Dhilwan Kalan, Kotkapoora, District Faridkot, Punjab Mobile: 09417929149

BUSINESS MODEL

The innovator has made a packing size of Jhaar Karela of 1, 2 and 5 kg. The Jhaar Karela is priced up to Rs. 50–60 per kg. The innovator gets booking for it from Ludhiana, Batinda. He also gives free advices in the 7 day camp that is held in KVK. The farmer has earned a net return of about Rs. 2, 00,000 per hectare. His additional source of income is from garlic crop in his other fields and earns up to 2.5 lakh per acre.

INNOVATION DETAILS

Jhaar Karela is found on bushes on sandy area as wild plant. The innovator has adopted the wild cultivar and brought it under commercial cultivation. He has collected the seed from a wild plant growing as weed from south-western districts of Punjab. He even travelled Rajasthan for collecting the seeds. He made the selection and developed a variety of his own. It has been 5 years since he is growing 'Jhaar Karela' on an average land of 0.5–1.5 hectares annually. It is a vine type crop and requires staking for successful cultivation. The farmer has developed a system of bamboo staking on concrete foundation to trail the vines.

IMPACT OF INNOVATION/TECHNOLOGY

The average yield produced is 75 quintals per hectare. He had been marketing the produce himself with his own conveyance. He sold the crop in the adjoining markets at an average price of Rs. 5000 per quintal per hectare. The plant has a medicinal value for diabetic patients. The crop can be adopted by farmers as an alternate crop.

RECOGNITION/AWARDS

None

ISSUES

No Issues

PRODUCT VIEW

THEME OF INNOVATION

Horticulture Development for Coconut and Chikku in Semi-arid Land

FOCUS AREA

Fruits & Vegetables

DETAILS OF INNOVATOR

Name	Mr. Natu Bhai Desai
Experience	25 years
Region of operation	Mahuva, Rajkot
Turnover	Rs. 30,000 per year
Volume	3,000 coconuts per year
No. of employees	3
Contact details	At Post Mahuva, Taluka Mahuva, District Bhavnagar, Gujarat Mobile: 09924849335

BUSINESS MODEL

The coconut produced in the non-conventional regions is being sold at the rate of Rs. 10 per piece in the local and APMC market. Approximately, he sells 3,000 coconuts annually and generates revenue of Rs. 30,000 each year only from coconut. Overall, he earns around Rs. 35,000 per acre of non-traditional horticulture farm.

INNOVATION DETAILS

Mr. Natu Bhai identified the business opportunity to grow the coconut and chikku in the non-traditional areas, which had lesser investment and ensured the longer life of the plants. He has been cultivating the land to grow coconut and chikku for more than 25 years now despite these not being the traditional crops of the region. The prominent factor of running this business for so long is the lesser labour requirement. Notably, the productivity in the non-traditional (for coconut and chikku) horticulture land having different soil characteristics was found as par with the traditional land. This enabled him to capture the high demands of some these two coastal crops which led to a high profit for him. There is a huge scope of popularizing these coastal crops in this region since it will meet the demands in the local market through appropriate market linkages which otherwise was a problem due to the established and traditional supplies from Kerala and Tamil Nadu.

IMPACT OF INNOVATION/TECHNOLOGY

Being inspired and motivated from Mr. Natu Bhai recently, five families started to earn from horticulture cultivation in the non-conventional regions which were in an abandoned stage earlier. Not only at individual level but he has disseminated the knowledge of such horticulture development to the mass through participation in the seminars for Horticulture Development at Mahuva and for Nursery Development at Rajkot.

RECOGNITION/AWARDS

- Kruska Ruska Award by Mahuva Agriculture Department

ISSUES

According to him, markets like APMC have become quality conscious nowadays but adopting the good practices sometimes become constraints for the farmers. Post harvest losses are also very common in these areas. Currently,

the farmers in this region are given the loan at the rate of interest of 36% annually by the moneylender; hence they need loan from the banks whose services are still unreachable by the local people because of poor infrastructure and connectivity.

PRODUCT VIEW

THEME OF INNOVATION

High Onion Production

FOCUS AREA

Fruits & Vegetables

DETAILS OF INNOVATOR

Name	Dinesh Bhai Miyani
Experience	1 year
Region of operation	Gujarat
Turnover	Rs. 2,40,000 per year
Volume	12 tons per acre
No. of employees	2
Contact details	At Valukar, Taluka Ghogha, District Bhavnagar, Gujarat Mobile: 09904174995

BUSINESS MODEL

The innovator provides free consultation to the farmers. The innovator has formed a group of high quality onion producing farmers to meet the city demand of onion. He is also selling seeds at a price of about Rs. 1,200 per kg.

INNOVATION DETAILS

In the area of Bhavnagar where farmers are involved in cotton cultivation, Mr. Dinesh Bhai has concentrated mainly on onion crop by using hybrid seeds and proper fertilizer dose. He has taken up crop rotation to meet the city demands which lead to crop diversification. He does crop rotation of onion with maize crop. Changing crops annually reduces the chance of particular soil deficiencies developing as the balance of nutrients removed from the soil tends to even out over time. A variety of crops (and manure) on the same piece of land over a number of years typically is associated with greater soil organic matter, soil structure and aggregation compared to simple rotations or mono-cropping. Enhancement of such properties reduces soil erosion potential due to increased water infiltration and water holding capacity.

IMPACT OF INNOVATION/TECHNOLOGY

He has inspired 6 new farmers to take up onion cultivation. Has led to increase in production by 2000 kg per acres compared to the traditional crops of the region; and has increased soil quality through diversification.

RECOGNITION/AWARDS

None

ISSUES

The farmer has financial constraints as he requires up to Rs. 1 lakh for pre-ploughing. He is also trying to develop forward linkages himself as the local market doesn't offer good prices for the product.

PRODUCT VIEW

THEME OF INNOVATION

Continuous Banana Farming

FOCUS AREA

Fruits & Vegetables

DETAILS OF INNOVATOR

Name	Rajeshbhai Jayantibhai Patel
Experience	40 years
Region of operation	Gujarat
Turnover	Not disclosed
Volume	Not disclosed
No. of employees	Not disclosed
Contact details	At Post Panetha, Taluka Jhagadia, District Bharuch, Gujarat Mobile: 09930141781

BUSINESS MODEL

He did not require any extra money to implement this new cultivation practice. He provides free consultation to other farmers.

INNOVATION DETAILS

Traditionally in India, only one banana crop was cultivated in the entire period of one year. Now Rajesh Patel has introduced the concept of cultivation of seven crops of banana in two years. By this method, the labour cost, land preparation cost and tissue plant cost have been saved significantly. Also, it generates almost a continuous source of income for him. Plantation of banana plant is done only once in two years time period. The banana tissue plant is planted at a particular distance from the other plants and drip irrigation is used to save water. After cultivation of one crop, the existing banana plant is allowed to die and it becomes the green manure for next crop. Also, one of its buds (small grown plant) is nurtured to grow such that the next crop can be developed from this plant. Hence there is no need to prepare the field again and plant the new tissue. This process is repeated for next rounds of banana cultivation also.

IMPACT OF INNOVATION/TECHNOLOGY

This method, introduced by Rajesh Patel, has huge impact on the cultivation, production and on the income of the many farmers. By this technique, seven crops in one year can be produced. The income of the farmers has increased many folds and inputs cost has been also reduced.

RECOGNITION/AWARDS

None

ISSUES

High input and irrigation cost, unavailability of labour.

PRODUCT VIEW

THEME OF INNOVATION

Mixed Cropping of Banana and Papaya

FOCUS AREA

Fruits & Vegetables

DETAILS OF INNOVATOR

Name	Mehulbhai Bhogilal
Experience	8 years
Region of operation	Gujarat
Turnover	Not disclosed
Volume	Not disclosed
No. of employees	Not disclosed
Contact details	At Post Dungra, Taluka Kamrej, District Surat, Gujarat

BUSINESS MODEL

He sells produce in the local market. He does not take any loan assistance from the state or central government, and directly purchases banana and papaya tissue plant from market by investing his own money. He does not charge consultation fee for sharing this mixed cropping knowledge with other farmers.

INNOVATION DETAILS

Traditionally there was only one crop cultivated in this region. Mehulbhai introduced the concept of multiple cropping in horticulture crops here. He planted papaya and banana crops simultaneously. This method requires less labour to cultivate these crops because the two crops ripen at different points of time. Thus it makes it easy to manage the whole growing and cultivation process for both crops. He planted 650 plants of Papaya & 1100 plants of Banana alternatively in one acre of land.

IMPACT OF INNOVATION/TECHNOLOGY

Production increased more than 50% compared to regular crop. Thus it increased the income of farmers by taking multiple crops simultaneously on same field. It helped in reduction of cost and increase in profit per acre. Cultivation of multiple crops on the same field also results in improvement in the quality of soil.

RECOGNITION/AWARDS

None

ISSUES

No guidance regarding the selection of right crop for mixed crops from the agricultural scientists.

PRODUCT VIEW

THEME OF INNOVATION

Customization and Implementation of Imported Technology for Banana Cultivation

FOCUS AREA

Fruits & Vegetables

DETAILS OF INNOVATOR

Name	Desai Fruits & Vegetables
Experience	10 years
Region of operation	Gujarat, Maharashtra
Turnover	Not disclosed
Volume	Not disclosed
No. of employees	Not disclosed
Contact details	Plot No. 49, At Post Amadpore, NH8, Navasari, Gujarat Phone: 02637 281547, Mobile: 09824121574 (Mr. Ajit Desai)

BUSINESS MODEL

The technology was imported from Philippines at a fixed yearly fee and a success linked fee. A team from Philippines was maintained at the farms during the training and implementation.

INNOVATION DETAILS

India is world's largest producer of banana and yet it has been unable to produce significant amount of export quality bananas. Supply chain inefficiencies, outdated farming techniques and recurrent diseases had made this fruit from India uncompetitive in the international market. Seeing the immense potential in this fruit trade in and from India, Desai Fruit & Vegetables (DFV) started looking for technologies from overseas that could help realize this potential. It came across a Philippines based agency that had developed successful and comprehensive technology for both pre harvest and post harvest processes in banana cultivation. Similar technologies were also being offered by some other Philippines and South America based firms.

DFV associated with this agency to break away from the existing inefficient techniques and bring to India a new technology that has the potential to change the landscape of banana production in India. The technology involves multiple interventions at farm and processing level of the supply chain. The number of plants per acre is reduced to ensure greater resource availability to each plant. There is also a distinct fertigation plan. The biggest problem for banana cultivation in India is the disease called Siga Toka. This technology included application of certain chemicals at scheduled intervals that showed drastic improvements over control of this disease. There were also new techniques being implemented for plant care which included use of polythene covers and foam to prevent cosmetic deterioration of fruit. In the post harvest activities, special trailers were introduced for farm to pack house transport that ensured minimum damage to the fruits. The application of certain chemicals during the processing stage also ensured healthy survival of the fruits through the rest of the supply chain. There was even a superior ripening technique introduced that was much less harmful than the usual techniques being used in India.

IMPACT OF INNOVATION/TECHNOLOGY

Despite the lesser number of plants per acre, the overall yield per acre was significantly improved resulting in a substantial increase in production per acre, and thereby revenue per acre. The bunch weight increased almost by 50% while the cosmetics of the fruit also improved with much less marks and spots. Not only this, but instead of

the usual 2 harvest crops in every 2 years, it was possible to achieve 3 harvest crops in 2 years. DFV also invested efforts in extensive training of the farmers and in creation of farmer associations across villages.

RECOGNITION/AWARDS

- Coverage in Economic Times and Business Standard
- Award from APEDA

ISSUES

The first issue that is faced is the fact that farmers are very reluctant towards a new technology and also the fact that this technology actually asks them to plant fewer plants per acre. Also, this technology is labour intensive and requires the labourers to undergo focused training. There is also the necessity of using drip irrigation and the initial investment in infrastructure can also be a obstacle in more farmers adopting these techniques, if not shared by the exporter or subsidized by government. The availability of some chemicals is also limited and sometimes requires being imported.

PRODUCT VIEW

OTHER CROPS

THEME OF INNOVATION

A New White Seeded Rabi Type Pigeon Pea Variety called GT 102

FOCUS AREA

Other Crops

DETAILS OF INNOVATOR

Name	Pulse Research Station, Navsari Agriculture University
Experience	Not applicable
Region of operation	Gujarat
Turnover	Not applicable
Volume	Not applicable
No. of employees	Not applicable
Contact details	Pulse Research Station, Navsari Agriculture University Navsari, Gujarat Phone: 02637 282028, Email: pulsenau@gmail.com

BUSINESS MODEL

They produce and sell seeds to cooperatives and in markets. The product is marketed by Navsari Agriculture University (NAU).

INNOVATION DETAILS

Farmers in south Gujarat required a white seeded pigeon type variety for the Rabi season. Scientists at the Pulse Research Station, Navsari Agriculture University fulfilled this need by developing GT 102. It has medium-term maturity period, is moderately tall and has spreading type growth habit with purple red streaks green pods and bold white seeds. It is also resistant to SMD (Sterility Mosaic Disease) which is a big problem for farmers in this area. The disease manifests itself as bushy, pale green plants without flowers – the leaves develop a light and dark green mosaic pattern. Controlling this disease involves uprooting of the infected plants which takes time and labour.

IMPACT OF INNOVATION/TECHNOLOGY

This variety gives the farmers an option of Rabi plantation. This also gives a yield of 1595 kg per hectare and shows a 16.5% and 47.8% yield advantage over C-11 and BDN-2 (the other dominant varieties). The resistance to SMD is one of its biggest benefits.

RECOGNITION/AWARDS

None

ISSUES

The only major issue this variety faces is that if N-type fertilizer is applied in amounts greater than what is recommended, then the crop might get infected with SMD. Awareness of this for the farmers is critical and can do with better knowledge dissemination.

PRODUCT VIEW

THEME OF INNOVATION

Indigenously Developed Single Stage Extraction Technology of Cottonseed Integrated with Miscilla Refinery

FOCUS AREA

Other Crops

DETAILS OF INNOVATOR

Name	Abhay Cotex Pvt Ltd
Experience	2 years
Region of operation	Maharashtra
Turnover	Rs. 96 crore
Volume	Not disclosed
No. of employees	305
Contact details	Mr. D A Prasad (CEO) Email: Prasad.d@abhaycotex.com, Mobile: 09404505881 Mr. Ashish Mantri (Director) Email: Ashish.m@abhaycotex.com, Mobile: 09595291999 31, New Gud Market, Mondha, Near Bus Stand Jalna, Maharashtra – 431203 Phone: 02482 229308, Website: www.abhaycotex.com

BUSINESS MODEL

The oil extracted is sold in the local market. The by products are exported. The DOCs (De-Oiled Cakes) have a very good demand, and majority of the business is in repeat sales. They are generally exported to South Africa and other Gulf countries. The hulls are exported to China, where they are used to grow mushrooms.

INNOVATION DETAILS

There are several processes available in the market for the extraction of oil from cotton seed. The oil is traditionally extracted by direct crushing. This is also known as the expeller process. The seeds are crudely crushed along with the lints and hulls (which are non-oil containing impurities). Thus the de-oiled cake (DOC) obtained after this process contains lints and hulls in a crushed and compacted form. India has a production of 12.5 million tons of cotton seeds annually; and around 96% of the seeds are crushed by this technique. The drawback of this process is that there is no separation of hulls and lints before extraction of oil. So the DOC has low protein content due to presence of hulls and lints. The other processes involve several stages of separation of lints and hulls from the seed, before the oil is extracted. However, most of these processes have huge consumption of water, and correspondingly huge discharge of effluents. These plants have run into problems with the pollution board as the discharge of effluents is a huge challenge.

The process used by Abhay Cotex Pvt Ltd. Is a single step refining process, which doesn't use any water. In the delinting process there is a weight reduction of about 10% by the removal of lints, which are used for other purposes. The dehulling process results in the weight reduction of about 30%. This way only very finely cleaned seeds are passed on to the extraction stage, and hulls and lints are left behind. As this process uses absolutely no water, it results in enormous savings of water and energy in its operation. Also, this process results in DOC which has a protein content of 38% as compared to 18% in the conventional process.

IMPACT OF INNOVATION/TECHNOLOGY

Apart from a superior process which is much cheaper than its competitors, the by products of this process are also very superior, and have good market of their own. The DOC which is used as cattle feed is much superior than any other such product in the market – having a protein content of 38% compared to an average of 22% in the market. It commands a good premium in the market, and there is a huge export market for it. This DOC increases milk yield by 20% if used regularly. It is mainly because this DOC has high content (65%) of by-pass proteins as compared to the conventional cattle feed (6%).

The hulls (in a compacted form) are exported to china, where they use it to grow mushrooms. This gives much better yield than growing mushrooms on the land. Whereas the Indian farmers use these hulls as cheaper cattle feed, the Chinese use it for further value addition, and thus are ready to give a higher price.

Currently, there is a shortage of oil in India (it imports almost 45–50% of its requirement). In this perspective, using a process which wastes 6–7% of the oil is a huge loss to the country. A study by National Dairy Research Institute (NDRI), Karnal revealed that using this process for all the cotton seed processing in India would result in a savings of whopping Rs. 6300 crore a year.

RECOGNITION/AWARDS

- Young Achievers Award
- Mega Project Status by State Government of Maharashtra
- Acknowledged for Good Manufacturing Practice by SGS India (Food Certification Services)

ISSUES

One of the main problems is the availability of good quality cotton seeds. This is being currently countered by educating the concerned farmers over the need to maintaining good storage conditions.

There are challenges in selling the hulls also. The Indian market does not currently appreciate the benefits of breeding mushrooms on the hulls. So the 95% of the hulls are exported to China.

The selling of DOC is also a challenge. The biggest challenge is to convince the local dairies to adopt this new product. It has the potential to increase their profits by about 20%.

PRODUCT VIEW

THEME OF INNOVATION

Development of Export Opportunity in Molasses During Lean Season

FOCUS AREA

Other Crops

DETAILS OF INNOVATOR

Name	Vikas Gaikwad
Experience	11 years
Region of operation	Maharashtra
Turnover	Rs. 12 crore (Group Turnover)
Volume	Not disclosed
No. of employees	27
Contact details	Royal Agro Foods Industry 2nd Floor, Bhanu Mansion, Bhawani Shankar Road Dadar, Mumbai Mobile: 09029555440, Email: vikas@royalagrofoods.com

BUSINESS MODEL

Export of sugar molasses with full advance payment. He mainly develops his business through trade websites like alibaba.com

INNOVATION DETAILS

Molasses is a by product of the sugarcane milling industry and is used mainly as an industrial raw material for alcohol. India is the second largest producer of sugarcane ion the world. From the perspective of local demand, there is always plenty of sugar molasses available in the local Indian market even in the lean season. This is generally wasted or sold off for human consumption. Mr. Vikas Gaikwad decided to find overseas markets where the molasses are in a short supply during the lean season in India. He found that there was considerable demand for molasses in Africa and Middle East during this period, and utilizing this window for exports would provide a tremendous opportunity. At that time, there was hardly any prominent Indian exporter of molasses during this lean season and while it presented a scenario of least competition, it also presented a case of significant risk since no one else was doing it. He thus started to develop this market for exports. He mainly found his clients from the trade website: alibaba.com. Then initially he took orders without advance payment – but soon the problems in timely payments from the importers convinced him that advance payment is the solution. In the meantime, his initial shipments had already established his reliability as a supplier for the African importers. He also kept the prices low but viable enough so that the exported shipments can compete successfully with the local production in Africa. Within a couple of years, this has established itself a profitable and steady source of income.

IMPACT OF INNOVATION/TECHNOLOGY

Just merely identifying opportunity, he has developed a steady business of Rs. 1–2 crore (approx) turnover. The entrepreneurial initiative paid off despite the risks, and has demonstrated how an opportunity can be created if the agricultural traders look beyond traditional markets.

RECOGNITION/AWARDS

None

ISSUES

One of the major issues he faced was with relation to the terms of payment. The clients in Africa had a high default rate on payments. There were many bad debtors too, and it was very difficult to deal with them. Now, he has slowly changed his business plan and deals only with clients who agree to give 100% advance payment.

PRODUCT VIEW

THEME OF INNOVATION

Rice Seed Conservation

FOCUS AREA

Other Crops

DETAILS OF INNOVATOR

Name	Mr. Mavanji Ganpat Pawar
Experience	5 years
Region of operation	Nearby villages
Turnover	Not disclosed
Volume	Not disclosed
No. of employees	Not disclosed
Contact details	Village Chouk, Taluka Jawahar, District Thane, Maharashtra Mobile: 09209583106

BUSINESS MODEL

On this farm, they multiply seeds. These seeds are given free of cost to other farmers. The only condition is that the farmer should return twice as many seeds of the variety later. BAIF is providing some financial help to Mr. Pawar for this initiative.

INNOVATION DETAILS

This project is being operated in partnership with BAIF. Major objective is to conserve the local varieties of rice which are becoming rare. The hybrid varieties of rice that have become popular among farmers instead of these traditional varieties have resulted in high cost input cost because they require high amount of external inputs and has also resulted in the productivity of soil getting deteriorated. For future food security, it is essential to conserve these local varieties of rice. These varieties are also said to have higher nutrition value as compared to hybrid varieties. Under this project, different varieties of rice are collected from different clusters of Thane. They have found 220 rare varieties of rice from Thane district till date. These are planted in land and after harvesting, seeds are kept with care in specially designed pots. Also, records are kept on different attributes like yield, number of tillers etc. These seeds are given free of cost to other farmers on the condition that they will return twice as many seeds of the same variety later – thereby ensuring success of this seed conservation initiative.

IMPACT OF INNOVATION/TECHNOLOGY

Major step and innovation in India's future food security. Many farmers form different parts of country have visited and replicated this.

RECOGNITION/AWARDS

None

ISSUES

Need to do awareness campaigns on large scale. Needs more facilities to propagate these varieties to many other farmers.

PRODUCT VIEW

THEME OF INNOVATION

A New Variety of Green Gram – GBM1

FOCUS AREA

Other Crops

DETAILS OF INNOVATOR

Name	Pulse Research Station, Navsari Agriculture University
Experience	Not applicable
Region of operation	Gujarat
Turnover	Not applicable
Volume	Not applicable
No. of employees	Not applicable
Contact details	Pulse Research Station Navsari Agriculture University, Navsari, Gujarat Phone: 02637 282028, Email: pulsenau@gmail.com

BUSINESS MODEL

They produce and sell seeds to cooperatives and in markets. The product is marketed by Navsari Agriculture University (NAU).

INNOVATION DETAILS

Scientists at Navsari Agriculture university developed a new variety of green gram called as Gujrat Black Moong 1 (GBM 1). This green gram is black in colour and has very good residual moisture condition. It has short duration, medium tall in height having black coloured bold seeds. It is also resistant to MYMV, powdery mildew and macrophomina blight diseases and suitable for rabi cultivation under conserved moisture condition. This is a unique variety where farmers get an alternative for *rabi* moong bean.

IMPACT OF INNOVATION/TECHNOLOGY

This variety gives a yield advantage of 27.75% over the other varieties of green gram. It gives yield of 930 kg per hectares. The most important advantage of this is it acts as an alternative for rabi season moong variety. Earlier farmers only had one variety of moong that can be grown in rabi season.

RECOGNITION/AWARDS

None

ISSUES

Major issue this variety faces is that if N-type fertilizer is applied in amounts greater than what is recommended, then the crop might get infected with Yellow Mosaic Virus. Awareness of this for the farmers is critical and can do with better knowledge dissemination.

PRODUCT VIEW

FISHERIES

THEME OF INNOVATION

Cost-effective Fish Seed Packing and Transport

FOCUS AREA

Fisheries

DETAILS OF INNOVATOR

Name	Shri Hasan Mhaslai
Experience	6 years
Region of operation	Maharashtra
Turnover	None
Volume	Not disclosed
No. of employees	1
Contact details	At Gove, Post Pugaon, Taluka Roha, District Raigad, Maharashtra Mobile: 09421252939, Email: hasnmhaslai@yahoo.com

BUSINESS MODEL

He provides free consultation to the farmers. He depends upon word-of-mouth publicity – though he does not market the product for profit. He earns Rs. 3–4 lakh from other sources.

INNOVATION DETAILS

Mr. Hasan Mhaslai devised a new technique for packing of fish seed (fry and fingernails) from easily available polythene bags. The bags had dimensions of 50" by 24" and used 300–350 gsm material. They had a capacity to hold 50 litres of water as against 20 litre capacity of the traditional bags. He filled the bag with 5000 numbers of fry in 20 litres of water. He then filled the remaining bag with oxygen and sealed those bags with locally available nylon cables (250 x 4.8 mm) instead of jute rope.

IMPACT OF INNOVATION/TECHNOLOGY

The increased size of the polythene bag increased the no. of seeds per bag, and consequently reduced the no. of bags by one-sixth. This reduced overcrowding in packaging and eased transportation. It also reduced the packaging and transportation charges. The use of readymade ties or nylon cables for tying the polythene bags reduced the leakage of oxygen and increased the survival rate of the fish seed during transportation. This technology leads to cost reduction, increased profitability and reduced drudgery. It is also very easy to adapt and the cost to shift to this technology is very low. It also reduces the labour work by one-tenth and saves on water usage by 9 litres per drum.

RECOGNITION/AWARDS

- Chairman of Kundalika Macchimar Sahakari Society, Gove

ISSUES

The innovator is not doing the publicity due to lack of time and people are also not willing to buy the product due to the huge investment involved in this product.

PRODUCT VIEW

ANIMAL HUSBANDRY

THEME OF INNOVATION

Making Indian Bull Less Susceptible to Infections

FOCUS AREA

Animal Husbandry

DETAILS OF INNOVATOR

Name	Mr. Shivaji Jondhale
Experience	25 years
Region of operation	Maharashtra
Turnover	Approx Rs. 2 lakh
Volume	1 calf per year
No. of employees	3
Contact details	At Post Kauthe Kamleshwar, Taluka, District Ahmednagar, Maharashtra Mobile: 09545140773

BUSINESS MODEL

Earns revenue from the sale of bulls for agriculture purposes. He depends mostly on word-of-mouth publicity.

INNOVATION DETAILS

The innovator is having Indian breeds of cow like Khilhar. He also rears bulls. Instead of selling the milk from the cows, he rears the bulls on their milk which enhances quality of the bull and then he sells them in market for agriculture work purpose. The bulls reared in this manner are much more strong and capable for use on fields. They have been doing this work since last 2 generations. He is not involved in any other business or farming and has established this as a sustainable income.

IMPACT OF INNOVATION/TECHNOLOGY

The innovation has shown a novel opportunity as against traditional use of cows only for dairy farming/milk sale. With the use of local breeds, the cost end is kept low while the sale of bulls reared on this milk fetches far more profits than would be accrued from selling the milk. Many farmers in the surrounding villages have learnt about the concept and are implementing it.

RECOGNITION/AWARDS

None

ISSUES

None

PRODUCT VIEW

THEME OF INNOVATION

Area Specific Mineral Mixture for Livestock

FOCUS AREA

Animal Husbandry

DETAILS OF INNOVATOR

Name	Mr. R. S. Gupta
Experience	-
Region of operation	Gujarat
Turnover	Not applicable
Volume	Not applicable
No. of employees	Not applicable
Contact details	Research scientist, Animal nutrition Research Department College of Veterinary Science and Animal Husbandry, Anand Agricultural University Anand - 388110, Phone: 02692 263440

BUSINESS MODEL

Not Applicable

INNOVATION DETAILS

Farmers usually feed their animals based on one or two locally available concentrate ingredient(s), along with the grasses and crop residues, which leads to imbalanced feeding. As a result, milk production potential of the animals is not fully exploited and the cost of milk production is some times higher, if the animals are over-fed. If supplementation of minerals is adequate then it helps in efficient utilization of absorbed nutrients and in so many other ways, for improving growth, milk production and reproduction efficiency. Thus, Anand Agricultural university (AAU) undertakes mineral mapping program to identify area specific mineral deficiencies and formulate area specific mineral mixture to meet the mineral requirement of animals in a particular agro-climatic zone. The cost of 1 kg mineral mixture varies from 50–200.

IMPACT OF INNOVATION/TECHNOLOGY

It can be used as additive or food supplement with fodder. Chances of conception increases in case of cow and buffalo due to reduction in maturation period. As daily mineral requirement of animals get fulfilled, the chances of mineral deficiency get reduced. Also, diseases caused due to mineral deficiency get decreased. The improved health and balanced nutrition tended to improve milk yield of the animals, thereby increasing the income of their owners.

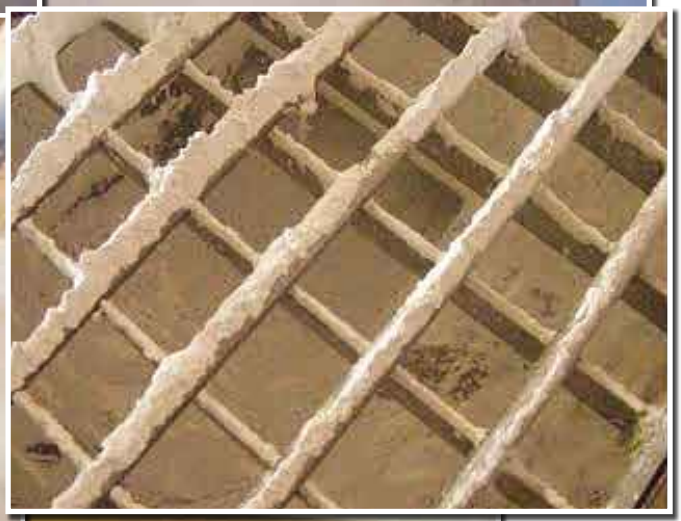
RECOGNITION/AWARDS

No award for this innovation but publication on this is in the process.

ISSUES

Variation of cost takes place as it is area specific. Raw material is available but there is need of optimization of quality and cost. Farmers don't have idea about daily requirement of minerals of animals, thus are not willing to buy.

PRODUCT VIEW



THEME OF INNOVATION

Probiotic Supplement for Farm Animals

FOCUS AREA

Animal Husbandry

DETAILS OF INNOVATOR

Name	Mr. Moulik Patel
Experience	-
Region of operation	Anand Agricultural University
Turnover	Not applicable
Volume	Not applicable
No. of employees	Not applicable
Contact details	"Trishakti" Bungalow, Madhuram Park, Opp. Ekta Parivar Society, A. V. Road, Anand - 388001 Mobile: 09998183710, Email: maulik8090@yahoo.co.in

BUSINESS MODEL

Not Applicable

INNOVATION DETAILS

Innovator is developing a probiotic formulation especially for farm animals. The product includes live micro-organism. The strain that is going to be used as a probiotic is *Bacillus pumilus*. The formulation will contain spores of *Bacillus pumilus. Bacillus pumilus* is Gram positive spore forming non-pathogenic microbes. The product contains the strain of *Bacillus pumilus* having antibacterial activity against Gram Positive microbes. This helps the targeted animal to survive disease related to gram positive microbes because it is a major area of concern for cattle as they are suffering from diseases like mastitis. The economic loss due to mastitis includes more than Rs. 1670.2 crore per annum. The aim of innovation is to develop a product that is involved in reducing the risk of attacking microbes for the farm animals.

IMPACT OF INNOVATION/TECHNOLOGY

The product can protect farm animals against gram positive pathogenic microbes as they produce an antibacterial compound. The product can be actively involved in reducing disease risk in poultry animals as they are more prone to microbial diseases. It can also be involved in colonizing pathogenic microbes and thus reduce the risk to all animals and even for aqua culture species like fisheries. Solutions with this probiotic product can help to improve farm animal's health and their immune system to combat against pathogenic microbes. It is especially useful in getting high quality and quantity of milk in case of mulching animals.

RECOGNITION/AWARDS

None

ISSUES

Innovator is financially weak, seeks funds for further research.

PRODUCT VIEW

DAIRY

THEME OF INNOVATION

Producing Low Cholesterol Milk through Gir Cattle Breeding

FOCUS AREA

Dairy

DETAILS OF INNOVATOR

Name	Mr. Vaji Bhai Mohan Bhai Patel
Experience	6 years
Region of operation	Aghwade village and other parts of Bhavnagar
Turnover	Rs. 14,40,000
Volume	36,000 litres/year
No. of employees	8
Contact details	At Post Aghevada, District Bhavnagar, Gujarat Mobile: 09712959191

BUSINESS MODEL

This project is self-funded by Mr. Vaji Bhai who sells around 100 litres milk/day at the rate of Rs. 40/litre through his own retail system which earns him an annual profit of Rs. 3.6 lakh. He has been involved in this business for 6 years and is ready to provide free consultation to others for starting up the same business.

INNOVATION DETAILS

There was a huge demand of low-cholesterol and low-fat milk which was more prevalent among the people of more than 50 years old. Therefore, Mr. Vaji Bhai from Aghwade identified this opportunity and decided to tap this market for providing low-cholesterol milk by focusing only on Gir cow breeding. Presently, he is planning to scale up this business by granting a loan for developing the facilities like better cowshed and water supply system. An increase of 1.5 kg milk/cow is being observed by the farmer. The soil quality is also improved by using the farm yard manure generated by the livestock. This has reduced the daily labourer requirement by 2 and also saves a total time of 2 hours/day in farm operations.

IMPACT OF INNOVATION/TECHNOLOGY

This milk has generated substantial demand in the village market and therefore more people are opting for the Gir breed.

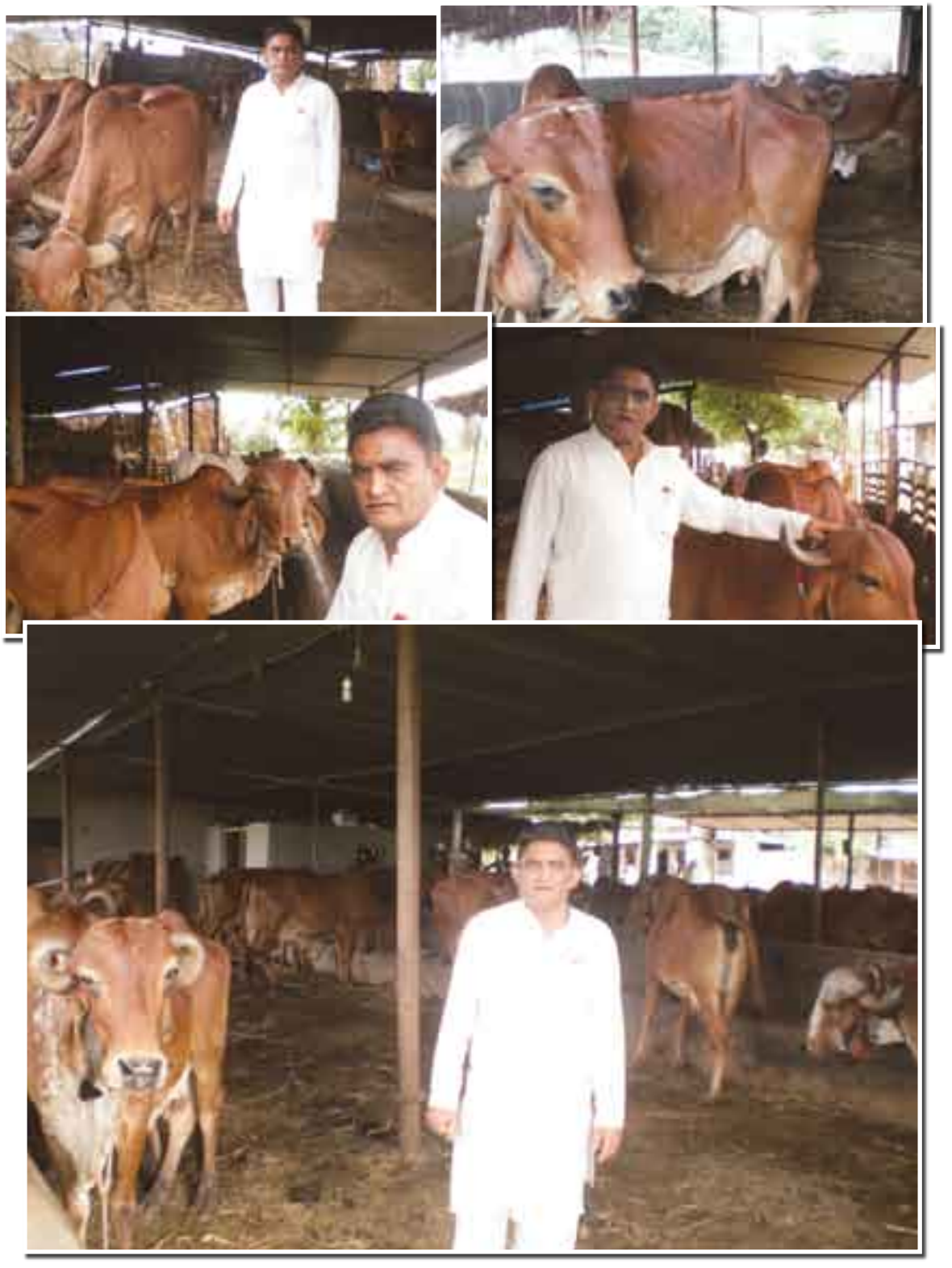
RECOGNITION/AWARDS

None

ISSUES

The major hurdle of this business is that the Gir cows are very sensitive and thus, one needs to be very careful for their maintenance. Skilled labour is a constraint because the innovator spends time in training them. According to Mr. Vaji Bhai approximately Rs. 7 lakh is required for developing the cow shade and water supply system.

PRODUCT VIEW



THEME OF INNOVATION

New Dairy Shed Design and Management

FOCUS AREA

Dairy

DETAILS OF INNOVATOR

Name	Mr. Kailas Jadhav
Experience	15 years
Region of operation	Pune, Maharashtra
Turnover	Rs. 54,75,000
Volume	40 Buffalos, 300 Litre Milk every day
No. of employees	3
Contact details	Raviraj Hitech Farm, AP Nere, Taluka Mulsh, District Pune Mobile: 09822258378

BUSINESS MODEL

There are 40 buffaloes in the dairy farm. Each buffalo gives around 9 to 11 litres of milk everyday which is sold in Pune by their own market chain at the rate of Rs. 50 per litre. They are using 5 Acre of farm land to produce fodder for buffaloes.

INNOVATION DETAILS

New hygienic and naturally cooled dairy shed have been designed which cost 4 to 5 lakh for 10,000 sqm area. This model provides good air circulation. The air circulates from top as well as from the sides. It also protects from sunlight and rain. They are managing a personal outlet in Pune to sell milk and other milk products. GI sheets have been used for the roof-top, this model design helps in keeping the temperature low during summers, and It is a cost effective and convenient design. Use of Ayurvedic medicine is majorly practiced on buffaloes. Also different type of grass is used to increase the nutrients in the milk. Model is working on holistic approach instead of only commercial approach.

IMPACT OF INNOVATION/TECHNOLOGY

The cost of medicine has been reduced by 50 to 60 Percent. 20 to 30% more milk is produced then other conventionally managed dairy projects. They get good income on the milk because of their own marketing chain. Many farmers and entherpreners from all over India visit their farm.

RECOGNITION/AWARDS

None

ISSUES

They seek for proper electric supply. Labour is a major issue. The existing design of milk extracting machine is not suitable for Indian buffaloes and seek for a better designed machine.

PRODUCT VIEW

MEAT & POULTRY

THEME OF INNOVATION

Indigenous Poultry Farming ("Desi Kombdi") with Small Plot Area

FOCUS AREA

Meat & Poultry

DETAILS OF INNOVATOR

Name	Dyandev Sopanrav Vagh
Experience	8 years
Region of operation	Maharashtra
Turnover	Rs. 11.4 lakh per year
Volume	1000 birds per month
No. of employees	2
Contact details	Near Aadarsh School, At Post Bhigvan, Taluka Daund, District Pune Mobile: 09970737195

BUSINESS MODEL

Local indigenous hens of a species called "Desi Kombdi" in local parlance are commercially reared for sale. Total birds are 3000 in number. Their age varies from 1, 2 and 3 months. Every month 900 to 1000 birds sold in market. Each birds costs Rs. 90 to 110. He makes profit of Rs. 35–45 per bird.

INNOVATION DETAILS

He has only 1 acre of land and he utilizes land for poultry farm – this is usually an unfeasibly small size for poultry farming. However, he has made this into a profitable venture.

About 3/8 acres of land is utilized for sheds for hens of this species. While half acre of land is used for growing feed for hens. Though the capacity is more, he does not utilize full capacity so that taking care of hens becomes easy. Up to 90% survival rate has been observed. He made all the sheds himself and also learned how to give vaccine to the birds.

IMPACT OF INNOVATION/TECHNOLOGY

The fact that even with a small plot of land he was able to develop a sustainable income through poultry farming has inspired a lot of small farmers in the region and they continue to visit him from time to time to start off in a similar manner.

RECOGNITION/AWARDS

None

ISSUES

Electricity is irregular and costly. Because of load shedding at night, many birds die.

PRODUCT VIEW

THEME OF INNOVATION

Emu Farming

FOCUS AREA

Meat & Poultry

DETAILS OF INNOVATOR

Name	Ashok Patil Tavare
Experience	10 years
Region of operation	Maharashtra
Turnover	Not disclosed
Volume	0.5 acre
No. of employees	3
Contact details	At Post Malegao Khurd 29 B, Taluka Baramati, District Pune, Maharashtra Mobile: 09767735151

BUSINESS MODEL

He sells eggs as well as the birds. He sold around 1250 eggs, 500 small bird couples and 20 big birds (each 25 kg approx) last year. He has also consulted many NGOs, farmers and individuals who are interested in promoting Emu farming in India. There is a training fee of Rs. 3000 per such trainee.

INNOVATION DETAILS

The region was traditionally dedicated to sugarcane cropping. The requirement of water was significant and round-the-year income was not assured. To address this, Mr. Tavare thought of utilizing a portion of his farm for Emu farming, which is relatively new to India.

For Emu farming, about 1500 m^2 area is confined for big birds. Newborn birds are kept in a separate closed compartment with controlled temperature. When the age is between 1 month to 3 months, birds are transferred to a small open-air compartment. After 3 months, birds are kept in a big open-air compartment. One employee is sufficient to take care of these birds. About 50 kg fodder is required to feed about 100 birds. The major part of this food is green grass (fodder) and this is grown on the farm. Each bird has a life span of about 40 years. The female ones give 18 to 32 eggs in a year and they produce eggs till about 25 years of age. A 12 to 15 year old bird is usually sold for meat.

IMPACT OF INNOVATION/TECHNOLOGY

Provides fixed income round the year. Water requirement is reduced to 75 percent as compared to conventional sugarcane crop. Labour requirement is also less, when compared to sugarcane cultivation. Many entrepreneurs from nearby villages got motivated from this project and successfully started on their own.

RECOGNITION/AWARDS

None

ISSUES

Due to being a relatively new concept to India, the awareness about Emu farming is low and could help with more publicity initiatives from other agencies.

PRODUCT VIEW

COMMUNITY INITIATIVES

THEME OF INNOVATION

Cost Effective Crop-livestock Integrated Farming

FOCUS AREA

Community Initiatives

DETAILS OF INNOVATOR

Name	Mr. Natthu Bhai Kalu Bhai Jadhav
Experience	4 years
Region of operation	Omer village, Talaja and Mahava region
Turnover	Rs. 5,40,000
Volume	14,600 litres
No. of employees	5
Contact details	At Post Degvada, Taluka Mahuva, District Bhavnagar Mobile: 09427559234

BUSINESS MODEL

Mr. Natthu Bhai sells 40 litres milk/day at the rate of Rs. 37/litre to Bhavnagar District Milk Producing Union Limited which earns him an annual profit of Rs. 4 lakh. He is also a part of the milk cooperative and this cooperative purchases milk at fat percent basis. He is ready to provide free consultation to others for starting up the same business.

INNOVATION DETAILS

The initiatives taken by Mr. Natthu Bhai like converting an old barren land into a productive one and developing cattle farming along with it brought a significant positive change in his and his associates' livelihoods. Earlier there was no water percolation in the soil which prompted Mr. Natthu Bhai to develop ponds for farming activities and hence, he started cattle farming with it too. He formed a group of 12 people in the village to run this business as a cooperative model. The farm yard manure is being used in farming and the produce from the farm is being used as a feed to the cattle which has reduced the overall cost significantly. Recently, he has been separated and is doing this business independently with 5 buffalos. Presently, he is planning to scale up this business after identifying the demand in the market.

IMPACT OF INNOVATION/TECHNOLOGY

As a result of this innovation, an increase of 2 litres of daily milk production is being observed. The soil quality is also improved by using the farm yard manure generated by the livestock. Besides this, a total 50% reduction in labour requirement and 30% to 50% time saving is also being noticed. Moreover, the business is not very complex and hence, very easy to maintain.

Overall, the creation of milk cooperative has tremendously helped the dairy farmers to fetch a good price for their production as well as encouraged many more to take up dairy farming.

RECOGNITION/AWARDS

None

ISSUES

Although there are no problems faced by the farmer regarding the marketing aspect, but approximately Rs. 10 lakh are required for purchasing more livestock and building new sheds in order to scale up the business. Presently he is planning to purchase 20 more buffalos for milk production.

PRODUCT VIEW

THEME OF INNOVATION

Community Farming, Growing Exotic and Local Vegetables and Flowers

FOCUS AREA

Community Initiatives

DETAILS OF INNOVATOR

Name	Abhinav Farmers Group
Experience	10 years
Region of operation	Maharashtra
Turnover	Not disclosed
Volume	Not disclosed
No. of employees	850
Contact details	Abhinav Farmers Group, S. No 428/1, At Post Man, Taluka Mulshi, District Pune

BUSINESS MODEL

50% subsidy is provided by Maharashtra government to setup green house. 20% profit on turnover was made possible in the last financial year. Vegetables and flowers are grown only after taking orders in advance from the consumer. So assured market for the products.

INNOVATION DETAILS

The region had seen a growing interest in the farmers for exotic vegetables and flowers. However, when it came to marketing these products, there was a major hurdle faced in terms of certainty of demand as the local APMC did not have regular demand for these products. With an aim to solve this problem, a group of farmers came together and decided to synergize the grading, packaging and delivery operations as well as develop forward linkages directly with Pune based hotel chains, retail outlets and other customers. All the crops are grown organically. Permanent raised bed system with drip irrigation is used. The farmer group has now grown to about 216 members and is employing about 850 people. The vegetables and flowers from the farms of the member farmers are transported to the farm of a few selected members. These members are also the ones who are at the forefront of developing forward linkages in Pune city on behalf of the farmer group. Here, the grading and packaging are done on farm by self-help group. Finally, the products are transported to Pune city customers for direct delivery.

IMPACT OF INNOVATION/TECHNOLOGY

This is a very good example of reaching out to the demand with non-traditional crops. The ability to build the forward linkages themselves has eliminated middle men from the supply chain and the concept of working together has enabled a lot of synergizing and knowledge sharing.

RECOGNITION/AWARDS

- National Award of 2007–08

ISSUES

The demand has outpaced production and the group is looking at more farmers joining in.

PRODUCT VIEW

THEME OF INNOVATION

Agro Service Centres

FOCUS AREA

Community Initiatives

DETAILS OF INNOVATOR

Name	Deepak Fertilizers and Petrochemicals Corporation Limited
Experience	-
Region of operation	Maharashtra
Turnover	Not disclosed
Volume	2500 farmers every year
No. of employees	85
Contact details	201–204 Marigold, Neco Gardens, Viman Nagar Pune - 411014, Maharashtra, India Phone: 020 66478000, Email: abfs@deepakfertilisers.com

BUSINESS MODEL

Mahadhan Saarrthie Centers cover over 1000 villages and reach out to nearly 10,500 farmers across Maharashtra, Karnataka and Gujarat.

INNOVATION DETAILS

Deepak Fertilizers has initiated an advisory based 'Mahadhan Saarrthie' concept to provide agri solutions under one roof. Mahadhan Saarrthie aims to provide total agri-solutions through soil, water and plant testing facilities vis a vis complete crop nutritional management by utilizing its range of plant nutrient products which include secondary and micronutrients in addition to the primary nutrient (NPK). Each Mahadhan Saarrthie centre operates from centrally located offices in potential market places. To provide efficient services, each centre is managed by an Agronomist who is assisted by a team of supervisors and technical assistants. A team of five Saarrthie supervisors support the Agronomist with field work. They provide crop-based technical advice based on the test reports, and marketing information through interaction with member farmers. They also organise field days, crop seminars and expert field visits and provide marketing linkage for selling farm produce through procurement and retailing, apart from ensuring higher yields for identified crops. These make farmers globally competitive, and provide them valuable information pertaining to selected crops from its library. The main services in which they help farmers are plant nutrition services, good agricultural practices, post harvest management services and farm linkages services.

IMPACT OF INNOVATION/TECHNOLOGY

Due to the presence of these centers in the villages, the farmers are seeking expert advice for all the technical details without travelling far from their farms and markets. It has bridged a very long standing gap between the farmers and the access to knowledge pertaining to latest developments in agricultural sciences.

RECOGNITION/AWARDS

- Award for best extension activities from FAI

ISSUES

Availability of agricultural inputs in some centres becomes an issue. Adoption of the advisory provided by theses centres is not 100%.

PRODUCT VIEW

THEME OF INNOVATION

Krishi Vigyaan Vahan

FOCUS AREA

Community & Industry Initiatives

DETAILS OF INNOVATOR

Name	Aries Agro Limited
Experience	42 years
Region of operation	Maharashtra
Turnover	Rs. 175 crore
Volume	Not disclosed
No. of employees	500–1000
Contact details	Aries House, Plot no 24, Deonar, Govandi (E), Mumbai - 400043 Phone: 022 25564052

BUSINESS MODEL

Aries Agro has pioneered several unique concept development initiatives for spreading knowledge of world class plant nutrition concepts to over 8 million farmers across 26 states in India. This includes over 500 trained marketing staff and a fleet of 100 **Krishi Vigyan Vahans (KVVs)** fully equipped with Audio visual equipment, mobile soil testing equipment, an agronomist and demonstration material which visits 6 villages every day along pre-determined routes to spread awareness of the innovative concepts that form the basis of Aries brands.

INNOVATION DETAILS

Aries Krishi Vigyan Vahans (KVVs) - A fleet of 100 vehicles, fully equipped with Audio visual equipment, mobile soil testing equipment, an agronomist and demonstration material visits 6 villages every day along pre-determined routes to spread awareness of the innovative concepts that form the basis of Aries brands. In addition to spreading knowledge and creating demand, the staff on the vehicle book orders and provide farmers with free accident and medical insurance facilities. These vehicles represent a marketing practice that is changing the method of information delivery in rural communities. Moreover, the dealers' and distributors' stocks are sold faster due to the orders booked on the KVVs - thus keeping them actively involved as beneficiaries of this innovation.

IMPACT OF INNOVATION/TECHNOLOGY

KVVs focus is to build awareness in remote, un-serviced markets. They conduct farmer meetings and audio-visual shows on product applications. They also provide doorstep farmer advisory services, soil testing and query resolution. Incentives are given to farmers by providing special schemes on booking through the KVVs. They also keep track of impact of extension work i.e. farmers contacted v/s booked orders v/s actual sales.

RECOGNITION/AWARDS

- These vehicles were applauded by The Wall Street Journal as one of the most innovative rural marketing techniques in use in India today.

ISSUES

For selling products in India, one requires a sales tax number which is not entitled to moving vehicles. Thus these vans cannot be used for selling the products – only for booking orders.

PRODUCT VIEW

THEME OF INNOVATION

Agro Service Centres

FOCUS AREA

Community Initiatives

DETAILS OF INNOVATOR

Name	Shashank Kumar, Manish Kumar
Experience	3 years
Region of operation	Bihar
Turnover	Not disclosed
Volume	Not disclosed
No. of employees	Not disclosed
Contact details	Kharauna Gate, (Bouddha Vishwa Shanti Stoop), Vaishali, Bihar Mobile: 09304511409

BUSINESS MODEL

FnF remains with farmers throughout the season, right from the crop selection to marketing for a nominal fee. FnF maintains profile of every member farmer, which covers land details, cropping pattern of last 3 years, irrigation plans, help available on the farm and other details. Farms n Farmers (FnF) have a large and diversified farmer's base across the state. FnF farmers' network is well capable of meeting the demand of all kind of suitable cereals, pulse, vegetables, spices and fruits.

INNOVATION DETAILS

Farms and Farmers (FnF) provides 360^0 services to farmers – right from crop selection to marketing. FnF forms a cluster of farmers of neighbouring villages and plans the crops for the next 1 year based on soil condition and farmer's profile. Other operations, including centralized procurement of quality seeds of the selected crop at the negotiated price, farmers' training, season scheduling, troubleshooting, harvesting and post harvest value addition etc. is done at the village level. At the end of these processes the produce is collected from the nearest centre. Nearest FnF centre provides other useful information like daily price of relevant agricultural commodities, videos of new technology, success stories of farmers in other parts of the country etc. Today FnF team is working with more than five hundred farmers in six districts of Bihar. FnF is helping its member farmers on a total of 350 acres across the state with crops like basmati rice, rajma, baby corn, mushroom, litchi, papaya, gram, medicinal herbs, spices and seasonal vegetables.

IMPACT OF INNOVATION/TECHNOLOGY

FnF's working model is such that even a small farmer gets benefitted like a large farmer: being a part of a bigger cluster helps them secure their raw material at lower costs while giving them higher return for their produce - and at the same time, eliminates the need to go to multiple middle-men at various stages. This leads to increment in revenue per unit area by 40%–50% for a small farmer and also reduces the frequency of returns from 150–160 days to 80–90 days.

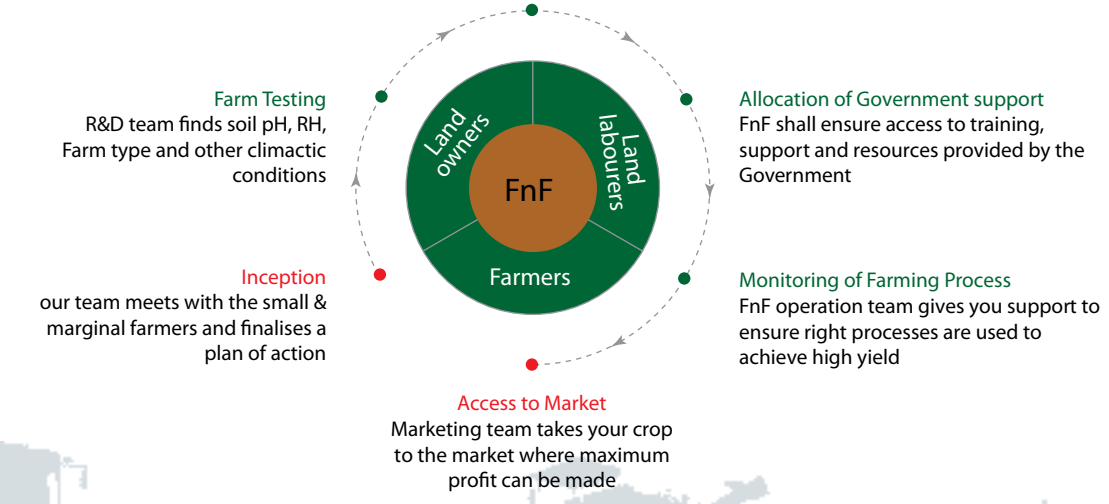
RECOGNITION/AWARDS

None

ISSUES

One of the most difficult steps in this direction is to build faith and trust with the local farmers. As the farmers have a history of being cheated by multiple middlemen in the past, it is very difficult to make them see that by associating with FnF, they have nothing to lose but only gain.

PRODUCT VIEW



Crop Finalisation
Based on R&D result and Market andalysis expert recommends what to cultivate

Farm Testing
R&D team finds soil pH, RH, Farm type and other climactic conditions

Allocation of Government support
FnF shall ensure access to training, support and resources provided by the Government

Inception
our team meets with the small & marginal farmers and finalises a plan of action

Monitoring of Farming Process
FnF operation team gives you support to ensure right processes are used to achieve high yield

Access to Market
Marketing team takes your crop to the market where maximum profit can be made

THEME OF INNOVATION

Community Effort for Kalbhat Variety Rice Conservation and Organic Production

FOCUS AREA

Community Initiatives

DETAILS OF INNOVATOR

Name	Mr. Sarang Pande (Lok Panchayat)
Experience	10 years
Region of operation	Nearby villages
Turnover	Rs. 12 lakh
Volume	225 farmers in 25 villages in Akole block
No. of employees	Not disclosed
Contact details	Lok Panchayat, Taluka Sangamner, District Ahmednagar Maharashtra Mobile: 09421590907

BUSINESS MODEL

About 100 hectare of land under cultivation for this variety. Lok Panchayat buys at a rate of Rs. 25 Per kg for non-dehusked rice from farmers. They sell this in market at the rate of Rs. 50–60 per kg.

INNOVATION DETAILS

Lok Panchayat is an organization of farmers - it gives training to the farmers about organic farming, organic fertilizer and pesticide production, government schemes and many other topics in farming. It also does the marketing of a rare variety of rice. Kalbhat is a local indigenous variety of rice - it has fragrance and high nutritional value. It has become a rare variety because of hybrid high yield varieties forced by the market demand. The marketing support has resulted in good returns to the farmers for this variety of rice compared to earlier. The organization has also helped the farmers to implement low cost organic inputs and processes. Productivity achieved is about 9 to 10 quintals per acre. The organization is also continuously doing research on a 10 acre experimental farm. The member farmers organize meets together and discuss on the policies and plan of actions.

IMPACT OF INNOVATION/TECHNOLOGY

Being a big group of farmers and it being a rare variety of rice has enabled them to get good subsidies from government. Farmers are happy because they have also saved money on all the external inputs as seeds are available from their own crops and low cost input can be made on farm. More and more farmers are joining this organization and getting benefits.

RECOGNITION/AWARDS

None

ISSUES

Farmers have more faith on hybrid variety than this variety. Good demand can be generated in market through continued effort but the fact that productivity is 2 times less as compared to the hybrid variety, is an initial inhibitor.

PRODUCT VIEW

THEME OF INNOVATION

Community Vegetable Growing (Vegetable Hub)

FOCUS AREA

Community Initiatives

DETAILS OF INNOVATOR

Name	Mr. Krishnapal Singh Moray
Experience	6 years
Region of operation	Nearby villages
Turnover	Not disclosed
Volume	200 farmers
No. of employees	Not disclosed
Contact details	Sanawad, District Khandawa, Madhya Pradesh, Mobile: 09826621562

BUSINESS MODEL

He provides free consulting for crop selection, crop cultivation and soil inspection. Also provides advice on different fertilizers and eco-friendly chemical pesticides. With all practices put together, his farm provides an average of Rs. 2 lakh profit per acre. He has also started his own drip irrigation and mulching paper supply agency.

INNOVATION DETAILS

Mr. Moray had 50 acres of land – most of which was not in use for cultivation and the quality and quantity of yield was also dismal. Hence he decided to try growing various varieties of vegetables on 30 acres of land and treat it as an experiment. He would find out about the best practices for cultivation, crop selection and soil improvement, and implement them on this farm. Gradually, he was able to build an empirically tested knowledge about all the aspects of vegetable growing for the soil and climatic conditions of that region. The land which was hardly giving any good yield, now gives considerable profit. For land development, he mainly used mulching and drip irrigation techniques. He also used different high yield hybrid variety seeds in order to find the best suited ones for the conditions of his farm. Today, he grows major vegetables like capsicum, water melon, tomato, chili, bitter guard etc. About 200 big farmers followed suit after consulting him. Now they even cater to the vegetable market together and use common transportation to optimize on the costs and effort.

IMPACT OF INNOVATION/TECHNOLOGY

This is a good example of the risk-taking ability of Indian farmers. The fact that a farmer decided to experiment on a large scale and develop a solution using various bit and pieces of knowledge he got from here and there, is proof of that. The knowledge, when shared with other farmers of the region has even led to about 200 farmers benefiting from his experience and even leading to a common market development and transport initiative from them – an example of how an individual benefit could lead to wide ranging impact in the region.

RECOGNITION/AWARDS

- "Best Farmer" award at block level

ISSUES

The group of farmers has a demand for mulching machine which is not easily available. Also the mulching paper provided by government is said to be of inferior quality. He also mentions that the Government does not provide MSP (Minimum Support Price) for vegetables and thus leads to a level of uncertainty in sale price for the farmers – which is especially proving to be a hindrance for small farmers in taking up vegetable cultivation.

PRODUCT VIEW










THEME OF INNOVATION

Traditional Weather Forecasting Technique for Small Farm

FOCUS AREA

Community Initiatives

DETAILS OF INNOVATOR

Name	Shri Nagesh M Swami
Experience	12 years
Region of operation	Maharashtra
Turnover	Rs. 1,10,500
Volume	Not applicable
No. of employees	1
Contact details	Shewade (Umbraj) Taluka Karad, District Solapur - 415109 Mobiles: 09822848432, 09423341861

BUSINESS MODEL

This technique developed by Mr. Swami gives an accurate prediction of weather for next 6 months. He can predict the average rainfall, also number of rainfall days for the coming week. It also helps him to do all farm operations within safe time period. Many farmers and interested people visited his farm and tried to understand this method.

INNOVATION DETAILS

As the government does not provide weather forecasting for a particular area or region. So for small farmer it becomes difficult to understand that for next 6 months how the weather will progress and which crop is suitable for the upcoming time. The innovator developed a system which helps him to predict the intensity of wind flow, sunlight, rainfall, moisture etc. for next 6 month as well as for coming week also. From his experience, he was confident that his predictions are 80 to 90% accurate over the actual climate on predicted time period. He maintains a diary in which he has written the weather conditions of every day for last 6 years. He is predicting the weather using the past data and the position of asterisms (Nakshatra), Sun, Moon and Earth. He always sends the information of his prediction to the agriculture university in his area.

IMPACT OF INNOVATION/TECHNOLOGY

Due to the availability of past data to him he can predict the natural season of different crops in future time. It helps him to take crop pattern accordingly in his farm. It saves his time and get every time good organic farming crop yield. This method helps the farmer to become self-reliant.

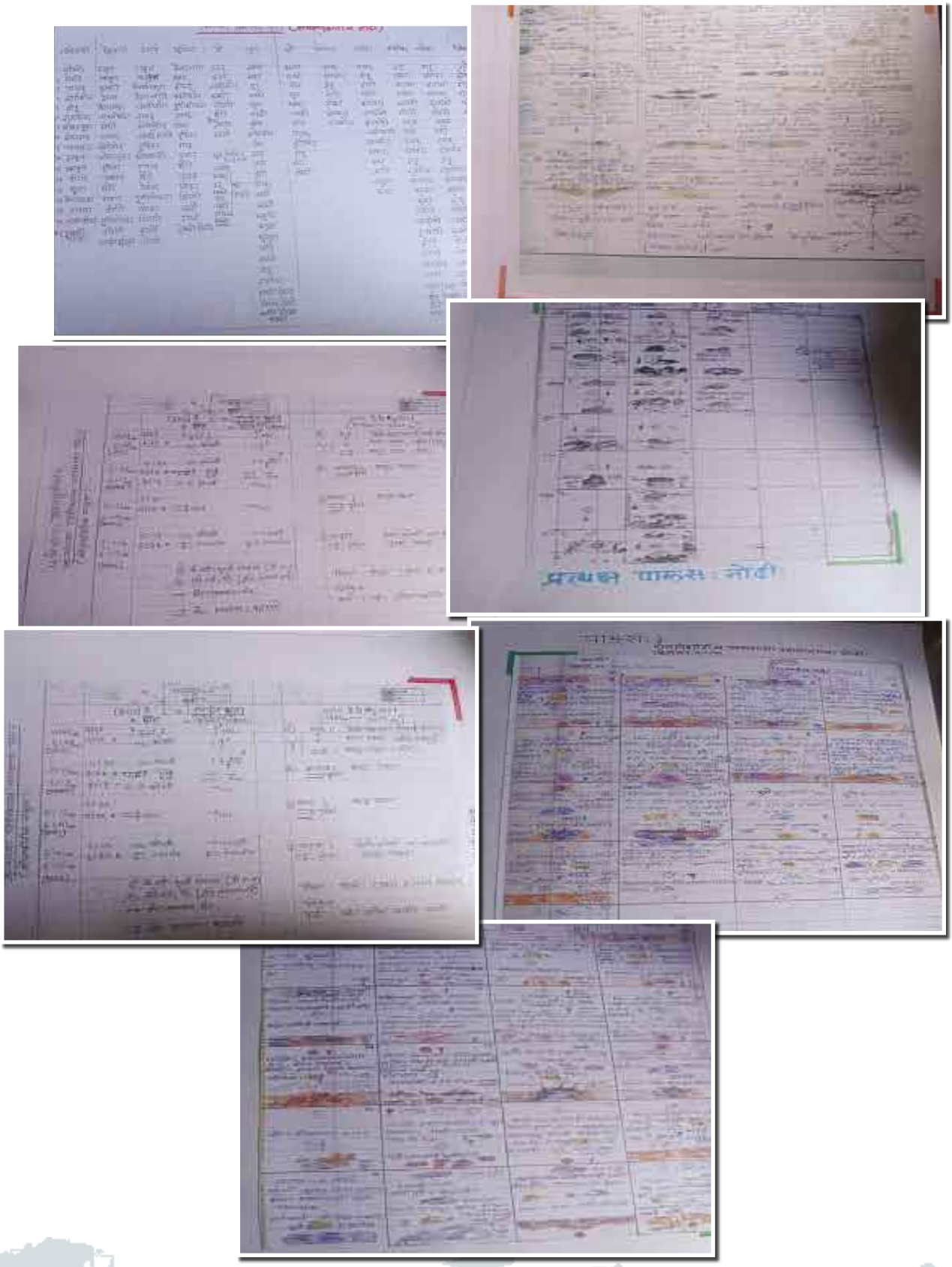
RECOGNITION/AWARDS

None

ISSUES

The innovator requires a cheap rainfall measuring device. In addition, he appeals government and agriculture university to include his knowledge in the present syllabus.

PRODUCT VIEW



THEME OF INNOVATION

Innovative Contract Farming Model for Pomegranate

FOCUS AREA

Community Initiatives

DETAILS OF INNOVATOR

Name	InI Farms Pvt. Ltd.
Experience	NA
Region of operation	Maharashtra/Madhya Pradesh
Turnover	Not disclosed
Volume	Not disclosed
No. of employees	37
Contact details	B202, Universal Business Park, Chandivali Farm Road, Andheri (E), Mumbai - 400072 Phone: 022 42600700

BUSINESS MODEL

Contract Farming for development of pomegranate orchards and direct supplies to retailers and exports – the idea is to build large scale plantations to drive economies of scale while working with small farmers.

INNOVATION DETAILS

INI Farms and Pravara Fruits and Vegetables Marketing Society have entered into an association to develop 300 acres of pomegranate farms with small and medium farmers. The innovation is in developing innovative model for contract farming wherein the company, society and farmers jointly invest into development of orchards with technology, inputs and management provided by company and society; minimum guarantee price provided to farmers and additional profits generated are shared between the 3 entities. The model taps into the various government schemes like SFAC Venture Capital scheme and cluster development schemes to provide financial support to farmers.

IMPACT OF INNOVATION/TECHNOLOGY

The innovative model would support 60–70 farmers, will remove all intermediaries leading to superior realization for farmers, increases productivity by 30% and produces best quality products meeting Globalgap standards. The innovative model ensures that each entity's interest are aligned for the success of contract farming model.

RECOGNITION/AWARDS

None

ISSUES

There have been significant issues in making contract farming work in India due to conflicts of interest and fluctuations in market prices.

PRODUCT VIEW

THEME OF INNOVATION

Producer Company Model for Agriculture Prosperity

FOCUS AREA

Community Initiatives

DETAILS OF INNOVATOR

Name	Mr. Nayan Ranjan
Experience	5 years
Region of operation	Gaitatganj
Turnover	Rs. 65 lakh per annum
Volume	2001 shareholders
No. of employees	Not applicable
Contact details	Village MehguvanKalan, Raisen - 464552, Madhya Pradesh Mobile: 09329775146, Email: ikcpcl@rediffmail.com

BUSINESS MODEL

Lavkush Crop Producer Company started under the initiative of DPIP project to incorporate producer company for small and marginal farmers to link them directly to market so that with limited resources, with technology assistance they can enhance their farm production and fetch better prices of their farm produce. Lavkush Crop Producer started functioning from 1 village and now its presence has reached to 63 villages of two blocks namely Silvani and Gairatganj comprising of nearly 2000 shareholders.

INNOVATION DETAILS

DPIP had granted fund for well, tube well, diesel pump, quality seed etc. for enhancing the farm production. Currently this company is engaged in seed business and farm input supply for providing good quality of seed, fertilizers and agro chemicals to poor and marginal farmers at reasonable prices. It introduced new variety of soya bean first time in district through breeder seed, and also a new variety of green gram, pigeon pea, and field pea.

IMPACT OF INNOVATION/TECHNOLOGY

The farmers of village Megaun-kala were growing potato but the predicament was that they were not getting good market prices of their produce. By seeing such circumstances DPIP had motivated farmers to form a federation at farmer level. Farmers were benefited on premium and subsidy, quality seeds, better market price of farm products, knowledge up-gradation about market force, good quality seed at subsidized rates. They provide the agri inputs on marginal and subsidized rate on doorstep through their service provider.

RECOGNITION/AWARDS

None

ISSUES

None

PRODUCT VIEW

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Note for Readers

This compendium of innovations has been compiled on behalf of SFAC by INI Consulting Pvt. Ltd. Due diligence has been exercised by the consultant to verify the claims of the innovators and make a field check in every case and collect relevant documents etc. Copies of all these records are available with SFAC.

However, it is still possible that certain factual inaccuracies may remain in some of the case studies. Readers are encouraged to bring these to our knowledge if they are aware of such errors.

We also invite additional inputs on similar innovations from all parts of the country and will shortly publish a second volume along these lines. Information should be submitted in the same format as it is published in this volume and must be accompanied with photographs.

Contributions may be posted or e-mailed to SFAC at the address on the back cover.

YEAR of HORTICULTURE 2012

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