

Reimagining Agriculture

Farmers Innovations



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PREFACE

Agriculture is a way life in India, and is deeply intertwined with its culture and traditions. Although the most commonly used natural resources are the land and water, the resource base includes the house/buildings for family and livestock, the animals, crops, genetic material and locally manufactured equipment. But more important resource is the know-how that specifies how to combine and use all these resources. The technologies or practices that are developed through formal research as innovations have helped the country to enhance agricultural production manifolds ever since Independence. In addition to these technologies, the innovations and reinventions by the farmers and practitioners have widened the basket of the location specific technologies to suit various agro climatic conditions and to meet the ever-changing consumer requirements. In the changing global-village scenario, the demand for redefining agriculture as a profitable and economically viable profession is gaining strength and accumulating mass than ever before.

Considering the diversity in the production situations and dynamics in the post-production environment, there is a greater need to identify, recognize and promote farmers innovations. Best part of these innovations is that these have not only emerged from vastly-experienced farmers but also from the budding tech-savvy entrepreneurs entering into agriculture with imaginations of their own. Such explorations have led to the development of crop varieties, planting material, agronomic practices, livestock management techniques, low-cost multi-purpose ergonomic machines, problem-solving gadgets, value added products and so on. Benefits accrued from such innovative ideas need to be widely shared for the advantage of different stakeholders. Beyond these innovations, the scientific talent behind such grassroot level innovations also needs to be encouraged and recognized. The Indian Council of Agricultural Research (ICAR) through its Agricultural Technology Application Research Institutes (ATARI) across the country has rightly initiated the process of documentation of farmers' innovations. ICAR, ATARI- Bengaluru has made an effort to document innovations in the form of this publication "**Reimagining Agriculture: Farmers Innovations**" for the benefit of everyone in the system.

This document collates the efforts of farm innovators in the thematic areas of nursery management (2), varietal development, cropping systems (3), resource management (3), livestock management (5), fodder production (3), processing and value addition (4), wild-life management (3), and farm mechanization (11). A total of 35 profiles of innovators are presented by 22 KVKs across Karnataka. Each one throws light on their simple yet useful ideas and innovative practices. We gratefully acknowledge all the farmers and thank them for wholeheartedly sharing the information and images related to their innovations. Efforts made by the Scientists of KVKs in visiting and collecting details of the innovations and the innovators are highly commendable. We sincerely hope that this compilation on the unsung heroes of the hinterlands inspires several others.

Date: 08-02-2019

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FOREWORD

An agricultural innovation system is about people, the knowledge, technology and cultures they have created or learned. It also includes new ideas they are experimenting with. Innovations in farming arise from the need to address a wide ranging challenges relating to ecological, climatic, economic and socio-cultural conditions. Innovations in farming technology, both from formal and informal sectors, have contributed to a rise in productivity and income to the farming community. The positive results have encouraged the innovative farmers to evolve with the time and have access to technologies which are in sync with today's needs. It is necessary to document the farm innovations for their further upscaling and out scaling. Identifying and recognising the innovator farmers is equally important to boost their self-esteem and also to motivate the fellow farmers for experimenting with new ideas.

The Krishi Vigyan Kendras (KVKs) have been very receptive to this scenario and are facilitating validation of farmers' innovations in a participatory mode. KVKs are also enabling the adoption and sharing of such innovations in the community by mainstreaming those into on-going schemes for wider adoption. I appreciate the efforts made by the KVKs of Karnataka in identifying good number of innovators, their innovations and collect the details in a systematic manner. Contributions of the scientists in identifying the innovations covering entire gamut of agriculture are commendable. The innovative farmers featured in this publication are role models and can inspire others to innovate. Hope this book will be a source of motivation for other farmers to attempt innovations to overcome their problems as well as problems of farmers in the community.

The ICAR-ATARI Bengaluru deserves all the appreciation for its efforts in guiding KVKs in identifying the innovators and bring out a quality publication.

Date: 08.02.2019

(A.K. Singh)

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Vegetable Nursery with a Market Vision



M. Prakash

Ekalavya Hitech Nursery
Pakegowdanapalya
Bengaluru - 560 090
Age : 50 years
Education: SSLC
Land holding: 7.5 acres
Mobile: 9448306101

A small scale vegetable nursery “Ekalavya” began in the year 2000 with an investment of Rs. 150. The journey was riddled with problems. Poor quality and high cost of coir pith compost was the initial teething problem. High-value plants of capsicum (Rs. 5 to 8 per seedling) kept at ground level in the poly house were often subjected to disease infection. Under shade net, rains or insufficient humidity/sunshine affected the nursery production. Labour shortage, unskilled manpower and high cost led to reduced profits. He overcame all these and innovated at each stage with the support of scientists of Indian Institute of Horticulture Research (IIHR), located a few kilometers away.



Innovations

- Preparation of quality media material of well-decomposed coco-peat, enriched with microbial consortia of IIHR and a home-made pro-biotic mixture was his first innovation.
- Mechanization like pulverizers, seed sowing machines, conveyor belts, modified transport vehicle with easy to operate racks and box system all have complemented each other to increase efficiency.
- Created an elevated metal platform structure to prevent ground contact for high value plants and switched to 70-cup pro-tray having larger bowl size to avoid disease infection at ground.
- In the shade-net nursery, experimented with plastic tunnels and finally arrived at a triangle structure covered by plastic sheet with easy to roll and un-roll mechanism.
- Having realized that successful farmers are his true ambassadors, he guides farmers in choice of varieties, right time of sowing that coincides with right marketing season, field

level assistance in the form of providing skilled labour for specialized planting of high value crops like capsicum or papaya ensured farmers make the horizontal spread of its name.



Output and Outcome

Prakash is able to produce media at a cost of Rs. 2 per kg as compared to commercially available not-so-good quality media which is priced at Rs. 5 per kg. Own production ensured quality, timely and unlimited supply. He is now producing 40 tons of fermented coco-peat enriched with microbial consortia every month and able to save nearly Rs. 1.2 lakh on the media every month.

The quantity of good quality media ensured 100 % establishment at the field level and the plants withstand no-irrigation for one week after planting.

Raised metal rack on which pro-trays of high value planting material were raised totally prevented disease infection. Adequate aeration, least damage during handling and easy draining out of excess moisture ensured sturdy and strong plants.

Triangle shape plastic tunnels inside the shade net house ensured protection against rains and also required level of humidity maintenance. The use of rolling and unrolling mechanism of the plastic sheets led to minimum labour and time requirement.

Annually about 15 lakh seedlings of color capsicum, 25 lakh seedlings of green capsicum, 140 lakh seedlings of cabbage/cauliflower, 50 lakh seedlings of tomato and other vegetables, papaya and ornamental crops are produced and supplied.

He is supplying plants to long-distances up to West Bengal, Chhattisgarh, besides neighboring states like Maharashtra, Kerala, Andhra Pradesh and Tamil Nadu.

His son has completed graduation in Bio-technology and is now fully engaged in the enterprise looking after the expansion of business to ornamental plants. Daughter is pursuing graduation in Horticulture under University of Horticultural Sciences to scale-up the enterprise.



The Bud Grafting Expert in Jackfruit (*Artocarpus hetetophyllus*)



Anil

Ninnikallu Nursery,
Alakemajalu, Kabaka
Puttur DK -574220

Age: 41 years

Education: SSLC

Land holding: 0.5 acres

Mobile : 9448778497

Hailing from Kerala, but settled in Alakemajalu, Kabaka Puttur, Dakshina Kannada District, out of his love for jack fruits. Once while travelling in a train with 10 plants of gumless jackfruit, the interest shown by the co-passengers aroused his interest for the jack planting material. Started a nursery with the popular epicotyle and approach grafting. However, these methods were not effective as the success rate was less than 30%. His perseverance for achieving higher success rate resulted in evolving a new method of grafting in jackfruit.



Innovations

- He adapted the bud grafting method that was used in rubber and nutmeg grafting. The bud grafting in jackfruit was an instant success and was able to achieve 60-70% success rate.
- Using a particular kind of red soil alone, over the years he optimized the media to fill the ploy bags for raising root stocks. This ensured healthy strong root stocks and higher survival percentage after bud-grafting.
- Budding season during dry months (November-December) allows him to keep the bud portion unwrapped. If done during rainy season, the bud grafted portion also need to be fully wrapped with tape and the tape needs to be removed after the union of budded portion to allow the shoot growth from the budded area. This requires additional cost in terms of labour expenditure.

- He devised a storage technique for preserving of seeds collected during May to July in a medium so that seed viability is retained.
- The success in bud grafting also enabled him to identify 4 new selections from popular fruit types.
 - *Akalahalasu* (off-season type): Singapore, Vietnam, Malaysia dwarf.
 - *Chandra halasu*(red fruits): 15 varieties, eg. Rudrakshi, Ramachandra
 - Timber purpose jackfruit
 - Garden purpose(Small and bushy)



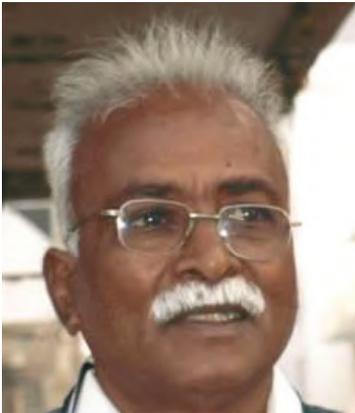
Output and Outcome

His grafting skills made him very popular so much so that he is called as 'Jack Anil'. He has used this as his brand for all the products that he is producing.

Supplying plants to more than 100 nurseries in Kerala. He is producing nearly 70,000 plants in a year. He has contacts with more than 2,000 farmers besides Agricultural Universities, KVKs and Research Stations.

Technically assisted in establishing mother scion banks in the Agricultural Universities like University of Agricultural Sciences, Bengaluru, University of Horticultural Sciences, Bagalkot, IIHR Research Station at Hirehalli and several KVKs including KVK Pattanamthitta which is leading the jack revolution in Kerala. During 2018, he sold 70000 jack grafts earning about Rs. 10 lakh as net income.

High Yielding Paddy (*Oryza sativa*) Variety for Organic Farming



Shankarguru

Madralli Village,
Kannalli Post,
T. Narasipur Taluk,
Mysore District,
Karnataka - 571442
Age: 71 years
Education: SSLC
Land holding: 20 acres
Mobile: 9900658921

Varieties that adapt well to extreme temperatures, rainfall and climate change and the ones that do not depend on chemicals, but still perform well are in great demand.

He has been a paddy farmer since 50 years and had mixed experiences of growing new as well as traditional varieties. His pursuit for varietal development started with the off-types found in 'Salem Sanna' grown in his farm during 1992.



Innovations

- Selection of best and uniform plants and their seeds was continued for seven years until he could stabilize the characteristics. He then approached the Zonal Agricultural Research Station, Mandya, to test the selections.
- KVK Mysuru conducted trials on its instructional farm. After all the testing and trials, he has named his variety as NMS 2 standing for Nirmala (wife), Madralli (village) Shankarguru.



Output and Outcome

The variety NMS 2 is medium duration (120 days) has high yield potential (80q/ ha), is resistant to biotic and abiotic stresses, has tall and robust stem (high fodder yield) and thrives well under low-input management, especially suitable for organic farming method.

Jyothi, a popular coarse red rice variety popular in Mysuru district yields an average 50q/ha, with a B:C ratio of 3.13. On the other hand, the NMS 2 variety with a conservative yield of 65q/ha is sold at Rs. 2000/q selling price offers a net return of Rs. 95000/ha with a B:C ratio of 3.71.

Performance of NMS 2 does not vary under conventional or organic method whereas the yield of Jyothi gets drastically reduced under organic method.

The variety has spread to the neighbouring states, Andhra Pradesh, Tamil Nadu and Maharashtra. More than 1000 farmers are growing this variety on about 2000 acres. The number of farmers and acreage is likely to increase as more farmers are attracted to organic farming.

High Density Cropping in Pepper (*Piper nigrum*) increases Productivity and Income



Dr. Viveka B. S

Channapura Road, Kote
Chikkamagaluru- 577 101
Age: 47 years
Education level: BDS
(Dentist)
Land holding: 80 acres
Mobile : 9480028668

Black pepper known as the “king of spices”, is grown as a pure crop or as a mixed crop in coffee plantations trained on shade-trees / *Erythrina indica* or *Garuga pinnata*. Pepper plants are also trained on coconut and arecanut trunks. Using live trees as support has its own problem, particularly when the support trees suffer from pests/diseases.



Innovations

- He experimented with many good agricultural practices to make pepper production economically sustainable. Use of concrete pole as standards for pepper is one such practice. Concrete poles next to diseased arecanut plants support the pepper vine till the freshly planted arecanut plants attain 8 years and reach reasonable height.
- Irrigation through a combination of drip and hose providing upto 150 litres per plant depending on season and weather has been standardized to optimize production.
- He has a multi - storied cropping system keeping arecanut and coconut as the mainstay, suitably intercropping with cocoa, pepper, orange and sapota.

- He has adopted $8 \times 8\frac{1}{2} \times 9$ ft spacing and maintained plant geometry in such a way that arecanut plants are not exposed to sun burn.
- He has also maintained high density pepper orchard with 540 vines per acre.
- He has successfully optimized and obtained best results from spraying 0.66% Bordeaux mixture instead of the recommended 1% mixture.
- The harvesting is done several times at each stages, to ensure pepper harvesting at the right stage.
- Solarization method of pepper processing spread on tarpaulin sheet covered with polypropylene sheets is giving quality pepper.



Output and Outcome

He has achieved higher average yield of about 30 kg dry pepper per vine. Some vines yield upto 40 kg dry pepper.

Productivity keep increasing every year through a combination of new technologies and timely execution, resulting in increased annual income.

He realized net profit upto Rs. 50 lakh per annum by adopting this innovative technology. Around 4000 farmers visited the farm and adopting the technology.

High density planting of pepper for higher yield and returns is serving as a model block and has received International Pepper Community (IPC) award, at Srilanka.

Inter-Cropping helps in Eco-Friendly Pest Management



Dhanapal Nanappa Yallatti

Bhemappa Kamatagi

Teradal, Teradal

Jamakhandi,

Dist: Bagalkot

Age: 53 years

Education: SSLC

Land holding: 25 acres

Mobile: 9900030678

Farmers face several problems but more persisting are price fluctuation, soil degradation, high cost of cultivation, water scarcity, pest and disease incidence. To overcome some of these problems, Dhanapal tried inter-cropping through trial and error method. His cropping system aimed at achieving continuous income and ease of pest/disease management.



Innovations

- Intercropping marigold with brinjal helped to reduce insect damages, saved at least two sprays against pests of brinjal.
- Papaya intercropping in banana is not an established practice, but he claims that this intercropping is highest remunerating system for the mutual beneficial effects noticed.



- Cluster-bean catch-crop in sugarcane ensured efficient utilization of space, time and resources. Besides regular income, crop residue served as mulch, added organic matter, reduced fertilizer requirement and saved irrigation requirement of sugarcane.



Output and Outcome

In intercropping with brinjal fruit and shoot borer incidence in brinjal reduced, cost of five sprays worth Rs. 2500/acre saved. Quality fruits fetched better price and additional net income.

Low incidence of ring spot virus and sucking pests in papaya was noticed in papaya intercropping in banana. Micronutrients applied for banana and papaya served mutually beneficial for both crops thus harvesting quality fruits.

Cluster-bean intercropping enabled to reduce fertilizer application to sugarcane by 15%, besides irrigation water saving by about 2 irrigations.

Many farmers from neighbouring district are visiting his farm, which is serving as a centre of agro-ecotourism.

Best farmers of the district Sri. Parasappa Hunnur of Kulahalli (Best farmer of the district 2017), Sri Shrikant Kumbar (Youth farmer of Jamakhandi taluka), Sri Dhareppa Kittur (Krishi Pandit award winner and ICAR innovative farmer) and many others have adopted these systems.

Mixed-Cropping: Economically Feasible and Environmentally Sustainable



Hanumanthappa

Kapageri, Soraba Road

Post :Banavasi,

Taluk: Sirsi

District :Uttara Kannada

Age: 55 years

Education: 1st standard

Land holding: 3 acres

Mobile : 7353008733,

8197937071

As an agriculture labour, Shri Hanumanthappa had dreams of making his own farm, rich in diversity and rewarding throughout the year. Labour-hood enabled him to learn the crop management skills early on. With his sincere and dedicated efforts, he could transform his 3.5 acres of agriculture land into a multi-crop heaven.



Innovations

- Cultivated more than 60 different types of crops in just 1.2 ha of land under rainfed condition. Mixed cropping is done without wasting an inch of land, with crops of 2 to 3 months duration. All crops are harvested / completed during June-January allowing 4 months rest to soil during February to May.
- Well maintained pathways inside field are planted with flower crops for beautification, attract bees for pollination and to serve as trap crops for insects
- Pathways have drains which are linked with water harvesting structures to conserve the rain water for use at the fag end of rainy season.

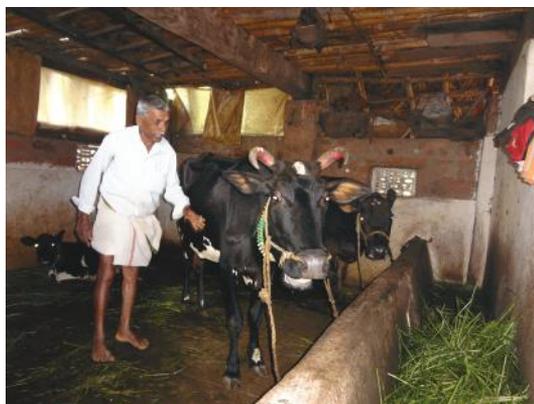
- Has conserved traditional vegetable seeds which have local market demand. Also produces seeds of these varieties and sells to visitors for spreading the area under traditionally popular vegetables.



Output and Outcome

His family farming and integrated approaches earn upto Rs. 6.5 lakh annually with a net return of about Rs. 3 lakh. 400 plants of 18 different types of daisy flowers on the pathways fetches regular income. Visitors to his farm purchase vegetable seeds. Milk yield from dairy cows 18-20 litres per day and sells @ Rs. 30 per litre.

Nearly 1500 to 2000 farmers from all over the state, Self Help Groups created by a leading NGO in Karnataka have visited his farm.



Many officials from different developmental departments and State Agricultural Universities appreciated the efforts made by him.

He is recognized by local administration, state agricultural universities, and non-government organizations. Krishi Sadhaka award at the State level Krishi Mela organized by Shri Kshetra Dharmasthala Rural Development Foundation (SKDRDP), Best Farmer award by local gram panchayat president, Best Horticulture Farmer award by University of Horticulture Sciences, Bagalkot and Innovative farmer award by University of Agricultural Sciences Dharwad are a few recognitions earned by Sri. Hanumanthappa.

Technology Driven Integrated Farming



Narendra Kollur

Ganagapura,
Kalaburagi District,
Karnataka

Age: 25 years

Education: BE

Land holding: 14 acres

Mobile : 97392 09520

Located in a religious-linked tourist place Ganagapura in Kalaburagi district, the Kollur family had enough resources, both natural and financial, but were unable to make it big due to labour problems and high external inputs. High temperature during summer and traditional method of irrigation used to demand huge amount of irrigation water. Engineering graduate Mr.Narendra decided to change all that with technology intensive integrated farming approach in his family farm.



Innovations

- Adopted high density planting of guava with mulching and drip irrigation. Standardized the pruning through trial and error basis in such a way that the fruits are available round the year to meet the demand of tourists.
- Adapted the micro irrigation in an improvised manner to ensure an appropriate micro climate both at the basin level (micro-sprinkler) as well as at the crop canopy level (heavy pressure over the top sprinkler) for mango crop.
- Desi cow milk was processed to produce traditionally popular Gujarati sweet products to harness the demands of Gujarati tourists.



Output and Outcome

High density planting accommodated double the number of plants in guava, whereas, drip irrigation with mulching ensured 50% saving in water. Standardized pruning ensured high productivity in terms of yield by about 10%. Attractive and shining fruits fetched better price in the market by 10%.

Maintaining a cool micro-climate at the basin level and at the crop canopy level after fruit-set in mango orchard ensured higher fruit retention as well as better size. Yield increased by about 20%. He has used solar-energy pumping system to ensure that the irrigation is not affected by power-cuts.

Desi cow milk products provided continuous income through selling to the tourists and helped farmer to invest on high-tech micro-irrigation and mulching technologies.



More Crop Per Drop: Deep Pipe Irrigation



Ashok Kumar. S

Rampur,

Post: Gummareddy

Kolar District-563126

Age : 49 years

Education: M.Sc,

PG Diploma

Land holding : 25 acres

Mobile: 9902819595

Kolar district is in the hot semi arid eco region with ground water level more than 1500 feet. Rainwater harvesting and water use efficiency techniques are imminent for any farmer as the groundwater is fast declining/ disappearing.

Ashok was initially practicing flood irrigation, but decreased ground water made him to experiment different water saving techniques, and finally arrived at deep-pipe irrigation.



Innovations

- In the normal drip irrigation, water is emitted on the surface through laterals. On the contrary, in the deep-pipe drip irrigation, water from the laterals is supplied through a 2 ft long pipe.
- It requires an additional cost of about Rs. 8000/acre, including labour cost towards the pipe and micro tube for this method.
- On top of the half inch pipe three holes are made to insert micro tubes. One extra hole is made as a precaution against clogging. At the bottom of the pipe, three holes are made for aeration and supply of water to direct root zone of the plant. Two labours per acre are required for making holes and installation of pipe in the field.

- The water is emitted directly in the root zone, thus ensuring least wastage of water and maximum utility of irrigation water.



Output and Outcome

Deep pipe irrigation method increased the irrigation efficiency by 40% compared to drip irrigation method. As per this, it requires 6 litres of water per plant in mulberry @ 2 litres thrice a week. However, in drip irrigation it requires 10 litres per plant per week.

The quality of the leaf is good as it increases the supply of water directly to the root zone. Besides it also reduces availability of moisture on top soil in the field hence this method reduces growth of weeds.

More than 180 farmers are practicing in different Districts like Kolar, Tumkur, Hassan and Chitradurga for different Horticultural crops after visiting his farm. Presently Tiptur Taluq farmers are practicing for coconut palms as it gives good yield and increases water use efficiency. The ICAR-Krishi Vigyan Kendra, Kolar has been helping to promote this technique to other farmers in the district through exposure visits.



Modified “Y” Training of Grapes (*Vitis vinifera*)



Gurupadappa Phathate

Mashal Tq: Afzalapur,
Dist: Kalaburagi
Age: 38 years
Education: PUC (Science)
Land holding: 25 acres
Mobile: 9590055427

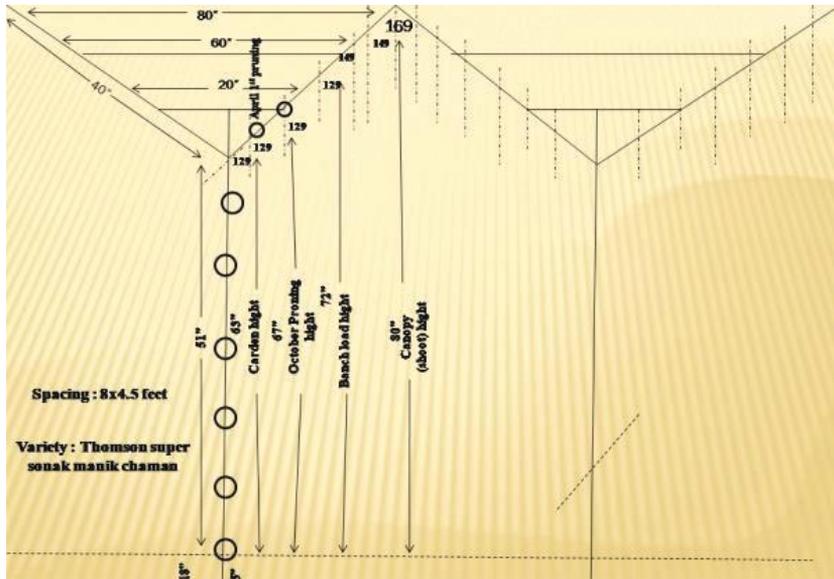
In grapes (*Vitis vinifera*) cultivation, pruning of vegetative part of the plant and training the fresh shoots to spread in a desired pattern are the two critical operations.

Pendal system, Telephone system, Y- system and Single row system are the different training methods in practice. Each method has its own constraints like labour requirement, leaf overlapping, uneven bunches and improper spray coverage.



Innovations

- He modified the Y system and came with an innovative method of pruning and has named it modified Y trellis.
- Height of the main stem is maintained at 4.5 to 5 ft as against the pendal system of 6 ft, which is unreachable for many operations.
- The vines are trained in 60°-75° angle compared to flat spreading in pendal system and thus each vine gets exposed to max sunlight and better photosynthesis rate.
- In the normal Y method the maximum width was 60 cm whereas in the modified Y method, upto 80 cm width is maintained.
- Bunch load height in the normal Y method is about 42” whereas in the modified Y method, the bunch load height is maintained at 72” thus making operations easy with less drudgery.

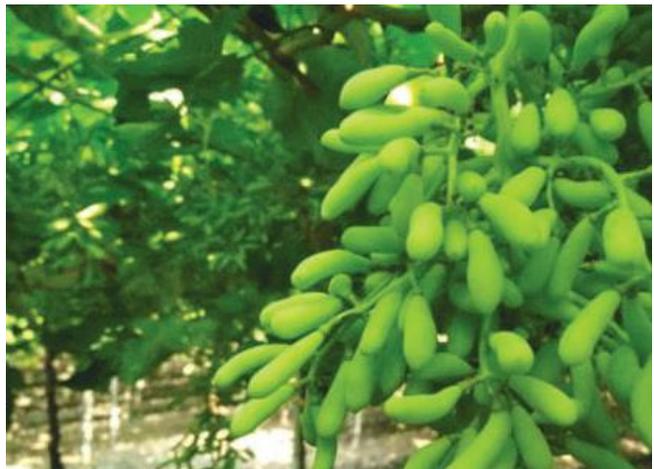


Output and Outcome

Labour requirement per spray operation is reduced by 20% owing to its easy operation and navigation.

Yield is increased by 10% and proportion of best quality grapes in the total harvest is 70-80% as compared to about 60% in other systems.

Reduced cost on labour, higher yield and better quality is resulting in a net gain of about Rs. 2 lakh / acre.



More than 15 farmers have adopted this technique in 15 hectares. Farmers themselves are spreading the technology to the other districts and in neighbouring states.

Grabit – An Innovative Rabbit and Poultry Farming Enterprise



Mohan Kumar

Raichur, Karnataka.

Age : 26 years

Education: M.Sc.

Agri.Economics

Land holding: nil

Mobile: 9606653957

As post graduate in Agricultural Economics from UAS, Raichur in 2017, he dreamt of becoming an entrepreneur. His enterprising mind looked for less explored agri business opportunities. Rabbit farming appeared to be one, but challenges were many. An analysis of failed rabbit farming ventures revealed high mortality of rabbits transported from distant places, difficulty in bunnies feeding mother's milk up to 1 week age, poor growth rate due to inadequate water consumption, wastage of feed due to improper feed bowls, under-utilization of rabbit rearing space and limited market for meat.



Innovations

- Established the rabbit unit in Karnataka–Telangana border to access parent-stock from a Hyderabad based firm. Reduced distance ensured least mortality and speedy acclimatization.
- Designed a mechanism to keep bunnies in a card board box and placing mother rabbit to feed the bunnies at a specified time of a day. It avoided the labour requirement for manual method of making the bunnies feed their mother. This reduced the mortality to less than 20%.
- Designed an innovative water-channel system with nipples of appropriate shape and size from which rabbits suck the water whenever required. Increased water consumption contributed to higher growth rate.

- Tested different sized/shaped feed-bowls and standardized the right shaped earthen pots that reduced feed wastage as well as damage to bowls.
- Integrated the poultry inside the rabbit house to optimize the space utilization. The choice of desi poultry breed – Aseel from nearby district Karnool was an instant success. These birds are in great demand not only for meat purpose but also as parent stock for back yard poultry farmers.
- Trained the rural unemployed youth on scientific slaughtering and tied up with meat buyers from Hyderabad city. This assured stable market for meat in terms of demand and also price.



Output and Outcome

Within a time span of six months Mr. Mohan has successfully established 5 unit rabbit farm consisting of 35 female and 15 male.

Higher productivity of 5 bunnies/ mother ensured about 175 bunnies per batch. Each mother will have about 8 kiddings per year.

Sells rabbits at the age of 3 months either for meat purpose or for rearing purpose. Realizing that meat purpose fetches about Rs. 100 more per rabbit, he is concentrating on quality meat production and has established market linkage with buyers in Hyderabad city. He is able to earn about Rs. 10000/week.

Rearing of 100 desi birds in each batch along with rabbits fetches him about Rs. 10000 additional revenue per week. Desi birds eat away the worms dropped after deworming of bunnies and rabbits.

Combination of rabbit and poultry has ensured weekly income of up to Rs. 20000. He has planned to help small scale rabbit rearers in Raichur district for whom he is already supplying rabbit bunnies age. He has planned to register his firm as Grabit rabbit rearing unit.

Scientific Dairy Housing and Management



Lokeshappa

Hireangala, Birur Taluk,
Chikkamagalur

Age: 64 years

Education: PUC

Land holding: 9 acres

Mobile : 9611797613

He started his one-cow dairy unit in 1982, but could not sell the milk as there was no milk cooperative society in the entire district. Unperturbed, he chose to continue his dairy with marketing tie-up with Akshayakalpa, a private initiative. As the number of cows increased his makeshift housing was unable to support the herd. The rate of growth in calves was slow, puberty attainment was late and productivity was declining. His exposure visit to a progressive dairy unit in the neighboring district during 2014 changed all that.



Innovations

- Designed a dairy house scientifically with own imagination and with inputs from his family members.
- Each cow has been provided with a space of 6 ft × 4 ft, kept sufficient space for management activities like feeding, cleaning and milking is provided at the front and rear portion of each row of animals.
- Barricade between cows is kept at the feed trough / manger level, and not fitted to floor, thus no rusting. A cross bar fitted at the height of the cow-forehead checks the entry of animals to manger area.
- Water troughs are connected to a storage tank kept at the same level. Water is filled to storage tank twice a day, maintaining continuous availability of water. Shape, depth and location of troughs are well designed ensuring least wastage of water.

Mats on the floor are held intact with the help of low cost structure that prevent slippage & tearing thus enhancing the longevity of the mats.

30 kg of fresh green fodder + silage/chopped dry straw is fed to every animal thus reducing the dependency on concentrate feed (5 kg per day per animal).



Output and Outcome

Clean and spacious housing improved animal health considerably. Puberty age came down from 30 months to about 21 months. Healthy heifers are also conceiving at the first insemination itself and thus giving birth to calf at an early age.

Washing is made easy and self-maintaining due to adequate slope and easy draining out of cow-urine.

Drained-out urine and washed water is collected in a tank and pumped for irrigation through drip lines, thus integrating dairy with agri-horti system.

Able to manage the dairy unit with just 10 man-hours of labour per day. Considering his herd size of 24, this amounts to less than half-an hour per animal.

Scientific management in terms of housing, water and feeding have resulted in average milk yield of 14 litres of milk per day per animal. Consistent quality parameters helped in obtaining marketing tie up with Akshayakalpa which is offering Rs. 32/litre.



Smart Pig Farming and Meat Marketing



Amar D' Souza

Madeneralu, Aldur,
Chikkamagaluru -577 111
Age: 51 years
Education: PUC
Land holding: 22.7 acres
Mobile : 9900431066

Piggery farming is a subsidiary enterprise in Transitional and Hilly agro-climatic region of Karnataka. Few have succeeded due to inability to manage complex processes. Amar D'souza started with 2 piglets and faced initial problems like piglet mortality, poor growth rate and high cost of rearing. At times, he also faced problem of limited market for the piglets and the pig meat.

With the support of KVK, Chikkamagaluru located at Mudigere, he acquired higher skills in breeding and management. He started innovating on his own as he is managing large piggery unit.



Innovations

- He has an uncanny knack of breeding, maintained three varieties – Durac, Yorkshire and local landrace. He has standardized the timing of cross-breeding 80 breedable females using 10 male, breeding in batches of 10 animals at a time to manage the resources and marketing of piglets.
- He developed Durac+Yorkshire for low-fat and fast growing; Durac+landrace for tasty meat, Pure Durac for breeders of specific interest, Yorkshire+landrace for fast growth and tasty meat.
- Managing the piglet mortality is attempted by adopting innovative structures like iron platform with space for piglets to feed from below and cement projections from wall to allow piglets to escape from getting trapped under the mother etc.

- He Optimized the feed cost by a combination of local waste and recommended ration of soybean flour + maize grains + groundnut cake+ mineral mixtures. The chicken-waste collected from culling/meat centers is boiled and fed at controlled quantity to add nutritive value to the daily feed.
- He has established a buy-back system of adult pigs for meat from farmers who buy piglets.
- He maintains his own meat processing unit which added more strength in marketing, besides developing a network of meat buyers from within and outside the state.



Output and Outcome

About 1000 piglets sold per year at varied prices like Rs. 10000/piglet of pure Durac breed, Rs. 6000/piglet of Durac cross, Rs. 3000/piglet of Yorkshire cross.

He has branded the meat with specialized items like red meat, boneless, rib-cage meat, bone-meat and sells at differential prices ranging from Rs. 200/kg to Rs. 400/kg.

He got net returns of more than Rs. 25 lakh in the last year.

More than 2000 farmers buy piglets from him and has buy-back arrangement with most of them.

Meat is marketed through resorts, hotels, home-stays etc. besides sending to bigger cities in Kerala.

Around 2500 farmers and students visited the farm every year.

Multi-Innovations makes Sheep Breeding and Mushroom Successful Enterprise



Ashok Reddy N.S.

Nandhiganahalli (V) & (P),
Murugamalla (H)

Chintamani (T)- 563 146

Age: 35 years

Education : B.A.

Land Holding: 25 acres

Mobile: 7259537316

Sheep rearing is a popular subsidiary occupation in low rainfall areas. However, expanding the sheep units is constrained by limited lambing, mostly single lamb per time. Local breeds also have a problem with slow growth rate. Mr. Ashok's family in Chintamani taluk of Chikkaballapura district has been rearing sheep since 2011. The family always looked for improved breeds capable of giving more lambs per time. In addition, they were also looking for fast growing breeds.



Innovations

- To begin with, got a ram of Yelaga breed from Bagalkot district. The off-springs grow upto 80 kg in 9 months under good management. Although Yelaga breed gives only single lamb per time, the fast growth makes up this limitation.
- He also learnt the art of managing NARI Suvarna, a new breed which has the capacity to give birth to triplets. Most sheep give twins and some give triplets.
- Semi-intensive rearing with a combination of grazing and use of locally available feed resources has kept the cost of production low.

- His housing and management has also helped in least mortality (less than 5%) and high growth rate.
- Besides sheep rearing, Mr Ashok Reddy has developed interest for mushroom rearing. He designed his own method of straw-sterilization using a low cost autoclave.



- The unit consists of three inter-connected tin drums, one for boiling water and the other two to fill the straw/other materials that need to be sterilized. Steam from the boiling water drum passes to the other two drums for disinfecting the material.
- The modified autoclave with a capacity to sterilize 80 kgs of paddy straw costs only Rs.6000, whereas the standard autoclave costs more than a lakh. He also designed a modified rack system, wherein the metal rods are covered with plastic pipes to avoid rust and also to prevent any injury to workers.



Output and Outcome

He has supplied rams to more than 50 farmers in his surrounding jurisdiction. Farmers from neighbouring state of Andhra Pradesh are also procuring rams from him.

The Department of Animal husbandry has identified the rams produced by him for distribution under developmental schemes.

He rears young ones up to the age of 9 months, and sells sheep at Rs. 300 per kg live body weight. When demand for lambs is more, he sells at the age of 3 months for about Rs. 4000 per lamb.

The mushroom cultivation room, racks and low cost autoclave has been visited by several farmers and potential entrepreneurs.

Small-Livestock based Exotic Meat Production



Mr. Ananth Kumar Naidu

AKN Farms Pvt Ltd.
Kurubarahalli, Shivkote
Post Bengaluru 560089
Age: 31 years
Education: B.Com
Land Holding: Nil
Mobile: 98805 81562

Though from a non-agriculture background, he always had a dream of becoming an agricultural entrepreneur. Started livestock farming in 2007 as a part-time and small scale activity, but went through hard times. Lack of knowledge in livestock farming, the disease management, incomplete guidance from the established units, lack of knowledge on the product market channels, live market prices, and inadequate pre and post analysis of the business were the major problems. Realizing that part-time attention doesn't yield rewards, he changed to a full-time business with Integrated Farming Concepts.



Innovations

- Introduced stand system for rabbit farming which occupies less place, easy to maintain, cleanliness and also helps in collecting urine and stool.
- Introduced rabbit meat in many restaurants, super markets and many food stalls as exotic meat. First company in the region to promote exotic meat and bring awareness on exotic livestock farming with the help of veterinary doctors and scientists.
- Introduced rabbit urine as a liquid fertilizer in his region and teaching farmers to make use of farm waste.
- Diversified to duck and turkey farming based on the experiences gained in rabbit farming. Integrated with backyard poultry to augment income on a regular basis.
- Started livestock training center for farmers and women entrepreneurs to achieve the desired scale of production.

- Making groups among farmers to learn from each other and create their own market and double their income. Trained farmers on meat processing and connected them to meat marketing channels.



Output and Outcome

The Firm has been an inspiration to the farmers and youngsters as to how to be a successful entrepreneur. The firm sells around 2,000 turkey bird chicks every month in Karnataka, Tamil Nadu, and Andhra Pradesh. Sell around 15,000 Country Chicken chicks, either 1-day old or 1-month old to farmers in Karnataka. Transport 3000 ducklings to Assam, Delhi, and Uttar Pradesh besides 3000–5000 Kadaknath chicks per month for farming in Karnataka.

The firm expanded their business to a meat processing plant in 2008 with the support of experts from the meat processing industries. He has started distribution of meat which is in compliance with International Food Standards in Karnataka, Tamil Nadu, Andhra Pradesh, Kerala, Goa, and Maharashtra states. The firm produces up to 1 ton of exotic livestock meat and 4 tons of Duck meat every month.

Rural youth working as cab drivers in Bengaluru were inspired by the enterprise and have returned to their native to start full-fledged livestock farming with the support of AKN Farms Pvt. Ltd., and are earning equal income as they used to earn as cab drivers.

AKN Farms is planning to develop an application which will be user-friendly for farmers, consumers, and retailers to provide a platform for meat marketing. To combat the problems posed by mediators in the market and for promoting a platform for easy selling of meat products.

Low cost Hydroponic System for Green Fodder Production



Prakash Basavanthappa Bijapur

Post: Kusugal, Tq. Hubballi

Dist. Dharwad State: Karnataka

Age: 48 years

Education: B.Com

Land holding: 4 acres

Mobile : 9538146978

In dairy farming, more than 70% of cost incurred is mainly on feed and fodder. During droughts and summer days farmers struggle hard to provide quality green fodder to milking animals. Hydroponic system of fodder production has provided an avenue to meet the green fodder requirement during lean seasons and also for farmers who do not have facilities including land to grow the fodder.



Innovations

- Came up with low-cost hydroponic technology on a large scale, which is now functional at a commercial level.
- He developed the low-cost large scale hydroponic green fodder production system (Size: 18'x 6.5', Capacity: 850 tray, Tray size: 1.5'x 1') with minimum water requirement of 1369 metric ton/year to provide green fodder for 60 dairy animals. Locally available materials like bamboo sticks were used for the structure. Locally available trays, barrel, pump and sprinklers were used for operating the unit.

- The total cost for development of this hydroponic green fodder unit was around 1.50 lakh. Commercially available hydroponic unit of same size costing about Rs. 10 lakh (Size: 18'x 5', Capacity: 168 tray, Tray size: 3'x1.5') can only produce 1.68 ton/batch.
- With technical support from KVK, Dharwad, improving the impure hard water and mixing of water with Jeevamruth for sprinkling the hydroponic green fodder for dairy animals were standardised to maintain nutrient rich, disease free, good green fodder.



Output and Outcome

Harvesting 5 kg of green fodder from each tray after 10 days of process is producing a total of 4.25 tons green fodder per batch. He is producing around 136 tons of green fodder yearly with B:C ratio of 6.66.

Technology has been disseminated to more than 3000 farmers in and around the district and more than 200 farmers from outside state. More than 80 farmers adopted this hydroponic technology. About 100 officials from NABARD, KVGB bank, different state department officials and scientists visited this innovation technology.

Wealth From Waste- Chaya Seedlings from Leftover Fodder Stem (*Cnidoscolus aconitifolius*)



Ningamma

w/o Shri. H K Tammayya,
Horalagelu Post
KasabaHobali, Kanaka-
pur, Taluk, Ramanagara
District, Karnataka
Age: 48 years
Education: Illiterate
Land holding : 4.5 acres
Mobile : 9845343897

Animal husbandry is a source of livelihood for large number of farm families. Feed and fodder management and supplementation with nutritious feed are important to ensure more returns. She was feeding banyan tree leaves and ragi fodder enriched with jaggery and salt to goat & sheep.

Her husband brought one cutting of Chaya (*Cnidoscolus aconitifolius*) a fodder shrub, rich in protein, calcium, iron & vitamin A, from an agri exhibition during 2012 after knowing its fodder value to cultivate in his field. But, only the leaves and tender stem were eaten by animals. The left over stem was discarded into the compost pits.



Innovations

- To her surprise the stems in the compost heap, instead of getting decomposed, started sprouting. This motivated her to think about planting material multiplication.
- With technical guidance from KVK, she planted the stem cuttings in polybags. She could standardize the medium filled in bags, watering frequency and methods to scale up the planting material production.



Output and Outcome

Right stage harvest ensured that the sheep and goat fed about 90% of the chaya fodder. The left over 10% is hard stem and was reused as planting material. It serves the dual purpose of fodder as well as planting material. Nutritious fodder helped in increasing the milk yield by 0.3-0.4 litres/day. Chaya tree serve as live fence and also as fodder trees.

More than 4000 cuttings were raised and supplied to farmers of Ramanagara, Tumkur, Shimogga, Tiptur, Arsikere and NDRI, Adugodi. This method helped more number of farmers to grow and feed nutritious perennial fodder to their animals. Krishi Vigyan Kendra is conducting On Farm Testing on this shrub and studying intensively about its acceptance among animals. She is supplying the cuttings for KVKs also.

ICT Approaches Enhance Fodder Seed Business



Santosh Pagad

Krishi Agro Farm
Post: Kothabal,
Tq: Ron, Dist: Gadag
Age: 30 years
Education: M.Sc (agri) in
Agronomy
Land holding: 30 acres
Mobile : 9481448990

Non-availability of quality fodder seeds affects the economic performance of dairy units significantly. Realizing the huge gap and potential, The post-graduate in agriculture ventured into fodder seed production with Anand-2 variety of Lucerne. Initial material received from outside state was infested with cuscuta parasitic seeds. Poor quality material, non-availability of trained labour and limited marketing affected his venture substantially.



Innovations

- He tried and found that RL-88 variety is better to his situation and procured breeder seeds of Lucerne from ICAR-Indian Grassland and Fodder Research Institute, Dharwad.
- He introduced mechanisation through use of reaper harvester, mini tiller, brush cutter, chaff cutters, seed processing and cleaning equipment.
- Expanded the seed production to South African Tall, Cowpea, Napier, Stylo Heamata, Subabul, Sesbenia, Drumstick and multi-cut fodder sorghum.

- Registered the firm Krishi Agro Farm Developers and maintained strong functional linkage with ICAR Institutes, Agricultural Universities, Krishi Vigyan Kendras, Karnataka Milk Federation, Department of Agriculture, Department of Animal Husbandry and Veterinary Services. This has helped him for marketing of his seeds.



- Digital media “Facebook Page”, YouTube and a WhatsApp user group of more than 2000 farmers are used for providing technical advisories on fodder seed production.



Output and Outcome

Lucerne seeds free from cuscuta and striga-free seed of perennial fodder sorghum increased the fodder yield by 30 per cent. From just 400 kg in 2011-12, the seed production reached 9800 kg in 2018, which included Lucerne (3000 kg), Fodder Lucerne (5000 kg), Hedge Lucerne (800 kg) and other fodder (1000 kg). His client base increased from 100 farmers to 800 farmers, and has served more than 3500 farmers till date with 27 tons of fodder seeds in 7 years. Net income from seed production was Rs. 9 lakh during 2018.

Participates in Krishi Melas organised by the Agricultural Universities in Karnataka. University of Agricultural Sciences, Dharwad has conferred him “Best Young Farmer Award” during 2017-18.

Honey Processor turned Bee Therapist: Apiculture of Business Standard



Madhukeshwar J Hegde

Kallallimane,
Sadashivalli Taragod Post,
Sirsi Taluk,
Uttarakannada Dist.
Age: 40 years
Education : 8th std
Land Holding: 25 acres
Mobile : 9480746335

Having lost his parents at the age of 12, he was forced to discontinue education at 8th standard. Without any land, house and capital, he was working as wage labour till he started visualizing an enterprise of his own. Diversity-rich western ghats and his interest in beekeeping encouraged him to take up honeybee rearing. Started with two boxes, and the initial success led to 40 boxes by 1982. Developed mastery in bee colony multiplication and upscaled honey production. When the quantity of honey increased to 15 qtl he faced marketing problem.

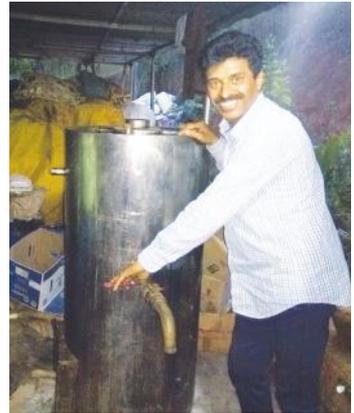
There were no takers for the raw honey, as much sweeter honey (often sugar-added) was available in plenty in the area. Realizing that the honey alone won't matter to people he decided to sell it in different forms.



Innovations

- Honey jam was his first innovation, a value added product with dry-fruits. It became an instant hit as the locals have a liking for the dry-fruits, but are not grown locally. The jam has passed the test of time as it stands as a unique product even today.
- He standardized the flavoured-honey production matching the season of different flora available in the nature. His best-selling soap-nut and jamun-flavoured honey are the gift of nature.

- Honey, Amla, Ashwaganda with royal jelly, Hair oil and other honey based medicines for curing cancer, joint pain, weakness, piles, asthma, diabetes, reducing fat.
- He developed expertise in bee-therapy to alleviate the pain in joints caused by rheumatoid arthritis. The bee-stinging not only provided immediate relief but continuous treatment for a short-while provided relief in the long run. With support from scientists of University of Agriculture Sciences, Dharwad and Krishi Vigyan Kendra Sirsi, he is able to expand the activities scientifically.



Output and Outcome

Bee-therapy success made him interested in ethno-medicine and is now a popular Ayurveda doctor. He treats patients coming from far and wide, on Thursday and Sunday every week.



He has a bee-box making machine, honey processing unit, honey extractor and transporter of products.

He has given employment to 20 persons throughout the year. He has property worth of 6.5 crores presently.

He bagged more than 20 different awards and certificates including innovative farmer award from UAS Dharwad and state level Krishi Pandit award of Government of Karnataka.

Cashew Apple (*Anacardium occidentale*) Processing Adds to Income



Canute Aranha

Prakrithi Group of
Gardens
Post: Kenchanakere
Via: Mulki 574154
Mangaluru Taluk DK
Age: 49 years
Education: B.Com,
PG(Dip.)
Land holding: 4 acres
Mobile : 9449209179

Started his agri-business of nursery producing fruits and ornamental plants. He had a cashew orchard, where he noticed the wastage of cashew apple. On his request, KVK, Dakshina Kannada trained him and allowed him to use the cashew apple juice extraction unit.

The distance to KVK and the time being spent to travel made him to think about his own juice extraction and processing unit. The initial extraction unit established by him was efficient. He started processing cashew apple and had to face several problems in the quality of cashew apple syrup and juice.



Innovations

- The cashew juice extraction method was refined by optimizing the extent of pressing apples and removing only the ideal portion of juice from the apples.
- In order to achieve this he invented a pressing machine (juice extraction machine) and that extracts up to 75 to 80% of the juice so that the tannin content in the juice is less.
- He standardized the optimum time after fruit harvest (upto 2 hours) so that the juice shelf-life is maximum. Beyond 2 hours after harvest, the juice quality deteriorates.

- He also standardized the other products like cashew apple syrup preparation. Adopted the process to other fruits like passion fruit to utilize the equipment during the cashew off-season.
- Designed the brand name “Kenfresh” and established a vast market network.

Output and Outcome

Huge demand for his products indicates the quality of produce. In order to mobilize sufficient quantity of cashew apple for his processing unit he arranged farmers into commodity group and taught them the right stage of collecting the fresh cashew apples so that the quality of juice/syrup is of high order.

He is able to achieve Rs. 2-3 lakh as net income from the cashew apples otherwise waste.

He is helping to enhance income to other farmers as well by processing their waste cashew apples.



Amla (*Phyllanthus emblica*) Processor turns into a Multiple Innovator



N.M. Mahesha

D.Nagenahalli

Koratagere Tq

Tumakuru-572 149

Age: 41 years

Education: Diploma

Land holding: 6.8 acres

Mobile : 9741048653

Has about to cut his one-acre amla orchard for lack of marketing opportunity to his produce in 2011. Fortune was that the KVK team visited his field for promoting climate resilient agricultural practices. KVK offered him an immediate solution to wean him away from desperation. The first support was a market link for his graded produce that fetched him upto Rs.70000. Soon he realized the unexplored world of amla. The KVK trained him to de-seed and use the pulp for juice extraction. The market for raw fruits and juice ignited his entrepreneurial mind to search for more opportunities.



Innovations

- He started working on alternative uses of the waste from the juice extracted pulp and seeds of amla. Seeds are being sold to another firm for medicinal properties/purpose. The juice-extracted pulp is also diverted for preparation of bye-products like shampoo, mouth-freshener etc.
- He developed expertize to produce amla dry powder from all varieites. However, the quality of dry powder varied among varieties. While the good quality seeds are used for planting material production, poor quality seeds are converted to amla powder and used as poultry feed.
- He standardized/refined a juice-extraction machine that enhanced the capacity from a drudgery-filled 100 litre per day to an effort-less 1000 litres per day. The juice so extracted was qualitatively superior and fetched better price in the market. Wide-ranging contacts

in dryland horticulture made him to learn many new things including ground-water recharging.

- Water-harvesting structures like nala-bunds and check-dams built in the village under NICRA project increased the water level in the open wells. He used his knowledge and connected check dam to open well and then the overflowing water from the open well to a defunct bore-well in his farm.



Output and Outcome

He has completely revived his amla orchard producing up to 20 tons fruits / acre. Graded fruits sold as raw gave a gross revenue of Rs. 7000/ ton, which earned Rs. 1.5 lakh/acre. Processing the same as juice yielded 8000 litres, the pulp and seed bye-products together, fetched him gross income of Rs. 8 lakh and net income of Rs. 4 lakh /acre. Initial success in the amla processing activities exposed him to the bigger world of contacts with officials and developmental departments. Using such contacts, he started participating in various exhibitions and expanded the market network for his products.

He has developed a network of 183 farmers in the district who are having amla trees but are not able to venture into processing. He procures all their produce at Rs. 10000 / ton.

Safe & Hygienic Drying of Papad



Rajashekhar S.N.

Karthavya Enterprises,
Kanakapura, Ramanagara
District, Karnataka
Age: 42 years
Education: M.Sc. (Agri.)
Land holding : 8 acres
Mobile : 7847918323

Home-made product preparation is picking up as an enterprise in recent years. With the help of mechanization and skill development these products can be prepared round the year but there is a scarcity of space for hygienic drying. Drying under hygienic conditions demand space and investment.

To address this problem the entrepreneur involved in production of papads & pickles, tried out a technique using a metal rack and modified in such a way to dry the papads in limited area and ensured hygienic drying.



Innovations

- The width and height of additional shelves were designed based on the minimum distance between two shelves required for drying the papads.
- The existing metal rack sized 2 x 3 x 6 ft with 6 metal shelves could dry 288 papads. This rack is modified into 16 shelves by adding 10 foam sheets in between the shelves to dry 768 papads (48 papads of 10 cm dia per shelf).
- The area required for this innovative method was 6 Sq. ft. floor area as compared to 89 Sq.ft. floor area in traditional drying method.
- The innovative idea of installing additional shelves for the existing rack emerged during discussion with KVK Scientist.



Output and Outcome

This drying technique reduced the drying space. Irrespective of season, papads can be dried throughout the year by using fans and cross ventilation in room through windows.

Dust free hygienic papads could be prepared. Reduction in drudgery due to fatigue in the process of drying papads.

It is easy to supervise and labour saving techniques. More production is possible in less unit area.

One rack enables preparation of 12 kg papad / day instead of 3 kg / day.

There is fourfold increase in production capacity with the same area and also effective utilization of manpower.

Several SHGs visited his production unit and expressed interest to adopt his innovative method in there activities for enhanced production.

He is earning monthly gross income of Rs. 43200 by producing 360 kg of papads per month instead of Rs. 10800 by producing 90 kg of papads / month.

Turmeric (*Curcuma longa*) Harvesting made Easy and Efficient



Madappa

Ayarahalli,
Mysuru taluk
Mysuru district,
Karnataka- 571 311
Age: 65 years
Education: SSLC
Land holding: 13 acres
Mobile : 99024 17976

Scarcity of skilled labour and high wage rates during harvesting season have been constant deterrents for harvesting turmeric, often under challenging soil moisture conditions. Incomplete picking would also lead to drying of uprooted rhizomes resulting in yield loss.



Innovations

- Having used the tractor-drawn harrows often in the past, he thought the harrows with longer blades can dig out turmeric from a little deeper soil profile.
- He experimented with smaller blades that were damaging the corms and longer blades were getting stuck in the soil.
- Several attempts over a period of 3 months designed a harrow of width 60cm, weighing less than 50 kg, with a blade and teeth for easy penetration into the soil and digging of the rhizomes with the help of power tiller.
- Two rows of turmeric (30cm row spacing) can be dug simultaneously using the harvester without damaging the rhizomes. The implement can be upgraded by increasing the width and bed size (120cm) for using as an attachment on mini tractor.
- Farmers are educated to plant turmeric seed material not too deep in the soil at the time of planting to get best results at the time of harvesting.



Output and Outcome

One acre of turmeric crop can be harvested in 5 hours with the harvester attached to a power tiller (@ rent of Rs.500/hr, including operator), total harvesting cost about Rs. 2500/acre.

Cost of the harvester (Rs. 3000) can be recovered in a single season. It can be locally fabricated, light weight, handled with ease, and can be fitted to any make of power tiller.

Reduced labour, time and harvesting cost makes it highly suitable for small and marginal farmers.

10 farmers in Hanur village of the neighbouring Chamarajanagar district have used it for harvesting 30 acres of turmeric. The B:C ratio is 2.45 as against 1.94 in conventional / manual harvesting.

Low Cost Nipping in Pigeonpea (*Cajanus cajan*) boosts Yield



Sharanabasappa

R/o Hal Sultanapur

Tq: Kalaburagi

Dist: Kalaburagi

Age: 43 years

Education : Diploma
(Electrical)

Land Holding: 20 acres

Mobile: 9900438541

Nipping practice (removal of apical portion) facilitates the side branching in plants. In pigeonpea the nipping practice is a must for getting more branches and increased yield. But manual nipping is laborious and not feasible for large farmers. To overcome the problem, the farmer designed a equipment which is user-friendly and cost effective. Besides the nipping machine, the farmer is known for his solar fencing system. The low-cost fencing has been found to be effective against plain-land wild animals.



Innovations

- The nipping machine consists of five shaving blades fitted on a disc. The machine is ultra low volume sprayer which runs on a 1.5 volt battery. To this machine he fitted the blades which rotates and nips the terminal shoots.
- Solar fencing is another initiative to protect the crops from wild animals.
- Tap irrigation as an alternative to drip irrigation protects pipes from rat damage. Timer fixed to the taps enable farmers to manage irrigation water effectively.



Output and Outcome

Manual nipping needs 16 women labour/ha costing about Rs. 3200/ha, whereas the cost of nipping by using the machine is Rs. 400/ha.

Nipping is done perfectly without leaving any shoot, thus ensuring 100% nipping. Whereas the manual nipping is often incomplete and about 10 % shoots escape nipping.

Machine nipping has resulted in more number of branches and thus has added to yield by about 15%.

KVK, Kalaburagi verified the practice and department of agriculture organized exposure visits to his field for several local farmers who have taken up this innovative method.

He has sold about 15000 discs to the fellow farmers. Now about 20,000 farmers are using this machine and covering 1 lakh acre every year.

Solar fencing is adopted by 10000 farmers throughout the state and neighbouring states.

Drip-Line Roller and Fertilizer Dispenser



Amaresh Sharanappa Kote

Jakkalddinni, Manvi Taluk,
Raichur District

Age: 32 years

Education : 7th standard

Land holding : 5 acres

Mobile: 8861233616

Drip irrigation system demand rolling and relaying of drip lines in every season as the crops change. This is also required in perennial crops to facilitate intercultural operations. Farmers invest large amount in drip system but within 3 - 4 years the drip system becomes useless because of improper handling of the drip laterals. Manual rolling of drip laterals in one hectare require 3man days of labour, costing around Rs.1500/ha. Non-availability of labour makes farmers to simply pile-up the pipes on the bunds thus exposing to physical damage and rat-bites.



Innovations

- A rotating drum, a handle to rotate the drum, umbrella folding technique to remove the bundle of rolled pipes and a stand to hold these parts complete the rolling machine. Entire unit costs around Rs. 5000.
- With this implement,two persons can roll the drip laterals in one acre within 2 hrs without drudgery in handling. This operation manually would have required 1manday/acre thus reducing the labour requirement by 50%.
- He has also devised a fertilizer and pesticide dispenser using drinking water dispenser tank.
- He fitted an adjustable valve to vary the dispensed quantity based on fertilizer and pesticide dosage. This is drawn by single or a pair of bullock.



Output and Outcome

Neat rolling increases the life span of laterals without any bends and cuts. Relaying is also easy as pipes without any knots and bundles are easy to unroll.

Life of drip laterals can be increased by at least 2 years, thus increasing the life by 25%.

Other farmers in the village and in neighbouring villages are using this equipment without any hiring charges.

The fertilizer and pesticide dispenser saves 3 to 4 man days per acre. More importantly, the chemical is applied at the right spot and depth enhancing the efficiency and effectiveness of chemical applied.



Solar Energy Operated Insect Trap



Karibasappa M.G.

No. 2062, Sante Road,
Basaveshwara Badavane
Malebennur at
Post: Harihara, Tq:
Davanagere-577530
Age: 55 years
Education: 10th Std
Land Holding: 5 acres
Mobile: 9880973218

Insect traps have been helping to track insect out-break and to reduce insect damages to some extent. Light traps are popular, but are limited by irregular power supply. He started with one electric bulb in his pomegranate plot and later used upto 8 bulbs, which was not only expensive but frequent load shedding reduced efficiency. He conceived the idea of a solar-powered light trap, but had no technical expertise.



Innovations

- The guidance from Department of Entomology, University of Agricultural Sciences, Bengaluru and Scientists from ICRISAT, Hyderabad led to the development of solar energy operated insect trap.
- The device consists of 5 feet long metal rod attached with solar panel and hanging solar bulb with battery, operated by a switch at the bottom.
- Just below the solar bulb a container filled with water and soap or shampoo mix is kept to kill the attracted insects. One can change the water in the container once in 2 days. He improved it further by using coloured LED bulb.
- The device is portable, reusable and completely automatic with the use of abundantly available solar energy in wide range of agriculture and horticulture crops in different seasons at 1 trap/acre. It is an eco-friendly equipment and can be used as an alternative to pesticides in crops, parks, lawns, kitchen gardens, resorts etc. Attracts and kills insects

without harming the environment.



Output and Outcome

Coloured light attracts large number of insects and solar power makes it continuously operational without interruption. Height of installation is matched with insect flight and the technology used to attract insects is under patent registration. The trap can be used in paddy, red gram, tomato, brinjal, bitter gourd, ridge gourd, mango, guava, coconut, arecanut, grapes, pomegranate, lemon and other crops. The trap is effective against thrips, leaf minors, root-grubs, fruit-borers, boll-worms, sucking pests and stem-borers. Presently, the farmer has started an enterprise 'Laxmi Agencies' in Davanagere with financial assistance under Mudra Yojana.

Farmers have used this trap in tomato and as a result, cost on insecticide spray reduced atleast Rs. 3000/ acre. Using this trap in pomegranate, some farmers have successfully managed crop without single sprays against insects.

The device is under trial for cotton pest management by UAS, Dharwad and outcome is awaited. Patent registration of this device is under process by National Innovation Foundation (NIF) Ahmedabad. In the last 3 years the farmer has sold more than 1075 units at Rs. 4875/ unit in Karnataka, Andhra Pradesh and Maharashtra.

Bamboo Trapper Minimises Rat menace



Arun Kumar S.R

Shettikere

Chikkanayakanahalli

Tumakuru Dist-572 226

Age : 39 years

Education: B.Sc.

Land Holding: 7.75 acres

Mobile: 9900824420

He was cultivating coconut, arecanut and field crops noticed damage by rats during plant growth and post-harvest storage stages was rampant. Rats used to consume and contaminate stored food, bite drip irrigation pipes, kill poultry birds, consume eggs and drink tender coconuts. Available rat traps were not effective as these are kept on the ground, particularly in plantation crops.



Innovations

- Developed a “Bamboo rat trapper” placed inside an old bamboo basket. Four corners of the basket are tied with a binding wire. All the four binding wires are connected to a plastic rope and the other end is tied with the stone.
- The basket is placed on a coconut frond that can be pulled up and down.
- A desiccated coconut piece is attached to the trap. Rats get attracted to desiccated coconut and get trapped. The dead rats are manually removed and buried.



Output and Outcome

It is cost effective method of controlling rats in the farm. One trap is sufficient for 40 trees. It is useful for all plantation and fruit crops. It will kill one rat at a time and its effective usage can kill or trap up to 120 rats / month.

Nearly 2000 farmers were trained and about 1500 farmers adopted this technology in their farms. He has sold around 2000 traps.

Adoption of this technology in coconut crop has saved approximately 2000 nuts/ha/year and approximately 3 q/ha/year in arecanut crop.



Cracker Gun keeps Monkeys at Bay



S.H.M. Basaiah Swamy

Kaddi Rampura post,
Hosapete Taluk, Ballari
District-583 239

Age: 56 years

Education: 8th Standard

Land holding: 3 acres

Mobile: 9449133154

Farmers in the villages around historical Hampi of Vijayanagar empire region grow banana and sugarcane to meet the tourists demand. Langurs and Hanuman monkey cause loss to a tune of 20-25% at different stages of crops. Available mechanisms to scare away monkeys are not working. Hurting or killing monkeys is an offence under wild life Act. Hence safe and efficient monkey scaring devices are urgently needed.



Innovations

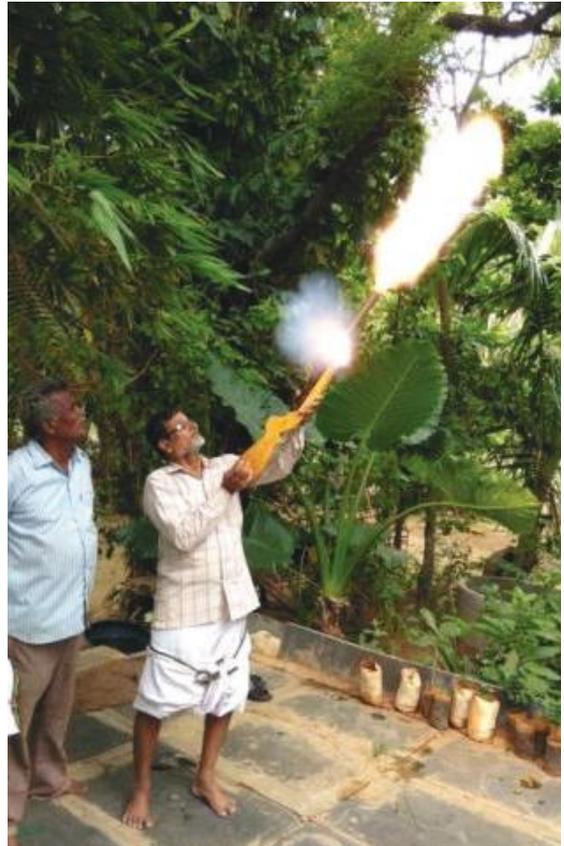
- The farmer designed a simple device resembling a gun, within which a firecracker is lit and a loud sound is produced to scare away the monkeys.
- One- inch diameter iron pipe fitted on a wooden handle is designed to hold a fire cracker of a small lemon size and 6-8 small pebbles. The wooden handle resembles a 'rifle stock/butt'.
- When the fire cracker is lit, it produces a loud noise with a big bang and small pebbles inside the barrel like pipe are fired up to 200 feet. Loud sound and pebbles scare the monkeys away.

Output and Outcome

Crop loss/damage by monkeys to the tune of 20% is saved by using this gun. Langurs, easily get scared by the sound of the gun and stay away from the fields for longer duration. Hanuman monkeys are stubborn and return back in 2-3 days, but firing at them again will also keep them at bay for a considerable period.

Guns costing at Rs. 1000 are purchased by more than 200 farmers. ICAR-KVK, Bellari has facilitated the farmer to demonstrate in Krishi Melas and exhibitions. Farmers from Joga and Bandri of Sandur area are using this gun to scare away wild boars also. Birds which prey on fishes in fish pond are also scared away with help of this gun by Andhra Pradesh farmers.

Besides monkey gun Sri. Basaiah is an apiculture expert. He has mastered the art of collecting the wild honey bee colonies by placing earthen pots on the trees. Has trained many youth to trap wild bee colonies in their farm and backyards.



Single Bullock Drawn Multi Tillage Tool



Abdul Sattar

Tq: Shorapur,

Dist: Yadgir

Age: 43 years

Education: 3rd Standard

Land holding: 9 acres

Mobile: 9902525367

Replacing an injured/diseased bullock is not any easy thing. The survivor bullock is often sold for a low price or else it becomes non-functional as most of the bullock-drawn implement are driven by a pair. This necessitated the need for Single Bullock Drawn Multipurpose Tillage Tool.



Innovations

- The single bullock cage developed by Mr. Abdul Sattar, can be connected to any of the implement (harrower/ plough /ridger/ land leveler/ bund former/ tiller and seed drill) by its detachable shaft.
- All these implements are custom made for easy attachment and detachment with adjustable length as per requirement depending upon soil conditions and bullock height.
- He used old discarded shafts from his son's garage and other low-cost inputs from metal scrap to develop this multipurpose tillage tool implement.
- It enables many operations with single bullock with same time and efficiency at lower drudgery than double bullock drawn implement. The single bullock drawn unit is found equally efficient than two bullock drawn unit.
- With his innovative thinking, he has also developed mechanized low-cost power tiller using old discarded two-wheeler engine and spare-parts. This low-cost unit runs on petrol

and very easy to handle.



Output and Outcome

Cost of maintenance of bullock reduced by 50%. It costs around Rs. 10000 for a set of cage with three detachable implements. The same implements drawn by two bullocks will cost more than Rs. 60000. Thus its very cost effective and easy to maintain. In terms of profitability it's helpful in net savings of 50% in all the farm tillage operations.

The low-cost power tiller can perform inter-cultivation operations with just 2 litre of petrol for an acre of land. In a day around 4 to 5 acres can be covered. Single person is enough to operate with least drudgery.

It costs Rs. 4500 compared to Rs. 40000 for any motorized power tiller. 15 farmers in his taluk have already purchased the unit and more than 50 farmers have shown interest.

Automation Expert : the Robot Farmer



Manjegowda

K.R.Pete taluk, Mandya district

Age: 47 years

Education: 8th standard

Land holding: 8 acres

Mobile: 9900773528

Because of ill-health of his father, at the age of 13 he discontinued his education and took responsibilities of the family. Journey of “Robot Hero” started with growing paddy, sugarcane and vegetables but always struggled to manage the family expenditure. Using his innovative thinking, started a sugarcane processing unit and used its wastes for biogas production. Realizing that growing crops alone will not be economically viable he started subsidiary activities like dairy and fishery.



Innovation

- He introduced “Zero-power water pump” by modifying age old technique (yetha) of water lifting. Generator has been fitted to the water pump with the help of belt, so that the wheel present inside the pump can easily rotate and generate power simultaneously.
- Innovated a “low cost transplanter” to overcome labour scarcity and problems related to damage to seedlings during manual transplanting and non-uniform establishment of plants. By using this transplanter farmers can easily transplant vegetables.
- Designed a “vehicle cart” which is made by attaching the cart to the bike. The cart is used for transporting fertilizers and green manures within the farm and between farm and home.
- Devised a low cost apparatus called “Coconut robot” to climb coconut trees. This can perform harvesting of nuts and cleaning of dried leaves and fronds.

- To avoid the emission of carbon di-oxide and other poisonous gases from vehicles, he made a “smokeless silencer”. It is made up of different types of plants and leaves mixture which absorbs the poisonous gas and purifies the air.
- Automatic hydraulic system, safety box for vehicles, low cost residential lift, robot for protection of soldiers, automatic gate, organic liquid processor, life saver for persons struck in the tube well have been designed by him.



Output and Outcome

He has been recognized with successful farmer award at state level by Vijaya Karnataka and Rajyotsava puraskara award by Karnataka sangha, Mandya.

He is also appreciated by many government organizations, associations including Akashvani Chandana and many Magazines and T.V channels. Sainik robot is specially appreciated by many soldiers and they are planning to introduce this technology to army.

Farmers from different states visit his farm and have adopted many of his technologies in their farms.

Motor Cycle Operated Multipurpose Equipment



Malappa Ningappa Hirekurubar

Post: Sindagi
Chennamma Circle,

Dist.: Vijayapura

Age : 53 years

Education : SSLC

Land holding: 25 acres

Mobile: 9663900406

Shri Malappa Ningappa Hirekurubar, a farmer-cum-mechanic, used to help fellow farmers by repairing their farm implements as a service motto. He used to hear farmers complaining about the time, cost, non-availability of bullock and the operating labour in carrying out field operations. Imagining a low-cost farm machine, he thought of modifying his motorbike for field operations as small farmers cannot afford to buy tractor.



Innovations

- First he attempted bike-mounted sprayer which was instant popular. Then he developed bike-mounted blade harrow for weeding, operating a seed drill, bund former and inter-cultivator in wide-row spaced crops.
- Now he is developing a chain/iron wheels to cover the wheels so that they can be used in high moisture conditions.



Output and Outcome

Efficient utilization of implement is evident by its workability 2 acres per hour and costing Rs. 200/hour. The implement cost ranges from Rs. 4000-6000 and one time investment. There is reduction in cost of field operations upto Rs. 2000 per acre and ensured timely field operations leading to increased yield upto 15-20%

The technology has been tested by KVK Vijayapura and State Department of Agriculture. The equipment was exhibited at Krishimela 2017 at UAS Dharwad and Krishimela 2018 at Vijayapura. Adoption is increasing day by day particularly by the farmers growing wider row spaced field crops, and about 30 farmers are using this technology at present.

Two-Wheeler turned to Farm Mobile Vehicle



Vijaykumar Naik

R/o GundahalliTanda
Tq: Shahaapur,
Dist: Yadgir
Age: 52 years
Education: PUC
Land holding: 25 acres
Mobile: 9902058821

Non-availability of labour and delay in farm operations hinder farm income. Sometimes losses were up to 30 to 40 per cent in horticultural fruit and vegetable crops. Mr.Vijayakumar Naik often used to hire 3-wheeler pickup van for transportation of farm inputs/produce using labourers at a high cost. He tried to find a solution to all these difficulties. The pickup van inspired him to develop his own at a low cost and that can serve multiple purposes.



Innovations

- The farmer modified his old two wheeler motorcycle of 150 cc, by removing the rear wheel and attached a compartment stand with two wheels for mobility.
- It is designed to perform spraying and intercultural operations. Transportation within the crops field and also to market places with up to 400 kg of fruits/vegetables/fertilizers and other commodities, are its additional advantages.
- One compartment space has been provided for a 700 litre water tank with 20 feet hose pipe on either side of the bike for spraying. This innovation has no need of personal handling of spray guns.

- This innovative mobile unit proved very cost effective, less time consuming and also saves labourer requirement. In addition, it can be assembled using old two wheeler vehicle.
- He has been reaping 30 to 35% more revenue with less dependence on labour than earlier.



Output and Outcome

This modified bike can be used for plant protection sprays, herbicide spray and other bio-agents spray for perennial horticulture crops and also in field crops with high canopy.

It can also be used for transportation of agriculture inputs like fertilizers, seeds and pesticides and farm produce etc. The mobile unit can be useful for ferrying 8-10 farm labourers for farm activities from village to the farm.

The machine costs Rs. 30000 and can be used for 8-10 acres of farm operations in a day. The investment shall be recovered within few months on a farm of 5 or 6 acres. Compared to manual spraying it saves the cost by 60 to 70 % and reduces labourer dependence.

Many farmers are using his invention on rent basis. Four farmers in his taluk have got it designed for their own use. The encouraging feedback and the interest being shown by other farmers has inspired him to establish a workshop to scale-up production.

Simple and Low Cost Bund Former



Mahadev Reddy

R/o Handryal

Post: Tadola

Tq: Basavakalyan - 585331

Dist : Bidar

Age: 47 years

Education: B.A

Land holding: 56 acres

Mobile: 9741012685

Bund making is a laborious work, requires labour, cost and time especially in sugarcane and ginger crops. Non-availability of bullocks, bullock-drawn implements and appropriate tractor-drawn implements was an impediment to several farmers whose fields badly needed bunds.



Innovations

- He has designed a low cost device using his own intuition and ingenuity. He is using this device for last 4 years which is very cost effective and efficient in bund formation.
- This tool is made of iron at a cost of Rs. 1000. It can be fixed on a tractor operated cultivator with a 1.5 feet width and 3 feet length iron plate on both sides in such a way that it takes triangular shape for bund farming.
- Bund former in one hour can cover 2 acres. It saves labour, time and cost. Perfect bunds can be formed in the absence of regular bund former.



Output and Outcome

This device is designed for both irrigated and rainfed conditions, which is labour saving and economical. It helps in making bunds upto 2 feet height using tractor.

The farmer came up with this innovation to reduce the drudgery, labour requirement and to increase the work efficiency. KVK, Bidar verified this device in farmers fields and found useful in bund formation at lower labour rate and cost. Now several other farmers are using it in their fields, in his village and in nearby villages.

Tractor drawn Compartment Bunding Cum Furrow Opener



Suryakant Gurupadappa Gadagi

Gadagi layout ,
Ibrahimpur,
B.Bagewadi road,
Dist.: Vijayapura

Age: 66 years

Education: 9th Standard

Land holding : 25 acres

Mobile : 9448939685

In the deep black cotton soils which can hold more moisture, conservation measures like compartment bunding have huge potential. Bullock drawn bund formers are inefficient under undulated land and insufficient moisture conditions during rabi season. Cost, non-availability of bullock and time consumption are the other constraints.



Innovations

- Using the unused metal wheels, parts and steel blade, belts etc. With the help of a mechanic, he got developed a V shaped bund former and one metal plate to form the ridges after every 6 ft.
- The implement forms compartment bunds of 8 ft x 6 ft. It also helps in furrow opening. The original design was to develop furrow opener. But the mechanic gave the idea of making both bund former and furrow opener.
- Thin metal sheets with hydraulic system is helpful in early raising or lowering, making this implement useful even in undulating land.
- The metal wheels are advantageous in high moisture conditions.



Output and Outcome

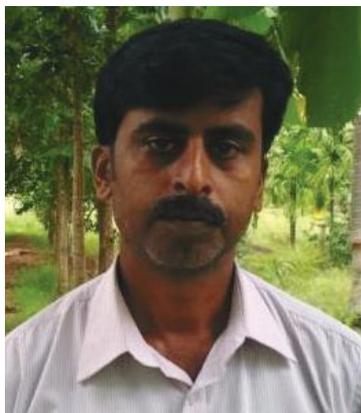
Bullock drawn bund former covers 2 acre/day and costs about Rs. 2000 / acre where as tractor drawn implements covers 16 acres/ day @ Rs. 350 / acre.

The middle plate of 6ft forms the ridges, saves the cost of extra labour to form the ridges.

The compartment bund with ridges conserve the moisture and increase yield more than 20% during rabi 2018.

The implement has been tested by KVK, AICRP on Dryland Agriculture and Regional Agricultural Research Station, Vijayapur. The technology is now being used by 32 farmers in about 300 ha and adoption is increasing. The farmers participated in Krishimela at RARS, Vijayapur have appreciated the innovation, particularly by those who are affected by run-off losses.

Coconut (*Cocos nucifera*) Frond based Vermicomposting



V.C. Byreshappa

Vaderahalli,

Tq: Holalkere,

District: Chitradurga

Age: 38 years

Education: SSLC

Land Holding: 3.2 acres

Mobile : 9108101629

Farmer Byreshappa of Holalkere taluk has been successfully using the coconut waste for producing compost. His training at KVK Chitradurga and at Agriculture and Horticulture University campus, Shimogga helped him to understand the composting methods and processes.

He used the chaff cutter to cut the fronds to small pieces and started compost preparation. He noticed few problems like the hard portion of the frond remained un-decomposed. The stick-edge portion of the leaves, posed risk to farm labours by hurting their hands and fingers. He separated these two portions and then composted the soft portion.



Innovations

- He improvised the composting process which resulted in quick and quality manure production within a reasonable period of time.
- He introduced earthworms to the partially decomposed coconut waste material and increased volume of compost produced.



Mulching using coconut fronds



Dairy Unit

Output and Outcome

Compost production has increased by four-folds to 20 t/year by complete utilization of the farm waste. He installed biogas unit and thus avoided using farm waste as fuel. Recycling and use of coconut fronds compost increased the soil fertility. In the process, saved expenditure on chemical fertilizer to the extent of Rs. 28000 annually. Part of his farm is now maintained under complete organic farming. The remaining part is also being slowly converted into organic farming.

His efforts were instrumental in getting the Organic Farming Village scheme implemented by State Department of Agriculture. Several youth tried to emulate him in converting the waste to wealth.

Pre-sowing and Post-Sowing Equipment



Somashekar

R/o Hudgi -555329

Tq: Humnabad

District: Bidar

Age: 44 years

Education: B.Com

Land Holding: 21 acres

Mobile: 9343057351

Pre-sowing and post-sowing operations have to be timely as it decides the germination and crop stand. Pre-sowing cleaning of crop-residue or removing of dried weeds requires 10-15 labour a day costing almost Rs.3000/acre. Non-availability of labour often forces farmers to sow the seeds in under-prepared soils. Improper coverage of seeds can worsen the germination.



Innovation

- He designed a crop-residue & dried weeds collecting tool which is both a small-tractor as well as bullock-drawn equipment. Made up of iron angles, the equipment can be assembled at a cost of Rs.1000.
- For post-sowing covering of seeds with a layer of soil and levelling the furrows, Mr. Somashekar designed a seed covering device, light in weight at a cost of Rs. 600 and can be assembled with locally available material.
- The post-sowing covering and levelling device can cover 4 acre of land area at an operating cost of Rs. 1000 / day or Rs. 250 / acre.
- The crop-residue collecting equipment, attached with a pair of bullock can cover 8 acres a day and collect crop residue and clean the field, at an operating cost of just Rs. 1000/day or Rs. 125/acre.



Output and Outcome

ICAR-KVK, Bidar verified the practice in the field of Sri. Somashekar and several other farmers' field. This device has reduced the drudgery and saved the labour usage. On an average it saves 18-20 labours with minimum of Rs. 6000 to Rs. 7000 labour cost/ha.

