



**SUCCESS STORIES OF
RASTIRIYA KRISHI
VIKASA YOJANA**



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Karnataka State Department of Agriculture
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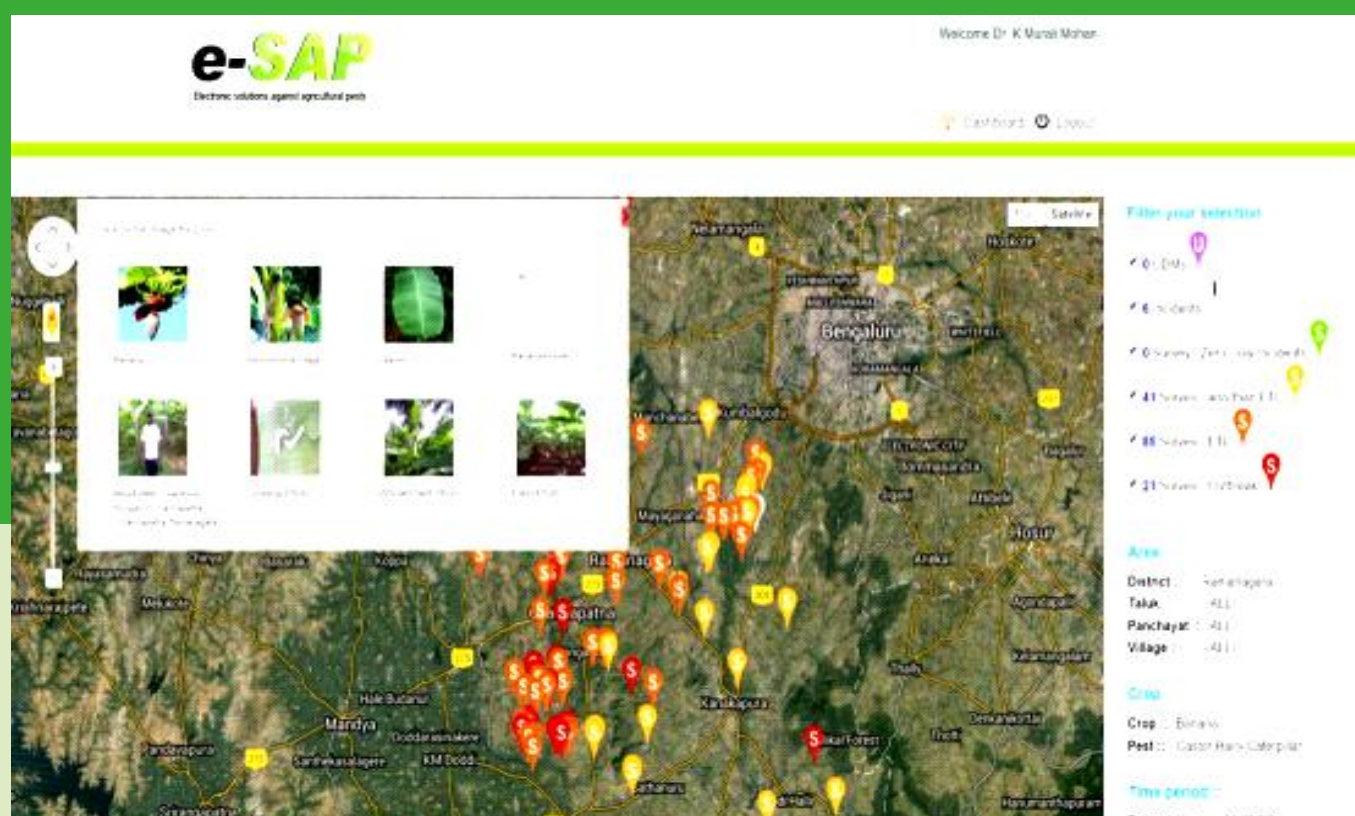
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e-Pest surveillance in selected cropping ecosystems through e-SAP. (IA: UAS, Raichur)



Year: 2011-2015 Project Cost: 3.25 crore.

e-SAP (Electronic Solutions against Agricultural Pests) is a dedicated IT application for crop health management. It enables the extension/field officer for on-field identification, quantification, intensity based advisory of insect pest, diseases, nutrient deficiency and weed problems with 90-95 per cent accuracy. It also enables collect feedback of the farmer regarding adoption of the advisory. On the other hand, the surveillance data collected from the field will automatically develop into multimedia reports for the administrators and scientists for real time analysis of the situation.

A study on **“perception analysis of e-SAP by farmers in the districts of implementation of e-SAP”** revealed highly positive response from the farmers as well as field user (70% of the sample farmers gave positive response) endorsing the power of the technology in the field of crop protection. e-SAP has helped farmers to overcome a major difficulty—reliable identification of their crop pest problems. Further, e-SAP has effectively driven the concept of quantification of the pest problem and has introduced the concept of pest-intensity based management system. Today, many farmers receiving printed prescriptions carry it to the retailers and demand the same to be given to them. It has had a significant impact on the interactions between the pesticide retailers and farmers. Their confidence levels for tackling pest problems have increased. This is largely because of the fact that they are completely involved in the identification and quantification process by the extension functionary.



Based on the successful pilot study conducted by UAS, Raichur covering more than 1,00,000 farms in Karnataka, and three more fellow agricultural universities in Karnataka adopted e-SAP. More than 100 extension workers recruited under various projects have received employment opportunities. The opportunities for selling ineffective (and sometimes, spurious) substances has drastically come down. The quantity of pesticides applied is also in accordance to the recommendation of experts and the administrators.

The success was measured in terms of appreciations from the farmer, extension persons, experts of the university and administrators of University including Hon'ble Vice-chancellor, policy makers of the administrative and legislative wing.



Identification of problem through e-SAP



An Initiative to double the farmer Income by Hi-tech horticulture through CoE on Precision farming in Horticulture crops.

(IA: Department of Horticulture)

Year: 2015-16 to 2020-21, Project Cost: 9.27crore

Precision farming in Horticulture sector provides an excellent opportunity in raising the income of the farmers throughout the year. A significant shift towards horticulture is envisaged in the state with an increase in area and production after the launch of the RKVY scheme.

Centre of Excellence (CoE) on precision farming has been established under RKVY scheme of 2015-16 at Madduru, Karnataka state. The centre cater the need of precision farming training in open and protected cultivation, demonstration of these technologies in farm and distribution of quality planting materials to the farmers. This precisely envisages less challenges and more profit by using per drop of water. The private company partners were also involved particularly in Color and Green Capsicum, Carnation and English Cucumber to give technical information.

CoE has taken steps to demonstrate the appropriate scientific technologies in 26 acres of farm.

The centralized drip and automation technology is also demonstrated. The total number of farmers trained in this centre from 2016-17 to 2020-21 is 1860.





Krishi Yantra Dhare Custom hire service centre.

(IA: Agriculture)

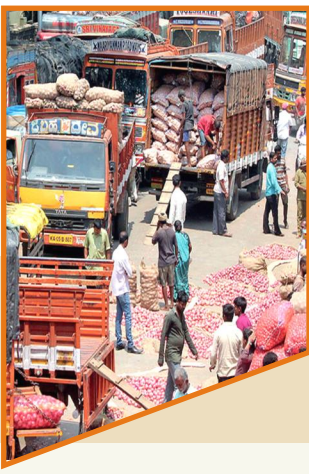
Year: 2014-15 to 2020-21, project cost:Rs.152.38 Crore.

A unique platform for service providers to reach the farming community, to create awareness about Hi-tech/advanced farm machinery to farmers to facilitate timely availability of Hi-tech farm machinery at the farmer's doorstep with hiring charges up to 25-30% lesser than the market price.

The initiative started during 2014-15 with 175 centres under PPP mode. The facility was expanded phase wise and as on 2020-21, 195 centres are established with financial assistance under RKVY and also other schemes.

The total investment from private partners and Government is Rs.292.61 crore and Government contribution is Rs.152.38 crore. Around 20.79 lakhs farmers are benefitted from Krishi Yantra Dhare.





Establishment of Value Addition Market Infrastructure in Agricultural Produce Marketing Committees (APMC) in Karnataka.

(IA: Agricultural Marketing)

*Year: 2012-13 to 2015-16,
Project Cost: Rs.158.98 crore*



The farming community is facing hardship in the absence of adequate post-harvest produce management and value addition facilities. The basic objective of creating this facility is to provide higher profit margins to the farmers by better post-harvest management of the produce. Help farmers in getting pledge loans from banks for continuing their agricultural activities and desist the farmers to approach scrupulous money lenders.



The 186 scientific storage godowns of different capacities ranging from 400MT to 5000 MT have been constructed in various APMC's 101 number of locations under RKVY with the total storage capacity of 2,34,250MT. This will help farmer to store their products in case of glut in the market and discourage them to go for distress sale and also reduce post-harvest losses. It has multiplier effect on the income of the APMC in term of higher market fee realization due to higher sales price.





Three-in-one concept towards "Boat to Plate" by KFDC's Matsyadarshini.

(IA: Karnataka Fisheries Development Corporation)



Customer Utility of KFDC Mathsyadarshini -A Three in One Concept

Year: 2008-09, Project Cost:Rs.1.00 Crore.

This model of Matsyadarshini is very much appreciated by the public and has helped to create awareness of eating fish in the health point of view. This model is replicated in most of cities particularly in Mangalore, Bangalore, other cities and towns of Karnataka.

KFDC has collaborated with entrepreneurs in Bangalore, Mysore, Mangalore and even Kochi, Kerala to operate as KFDC franchises. Fresh sales started in Matsyadarshini 8 years back and have now reached 100MT/annum. On popular demand evening counter is also started at Matsyadarshini, Cubbon Park, Bangalore, KFDC is getting lot of enquiries within and outside states to establish similar models on License/Franchise/Agency basis.



Farmer Producer Organization(FPO)

(IA: Department of Sericulture/ Horticulture/ Watershed Development / Animal Husbandry and Veterinary Science)

**Year: 2015-16 to 2020-21,
Project Cost: 37.103 Crore.**

**(Sericulture-
5 FPOs, Rs.1.93 Crore)**

**(Horticulture-
73 FPOs, Rs.21.84 Crore)**

**(Watershed Development-
130 FPOs, Rs.8.333 Crore)**

**(Animal Husbandry -
30 FPOs, Rs.5.00 Crore)**

Through FPO, farmers are collectivized, sharing their farming experiences with each other. Production cost has been lowered due to low cost and easy access of inputs of FPO. Encouraging establishment of Custom Hiring Service Centre (CHSC) by FPOs has reduced the drudgery of farm labour. CHSC provides access to high cost farm machinery at lower hiring rates for small and marginal farmers, facilitates timely farm operations and efficient use of inputs. Overall reduction in production cost adds on to the profit. Collective marketing through FPO for better price has not only helped farmers realize better income but also reduced the burden of individual marketing on farmers.



Agri/Horticulture inputs hops operated FPOs



INM and IPM training and demonstration to FPO Members



FPO Custom Hiring Centre's (CHC)



Output Marketing of Onions by Ramalingeshwara HFPC, Hosadurga taluk, Chitradurga district



Establishment of Multi Chamber Cold storage facility at Vijayapura

(IA: Karnataka State Agricultural Produce Processing & Export Corporation Limited (KAPPEC)

Year: 2014-15 to 2016-17, Project Cost:Rs.6.50 Crore.

KAPPEC has been engaged in the creation of post harvest infrastructure facilities. One such facility is the creation of cold storage of 300Mts. Capacity at Vijayapura for storing of raisins and other Horticulture produce to ensure the scientific and secured cold storage facility to the farming communities well as other stakeholders in the area and to increase the shelf life of the produce and realize better price for their produce.





Strengthening of Infrastructure facilities for Seed processing and scientific seed storage.

(IA: Karnataka State Seed Corporation Ltd.,)

Year: 2014-15, Project Cost: 16.50 Crore.

Karnataka State Seed Corporation Limited is a Government of Karnataka Enterprise is engage in production of good quality seeds & organizes seed production through its shareholder growers and other resourceful growers on their land holdings. Till 2014-15, the available seed storage capacity was about 3.85 lakh quintals as against the targeted production of about 6.0 lakh quintals.

The creation of seed processing and scientific seed storage facilities has facilitated Karnataka State Seeds Corporation to increase its seed production, thus increase the availability of quality certified seeds to the farmers. The installation of new processing output and improvement in seed increase in seed processing output and improvement in seed quality. Both seed processing and storage facilities are created at Sindhanur and seed storage facilities are aerated at Mandya, Raichur, Bheemarayana Gudi, Haveri and K.R.Nagara. Total facility is created to handle 97250 quintals.



Construction of Quality Control Divisional Level Training Centre's at Haveri

(IA: Karnataka State Seed and Organic Certification Agency)

Year: 2016-17 to 2017-18, Project Cost: 0.78 Crore

Karnataka State Seed Certification Agency (KSSC) is autonomous body established in the year 1974, with objective of providing quality certified seeds to the farmers. The activities of the agency are increasing every year due to increased awareness amongst the farming community about the use of high quality certified seeds and also encouragement and support extended by the central and state Governments.

The infrastructure was created to provide training to the seed producers, seed growers and processing unit in-charge persons in various aspects of seed production & processing techniques.



Strengthening of seed certification activities.

(IA: Karnataka State Seed and Organic Certification Agency)

Year: 2014-15, Project Cost: 0.50 Crore

Seed moisture content is the most vital parameter which influences the seed quality and storage life of the seed. Seed moisture content is closely associated with several aspects of physiological seed quality. Movement of harvested produce from field to seed processing unit without knowing the optimum seed moisture content required for processing delays further seed certification activities and adding transportation cost to the farmer.

This initiative helped the farmers to know the moisture content of the harvested produce instantly take decision for further drying of the seed processing unit for processing and further certification activities. Number of farmers benefitted- 390.

MOISTURE TESTING OF PADDY and BENGALGRAM SEEDS.



Construction of seed testing laboratory and training complex at Raichur

(IA: Karnataka State Seed and Organic Certification Agency)

Year: 2012-13 to 2014-15, Project Cost: Rs.1.00 crore

KSSOCA is a Government sector in state in regulating the supply of quality certified seeds to the farming community. The facility was created to facilitate timely testing & communications of results of seed samples and provide training to the seed producers, growers and farmers of north districts of Karnataka viz., Bidar, Kalaburgi, Yadgiri, Raichur, Koppal & Bellary districts involved in certified seed production. The initiative improved the seed testing facilities of the agency. Quick communication of result with respect to seed testing in turn hastened the seed certification activities.

Number of farmer's benefitted-13,158.



Seed Testing Laboratory and Training Complex at Raichur



Front view of Seed Testing Laboratory and Training

Walk-in Germinator Chamber of STL, Raichur





Construction of godowns and warehouses for scientific storage of agricultural products under post harvest management.

(IA-Karnataka State Warehousing Corporation Ltd.)

Year: 2014-15 to 2017-18, Project Cost: Rs.180.51 crore

The Karnataka State Warehousing Corporation (KSWC) was established in the year 1957 under the agricultural produce (Development and Warehousing) Corporations Act 1956.

The corporation took up the construction of 11 godowns of total 53,500Mt capacity with RKVY grants to provide good scientific storage facilities to farmers so that farmers can avoid DISTRESS SALES. The facility is also used to store agricultural produce, seeds, manures, fertilizers, agricultural implements and other notified commodities in the Warehouses and preserve them by scientific means. The farmers are getting 70% loan on the value of their stored commodities. A rebate of 15% on the storage charges is allowed, for stocks belonging to the bonafide Agriculturists and 25% is allowed for stocks for schedule caste and schedule tribe farmers.

With this intervention, corporation network of Warehouses has increased from 154 with a total storage capacity of about 17.15 lakh Mts to 18.05 lakhs Mts.





Improved social status by adopting Bivoltine Sericulture

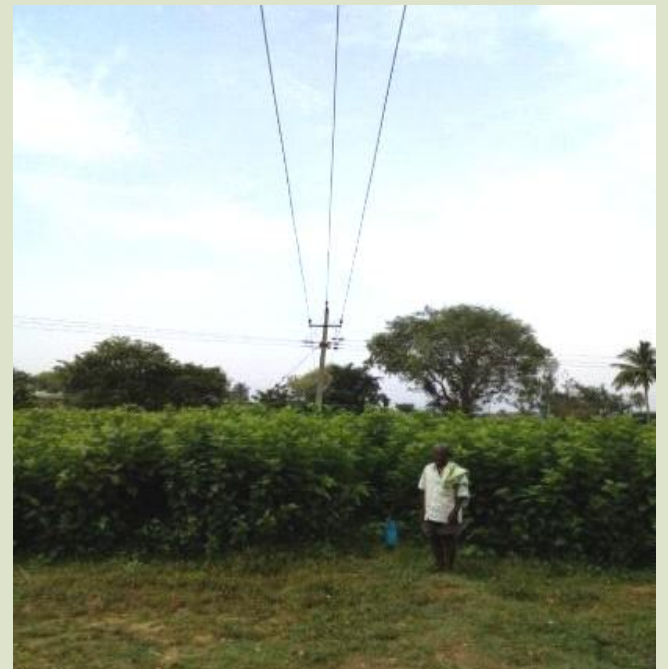
(IA: Department of Sericulture)

Year: 2013-14, Project Cost: Rs.0.32 crore

Agriculture to Sericulture: Farmer Mobile No-9482076151.

Sri Byrappa is a small farmer from Muthanur, Kolar district practicing agriculture. The farmer extended his activities to sericulture and construction of a separate house for bivoltine silkworm was possible through assistance from the RKVY scheme. He planned to rear the bivoltine silkworms with the aim of becoming a model successful farmer in this field. He got all support from the cluster promotion program of Central Silk Board and Development of Sericulture and managed to learn all the sericulture technology such as proper disinfection using sprayer, indenting only chawki worms, 3'X3' plantation system, shoot rearing system, usage of bed disinfectants and improved plantation maintenance in his garden known to him from various extension communication program conducted specially for the bivoltine sericulture farmers in this village.

The income of the farmer prior to adoption of Sericulture is Rs.10-12 thousand per year after adopting Sericulture the income of the farmer increased to Rs. 3.40 lakhs per year.





Assistance for installing disinfection and fogger cum cooling unit in Sericulture

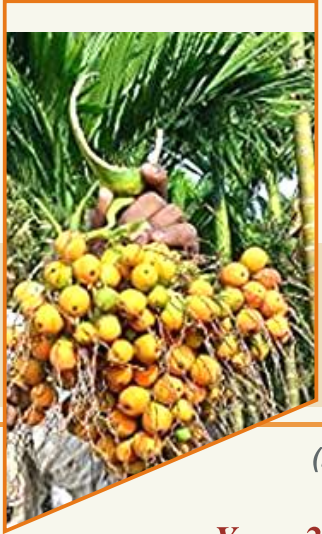
(IA: Department of Sericulture)

Year: 2017-18 to 2018-19 , Project Cost:Rs.4.50 crore

Kolar district is in forefront in the state and national level for its Bivoltine silk production. Many farmers in the district have improved their livelihood financially by adopting silkworm rearing. Mrs.Lalita Suresh of Hosakote village of Kasaba Hobli, Bangarapete taluk, is one among them.

When Japan International Cooperation Agency (JICA) project was implemented, they started rearing Bivoltine silkworm by adopting new technologies. Mulberry with improved variety (v1) was planned in an extent of 2 acres area, constructed separate silkworm rearing house and 400-450 kg good technologies were adopted, it is difficult to undertake silkworm rearing during summer with high temperature and low humidity. Disinfection and maintenance of optimum temperature and humidity plays a vital role in Sericulture. “Disinfection cum Fogger and cooling” units under RKVY programme were helpful in maintaining optimum temperature and humidity.





Research and Development efforts in integrated root grub management in Areca nut in hill and costal zones of Karnataka.

(IA: UAHS, Shivamogga)

**Year: 2012-13,
Project Cost: 0.4 Crore.**

Successful management of grubs requires integrated approach of mechanical collection and destruction, clean garden, pesticide usage (both bio and chemical). Farmers are trained with respect to management of root grub i.e., timing of insecticidal application, identification of females, trap setting and adult collection in their fields and is low being practiced by many farmers. There is increase in the knowledge among farmers with importance of integrated pest management (IPM). Survey also indicated 60-75% reduction of white grubs in farmers fields practicing IPM compared to farmers who took single application of insecticides. The yields are years to gradually increasing as the farmers are repeating management for 3-4 years to completely eliminate the population from their fields. The farmers are delightful and thankful for this intervention.



Insecticidal Management of White grubs





Popularization of high value Horticulture crops under protected cultivation for economical sustainability

(IA: UAHS, Shivamogga)

Year: 2013-14, Project Cost: Rs.1.50 crore

Productivity per unit area can be increased with use of precision techniques like harnessing sunlight, drip irrigation increased input use efficiency etc. protected cultivation envisages higher productivity i.e. growing of high value crops like flowers and vegetables. Under this project, totally 7 poly houses and 8 shade houses were erected covering an area of 12,654m² for establishing demonstration units for high value horticultural crops. Also demonstration units for high value horticulture crops were established at different centers.

12 PG students have completed research under the protected structures and 2300 farmers have been educated on technologies of cultivating high value horticulture crops under protected cultivation through training and exposure visits.

Naturally ventilated poly house





Establishment of farm machinery workshop cum service and training centre.

(IA: UAHS, Shivamogga)

Year: 2013-14, Project Cost: Rs.2.00 crore

Role of engineering in agricultural field is important and it should reach the resource poor farmers. The target beneficiaries of the project included resource poor farmers, small and marginal farmers of dry land region. The project also aimed at empowering rural youth on fabrication of newly developed equipments suited for small land holders, employment for rural youth by creating awareness about modern technology applications in agriculture through training camp, seminars and demonstration.

A-Z mechanization in Ground nut is available at this station, caster thresher, decorticator, cycle weeder, bund formers, tamarind dehusking and tamarind de-seeding machines are in demand and also A-Z mechanizations in onion is under progress. Farmers are benefited through custom hiring centre. Percentage saving through mechanization is 55.10% compared to labour cost.

Demonstration of Groundnut Digger



Demonstration of Groundnut Digger





Promotion of integrated farming system for sustainable livelihoods of farming community.

Year: 2012-13, Project Cost: Rs.2.50 crore

Puttamallappa is a farmer of Mallenahlli village of Tarikere taluk of Chikkamagalur district. He had an orchard of coconut, Areca nut and was cultivating Groundnut. The income generated from this cropping system was very low & uneconomical. He was guided to go with new HYV of groundnut like GPBD-4 & GPBD-5, use of Bio-fertilizers to get the higher yields. In addition, he adopted improved irrigation system, Multi-storied cropping in areca, composting and kitchen garden. With these technical interventions his income was raised by 56.40% (Rs.6, 70,700).

Mr. Durgappa Angadi of Sasaravalli village of Shikaripur taluk was struggling unable to repay a loan of Rs.9 lakh 30 months ago. His crops had failed consistently. Today, he was not only become a successful farmer, but has also become an ambassador of integrated farming. Recalling his difficult days, Mr.Durgappa says it was a programme on television that was the turning point for him. It portrayed a small farmer from Kolar district earning huge profits from just two acres of land through integrated farming. “Within months, my experiment with integrated farming began and I harvested a bumper yield by growing ivy gourd,” he recalls. He was able to repay the entire loan within 18 months.

And then he decided to spend the rest of his life on instilling confidence among small and marginal farmers that farming is still a profitable venture. He now takes up organic farming on two and half acres of land and earns an average annual income of about Rs.5.25 lakh. Apart from growing half a dozen horticultural crops and vegetables, he also takes up apiary and dog breeding. University of Agricultural Science-Bangalore's alumni association, which comprises about 10,000 agricultural graduates, has now chosen four innovative farmers, including Mr.Durgappa, to become its ambassadors of integrated farming. He also remembered how University of Agriculture and Horticultural Sciences, Shivamogga helped him from past days. He said that the crop seminars, input distribution programmes and other valuable programmes arranged by our RKVY team had not only helped him and also his village members which created a ray of hope among the farmers. Here are some plates showing the work done by our IFS Farmer Durgappa Angadi and our University team.

“Development of site specific and appropriate crop/enterprise based models suitable for different agro-eco situations”.



Model farmhouse and cattle shed constructed at IFS unit

Establishment of Azolla unit at IFS unit
Kitchen garden fish pond



Solar operated pump

Portable Syntax Biogas Plant



Training and demonstration of system maintenance and efficient water use through improved irrigation devices (Drip and Sprinkler) and revival of failed systems.

(IA: UAHS, Shivamogga)

**Year: 2012-13,
Project Cost: 0.80 Crore**

(Success story of Smt. Indiramma W/o of late Gurubasappa, Doddabbigere, Channagiri tq. Contact Number-9448847016.)

Smt. Indiramma W/o of late Gurubasappa, is a farm women owning 20 acres of land in a single piece in Doddabbigere village, Channagiri tq. The whole garden was rain fed without any irrigation facilities having 200 each old coconut palms and mango within annual income of Rs.50 to 80 thousand which was very low. The project helped her to overcome the problem of water scarcity through the interventions of irrigation plan worked out as per the cropping plan to manage the crops with available bore well water, scientific solar operated pump set instead of waiting for electric supply.

Within few months, farmers could see a very food crop response and the farmer realizing all the benefits of improved drip irrigation. now many farmers have adopted solar system and major modifications like changing over from micro tubes to pressure compensating drippers, filter and ventury for fertigation, keeping the dripper away from the base of the stem. This has a relevance to farmers, livelihood security and also conservation of resource like power and water.



Fig.1.Farmers interacting with Scientists regarding solar Pump



Fig.2.Farmers and students of DEASI, Shivamogga, visiting the farm



Fig.3.Young mango seedling being nurtured through drip irrigation



Improvement of soil health and productivity for yield maximization through integrated crop management practices and climate resilient Agriculture.

(IA: UAHS, Shivamogga)

Year: 2014-15, Project Cost:Rs.0.39 crore

Now a day, biological means for production of agricultural commodities is gaining lot of importance, among biological means: microorganisms being an integral component of soil ecosystem plays a prestigious role by making the soil truly living.

In the carrier based (solid) bio fertilizers, the microorganisms have a shelf life of only six months. They are not tolerant to UV rays and temperatures more than 30 degrees. The shelf life of the microbes in liquid formulations is two years. They are tolerant to high temperatures (55 degrees) and ultra violet radiations.

Development and popularization of liquid plant growth promoting microbial inoculants for the major crops was taken up and the farmers of the region are adopting the plant growth promoting rhizo microbial consortia for growing different crops like maize, ginger, and areca nut. The major outcomes of this initiative are identification of Native and efficient PGPR isolates, development of cheaper material for mass production of liquid PGPR, development of 7 individual liquid formulation is in the brand name of “Sahyadri” and liquid microbial formulation of 1) PSB + KSB 2)Azotobacter +Azospirillum, 3)PSB+ KSB + Azotobacter).

These products were popularized through trainings and large scale demonstration at framers fields in paddy and ginger.

Liquid Plant Growth Promoting Rhizo Micro organisms developed in the brand name of “SAHYADRI”



Gel formulation soft he PGPR is formulated or Survivability of the micro organism





Increasing Agricultural productivity by amelioration of problematic soils

(IA: UAS, Bangalore)

Year: 2011-12, Project Cost: Rs.1.94 crore.

At Bhadra command, subsurface drainage installation was taken up and paddy yields were increased after installation to an extent of 22.99 per cent, compared to paddy yield before subsurface drains installation (average-21.42 q/acre). Second crop also increased to an extent of 25.13 per cent. Whereas, in sodic soil farmers field, yield increased to an extent of 38.28 q/acre. If the extra grain obtained is calculated for its market rates (Rs. 1500/q) nearly 10.50 lakhs extra profit is obtained from this technology in a single season.

After seeing the success in improving problematic soils by installation of SSD at Bhadra command area, two farmers viz., Thippeshappa of Doddaghatta village and Basappa of Navile village of Davangere district have adopted SSD and soil test gypsum application technology on their own to overcome salinity –sodicity problems by seeking advice from the project leader in their land by spending 3.5 and 1.75 lakh rupees, respectively.

At Cauvery command, after SSD installation, paddy yields have been increased from 12.74 q ha-1 per acre in 2013-14 to 2014-15 and further to 31.65 qha-1 per acre in 2016-17. In the year 2014, sugarcane was planted in an area of 1.5 acre from which 74.5 tons of sugarcane was harvested, where no crop was grown earlier due to salinity-sodicity problem. The soil properties after SSD installation indicated improvement in soil properties through SSD installation.



Salt affected area at V.C. farm, Mandya before installation of SSD



Waterlogged area at Tyavanagi village before installation of SSD



Waterlogged area at Tyavanagi village before installation of SSD



A view of leachate sample collection from outlets and distribution of gypsum to beneficiary farmers at Tyavanagi village





Leaf reddening and its management in Bt. Cotton

(IA: UAS, Raichur)

Year: 2013-14, Project Cost:Rs.0.50 crore

In Karnataka the area under cotton was around 6.0 lakh hectares with 535 kg/ha productivity during 2015-16, technological intervention i.e., application of chemical fertilizers containing nutrients N.P.K and Mg overall increased the cotton yield by 17.25 percent over the control plots which lead to an increase nearly one quintal/ha and overall leaf reddening in Bt cotton was reduced (controlled) by 35 percent.

65% of farmers growing Bt. cotton are practicing this technology to control leaf reddening in cotton in Karnataka. The recommendations of the technology officially added in package of practices





Economic impact of production and supply of quality seeds of Pigeon pea/TS3R

(IA: UAS, Raichur)

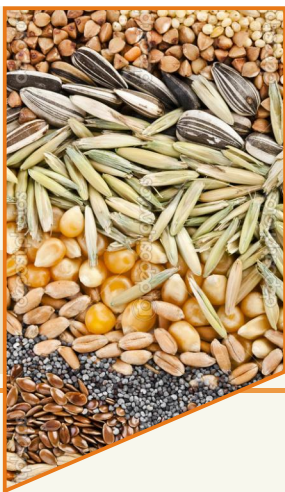
Year: 2011-12 to 2014-15, Project Cost:Rs.1.00 crore

One group of farmers in directly involved in the seed production and gets the additional income by involved in the seed production other group of farmers are the indirectly benefited by the use of quality seeds of RS3R and gets the additional yield advantage over the farmers who use the seeds of the local varieties. Number of farmers involved is 115 with an area covered 28424 hectares, the quantity of seed produced is 3553 quintals.

Presently the local pigeon pea genotype has been replaced by TS3R and the total area is about 10 lakh ha and the average yield is 15-20 q per ha.

View of TS3R Seed and plant





Dry direct seeded rice - Conservation agriculture in Hyderabad-Karnataka region.

(IA: UAS, Raichur)

Year: 2011-12 to 2014-15, Project Cost: Rs.0.50 crore

Realizing the potential of the conservation agriculture based management system in water scarce rice ecologies such as major command areas of the region, systematic work on dry Direct Seeded Rice (DSR) was initiated by the University of Agricultural Sciences (UAS), Raichur.

Enthusied by the assured yields without additional investment through reduced seed rate, water, energy, labour and fertilizers/ chemicals farmers are taking this revolutionary technology in to the length and breadth and also across inter and intra commands of the state. Efforts of mass media (daily news, DD, field days etc) accelerated spread and days are not far off to see DSR in every command due to falling resource bases.

Success of DSR is mainly attributed to:

- * Timely sowing
- * Reduced cost of cultivation as compared to transplanting (labour, puddling cost, water for puddling 12-15%; diesel 15-16 liters, etc)
- * Reduced seed rate (8-12 kg per acre as against 25-30 kg per acre required for transplanting)
- * Saves 35-40 per cent water and thereby helps to increase more area under irrigation, additional production, profit, reduced water logging/salinity, increased environmental benefits etc.

Currently the DRS method is adopted in a 75000 ha area.



Direct seeding VS Transplanting



Dry direct seeded rice crop at various stages

Impact of Climate change on important crops of Hyderabad Karnataka region.

(IA: UAS, Raichur)

Year: 2012-13 to 2014-15, Project Cost: Rs.3.00 crore

Weather based agro-advisories are given through SMS to farmers of the Hyderabad Karnataka region and as on date 19709 farmers of Raichur, Kalburgi, Bellary and Koppal district are benefitted with this service. These services have helped farmers to increase the knowledge about the farming practices and also get real-time weather information to take up appropriate practices to increase yield and thus increase the monetary benefits.

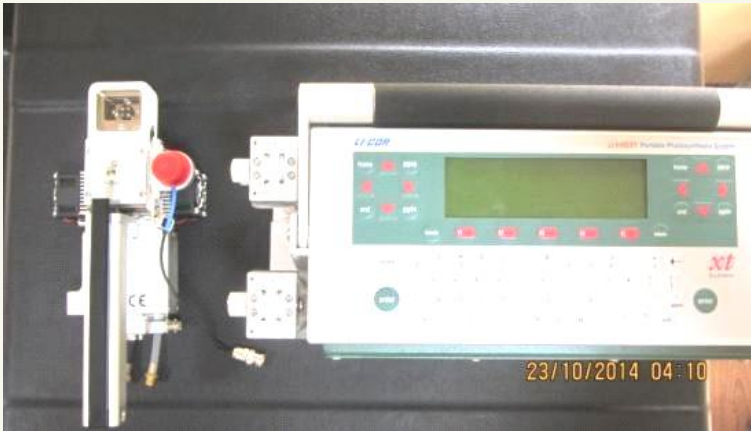
The studies on crops have shown that, C3 crops like pigeon pea and Bt. cotton and maize being a C4 crop showed good responses to climate change in terms more growth, yield and yield parameters. However, C3 crops were more benefitted by enriched CO₂. Biochemically CO₂. Nitrogen related compounds viz., leaf nitrogen, proteins, amino acids, pigments have decreased. Hence these crops may yield more in the changed climatic situations which might be beneficiary to the farmers.

The studies on insects has given evidence that, climate change in the form of increased CO₂ and temperature have substantial impact on host-herbivore interactions leading to food web. In future climate change situations, there are risks of introduction of alien pest species and outbreak of pest is a common phenomenon. Accordingly, management strategies need to be altered and reoriented.

Overview of Open Top Chambers where studies undertaken



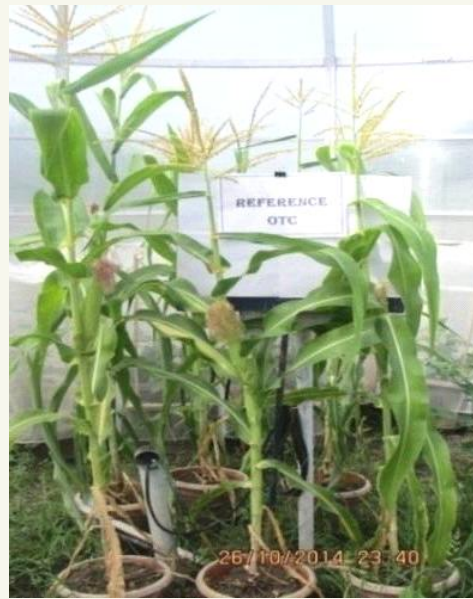
Photosynthesis system (Infrared Gas Analyzer) Chlorophyll meter



Green Seeker Automatic Weather Stations



Grown in Open Top chambers for climate change studies



Bt. cotton grown under OTC



Mulberry grown in open top chambers



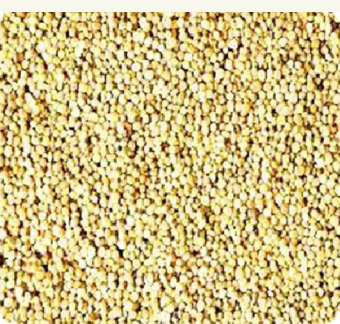
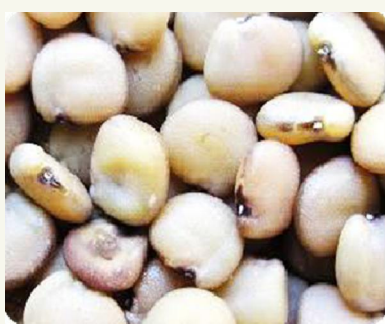
Gum Guar- A remunerative crop for dry land agriculture.

(IA: UAS, Raichur)

Year: 2013-14, Project Cost: Rs.1.00 crore

Agricultural production in rain fed areas have always remained low and unstable due to impact of climate change, erratic monsoon occurs leading to natural disasters such as drought, floods, cyclones etc. the prime objective of the RKVY sponsored project was to improve the livelihood of the dry land farmers by introducing an alternate and economic crop for rain fed areas with higher productivity fetching good economic returns to the farmers.

Emergence of a climate resilient crop for dry lands with good economic returns to farmers is the outcome of this project. Total package for gum guar production was evolved, recommended as an alternate option for groundnut, horse gram and minor millets in rain fed areas. Market facilitation to the export oriented crop was established.



Techno-economics of Baling Biomass: A mechanized way of managing Rice straw for valuable feedstock.

(IA: UAS, Raichur)

Year: 2012-13, Project Cost:Rs.0.20 crore

High cost associated with traditional method of in-field management of paddy straw and non availability of farm labours during peak harvesting season are the major cause of burning paddy straw in the field. Straw baling in the combine harvested paddy field is considered as technically and economically viable option for sustainable management of straw for animal feed, biofuel and other industrial uses.

Many paddy growers in and around Raichur were exposed to the technology of mechanized baling of paddy straw through demonstrations carried out at various forward speeds and moisture content of paddy straw. Many paddy farmers expressed that straw baling technology is very useful for mechanized collection of straw and can be done in less time and also straw bales are more convenient and economical for handling, transportation and storage of straw. From large scale multi-location demonstrations around 1.40 lakh farmers and stakeholders had the opportunity to understand and got benefitted from this technology.



Field operation of tractor operated baler



Field operation of tractor operated rake



Field demonstration and training soft hestraw baling using tractor operated baler



Farmers Participatory varietal selection in Groundnut: where farmer is a breeder.

(IA: UAS, Raichur)

Year: 2015-16 to 2016-17, Project Cost:Rs.0.30 crore

Groundnut is one of the major oilseed crops of Hyderabad-Karnataka region. The groundnut area in Karnataka significantly declined nearly by half in last two decades along with low productivity of 907 kg ha⁻¹ as compared to the national average about 1750 kg per ha in 2013-14. Hence, this RKVY project with the objective of introduction of new varieties in the farmer's field with concomitant large-scale replacement of the old variety (TMV-2) and popularization of promising varieties among the groundnut growers and all stakeholders by conducting intensive training, field days and seed multiplication.

The farmers came to know the importance of improved varieties in cultivation and chose among the varieties because results were in front of them. Higher yields of new varieties definitely increased their farm income, low pest and disease incidence reduced the cost of cultivation and high quality fodder due to less incidence of diseases and pests was noticed.



On-Farm training for farmers' field visits

Sl. No	Genotypes	Percent Preference
1.	Kadiri-9	22.70
2.	ICGV-00351	11.64
3.	Dharani	14.94
4.	Kadiri Haritandra	4.60
5.	TG-37A	5.89
6.	TPG-41	5.03
7.	TG-51	2.87
8.	TMV-2	8.48
9.	G2-52	8.33
10.	GPBD-5	15.52

Operational Research for Higher Water Productivity in Command Area

(IA: UAS, Raichur)

Year: 2010-11 to 2016-17, Project cost: Rs.0.87 crore.

There is a lot of land improvement by opening of nala and providing drainage to the affected land or cleaning of existing nala in water logging/ salinity affected site. The farmers are now able to take up crop in the lands previously affected by water logging / salinity. The farmers have harvested the crops with increase in the yield by 28.70%, 37.50% and 16.7% in paddy, cotton and groundnut respectively. The soil salinity has reduced from 15ds/m to less than 7.20 ds/m. The water table has reduced from average depth of 0.5 to > 1.5m. The ph of the soils also reduced from 8.70 to 7.30.

Improved methods of irrigation viz., alternate furrow method, border strip method of irrigation and irrigation at critical stage, flooding with 5 cm depth with alternate wetting and drying is demonstrated. The result obtained is a yield as comparable to normally practiced 10cm by the farmers. In addition to this, the farmers of the site also opined that BPH population was not observed and reduced the chemical spray for its control.



Field demonstration and training soft hestraw baling using tractor operated baler



Public Private Partnership for Integrated Agriculture Development

(IA - Watershed Development Department)

Year: 2010-11 to 2016-17, Project cost: Rs.0.87 crore.

Public Private Partnership for Integrated Agriculture Development (PPP-IAD) concept is conceived to make use of the technologies developed by the private sector for increasing the productivity and reducing the post-harvest losses and to ensure complete value chain for farmers, the involvement of the private sector is an important strategy to make farming viable. This model is essential for facilitating integrated projects by private sector players in the agriculture and allied sectors, for aggregating farmers/ creating critical rural infrastructure/ introducing new technologies/ adding value to the produce and integrating the agricultural supply chain.

So far 35 PPP-IAD projects have been approved in the state for implementation. 4 projects have been completed and 23 projects are under implementation over 80,000 ha. and involving more than 60,000 farmers. 8 Projects have dropped off, due to various reasons.

Few Success Stories:

Value Chain Development in Oilseeds (Soybean/Sunflower) project in partnership with Archer Daniels Midland Company (ADM) Agro Industries India Pvt. Ltd is being implemented in Dharwad, Belagavi, Haveri, Bagalkote, Bidar and Gadag districts of the State from 2018-19.

* Linked 52,000 ha. Area for oilseed value chain development.

* Awareness building to 26,000 farmers on parameters of GAPs in oilseeds production, processing and marketing. Branding Karnataka Spices in International Market

* Kadamba Marketing Souharda Sahakari is working with 2000 farmers covering 1300 acres in Sirsi taluk for Black pepper and other spices.

* The Green Valley Organic Spices Ltd is working with 500 farmer's covering 1500 acres in the Siddapura taluk of Uttar Kannada District. Both the projects have setup the integrated pack house and spice processing centres. Banana Value Chain Development for the International Market.

Under PPP-IAD, many proposals were received for the Banana value chain development, of which Sanjeevani Agro Phale V Phule Kharidi-Vikri Sahkari Sanstha Maryadit (Sanjeevani) in Belagavi district and Farm Folks in Mysore district have made remarkable impact in spot free Banana production for export and processing.

Production of quality planting material in high value Horticultural crop - Unemployed rural youth turned into successful nursery entrepreneur

(IA – Indian Institute of Horticultural Research)



Year: 2014-15, Project Cost:Rs.2.99 crore.

Mr. Anand, a contractual worker at CHES, Chettahalli, under RKVY sponsored project on production of quality planting material in high value horticultural crops. Earlier he worked under RKVY project on a temporary basis, at Chettahalli. He has been very keen to establish his own nursery and is continuously in touch with ICAR-IIHR Scientists.

Mr. Anand (mob: 8217214457) a contractual worker at CHES, Chettahalli, under RKVY sponsored project on production of quality planting material in high value horticultural crops project on a temporary basis. He has shown very keen interest to establish his own nursery and is continuously in touch with ICAR-IIHR Scientists for guidance. After knowing the demand for quality planting materials in fruit plants, especially Avocado - a potential future fruit crop identified and popularised by CHES, Chettahalli. He started his own nursery in the year 2017 in the name of M/S. Hasiru Nursery, Chettahalli, Kodagu, Karnataka.

The nursery man produced very good quality avocado seedlings i.e. 4,000 plants in the first year and 8,000 seedlings and 5,000 grafted plants in the second year. He could sell his seedlings @ Rs 60 and Rs.150 per grafted plants in the market constantly also making air-layered plants of Litchi 4,000 plants per year @200 per plant. He was very happy with the performance of Nursery business under the inspiration of RKVY in terms of better quality planting materials he got premium price and higher net returns. He earned Rs. 2.40 lakhs in the first year, Rs. 14.50 lakhs in the 2nd year with an investment of 4 lakhs. So he is very much satisfied. The cost-benefit ratio is 1:2. Apart from butter fruit plant sales, he also sells other future fruit crops plants like Litchi, Rambutan and Mangosteen, he earned additional income of Rs 3.5 lakhs in the second year. Overall his income was increased from Rs.2.40 to 15.00 lakhs in the second year itself. In the third year his net profit jumped to Rs.30 lakhs.

The RKVY project made an impact in the livelihood of rural youth like Mr. Anand, also in the long run impact will be he contributed to the spread of Avocado growing area around 500 acres in the country. If we calculate the Rs.75 lakh RKVY project impact in 500 acres of avocado, with an average net income of 3 lakhs per acre, the BC ratio of the project will be many fold (Rs. 15 crore per annum)

Promotion of Market driven production technology for protected cultivation of high value vegetable crops.

(IA - Indian Institute of Horticultural Research)

Year: 2013-14, Project Cost:Rs.0.60 crore

Protected cultivation of vegetable crops is useful in enhancing productivity of land, labour, capital and all the farm resources and increased possibility of producing off-season crops round the year and increasing income along with catering fresh vegetable for high end markets. Under these circumstances the production technology developed by IIHR Bangalore, was refined and transferred to farmers to suit the market demand for holistic package starting from selection of production site, varieties, crop management practices, safe, integrated and effective plant protection practices and good post harvest management packages. Due to easy adoptability and its effectiveness in catering the needs of multiple stakeholders, the IIHR technology has spread in large scale and has become successful technology in the field.





Subsoil Mannuring for Enhancing crop productivity in rain fed farming regions of Southern Karnataka

(IA - UAS, Bangalore)

Year: 2017-18, Project cost:Rs.0.50 crore

Subsoil compaction occurs in soil profile naturally or may also take place due to repeated tillage with heavy implements. This compaction in subsoil due to high clay content causes reduction in pore size, porosity and increased bulk density and resistance to root penetration and also reduce water use efficiency, low infiltration rate, reduces soil air content, soil drainage leading decreased crop yields.

To ward off these effects, Subsoil mannuring - A new technology which involves the deep incorporation of high rates of organic manures into the top of the clay B horizon resulting in better root growth, aggregation of clay particles leading to improvements in its physical properties has been successfully demonstrated by University of Agricultural Sciences, Bangalore through RKVY project which can be adopted anywhere in the country where subsoil hard pans / sodic hard pans are observed.





Development of cost effective storage techniques and processing of onion.

(IA - UHS, Bagalakote)

Year: 2009-10 to 2010-11, Project cost:Rs.1.64 crore

The project was implemented in eight districts of Karnataka based on the consideration that these areas are major onion growing belts in the state, with the help of officials of state Department of Horticulture an initial assessment was done before project implementation with respect to awareness regarding handling and storage mechanism / methods followed.

The onion produce is available in market during October-November (20%) as Kharif crop, January-February (20%) as late Kharif crop and April-May (60%) as rabi crop. The rabi crop produce has better storage ability and use for domestic, export and seed bulbs purposes from June to November. This is the critical period in whole country, where there is no fresh harvest of onion is available in the market and hence, storage becomes paramount importance for steady supply during this critical period to meet the market demand. An estimated nearly two million tonnes needs to be stored during this period.

After construction of Onion storage structures, it has been demonstrated to farmers. District level training programme has created lot of awareness among the onion growers in the districts with respect to judging of maturity, correct stage of harvesting, proper curing, and sorting, grading and improved method storage. The dissemination of information resulted in construction of 200 storage structures by the farmers with the help of the Horticulture department scheme (NHM) in the onion growing region of the districts of the Karnataka state.





Advanced centre on management of diseases and insect pests of Horticultural crops with special reference to grape, pomegranate and acid lime.

(IA - UHS, Bagalkote)

Year: 2009-10, Project cost:Rs.2.54 crore

The implementation of this project has strengthened this research station as a resource centre on the mandate crops. To transfer the technologies of production including protection aspects through training programmes, field days, diagnostic field visits, radio talk, and farmer's interaction meet, participation in Krishi melas / Totagarika melas to address the issues in grape, pomegranate and acid lime.

The forecasting of the pest and diseases outbreak in the targeted crops is being done with the use of automated weather station installed by IMD, Pune. The impact of the implementation of the project can be observed by the expansion in area, and improvement in productivity in respect of the grapes, pomegranate and acid lime in Vijayapura district.

*High Resolution Binocular
Atomic Absorption*



*Spectrophotometer
Research Microscope*



Glasshouse



Automatic weather station



Establishment of centre for Horticultural Biotechnology.

(IA - UHS, Bagalkote)

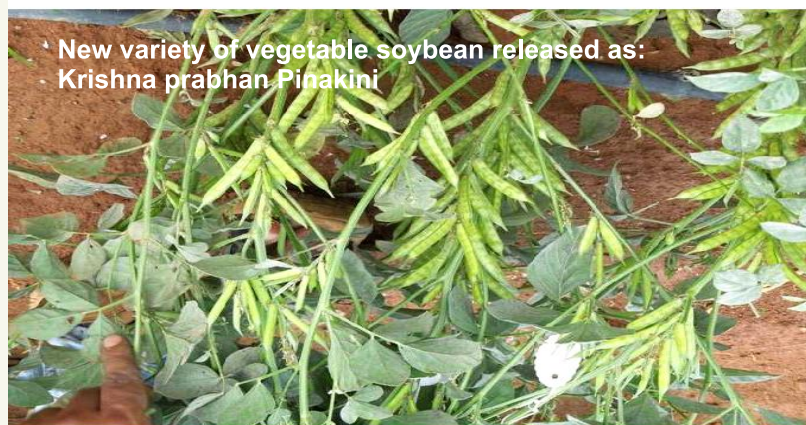
Year: 2013-14, Project cost:Rs. 3.00 crore

The centre for biotechnology with required facilities has been in thorough use. Many students of the University use the facility to undertake research with biotechnology tools. The tissue culture laboratory at Bagalakote is also being used to train the entrepreneurs for tissue culture of horticulture crops. The germplasm resources collect cluster bean, soybean, shallots onion, French bean, etc., has been valuable resource to undertake the crop improvement work.

Brinjal: 16 advanced breeding lines identified, French bean: Three advanced mutants have been identified; further over 54 advanced mutants have been characterized and inducted into French bean germplasm repository. Vegetable soybean: Five advance mutants for high yield has been identified. Cluster bean: 18 advanced breeding lines identified Vegetable pigeon pea: 22 new vegetable types have been identified Shallots: five advanced breeding lines have been identified

Three varieties, one each in Shallots onion, vegetable soybean and cluster bean have been released, line with superior traits in different crops identified and characterized have been in use for breeding and research by students and faculty members, which eventually will results in additional new varieties.

PCR based diagnostic kit identification of bacterial blight disease of pomegranate has been developed.





Establishment of distillation and value addition facility to promote menthol mint cultivation.

(IA: UAHS, Shivamogga)

Year: 2017-18, project cost:Rs. 0.40 crore

With the continues efforts under project, one menthol mint based aromatic crop industry is on its way. An enterprising farmer form Athani Mr. Annasab Baloj had grown the crop on a small area both under open condition and with sugarcane with our technical guidance. The harvested crop was distilled in unit established under the project. With the encouraging result, he expanded area to four acres and established own distillation facility.

He is having a 1.25 ton single vessel steam distillation unit made from Mild steal. Currently he is having crop on six acres and planning to grow the crop on others farmers field in the coming seasons to make better use of his distillation unit. A market leader, M/s Kancor Ingredients Limited has come forward to provide assured market facility for the menthol mint oil to farmer.





Development Bio-formulation for Biological control for Root Knot Nematodes in Pomegranate.

(IA - UHS, Bagalkote)

Year: 2017-18, Project cost:Rs.0.60 crore

The project funded by RKVY, developed an eco-friendly bioformulation products for effective management of Root-Knot infestation and wilt complex in pomegranate and other fruits & vegetable crops. Developed economically feasible production technology for production of bio formulation product and delivery system for managing root knot nematodes of pomegranate and loss associated with root-knot nematode infestation reduced and possibly even wilt complex in pomegranate.

A Biocontrol agent's production unit with a production capacity of 50 tons per annum was established at Dept. of Agricultural Microbiology, College of Horticulture, Bagalkote, and Karnataka. During 2019-20 & 2020-21 more than 25 tons of bioformulations worth Rs. 25 lakh rupees was produced and distributed to the more than 500 Horticultural farmers of the state covering nearly 3000 acres.

After the completion of the project fund, a self-sustaining Revolving Fund Project was started to continue the mass production and distribution of bioformulations to farmers at nominal rates. We have also provided employment to 4 workers in the production unit,

Apart from providing bioformulations we are also providing training to farmers on the technique of on-farm production of bioformulations, which will help in reducing the input cost. Till now more than 200 farmers and 100 students have been given the training in the area of biofertilizers.

This project has helped in the development of an environmental friendly byproduct for management of Root-knot Nematode and wilt complex in fruit crops which is a present day burning problem especially in crops like pomegranate and Banana.



Untreated Control



Biocontrol agents Consortia



RKVY Raitha Siri: Boon for rain fed farmers.

(IA-Department of Agriculture)

Year: 2019-20, Project cost:Rs.26.68 crore

“Raitha Siri” is being implemented in Karnataka since 2019-20 to encourage cultivation of organically and traditionally grown minor millets/nutria –cereals viz., foxtail millet, little millet, Indian barnyard millet, kodo millet, brown top millet and proso millet. Millets are not only richer in nutrients than staple grains but also resilient to climate change impacts. Assistance of Rs.6000/- per hectare under RKVY was directly transferred to the bank accounts of farmers growing minor millets through DBT.

(Add number of farmers benefitted) As a result of obtaining technical information from RSK, he could get a good yield of 6 Qtl/Acre. It reduced the cost of cultivation and he got Rs. 20000/acre income.



Good Foxtail Millet (Navane) crop

Field day conducted at Sri Nagbhushan farmer's field in Chikunti Village, Kasaba Hobli, Molakalmur taluk





Construction of building for processing cleaning, grading, storing of Agriculture produce and spices.

(IA - Co-operation)



Year: 2020-21, Project Cost: 0.18 Crore

Benefits from the Scheme- Additional income, value addition (any processing done to the millets), Employment generated.

Rural Agri-Godown I poor, small farmers co-operative. (Brief report on the growth of the seva sahakari sangh Ltd. Kanchikai and the role played by RKVY in its development)

Impact: The accomplishment of Construction of an Agricultural Godown in the rural premises of the PAC has put an end to the daily visits to the town by both PAC and farmers to procure essential goods, tools and inputs. It has enabled the farmers to concentrate more on their agricultural activities.



Strengthening of Tissue culture laboratory for mass multiplication of pomegranate (*Punica granatum* L.) through micro propagation.

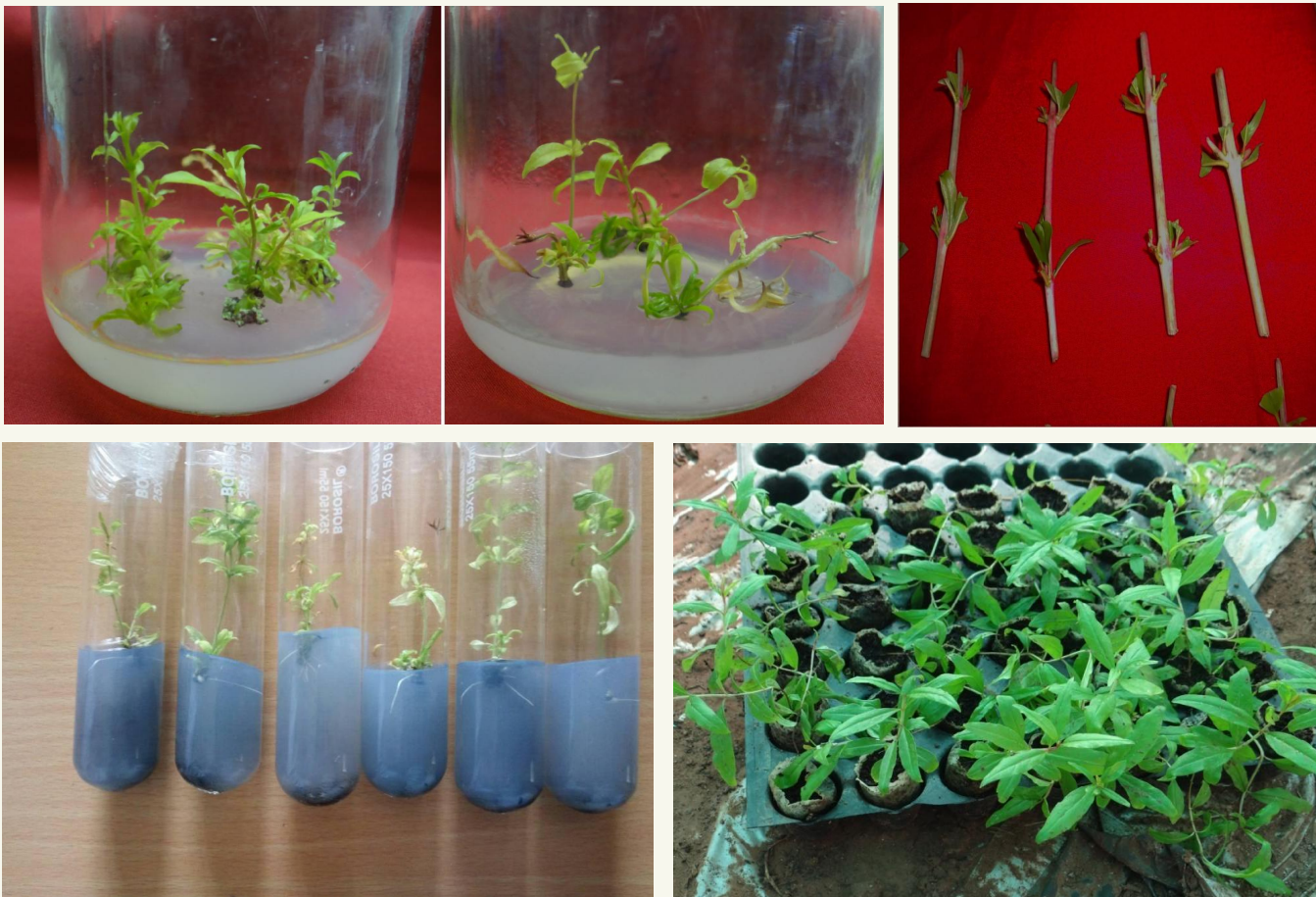
(IA –UHS, Bagalkote)

Year: 2015-16, Project cost:Rs.0.81 crore

The protocol for mass multiplication of pomegranate cv Kesar has been developed and supplying genuine tissue culture plants to the farming community and crop is in good and bearing condition.

Impact and recommendation

1. Standardized protocol employed for mass multiplication of pomegranate
2. Awareness about pomegranate tissue culture plants among the farming community.
3. Created facility can be utilized for the intensive research purpose for development of transgenic crops and development of protocol for the other crops which are more economical. The well established tissue culture laboratory is used as incubation centre for mass multiplication of Horticulture crops entrepreneurship programme.





Development of certification protocols for planting materials of Horticultural origin.

(IA –UHS, Bagalakote)

Year: 2017-18, Project cost:Rs.0.42 crore

The technologies developed for mango, pepper, pomegranate and black pepper crop varieties in this project have a great impact to go in the long run. The major achievement is going to be the purity of the orchards of these crops, true to the variety intended by the farmers. As an outcome of this, the produce will be uniform and true to the intended quality and type, which eventually can fetch a better price in national and international markets. In long run, the nurseries will have to send their samples of each lot intended to be sold to the farmers to the laboratory in the college of Horticulture, Bangalore for addressing and certification of the planting material. The test being on PCR it takes minimum time for the results to the nurseries or to the farmers.





Bhoo Samruddhi.

(IA: Department of Agriculture)

Year: 2015-16 to 2017-18, Project cost:Rs.33.87 crore

Bhoosamruddhi programme is being implemented with the technical guidance of nine international institutes. Right strategies designed with the assistance from these institutes will be implemented in eight districts viz., Bijapur, Chikkamagalur, Raichur, Tumkur, Bidar, Chikkaballapur, Dharwad and Udupi.

Mr. Manohar Badiger, a farmer from Jumnal Village of Vijayapur District :

a. Insect pests are one of the major constraints for the crop yield. Use of chemicals and pesticides towards the control insect pests not only increases the cost of production it also pollutes the environment. Keeping this in view eco-friendly Solar Insect Light Trap were introduced for controlling the insect pests of crops.

“ I have 7 acres of land with 2 acres of Grapes, 2 acres of Lemon and Green House in half acre and remaining area is utilized for cultivation of field crops. Initially capsicum and tomato production was taken under green house which yielded very low due to the heavy infestation of insect pests majorly fruit borers, thrips and flies. Chemical Pest control also increased my cost of production.

I installed solar light traps with the technical advice of agriculture department in my green house. A single light trap can control the population of insects up to 2.5 acres radial area from the center of installation. It very efficiently attracts adult flying insects and kills them, this leads to termination of the reproductive cycle and control their population. I advice all farmers to adopt solar light traps for controlling infestation of insects pest.





b. MAGNETIC WATER CONDITIONER: Vijayapur District is mainly composed of black soils and the main source of irrigation is open well and tube wells. This water is composed of more salts the pH of water will be alkaline in most of the places. The nutrient given to the plants through fertigation were not available to the plants due to the presence of salts in water which reduces the nutrients absorption capacity of the plants.

A white layer of salt is formed on the surface of the soil and bottom of the plant. This salt also blocks the holes of emitter in drip pipelines, thus creating a major problem in providing irrigation. To solve this problem DoA and ICRISAT introduced a new technology of magnetic treatment to water.

It is observed that in magnet treated plots the crop growth, fruit size and color were more better than as compare to the un treated plot. Savings of 30-40 % in fertilizer and 25% in irrigation water is observed. 28 qt yield is harvested treated plot and 20 qt in untreated plot This device adoption was extended to grapes plot. There increased pulp content in fruits was observed in magnet treated plot. 1 kg of resins were obtained from 3 kg of grapes harvested in treated plot whereas 4 kg of grapes was required from controlled plot to get 1kg resins. This instrument is eco-friendly in nature and can be used for long period more than 50 years.





Public Private Partnership for Integrated Horticulture Development (PPP-IHD).

(IA: Department of Horticulture)

Year: 2015-16 to 2020-21, Project cost:Rs.14.953crore

Quality produce as required by companies not only assures market for farmer produce but also helps them earn better market price. Direct procurement from companies' help farmers reduce the cost of intermediaries and raise in income. Creation of market linkages, besides improving crop productivity is one of the major benefits of the PPP-IHD programme.

Through the intervention of PPP-IHD projects in the selected location, education and awareness about the crop management practices had major impact on improvement in production and productivity. Farmers also realized that effective extension services and quality agri inputs is a major factor behind quality production. The farmers, who were earlier reluctant to grow horticulture crops because of possible risk and cost involved, have also started growing horticulture crops because of the support and extension service provided by the private companies through PPP-IHD programme.

The technical expertise has helped the farmers use optimum chemicals / grow as desired by the buyers to get a better price. This has to lead to reduce the cost of cultivation by about 10% and get a better price realization of 10-15% compared to open market.







Incentives for Post Harvest Management activities in Horticulture as Covid-19 mitigation.

(IA: Department of Horticulture)

Year: 2020-21, Project cost:Rs.3.70crore

Gherkin is a unique crop grown in Karnataka especially for the export market. It is mainly used in its preserved form in almost all the European countries and the US. Since the crop cannot be grown throughout the year in these countries on account of the disadvantages in agro climatic conditions, they are dependent on Indian sub continent. Since the requirement is voluminous and is increasing day by day it is practically not possible to cultivate the crop by one individual on such a large scale. Since it is a labour intensive crop, increased labour cost has forced the buyers to get into contract farming arrangement which is one of the most successful models seen so far.

Mr. Govindaraja Shetti P.T.Dasudi village, Huliya hobli, Chikkanayakanahalli taluk, Tumkur district a gherkin growing farmer cum aggregator and supplier of green gherkins to other states. However, selling fresh gherkins always fetched a lower price and also the crop had to be disposed immediately without waiting for better price due to low shelflife. Hence, the profits he earned in spite of huge investments and hard work left him with little profits. This lead to a new initiative in the name of M/s Union Agro Vegetables Pvt. Ltd.

Crop Area Covered : Around 400 Ha. of Gherkin is under cultivation after the unit was established benefiting 900-1000 Farming communities in Chikkanaykanhalli taluk.

Employ benefit: This initiative provides employment to 1500 employees of Chikkanayakanahalli taluk.

Income to Farmer: Due to contract farming with M/s Union Agro Vegetables Pvt. Ltd, the farmers are getting an assured income of Rs.80, 000 to 1, 20,000/acre.





Replacement of polythene sheet and planting material under protected cultivation as Covid-19 mitigation.

(IA: Department of Horticulture)

Year: 2020-21, Project cost: 4.384Crore

Hi-tech Horticulture has gained importance due to high returns and quality crop all through the year. The Department of Horticulture has supported the farmers by extending subsidy to construct poly house under schemes like National Horticulture Mission, RKVY and state sector schemes as well. However, the polycover used in these structures is exposed to the harsh sunlight and heavy rainfall due to which it gets damaged over a period of time. Similarly, the planting material used for cultivation of perennial flower crops under poly house also loses vigour over a period of time. Thus resulting in lower yields and poor quality produce. These both factors effect the quality of the crop and also productivity, further adding to the farmers' financial burden. Hence, the polythene sheet and planting material needs to be replaced to maintain quality production and high productivity.

Impact: 280 farmers have been benefited under this programme with a budget of Rs.306.00 lakhs.





Shifting from mono cropping to multi cropping system; impact of vented Check dam

(IA: Watershed Development Department)

Year: 2017-18 to 2020-21,

Project cost: 113.929Crore

A good example pertaining to change in cropping system is Mr. Suresh S/O Thimmachar, a farmer- from jammanahalli village, Sakaleshpur taluk, Hassan District having 4 acres of total land. The land utilization pattern was 2 acres coffee, 1 acre paddy and another 1 acre was left barren due to insufficient water during dry spells. VENTED CHECK DAM was constructed through Department of Watershed during the year 2020-21, in survey number-131, and adjoining survey numbers 133, 154 with the total 20 acres catchment area covering around 5 to 6 farmers land.

Hitherto, the farmer never tried any other crops in his land other than coffee and paddy, even though he had sufficient knowledge regarding other crops. After construction of vented check dam, farmer started growing annual vegetable crops in his land all-round the year, such as beans, chilli as intercrops along with perennial plantation crop areca nut. Farmers in the catchment area were dependent on rainfall for growing crops. However, after the construction of VCD, there was no dearth of water to all the crops & seedlings during summer season. Nearly 10-15% of additional yield with good quality produce was realised besides fetching him additional income of Rs 5.0 lakh. Prior to the construction of VCD, the farmers had no plan of growing additional crops due to insufficient water during summer. All the adjoining farmers too collectively use available water efficiently without wastage and grow vegetables in small area for their consumption as well as to domestic market. Hence, the VCD brings new hope during the dry spells.

The entire scenario of the farmers in the locality changed in terms of socio economic status, change in cropping pattern, increase in production and productivity.





Revival of cashew plantations

(IA: KCDC, Mangalore)

Year: 2018-19 to 2020-21, Project cost:Rs.13.92 crore

Karnataka Cashew Development Corporation is a Government of Karnataka undertaking having Head quarters at Mangalore. The districts of Uttara Kannada, Shivamogga, Udupi & Dakshina Kannada Districts have been highly benefited due to rejuvenation works of older cashew plantations due to plantation development, soil working, establishment of water resources, fertilization to plants and establishment of new cashew plantations under area expansion schemes. There is benefit of rural employment generation also. The efforts of the KCDC in raising HYV quality cashew grafts is appreciated by senior officers.



Study tours and workshop have been conducted to farmers. Expert talk from resource persons from NRC/ARS Ullala/Director, Directorate of Cashew & Cocoa Development, Kochi & Directorate of Cashew Research, Puttur were held to extend technology to farmers. During 2018-19 to 2020-21 4500 hectares of rejuvenation of cashew plantations has been taken up which was not carried out since last 20 years. The rejuvenation work has created a marked difference between the treated area and the left over area.

RKVY Scheme has really shown impact on the cashew growth of 4 districts of coastal Karnataka and has developed interest in the local farmers to grow high yielding varieties of cashew seedlings and improve the economical status and increasing the availability of raw materials to the local industry





Establishment of Mobile Plant Health Clinics

(IA: Department of Agriculture)

Year: 2019-20, Project cost: 8.00Crore

The programme aims at “taking care of crop production constraints at the right time for harnessing the maximum potential of the crop for higher returns to the farmers”

Occurrence of pests and diseases in many crops are considerably increasing over the years in spite of preventive and precautionary spray of chemical and bio-pesticides. Apart from pests and diseases there is need to pay attention towards the management of soil and to identify the balanced nutritional requirement of the crop.

Presently, 40 Mobile Plant Health Clinics (MPHC) are established under Rashtriya Krishi Vikas Yojana. Further the State has extended support for additional 20 MPHC's. These MPHCs have covered about 70,000 farmers majority of which are small and marginal farmers.

It has enabled the participation of farmers in close monitoring and identification of production constraints, improvement in knowledge on identification of soil constraints, nutritional requirement, quality of inputs, taking the appropriate measures apart from reducing the unnecessary investments on corrective measures.

Use of Leaf Color Chart in identification of Nitrogen requirement in crops and advisories to the farmers at farm level.







Diversity to Digital Marketing: Agro-forestry based Value Chain Systems in Rural Areas of Uttara Kannada District

(IA: UAS, Dharwad)

Year: 2013-14, Project cost:Rs.0.60crore

Around 55 species of tropical edible fruit tree species in home-gardens and farmlands in Uttara Kannada district with over 166 local/indigenous varieties have been documented and characterized. Perhaps this is the richest for any district in India with respect to the local tropical fruit diversity. Community nurseries were established in all the villages. This institutional mechanism is highly useful for conserving genetic diversity of wild pickle mango. Due to the activity of these informal groups, the availability of grafted plants of unique varieties has increased and over 50,000 such grafts of over 35 varieties of focused tropical fruit have been generated and distributed. As a testimony of this, today several of the most important wild pickle mango types, such as 'Ananthabhatta Appe' and 'Haladota Appe' have been safely conserved on farm, although the original mother trees have been lost in the wild. As a part of this project, a clonal bank of 94 farmers' Appe Mango, was established at Agricultural Research Station (ARS) near Sirsi. Some of the value added products developed from the tropical fruits are Kokum Agal, kokum juice, kokum wine, spicy/sweet chips of jack fruit, biscuits prepared from seeds of jack fruit. An innovative experiment was conducted to partially replace paraffin (a cancer causing agent in ordinary candles) with Garcinia butter and the results were interesting. Candles could be prepared by using Garcinia butter by adding 40% Garcinia butter to 60% paraffin wax.





Breeding for biotic stress and drought tolerance in major field crops for increasing productivity under changing climate conditions through molecular assisted selection

IA: UAS, Dharwad

Year: 2013-14; Project cost: 0.60crore

Biotic stress in plants is caused by living organisms, specially viruses, bacteria, fungi, nematodes, insects, arachnids and weeds. The agents causing biotic stress directly deprive their host of its nutrients can lead to death of plants.

Abiotic stress imposed on plants by environment may be either physical or chemical, while as biotic stress exposed to the crop plants is a biological unit like diseases, insects, etc. [1]. Some stresses to the plants injured them as such that plants exhibit several metabolic dysfunctions

Three genotypes with ty2 and three with ty3 exhibiting resistance to virus were multiplied and are entering to multilocation trials With respect to biotic stress tolerance in tomato. Six lines resistant to tomato leaf curl virus with target gene ty2 and ty3 were identified.

In wheat, 10 homozygous lines for Lr24 and Lr28 genes were identified which are potential lines for multi-location trials. 22 homozygous lines for Lr24 gene and 13 homozygous lines for Lr28 gene were identified. Similarly in rice, two entries MGD-V-14-4 and MGD-V-14-7 resistant to blast were contributed to multilocation trials.

In respect to the abiotic stress tolerance BIL 149, BA 60, RF55-155 drought tolerant genotypes were contributed to AICRP trials. The lines pyramided with both the genes can be used in the future breeding programs as donors. If these are found superior with respect to yield under multilocal trials, can be released as varieties.

In tomato, lines introgressed with either ty-2 or ty-3 can be used as inbred lines/parents in the development of hybrids with resistance to tomato leaf curl virus. If found superior, can be released as variety.

In rice also genotypes introgressed with the blast resistant genes can be released as varieties or used as parents in the breeding programs.

Abiotic stress: Studies on abiotic stress tolerance are very less. Identification of traits associated with drought stress is very important so as to make crosses between genotypes with complementary traits. Under this project studies were conducted to identify the component traits for drought tolerance and succeeded in identifying them in groundnut, sunflower and rice.

Traditional land races of rice, Dodiga (D-6-2-2) and Navali (A-67) were found as good donors for root traits and drought tolerance. Azucena a traditional japonica variety is also good for root length and root dry matter.

Cross derivatives (stabilised lines) of Dodiga (D-6-2-2) and Navali (A-67) with BPT-5204 were also found good for root characters.

The backcross Inbred Lines (BILs) identified for drought tolerance are under AICRP trials. If these lines are found significantly better under drought conditions, they will be released as varieties.

In groundnut GM6-1, a promising genotype with deep root system and relatively higher Relative Water Content (RWC) and Specific Leaf Weight (SLW) resulted in better pod yield under moisture stress conditions

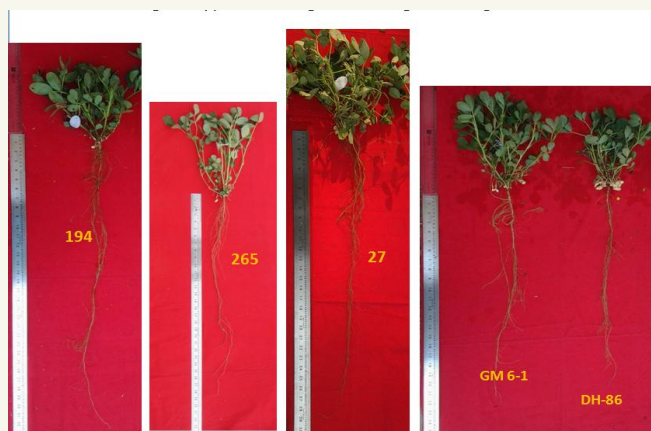
Recombinant Inbred Lines (RILs) were developed by crossing GM6-1 x TMV-2. RILs 101, 261, 44, 179, 181, 1, 50, 296 and 26 were found to be promising.

Screening rice genotypes for root characters in polythene bags



Some of the genotypes with high root length during summer 2014

Screening of genotypes for drought tolerance in groundnut during summer





Genomics approaches for drought stress and disease management in crop plants.

(IA: UAS, Dharwad)

Year: 2013-14, Project cost: 2.00Crore

The project has enhanced infrastructure in terms of state of art genomics facility which has added value to the University as well has attracted the attention of the students and researches in the cutting areas of genomics research in agriculture. Several isolates of bacteria and actinobacteria have been purified and developed as a “Repository of Microbes” for current and future research. Certain bacteria and actinobacteria have been identified capable of a)controlling diseases in rice, tomato, sugarcane and groundnut b) overcoming slight water stress in maize and groundnut. c) capable of growing in saline soils and improving plant growth. Some of these bacteria have formed a part of consortia of microbes later recommended for increased growth and yield in wheat, rabi sorghum and chickpea.

The impact would be felt at various levels

The isolates identified in this study will go a long way in development of bioinoculant based technologies for warding off pests and diseases as well over come slight water and salinity in various crops such as groundnut, tomato, maize, sugarcane etc. This would help the farming community to reduce their dependency on chemicals and sustain the health of the soils that they cultivate.



Peanut after 10days of water withheld



Peanut plant growth promotion



Molecular breeding and genetic enhancement in breaking yield barriers in pulses

(IA: UAS, Dharwad)

Year: 2017-18; Project cost: Ra.0.99 crore

Chickpea (*Cicer arietinum* L.) is the most cultivated pulse crop globally; its productivity is limited blisteringly by gram pod borer insect and Fusarium wilt disease. Pyramiding of two biotic stress resistances in a single genotype helps to increase productivity and also reduces the usage of pesticides/fungicides by farmers, which boost economic viability in the cultivation of this crop. Hence, we planned to transfer the cry1Ac and cry2Aa genes, which impart pod borer resistance from BS 100B event, to Super Annigeri-1(SA-1), the wilt resistant variety breed through marker-assisted backcrossing. Chickpea lines with fusarium wilt and pod borer resistance are available and will be useful for farmers after release. Two research publications are prepared, one is already published and another one is under review.

The application of molecular markers reduces breeding cycles Number of breeding cycles for pest of disease resistance with and without molecular markers

Years	Backcross breeding cycles to reach BC ₂ F ₁ without molecular markers	Backcross breeding cycles to reach BC ₂ F ₁ with molecular markers
1	Crossing, P ₁ X P ₂	Crossing, P ₁ X P ₂
2	Raising F ₁ and backcrossing	Raising F ₁ and backcrossing
3	Raising BC ₁ F ₁ , evaluating, selling	BC ₁ F ₁ raising selecting plants molecular markers and crossing recurrent parent with desirable plants selected
4	Planting desirable plants and crossing with the recurrent parent	Raising BC ₂ F ₁
5	Raising BC ₂ F ₁	

To reach BC₂F₁, one season is saved with marker technology and as backcrossing is continued; the saving breeding duration is also increasing.



Rainout shelter



Rhizotron



Fodder seeds & Pashubhagya Yojane 4 Year: 2015-16

(Dairy component- Milk Production ,Calf rearing) (IA: Animal Husbandry)

Year: 2015-16 to 2021-22; Project cost: Rs.151.55 crore

Reshma Pereira, Bhosgali, Kanapur Thaluk, Belagavi Dist, Mobile: 9341425225

Started with 2 cows 2 years ago with average milk production of 12 liters per day. Today she is having 4 cows (4 adults and 3 calves) with max milk production of 30 to 40 liters at peak lactation.

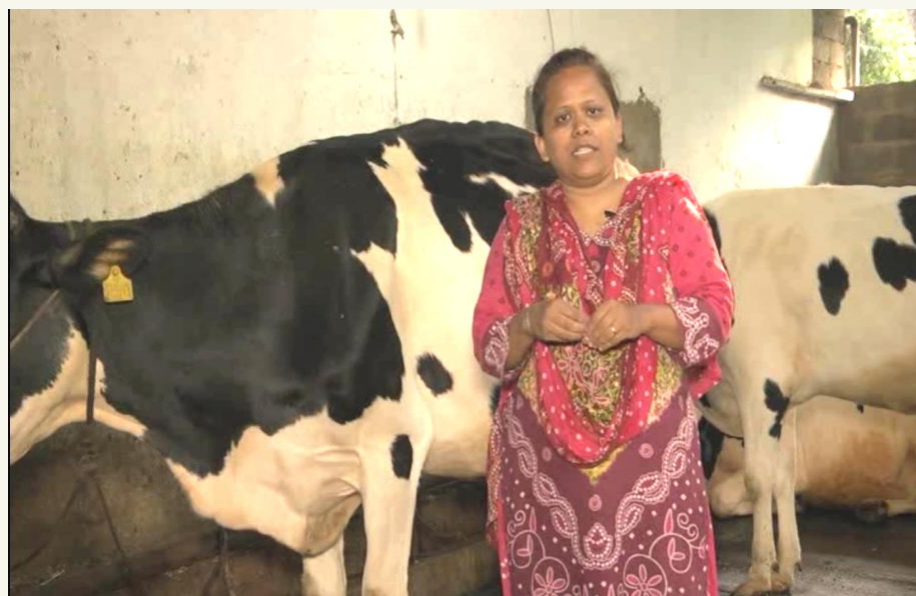
Using chaff cutter the fodder is given in the form of small pieces, Consumed easily with less strain & Maximum digestion

1. Using unsalable fruits like banana, apple, and oranges in feed.

Most of the vendors discard fruits which have become soft because the customers will not buy them. These fruits are still in good condition and can be used as feed for cows as they are rich in vitamins and minerals. Most of the vendors will give it for free or for a very small price. Instead of money or taking for free we exchanged the fruits with milk. This approach allowed us to build a very good relationship with fruit vendors as they did not feel the loss of giving away fruits. We made them feel that their fruits came back to them in the form of milk, which was benefitted by their whole family, increase milk production by 10% to 20%.

2. Overnight Fermentation of dry feed using *Saccharomyces cerevisiae*

Dry feed like cotton cake, Groundnut cake, Wheat bran, etc. are not completely digested by the ruminants. To assist in the digestion and also increase the absorption of the nutrients. By overnight (12 to 24 hours) Pre-digestion/part fermentation with help of microbes increases the probability of absorption by the ruminants. After the fermentation process the dry feed become soft which the cows consume with ease without any strain. Consumed easily with less strain while intake, maximum digestion and maximum absorption of the nutrients, Increase in milk fat by 0.5% to 1%.





Achieving Total Health Coverage of Livestock through Augmented Vaccine Production and Supply

(IA: Animal Husbandry)

Year: 2016-17 and 2017-18; Project cost: Rs.5.00 crore

Livestock play an important role in rural India. As more than 65% farming community live in villages and depend directly or indirectly on livestock, animal husbandry has become an integral part of agriculture. Farmers rear animals for their economic stability and for their daily or emergency monetary needs. Milk being the regular source of income, sheep and goat are some time termed as ATMs (Any Time Money) for farmers. Protecting health of the livestock is the responsibility of any Government and vaccination is the only possible solution to prevent the diseases. Constant supply of quality vaccines and to take effective measures to reach these vaccines farmers livestock is very important. Karnataka being one of the largest producers of milk, meat and egg, strengthening of infrastructure to produce and supply these life saving vaccines was important.

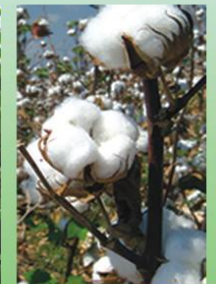
- * The vaccine production capacity of the Institute has been upgraded to cGMP standards as per the Drug Controller requirement to cater to the needs for next 10 years.
- * Production capacity of both bacterial and viral vaccines was increased by several folds using latest production technology using bio fermentors and hence required quantity to vaccine is supplied to achieve herd immunity. Vaccines are supplied to the livestock of farmers FREE OF COST.
- * Only state in the country to vaccinate sheep and goat with ET vaccine twice a year. (Approx. 300 lakh doses)
- * Helped to take up 100% vaccination against PPR in sheep and goats (Approx. 150 lakh doses) (since last four years).
- * Decreased outbreaks of the diseases because of timely mass vaccinations.
- * Created backup storage facility to store surplus vaccines which could be used for exigencies and immediate availability of vaccine to the farmers any time during the year.
- * Due to limited disease outbreaks farmers are showing increased motivation for livestock farming. Example of impact of augmentation of production and increased vaccination of Enterotoxaemia disease in sheep and goat.
- * Surplus vaccines are being supplied to other Govt. agencies at cost price. Facilities thus established under this project would be of use for the production of newer vaccines



Apart from vaccination of animals disease diagnosis is being carried out at farmers door steps by a qualified Veterinarian. We have established four labs at Sirsi, Sira, Bagalkote and Kolar from RKVY funds and functioning full fledged in disease diagnosis, vaccine supply and creating awareness among farmers.

Institute is proud to state that as part of RKVY initiative a separate R&D facility has been established to develop new vaccines and diagnostics, improve the existing vaccines and develop newer diagnostic techniques for the benefit of the farming community. As a result, we have developed pentavalent vaccine for Bluetongue disease in sheep, Swine fever vaccine for pigs, Duck Pasturella vaccine for ducks and turkeys, Mycoplasma diagnostic antigen for sheep and goats. Trivalent Mycoplasma inactivated vaccine for sheep and goats, combined vaccines of HS and BQ, combined vaccines of sheep pox and PPR and goat pox and PPR are in different stages of testing





Karnataka State Department of Agriculture

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Design: Farm Information Section, Dept of Agriculture, Bengaluru

