Krishi Vigyan Kendra, Hirehalli, Tumakuru

Activities and Achievements (2010-15)

KRISHI VIGYAN KENDRA

ICAR-INDIAN INSTITUTE OF HORTICULTURAL RESEARCH

HIREHALLI-572168 (KARNATAKA)

***Book on* 'Krishi Vigyan Kendra, Hirehalli, Tumakuru, Activities and Achievements (2010-15)'**

Authors :
Loganandhan N.
Hanumanthegowda B.
Ramesh P.R.
Prashanth J.M.
Somashekhar
Radha R. Banakar
Jagadish K.N.
Shashidhar K.N.
Karunakaran G.
Hegde M.R.
Naik L.B.

Citation :
Loganandhan N., Hanumanthegowda B., Ramesh P.R., Prashanth J.M., Somashekhar Radha R. Banakar, Jagadish K.N., Shashidhar K.N., Karunakaran G., Hegde M.R., Naik L.B. (2015), 'Krishi Vigyan Kendra, Hirehalli, Tumakuru, Activities and Achievements (2010-15)' Book published by KVK, Hirehalli, Tumakuru, Karnataka.

Published by :
The Director,
ICAR - Indian Institute of Horticultural Research
Bengaluru - 560 089

No. of Copies : 100

Cover page designed by :
Jyoti Appu Naik

Printed at : Padmamba Printers
Bengaluru. Ph : 23303360

Foreword

Krishi Vigyan Kendra, Hirehalli has been functioning since 2009, serving farmers of five taluks of Tumakuru. It is my pleasure that KVK, Hirehalli successfully completed five years under the guidance of ICAR-Indian Institute of Horticultural Research, Bengaluru and ICAR-Zonal Project Directorate, Bengaluru. I appreciate their efforts in the field of technology refinement and dissemination, apart from production and sale of ICAR – IIHR technologies in large scale to the farming community. The On Farm Trials and Front Line Demonstrations carried out by the staff of KVK helps in evaluating these technologies at farmers' fields and exhibit the potential of those technologies in a wider spectrum. I hope that the trainings and other extension activities organized by the KVK would surely benefit the rural youth and entrepreneurs to develop their knowledge and skill in the field of agriculture and allied sectors.

I am happy to know that KVK, Hirehalli has brought out publication "KVK – Activities and Achievements (2009-2014)". I hope that the information shared and the feedback given in this publication will be much useful to the research scientists to know the real need of the farmers.

I wish them all the best for successfully continuing their service in the field of extension and helping for the livelihood development of farming community.

Bengaluru
23rd July, 2015

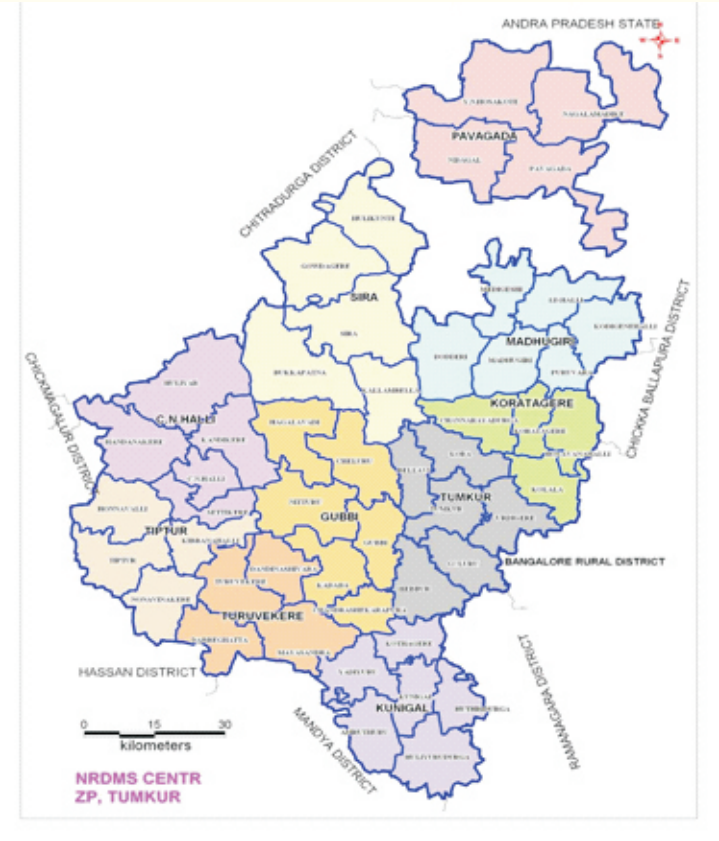
T. Manjunatha Rao
Director (Acting)
ICAR-IIHR, Bengaluru

Preface

Contents

1. Tumakuru District – A glance

The Tumakuru district is located in the eastern belt in the southern half of the Karnataka state. Spanning an area of 10,597 sq.km, this district lies between the latitudinal parallels of 12o 45' and 14o 22' N and the longitudinal parallels of 76o 24' and 77o 30'E. The district consists of ten taluks, viz., Koratagere, Gubbi, Chikkanayakanahalli, Tumakuru, Pavagada, Sira, Turuvekere, Kunigal, Madhugiri and Tiptur. The peculiar feature of the district is that the north-eastern portion is totally detached from the remaining areas. This portion constituting Pavagada taluk is almost surrounded on all sides by territories belonging to Andhra Pradesh. Tumakuru district is bounded on the north by Anantapur district of Andhra Pradesh; on the east by the districts of Kolar and Bengaluru; on the south by Mandya district and on the west and north-west by the districts of Hassan and Chitradurga and Chikkamagalur districts.



Social, demographical and agricultural status of the district :

The Tumakuru district is situated in three agro-climatic Zones of Karnataka viz., a) Central Dry Zone, b) Eastern Dry Zone and c) Southern Dry Zone. The normal annual rainfall of the district is 584.4 mm with 32 rainy days. Most of the rain is received in the month of June to September. The major portion of the rainfall is received during South west monsoon and very limited rains are received in the Northeast monsoon.

According to 2011 census the population of the district is 26, 78,980, out of which 4,97,521 (77.7%) is rural and 1,42,560 is urban population. The district consists of 10 taluks, 50 blocks and 2,574 villages. Given below is the area, crops gown and other details of the district.

Table No.1 : Area, crops grown and other details of the district

Particulars	Area in Sq.Kms
Total Area details	**Area in ha**
Total Geographical area	10,59,700
Forest	45,177
Net area sown	5,09,542
Gross area sown	5,75,961
Area sown more than once	66,419
Net irrigated area (27%)	1,59,802
Total irrigated area	1,83,141
Crops Cultivated	
Ragi	1,42,314
Fruits	21,940
Vegetables	3,158
Ground nut	86,498
Flower	2,000
Mango	10,000
Banana	3,000
Coconut	1,22,000
Areca nut	19,000

Irrigation source	
Canal irrigation	5,000
Tank	25,000
Open well	2,000
Bore well	1,43,000
Weather data	
Rainfall	584.4 mm
Rainy days	32
Demographic details	
Population (2011)	26,78,980
Total No. of house holds	6,40,081
Rural population	4,97,521 (77.7%)
Urban population	1,42,560
Total Gram Panchayats	321 (172 in 5 taluks under KVK jurisdiction)
Total villages	2574 (1272 in 5 taluks under KVK jurisdiction)
Blocks (Hoblis)	50

Table No. 2 : Major farming systems/enterprises of the district

Sl. No.	Farming system/enterprise
1.	Dry Land Agriculture
2.	Dry Land Horticulture
3.	Dairy

Table No.3 : Description of Agro-climatic Zone & major agro ecological situations (based on soil and topography) of taluks under KVK juridiction:

Sl. No.	Agro-climatic Zone	Characteristics
1.	Central Dry Zone (Zone IV) Taluks: Koratgere, Madhugiri, Sira, Pavagada	• This zone covers an area of 4.74 Lakhs hectare • The Annual rainfall ranges from 454 and 718 mm, of which more than 55% received in Kharif season. • The elevation ranges from 639 and 1197m • Soils are red sandy loams in major areas, shallow to deep black in remaining areas. • The major crops grown are Ragi, Paddy,Redgram, Groundnut, Sunflower,Coconut, Arecanut, Mango, Banana, Tomato, Brinjal, Beans, Peas, Aster, Dairy
2.	Eastern Dry Zone (Zone V) Taluk: Tumakuru	• This zone covers an area of 1.04 Lakh hectares. • The Annual rainfall ranges from 679 and 889 mm, of which more than 50% received in Kharif season. • The elevation is 818 m from sea level. • Soils are red loamy in major areas, shallow to deep black in remaining areas. • The major crops grown are Groundnut, Maize, Paddy, Ragi, Redgram, Tomato, Brinjal, Mango,Sapota, Arecanut,Coconut, Aster, Dairy

Table No.4 : Description of Soil types in the district :

Soil type	Characteristics	Area in ha
Red Sandy Loam	• Colour given by haematites or Yellow limonites • Poor in soil fertility • Low Base Exchange capacity • Deficient in organic matter • Low water holding capacity • The pH ranges from 5.5.-6.5 • Low cohesion, plasticity & swelling	6,15,230
Red Loam	• Colour given by oxides of iron • Poor in soil fertility • Low- medium Base Exchange capacity • Deficient in organic matter • Low water holding capacity • The pH ranges from slightly acidic or neutral • Low cohesion , plasticity & swelling	2,04,093
Shallow Black Soil	• Colour varying from dark brown to dark yellowish brown • Soil with more than 35 per cent clay and crack when dry. • High soil fertility • High base exchange capacity • High organic matter content • High water holding capacity • The pH ranges from 7.5 -8.5 • High cohesion, plasticity & swelling	2,45,432

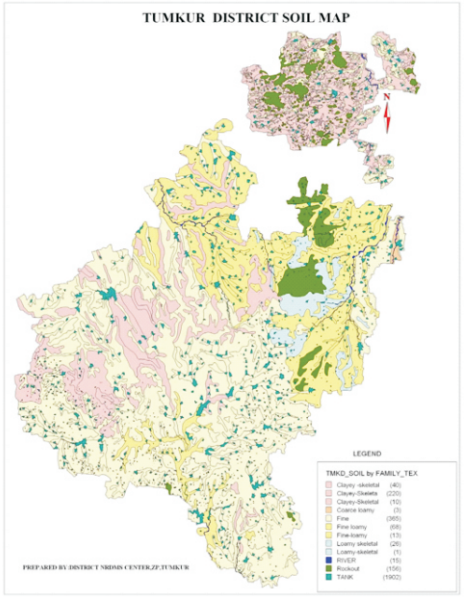


Table No.5 : Area, Production and Productivity of major crops cultivated in the district (2013-14) :

Crop	Area (ha)	Production (Tonnes)	Productivity (Kg /ha)
Rice	14868	98632	3003
Jowar	3334	329	798
Ragi	137730	308308	1795
Maize	25191	57394	2777
M.Millets	2293	1494	1032
Redgram	10469	5604	308
Black gram	155	224	382
Horsegram	23598	12740	618
Avare	8083	8613	933
Greengram	9676	3334	327
Cowpea	3569	2993	607
Groundnut	83983	67923	530
Sesamum	378	453	596
Sunflower	1779	4007	1005
Castor	2621	2031	656
Niger	1068	308	250
Cotton	1385	2878	532
Sugarcane	2653	161452	103

*(**Source:** District At a Glance-Tumakuru: 2013-14)*

2. Kishi Vigyan Kendra, Hirehalli – An overview

Background

Krishi Vigyan Kendra (KVK), Hirehalli, was established by the Indian Council of Agricultural Research (ICAR), New Delhi on 24th March, 2009. It is located opposite to Hirehalli railway station, in the NH-4 main road, about 10 k.m from Tumakuru towards Bengaluru. The major aim of the KVK is to cater to the needs of farmers of Tumakuru District, covering five out of ten taluks viz., Sira, Koratagere, Pavagada, Madhugiri (Central Dry Zone IV) and Tumakuru (Eastern Dry Zone V). This KVK is functioning under Indian Institute of Horticultural Research (IIHR), Bengaluru.

MANDATE

Main mandate of the KVK is technology assessment, refinement and demonstration of technologies/products.

Area and Inspection :

The major activities of the KVK are given below:

- On-farm testing to identify the location specificity of agricultural technologies under various farming systems.

- Frontline Demonstrations to establish production potential of technologies on the farmers' fields.

- Training of farmers to update their knowledge and skills in modern agricultural technologies, and training of extension personnel to orient them in the frontier areas of technology development.

- To work as resource and knowledge centre of agricultural technology for supporting initiatives of public, private and voluntary sector for improving the agricultural economy of the district.
- In order to create awareness about improved technology, a large number of extension activities will be taken up.

- The seeds and planting materials produced by the KVKs will also be made available to the farmers.

Facilities at KVK

- **General Facilities**
- **Infrastructure/Buildings:** The KVK has very well developed administrative building having training hall, library, Office Space.

- **Automatic Weather Station /Meteorological Unit**

  This automatic weather station at KVK records daily minimum & maximum temperature, humidity, rainfall, evaporation rate etc. It also provides information for weather forecasts and agro advisory based on the forecast. This data can be made available to farmers on demand, free of cost for working out the water requirements of the plants & prediction of plant diseases due changes in weather.

- **Farmers' Hostel**

  The KVK has a farmers' hostel that can accommodate more than 30 farmers' at a time. The facilities are also available on nominal charges to outside farmers who visit us during study tours.

- **KVK Sales counter**

  One of the mandates of KVK is to provide genuine and good quality seed/planting material. To fulfill this object KVK has exclusive sales counter to sell all the KVK products and Farm Products.

o **Instructional Farm**

The KVK possesses about 50 acres of farm land that is fully under cultivation of crops relevant to this area. The main purpose of the farm is to demonstrate the latest agricultural practices. It also acts as a tool to do applied research on agricultural technologies and undertake trials before their transfer to farmers' fields. After careful planning and analysis of soil types, the farm was divided into three major blocks such as Horticulture, Seed Production and Nursery unit. Thereafter, planting of mother plants of horticulture crops

such as mango, sapota, guava, amla, custard apple, pomegranate, figs etc was undertaken. The plantation was completed in the year 2009. In seed production block, crops like french beans, onion, radish, cowpea, tomato and chili are being grown. Now the entire farm is operated on drip irrigation system for which the water storage tank of 1 Lakh Litres capacity has been established.

o Production/Processing Units

- **Micro Nutrient Production Unit**

  Due to excessive use of DAP fertilizers and introduction of high yielding cultivars, deficiency of micronutrients has become a major problem. However, very few farmers use micronutrient fertilizers. Balanced nutrition is very important for high yield, quality and resistance to diseases. Hence foliar spray comprising secondary and micronutrients viz., Magnesium, Sulphur, Zinc, Boron, Iron, Copper, Manganese and Molybdenum is important. To meet farmers' demand, KVK is producing micronutrient formulations as Banana, Vegetable, Mango and Citrus Special and making them available to the farmers through sales counter.

- **Mango Fruitfly trap Production**

  Bacteroara SPP is a major pest in Mango orchard.As a monitoring tool for these fruit fly *Bactrocera* spp, a convenient polythene sachet trap using plywood impregnated pheromone chemical and insecticide was developed by IIHR .To meet the farmers demand KVK, Hirehalli is producing the same in large scale.

- **Biological Products Unit**

  KVK, Hirehalli is producing the following different biological products such as bio-fertilizers: Arka Microbial Consortium, Neem and Pongamia Soap and bio control agent for the benefit of farmers.

- **Neem and Pongamia Soap**

  These are prepared from the respective oils and are in the form of concentrates which can be diluted easily when required and sprayed. The life span is about three months. These products help in controlling pests and diseases of various field crops.

- **Arka Microbial Consortium**

In horticultural production, overuse of mineral fertilizers, pesticides and inadequate management practices of soil, can significantly affect the soil quality by changing their physical, chemical, and biological properties. Arka Microbial Consortium is a combined application of microbial products (N fixer, P solubilizer and growth promoter) had better results than single microbial product for the sustainable production of vegetables and other crops.

- **Bio Control Agents**

Bio control agents such as Trichogramma chilonis are produced inthis units and supplied to farmers as Tricho cards.Other important bio control agents sticky traps etc. are also available for farmers.

- **Seed Production**

Institutes like Indian Institute of Horticultural Research (IIHR, Bengaluru), University of Agricultural Sciences, Bengaluru, have umpteen numbers of potential varieties/hybrids known for their high yield and other

nutritional benefits. These are being regularly produced at our farm and sold at reasonable price. On an average, 3000 kg quality seeds are being produced and sold every year from farm.

- **Seed Processing Unit**

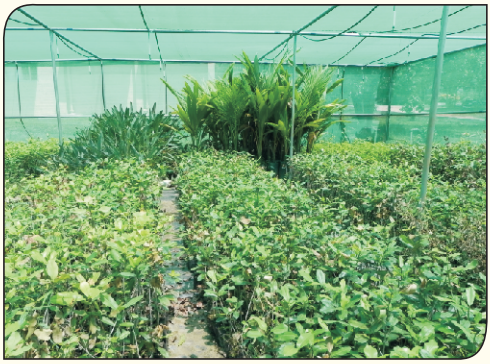
A seed-processing unit has been established having a capacity of processing one tone per hour. The main aim of this unit is to promote the participatory seed production with farmers in Tumakuru district, which will benefit both producers as well as the buyers. Those farmers who wish to take up seed production may register their names with the KVK and receive the benefit.

- **Green House and Shade House**

The KVK has constructed two green houses which are naturally ventilated. They are meant for cultivation of flowers and vegetables under protected condition. The KVK has three shade houses for nursery purpose.

- **Model Nursery**

  The KVK has a government recognized nursery over 0.20 ha area. Farmers can purchase grafts and seedlings of fruits and plantation crops.



- **Medicinal Plants Nursery**

  The main emphasis of this unit is to multiply the important medicinal plants which are having high demand in Tumakuru district. Important medicinal Plants such as Amla, Tulasi, Aloe vera, etc., are being multiplied here and sold to farmers.

- **Food Processing Unit**

  To achieve sustainable income from agriculture, value addition is an important factor in which small scale food processing units play a major role. Hence, demonstrations on processing and value addition to farm produce is being conducted through training programmes.

- **Amla Processing Unit**

  Amla can be easily processed into various products such as squash, powder, salted Amla supari, candy, murabba, pickle etc. However the nutritive and health benefits have to be transferred to farmers/farm women/youth/school

children through demonstration and trainings as they are not aware of the benefits of Amla. In view of the aforesaid, it is now proposed to promote usage of amla through demonstrations-cum-trainings on its value addition.

- **Mushroom Spawn Production Unit**

  For farmers who wish to cultivate mushroom, spawn may be obtained from this unit. All facilities have been created here to produce different kinds spawn and being sold at reasonable rates.

- **Arecanut Plate Production Unit**

  Arecanut is grown in large area in Karnataka, mainly for nuts and the leaves are wasted or used for firewood purpose. KVK has started a making plates arecanut leaves by using latest technologies These arecanut plates which are eco-friendly and bio degradable in nature.

- **Laboratories**

  Soil, Water and Leaf Testing Lab: In this well equipped laboratory, samples of soil, water, petiole (leaf), and fertilizer/manure can be analyzed using

advanced facilities like Atomic Absorption Spectrophotometer, at reasonable rates. The laboratory is supported with computer software for more precise interpretation of results. Every soil sample is analyzed for eight parameters such as pH, Electric Conductivity, Organic Carbon, available Nitrogen, available Phosphorus & Potassium, Exchangeable Sodium, Calcium & Magnesium content.

- **Plant Health Clinic:** The KVK has established a plant health clinic that provides farm consultancy services of all types at nominal cost to farmers. Farmers may visit us with their queries or write to us for guidance.

Services Offered by KVK :

Following are services offered by the KVK.

- **Training Programmes:** Interested farmers may register their names with the KVK either personally or through phone or e-mail for the training that he/she wishes to attend. The KVK is also arranging off-campus training on desired topics in farmer's villages. For such trainings minimum 25 farmers from the same village need to participate. Special trainings can also be arranged for organizations on topics of their choice.

- **Participation in Extension Activities:** Farmers can participate in extension activities like Kisan melas, study tours, field days by prior registration.

- **Consultancy:** Farmers may interact with the scientists at the KVK & get consultancy on issues related to agriculture, allied fields & information on advanced agricultural technologies.

- **Source of Information:** Farmers can get information on weather, pest and diseases forecast, government schemes etc, in the form of mobile SMS from the KVK. Accordingly they can decide on their agricultural activities, future plans accordingly.
- **Availability of Infrastructure:** Other organizations that wish to conduct trainings for the farmers can use our class rooms and audio visual aids on nominal charges.
- **Demonstration Units:** Farmers can visit KVK, its instructional farm and demonstration units on greenhouses, nursery, mushroom, bio-fertilizers,

micro-nutrient formulations and unit of agri implements. Farmers can stay in our hostels on nominal charges.

- **Soil and Water Testing:** Farmers can get their soil, water and leaf samples tested for various parameters of their choice at reasonable rates at our soil testing laboratory.
- **Diagnostic Services:** Farmers can request KVK scientists to visits their problematic fields for getting curative and diagnostic recommendations.

Farmers can buy given below inputs from KVK, which are sold on nominal cost.

- Improved varietal seeds of vegetables, cereals, pulses, oilseeds, fodder varieties and mushroom spawn.
- Grafts of improved varieties of fruit plants and medicinal plants.
- Value added products from agriculture and horticultural crops.
- Micronutrient foliar nutrients such as Vegetable Special, Banana Special and Mango Special.
- Bio-fertilizers such as Arka Microbial Consortium.
- Pheromone traps against heliothis, diamond back moth and fruit borers of vegetables.
- Chemical traps for the control of fruit flies in mango, guava and cucurbitaceous crops.
- Other agents of biological control of pests such as tricho cards, sticky traps etc.

Technological Products from KVK, Hirehalli :

1. **Seeds:** Chili, Tomato, Brinjal, French bean, Cowpea, Okra, Amaranthus, Onion, Pumpkin, Ridge gourd, Drumstick, Papaya, Vegetable Seed Kit

2. **Seedlings:** Arecanut ,Amla ,Coconut ,Tulasi ,Aloe vera ,Stevia , Mango, Sapota, Pomegranate, Jamoon ,Tamarind, Fig, Guava, Lime, Pomello, Roseapple and Custard apple

3. **Micro nutrient formulations:** Banana Special, Mango Special, Citrus Special, Vegetable Special

4. **Bio fertilizer:** Arka Microbial Consortium

5 . **Bio pesticides:** Neem Soap, Pongamia Soap

6. **Value added products:** Amla Candy, Amla Juice, Amla Supari and Ragi Malt

7. **Other Products:** Mushroom spawn, Mango fruit fly trap and lures and Sealer cum Healer

3. Major mandated activities and achievements of KVK - A review

I. Details of problems faced and thrust areas identified

In the initial days of KVK, proper surveys and Participatory Rural Appraisals (PRAs) were conducted to assess the location specific problems and thrust areas of the district. The outcome of those surveys formed the core areas of action for further extension work to be practiced in the selected cluster villages.

A. General problems of the district:

- Use of local varieties and low yield
- No Seed Treatment
- Poor Soil and Nutrient Management
- Moisture stress
- Lack of skill in Nursery Techniques & Management
- Lack of knowledge about importance of Soil & Water Testing
- Lack of knowledge in pre and post harvest technology management
- Lack of knowledge about income generating activities
- Malnutrition and unhygienic practices
- Drudgery in the field practices

B. Crop specific issues:

- Tikka disease, root grub, Red and hairy caterpillar in Groundnut
- Zinc and Iron deficiency in Maize and Zn deficiency in Paddy
- Black headed caterpillar, stem bleeding and Anabe disease in Coconut
- Pod borer and sterile mosaic disease in Red gram
- Shoot and fruit Borer in Brinjal
- Flower and Fruit dropping, Powdery mildew and hoppers in Mango

- Dropping and splitting in Areca nut
- Low yield in Banana
- Leaf reddening, flower drop, black arm, sucking pest and bollworms problem in cotton

C. Thrust areas identified to tackle the problems

- Popularization of HYV / hybrids
- Seed production techniques in vegetables and field crops
- Integrated Nutrient Management and Soil test based fertilizer application
- Integrated Pest & Disease Management.
- Propagation techniques in fruits and vegetables
- Income generating activities
- Value added products
- Education on Nutrition and hygiene
- Post harvest technology in Vegetables and Fruits.

Based on the identified thrust areas, mandate activities of the KVK were formulated.

II. Mandated activities of KVK

1. On Farm Trials (OFTs)
2. Front Line Demonstrations (FLDs)
3. Training programmes
4. Extension programmes
5. Production of seeds, planting materials, bio- products and details of soil, water and leaf samples analyzed
6. Publications from KVK

1. On Farm Trials (OFTs)

On-farm experiments were conducted in 25 farmers' plots with their active participation, covering an area of 47.00 ha during the period from 2010 to 2015. Systematic methodologies were followed for conducting each trial and observations were recorded in each experiment.

a. List of OFTs conducted during the year 2010-2015:

1. Assessment of Groundnut varieties
2. Management of Collar rot disease in Groundnut
3. Enhancing the productivity in Redgram production system through transplanting.
4. Assessment of Mucuna (Medicinal plant) as intercrop in Mango.
5. Paired row with Zig zag (paired row) and pit method of Planting in Banana.
6. Management of Nut Splitting in Arecanut
7. Integrated Management of Eriophid mite in Coconut
8. Performance and assessment of tomato varieties
9. Assessment of microbial consortium for Tomato production
10. Performance of Assessment of China Aster Varieties
11. Assessment of Areca nut -French bean intercropping system for high soil fertility and higher income and higher income
12. Assessment of Redgram: Greengram (1:4) as a intercrop in Mango orchard for climate resilient agriculture
13. Evaluation of technology for management of Pomegranate wilt

Table No.6 : Year wise details OFTs conducted :

Thematic Areas	2010-11		2011-12		2012-13		2013-14		2014-15	
	No.	Area (ha)	No.	Area (ha)	No.	Area (ha)	No.	Area (ha)	No.	Area (ha)
Integrated Nutrient Management	2	2	-	-	-	-	-	-	-	-
Varietal Evaluation	3	4	3	4	1	2	-	-	1	1
Integrated Pest Management	1	3	1	3	-	-	-	-		
Integrated Crop Management	3	5.6	3	5.6	1	1	2	1.6	2	3.2
Integrated Disease Management	1	3.6	1	3.6	1	2	-	-	1	1.8
Total	**10**	**18.2**	**8**	**16.2**	**3**	**5**	**2**	**1.6**	**4**	**6**

b. Major outcome of On Farm Trials (OFTs) :

1. Effective control of collar rot disease in Groundnut: Seed Treatment with *Pseudomonas fluorescens* @ 4g/kg seeds & soil treatment with *Pseudomonas* @ 2.5kg /ha reduced disease incidence to the extent 11.49 per cent.

2. In Groundnut, GPBD-4 (12.36 q/ha) has given more yield than TMV-2 (10.35 q/ha) and also tolerant to foliar diseases.

3. In Banana, paired row planting system (1.2 m x1.2m x2.0 m) recorded higher yield of 746 q/ha (30 per cent more) than the conventional planting system (516 q/ha).

4. Areanut + Frenchbean intercropping System has been recorded highest biomas production and income per ha per unit area (Rs. 1.54 lakhs) with high BC ratio 3.11 as compared to Farmers practice with BC ratio 2.7

5. Mango + Redgram + Greengram intercropping System has been recorded highest biomas production and income per ha (Rs. 0.72 lakhs) with high BC ratio 2.3 as compared to Farmers practice with BC ratio 1.8

6. Application of Borax 30g / plant to manage Arecanut splitting has recorded highest yield of 1.8 ton/ha 20 per cent more) as compared to that of farmers practice 1.5 with BC ratio 3.3.

7. Use of Arka Microbial Consortium Bio fertilizer 25g/lit in Tomato production increases yield 52.2 ton/ha (23.6 per cent more) as compared to farmers practice 42.2 ton/ha with BC ratio 4.8.

8. China Aster variety Phule Ganesh (PG Pink) recorded the highest number of flowers per plant (42.2), flower diameter (4.8 cm) and yield (4.12 t/ha) with higher BC ratio of 2.8 as compared to local variety (2.25 t/ha) with BC ratio of 1.43.

9. DMT-2 Tomato variety performed better than other variety Vaiabhav and Arka Meghali.

2. Front line demonstrations

Frontline demonstrations are meant to disseminate the successful technologies in a large scale. For the past five years, KVK conducted a total of 86 demonstrations on agricultural and horticultural crops covering an area of 162.9 ha.

a. List of FLDs conducted during the year 2010-2015:

1. ICM in Tomato
2. Management of Saline Soils.
3. Combating drought vulnerability by Aerobic Paddy cultivation.
4. Sequential cropping of Cowpea followed by Ragi.
5. ICM in Maize
6. ICM in Mango
7. INM in Banana
8. IDM in Arecanut
9. Enrichment of dry fodder -CO-3 variety

10. IDM in Pomegranate
11. Popularization of Arka Jay variety
12. IPM in Cabbage
13. ICM in Brinjal
14. Integrated Crop Management in Frenchbean
15. Ground nut Decorticator
16. Safe Storage of Pulses
17. Management of nut splitting in Arecanut
18. Cost effective Arka Microbial consortium for tomato production
19. Demonstration of High yielding variety Arka Prabhat in Papaya
20. Mucuna (Medicinal plant) as Intercrop in Mango
21. Addressing Drought Vulnerability by Drought tolerant Ragi ML -365.
22. Use of Polythene mulch in tomato.
23. Demonstration of Seedpro – A microbial plant growth promoter against soil borne pathogens in Solanaceous vegetable crops.
24. Bio- intensive Management Brinjal Shoot and fruit borer
25. Introduction of Arka Anand hybrid
26. Demonstration of High density planting of Banana
27. Demonstration of Dry land Horticulture crop Jamoon
28. Cost effective Eco friendly management of fruit fly through pheromone traps in Mango.
29. Management of Mango Stem Borer by Sealer cum Healer.
30. Mango Harvester, Ripening chamber and Packing.
31. Amla :Value Addition, Branding and Market Linkage
32. Value Addition, Labelling & Branding of Ragi Products

33. Management of Basal stem rot (Ganoderma wilt) in Coconut

34. Seed production of French bean Var. Arka Suvidha.

35. Enhancement of Red gram yield through demonstration of BRG-4 variety.

36. Use of Polythene mulch in Tomato

37. Demonstration of Arka Rakshak F1 resistant to Leaf curl, Bacterial Wilt and Early leaf Blight in Tomato

Table No.7 : Year wise details FLDs conducted:

Thematic Areas	2010-11		2011-12		2012-13		2013-14		2014-15	
	No.	Area (ha)	No.	Area (ha)	No.	Area (ha)	No.	Area (ha)	No.	Area (ha)
Integrated Nutrient Management	1	2	3	6	3	6	2	4	2	4
Varietal Evaluation	2	2.5	1	2	2	4	3	3	3	3.4
Integrated Pest Management	1	2	1	2	1	2	3	7	3	4.5
Integrated Crop Management	8	20	8	20	9	26	5	14	5	12
Integrated Disease Management	2	3	2	3	1	2	2	3.5	1	1
Seed Production	-	-	-	-	-	-	1	2	1	2
Post Harvest Technology	2	-	2	-	2	-	3	-	1	-
Total	16	29.5	17	33	18	40	19	33.5	16	26.9

Major outcome of Frontline Demonstrations

1. The yield of Drought tolerant Ragi ML -365 (24.3 q/ha) has increased to the extent of 30 percent.

2. The performance of Aerobic paddy MAS-26 was found suitable for drought condition with an advantages like 50 per cent water saving, 80 per cent savings on seed material with no need of puddling and increased yield of 12.69 per cent. Farmers' feedback was that there was a drastic reduction of

damage caused by rodents attack (due to dry field condition and free movement of cats).

3. Nut splitting and nut dropping in Arecanut was reduced by demonstrating CPCRI technology with increase in crop yield to an extent of 10.66 per cent.

4. Use of Arka Microbial Consortium in tomato reduced the Chemical Fertilizer upto 25 per cent and also increased the yield 15.07 per cent.

5. Demonstration of BRG-1 Red gram variety is recommended for high yield which increases yield up to 12.12 % compared to the local check .

6. Demonstration on wilt resistant Arka Anand hybrid resulted in 12.08 % increased yield over control with more number of fruits per plant (28) compared to control (18 Nos.) with higher BC ratio (3.33) as of Check (2.66). Farmers' feedback was that harvesting the fruits at right maturity will retain the lush green colour to fetch better price in the market.

7. Demonstration of Dry land Horticulture crop –Jamoon variety Dhoopdal has been introduced in Tumakuru and Koratagere taluk.

8. Use of Polythene mulch in tomato : Arka Smarat with polymulch technology yields more no of fruits , fruit weight per plant (48 & 97.8 g), with an average yield of 30.5 t/ac with B:C ratio of 4.5 compared to check 3.4. Labour saving on weeding and water saving nearly 50%. Additional yield of 4.0 t worth of Rs. 40000 /- compared to check.

9. Demonstration of High density planting of Banana: HDP in Banana (G9) recorded highest yield (748 q/ha) with increased in percentage of yield to the tune of 43.3 as compared to the farmers practice. HDP yields higher B:C ratio of 3.58 as of check (3.10)

10. Through French bean seed production, the income level was more with bc ratio of 3.86 compared to 3.54 if grown as vegetable purpose.

11. Through cultivation of improved Papaya variety Arka Prabhath farmer got 33% more yield and the disease tolerance for Ring spot virus was almost same.

12. Through adoption of Mango harvester, ripening chamber and packing mango fruits, farmers got 9 % more income than traditional practice.

13. Value addition to Amla: farmer got more income compared to fresh fruit sale. Value added products were amla juice and candy. He got 42 % more yield through value addition to amla fruits.

14. Value addition , Labeling & Branding of Ragi Products: Self Help Groups involved in value addition , Labeling & Branding of Ragi Products got 30% more income and also generated employment to the group of Ten women.

15. Bio intensive Management of brinjal shoot and fruit borer : Effective control of fruit and shoot borer in Brinjal through integration of pheromone trap, Release of T.chilonis and Bt spray . It was evident that 4.89 % shoot infestation was recorded in demo plot compared to check plot(28.9 %) and fruit infestation of 12.65 % compared to control plot (33.65%) with net increase in yield of 58.52 %..

16. Demonstration of Seed Pro a microbial plant growth promoter :8.2 % damping off was recorded in demo plot compared to check plot(34.5 %) with net increase in yield of 19.05 %

17. Cost effective eco friendly management of fruit fly through Pheromone traps in Mango : 37 adult male fruit flies trapped per trap which were erected in the Demo plot

18. Management of Mango stem borer by Sealer cum healer : 9 grubs were reported before the treatment with Sealer cum Healer and 28cm hole due to stem borer was fully healed up after the treatment.

19. Use of Groundnut Decorticator (Hiriyur model) 95% more seeds can be extracted over traditional method of seed removal.

20. By practicing Integrated Crop Management with use of Arka Ananya hybrid as one of the component has fetched 27.93% more income.

3. Training programmes :

Training programmes are formulated mainly to impart technical 'know-how' and 'do-how' to the farmers, farm women, rural youth, and field level extension functionaries by following the principle of 'learning by doing'. Further, they help the staff of line departments and voluntary organizations to update the knowledge of recent advances and skills in the agriculture and allied sectors.

The target groups belonging to cluster villages of Tumakuru district are being covered. KVK has trained a total of 10808 personnel comprising of practicing farmers, rural youth, farm women, women self help groups, extension functionaries. Out of these courses, 101 are on-campus and 146 are off campus programmes, conducted in different disciplines such as Agronomy, Crop Protection, Horticulture, Home Science, Agricultural Extension, Agricultural Engineering, Animal Husbandry and Fisheries. The details are presented below.

Table No.8 : Training programmes organized during 2010-2015 :

Training Particulars	Number of Training Programmes	Number of Farmers Attended
Farmers and Farm Women - ON campus	101	3254
Farmers and Farm Women - OFF campus	146	6007
Rural Youths - ON campus	4	158
Rural Youths OFF campus	3	108
Extension Personnel - ON campus	16	262
Extension Personnel - OFF campus	7	417
Sponsored Training programmes	7	428
Vocational Training Programmes	8	174
Total	**292**	**10808**

Table No.9 : Disciplinewise Training Programme conducted :

Title	2010-11		2011-12		2012-13		2013-14		2014-15	
	No.s	No.of Parti-cipants	No.s	No.of Parti-cipants	No.s	No.of Parti-cipants	No.s	No.of Parti-cipants	No.s	No.of Parti-cipants
Crop Production	8	270	8	280	20	691	19	710	7	276
Seed Production	6	226	5	157	1	17	2	95	2	54
Horticulture	7	159	6	173	13	442	8	254	11	577
Soil Science	5	132	7	291	5	833	7	389	10	281
Home Science	12	356	11	406	12	408	7	389	4	164
Plant Production	8	253	9	247	6	293	2	56	2	56
Agri. Extension	-	-	5	172	10	293	4	118	-	-
Animal Science	1	26	-	-	-	-	1	22	4	199
Production of Inputs at site	-	-	11	284	11	266	5	161	10	332
Total	47	1422	62	2010	78	3243	55	2194	50	1939

a. Impact evaluation:

There used to be regular programmes of impact evaluation of both on campus and off campus training programmes conducted by the KVK. The procedure followed to evaluate the on campus training programme is pre and post evaluation tests through questionnaires and off campus training programme evaluation is purely on responses of the participants for information and adoption. The follow up activities were also taken up for the trained farmers in terms of providing necessary guidance to solve their problems in production process of the farm operations. Necessary arrangements were made to supply the seeds, saplings to fulfill their needs on cost basis. Some of field problems of trained farmers have been taken up for assessment at our KVK farm and the feedback was provided to research system for further assessment and refinement.

Given below are the few examples of results of pre and post evaluation tests conducted for the On Campus training programmes organized at the KVK.

Table No. 10 : Results of Evaluation tests conducted in the on campus trainings at KVK

	Title of the programme	No. programmes	Duration (days)	Pre evaluation		Post evaluation		Increase in knowledge (%)
				Right answer (%)	Wrong answer (%)	Right answer (%)	Wrong answer (%)	
a.	**Soil Science:**							
1	Importance of Soil and Method of Sampling	03	01	60.5	37.5	90.8	5.2	35.3
2	Organic Farming	2	02	42.0	58.0	92.7	7.3	50.7
3	Improved Method Compost Preparation	01	01	38.2	58.8	90.2	4.8	52.0
b.	**Horticulture:**							
	Orchard Management	02	01	58	34	70	18	20
c.	**Plant Breeding**							
	Seed production Practices in Brinjal and Okra	02	02	77	23	85.5	14.5	85
d.	**Plant Protection :**							
	Disease Management in Arecanut	02	02	18.9	81.1	75.8	24.2	56.9
	Disease Management in Vegetables	01	01	43.5	46.4	75.8	24.2	32.3
e.	**Home science:**							
	Ragi and Amla Value Addition	2	2	18.9	81.1	75.8	24.2	56.9

4. Extension Activities/Services:

KVK is striving hard to cater to the needs of various clientele by organizing/ participating in various extension programmes of its own as well as in co-ordination with CHES & IIHR and other line departments/ institution/ agencies for boosting farm production and creating self-employment opportunities. The various extension activities/services that KVK had undertaken during 2010-2015 are given below:

(a) Field visits : Visits to the farmers fields is an important programme of KVK as this will facilitate face to face conversations, where information is exchanged and discussed. Many of the visits are made as per the request received from farmers regarding their existing field problems or related to individual crops. In this direction, the faculty had under taken 601diagnostic field visits covering most of the villages of Tumakuru district.

(b) Advisory Services: Farm advisory services on cultivation, pest and disease management of various crops, soil and water conservation methods and home science activities covered 2223 nos. of Farmers.

(c) Farmers group discussion/meetings : A total ten farmers group meetings/discussions were arranged for arriving possible solutions to certain problems expressed by the farmers in various villages in the district.

(d) Method/interactive demonstrations: Around 55 demonstrations were conducted for the benefit of various farmers during training programmes and field visits.

(e) Field days : The KVK has conducted field days in connection with FLD and OFT programmes. Organized 22 field days in FLD and OFT villages with the participation of 1674 farmers.

(f) Agricultural seminars: Faculty participated in seven agricultural seminars organized by various line departments and extended various technologies related to agriculture and allied sector.

(g) Workshops: Faculty participated in four workshops organized by other line departments and discussed problems faced by the farmers.

(h) Kisan Divas: Kisan divas is celebrated on 23 December since 2010 to commemorate the birth day of Hon. (Late) Prime Minister, Shri. Chowdhary Charan Singh. On this occasion, various activities like training programmes, exhibitions etc were conducted for the benefit of farmers.

(i) Lectures delivered as resource persons: Faculty participated as resource personsin training programmes operated by different agencies/ organizations in the district.

(j) Exhibitions: Since exhibits serve as a means of reaching people who doesn't read publications, listen to broadcast or attend meetings, and furnish a cross section of technologies, this Kendra had arranged 35 exhibitions. Around 62142 people visited the exhibition stall and discussed in detail about the different technologies available. Many of them have contacted the KVK for getting more knowledge.

(k) News Paper coverage: A total of 61 programmes in connection with the developmental activities of KVK were given proper coverage through national and local dailies.

(l)T.V. Programmes: Faculty participated in 59 interview programmes conducted by Doordarshan and other private channels.

(m) Radio programmes: Faculty have given 26 radio programmes in the form talks, interview, discussions and phone-in- programme through All India Radio Tumakuru and Bengaluru on Agricultural and Horticultural aspects and KVK activities.

(n) Extension literature: A total of 20 popular articles on various topics were published by KVK faculties in various farm Journals and agricultural columns of national and local dailies and magazines.

(o) Kisan mela : Faculty actively participated in five Kisan melas organized by ICAR Institutes or Agril. Universities or by other line Departments.

(p) Campaigns: A total of five campaigns on various aspects like plant protection, soil and water conservation measure, integrated nutrient management etc with respect to different horticultural crops were organized by this Kendra

5. Production of seeds, planting materials, and bio-products and other products :

Table No. 11 : Production of seeds :

Sl. No	Crop	2009-10	2010-11	2011-12	2012-13	2003-14	2014-15	Total
1	French bean	624	450.5	913	450	644	200	3281.5
2	Cow pea	151		280	16	150	50	647
3	Tomato	22.4	4.8	6.4	-	-	12	45.6
4	Brinjal	42.8	42	26	-	-		110.8
5	Chilli		13	8.3	100	20		141.3
6	Okra	756	218	92	16	26		1108
7	Amaranthus	-	-	100	-	-	102	202
8	Palak	23.5	-	-	-	-	48	71.5
9	Ridge gourd	89.2	88.2	100	-	-	-	277.4
10	Bitter gourd	5.2	-	-	-	-	-	5.2
11	Pumpkin	-	-	87	50	25	45	207.0
12	Radish	-	70	-	8.5	20	40	138.5
13	Onion	144.0	30	142	450	150	450	1366
14	Dolichos	-	150	100	-	-	-	250
15	Mucuna	11.6	600	-	-	-	-	611.6
16	Papaya			5				5
17	Ragi				800	200	180	1180
18	Fodder Sorghum						95	95
19	Fodder Cow pea						35	35
20	Vegetable seed kits (No,s)					2500	2000	4500
	Total	**1869.6**	**1666.5**	**1859.7**	**1890.5**	**1235**	**1257**	**9778.3**

Table No. 12 : Production of planting materials:

Sl. No	Crop	Variety	Number of Seedlings produced					
			2009-10	2010-11	2011-12	2012-13	2003-14	2014-15
1	Areca nut	Hirehalli Tall	48000	54451	45000	50000	58000	20500
2	Coconut	Arsikere Tall		150	175	1000	800	850
3	Bird of Paradise	IIHR Var			4000	1250	2000	
4	Mango	Alphenso/Badami				1000	150	200
5	Guava	Pink Flesh, L-49,Mridula				1000	200	250
6	Lime	Seedless Lime/Kagzi				100	5	480
7	Amla	NA-4,5,7				1500	250	450
8	Drumstick	PKM-1						750
9	Jamoon	Gokak						100
10	Tuberose	Prajwal,Vaibhav						22000
	Total Production		**48000**	**54601**	**49175**	**55850**	**61405**	**45580**

Table No. 13 : Production of Value added Products :

Sl. No.	Value Added Products	Quantity Produced				
		2011-12	2012-13	2013-14	2014-15	Total
1	Amla Juice (Litres)	100	440	500	68	1108
2	Amla Candy (kg)	50	90	100	15	255
3	Amla Supari (kg)	5	22	20		47
4	Ragi Malt (kg)	30	64	100		194
	Total Production	**185**	**616**	**720**	**83**	**1604**

Table No. 14 : Production of Bioproducts:

Sl. No.	Variety	Quantity Produced (Kgs)				
		2011-12	2012-13	2013-14	2014-15	Total
	Foliar Micronutrients					
1	Banana special	800	1450	6,813	4345	13408
2	Vegetable Special	366	888	3414	2066	6734
3	Mango Special			2612	1422	4034
4	Citrus Special			320	1100	1420
	Biopesticides					
5	Neem Soap	600	1555	1417	2110	5682
6	Pongamia Soap	250	589	950	924	2713
	Bio fungicide					
7	Arka Microbial consortium			150	2686	2836
	Bio Agents					
8	Mango fruit fly traps			11000 Nos.	8763	8763
Total Production		**2016**	**2144**	**15676**	**23416**	**45590**

Table No. 15 : Soil Samples Analyzed :

Particular	No. of Samples analyzed	Rate/ sample (Rs.)	Amount (Rs.)
Soil	623	100	62,300
Water	414	50	20,200
Leaf	112	100	11,200
Total	**1,149**		**93,700**

6. Publications:

1. Research papers:

Yogeesha H.Y., Vasugi C., Somashekhar, Bhanuprakash K and Naik L.B. 2013. Papaya (*Carica papaya*) seed quality as influenced by stage of fruit harvest, postharvest ripening and seed extraction. *The Indian Journal of Agricultural Sciences:* Vol. 83 (9) **Pp:**928-932

Kumar.N, Somashekhar, Hanumanthe Gowda.B, Mohamadshafi Korabu, Ramesh.P.R, 2014. Study the growth, Yield and Nutrition value of Vegetable Soyabean in Tumakuru District of Karnataka, India. *International Journal on Agricultural Sciences* 6 (1) **Pp:**1-3.

2. Conference / workshop proceedings:

Loganandhan N, Ramesh P R, and Hanumanthe Gowda,B 2014. Technologies for sustainable Rural Development from Indian Institute of Horticulture, Bengaluru. Technologies for sustainable Rural Development (TSRD).

Ramesh P R, Hanumanthe gowda B, Praveen kumar, Loganandhan N and Naik LB, 2015. Water resource management to combat climatic vulnerability: A case study of D. Nagenahalli, Tumakuru, Karnataka. "Climate Change and Agrarian Economy: An Indian perspective held at University of Agricultural Sciences, Dharwad from January 22-23, 2015.

Loganandhan N, Ramesh PR, Jagadish K.N, Prasanth J.M, and Naik, L B,2015. Three years, seventy farm ponds, eighteen thousand cubic meters capacity– A success story from a NICRA village in Tumakuru district of Karnataka. International Conference on Natural Resource Management for Farming Systems and Rural Livelihood held at Soil Conservation Society of India, New Delhi from 10-13 February, 2015.

Loganandhan N, Ramesh P.R, and Hanumanthe Gowda B, 2015. Effect of Arka microbial consortium and seedpro growth promoter on soil health productivity of tomato crop. International Conference on Natural Resource Management for Farming Systems and Rural Livelihood held at Soil Conservation Society of India, New Delhi from 10-13 February, 2015.

Loganandhan N, and Ramesh P.R, 2013, Adoption of Climate Resilient Technologies in a Drought Prone Village in Tumakuru District, Karnataka,

in ILSI India Center for integrated Modeling of Sustainable Agriculture and Nutrition Security (CIMSANS)

Ramesh P.R, Jagadish K.N, Prasanth J.M and Naik L.B, 2013, Technology demonstration component D Nagenahalli NICRA village, Farmers First, Soil and Water Conservation National Conference held at Hebbal UAS Bengaluru .

Mamatha, Ramesh P.R, Desai and Sujith, 2013, Studies on influence of physiochemical properties of soil on growth and yield attributes of coleus Vettiveroedes, Farmers First, Soil and Conservation National Conference held at Hebbal UAS Bengaluru.

Radha R.Banakar, Somashekhar and Pushpa Bharati, 2012. Cereal based supplementary food evaluation as an Infant Food.In: Proceedings of National Conference on Recent Trends in Micro Nutrient Research. Jain University, Bengaluru.

Radha R. Banakar, Somashekhar and Pushpa Bharati, 2012. Cereal based supplementary food evaluation as an Infant Food.In: Proceedings of National Conference on Functional Foods. Jain University, Bengaluru.

Radha R. Banakar, Somashekhar and Pushpa Bharati, 2012. Cereal based

supplementary food evaluation as an Infant Food.In: Proceedings of National Conference on Recent Trends in Micro Nutrient Research. Jain University, Bengaluru, **Pp:** 48.

Radha R.Banakar, Somashekhar and Pushpa Bharati, 2012. Evaluation of Cereal based supplementary food for Infants .In: Proceedings of National Conference on Functional Foods. Jain University, Bengaluru. **Pp:** 125.

Naik L.B and Ramesh P.R, 2012 , Resource Inventory of Durgada Nagenahalli Village, Koratagere Taluk, Tumakuru District, Karnataka for Integrated Development under NICRA Project

3. Popular articles:

Radha R Banakar, Shivashenkaramurty and Prasanth J.M., (2010-11). Amla Value added products "Topo vana Souvenir" Phalapusha Pradrashana Edited and Published by State Horticulture Dept. Tumakuru.

Radha R Banakar and Shivashenkaramurty. Poustika Kaithota, November, 2010, *Annadhata monthly magazine.*

Shivashenkaramurthy, Prasanth J.M, Radha R Banakar and Manjunath K.S., Bettada Nelli "Topo vana Souvenir" Phalapusha Pradrashana Edited and Published by State Horticulture Dept. Tumakuru.

Somashekhar, Shivashenkaramurthy, K.S. Manjunath. Angansha krushiya labhagalu."Topo vana Souvenir" Phalapusha Pradrashana Edited and Published by State Horticulture Dept. Tumakuru.

Prasanth J.M., Shivashenkaramurty, Manjunath K.S. and Radha R Banakar (2010-11). Post harvest technology and Export of Mango "Topo vana Souvenir" Palapusha Pradrashana Edited and Published by State Horticulture Dept. Tumakuru.

Radha R. Banakar and Somashekhar, 2012. Uttama Arogyakkagi Sevisi-Bettada nelli. In: Souvenir released during Amla Campaign programme. Krishi Vigyan Kendra, Hirehalli, Tumakuru. April 12-13, 2012, **Pp:**

Radha R.Banakar (2012). Uttama Arogyakkagi Taja Hannina Rasaglu. In: *Siri samruddi monthly magzine. BAIF, Tiptur.* June, 2012, PP-

Radha R.Banakar, Somashekhar and Sanna Manjunath.K.S, (2012). Uttama ArogyakkagiHasiru soppu Tarakarigalu.In:*Siri samruddi monthly magzine.BAIF, Tiptur.,* 2012, **Pp:**

Radha R.Banakarand Somashekhar, (2012). Arogyakku, Adayakku anabe Krushi. In : Siri samruddi monthly magzine.BAIF, Tiptur., 2012, **Pp:**

Somashekhar Radha R.Banakarand Sannamanjunath K.S, (2013). Thingala Huralikai Popular article published in *Siri Samruddhi, Monthly kannada Journal.* July 12-13, 2013, **Pp:**-12-13.

Radha R.Banakarand Somashekhar, (2012). Uttama Arogyakkagi Dinanitya Sevisi-Bettada NelliKai. In: Souvenir released during Amla Campaign programme. Krishi Vigyan Kendra, Hirehalli, Tumakuru. April 12-13, 2012, **Pp:**18

Radha R. Banakar (2012). Uttama Arogyakkagi Taja Hannina Rasaglu. In: *Siri samruddi monthly magzine.BAIF, Tiptur.* June, 2012, **Pp:** 6

Radha R.Banakar, Dr. Somashekhar and Sanna Manjunath. K.S, (2013). Arogyakkagi Hasiru soppu Tarakarigalu.In: *Siri samruddi monthly magzine.BAIF, Tiptur,* February 2013, **Pp:** 13

Radha R.Banakarand Somashekhar, (2013). Arogyakku, Adayakku anabe Krushi. In: *Siri samruddi monthly magzine.BAIF, Tiptur.* March 2013, **Pp:** 11

Ramesh P.R, Sanamanjunath, K.S., K.N. Jagadish, 2012, Banana bunch feeding technology "Tapo Vana souvenir" palapushpa pradarshana Edited and Published by State Horticulture Dept. Tumakuru.

4. Folders:

Prasanth J.M., Dr. Somashekar, Shivashenkarmurhty M, 2011, Bettada Nelli,

Prachandolona. Published under Amla Campaign Project funded by KAMPA, Bengaluru

M.Shivashenkarmurhty, J.M.Prashanth K.S. and SannaManjunath, 2011, General benefits of Amla Published under Amla Campaign Project funded by KAMPA, Bengaluru

Shivshenkaramurthy, M., Ramesh, P.R., J.M.Prashanth and Jagadish, K.N. Bettada Nelli . Published under Amla Campaign project funded by IIHR, Bengaluru

Radha R.Banakar,J.M.Prashanth, M.Shivashenkarmurhty, B.Hanumnathegowda, 2011, Bettada Nelliyalli Moulyavardhita Padarthagalu. Published under Amla Campaign Project funded by KAMPA, Bengaluru

Radha R. Banakar,Somashekhar Ramesh P.R and Jagadish K.N, 2012, Moulyavardhita Ragi Utpannagalu.

Radha R.Banakar, Somashekhar and Prashanth J.M., 2012, *Adike Tatte Tayarike*

Radha R.Banakar, Somashekhar, 2012 *Arogyakku, Adayakku anabe Krushi.*

Somashekhar, Radha R.Banakar, J.M.Prashanth, 2012, *Tingal Huruli.*

Radha R.Banakar, Somashekhar Loganandan and Prashanth J.M, 2013, Hannu – Tharakari Shekarane matthu Samskarane, Extension folder No.9, Published by Krishi Vigyan Kendra, Hirehalli

Remedies and Receipes of Betelvine – Extension Bulletin -16, K.Hima Bindu, Radha R Banakar, Shubha Sree, B.R.Lalitha, February 2014, Published by Director, Indian Institute of Horticultural Research, Bengaluru – 560 089.

Ramesh P.R., Paneer Selvam P, Loganandhan N, Shashidhara K.N. and– 2013 Arka Microbial Consortium, a Bio Fertilizer for sustainable Agriculture Production, at KVK (IIHR) Hirehalli.

4. Externally Funded Projects of KVK - A report

1. ICAR Flagship Programme on Climate Change :

Technology Demonstration Component - National Initiative on Climate Resilient Agriculture

National Initiative on Climate Resilient Agriculture (NICRA) is a network project of the Indian Council of Agricultural Research (ICAR) launched in February, 2011. The Technology Demonstration Component of NICRA deals with demonstrating proven technologies for adaptation of crops and livestock production systems to climate variability.

Objectives:

With this background, the ICAR has launched a major Project entitled, National Initiative on Climate Resilient Agriculture (NICRA) during 2010-11 with the following objectives.

- To enhance the resilience of Indian agriculture covering crops, livestock and fisheries to climatic variability and climate change through development and application of improved production and risk management technologies
- To demonstrate site specific technology packages on farmers' fields for adapting to current climate risks
- To enhance the capacity building of scientists and other stakeholders in climate resilient agricultural research and its application.

NICRA Project was funded by the **Central Research Institute for Dry land Agriculture,** Hyderabad. NICRA Project was implemented in **Durgada Nagenahalli** (D.Nagenahalli) village of Koratagere taluk, Tumakuru district by **KVK Hirehalli,** Tumakuru. The village was selected based on vulnerable to climatic variability like drought, dry-spells and extreme temperatures. The village has acute shortage of water and preponderance of waste and common land.

Significant Achievements:

The technological interventions for enhancing resilience of farming systems to climatic variability were identified and finalized involving the multidisciplinary

team of KVK and major stakeholders (farmers, researchers, NGOs and extension specialists) through brainstorming and group discussions. The climate resilient interventions were mentioned below.

- The survey of entire D.Nagenahalli village was done by NICRA Project team of the KVK in collaboration with NBSS and LUP and published the book on "Land Resource Assessment of D.Nagenahalli for Integrated Development".
- **Promoting farm mechanization through Custom Hiring Centre:** An area of around 25 ha was serviced by the equipments of the custom hiring centre where in the cost saving on account of labour ranged between 30 – 50 %.
- **Established Weather Station for monitoring Temperature, Wind speed, Evapotransporation and Rainfall.**
- **Soil Management through :**
  - o Trench cum bunding- 123 ha, 202 farmers benefitted.
  - o Land leveling and making compartments- 15ha, 39 farmers benefitted.
  - o Contour bunding – 1.5 ha, 2 farmers benefitted.
  - o Live bunds – 5 ha, 20 farmers benefitted.
  - o Crop mulching 6 ha , 14 farmers benifitted
  - o Stubble mulching - 4 ha, 11 farmers benefitted.
  - o Compost production units – 12 Units
  - o Biodigester- 2 numbers
  - o Soil health card as monitoring tool – 190 farmers

- **Water Management through :**
  - o New farm pond – 76 numbers, storage capacity 18730 Cu m, 92 farmers benefitted
  - o Percolation pond – 13 numbers, storage capacity 1750 Cu m, 13 farmers benefitted
  - o New Check dam -5 numbers, storage capacity 6750 Cu m., 11 farmers benefitted
  - o Water storage structure - 4 numbers, storage capacity 760 Cu m, 4 farmers benefitted
  - o Plastic lining of farm pond – 2 numbers, storage capacity 600 Cu m, 4 farmers benefitted
  - o Rejuvenation of farm pond-19numbers, storage capacity 8350 Cu m, 28 farmers benefitted
  - o Rejuvenation of check dam - 8 numbers, storage capacity 10700 Cu m, 15 farmers benefitted
  - o Desilting and widening of catchment channels (1500 m) and Blocking leakage of D.Nagenahalli Lake - 1 number, storage capacity 145600 Cu m, 18 farmers benefitted
  - o Micro irrigation – 5 ha, 9 farmers benefited.

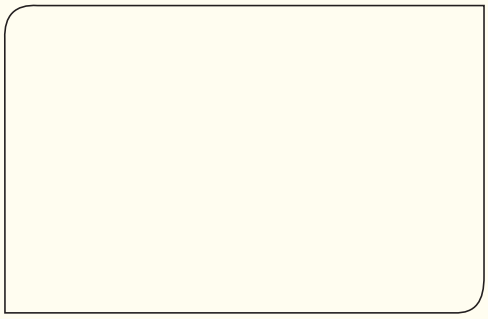
- **Crop interventions :**

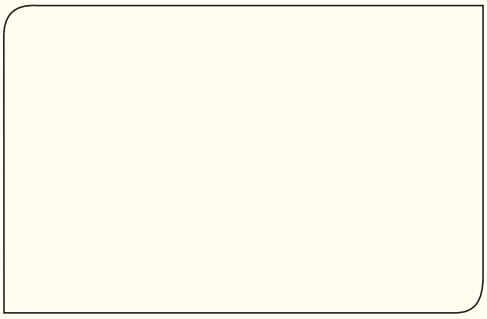
  Field crops:
  - o Ragi / Finger millet ML-365 was demonstrated in 50 ha and benefited 110 farmers.
  - o Maize NAH-1137 was demonstrated in 3 ha and benefited 10 farmers.
  - o Red gram BRG-2 was demonstrated in 52 ha and benefited 143 farmers.
  - o Red gram BRG-4 was demonstrated in 5 ha and benefited 15 farmers.

- o Ground nut GPBD-4 was demonstrated in 8 ha and benefited 25 farmers.
- o Ground nut ICGV-91114 was demonstrated in 1 ha and benefited 2 farmers.
- o Aerobic Paddy MAS-26 was demonstrated in 3 ha and benefited 7 farmers.
- o Dolichos Arka Amogh was demonstrated in 2 ha and benefitted 15 farmers
- o Navane Foxtail millet was demonstrated in 0.4 ha and benefitted 9 farmers

Vegetable crops:

Tomato and chilli were demonstrated in 3.5 ha and benefited 20 farmers.





- **Tree based farming system**

The following horticulture and forestry tree species block plantations were demonstrated in the village: Amla, Mango, Tamarind, Cashew, Jamoon, Melia dubia, Acacia aurculiformis, Silver oak, Teak,

Around 35,000 seedlings were planted in the village.

Perennial crops	Before NICRA (ha)	After NICRA (ha)
Mango	15.5	19.5
Tamarind	1.7	8.7
Aonla	0.4	4.4
Cashew	0	2
Melia dubia	0	15
Acacia aurculiformis	0	7
Silver oak	1	3
Pongemia	2	3
Teak	0.5	1.5
Neem	0.2	0.3

- **Livestock:**

Name of intervention undertaken	No of animals under taken	No of farmers covered / benefitted	Remarks
Preventive vaccination	403	44	Improved Animal health and Increased animal components
De-worming of animals	65	32	Improved Animal health
Animal health check-up	403	44	Improved Animal health and Increased animal components and there by increased milk and meat production
Fodder production	20	20	To make green fodder available during the late rabi and summer months

- **Institutional arrangements to be encouraged / made:**

The farmers of the village have constituted the committees to address the challenges due to climate change and to take up the project activities by calling a Grama Sabha meeting. The following committees have been constituted in the village.

1. Village Climate Risk Management Committee (VCRMC)
2. Farm Machinery Custom Hiring Centre (FMCHC)
3. Village Seed Bank

1. **Village Climate Risk Management Committee (VCRMC):**

An innovative institutional mechanism was put in place at the village level for management of the custom hiring centre for farm machinery. Village Climate Risk Management Committee (VCRMC) was constituted comprising of 12-20 villagers with nominated members as President, Secretary and Treasurer. A bank account is opened in the name of VCRMC and is operated by any two signatories. The committee fixes the charges for hiring for different implements and hiring rates are to be displayed prominently. Farmers' contributory share towards inputs like seeds, fertilizer, animals etc., is also deposited in the bank account. The revenue and expenditure details must be shared with the general body periodically.

2. **Farm Machinery Custom Hiring Centre (FMCHC):**

A Custom Hiring Centre was established in the village to facilitate time farm operation and also to help the poor farmers to carry out ordinary farm operations. The D.Nagenahalli village has been doing well in maintaining and running the Custom Hiring Centre which is equipped with the need based agricultural machineries. The centre has the following equipments (table. 26) which are in high demand in the farming community.

An area of around 184 ha was serviced by the equipments of the custom hiring centre where in the cost saving on account of labour ranged between 30 – 50%.

3. **Village Seed Bank:**

Seed shortages of suitable crop varieties are an important limitation faced by farmers to implement contingency plan to tackle aberrant rainfall situations. The farmers tend to dispose off the entire produce as grain and depend on external source for seed supply in the next season. Early season drought and need for re-sowing will only exacerbate the hardship faced by farmers. Seeds of certain contingency crops like minor millets are sometimes left out of normal seed supply chain.

Participatory village level seed production of short duration Ragi ML 365, Red gram BRG 2 and Aerobic Paddy MAS 26 were taken up in the village. Breeder seed and foundation seed were sourced from research farms for multiplication in farmer's field and the seeds so produced were used in the village and nearby villages.

2. National Horticultural Mission Sponsored Project :

a. Establishment of Leaf Tissue Analysis (LTA) Lab :

The changed agricultural scenario has to focus our attention on way to improve the soil fertility level of the district in all location to check the crop losses, avoid-wide fluctuations in productions and sustain the higher levels of productivity and quality of different horticultural crops. Establishment of a Leaf Tissue analysis Lab is to provide services to the farmers in and around Tumakuru district.

Objectives:

1. Analysis of plant and leaf in all high valued horticultural crops.
2. Provide the recommended dose of nutrients required by the plant based on the plant and leaf analysis.
3. To provide the immediate measures to the crop suffered by different nutrient deficiency.
4. To create awareness among the farmers about the different crop nutrient deficiencies and their remedial measures.

Project details:

Fund sanctioned: 20 Lakh
Date of Start of the Project: April 2013.
Completion of the Project: Mar 2014.

Activities supported:

- The fund was utilized for the procurement of instruments, glassware and chemicals needed.

Budget Utilization: Total amount of Rs.15.00 Lakh was utilised

4. Soil Samples Analyzed

Particular	No. of Samples	Rate/sample (Rs.)	Amount (Rs.)
Soil	623	100	62300
Water	414	50	20200
Leaf	112	100	11200
Total	**1149**		**93700**

Farmers covered: Total 1149 samples of soil, water and leaf were analyzed and benefited 465 farmers and covered 254 villages of 14 Taluks.

Training programmes organized : Total 7 training programmes on method of soil sampling and importance of soil, water and leaf testing and fertilizer recommendation were conducted. About 221 farmers were participated in the training programme.

b. Establishment of model nursery for multiplication of improved varieties and hybrids of horticultural crops

The project was taken for Production and distribution of genuine good quality seedlings of different horticultural crops and To build capacity of rural youths on nursery techniques and propagation of horticultural crops.

Project details:

Fund sanctioned: 25 Lakh

Date of Start of the Project: May 2013

Completion of the Project: May 2014

Activities supported:

1. Constructed Shade net house of 750 mt2
2. Purchased ploy bag filling machine of 380 bags /hr capacity
3. Purchased Propagation tools and equipments
4. Formation of label boards for display
5. Fencing facility for Mother block orchard
6. Instillation of Bio digester and Vermicompost Unit
7. Drip and sprinkler irrigation system for shade net house
8. Bore well drilled (790' Depth)
9. Raised root stocks of different fruit crops for propagation purpose
10. Production of grafted plants / seedlings of fruits crops, vegetables and plantation.

Nursery established under NHM

Bag filling machine for seedling production

Achievements:

Grafted plants / seedlings of fruits crops, vegetables and plantation produced under the scheme

Crop	Varieties	Seedlings /Graft production
Mango	Alphonso, Mallika, Baneshan & Dasheri	2500
Guava	Pink flesh, Mridula and L-49	1500
Amla	NA-5, NA-4 and NA-7	2000
Tamarind	PKM-1	150
Jamun	Gokak	250
Pomegranate	Baghva	4000
Lime	Kagzi lime	2600
Fig	Poona	200
Coconut	Arsikere	2000
Bird of Paradise	BoP	2000
Pomello	Devanahalli	1000
Seedless lime	Rasaraj	150
Drum stick	PKM-1	2000

c. Seed production of Vegetable Crops :

Year 2010-11 :

Under National Horticulture mission scheme, Krishi Vigyan Kendra received a project for the seed production program in vegetable crops, viz., French bean (Arka Suvidha), Bhendi (Arka Anamica), and Chilli (Arka lohit) during 2010-11, which would facilitate to supply the quality seed to the farmers of Tumakuru District. As per the guidelines of the sanctioning authority, Memorandum of understanding (MOU) was signed between Department of Horticulture and Indian Institute of Horticultural Research (IIHR) for the various terms and conditions. Under this program total an amount of Rupees Two Lakh was received by National Horticulture Mission (NHM) through Department of Horticulture, Tumakuru Government of Karnataka for producing the seeds in an Area of 4 ha land at Krishi Vigyan Kendra Hirehalli, Tumakuru. This project was completed with the quantity of seed produced as given in table 1.

Details of the seed production Programme along with the varieties :

Sl. No.	Crop	Variety	Area(ha)	Quantity of seed produced in Kg
1	French Bean	Arka Suvidha	2	498
2	Bhendi	Arka Anamica	1	200
3	Chilli	Arka Lohit	1	16
Total			**4**	**711**

After Production programme, the seeds were cleaned and graded at the processing unit located at the Indian Institute of Horticulture Research, Hessaraghatta Bengaluru as per the specifications of the Karnataka State Seed Certification Agency. Marketing of these seeds (Table 2) are being done at the cost decided as per the memorandum. The revenue generated through sale of these seeds is being accounted in the Revolving fund of the KVK. This Revolving fund will be utilized for the purpose of Vegetable seed production programme

in the subsequent years which will benefit the farming community of Tumakuru district in large. By use of this fund during 2011-12, we are planned to produce the same vegetable seeds like French bean, chilli and Bhendi which will be sold to farmers of the district in the subsequent year.

Year 2013-14 :

During this year an amount of Rs.4.00 Lakh was received for production of different vegetable seeds listed in below table.

Activities supported :

Budget has been utilized for the purchase of inputs like seeds, fertilizers, etc., and also for hiring the contractual labors for various activities like land preparation, sowing, weeding operation, harvesting, processing and packing of the vegetable seeds.

Seed Production Onion, French bean and Okra

Achievements :

Quality Seeds produced and distributed to the farmers during 2013-14 through NHM.

Sl No	Crop	Variety	Quantity (kg)	Selling Cost (Rs./ kg)*	Income generated (Rs.)
1	Onion	Arka Kalyan	450	500	225000
2	French bean	Arka Suvidha	550	90	49500
3	French bean	Arka Komal	148	90	13320
4	Okra	Arka Anamika	55	200	11000
	Total		**1203**		**2,98,820**

d. Integrated Mushroom Unit :

Introduction :

Spawn, i.e. seed required for growing mushroom, is the vegetative mycelium from a selected mushroom cultured on a convenient medium like wheat, sorghum grains, etc.,. Spawning is the essential first step in the early development of mushroom cultivation. In simple words spawn is grains covered with mushroom mycelium. It essentially involves the preparation of pure culture of mushroom from tissue/spores, evaluation of selected cultures for yield, quality and other desirable traits, maintenance of selected cultures on suitable agar medium, followed by culturing on sterilized grains and further multiplication on grains.

Infrastructure Development :

For spawn production unit, a building with size of floor area of 600 Square feet, has been constructed with following four rooms i.e. Storage room, Sterilization room, Inoculation room, Incubation room.

The Various Equipments required for Mushroom Laboratory was procured and being used in this project

Major Equipments under the project with their utility :

Sl.No.	Particulars	Purpose
Equipments and accessories		
1.	Grain Boiler	For grain boiling in large scale
2.	Fine wire meshed tray with legs 2 Nos	Utilized for drying the sterilized paddy straw
3.	Grain Filler	Filling of the grains in PP bags
4.	Trolleys	Movement of spawn bags
5.	Vertical Autoclave	Sterilizing the boiled grains and other media
6.	Laminar flow	Inoculation of boiled grains
7.	Spawn inoculators	Inoculation of spawn from one generation to next
8.	B.O.D Incubator	For spawn running
9.	Refrigerator	Storing the spawn
10.	Poly bags sealer	Sealing the pp covers
11.	Electrical balance	Measuring the chemicals for media preparation
12.	PH meter	To adjust the PH of the media
13.	High speed blender	Mixing the boiled grains with lime and Gypsum

Total amount of Rs.15.00 Lakh was sanctioned by National Horticulture Mission. As per the sanction, all the budget have been utilized during the project implementation.

After establishment of infrastructure through NHM, several Training programme were conducted at KVK, so far 20 training and awareness programmes on mushroom cultivation had been done. So far more than 300 farmers have been trained.

In Tumakuru district, very little is known about the importance of the mushroom for their nutritional benefits. KVK, Hirehalli popularized the mushroom cultivation and its economic benefits. Farmers are being encouraged to go for the cultivation of mushrooms and then the quality spawn will be supplied to the needy farmer/ mushroom grower in the district.

3. RKVY Project - Participatory Seed Production and Distribution System for Recently Released Vegetable Cultivars

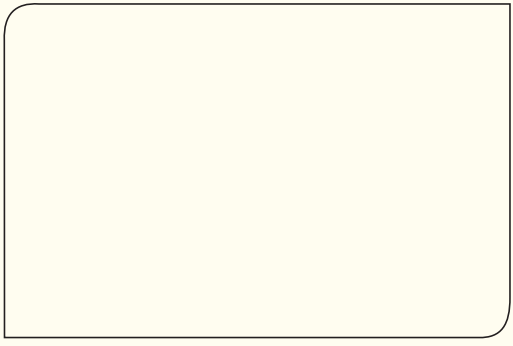
This project main goal is to create necessary infrastructure facility required for vegetable seed processing at KVK, Hirehalli. This will also facilitate to organize the Participatory seed production activity at the selected cluster villages of Tumakuru district. Two important physical structures are being created under this project, which will strengthen the seed production and marketing of the same. Important components of the project are given below.

1. **Seed Processing Unit**

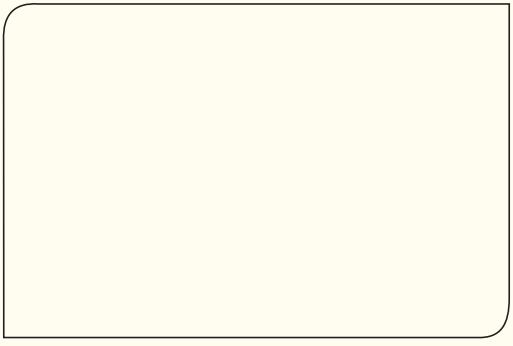
2. **Cold Seed storage unit cum sales outlet:** These two structures have been constructed with an amount of Rs.10 Lakh.

3. **Seed processing equipment Procurement:** Necessary equipments required for the processing and production of vegetable seed production are purchased.

Total fund received: 40 lakhs



Vegetable seed Processor



Vegetable seed kits

List of equipments and along with its cost purchased under RKVY Project:

Sl. No.	Name of the Equipment	Qty	Expenditure (in Lakh)	Justification for Purchase
1.	Vegetable Seed pre cleaner	1	0.49585	Pre cleaning of Vegetable seed for before Processing of Vegetable seed.
2.	Gravity separator	1	1.944	For separating the seed based on the gravity
3.	Vegetable seed processer	1	2.2302	For processing of Vegetable seed
4.	Automatic weighing and packing machine for vegetable seed	1	4.20	For large scale packing of Vegetable seed
5.	Digital balance capacity –150 and 15 kg	2	0.27454	For weighing of vegetable seed
6.	Auto start Diesel Generator	1	2.88	To provide Back up for the cold storage room and seed processing
7.	Refrigerator	1	0.402	For storage of Basic seed material for Seed production programme
8.	Other miscellaneous Equipments		3.77	

After establishing the Seed processing unit and seed storage unit, then participatory seed production activity will be initiated. As per the IIHR Institutional arrangement, an MOU will be made between IIHR and the seed grower. The seed produced by individual farmer will be asked to bring his produce to KVK, Where by his seed will be processed in the supervision of the farmer, and the cost of the seed will be paid to individual farmer directly to his account though IIHR Accounts. The processed seeds will be sold at KVK sales out let as well as to other part of the state in consultation with state department. This seed processing unit will be operated on No loss No profit basis for the benefit of the farming community.

4. National Amla Campaign by National Medicinal Plants Board, New Delhi

Amla as fruit can be used raw or in a processed form as a juice, candy, pickle, chatni, murabba or in dried form as powder etc. The versatility of its usage, therefore, makes it amenable to consumption in different forms.

In view of the aforesaid Amla National campaign project proposed and implemented in the district funded by Karnataka State Medicinal plants Authority (KaMPA) to promote usage and planting of Amla in schools where this can provide nutrition and promotive health care benefits to school children

Date of Start : October, 2010
Date of completion : August, 2013

Significant achievements made:

1. No. of seedlings planted- 4261
2. No. of Schools/Colleges covered – 126
3. No. of Training Programmes/Competition programmes organized –7

Trainings were organized for school teachers and students on

1. General Benefits of Amla
2. Cultivation Practices of Amla
3. Amla as dry land Horticulture crop
4. Value addition of Amla

Competition programmes were conducted on Amla benefits -3

Printed material Folders- 4

Title of Leaf Folders printed (Kannada)

1. Improved cultivation practices of Amla
2. Karnataka State Amla campaign
3. General Benefits of Amla
4. Value addition of Amla

Electronic media spots, documentaries prepared/telecast -02

Overall percentage of survival of grafts -62 % as reported by CFO Tumakuru

Other activities carried out in addition to the above:

1. Participated in 02 Akashavani Live Phone In programme telecasted on Amla Campaign project
2. World environment day celebration and distributed Amla grafted seedlings
3. Participated and presented the work carried out in Sensitization programme

5. Demonstration cum Training on Processing and Value Addition to Amla by Karnataka Medicinal Plants Authority, Bengaluru

Amla can be easily processed into various products squash, powder, salted Amla supari, candy, murabba, pickle etc. However the nutritive and health benefits have to be transferred to farmers/farm women/youth/school children through demonstration and trainings as they are not aware of the benefits of Amla. In view of the aforesaid, it is now proposed to promote usage of amla through

demonstrations-cum-trainings on its value addition to farm women, rural youths, school children, SHG members and extension functionaries. This apart from ensuring better health benefits would also help women to take up an income generating enterprise.

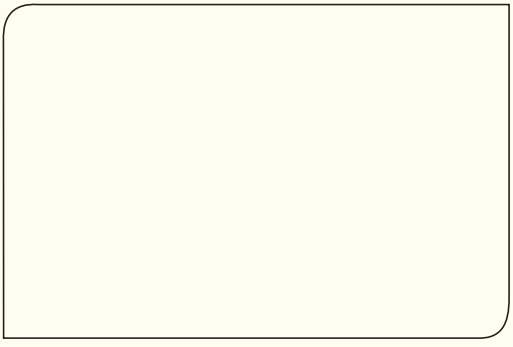
With this back ground, a project was proposed to KAMPA (Karnataka State Medicinal Plants Authority) Amla and the main emphasis of the project was to create necessary infrastructure facility for processing of the Amla fruits at KVK, Hirehalli and as well as to train the farmers about the processing and value addition to Amla. This potential and medicinally important fruit cannot be consumed directly because of sour nature, hence proper processing has to be done and can be converted into various products like squash, Amla powder, Amla supari, candy, Murabba, pickle etc.,

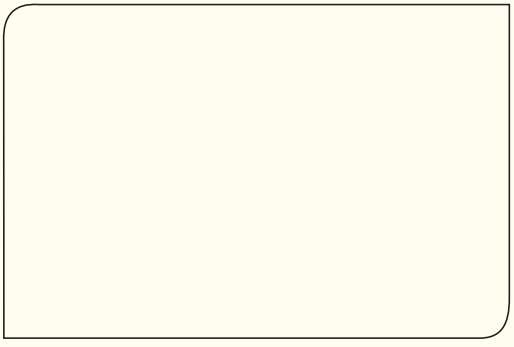
This project has been divided into two parts.

1. Creating infrastructure facility at KVK for processing of Amla: For processing of the Amla fruits and as per the project proposal, following three machines have been procured.

a. Amla Deseeder
b. Amla Juicer
c. Hot air oven

2. Conducting training cum demonstration on value addition to amla for the farming community: A series of training programmes were arranged to communicate and feel the hand in experience how the Fresh Amla fruits can be converted into various processed products like juice, candy, etc.,





Labeling and Packing of Amla Products: During the implementation of this project, In the allotted budget, we have procured around 500 each of juice bottles and candy boxes with attractive colour labels.

Budget Utilization: As per the proposal, budget has been utilized for the purchase of Amla Processing equipments and remaining fund has been utilized for the conduct of training programme as per the project proposal, a total amount of Rs.1.59 lakh rupies were spent on different components.

6. Mass multiplication of selected medicinal crops by National Mission on Medicinal Plants during 2011-12

The main objective of this project is to multiply the selected medicinal crops at KVK, Hirehalli and later these seedlings will be supplied at nominal cost to the farmers of the district. As per the proposal arrangements are made to multiply the selected six medicinal crops. For this all the planting materials are procured for establishing the mother block for the same. The crop details are given below.

Establishment of Mother Orchard and its Maintenance:In this Programme, following six medicinal crops are selected

1. Amla: *Emblica Officinalis.*
2. Ashoka : *Saraca asoca*
3. Chandana : *Santalum album*
4. Stevia : *Stevia rebudiana*
5. Coleus : *Coleus forskohlii*
6. Tulasi : *Ocimum sanctum*

Amla, Ashoka and Chandana being Perennial medicinal Crops and are being established. Stevia, Coleus and Tulusi are the small annual herbs, are being planted . The details of the each crop area, Progress, etc., are given in the following table. To achieve the goals of the project an amount of Rs.4.00 Lakh was received by National Mission on Medicinal Plants through Department of Horticulture during 2011-12. For propagation of these plants a poly house and net house of each 100 square feet has been established at KVK.

5. Success Stories of KVK – A view

1. Innovative Young Vegetable Farmer: An example of ARYA (Attracting and Retaining Youth in Agriculture)

Contact Details:

Sri. Krishnaiah, S.A.
S/o. Ajjiah,
Sangapuradhatti, Haraluru(P),
Tumakuru -572168
Mobile: 9611513201

Sri. Krishnaiah, aged 25 is from the village Sangapura Gollarahatti in Tumakuru district of Karnataka. He used to sell butter in Bengaluru city for his livelihood after the completion of Pre University Course. He used to earn around Rs.3000 per month in this way. He has a landholding of 5 acres with irrigated, rainfed and agro-forestry areas in his village. He was selected by SMS Agril. Extension from KVK Hirehalli for ARYA concept during 2009. Today, he is a vegetable farmer, growing vegetables like french beans, tomato, peas, radish, brinjal, chilli and green leafy vegetables for the last four years. Earlier, he used to grow field crops like ragi, jowar and mustard, but the income was not satisfactory. He is now growing Arka Suvidha, Arka Komal & Arka Anoop, improved french beans varieties of Indian Institute of Horticultural Research (IIHR), Bengaluru

The yield of French beans ranged from 14.5 –16.5 t/ha, which is the highest among nearby villages. Arka Suvidha variety fetched more price in market as it is a stringless variety. Whenever labour problem arises, harvesting can be done even after a gap of 5 days, as the beans of this variety do not lose its quality. Yield wise Arka Anoop is found to be the best. He could get 16.2 t/ha, and the variety is also resistant to important diseases like rust and bacterial blight. He got a market price of about Rs.14/kg for Arka Suvidha compared to Arka Anoop and Arka Komal (where he fetched Rs.12/kg). He now prefers to grow Arka

Anoop and Arka Suvidha because of their additional qualities and high yield. According to Sri. Krishnaiah, Arka Anoop and Arka Suvidha are having good cooking quality. Arka Suvidha fetches higher price in the market because of its preference by working women.

Earlier, Sri. Krishnaiah, as a small time farmer used to bring his vegetables for sale to important markets of Bengaluru. Once he started growing in large scale, neighboring vegetable vendors came to know about his produce and quality of the vegetables. Hence, the vendors come to his place and purchase the produce at attractive prices.

The seeds of improved varieties were provided for demonstrations by the KVK (IIHR) during the year 2010. After knowing the performance of these varieties, Sri. Krishnaiah visited and interacted with scientists of KVK and procured the seeds. He started growing improved varieties from 2010 onwards and he is now realizing higher yields. Sri. Krishnaiah is constantly in touch with Subject Matter Specialist (Agril. Extension) and as a follow up, the SMS and other KVK staff visit his field regularly. He has been provided with all the need based knowledge and skill, which included enrichment of fertilizer, pest management etc.

During his visit to KVK, he came to know about the vegetable special for the tomato, beans and other vegetables. The recommended dosage of vegetable special for tomato is 75 grams in 15 litres of water along with 1 shampoo sachet and 2 medium sized lemons. For french beans, it is 2 grams per litre. He is now using vegetable special regularly as he has noticed that the fruit quality and diseases resistance of the crops have improved. It also helps in retaining more number of flowers, thus increase in the fruit set, leading to higher yield.

Similarly, as an intercrop in areca nut, he is growing *ellaki* banana with the technical guidance from KVK Scientists. He follows techniques like banana bunch feeding technology, use of fruit fly traps in mango, use of bio-fertilizers for enrichment of soil. He started using both bio-fertilizer (Phosphate Solubilizing Bacteria (PSB), Azospirillum and Azotobacter) and bio-pesticides *(Pseudomonas fluoresces, Paecilomyces lilacinus & Pochonia chlamydospria).* He has also started growing other improved varieties like, Arka Anand (a hybrid green long Brinjal from IIHR, resistant to bacterial wilt) and chillies (Arka Meghana and Arka Shwetha).

He has been recognized by All India Radio, Mysore and an article on his success was published by NABARD in collaboration with AIR, Mysore. He participated in the ***"National Business Meet on Plant Protection in Protected Cultivation of Vegetables and Flowers" organized by IIHR,*** and Society for Promotion of Horticulture, Bengaluru during March 06-07, 2014 had gained knowledge in the concerned subject. He also participated in the Vocational Training programme - Coconut Friends and received second prize in Coconut Olympics.

The key to his success seems to be his eagerness to learn and understand quickly, hard work and positive attitude. He is now a model vegetable farmer for the region.

2. Strategies for success – A lesson from a Mango farmer

Contact Details:

Sri. Revannasiddaiah
S/o. Huchegowda,
Neralapura ,
Tumakuru-572168
Mobile: 9945465862

Sri. Revannasiddaiah, S/o Huchegowda, aged 67, is a Mango farmer from Neralapura village, Tumakuru District, Karnataka. Both husband and wife, studied up to S.S.L.C, are living in the village looking after their three acres mango orchard, while both the sons, educated are settled in Tumakuru and Hosakote. In the initial years, the farmer was in search of a suitable intervention for his three acres dry land farm. During 2003 he came into contact with Dr. B.M.C. Reddy, the then Director of Indian Institute of Horticultural Research (IIHR), Bengaluru. Based on his advice to go for Mango as a dryland horticulture intervention, he planted 74 grafted seedlings of Alphonso variety, initially in two acres of his land, in July 2004. Later in the year 2011, he purchased one more acre of adjacent land and continued mango cultivation in that land as well. Till 2009 he had contact with IIHR, Bengaluru and from 2010 onwards he came to know about the Krishi Vigyan Kendra (KVK), Hirehalli (under IIHR) at Tumakuru.

Dr. Reddy's package of practices (PoP) includes application of 60 kg of FYM, every year as a blanket application and 5 kg of oil cake mixtures (neem, pongamia, groundnut etc) at the root zone. In the additional one acre farm he applies 20 kg of FYM and half kg of oil cake mixture every year. He applies water using a water tanker only during the non-rainy period – November to May (7 months). About 40 litres of water is being applied to each tree once in 10 days.

In the year 2010 onwards, the KVK, Hirehalli helped him with some of the technological interventions, viz., Mucuna (Velvet bean) as an intercrop for green

manure (On Farm Trial), Micro Nutrients Foliar Spray (Mango special) for uniform mango size and increase in yield and use of Pheromone trap for monitoring Mango Fruit Flies (Front Line Demonstration). He was advised to apply Mango Special (75g of Mango Special Powder + 2 medium size Lemons + One sachet shampoo in 15 litres of water) to his entire orchard on monthly interval. He installed about 12 fruit fly traps in his 2 acres.

In the year 2010, from the first bearing, he got a yield of 480 Kgs. That was when a contractor approached him for a rate contract. The contractor asked for Rs.8000 for the whole orchard. But, the farmer thought otherwise and decided to sell the mangoes on his own. He came into contact with Dr. Rajendra Keni, General Physician at Sadashivanagar, a posh locality in Bengaluru city. The Doctor was aware of the quality of his mangoes, which were ripened on traditional method using paddy straw, free from calcium carbide, safe for health. Initially the farmer sold mangoes at prevailing market price. Once customers tasted Nelarapura Mangoes from the orchard of Sri. Revannasiddiah, they came back asking for same quality mangoes because they were free from fruit flies and were naturally ripened and tasty. Customers themselves offered premium prices for the quality produce. So, the farmer found a good market and started selling them directly to the Doctor's family members and friends. The Doctor, in turn started prescribing these quality mangoes to his clients and other friends. Thus, Sri. Revannasiddaiah decided to sell the mangoes regularly to these customers, who were ready to pay premium prices. That year finally he got a gross return of Rs.40,000, five times more than what the contractor had asked for! The customers keep in touch with the farmer for quality mangoes every year.

During 2011, the yield was 2400 kg. This time 1020 kg of graded fruits were packed and sold @ Rs 500 per box (of 6 kg). The remaining 1380 kg were sold to a contractor for Rs.25,000 at farm price. Whereas, the farmer sold graded mangoes for a whopping amount of Rs.85,000! The yield also started increasing every year but price is kept at Rs.500 per box till 2013.

Table 1: Increase in income through direct marketing :

Income through contractor			Income through direct marketing			Percentage increase in gross income
Production (kg)	Income (Rs.)	Average gross income per kg (Rs.)	Production (kg)	Income (Rs.)	Average gross income per kg (Rs.)	
1380	**25000**	**18**	**1020**	**85000**	**83**	**361**

In the year 2014, the bearing was comparatively less than the previous years and prices were also crashed due to some market related reasons. But, still he managed to sell them off for Rs.1,20,000. KVK has introduced Low Cost Mango Ripening Chamber to him. It is a small one cubic meter structure made of plastic pipes and polythene sheets. Mangoes (about 8 crates -1250 fruits) used to be kept in the chamber for 24 hours. In one cubic meter structure only 75 per cent of space for fruit was occupied. Inside the chamber, Ethylene solution (2%) and Sodium hydroxide (0.5 gms) were mixed and kept in a bowl. The controlled fumigation technique helped him to speed up the ripening process, whereas the dangers of using calcium carbide were completely avoided. In traditional ripening method, it used to take 10 days for ripening and change in colour. But using this low cost ripening technology, fruits are taken outside the chamber after 24 hours, and within 5 days they attain uniform colour. After keeping the mangoes for the specified period, he used to remove and pack them in used carton boxes. He sold 200 such boxes, each 6 kg of mangoes (in total 1200 kgs). On an average he sold them for Rs.100 per kg, which was much higher than the prevailing rate for Alphonso variety at that time. For transport to Bengaluru, all he invested was Rs.1400 per trip and in each trip he carried about 100 boxes. Thus the farmer made a fortune by producing and selling his mangoes by using simple technologies suggested by IIHR and KVK. His interview on Low Cost Mango Ripening Chamber Technology was telecasted in Doordarshan – Chandana channel on 12th & 13th of June 2014.

Sri. Revannasiddaiah earned about two lakhs rupees in a short period of time by following the methodologies suggested by KVK (IIHR) for production and

post-harvest care of mangoes. Recently, he purchased a TVS Moped from this income. Now, he also motivates several other neighboring farmers to adopt the scientific cultivation and processing methods offered by the KVK.

3. Innovative vegetable women farmer – a success story through adoption of new technologies

Contact Details:
Mrs. Shashikala .T
W/o. Ranganath. P.D.
Pemananahalli, Udigere Hobli,
Tumakuru – 572168,
Mobile: 7259488516

Smt. Shashikala is an innovative vegetable farmer from Pemmanahalli village of Udigere Hobli, Tumakuru Taluk and Tumakuru District, Karnataka. She has completed her S.S.L.C. and currently actively involved in the development of agriculture, horticulture and animal husbandry. Smt. Shashikala has got a keen interest in horticulture related activities and has developed good linkages with different public development departments like Indian Institute of Horticultural Research (IIHR), Bengaluru, Krishi Vigyan Kendra (KVK), Hirehalli, Tumakuru, and Karnataka State Horticulture Department (KSHD). She is motivating women farmer members of various self help groups to adopt new technologies of IIHR. She is having a landholding of 4 acres out of which 1.5 acres is irrigated.

She is the member of a Sri Vinayaka Shree Shakthi - Self Help Group (SHG) which is having 20 members. The group meets once in every 15 days. The SHG group activity includes agriculture and horticulture planning, organic farming, animal husbandry and vermi-composting. She started growing vegetables like french beans, tomato, peas, brinjal, chilli and green leafy vegetables since 2010. Earlier they used to grow field crops like ragi, field bean, red gram and jowar.

Crops and varieties: Smt. Shashikala is growing improved peas variety of IIHR (Arka Ajit) and Magadi local. Arka Ajit variety has been grown in Pemmanahalli at her farm for the last two years. The yield details are given below in Table.

Table : Average three season performance of improved and local varieties of peas (2009-12)

Sl. No.	Varieties	Yield (t/ha)
1.	Arka Ajit*	16.5 t/ha
2.	Magadi Local	17.4 t/ha

* Arka Ajit is resistance to powdery mildew from which cost on chemical fungicides was reduced to farmer.

Similarly, the yield of french beans, which she has grown for three consequent seasons, ranged from 13.5 – 18.5 t/ha and the productivity is highest among nearby villages. She found Arka Suvidha variety better being stringless variety, fetching more price in the market. Traders found it to be suitable for local and Bengaluru markets. With Arka Anoop, she could get up to 17 t/ha. The variety is resistant to rust. She got a market price of about Rs.11/kg for Arka Suvidha compared to Arka Anoop and Arka Komal (where she fetched Rs.10/kg). She now prefers to grow Arka Anoop and Arka Suvidha because of their additional qualities and high yield. According to her, Arka Anoop and Arka Suvidha are having good cooking quality as well. Earlier she is used to grow in same land ragi, jowar, field bean and red gram, in which she used to realize an average net returns of Rs. 20,000/- per acre. Now by switching over to short duration vegetable crops she is able to earn a net return of Rs. 60,000/- per acre.

Interaction with Research Institutes: She is in constant touch with scientists from IIHR, Bengaluru and KVK, Hirehalli for her technological needs. The seeds of improved varieties were provided for demonstrations by the IIHR since 2006. She has now become an expert in management of french beans production including pest and disease management. Smt. Shashikala being hardworking and innovative farmer, she has been identified as a techno-agent for dissemination of technologies in horticulture to other farmer of the area. Her services are also being used by the KVK to educate other farmers on improved vegetable cultivation.

Market Integration: In contrast to her visits to Bengaluru market earlier, now the vendors come to her place and purchase the produces. She has also motivated other farmers in her own and neighboring villages and about 15 farmers are now growing improved varieties of french beans.

Use of Organic Formulations: In case of peas and tomato, she is now using *'Panchagavya'*, an organic formulation during the flowering stage. She has found it effective in controlling flower drop. *Panchagavya* is made with 5 kg of cow dung, 10 litre of cow urine, 1 litre of curd, 1 litre of milk, 1 kg of ghee. After keeping for 15 days, the solution is diluted with water in 1:10 ratio and sprayed.

Use of Vegetable Special: During her visit to IIHR, she came to know about the vegetable special for the tomato, beans other vegetables. The recommended dosages of vegetable special for french beans is 2 g/l. She is now using vegetable special regularly, as she has noticed that the fruit quality, diseases resistance of the crops grown have improved.

Use of Bio-fertilizer & Bio-pesticides: She has started using bio-fertilizers like Phosphate Solubilizing Bacteria (PSB), Azospirillum & Azotobacter for enriching the farm yard manure. She is also using bio-pesticides *(Pseudomonas fluoresces, Paecilomyces lilacinus & Pochonia chlamydospria)* for bio-controlling of pest and diseases.

Innovativeness: Smt. Shashikala, through her continuous training and interaction with scientists, is able to identify the insect pests of french beans, including stem fly, and is better in their management practices. After seeing the potential of the new variety, she has taken up seed production in the current year. The seeds so generated were supplied to the neighboring farmers. With her intervention they have started to grow different vegetable crops in a season in the village and as a result they are realizing better price in the market. She is convinced about the group approach in popularizing technologies among the farmers of her village. She has organized numerous group meetings with help of scientists from IIHR and KVK, Hirehalli. The meeting on topic like seed production in french bean, Integrated pest and disease management were organized, in which 12-15 groups of farmers participated. The idea was to have good exchange of ideas, discussing pros and cons of technologies etc. She is convinced of bringing agricultural and horticultural development in the village through group approach. By realizing the importance of growing vegetable crops she is diversifying to other horticultural crops like tomato, chilli, leafy vegetables and banana. In all these crops she is following the recommended practices of IIHR, by interacting with the KVK scientists and Division of Extension and Training.

New varieties: She has started growing other improved varieties and hybrids like Arka Anand (a hybrid green long Brinjal from IIHR, resistant to bacterial wilt), Chilli (Arka Meghana and Arka Shwetha), Amaranthus (Arka Suguna) and Palak (Arka Anupama). She is preserving seeds of Magadi local peas at Pemanahalli since 40 years and earning good remuneration by selling seeds and pods. Her success story on cultivation of Magadi local peas was documented in DD Chandana and Adoption of IIHR technology for self sustainable in agriculture. She is also the recipient of Young Farm Women award at UAS, Bengaluru during International Krishi Mela 2013. During November 2014 she was identified under young farm women category by UAS, Bengaluru and selected for Farmer Exposure Visit - All India Tour sponsored by Govt. of Karnataka. By this she gained knowledge in different agriculture and horticulture practices. Now she is a Champion farmer for KVK Hirehalli. The key to her success lies in her eagerness to learn and grasp new technologies quickly and adopt them immediately in her field, a prime quality of an innovator.

4. Multiple Cropping with poly mulch and drip irrigation – A story worth to emulate

Contact Details:
Smt. Saroja G.C
W/o Ramachandraiah D.G.
Devarayapattana Post,
Tumakuru- 572106
Mobile: 9738230939

Smt.Saroja is a progressive women farmer from Devarayapatna village of Tumkauru district, Karnataka. She has graduated from Tumakauru and now grows vegetables and flowers in an area of 2 acres along with her husband. KVK, Hirehalli has introduced improved varieties of vegetables and flowers to her in the year 2013-14, in which she showed tremendous outcome.

The story started with the introduction of improved tomato variety – Arka Samrat under plastic mulching in her field. Tomato is an important commercial vegetable crop in India. Tomato farmers are facing problems due to the climate change which leads to outbreak of pest and diseases, drought situation, bore wells going dry, labour scarcity etc. In last 3-4 years major diseases like late blight and leaf curl have emerged as devastating problems for tomato crop. Subsequently cost of cultivation has also gone up and labour shortage has a major threat for farming community. Farmers are finding it difficult to cope up with the raised input costs and other related problems. Smt.Saroja is also not an exception from these predicaments.

To mitigate these problems, KVK (IIHR), Hirehalli initiated a demonstration of the technology - Poly mulching with drip irrigation in tomato crop under Front Line Demonstration (FLD) during the year 2013-14 in her field. Earlier, she used to grow only ragi and paddy crops during the monsoon. She was unable to cultivate the profit oriented crops due to the lack of technical knowhow and labour scarcity. She visited KVK, Hirehalli and discussed with scientists about cultivation of tomato. She was advised about the improved tomato production technology developed by IIHR Bengaluru with Hybrid Arka Samrat under poly mulching.

Keeping these suggestions in view, Smt. Saroja decided to go for summer tomato cultivation in her field. She planned for one acre and used the Hybrid Arka Samrat. She transplanted the tomato seedlings on raised beds with ploy mulch film laid with drip irrigation. She has followed package of practices with fertigation and plant protection recommendations as per the suggestions given by the SMS (Horticulture). She used to visit KVK, Hirehalli frequently for suggestions and regular visits were also made by the KVK Scientists to the FLD plot. The practice of mulching helped in moisture conservation, weed suppression and maintenance of soil structure. Mulches also improved the use efficiency of applied fertilizer and use of reflective mulches minimized the incidences of pests and viral diseases. She started harvesting tomato after 65 days after planting and got 32.50 tonnes of tomato per acre and sold them @ Rs.10 per kg. This resulted in a total income of Rs. 3.25 lakhs per acre. The total cost of cultivation for tomato was Rs.60,000 per acre. Thus, she earned a net profit of Rs. 2.65 lakh per acre (BC ratio 5.41). Farmers of surrounding villages were very impressed by the result of this technological intervention of plastic mulching with drip irrigation. Farmers from the village are of the opinion that by following these technologies, they can reduce the wastage of water and fertilizers and also increase the water use efficiency. The incidence of pests and diseases has come down. The number of seedlings required for planting one acre is also less because of the decreased seedling mortality. The fruits obtained are of better quality and colour, which fetched her more prices in the market.

The anticipated increase in income by using poly mulch in crops, especially of high value such as tomato, appropriately justifies the costs of plastic mulch and drip irrigation. However, use of plastic mulch may or may not impact the net profit in case of low value crops, considering the investment in mulching.

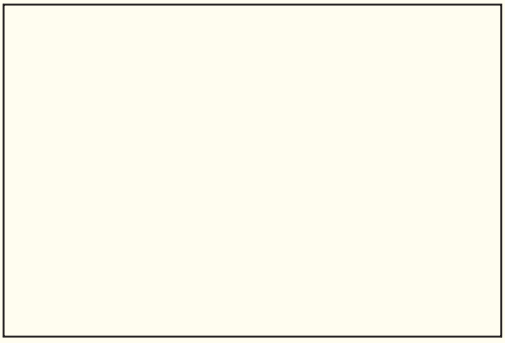
To reap more benefits from the investment made on mulch and drip irrigation, multiple cropping (growing a second or even third crop immediately after the previous crop) has become a common practice under plastic mulching. Rotation of *Solanaceous* crops with a leguminous crop could be a better option in this case. However, proper installation of a good quality plastic mulch and drip tube is absolutely necessary for successful multiple cropping. So, Smt. Saroja was suggested by the KVK to take up second crop as a french beans. She had

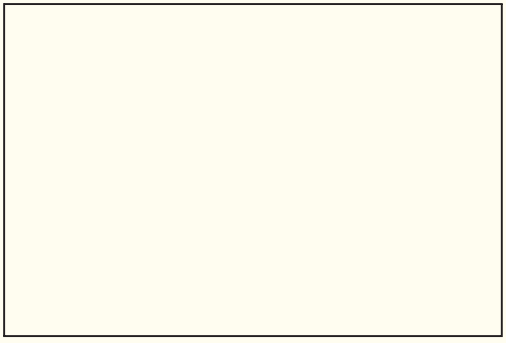
harvested french bean after 55 days after sowing and gained 3.5 t/acre. She sold them at the rate of Rs.22/kg. The gross income was Rs.77, 000 consecutively, considering the quality of the mulch and drip tubes, she was suggested to go for a third crop – newly released variety of Marigold Arka Bangara from IIHR, propagated through cuttings, in the same polymulch with same spacing. In Marigold, 45 days after planting, she got 1800 kg and sold at the rate of Rs. 20/ kg and gross income was Rs. 36,000. By this she earned a total net income of Rs. 0.92 lakh per acre.

Table : showing the income from all the three crops and in total

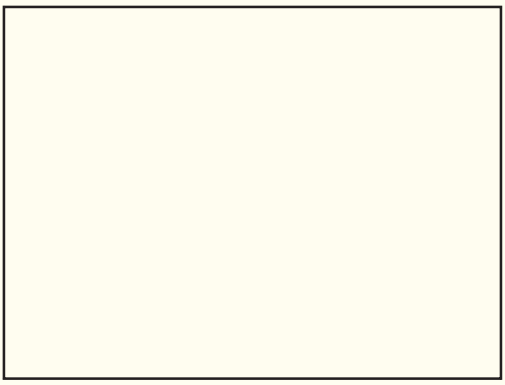
Sl. No.	Varieties	Yield	Net Returns (Rs./acre)
1.	Tomato Arka Samrat	32.50 t/acre	2,65,000
2.	French Bean –Pole beans	3.50 t/ acre	64,500
3.	Marigold- Arka Bangara	1800 kg /acre	27,500

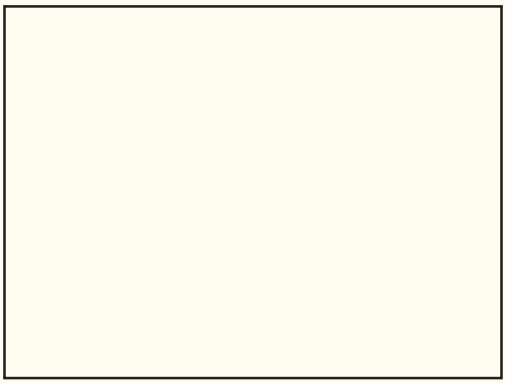
She received innovative farm woman award from IIHR on her success during the recent ICAR foundation day–18th July 2014. Smt.Saroja is acting as a role model for nearby farm women to lead a successful career by following improved horticulture practices.



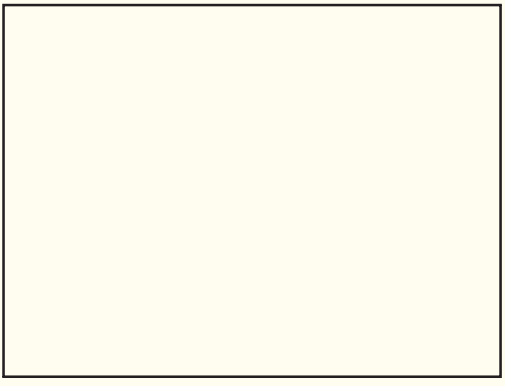


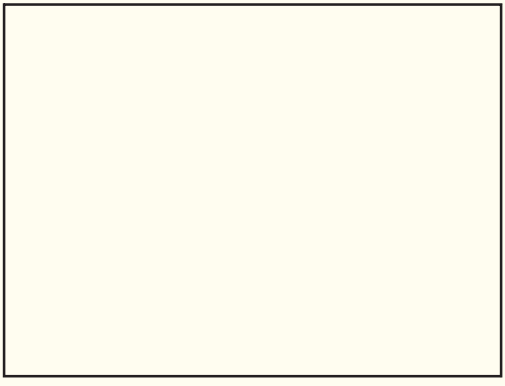
FLD Plot on Poly Mulching in Tomato – Arka Samrat



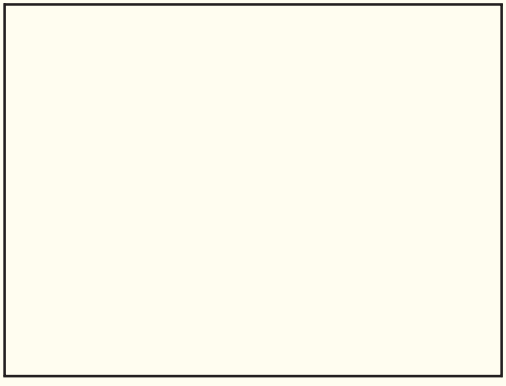


I crop - Tomato – Arka Samrat

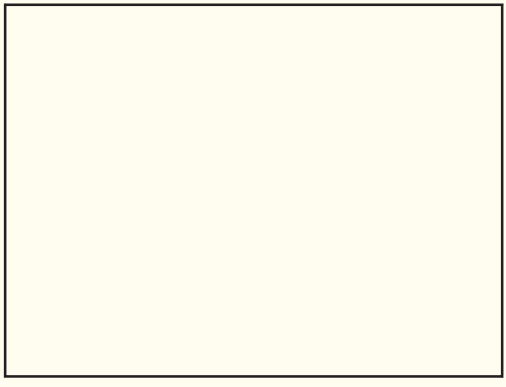




II crop: French bean crop in same polymulch- Pole beans

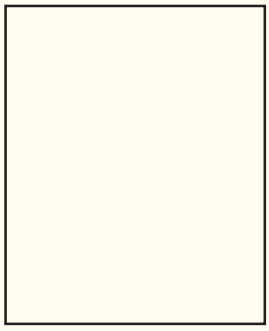


III crop: Marigold crop
- Arka Bangara



Felicitation during
ICAR Foundation day

5. High density planting in Banana: A boost to farmer's profit



Contact Details:
Mr. Mayaganna M.G
S/o Gundaiah
Mulakunte post, Tumakuru
Mobile : 9731665618

India is the largest producer and consumer of banana in the world. In Tumakuru district of Karnataka, among the major fruit crops, banana shows a steady increase in area after mango. The latest statistic data shows an area of 4,904 ha under banana in the district. Its varied and wider adoptability under different farming situation make it small farmers' favorite crop. The irrigation system and farm holdings also make banana a practical alternative crop.

Grand naine (G-9) variety of banana is a popular one among farmers, because of its relatively good shelf life and an attractive golden yellow colour at the time of maturity and is internationally well acceptable. More that 40 % of banana cultivation is as intercrop in areca nut and coconut gardens in Tumakuru district, since in conventional method of planting system productivity is very low due to the low plant population, resulting in minimum income from unit area.

However, most of the farmers consider banana as a risky crop for the small land holders. So, many institutes have released different technologies for minimizing the risk in banana cultivation. High density planting with paired row is one such technology developed by ICAR-National Research Centre on Banana (NRCB), Thiruchirapalli, Tamil Nadu. This technology helps the farmer to earn higher profits from the limited land resources.

In this connection, KVK Hirehalli has implemented a Front Line Demonstration (FLD) on high density planting of banana with paired row method in the field of Sri. Mayaganna of Mulakunte village of Tumakuru taluk. He is a banana farmer specialized in the cultivation of G-9 variety. His average annual income from banana farming was Rs.1.47 lakhs /ha. During year 2013-14, KVK

Hirehalli selected him as beneficiary farmer for the FLD, to study the suitability of high density planting in banana, a NRCB technology.

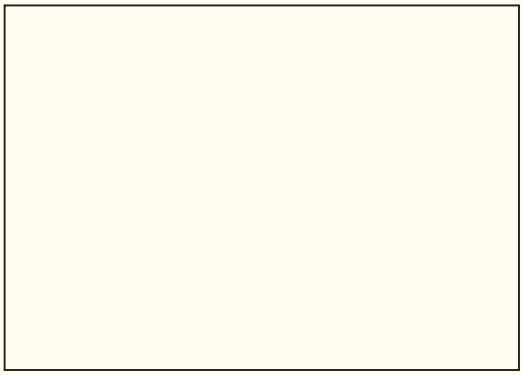
The SMS (Horticulture) trained him on the technology and the farmer planted the banana at a spacing of 1.5 x 1.5 x 2.0 mt in paired row with zig zag method of planting, in contrast to the conventional planting method of 2 x 2 mt. In the high density method he could plant 5200 plants per hectare in place of 2500 per hectare in the conventional method. Before start of the demonstration he believed that close spacing will reduce the overall yield.

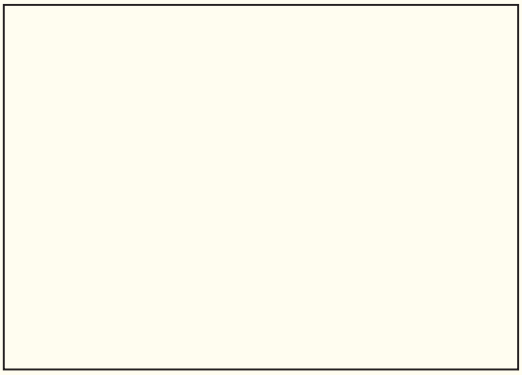
The average bunch weight in his method of planting was 20.5 kg leading to a productivity of 578 qt/ha whereas he got an average bunch weight of 17.2 kg in high density planting leading to a productivity of 760 qt /ha. This increased his income level to INR 3.82 lakhs / ha per annum with a B: C ratio 3.54.

Table on the above figures–comparing conventional and HDP in banana

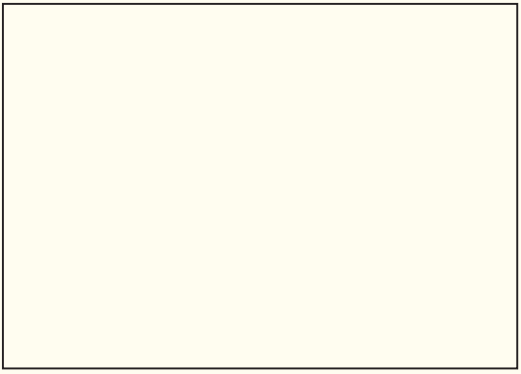
Sl. No.	Spacing (M)	Yield (qt/ha)	Net Returns (Rs./acre)	B: C ratio
1.	Paired row with Zig zag- 1.5 x 1.5 x 2.0	760	3,82,000	3.54
2.	Conventional method -2 x 2	578	2,54,600	2.69

Now Sri. Mayaganna is growing high density planting in banana with different varieties viz., *yelakki bale, nanjanagudu rasbale, puttabale* etc., and earning more profit. High density planting helps the plants to utilize water and fertilizer more efficiently through increase root density. It helps the plant to resist winds more effectively and thus cost for staking was also considerably reduced, he says. Now, seeing the success of Sri. Mayaganna, other farmers of the demonstrated area also want to cultivate banana in this method. Farmers from other villages are continuously visiting and contacting KVK for technical guidance.



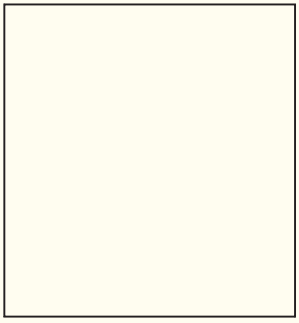


HDP in Grand Naine variety



HDP in Yelakki Bale variety

6. Increased Productivity of Banana trough foliar Application of Banana Special



Contact Details:
Mr.Jayaram
S/o Muniyappa
Sannappanpalaya
Hirehalli Post
Tumakuru – 572168
Mobile:9964510906

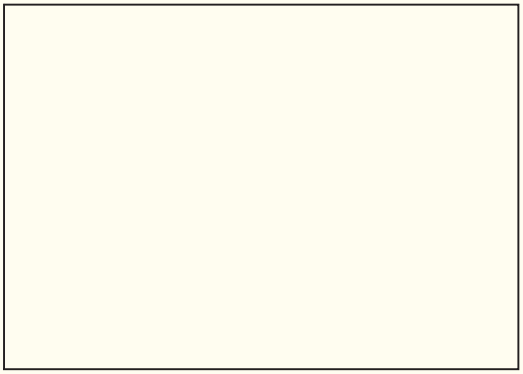
Banana is second most important fruit crop of the district, next only to mango, and is grown mainly under irrigation. The Banana Grand-9 is demonstrated at KVK, Hirehalli farm in 0.5 ha. The planting is done in the month of July. The availability of micronutrients is low in Tumakuru area due to coarse textured soil, low organic matter and high pH of soil. These result in predominant micronutrient disorders. To overcome these problems and to get higher productivity, Banana Special (an IIHR technology) was recommended by KVK, Hirehalli at the rate of 5 sprays @ 5 g/lit at 30 days interval starting from 5th month from the planting.

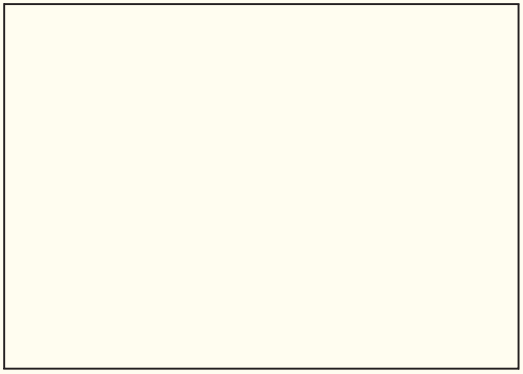
Sri.Jayaram is small farmer from Sannappanpalaya,Hirehalli Post,Tumakuru, growing banana in his 0.5 ha area. On observing the results in KVK farm he was motivated to apply the same technology in his field as well. The demonstration was conducted at his field in 0.5 ha. The results have clearly indicated that by adoption of the Banana Special foliar application, the yield of the crop could be increased to an extent of 17.46 % on an average. The farmer got benefitted with additional yield of 5.5 t/ha compared to local and an additional income of Rs. 27500.

Table 1 : Increase in yield using banana special

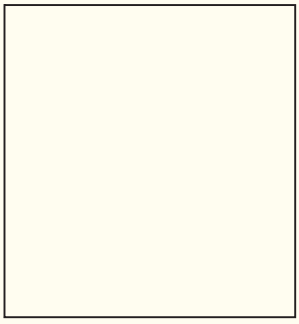
Area (ha)	Yield (t/ha)		Percentage increase
	Check	Banana Special Treated Plants	
0.5	31.5	37	17.46

The demonstration of this technology have been widely publicised through different mass media like news paper, radio and TV and widely used in the farmers training programme of the KVK. Dissemination efforts made by this KVK with the proven results, the farmers of the district under irrigated agro-ecosystem are adopting this technology with horizontal spread to a greater extent area (1597 ha) in Tumakuru.





7. Friends of Coconut Tree - A boon to the farmers of Tumakuru district and succeed in giving professional coconut tree climbers



Contact Details:
Mr.Gopal Gowda,
K. Bevenahalli,
Turuvakere, Tumakuru
Moblie Number :
7259724723

Coconut Palm is an important cash crop in the Tumakuru district and it is being cultivated in an area of about 1, 32,587 ha with a production of 20,912 lakh nuts. Coconut cultivation and allied activities provided livelihood security to the many farmers of Tumakuru district. For harvesting the nuts, removing the dried fronds and for spraying and applying insecticides on the crown, it requires skilled labourers to climb manually up the tree. Skilled and trained coconut tree climbers have become scarce and farmers are finding it difficult to harvest the nuts timely.

The traditional method of coconut climbing is cumbersome, risky and less effective, because of high energy consuming process. The younger generations are not showing interest to engage them in this activity. The aged people alone are doing traditional harvest. Often these aged people fall from coconut palms leading to permanent handicap even death occurs. In traditional methods farmers are harvesting an average of 30-40 palms per day. The labourers harvesting the coconut in traditional way are demanding Rs.20 to 30 per tree and they are attending harvesting on an average of 2-3 months interval. This has led to yield reduction due to improper maintenance of coconut palms and loss by theft of fallen coconuts.

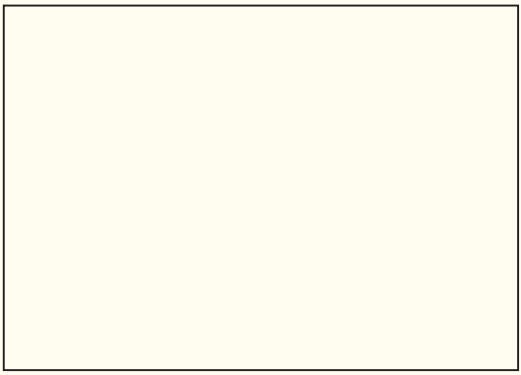
In this connection, Krishi Vigyan Kendra, Hirehalli conducted various trainings and demonstrations for a period of 6 days which was sponsored by the Coconut Development Board, Hulimavu, Bengaluru and introduced the mechanical coconut harvesting machine for rural youth of the district to create awareness and regular practicing of climbing by master trainers. Besides coconut climbing, they were trained on all aspects of coconut cultivation like seed nut selection

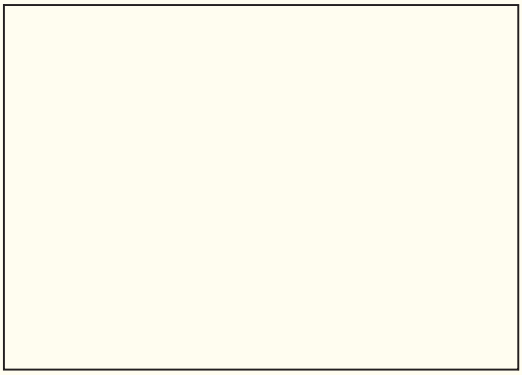
and procurement, safe handling of seed nuts and tender nuts, coconut nursery and its management, planting and aftercare, tender and mature nut identification, identification of pest and disease of coconut and their management etc. A total of four trainings and demonstrations were conducted. A total number of 80 rural youths were participated in the programmes from the district. The best part of the `coconut-climber' is that even non-professional climbers can operate it, making it a boon for farmers.

Successful outcome:

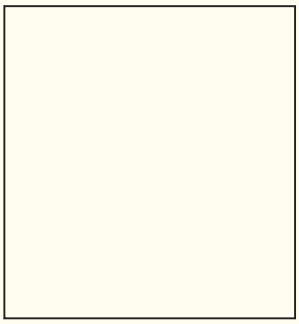
Sri Gopal Gowda, is unemployed residing at K. Bevenahalli ,Turuvakere taluk Tumakuru district attended the Friends of Coconut training programme at KVK Hirehalli. Soon after he completed the training programme successfully, he started coconut plucking as his career and goes to work on his own two wheeler along with the coconut climbing machine received during the training programme. Sri. Gopal Gowda climbs the palms for coconut harvesting and he also cleans the crown of the coconut palms, farmers engaging him are more satisfied. He also provides the information on Pest and disease management and fertilizer aspects for palms. On an average he climbs nearly 70 to 90 palms per day and approximately 750 palms per month. He is charging Rs.20-25 /tree depending on the total number of coconut trees available and also based on the height of the tree. He is having cell phone and communicating the programme to the customer in advance in the district and other adjacent districts also. He is earning Rs 1500-2000/day and the total revenue was Rs. 15,000 per month and leading a happy life. The labour scarcity for harvest of coconuts thereby is in a declining trend in the taluk.

Name & address of CTC	No of palms climbing /day	Price/ tree (Rs.)	Approx. No of palms climbing/ month	Total Revenue / Month (Rs.)
Sri. Gopal Gowda K. Bevenahalli , Turuvakere, Tumakuru M :7259724723	70 trees	20	750 palms	15,000



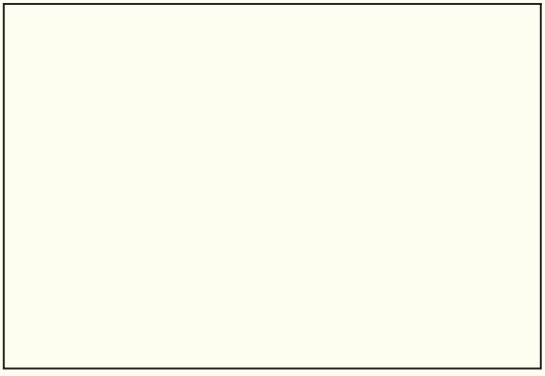


8. Rain Water Harvesting – A pathway to livelihood security



Contact Details:
Mr. Venkatappa,
D.Nagenahalli,
Anupanahalli Post
Kollala Hobli
Koratagere,Tumakuru - 572140
Mobile: 9611968711

Sri.Venkatappa is a marginal farmer of D.Nagenahalli village in Koratagere taluk of Tumakuru district. He is one of the farmers in D.Nagenahalli village who participated in the TDC-NICRA (Technology Demonstration Component - National Initiative on Climate Resilient Agriculture) Project of KVK, Hirehalli. He has 1.75 acre of land (of slightly slope with poor fertile soil). Before intervention, he used to grow one or two crops like Paddy (0.50 acre) and Groundnut (1 acre) or Ragi only during the monsoon in 1.5 acres, leaving 0.25 acre as fallow. Paddy was tried by him, and many of the other farmers in this village, because of the seepage water from upstream and consequent water logging condition. Because of this, he could not take any other crops. The farm income used to be less due to uneven rainfall and restricted crop choice.



The NICRA team from KVK, Hirehalli met him and discussed about the interventions. Gradually suitable interventions were introduced. The land was leveled and made compartments to reduce the soil erosion. A farm pond of dimension 10m x 10m x 2m with water storage capacity of 200 cu m was dugout to harvest the runoff in the year 2011. He started cultivating about three crops per year with the help of farm pond. Later, he brought the remaining 0.25 acre also under cultivation. He tried vegetables and aster flower along with his earlier crops in his farm after the intervention, which was typical example of diversification at farm level. The sole dependency on groundnut during monsoon

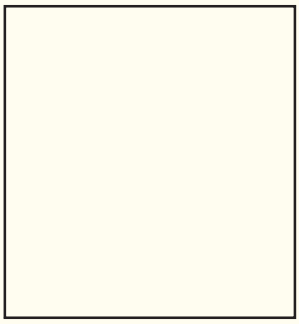
and paddy in the water logged area was replaced with the diversified cropping system, which is found to be very important as far as livelihood security is concerned. During these years even though monsoon was not good, he still managed to get sufficient yield with the harvest of whatever rain water precipitated. It was possible only due to his 200 cu.m farm pond. However, he used the collected water for irrigation at the critical stages. Given below are the details of additional yield and income gained by the farmer during 2011-12 to 2013-14 due to the additional water supply from the farm pond and the additional crops possible by the interventions.

Table 1. Impact of farm pond on income of the farmer

Crop	Variety	Area (Acre)	Yield (qtl)	Gross Cost (Rs.)	Gross Return (Rs.)	Net Return (Rs.)
2010-11 (Before NICRA)						
Paddy	Local	0.5	7	6150	9570	3420
Ground nut	Local	1.0	5.7	4492	14872	10380
			Total	**10642**	**24442**	**13800**
2011-12 (After NICRA)						
Paddy	Local	0.75	14	9100	14400	5300
Tomato	Lakshmi	0.25	7 ton	13700	41700	28000
Chilly	Local	0.25	1.5	5500	25500	20000
Coriander	Local	0.25	8	2500	18500	16000
			Total	**30800**	**111130**	**69300**
2012-13						
Paddy	Local	0.75	16	9500	15500	6000
Aster	Local	0.5	14	4500	17900	13400
Tomato	Local	0.5	5 ton	10500	21500	11000
			Total	**29500**	**54900**	**30400**
2013-14						
Paddy	Local	0.75	18	10500	19500	9000
Aster	Local	0.5	16	6000	20500	14500
Tomato	Lakshmi	0.5	6 ton	12500	37500	25000
			Total	**29000**	**77500**	**48500**

His income increased more than double in these years as shown in the table. The BC ratio was 1:2.3 before the intervention. But it improved to 1:3.6 and 1:2.7 in the years 2011-12 and 2013-14, except for the year 2012-13 (1:1.9)

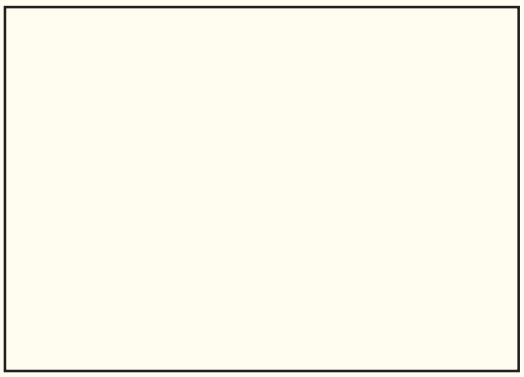
9. Addressing drought vulnerability by cultivation of Aerobic Paddy (MAS-26)

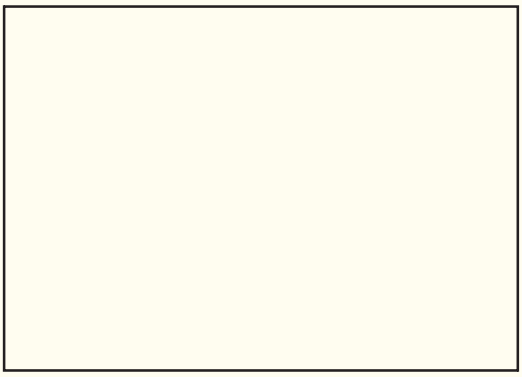


Contact Details:
Mr. Mahesh M.N.,
S/o Muddalagiriappa
D.Nagenahalli,
Anupanahalli Post
Kollala Hobli, Koratagere
Tumakuru - 572140
Mobile: 9741048653

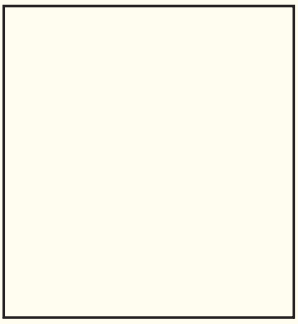
Rice (Oryza sativa L.) is the most important cereal crop of India. In Karnataka, about 55–60 % of the rice is grown under puddled system and the rest is under a rainfed situation. Traditional rice cultivation method is well- suited to countries and regions with low labour cost and high rainfall, as it is very labour-intensive. Irrigated rice is typically transplanted into puddled paddy fields, which includes land preparation with 4-6 inches of standing water and this method of cultivation requires large quantities of water. Because of increasing water scarcity, Aerobic Paddy cultivation is getting popular in the country, apart from SRI method. Considering the drought prone nature of D.Naganahalli, the village selected under TDC-NICRA project of KVK, it was decided to demonstrate this method in the NICRA village. The main advantages of the drought tolerant aerobic paddy MAS 26 are - direct sowing, no need for puddling, resistance to pests and diseases, reduction in pollution, medium duration, possibility of about 60 tillers on an average per seed and 50% water saving along with 80% seed saving.

The demonstration of aerobic paddy MAS-26 was conducted at farmer field Sri Mahesh.N.M, in 0.5 ha. Sri. Mahesh is a medium farmer. He studied diploma in Electricals. The performance of the aerobic paddy MAS-26 (37.5 q/ha) was found to be superior to the local variety of paddy (29.8 q/ha). The yield of MAS-26 increased to an extent 12.4 %. The farmer got benefitted with additional yield of 2q/ha compared to local and an additional income of Rs. 3,600.





10. Biointensive Management of Egg Plant Shoot and Fruit Borer



Contact Details:
Sri. Hanumanthrayappa,
Kolihalli Village,
Tumakuru -571168
Ph No: 9008240672

Mr.Hanumanthrayappa, Kolihalli Village of Tumakuru Taluk is having 5.5 acres of land. Out of which, he is growing 3 acres of vegetables like Brinzal , Tomato, Bhendi etc. His yearly income was Rs.1.75 lakhs. He grows Brinzal crop regularly in 1.0 acre of land particularly in two seasons. Unfortunately, He fetches severe yield loss mainly due to incidenece of shoot and fruit borer (Leucinodes orbonalis Guen.). The pest causes extensive yield loss up to an extent of 38 per cent. Despite serious nature of the pest, its management tactics by and large is limited to frequent sprays of chemical insecticide resulting in high cost of cultivation(Rs.37450/ha) and less control due pest resergence.

Under above circumstance, KVK ,Hirehalli has helped him adapt a new technology developed by IIHR,Bengaluru through front line demonstration during Kharif, 2013-14 i.e Biointensive management of Brinzal shoot and fruit borer viz., Erection of pheromone trap @ 1 for 400 sq.mts. (Lure changed once in 21 days), Release of T. chilonis @ 50,000/ha and Bt spray at peak flowering @ 1ml/L(two times). It was revealed that average shoot infestation was very low (4.89 %) compared to Check plot (28.90 %). The average fruit infestation of 12.65 per cent was recorded in demon. plot, where as check plot recorded the highest fruit infestation (33.65 %). The percent increase in marketable fruit yield(58.52 %) was higher in demon. plot over check with B.C ratio of 4.27. The net Returns was Rs.170160 compared to earlier returns of Rs.69890.

Mr.Hanumanthrayappa was very well convinced the above technology and spread the technology to the entire village as a ambassodor of KVK,Hirehalli. Now, nine farmers are practised the same technology covering 5ha in Kolihalli village.