



Enriching Farmers' Lives: **Bhoosamruddhi**

Enriching lives of millions of farmers across Karnataka: Bhoosamruddhi

Bhoosamruddhi a flagship initiative of GoK for establishing learning sites of scaling-up integrated and participatory research for development to benefit small and marginal farmers across eight districts of Karnataka.

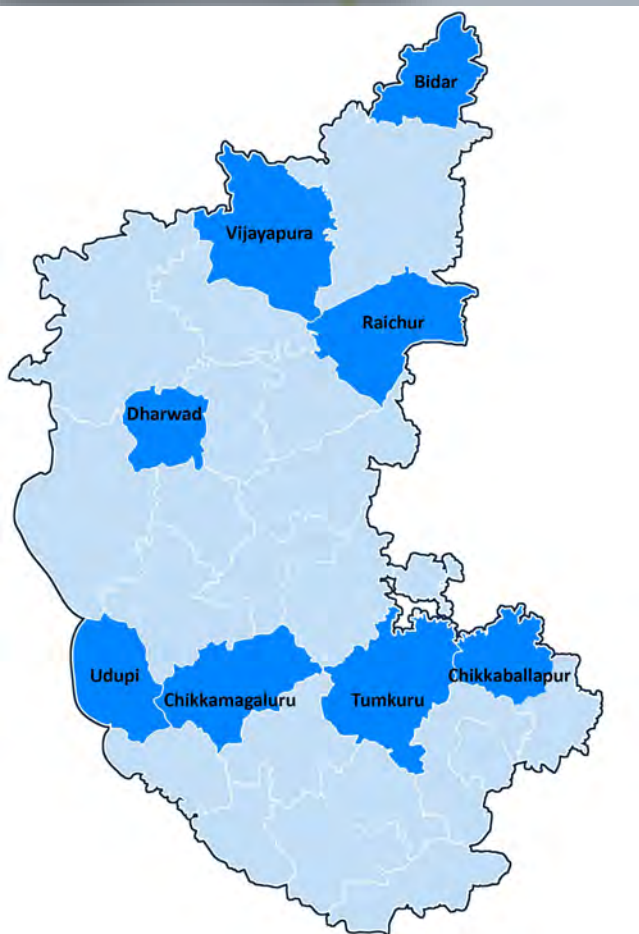


The Hon'ble Chief Minister, Govt. of Karnataka, in his 2015-16 budget speech, also announced that "Bhoosamruddhi initiative to be scaled-up in a phased manner to all the districts and Hon'ble Minister of Agriculture indicated that ICRISAT should provide technical backstopping for scaling-up Bhoosamrudhi in eight districts namely Tumkur, Chikkamagaluru, Raichur, Vijayapura, Bidar, Dharwad, Chikkabalapur and Udupi.

During the year 2015, forty thousand hectare area was covered in each of the four pilot sites with various innovative technologies at each pilot sites in the state which have shown good responses in terms of increased yield ranging from 17 to 35% increase as well as protecting the environment.



Objectives

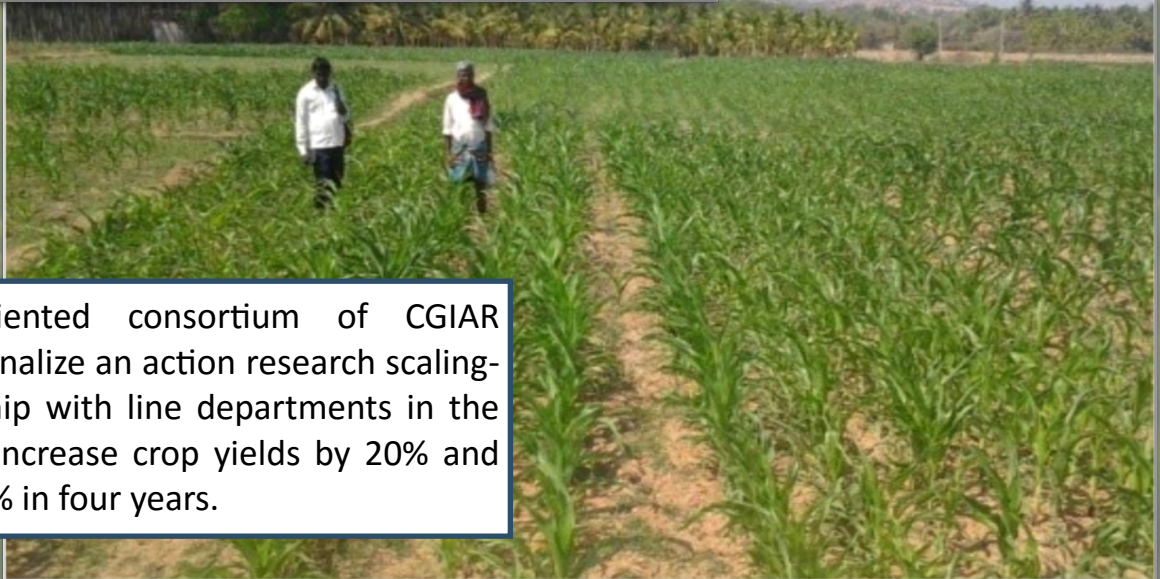


The specific objectives of this GoK-CGIAR initiative are:

- To establish four sites of learning pilot systems, to scale up approach integrated participatory research for development to benefit small and marginal farmers in irrigated and rainfed agriculture areas representing the revenue divisions in the state;



- To develop the capacity of agriculture related development agencies and researchers in the state to enhance the impact of the development programs through science-led support systems.



- To form action oriented consortium of CGIAR institutions to operationalize an action research scaling-up model in partnership with line departments in the state of Karnataka to increase crop yields by 20% and farmers' income by 25% in four years.

Consortium Approach

The consortium approach is adopted to harness the synergies of international research institutes (ICRISAT, IWMI, ILRI, IRRI, CIMMYT, IFPRI, ICARDA, AVRDC, NIHR), state agricultural universities (Bengaluru, Dharwad, Raichur, Shimoga), state horticulture university (Bagalkote), state university of Animal Husbandry & Fisheries (Bidar) and line-departments (DoA, WDD, DoAH, DoH, DoWR, DRD & PR, KSSC).



Strategy

The main strategy for this initiative is to achieve Convergence of the CGIAR research institutions with the GoK's line departments and the state agricultural universities (SAUs) and other academic institutions in the state to undertake the Participatory Research for Development (PR4D) to improve the livelihoods of small and marginal farmers in Karnataka.

Technologies Used

The Direct Seeded Rice (DSR) technology has been scaled-out in 8,000 ha (by 10,000 farmers) in Raichur and piloted in Chikkamagaluru and Tumkur sites. The DSR technology has shown on par or increased paddy yields with significantly reduced water usage as well as saving in time which has enabled timely sowing of 2nd crop.



Direct Seeded Rice

Soil Health Mapping



To understand soil nutrient status. Important soil parameters such as Organic Carbon, Available P, Available K, Ca, Mg, Zn, B, Fe, Cu, Mn and S were analysed.

Broad Bed and Furrow (BBF) with Drip



For *in-situ* soil and water conservation, improved land management i.e. Broad Bed and Furrow was piloted and drip irrigation system for enhancing water use efficiency was also implemented, resulting in increased crop yields by 15 to 20 % and saving of water.

Water Impact Calculator (WIC)



The water impact calculator, a generic decision support tool for efficient irrigation scheduling was demonstrated at Chikkamagaluru, Raichur, Vijayapura and Udupi that resulted in saving of 20 to 30 % water over calendar based scheduling.




With target to enhance productivity and adaptation to climate change scenarios, improved varieties of crops like groundnut, sorghum, castor, finger millet, pearl millet, pigeonpea, green gram, blackgram increased yields by 15 to 30 %

Improved Crop Cultivars

Rapid Aerobic Composting thru Microbes

With objective to enhance soil organic C and reduce dependence on chemical fertilizers, the recycling of on-farm wastes through accelerated decomposition by microbial consortia is promoted thru Aerobic Composting.



A woman in a green and blue sari and a man in a light blue shirt and turban are in a barn. The man is holding a white goat and feeding it from a bottle. The woman is standing next to him, looking at the goat. In the foreground, there are large, round, brown objects, possibly feed or manure, and a white bowl. The background is a simple, rustic structure.

To address fodder scarcity and enhance livestock based enterprises, high yielding fodder varieties like (Sorghum - CSH24MF, CSH 14; Maize – NK 6240) are promoted. As cattle fodder, multipurpose thornless Cactus is also being evaluated.

Feed & Fodder Security (Azolla, edible cactus and dual purpose cultivars)



Azolla as Feed supplement



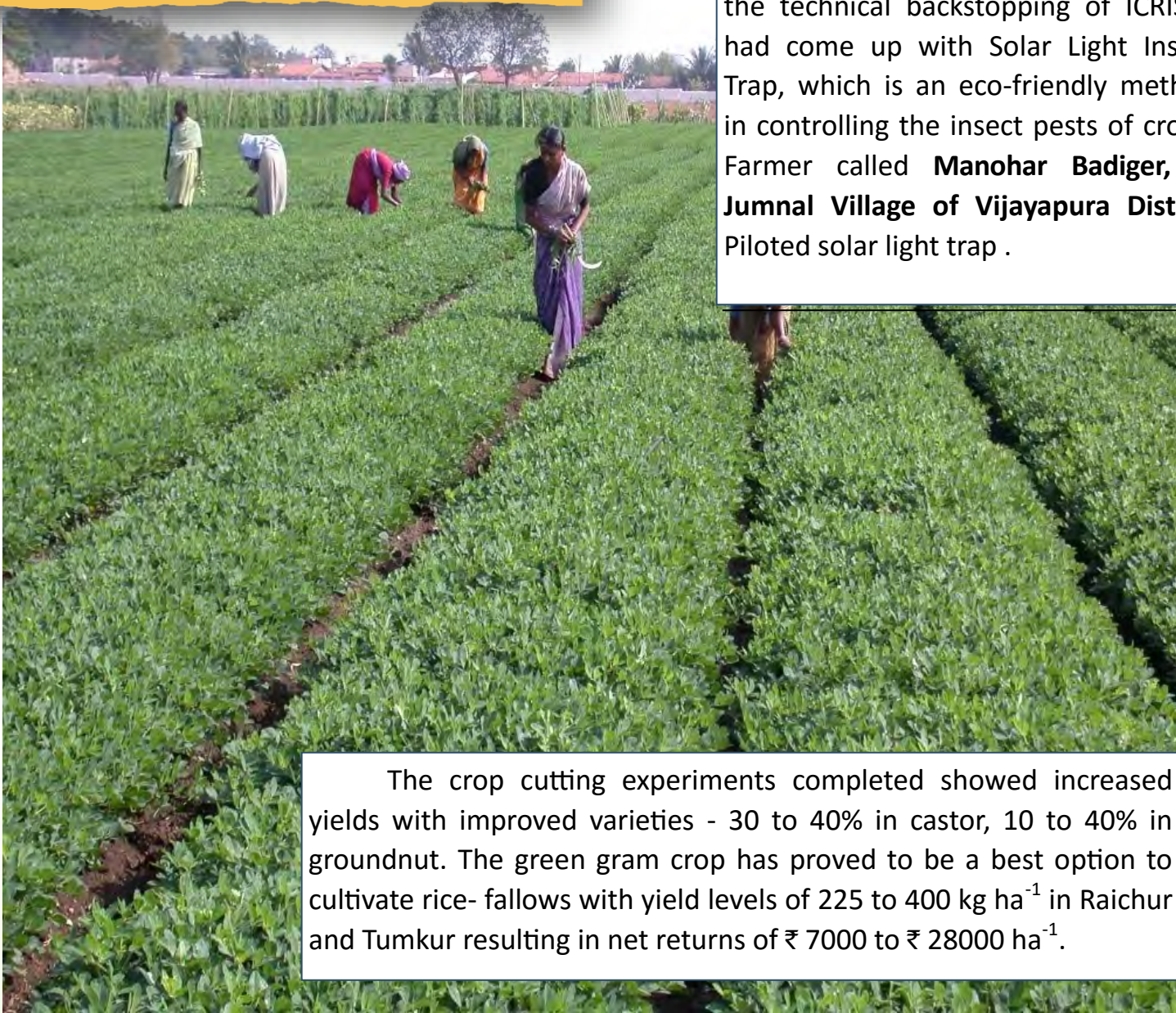
- Various other crop/weed extract, a source
- Spray, laser leveling,
- Weed management
- Insect-monitoring t
- Shredding machines
- Apart from the above
- For wastewater recy
- Tablet-based extens
- trainings, fields' day



site-specific important technologies piloted and showing benefits across the pilots are aquasap (source of nutrients and growth hormones)
zero tillage (along with machinery development, surface and sub-surface drip, through inter-cultivation and power weeder, relay planting (of maize in cotton) through pheromone traps
for biomass chopping – as fodder use and composting
e, good practices in vegetable cultivation, biomass generation through Gliricidia plantations.
cling, site has been selected where required
ion system, Krishi Gyan Sagar, farmer-farmer videos in addition to capacity building programs like
s including by CG centers



Positive Impact on Productivity



Department of Agriculture with the technical backstopping of ICRISAT had come up with Solar Light Insect Trap, which is an eco-friendly method in controlling the insect pests of crops. Farmer called **Manohar Badiger**, in **Jumnal Village of Vijayapura District** Piloted solar light trap .

The crop cutting experiments completed showed increased yields with improved varieties - 30 to 40% in castor, 10 to 40% in groundnut. The green gram crop has proved to be a best option to cultivate rice- fallows with yield levels of 225 to 400 kg ha⁻¹ in Raichur and Tumkur resulting in net returns of ₹ 7000 to ₹ 28000 ha⁻¹.



A single light trap can control the population of insects up to 2.5 acres radial area from the center of installation. It very efficiently attracts adult flying insects and kills them, thus abruptly stopping the reproduction of these insects and also control their population”, said the farmer.

The farmer used to spend Rs.15000 towards the purchase of insecticides before the installation of the light trap and this year, he saved that amount.

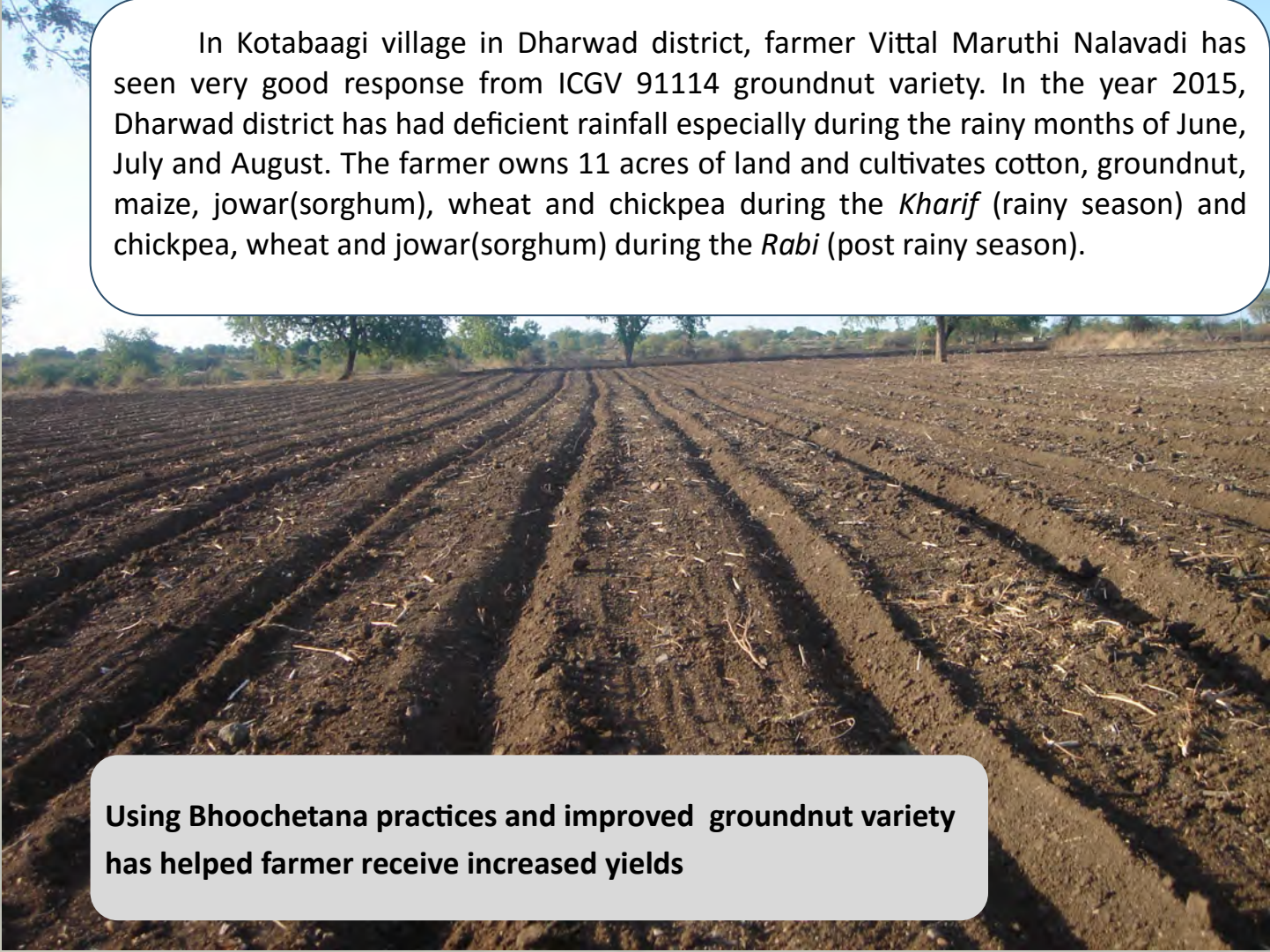


Solar light trap being inspected by DoA officials

Success Stories in Pictures

ICGV 91114 groundnut variety scripts yet another success story

In Kotabaagi village in Dharwad district, farmer Vittal Maruthi Nalavadi has seen very good response from ICGV 91114 groundnut variety. In the year 2015, Dharwad district has had deficient rainfall especially during the rainy months of June, July and August. The farmer owns 11 acres of land and cultivates cotton, groundnut, maize, jowar(sorghum), wheat and chickpea during the *Kharif* (rainy season) and chickpea, wheat and jowar(sorghum) during the *Rabi* (post rainy season).



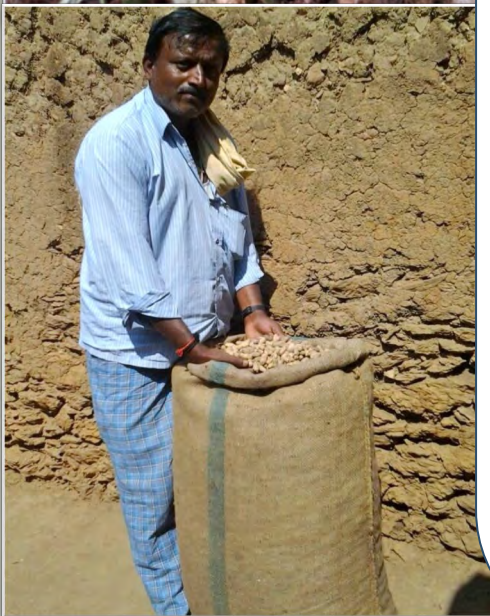
Using Bhoochetana practices and improved groundnut variety has helped farmer receive increased yields

In the year 2015, the farmer was convinced by ICRISAT officials to implement sowing of ICGV 91114 in his field and with the failure of the monsoon, he was ready to try his luck. For one acre, the farmer applied 10 kg of zinc sulphate, 250 kg of gypsum and 1 kg of borax. He also applied 4 truck loads of farm yard manure and one 50 kg bag of DAP as fertiliser.



In the earlier years with adequate supplemental irrigation of two times/ crop, he would receive only 5-6 quintals/acre. With the present variety he received 8-9 quintals/acre.

Having incurred a total expenditure of ₹ 15,000 for cultivation of the crop, the farmer has stored the groundnut and is waiting for a better price in the market. The present price is ₹ 4500/ quintal and the farmer said that he would sell the produce as soon as the price reaches ₹ 6000/quintal. With the prospect of increased income from the new variety, the farmer is extremely happy with the outcome and says that the extra income would encourage him to use this variety in the following year as well.



GBM 2 variety of Chickpea Scripts Success

Despite deficient rainfall in the year 2015, chickpea GBM 2 variety has yielded higher returns for farmer



In the previous years, the farmer used local variety and obtained yields of only about 4-5 quintals even with good rainfall. This year, despite failed rains, the farmer with GBM 2 variety managed to get a yield of 5 quintals using farmers method and 6 quintals using the BBF methods. The farmer also used 5 kg of zinc sulphate and 2.5 kg of borax as micronutrients.

The farmer is extremely happy with the new variety and said that micronutrients and the new variety prescribed to him through the Bhoosamruddhi program have helped him save his crop in the year 2015.

Shantappa Devappa Dindikopu, a farmer from Garag village in Dharwad district cannot be happier in the year 2015. The failed monsoon has accounted for low crop yield across the district. The farmer after initial hesitation decided to try the GBM 2 variety of chickpea after government officials and ICRISAT staff convinced him about the new variety under the Bhoosamruddhi program.

Government officials, ICRISAT staff and farmers observing farmer field day for Chickpea GBM 2 variety crop



Magnetic water conditioner to improve water quality and enhance crop yields

Vijayapura District is mainly composed of black soils and the main source of irrigation is open wells and tube wells. This water contains salts which makes the pH of water alkaline in most of the places.

Comparison of salt accumulation on soil surface in magnetic water conditioner treated and untreated plots of capsicum.





Magnetic water conditioner has helped reduce the excessive salts in the water and has enabled increase of nutrient absorption in plants



Due to this factor, the nutrients given to the plants through fertigation were not available to the plants due to the presence of salts in water which reduced the nutrients absorption capacity of the plants. To solve this problem, Department of Agriculture and ICRISAT promoted a new technology of magnetic treatment to water and the device is called a Magnetic Water Conditioner.

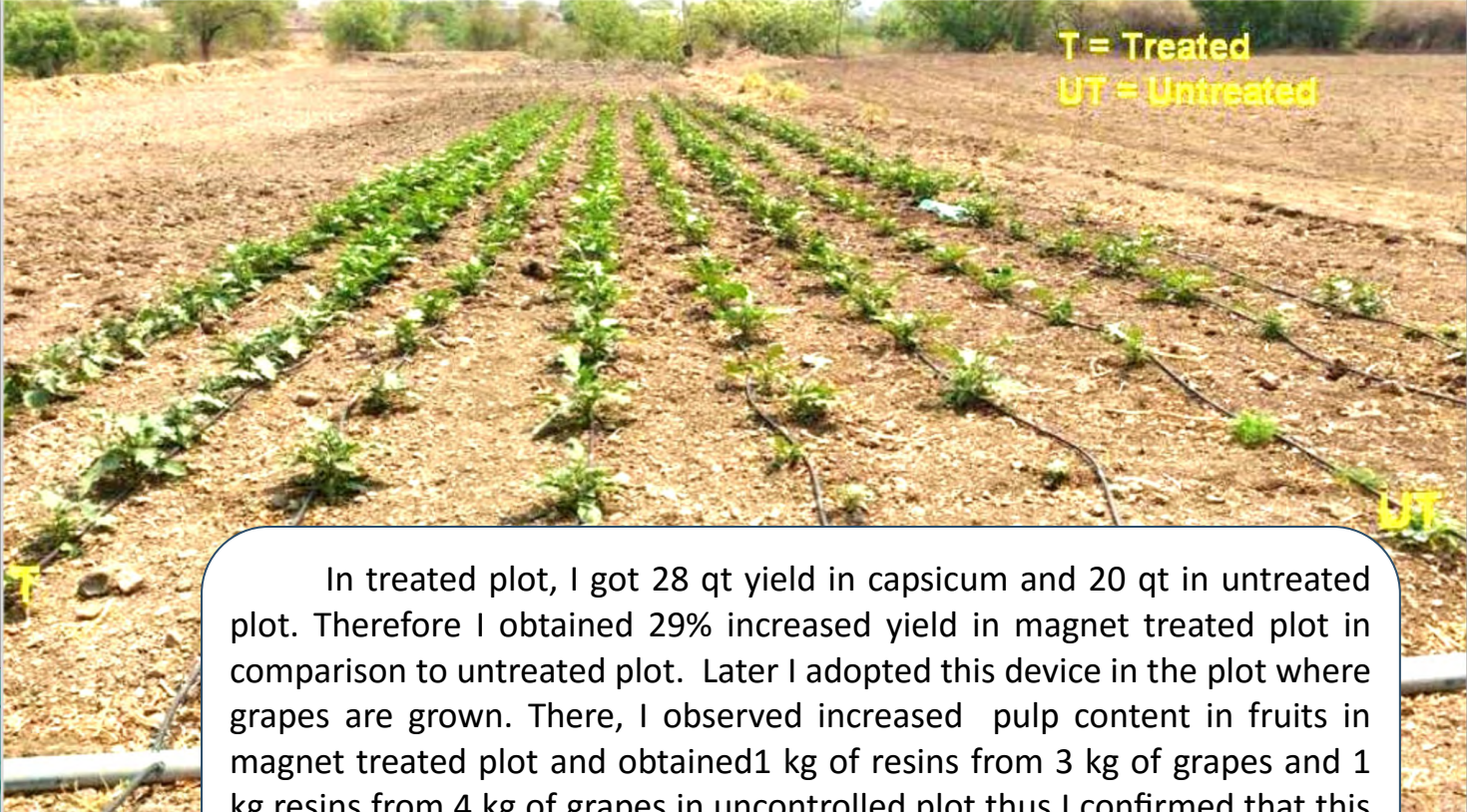
FARMER: ***Mr. Manohar Badiger*** who used the technology in his field, observed that in magnet treated plots, the crop growth, fruit size and color were more vibrant in comparison to the untreated plot. I have given less amount of fertilizer through fertigation to magnet treated plot than untreated plot. I have saved 30-40 % of fertilizer which I used to use in the past and 25% irrigation water.



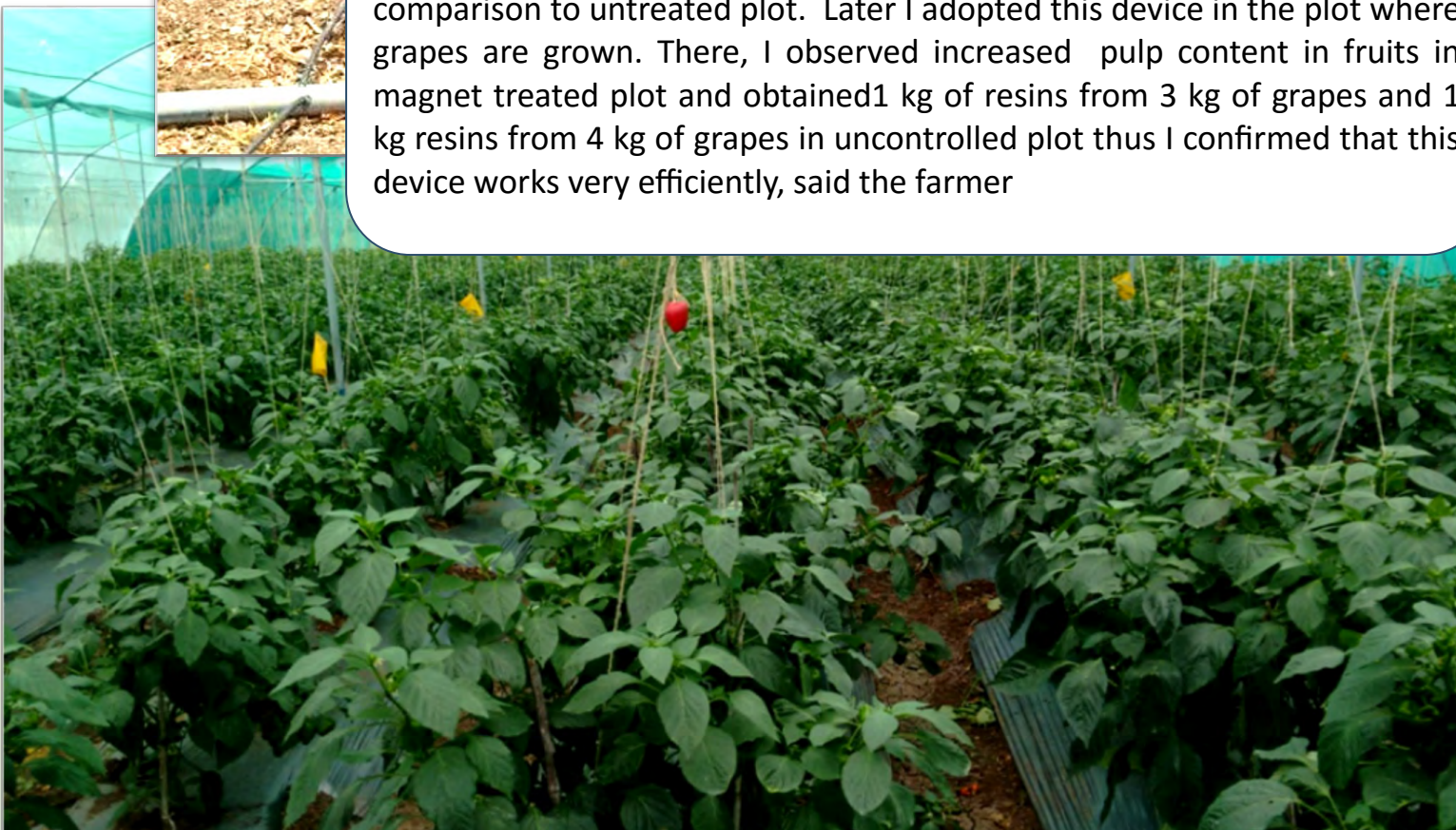
Treated

Untreated

T = Treated
UT = Untreated



In treated plot, I got 28 qt yield in capsicum and 20 qt in untreated plot. Therefore I obtained 29% increased yield in magnet treated plot in comparison to untreated plot. Later I adopted this device in the plot where grapes are grown. There, I observed increased pulp content in fruits in magnet treated plot and obtained 1 kg of resins from 3 kg of grapes and 1 kg resins from 4 kg of grapes in uncontrolled plot thus I confirmed that this device works very efficiently, said the farmer



Participatory evaluation of Maize Hybrids

Lakkamanahalli lies 25 km east of Chikkamagaluru. The climate here is typically dry, with gravelly soil and poor inherent physical and chemical environment. P 30 B 07 was found promising in the area as it recorded the highest yield (6.7 t ha^{-1}) followed by 25 K 55. Hybrids such as K 3059, GK 3090 etc. were also promising, while other hybrids proved significantly inferior.



In general, yields were low. The economics of the farmers' traditional practices vs improved method of raising crops were compared. The improved method yielded ₹ 96,000 ha⁻¹, while the farmers' practice generated only 69,600 ha⁻¹



Hon'ble Minister for Agriculture, Shri. Krishna Byregowda held In-field interaction with Scientist and officials on participatory evaluation of Maize hybrids in Emmedoddi village, Kadur Taluk.

After considering the cost of cultivation in both methods, there was a net increase of ₹22,878 ha⁻¹. An average yield increase of 150-200 kg ha⁻¹ was observed. With 1.15 m ha area under maize in the state, it follows that adopting new production technology can contribute significantly to yields and revenues. Assuming a conservative yield of 100-150 kg ha⁻¹, an additional yield of 0.115 to 1.15 m t can be achieved, thus contributing ₹ 144 crore to the state.

Besides savings and increased farm gate income, farmers were educated about balanced and target based fertilization techniques. Farmers were advised on CA-based resource conservation technologies to achieve higher and long-term sustainable yield through laser guided leveling, zero tillage and residue management, besides site-specific management options for food security.

Recycling of Cotton/ Pigeonpea waste through Aerobic Composting Method

The method of composting crop stalks is a natural way of recycling organic materials back into the soil and generating vital nutrients for new plant growth. This is one of the best ways to build soil fertility. Staff from ICRISAT and DOA staff created awareness about the production of compost from cotton/pigeonpea stalk by using a tractor operated shredder for chopping stalks and then using Madhyam culture for preparing the compost unit.



Mr Dharmareddy was extremely interested in adopting this technology and chaffed a 0.4 ha cotton/ pigeonpea field for the purpose. Within 65-75 days, he got nearly 1.5 t of compost worth ₹ 4500. Prior to this, he used to purchase compost for about ₹ 3000 t⁻¹. This experience showed the vast potential of utilizing cotton stalk for production of compost. This compost is rich in plant nutrients, including micro and secondary nutrients, while also taking much less time (2-2.5 months) than other methods (6-9 months). Besides him, more than 100 farmers in Idapanur have adopted this method of composting.



Composting using tractor operated shredder and Madhyam culture has helped improve soil fertility

Summary

The Government of Karnataka and Department of Agriculture decided to launch the Bhoosamruddhi program initially in four districts of Vijayapura, Chikkamagaluru, Raichur and Tumkur on pilot basis in an area of 10000 ha and increasing to 80,000 ha by fourth year in each district by converging ongoing schemes of Agriculture & allied departments including fisheries, horticulture and animal husbandry.

During the year 2015, forty thousand hectare area was covered in each of the four pilot sites in the state which have shown good responses in terms of increased yield ranging from 17 to 35% increase as well as protecting the environment.

With the success with four districts, the project has further been extended in four more districts and is currently also being implemented in Bidar, Udupi, Chikkaballapur and Dharwad district by converging ongoing schemes of Agriculture & allied departments.

