AGRIALLIS
Science for Agriculture and Allied Sector: A Monthly e Newsletter
Volume 1 – Issue 5
Online ISSN: 2582-368X
www.agriallis.com

ADVANCED CITRICULTURE IN VIDHARBHA REGION OF MAHARASHTRA: A CASE STUDY OF SUCCESSFUL ADOPTION OF TECHNOLOGIES

Article Id: AL201933

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Citrus is one of the major fruit crops in India. The citrus group includes Mandarins like Nagpur Mandarin, Kinnow, Darjeeling and Coorg Mandarin; Sweet Orange like Mosambi; Acid Limes and Lemons like Assam and Baramasi Lemons. According to the Horticulture Statistics Division of Ministry of Agriculture and Farmers' Welfare (2016-17), India produced 12.04 million tons of citrus in 0.94 Mha area with a yield of 12.75 tons/ha (GoI, 2017). Central India has ideal growing conditions for citrus and Vidharbha region produces bulk of the fruit. To provide impetus to the citrus cultivation of Central India, ICAR-CCRI was established (formerly NRCC) in 1985 in Nagpur and till date, this premiere institute is functioning with the motto of increasing the overall citrus production and productivity through high tech citriculture in the country (http://www.ccringp.org.in/ccringp/). The scientists through their rigorous research have developed revolutionary technologies which have changed the scenario of citrus cultivation in India over the years. The improved rootstocks, disease free planting material, high yielding and early maturing varieties, disease resistant rootstocks, microbial consortiums, recommended dosages of nutrient, protective chemicals and irrigation, nursery management and post harvest handling techniques have been standardized by the institute and disseminated to farmers who have immensely benefitted. Often the technologies developed by research institutes remain confined to experimental farms and laboratories. These technologies are not adopted by farmers and over the time, tend to lose significance. But the technologies which make their way to a farmers' field and generate remunerative income for them, bring pride and glory not only to the farmer but also to the research institute. One

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such case of successful adoption of CCRI technologies have been done by a progressive citrus grower of Kandli village of Achalpur taluka of Amravati district of Maharashtra, named Shri Pramod Jagannath Washankar.

Progressive Farmer: Shri Pramod Jagannath Washankar

Shri Washankar is a progressive farmer of 58 years of age who owns and manages citrus orchard of around 60 acres located near the Satpuda Hill region. With an experience of more than 19 years in citrus farming, he expresses his heartfelt thanks to CCRI whose technologies have helped him to improve his farming in scientific manner and fetch better income. He works in his orchard everyday for 8-9 hours, assisted with 5 labourers, taking care of about 6000 trees. His primary occupation is farming which has been his family occupation since ages. His father established citrus orchard in 1985 which had been handed over to him from year 2001.

Fig. 1: Mr. Washankar: the progressive citrus grower

Contact with CCRI

Way back in 2001 when Mr. Washankar involved himself in citrus farming, he came to know about CCRI and its activities through an acquaintance at Punjab Rao Deshmukh Krishi Vidyapeeth. From then there was no turning back. He improved his orchard's production and productivity by adopting the institute's technologies. To solve any major problem, he consults the scientists of CCRI. Most of the scientists of this institute are frequent visitors to his orchard. His orchards are an excellent showcase of improved technologies of CCRI.

Technologies Adopted

Shri Washankar has adopted several improved technologies of CCRI with great enthusiasm and has been receiving positive results.

- **Rootstocks and Nursery Management:** Shri Washankar prepares his own plants in his net house nursery in an area of 1 to 1.5 acres. He has adopted several types of

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rootstocks like Rough lemon, Sekhwasha, Trifoliate, Rangpur Lime and Alemow for cultivation of Nagpur Mandarin. Alemow is a promising rootstock which has been developed by CCRI through years of rigorous research. He has also grafted Mosambi and Acid Lime on Alemow. Mr. Washankar prepares his planting materials in plastic bags with growing media composed of soil, FYM and sand.

- **Cultivars and Varieties:** Most of the cultivars and varieties developed by CCRI are being cultivated with success by Mr. Washankar. They include NRCC-7, NRCC-4, Grape fruit, Pummelo, Blood Red, Cutter Valencia. Brazilian sweet orange varieties like Hamlin, Pera, Natal and Indian varieties like Jaffa and Katol Gold are also to be seen in his orchard.
- **Orchard Management:** Mr. Washankar maintains hygiene in his orchard by discarding fallen and infected fruits, barks etc. He removes the dead wood every year which is very essential to prevent citrus decline. He does pruning every alternate year in his trees, in November-December for *Ambia* flush and in March for *Mrig*. While planting of saplings from nursery to orchard, he treats the roots of saplings with fungicide. He maintains proper spacing while planting (about 5mx5m). He also practices high density planting of Nagpur Mandarin with about 240 trees per acre.
- **Irrigation management:** Shri Washankar's orchards are irrigated through drip irrigation method. Compared to traditional method of irrigation in citrus crop, drip saves 61 per cent water and gives an increase of about 50 per cent in yield. For inducing flowering, Mr. Washankar maintains in his orchards, a water stress period of about 30 days from mid Dec to mid Jan in *Ambia* flush of Nagpur Mandarin and again of 30 days from 2nd week of May to 2nd week of June in *Mrig* flush.
- **Nutrient Management:** Mr. Washankar follows the CCRI recommended doses of nutrient fertilizer 4 times a year to *Ambia* and *Mrig* flush trees. For *Ambia* he applies in Jan, April, June and end of August. For *Mrig* flush he applies in Sept, Oct, Nov, Jan, June. Depending on the quantity of bearing he keeps on changing the fertilizer doses but it basically consists of 1.75 kg DAP, 750 gm 10-26-26, 1 kg potash and 1kg ammonium. He also nourishes his trees with micro nutrients consisting of Zn, Fe and Borax.
- **Plant Protection:** Mr. Washankar follows CCRI recommended doses of fungicides for prevention of gummosis in citrus. For management of insect pests, he follows

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the same for insecticides. He has also installed fruit fly traps and sticky traps in his orchard mainly for reducing the application of chemicals. Once in 2004 due to *Kolshi* (Black Fly) attack in his orchard, he had suffered huge economic loss. He was able to recover his orchard back with the expert consultation of eminent entomologists of CCRI.

- **Harvest and Marketing:** When the fruits reach their maturity standards, Mr. Washankar handpicks them with utmost care. The fruits are graded and packed in cartons and loaded on trucks which take them to Paratwada waxing plant. The charges for waxing are Rs. 20 per carton. Thereafter agents from different states and even abroad purchase his fruits. Mr. Washankar supplies Mandarins to markets in Ahmedabad, Delhi, Pune and Kerala. His fruits also fetch good prices in markets of Bangladesh.

Production and Profits after contact with CCRI

Mr. Washankar at present makes a profit of around Rs. 10 lakhs annually. He expresses his sincere thanks to the highly productive and disease resistant rootstocks of CCRI like Alemow and improved cultivars which have helped him to achieve this target. Before his contact with CCRI he states that his income was merely around 1 lakh with trees having very poor bearing and infected by diseases.

Farmer led Innovation

By farmer led innovation we mean innovations done by the farmer in his own level to tackle a problem situation in his field. Mr. Washankar is no less in that. When he found a Nagpur mandarin tree was in its dying stage, he side grafted it with Alemow plant and now the Mandarin plant stands tall and sturdy bearing fruits by virtue of the healthy Alemow rootstock. It was inevitable a mastery of horticultural practice which Mr. Washankar had attained through his years of experience.

Constraints

When asked about the constraints which Mr. Washankar faces as a citrus grower, he says that the major constraint is attack of *Wayvar* in citrus fruits of the region. It causes decline in citrus production. The second main constraint is of depletion of ground water level. Even borewells as deep as 175 ft does not fetch water in the region of Satpuda Hills.

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Fig 2: Mr. Washankar inspecting the quality of fruits

Awards and Recognitions

In spite of natural constraints like erratic weather, insect or disease attack resulting in production fluctuations, Mr. Washankar has managed to prove his excellence as a progressive citrus farmer of Amravati district. He says that his contact with CCRI has helped him to achieve it. He was felicitated in Maharashtra State level Farmers' Meet organized by State Department of Agriculture and Animal Husbandry in Akola in June, 2004. He was also felicitated in National Citrus Meet organized by CCRI (then NRCC) in Nagpur in August, 2013 for his enormous contribution in citriculture. He had also attended the National Meet of innovative Horticultural Farmers organized by IIHR, Bangalore in 2014. He is also a member of the Farmer Producer Company in his Taluka which has about 250 registrations from farmers. He is also the Chairman of *Seva Sahkari* Society in his village which is funded by Amravati District Cooperative Bank and grants loans to farmers.

Future Aspirations

Mr. Washankar is enterprising and curious learner even at this age. He says that if given opportunity and required facilitation, he would like to venture into the world of citrus processing and export. Along with that he also wants to try new varieties and rootstocks tested and approved by CCRI.

Fig 3: Mr. Washankar with ICAR-CCRI Scientist Dr. R.K. Sonkar visiting his orchard

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Farm Family

Apart from being a citrus grower, Mr. Washankar is a loving and caring father who has always given equal opportunities to his daughter and son without any gender discrimination. His daughter is a mechanical engineer working in Oman and his son is preparing for NEET examination as a medical aspirant. His wife is involved in vegetable farming which she takes care herself and the produce is sold in the market. All the decisions regarding the seasonal vegetable to be grown and in how much area, all are taken by his wife. This reflects the individual roles which each family member in this particular farm family has.

Conclusion

Both Mr. and Mrs. Washankar are trying their best to contribute towards the food and nutritional security of the nation. About 58 per cent of India's population is dependent on agriculture as an occupation and whole of the nation of 1.2 billion is dependent on farmers for food security. Agricultural scientists are working rigorously to provide better technologies and livelihood opportunities to farmers. The Hon'ble Prime Minister of India has already declared Doubling Farmers' Income by 2022 as a target to be achieved. And the success story of Mr. Washankar increasing his income by adopting CCRI technologies is a reality. So it is now time that farmers and research institutes work in close coordination to identify research problem from field, solve it in laboratories and take the solution back to farmer through a Farmer Back to Farmer Model. Meanwhile research institutes through their encouragement to enthusiastic farmers like Mr. Washankar will continue creating new success stories.

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