Annual Progress Report

August 2019- July 2020

Doubling Farmers' Incomes through Grafted Vegetable Seedlings

Submitted to the
Department of Horticulture
Government of Andhra Pradesh

IDC ICRISAT DEVELOPMENT CENTER

ICRISAT INTERNATIONAL CROPS RESEARCH INSTITUTE FOR THE SEMI-ARID TROPICS

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Executive summary

The COVID-19 pandemic and the consequent nationwide lockdown brought to a halt livelihood opportunity across all sectors. Even though the central and Andhra Pradesh state governments relaxed rules on conducting some activities in the agriculture sector, this has not happened due to fear and the district administration's re-imposition of restrictions on travel and other activities in certain areas. This completely derailed the summer demonstration in farmers' fields and strategic experiments at ICRISAT this year. Given the current situation and time frame, it has become imperative to quickly start the activities by using available resources and support from local institutions, private partners, and the Department of Horticulture (DoH). Thus, ICRISAT organized an online meeting of officials from the DoH and other stakeholders to review, update and monitor the project interventions, with the focus being on achieving the target of producing over 4 lakh grafted vegetable seedling and over 8 lakh non-grafted vegetable seedlings from March to July 2020. Besides this, efforts were concentrated on capacity building of field staff and farmers.

Background

Andhra Pradesh produces about 19.88 million MT of horticultural produce from 1.4 m ha, accounting for 6.74% of the country's horticultural produce. Total vegetable production stands at 5.35 m MT from 0.2 m ha. The State ranks fourth in the production of loose flowers (1.40 m MT), which is about 8.49% of the total production (Horticultural Statistics at A Glance 2017: GoI and MoAFE).

Andhra Pradesh is home to one of the largest vegetable clusters in the world, located in the Madanapalle in Rayalaseema. The region is afflicted by soilborne diseases and decreasing yields due to salinity and high temperatures. Most small and marginal farmers in the region are hardworking and open to modern practices like drip irrigation. However, for some time now, they have been plagued by increasing input costs and stagnating yields, rendering cultivation non-remunerative. The State's Horticulture Department views the introduction of grafted vegetable seedlings of high-value crops as a way to counter these factors in order to improve the livelihoods and incomes of farmers. The new global trend of grafting vegetable seedlings enables intensive and continuous production, higher yields and boosts farm productivity.

The Department of Horticulture is focused on transforming the highly drought-prone Rayalaseema region into a horticulture hub of the country, for which it leverages the Centre of Excellence (CoE) facility and infrastructure in Kuppam.

Scope

Since the 1920s, Japan and Korea have been using grafting as an alternative approach in vegetable production to fight soilborne diseases such as Fusarium wilt, bacterial wilt, and nematodes. The method was later used for commercial production and adopted by many countries in Europe, the Middle East, Northern Africa, Central America, and parts of Asia. Grafted seedlings can be used to produce fruit-bearing vegetables like watermelon, cucumber, melon, tomato, eggplant, and pepper. Apart from providing resistance against biotic/abiotic stresses, the seedlings increase yields of cultivars.

Objectives

1. To establish a hi-tech grafted seedlings nursery for solanaceous and cucurbitaceous vegetables through the Centre of Excellence facility at Kuppam;
2. To establish a cluster of 600 ha to grow grafted vegetable seedlings in the Rayalaseema region during three cropping seasons;
3. To provide technical support and guidance with documentation to cluster farmers to increase productivity; and
4. To build awareness and capacity: Train 1200 farmers in seedling grafting and conduct six farmer exposure visits-cum-field days.

Consortium partners and institutional arrangements

To implement this project in mission mode, a Public-Private-Partnership consortium approach was followed, comprising of the following and partners:

- International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) to facilitate improved technologies to all stakeholders;
- Department of Horticulture, Andhra Pradesh; and
- Heirloom Seedlings and Plants Pvt. Ltd.

Strategy

The main purpose of the initiative is to enhance the incomes of vegetable farmers in the Rayalaseema region of Andhra Pradesh and develop 'sites of learning' in together with the Department of Horticulture, Government of Andhra Pradesh and experts in the field of hi-tech vegetable cultivation. The project has made efforts to link available state and national schemes to the grafting technology to further popularise and scale it out. The project has adopted a participatory Research for Development (PR4D) approach to help improve the livelihoods of small and marginal farmers.

The salient features of this novel initiative are as follows:

- Build partnerships with experts in grafted vegetable cultivation and harness synergies to benefit farmers through a science-led development strategy built on experiences gathered during the Bhoochetana and Rythu Kosam projects in Andhra Pradesh.
- Make concentrated efforts to harness the benefits of scientific developments and convert them into increased investments and impacts through scaling up.
- The pilot sites will be 'Sites of Learning' and the project will adopt the principle of 'Seeing is believing'.
- As consortium lead, ICRISAT will together with the DoH, strive to develop the capacity of all the partners in achieving systemic change in using grafting technology.
- Best-bet practices such as scientific crop management and pest management will aid the project's long term sustainability. The convergence of activities of the Department of horticulture (DoH) will ensure increased resource availability and efficiency.
- The Commissioner (Horticulture), Government of Andhra Pradesh, will be the chair of the State Coordination Committee (SCC), which will include decision makers from ICRISAT, and will meet regularly to ensure smooth convergence of activities.

Update on project activities

Owing to the lockdown as a result of the COVID-19 pandemic, project activities were disrupted. Given the current situation and the time left for the summer interventions, it has become essential to continue the flow of agreed activities using available resources, manpower, and support from local institutions and private partners. Given the rapport with farmers and stakeholders, active support from DoH, Government of Andhra Pradesh, and web-based meetings and training, the agreed work plan was successfully implemented in the target districts.

1. Establishment of clusters of vegetable growers

As agreed in the project, grafted and hybrid seedlings of different vegetable crops were raised at the facility of the Centre of Excellence (CoE) for vegetables and flowers at Kuppam in Chittoor district, which was created with support from Indo-Israel agriculture projects. Four different types of protected structures were used for the production of the vegetable seedlings.

a) Production of grafted vegetable seedlings

The project aims to achieve the target of growing grafted vegetables on 400 ha for farmers in the Rayalaseema region during three-year project period. ICRISAT, the DoH and Heirloom plants Pvt Ltd identified vegetable farmers from different districts of Andhra Pradesh to promote the use of grafted seedlings. In order to create "sites of learning", the villages of Kuppam, Ramakuppam, Vasanadu, Gundupalle, and Daseganuru in the vicinity of the CoE were chosen and grafted seedlings of vegetable crops were provided to the farmers there. Farmers were also given handholding support in terms of after care and management practices by DoH, ICRISAT and the partner. The beneficiary farmers observed less pest and disease incidence and recorded significant yields over non-grafted seedlings (Table 1). The gains accrued from cultivating grafted vegetable seedlings ranged from 20-150% compared to the traditional/earlier practice in different crops and with different management practices (Annexure I). During 2019-20, the grafted seedlings were shared with farmers of 14 blocks in 9 districts of the State (Annexure II).

Table 1. Details of the area over which the grafted and non-grafted seedlings of crops were grown (acres) and their production.

Sl. No.	Crop	Grafted seedlings		Non-grafted seedlings	
		Total seedlings produced in 2nd year	Approx. area covered (acres)	Total seedlings produced in 2nd year	Approx. area covered (acres)
1	Tomato	156,859	20.91	918,734	122.50
2	Brinjal	109,821	14.64	248,500	33.13
3	Bitter gourd	52,656	14.23	46,774	12.64
4	Bottle gourd	32,424	8.76	3,057	0.83

5	Cabbage	-	-	34,822	1.39
6	Capsicum	6,319	0.53	15,893	1.32
7	Chilli	-	-	573,732	47.81
8	Drumstick	20,264	20.26	1,643	1.64
9	Marigold	-	-	67,850	2.71
10	Ridge gourd	3,315	0.90	7,902	2.14
11	Snake gourd	-	-	550	0.15
12	Watermelon	-	-	21,160	5.72
13	Snake gourd	3,961	1.07	-	-
14	Pumpkin	475	0.13	-	-
	Total	386,094	80.2	1,940,617	232.0

As against a modest achievement of around 85,000 seedlings during the first year (due to several constraints), the project did remarkably well by producing 3.9 lakh grafted seedlings during the second year, covering close to 250 farmers. There was a demand for seedlings from farmer beneficiaries in different districts. Moreover, over 2 lakh non-grafted seedlings produced at the CoE facility using improved vegetable crop seeds benefitted over 400 farmers over an area of 232 acres. Both grafted and non-grafted seedlings are being provided to farmers at a subsidy through a convergence of state and national schemes.

b) Demonstration of new crop varieties

Considering the wider scope of this project, the yield potential of new varieties of high value crops such as purple cabbage, pumpkin, small pumpkin, vegetable soybean, purple corn, etc., under polyhouse and open field conditions was demonstrated to farmers at the COE facility (Table 1). These demonstrations were conducted in the CoE facility to explore the venue as a training option for nearby farmers.

2. Technical backstopping and documentation

The project is being carried out at two locations -- CoE, Kuppam, Chittoor and at ICRISAT, Hyderabad -- to generate knowledge on best management practices and make the best quality of planting material available to farmers.

a) Generating and sharing knowledge with stakeholders

Since the emphasis was on educating farmers, stakeholders and policymakers on the importance of grafted seedlings and their management, technical pamphlets in the local language Telugu were designed and shared with the beneficiary farmers in the pilot sites (Figure 1). The scientific grafting of tomato, chilli, brinjal, capsicum and bitter gourd were covered in detail, focusing on an integrated approach involving nutrient and pest management. The pamphlets, which were also made available at the CoE for farmers on exposure visits, also contained detailed information on

grafting technology, soil and bed preparation, seedling spacing, fertigation scheduling, etc.

అంటు కట్టిన నారు తో టమాటో సాగు

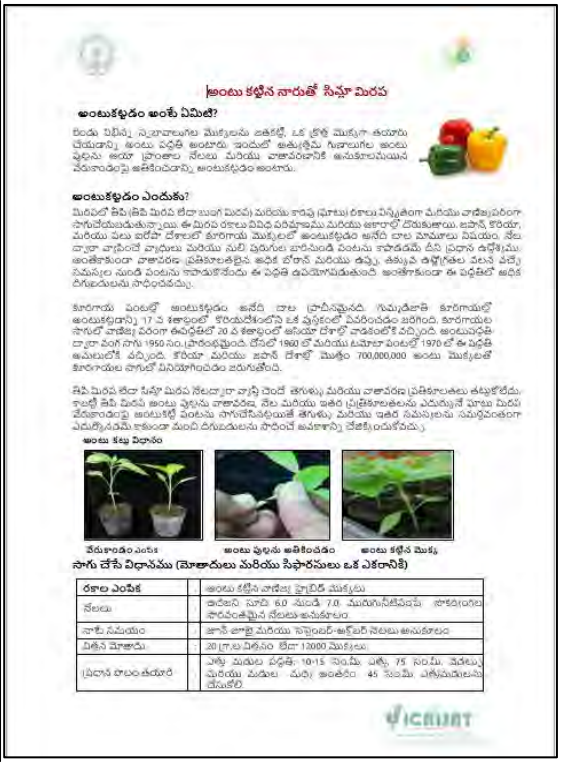
అంటుకట్టడం అంటే ఏమిటి

అంటుకట్టడం ఎందుకు?

అంటు కట్టు విధానం

సాగు చేసే విధానము (మోతాదులు మరియు సిఫారసులు ఒక ఎకరానికి)

మొక్క రకం	అంటు కట్టిన నువ్వర జాతి రకాలు
నేలలు	నీరు నిలువని సారవంతమైన మరియు ఉదజని సూచిక 6 నుండి 7 వరకు గల నేలలు అనుకూలం
నారు సమయం	[illegible]
నారు మొత్తం	7500 మొక్కలు
వైపాన పాలు తయారీ	ఎత్తు మడులు 10 - 15 సెమీ ఎత్తు, 75 సెమీ వెడల్పు, 45 సెమీ మడత
సేంద్రియ ఎరువులు	10 టన్నులు పశువుల ఎరువు గుంటలలో చేయాలి



అంటు కట్టిన నారుతో సిమ్లా మిరప

అంటుకట్టడం అంటే ఏమిటి?

అంటుకట్టడం ఎందుకు?

అంటు కట్టు విధానం

వేరుకాండం ఎంపిక | అంటు పుల్లను అతికించడం | అంటు కట్టిన మొక్క

సాగు చేసే విధానము (మోతాదులు మరియు సిఫారసులు ఒక ఎకరానికి)

రకాల ఎంపిక	అంటు కట్టిన వాణిజ్య హైబ్రిడ్ మొక్కలు
నేలలు	ఆదజని సూచిక 6.0 నుండి 7.0 మురుగునీటిపారుదల సౌకర్యంగల సారవంతమైన నేలలు అనుకూలం.
నారు సమయం	జూన్ జూలై మరియు సెప్టెంబర్-అక్టోబర్ నెలలు అనుకూలం
నాటిన మోతాదు	20 గ్రాం విత్తనం లేదా 12000 మొక్కలు
ప్రధాన పాలు తయారీ	ఎత్తు మడుల పద్ధతి: 10-15 సెంమీ. ఎత్తు, 75 సెంమీ. వెడల్పు, మరియు మడుల మధ్య అంతరం 45 సెంమీ ఎత్తుమడులను చేసుకోవాలి

అంటు కట్టిన నారుతో వంగ సాగు

అంటుకట్టడం అంటే ఏమిటి?

అంటుకట్టడం ఎందుకు?

అంటుకట్టుట ఎలా జరుగుతుంది?

అంటుపుల్ల ఎంపిక | క్లిప్ ఉపయోగించి వేరు కాండం మీద అంటుపుల్లను ఉంచడం

అంటు కట్టిన నారు తో మిరప సాగు

అంటుకట్టడం అంటే ఏమిటి

మిరపలో అంటు మొక్కలనే ఎందుకు వాడాలి?

అంటు కట్టు విధానం

వేరుకాండం ఎంపిక | అంటు పుల్లను అతికించడం | అంటు కట్టిన మొక్క

అంటు కట్టిన నారుతో కాకర సాగు

అంటుకట్టడం అంటే ఏమిటి?

రెండు విభిన్న స్వభావాలు గల మొక్కలను జతకట్టి, ఒక క్రొత్త మొక్కగా తయారు చేయడాన్ని ఏపతి అంటారు. ఇందులో ఉత్కృష్టమ గుణాలు గల అంటు పుల్లను ఆయా ప్రాంతాల నేలలు మరియు వాతావరణానికి అనుకూలమయిన వేరుకాండంపై అతికించడాన్ని అంటుకట్టడం అంటారు.

అంటుకట్టడం ఎందుకు?

జపాన్, కొరియా, మరియు ఏలు ఇరోపా దేశాలలో కూరగాయ మొక్కలలో అంటుకట్టడం అనేది చాల మామూలు విషయం. నేల ద్వారా వ్యాపించే వ్యాధులు మరియు నులి పురుగుల బారినుండి పంటను కాపాడుటమే దీని ప్రధాన ఉద్దేశ్యము. అంతేకాకుండా వాతావరణ ప్రతికూలతలైన అధిక లోదాన మరియు ఉష్ణ, తక్కువ ఉష్ణోగ్రతల వలన వచ్చే నమస్యల నుండి పంటను కాపాడుకోనేందు ఈ పద్ధతి ఉపయోగపడుతుంది. అంతేగాకుండా ఈ పద్ధతిలో అధిక దిగుబడులను సాధించవచ్చు.

కూరగాయ పంటలలో అంటుకట్టడం అనేది చాల ప్రాచీనమైనది. గుమ్మడిజాతి కూరగాయల అంటుకట్టడాన్ని 17 వ శతాబ్దంలో కొరియాలోనే ఒక పుస్తకంలో వివరించడం జరిగింది. కూరగాయల సాగులో వాణిజ్య పరంగా ఉపయోగిస్తే 20 వ శతాబ్దంలో జపాన్ దేశాల్లో వాడకంలోకి వచ్చింది. అంటుపద్ధతి ద్వారా వంగ సాగు 1950 సం. ప్రారంభమ్మైంది. దీనిలో 1960 లో మరియు టమోటా పంటల్లో 1970 ఈ పద్ధతి అమలులోకి వచ్చింది. కొరియా మరియు జపాన్ దేశాలో మొత్తం 700,000,000 అంటు మొక్కలతో కూరగాయల సాగులో వినియోగించడం జరుగుతోంది.

అంటుకట్టే ప్రక్రియ

సాగు చేసే విధానము (సిఫారసులు ఒక ఎకరానికి)

నేలలు	ఉదజని సూచి 6.0 నుండి 7.0 వరకు ఉండే, మురుగునీటిపంపే శాకర(గంగ నేలలు అనుకూలం.
నాటే సమయం	జూన్-జూలై మరియు ఫిబ్రవరి-మార్చి నెలలు అనుకూలం.
విత్తన మోతాదు	400-450 గ్రా. విత్తనం లేదా 3700 మొక్కలు
ప్రధాన పొలం తయారీ	దుక్కిలో 10 టన్నుల పశువుల ఎరువు + 30 కిలోల అమ్మోనియం నైట్రేట్ + 25 కిలోల సూపర్ ఫాస్ఫేట్ + 10 కిలోల మ్యూరేట్ ఆఫ్ పొటాష్ + 250 కిలోల వేప పిండి వేసి కలియ దున్నాలి. పాలాన్ని చదును చేసి, తదుపరి 10-15 సెం.మీ. ఎత్తు, 90 సెం.మీ. వెడల్పు మరియు 90 సెం.మీ. దూరం గల ఎత్తుమడులను చేసుకోవాలి. నాటిన 25 రోజుల తరువాత 100 కిలోల వేప పిండిని పై ఎరువుగా వేసుకోవాలి.

Figure 1. Pamphlets on cultivation of grafted vegetable seedlings in Telugu.

b) Strategic research at ICRISAT

In order to assess the suitability of the grafted vegetable seedlings under extreme edaphic conditions, i.e., disease surveillance, nematode infestation as well as pre-dominance of heavy metals in irrigation water, ICRISAT conducted research at its headquarters at the facility for protected cultivation (Table 2). The primary objective was to validate the research outcomes of the work in order to ascertain the best-bet rootstock and scion combination and to generate knowledge and technologies on using grafted seedlings.

Table 2. Strategic research activities undertaken during the second year at ICRISAT, Hyderabad.

Crops	Year II	Research
Tomato	Evaluation	Bacterial wilt resistance
Tomato and Chilli	Validation	Restricting heavy metals uptake
Capsicum	Evaluation	Resistance against root knot nematode
Bitter gourd	Evaluation & Validation	Fusarium wilt resistance

- **Evaluation of rootstock for bacterial wilt resistance in tomato**

To screen different rootstock to examine resistance against bacterial wilt in tomato, a culture was sought from IARI-Indian Type Culture Collection (ITCC), New Delhi. Two scion varieties of tomato -- PHS 448 and Tomato were grafted on two rootstocks, ie., NVPH and KKBW (Figure 2). A 1100 ml microbial culture of *Ralstonia solanacearum* was applied on each of the nine combinations of tomato plants. It was observed that the grafted combination of KKBW and Tomato variety was most resistant to bacterial wilt compared to other grafted combinations. Other combinations showed incidence of bacterial wilting after inoculation with a culture of *R. solanacearum.*

Figure 2. The bacterial wilt resistance trial.

- **Rootstock evaluation for root knot nematode resistance in capsicum**

Capsicum is most susceptible to nematode infestation. In order to address this issue, a screening trial of different graft combinations to evaluate resistance against root knot nematode was planned during summer 2020. A culture of *Meloidogyne* spp. was obtained from NBPGR, Hyderabad. However, the trial could not be continued due to the COVID-19 lockdown. The trial will be conducted during Rabi 2020.

- **Rootstock evaluation for fusarium wilt in bitter gourd**

Fusarium wilt is the most common problem in cucurbitaceous crops in many parts of Andhra Pradesh. It affects plants by blocking the xylem and later, vascular tissues. An experiment on screening of graft combinations in bitter gourd was planned during summer 2020 to analyze resistance against fusarium wilt. Since ICRISAT headquarters was shut down due to the pandemic, the trial could not be conducted. It is proposed to be conducted in Rabi 2020.

- **Evaluation of rootstock- scion combinations to restrict heavy metal uptake in tomato**

Based on the results from a previous study on "An investigation of chromium uptake in grafted and non-grafted tomato plants irrigated with treated wastewater" at ICRISAT, one variety of tomato, PHS 448, was selected and grafted on two rootstocks -- NVPH and KKBW -- along with non-grafted plants (Figure 3 and 4). Heavy metals were added to plants in the form of Lead acetate @ 1 ppm (Treatment 1), Potassium dichromate @ 0.5 ppm (Treatment 2) and Lead acetate @ 1 ppm + Potassium

dichromate @ 0.5 ppm (Treatment 3) through irrigation. The study found that NVPH rootstock performed well compared to KKBW rootstock and non-grafted plants of tomato. The highest concentration of lead and chromium were found in the fruits of non-grafted plants.

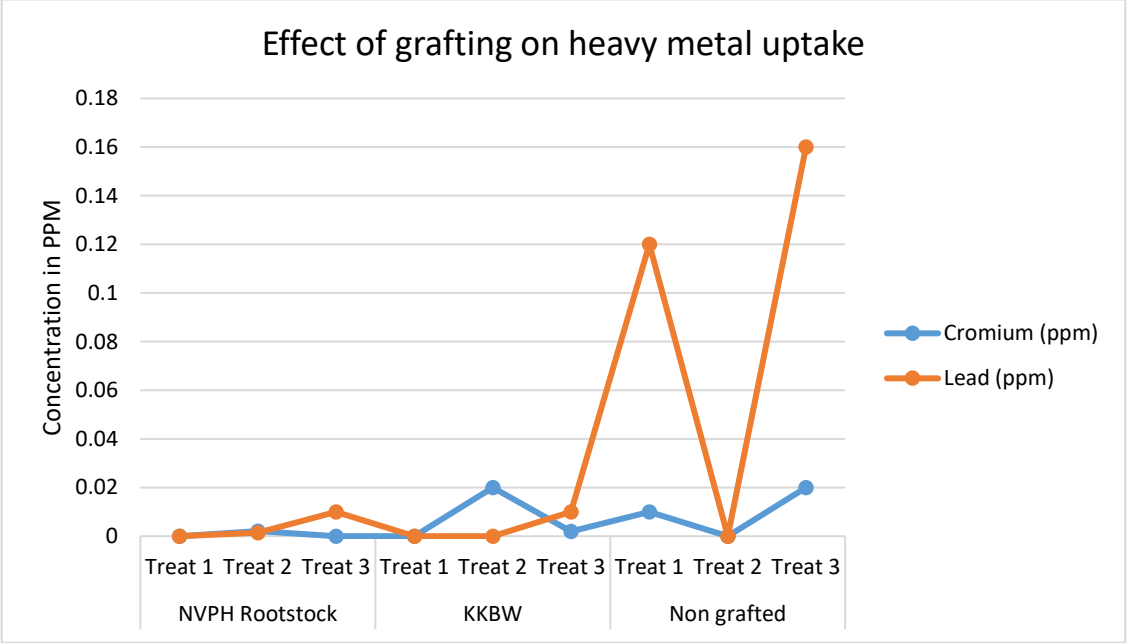


Figure 3. The effect of grafting on heavy metal uptake in tomato fruits.

Figure 4. (L) The experiment site and (B) formation of adventitious roots on tomato stem.

- **Growth and yield characterization under polyhouse conditions**

  In this experiment, Tomato (TO 3251), a farmer preferred variety of tomato was grafted on two different rootstocks, namely NVPH and KKBW. The grafted plants were transplanted in a naturally ventilated polyhouse to study its performance under protected conditions. Monthly observations of plant height, stem girth, number of branches, leaf area, chlorophyll content of leaves, yield and quality parameters like TSS content, fruit diameter, number of fruits/ plant, yield/plant and yield/ ha were recorded (Table 3).

Growth characterization

Table 3. Effect of grafting on the vegetative growth of tomato variety Tomato (TO 3251).

Treatment	Plant height (cm)	Stem girth (mm)	No. of branches	No. of leaves	Chlorophyll content	Leaf area (sq. cm)
NVPH X Tomato	105.33	10.07	36.58	204.78	51.54	79.28
KKBW X Tomato	109.11	9.81	35.67	164.00	49.49	72.96
Tomato (non-grafted)	139.44	8.61	31.78	152.42	48.14	66.70

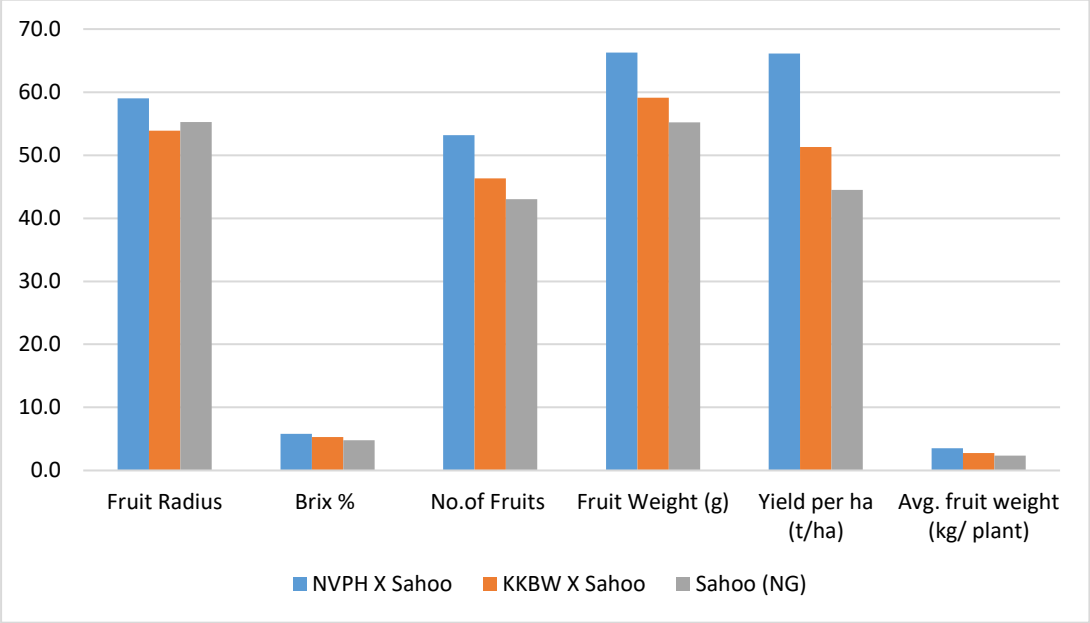


Figure 5. Effect of grafting on yield and quality of tomatoes under protected cultivation.

- **Effect on plant height (cm)**

Plant height was measured with the help of a meter scale at monthly intervals. Table 3 presents the average height of the sampled plants. Plant height was maximum in non-grafted tomato plants compared to grafted plants grown under polyhouse conditions. This result might be due to the effect of apical dominance in non-grafted plants which also showed less branching.

- **Effect on stem girth (mm)**

Stem girth was measured at 90days after transplanting. Table 3 shows the average stem girth of the sampled plants from the experiment. Stem girth was found to be maximum in NVPH X Tomato (grafted plants) compared to other combinations after transplanting tomato under polyhouse conditions.

- **Effect on number of branches and leaves per plant**

Number of branches per plant were measured at the completion of the experiment and the average number of branches and leaves per plant are shown in Table 3. The number of branches and leaves were maximum in grafted plants compared to non-grafted plants grown under polyhouse conditions.

- **Effect on chlorophyll content in leaves**

Chlorophyll content in leaves was measured using a SPAD meter. Table 3 shows the average chlorophyll content recorded from the top, middle and bottom leaves of the plants. It was observed that chlorophyll content was maximum in the leaves of grafted tomato plants.

- **Effect on leaf area**

Leaf samples collected from the plant were measured for leaf area. Results of the effect of grafting on leaf area (Table 3) reveals that maximum leaf area in grafted plants during all the growth stages in Tomato than in non- grafted plants.

- **Yield and quality characterization**

Observations on fruit yield and quality parameters were recorded at every picking (Table 4). Observations on fruit diameter, TSS, number of fruits/ plant, average weight of fruit, total fruit weight per plant and yield per hectare were recorded.

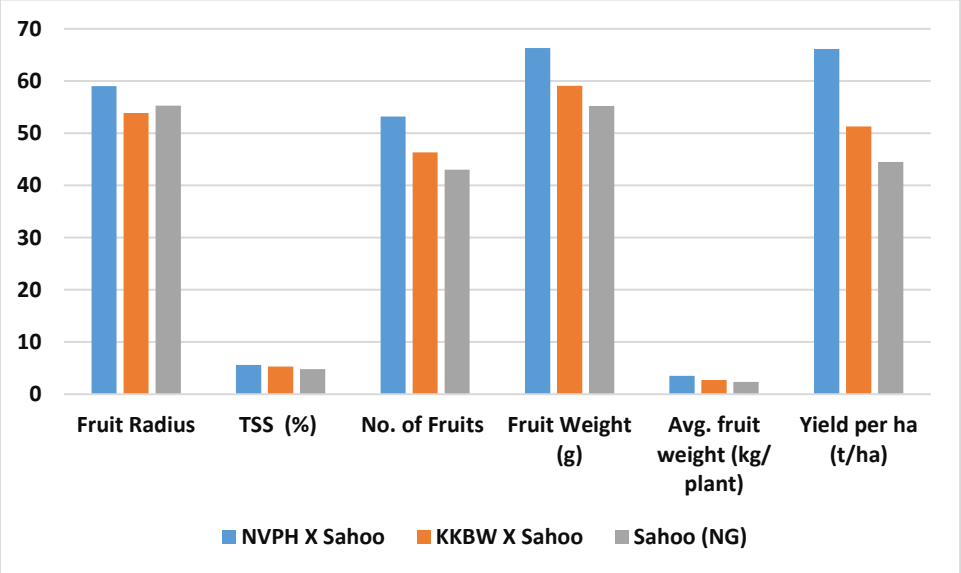


Figure 6. Effect of grafting on yield and quality of tomato fruits.

- **Effect on yield**

Effect of rootstock on yield and quality parameters was recorded during the fruiting and harvesting of tomato fruits. Rootstocks played a significant role in determining the yield and quality of fruits.

- **Fruit weight per plant (kg)**

Observations on average fruit weight are summarized in Table 4. From the data, it can be concluded that the average fruit weight per plant was maximum in grafted plants of tomato cv. Tomato under polyhouse conditions.

- **Other yield parameters**

Data on the number of fruits per plant, average fruit weight per plant and yield per hectare revealed that good quality fruits were harvested from grafted plants and yield from grafted tomato was maximum in grafted plants of Tomato variety under polyhouse conditions.

- **Effect on quality parameters**

Data on TSS and fruit diameter as mentioned in Table 3 reveal that good quality fruits were harvested from grafted plants of Tomato variety under polyhouse conditions than from non-grafted plants.

3. Training and capacity building of the farmers and stakeholders

Capacity building is an integral part of the project and was conducted through a series of trainings both in farmers' fields and at CoE, Kuppam (Figure 7).

a. Hands-on training

The objectives of the training were to create awareness and nurture the interest of local farmers and those from other districts towards the cultivation of grafted vegetables and to pave the way towards doubling farmers' incomes. In this regard, ICRISAT in collaboration with Department of Horticulture, AP and other government partners, organized a training workshop on Cultivation of high value vegetables and flowers under protected cultivation during 19-20 November, 29-30 November, and 18-19 December 2019 for small and marginal farmers involving about 550 farmers and several farmers' participatory organizations (Figures 7, 8, 9, 10, and 11).

More specifically, the objectives of the training workshop were to:

- Demonstrate vegetable grafting technology to farmers
- Carry out awareness activities at the Centre of Excellence
- Awareness on advantages and disadvantages of vegetable grafting
- Discuss major pests and diseases of vegetable crops in their area and their management

- Cultivation practices of grafted vegetable with an emphasis on land preparation, spacing, fertigation and pest- disease management.
- Provide handholding support through experts' visits to farmer fields.
- Create awareness on the strategic research carried out at ICRISAT Campus

Figure 7. Farmers training programs organized at Cheldinganipalle and Dasenganuru villages.

Figure 8. Indo-Israel project consultant and department of horticulture officials at the CoE.

Figure 9. Dr Vidya Shankar, Project Director, CoE, Kuppam, addressing the session.

Figure 10. ICRISAT scientists and department of Horticulture officials, Government of Andhra Pradesh, participated in the training program.

Figure 11. (L) Private partner explains the intricacies of grafting to visitors and (R) Mr Prithvi Ram, ICRISAT elucidates on the strategic research at ICRISAT.

b. Mass media coverage

Media coverage was an integral part of this project. Wide publicity was given to project interventions. TV 10, a well know news channel, covered the stories of the small farmers cultivating the grafted vegetables in Kuppam, with details of how it helped reduce pressure on the natural resources, delivered good food, and doubled farmer income (https://www.youtube.com/watch?v=9ibKbn3sNbU&feature=youtu.be).

How the interventions doubled farmers' incomes also appeared in the ICRISAT weekly Happenings newsletter. The news story can be accessed using this link:

http://idc.icrisat.org/

c. Success stories

The experiences of the progressive farmers who evaluated the field trials on grafted vegetables (Annexure 1) are documented on this link:

https://drive.google.com/drive/folders/1LYfEZXRiWC1Fy4XIRjxk8mXONrqDcP4W?usp=sharing

Mr Santosh, Byruganipalli

Mr Krishnamurthy, Byruganipalli

Mr Chowdappa, Ramakuppam

Mr Narendra, Kanchenabella

Mr Jagadeesh, Gowindapalli

Mr Nanda Kumar, Pallerulapalli

Mr Rama Krishna Raju, Pakellachiapalli

Mr Mohan Reddy, Chowdapalli

Mr Lakshmana, Malliahpadu

Mr Vonkuri Srinivas Reddy, Pathamallaiahpalem

Annexures

Annexure 1. Details of farmers selected for the field trials.

Name of the farmer	Village	Mandal	Area (acre)	Crop	Number of seedlings	Yield per acre (tons)	Mobile No.
Santosh	Byruganipalli	Kuppam	0.3	Tomato	2,000	13.6	9538501417
Lakshmana	Mallepadu	Madanapalli	0.6	Tomato	5,000	32.3	7993166200
Narendra	Kenchanaballa	Ramakuppam	1.19	Bottle gourd	600	NA	8074778793
B G Lakshmipathi	Chaldiganipalli	Ramakuppam	1.26	Bitter gourd	1,400	11.1	9908662866
B G Lakshmipathi	Chaldigaripalli	Ramakuppam	1.26	Snake gourd	3,500	NA	9908662866
Jagadeesh	Govindhapalli	Ramakuppam	0.28	Bitter gourd	642	10.8	9052251301
Mohan Reddy	Chowdapalle	Chowdapalle	1	Tomato	6,500	36.8	9440559244
Rama KrishnaRaju	Pakellachilappli	Chowdapalle	1	Tomato		NA	9701872036
Nandakumar	Palerlaplli	Kuppam	0.5	Bitter gourd		NA	7702989749
Krishnamurthy	Byruganipalli	Kuppam	0.5	Tomato	3,500	21.5	9912052776
Chowdappa	Chaldiganipalli	Kuppam	01	Bottle gourd	1,500	12.4	
Vonkuri Srinivas Reddy	Pathamallaiahpalem	Prathipadu	1	Chilli	10,000	11.6	9553157524

Annexure 2. Farmer-wise distribution of grafted and non-grafted seedlings.

S No	Farmer Name	Village	Mandal/ Blocks	Crop	Grafted seedlings	Non-grafted seedlings	Phone number
August 2019							
1	B Govindappa	Gaduru	Ramakuppam	Tomato		8000	9618381080
2	Betappa	Nulakunta	Kuppam	Tomato		8000	
3	C V Srinivasulu	Chandam	Kuppam	Tomato		8000	6305876601
4	Chinnamuneppa	Rambadunur	Kuppam	Tomato		8000	9502658009
5	Gm Chinna Swamy	Chinna Vasunadu	Kuppam	Tomato		8000	9000097532
6	Krishna Naick	Sugalimitta	Punganur	Tomato		13700	
7	Rathnamma	Mulakalapalli	Kuppam	Tomato		8000	9000039946
8	S Lakshmi	Manendram	Ramakuppam	Tomato		8000	7995524127
9	Siva Naick	Veernamala	Ramakuppam	Tomato		11000	
10	Chandarasekar Lakshmi	Singasamudram	Ramakuppam	Tomato		8000	9182630849
11	Subramanyam	Dhasaganur	Kuppam	Tomato		8000	
12	Ponuswamy	Nimakampalli	Kuppam	Tomato		5000	9666488036
13	Kumar	Rambadunur	Kuppam	Tomato		8000	
14	K Ramachandara	Urlaobanapalli	Kuppam	Tomato		8000	9010339133
15	Kareppa	Daseyganuur	Kuppam	Tomato	400		
16	Nandakumar	Palarlapalli	Kuppam	Tomato		11000	
17	Chalapathi	Bommadapuram	Ramakuppam	Tomato		16000	
18	Galli Subama	Markapuram		Tomato		4200	
19	Puliandaran	Kothapalli		Marigold yellow		6080	
20	Krishnappa	Kanchenaballa	Ramakuppam	Tomato	1000		
21	Krishnaya	Kothapalli	Kuppam	Pragathi	760	120	
22				Snake gourd			
23	Saravanan	P B Natham	Kuppam	Bitter gourd	178		

S No	Farmer Name	Village	Mandal/ Blocks	Crop	Grafted seedlings	Non-grafted seedlings	Phone number
24	Mallappa	Mallepadum	Madanapalli	Bitter gourd	20		
25	Neelamma	Kothindlu	Kuppam	Bitter gourd	11		
26	Swamy Nathan	Nadimur	Kuppam	Tomato		8000	
27	Jayappa	Bomadapuram		Tomato		4000	
28	Sudhakar	Yamaganipalli	Chittoor	Tomato		8000	
29	Balakarishna	Bangarupalyem	Chittoor	Tomato		5000	
30	Sivaiah	Bangarupalyem	Chittoor	Tomato		6000	
31	K Sankarappa	Gokulapalli	Chittoor	Tomato		4000	
32	Bogem Ankaiah	Markapuram	Prakasam	Tomato		4200	
33	Vadakapula	Markapuram	Prakasam	Tomato		4200	
34		Markapuram	Prakasam	Tomato			
35	M Venkatesh	Markapuram	Prakasam	Tomato		4200	
36	K V Vardhan Reddy	Markapuram	Prakasam	Tomato		4200	
37	Singareddy	Markapuram	Prakasam	Tomato		4100	
38	Harikrishna	D K Palli	Kuppam	Drumstick		10	
39	T Srinivasulu	Daseganur	Kuppam	Tomato		6000	
September 2019				Tomato			
40	Praveen	Chowdepalli	Madanapalli	Tomato	8330		
					250		
41	C Sriramulu	P B Natham	Kuppam	Brinjal		8000	
42	K Salaama	Srinivaspuram	Bangurupalyem	Tomato		6000	
43	M Setu	Cjfs Colony	Bangurupalyem	Tomato		6000	
43	Vinayakam	Cjfs Colony	Bangurupalyem	Tomato		8000	
44	Chinnama	Bangarpalyam		Tomato		6000	
45	Narendra	Kenchanaballa	Ramakuppam	Tomato	600	171	
45	Venkatesh	Thamgeydi	Kuppam	Tomato		8000	
46	Bharathi	Chekunatham	Kuppam	Tomato		6000	
47	Jayappa	Bomadapuram	Kuppam	Tomato		4000	
48	Lakshmipathy	Cheldiganipalli	Ramakuppam	Bitter gourd	1400		
				Snake gourd	1100		
49	Lakshmipathy	Cheldiganipalli		Bitter gourd		594	
50	Leelamma	Rathnamma	Chandam	Chilli		2000	
51	Subramanyam	Bomadapuram	Ramakuppam	Vibav		14000	
52	Ramanappa	Gumunesamedram	Chittoor	Tomato		6000	
53	K Ravi	Gurkuklkandiga		Tejaswini		10500	
54	Dharmendra	Peddavadalapudi		Marigold		2500	
55	Ramreddy	Shantipuram		Marigold		8000	
56	Ks Nagendra		Vishakhapatnam	Marigold yellow	2000		
57	S Lakshmama	Choudeypalli		Bottle gourd Tomato	2000		//
58	Lakshmidevi		Chittoor	Ujala		8000	
59	Prathap Reddy		Aarakonda	Capsicum			

S No	Farmer Name	Village	Mandal/ Blocks	Crop	Grafted seedlings	Non-grafted seedlings	Phone number
60	Ventakasami		Bengaluru	Bottle gourd Tomato	712		
61	Subramanyam	Gettur		Ridge gourd Naga	330	1315	
62	Balakokilama		Prakasam	Tomato	4500		
63	Narashimulu	Karvetinagar		Chilli		400	
64	Subramanyam	Gettur		Ridge gourd Naga		487	
65	Sankarappa		Gudupalli	Tomato		3000	
66	G R Narayappa	Anniganur	Ramakuppam	Cabbage		19772	
67	Deenadhyal		Kuppam	Brinjal		1000	
68	Narayanareddy	Modulavanka	Ramakuppam	Tomato		5000	
69	Prathap Reddy	Aragonda	Thavampalli	Capsicum	6440		
70	Dharmendra	Peddavadalapudi	Guntur	Bitter gourd	2878	935	
71	Purushothamreddy		Ramakuppam	Tomato	200		
				Cabbage		19772	
				Cabbage			
72	Prathapsireddy	Argonda	Chittoor	Capsicum	305		
				Tomato	15		
73	G Govindappa	Chnadam	Kuppam	Brinjal		5000	
74	Lakshmipathy	Cheldiganipalli	Ramakuppam	Bitter gourd	350	50	
75	Lakshaman	Malepudi	Madanapalli	Tomato	5000	1000	
76	K S Nagndraprsad		Vishakhapatnam	Tomato	350		
				Marigold		1580	
77	Chinni Krishna	Chlediganipall		Watermelon	1900	36500	///
Octo-ber 2019							
78	Jagadeesh	Govindapalli		Ridge gourd Naga			
79	Raja	Ganeshpuram	Kuppam	Chilli		6000	
80	Narayana	Bairiganipalli		Tomato	2000	200	
81	Dharmendra/Sambhi Reddy		Guntur	Tomato	7500		
				Pragati	1032	170	
				Tomato	198	54	
82	Praveen	Chowdapalli		Dhaval		36000	//
83	Nageswar Rao		Tirupati	Indum 5	650	7400	
84			Nellore	Priyanka		54250	
				Tomato		1000	
				Jumbo Yellow		50	
				Avl 1		30	
				Capsicum		20	
85	R Malliga	Pb Natham	Kuppam	Tomato	2000	200	//
86	Narayana Chari	Pb Natham	Kuppam				
				Red jewel			
87	Rathnamma	Chandam	Kuppam	Tomato	1000	1500	
88	Nageswar Raju		Tirupati	Tejaswini		6800	

S No	Farmer Name	Village	Mandal/ Blocks	Crop	Grafted seedlings	Non-grafted seedlings	Phone number
				Indum 5		1200	
				Ew26740	370		
				Ew26140		750	
				Dutch		1400	
				Hph 5531		600	
				Sakata Yellow		600	
				Dimple202		2000	
89	Guduru			Chilli (Raghu)		35000	
				Tomato (Karthik)		8000	
90	Krishnaapa	Lakshmipuram	Kuppam	Tomato	950		//
91	Nageswar Raju		Tirupati	Indum 5		700	
				Us341		900	
				Purple okra		100	
92	Krishna Murthy	Lakshmipuram	Kuppam	Tomato	600	100	//
93	Krishnappa	Boogupalli	Kuppam	Dimple 202		3500	
94	Joint Collector			Chinese cabbage	1600		3200
				Red cabbage			
				Cabbage			
				Cauliflower			
				Purple okra			
				Soft stem			
				Naga			
				Avl 1			
				Avl2			
				Covai			
				Tomato			
				Ew26470			
				Naga			
				Lia			
				Cutie			
				Pragati			
				Covai			
				Tomato			
				Ew			
				Salad			
95	Chaitanya		Vishakhapatnam	Avl1		250	
				Avl2		250	
				Purple okra		250	
				Pragati	4	8	
				Loofa		20	
				Covai		60	
				Ew		10	
				Naga	50	10	
96	Jagadeesh	Govindapalli	Chittoor	Bitter gourd	858	100	
				Ridge gourd	642	100	//
97	R Sathish Kumar	Pettahalli	Bangalore	Bottle gourd	1000		

S No	Farmer Name	Village	Mandal/ Blocks	Crop	Grafted seedlings	Non-grafted seedlings	Phone number
98	P N Chowdappa	Cheldiganipalli	Ramakuppam	Bottle Gourd	2000		
	P Raja	Genshpuram	Kuppam	Chilli		6000	
99	P Raja	Ganeshpuram	Kuppam	Brinjal		1000	
100	L R Narayana	Bairuganiappali	Kuppam	Chilli		3000	
101	Kalidasraj	Hosur		Snake gourd	270	60	
				Bitter gourd	180	30	
				Bottle gourd	90	30	
				Tomato	150	50	
				Capsicum	549		
				Chilli	180	90	
102	Kanan Dasdevan Hill		Munnar	Brinjal		951	
				Marigold		2772	
				Pumpkin	250		
				Capsicum	125		
				Capsicum	125		
				Snake gourd	20		
				Bitter gourd	20		
				Tomato	250		
				Bottle gourd	50		
				Cabbage		800	
103	Anusuyamma	Chandam	Kuppam	Brinjal		8000	
104	Ragupathi Naidu	Aragonda		Marigold		15080	
105	Damodhar	Anthamadugu		Capsicum	20		
				Marigold		31	
106	Sanjivaya	Anthamadugu		Chilli		18250	
107	B Chalammaya	Gangadharapalli		Chilli		16000	
108	B Sunitha	Saidapur		Chilli		20000	
109	Munsawamy		Gudupalli	Tomato		3000	
110	G Narayanna	Mulakalapalli	Kuppam	Cabbage		6000	
111	N Nageswarao	Madur	Hyderabad	Chrysanthemum		4846	
112	G Narayanna	Mulakalapalli	Kuppam	Tomato		7000	
113	Sarojamma	Lakshmipuram	Kuppam	Tomato	5550	500	
114	Sarojamma	Lakshmipuram	Kuppam	Tomato	950		
115	Sarojamma	Lakshmipuram		Tomato	600		
116	Mohan Reddy	Chowdepalli	Madanapalli	Tomato	7588		
Novem-ber 2019							
117	Suresh	Shantipuram		1018		84500	
118	Suresh		Mandapalli	Avl1		20	
						300	
						225	
						27	
						198	

S No	Farmer Name	Village	Mandal/ Blocks	Crop	Grafted seedlings	Non-grafted seedlings	Phone number
119	Chinni Krishna	Konganapalli				10	
				Avl1		20	
120	Balu Prasad		Peddapanjani	Tomato	10000		
121	Mallikarjuna		Peddapanjani	Scv116		6000	
122	Subramaniyam Reddy		Gangavaram	Druva		20000	
				Priyanka		2000	
123	Koteswar Rao	Shantipuram		1018		93150	
124	Tribuvan		Punganur	Chrysanthemum			
125	Sathish Kumar	Hoskote	Bangalore	Tomato	600		
				Pragati		50	
126	Srinivas Reddy (Dhramjagaru)		Guntur	Scv116	28000	8000	42000
127	Gangappa		Punganur			1000	
128	Srinivas Reddy		Bengaluru	Capsicum	3000		//
				Bachata	1782	6300	//
				Inspiration	495	5540	//
129	Kumar	Vendugampalli	Kuppam	Bitter gourd		2000	//
				Bitter gourd		2000	//
130	Samba Reddy		Vijayawada	Arka	600	6000	//
				Naga	450	950	//
131	Kumar	Rambandnur	Kuppam	Brinjal		2000	
132	Gadde Rammohan		Vijayawada	Pragati	2000		4000
	Anne Padmavathi	Nuzvudu	Guntur	Tomato	8000	500	12000
133	Anne Padmavathi	Nuzvidu	Guntur	Tomato	1300		2600
				Cutie	100		200
				Priyanka		2000	
134	Nageswar Raju		Tirupati	Avl1		800	
135	Nagaraj	Kanchanaballa		Tomato	500		///
136	Kali Das	Hosur		Marigold		12000	
137	Thimmapa	Kanchenbala		Tomato	500		
138	Varmajakkampudi	Vijayawada		Ridge Gourd	975	1600	
				Bottle gourd	800	200	
				Bitter gourd	2870	170	
				Snake gourd	500	100	
139	Annepadmavathi	Nuzividu	Guntur	Tomato			
140	Balasubramanyam			Tomato	1200		//
				Avl1			
				Naga			
141			Reddyvaripalli	1018		41700	
142	Chinni Krishna	Konganapalli		1018		98776	
143	Mahesh	Madanapalli		Brinjal		3000	
				Chilli		3000	
144	Umapathi Chandiganpalli			Priyanka		600	///

S No	Farmer Name	Village	Mandal/ Blocks	Crop	Grafted seedlings	Non-grafted seedlings	Phone number
				Tomato	100		
				Druva		100	
145	Nagaraj	Kanchanaballa		Tomato	200	100	
146	Radha Krishna	Nagapuram					
147	Nellore Collector			Tomato	15		
				Bottle gourd	10		
				Capsicum		15	
				Avl1		15	
				Avl2		15	
148	Damodhar		Gudur	Chilli		34000	//
						8000	
149	Nageswar Rao		Tirupati	Priyanka		3000	
150	Raitubazar			Tomato		8000	
151	Basha		Gdnellore	Green magic		9000	
				Red jewel		6400	
				Tomato	600		
151	Jarandhan		Kurnool	Tomato	1900		
				Cutie	100		
152	Chinni Krishna	Konganapalli		Vnr 22	6408		
				Naga	1368		
				Covai	72		
				Cutie	216		
153	Nalini			Chilli		4000	
				Brinjal		4000	
154	Timmapa		Kuppam	Tomato	200		
				Cutie	20		
155	Sahi Export		Kuppam	Yahudha		10	
				Purple Okra		4	
				Tomato		5	
				Tomato	99	10	
				Capsicum		99	
				Druva		30	
				Sc116		20	
156							
				Avl1		20	
157	Shanmugam	Vasanadu			1147	99	
158	Thimmappa	Kenvchanbala		Tomato	200		
				Cuttie	20		
				Bitter gourd	144		
				Ridge gourd	45		
159	Mohanreddy	Guntur		Snake gourd	20		7799995255
				Yahudha		20	

S No	Farmer Name	Village	Mandal/ Blocks	Crop	Grafted seedlings	Non-grafted seedlings	Phone number
				Indira		21	
				Scv116		20	
				Avl		10	
				Ujala		22	
				Indira	45		
				Tomato	45		
160	Bangarupalyam			Tomato (Sekhar)		40000	
161	Satish	Hoskote		Bottle gourd	644	40	
162	Suresh	Chittoor		Bottle gourd	10		
				Tomato (Sekhar)	10		
				Bitter gourd	10		
163	Subramanyam			Tomato	10		
				Cuttie	10		
				Covai	10		
				Vnr22	10		
				Spine	12		
				Tomato	10		
				Indira	15		
				Okra		98	
				Cuttie	10		
164	Bhashkar Reddy			Marigold		3000	
				Bottle gourd	15		
165	Ramana Reddy			Tomato	3100		
166	Apollo	Arkonda	Chittoor	Drumstick		1045	
				Capsicum		198	
167	Hemanth Kumar		Gudapalli	Brinjal		266	
Decem-ber 2019							
168	Chinnikrishana	Konganapalli		Indira		3800	
				Priyanka		1380	
				Vyshnavi		3400	
				Indira	600		Dp
				Druva		800	
169	Sankar Reddy	Punganur	Keelakiri	Tomato	500		9121046330
				16659	900		
170	Balaji			Tomato			9391833753
				Vnr 22			
171	Bogeswarao	Vijayawada		Vnr 22	4500	600	
				Us1315	1400	100	
172	Indian Gas	Kuppam		Yahudha		75	
173	F.P.O	Prakasam		Avl		46	
174	Muni Venkat Reddy	Kalahasti	Chittoor	Arka		2300	

S No	Farmer Name	Village	Mandal/ Blocks	Crop	Grafted seedlings	Non-grafted seedlings	Phone number
				Vnr 22	45		
175	Sujatha	Kuppam		Vnr 22		2	
				Okra		4	
				Capsicum		5	
				Brinjal		5	
				Chrysanthemum		10	
				Chilli		4	
176	GovCapsicumCapsicumjulu	Kenchanbala		Ns295		16137	9848188159
177	Srinivas	Pedda Vadlapudi	Guntur	Vnr 22	2700	300	9848145338
				Tomato	1800	200	
178	Ho(Ad Account) Ongole	Ongole		Ns295		2	
				Yahudha		20	
				Vnr 22	10		
				Tomato	10		
				Okra		20	
				Avl		270	
179	Srimanrayana	Guntur		Vnr 22	1800	200	9030109716
180		Bopparajupalli				50000	9849184519
						20000	
				Dhruva		15000	
		Dhrugasamudram				25000	
						9500	
						6000	
						20000	
181	Rangareddy	Prakasam		Vnr 22	15000	500	
182	Ramesh Yadav	Srikalahasti		Suprit	200	17500	
183	Himavanth	Singasamudram		Ns295	99	4300	9701137236
184	K S Rajakumar	Cheldiganipalli		Tomato	1700	300	9000170059
185	Venkatamunireddy	Srikalahasti		Tomato		5100	9908742248
				Tomato	200		///
				Sri		4050	
				Kaveri		7400	
				Us 1315		5580	
				Pragati	200		
				Okra		200	
				Harinya		1764	
				White		100	
186	Hemadri	Chittoor		Tomato	2		630573528
				Tomato	5		
				Us 1315	6		
				Kd	2		
				Okra		4	

S No	Farmer Name	Village	Mandal/ Blocks	Crop	Grafted seedlings	Non-grafted seedlings	Phone number
						4	
187	Guruparasad/ Ram Krs	Burusettipalli	Bairedlaplli	Tomato		8000	6302249838
	Venkatsubramanyam	Belupalli		Tomato		8000	9652613239
	B Krishanappa	Belupalli		Tomato		8000	9440698951
188	Nataraj/V Goud	Pessaladoddi	V Kota	Tomato		8000	9652112094
	Chalapathi/Subra	Pessaladoddi	V Kota	Tomato		8000	7702989606
	Somappa	Pessaladoddi	V Kota	Tomato		8000	8179808593
189	D Kirankumar/Gopi	Nagari	Puttur	Ujala		10000	9052466400
	Saradhamma	Pessaladoddi	V Kota	Tomato		5000	9502751916
190	K V Hanumathreddy	Yallagaram	V Kota	Tomato	750		9959940299
191	B M Danujaya	Jp Road	Kuppam	Vnr 22	1800	200	9502840485
192	Chinnikrishana	Konganapalli		Tomato	1500	500	
191	Annepadmavathy	Vijayawada		Okra		5500	9160877477
192	Ramesh Yadav	Tirupathi		Vnr 28	4000		7702469435
193	Dhinakaran	Chittoor		Tomato		2400	8897636325
192	Kanshaswamy	Adavibudhuguru	Kuppam	Tomato		3000	7702939418
193	B M Dhanujaya	Jp Road	Kuppam	Vnr 22	700		9502840485
194	Vinodh	Chittoor		Vnr 22	1000		
January 2020							
195	B Ramesh	Baireddlapalli	Kuppam	Tomato		15000	8790723661
196	Ganesh	Marwada	Kuppam	Tomato		3000	9550828015
197	Dhinkaran	Gudipata	Chittoor	Tomato		2700	8897636325
198	Vijayakumar	Dinepalli	Kuppam	Super gulabi		5200	9866812523
199	Chnadrasekhar		Srikalahasti	Ujala		10500	9989008688
200	K Ravi		Srikalahasti	Ujala		10000	9182294764
201	Hari Om (ICRISAT)			Tomato (St)			9492640352
				Tomato(Nvph)		50	
202	Pachiplala Kadirappa	Regavalu	Pileru	Tomato		8000	9948755689
203	Pachipala Nagarajuna	Kaduvarialllai	Pileru	Tomato		8000	7013445177
204	Pachipala Veeraya	Regvalu	Pileru	Tomato		8000	
205	G Pappaya	Regavulu	Pileru	Tomato		8000	
206	Manchuri Devalama		Pileru	Tomato		8000	9441661036
207	K Yarappa	Aluvariaplla	V Kota	Tomato		16000	7981131157
208	Vijyalakshmi	Mudaramdoddi	V Kota	Tomato		8000	7981131157
209	Narayanama	Mudaramdoddi	V Kota	Tomato		10000	9866794162
210	Rajama	Alauvariapalli	V Kota	Tomato		16000	9177175491
211	Nageswarao	Nandigama	Vijayawada	Brinjal (Kd)	6000		9951976965
212	Balakrishna	Dodikuppam	Santipuram	Tomato		8000	9949141614
213	Kumar		V Kota	Tomato		20000	8500048099

S No	Farmer Name	Village	Mandal/ Blocks	Crop	Grafted seedlings	Non-grafted seedlings	Phone number
214	Ram Chandrareddy	Nagireddypalli		Tomato			
215	Gopalapa	Gundlasagaram	Gudupalli	Tomato		8000	9972926522
216	Kokila	Ekaralapali	Kuppam	Vaishnavi		8000	8179546242
217	Srimanayan	Guntur		Snake gourd	1200	50	
218	P Lakshama	Nanjapeta	Santhipuram			10000	9603953203
219	Surya Narayanareddy	Peddaganur	Ramakuppam	Tomato		10000	9052713363
220	Kanakama	Nayanoor	Kuppam	Brinjal		6000	9912153800
221	Vinodhkumar		Punganur	Tomato	13333		9963195160
222	HarCapsicumCapsicum Ho	Kurnool		Tomato	3300		
Febru-ary 2020							
223	M Prasad	Naglapuram	Satyavedu	Ujala		6500	
224	Vinodkumar	Punganur	Madanapalli	Tomato	12667		
225	Venky Reddy		Chittoor	Brinjal (Adh)	8500	2000	9490050563
226	Chandrasekhar Reddy	Kaluvapalli	Chittoor	Bitter gourd	4850		
227	V Manjunath	Karnataka		Bottle gourd	1950		95007964126
228	Lakshmayya	Madanapalli		Tomato	8000		9573072724
229	Venky Reddy	Chittoor	Chittoor	Brinjal (Adh)	2000		9490050563
230	Bal Reedy Siva Reddy		Tambalapalli	tomato		8000	9502111898
231	B Gopi	Vasanthapura	Chittoor	Brinjal (Adh)	2000	2500	8897636325
232	M Muni Sekhar	Chandragiri	Chittoor	Ujala		3500	9885062401
233	P Muralli Mohan		Chittoor	Brinjal (Adh)	9000	1000	9440706509
234	Guntur Farmers			Brinjal (Adh)	70		
235	Raparla Lakshmi Prathima		Krishna	Brinjal Kd	8200		9492383999
236	Sr		Vishakhapatnam	Brinjal Kd	8000		8374701754
237	Nageshwara Raju	Tirupati	Chittoor	Ujala	4000		9441866909
238	Sudhar Kar Apeda	Hyderabad	Telangana	Red cabbage		7500	
				Broccoli		1000	
				Purple okra		1000	
				Pumpkin		200	
239	Nageswara Raju	Karvetinagaram	Chittoor	Ujalal	5000		Dp
240	Nageswara Raju	Karvetinagaram	Chittoor	Ujala	4000		Dip
241	Swaminathan	Rambramdhunur	Chittoor	Vibhav /Tomato		5000	
242	Mallika	Pb Natham	Chittoor	Vibhav		7000	
243	M Prasad	Sathivedu	Chittoor	Ujala	3000	1000	
244	Ravi	Sathivedu	Chittoor	Bitter gourd		8000	
245	M Venkatesh	Jd Nellore	Chittoor	Adh Brinjal	4000	2000	
246	Hari Krishna Ho	Chittoor	Chittoor	Adh Brinjal		3000	

S No	Farmer Name	Village	Mandal/ Blocks	Crop	Grafted seedlings	Non-grafted seedlings	Phone number
247	Giri	Bomma Samudhram111		Adh Brinjal		2000	
248	ICRISAT	Hyderabad		Snake gourd	1418	205	
				Bitter gourd	1420	208	
				Chilli	1287	550	
				Capsicum	716	410	
				Tomato	3500	700	
March 2020							
249	Tk Lakshmi Naryana	Dk Palli	Chittoor	Lalitha		4000	
250	Ligiah Naidu	Peleru	Tirupati	P Okra		1000	
251	Javaddi Simhardi Naidu	Pedd Vadlapudi	Guntur	Bitter gourd	3000	1000	
252	S Suresh	Nunemudulapalli	Chittoor	Tomato		7000	
253	Chandraiah Goud	Hoskote	Karnataka	Bottle gourd	900		
				Bitter gourd	250		
254	R Satish Kumar	Hoskote	Karnataka	Bottle gourd	400		
255	Sudha , Venkatapuram	Satyavedu	Chittoor	Ujala		5000	
256	Subramanyam, Avulapalli	V Kota	Chittoor	Tomato		12000	
257	Ram Anjenelu (Subra)	Adh, 9059010140	Chittoor	Tomato		4000	
258	Nageswara Raju	Karvetinagaram	Chittoor	Ujala	7000		Dip Mp
259	Gopal Appa	Anand/Ramakuppam	Chittoor	Tomato		10000	
260	Nageswara Raju	Karvetinagaram	Chittoor	Ujala	2000		Dip Mp
261	Manjunath	Anekal	Karnataka	Bottle gourd	350		
262	Venkateswaru	Samanthapudi, Darsi	Prakasam	Tomato		20000	
				Tomato		20000	
				Ib 131178		20000	
263	Mv Muneappa	Unisiganipalli/ Ramakuppam	Chittoor	Madan		11900	
264	Green orbit			Snake gourd	114		Dip
				Bitter gourd	135	60	
265				Bottle gourd	100		
				Bitter gourd Vnr		700	
				Purple okra		500	
266	Veerabadhrai (Chrysanthem	Gandhipuram	Chittoor	Tomato (Cherry)		3076	
267	Sheshagiri	Rajmundry	Chittoor	Chry		7692	
268	J Simhadri Rao	Peddavadlapudi	Guntur	Bitter gourd Us 1315	4000	1200	
269	Joythi	P B Natham /Kuppam	Chittoor	Tomato		12000	

S No	Farmer Name	Village	Mandal/ Blocks	Crop	Grafted seedlings	Non-grafted seedlings	Phone number
270	Ps Renuka Pathi	Kangundhi	Chittoor	Tomato		4100	
271	Lakshmana	Mallepalli, Madnapalle	Chittoor	Tomato	20000		Dip
272	Gs Lokesh	Vijulapuram,, Ramakuppam	Chittoor	Tomato		10000	
	Ms Prabhakar	Yendagandi	East Godavari	Mixing	59		
273	Krishna Appa	Vijulapuram, Ramakuppam	Chittoor	Tomato	5000	500	
274	V Munneappa	Vasanadu/Kuppam	Chittoor	Tomato	4500	500	
275	Nageswara Raju	Karvetinagaram	Chittoor	Ujala	16000	4000	Dip
					200		Dip
276	J Muniappa	Vasanadu, Kuppam	Chittoor	Tomato		2850	Dip
277	S Govinda Raju	Avulathemnapalli	Gudepalli	Tomato		4000	Dip
				Brinjal		4000	Dip
278	T Naryana Appa	Singa Samudhram	Chittoor	Tomato		20000	Dip
	Ps Renuka						
April 2020							
301	Ps Renukapathi	Kangundhi	Kuppam	Tomato		8000	7780281716
				Brinjal		8000	
302	Munirajamma	Kadhinayanapalli	Pakala	Lalitha	12000		9490400411
				Tomato	4000		
303	Madhusudhan	Chaldhiganipalli	Ramakuppam	Drumstick		1365	900170059
304	Krishnappa	Marawada	Kuppam	Tomato		3000	7893423828
305	K Anand	P B Natham	Kuppam	Tomato		8100	9177722065
306	Rajamma	Chandam	Kuppam	Tomato		4800	
				Tomato	200	1000	9160340803
307	B G Lakshmipahti	Cheldiganiaplli	Ramakuppam	Pragati	144	952	9908662866
308	V Kollappa	Kunjeganuru	Kuppam	Tomato		4000	8106283378
309	Venkatachalapthi	Attibeli	Bangalore	Capsicum	5000	99	7892754787
310	B Subramanyam	Settibala	Santhipuram	Tomato	5500		9885555830
				Ns295		360	
311	K Anand	Kangganur	Hosur	Tomato	240		9865368356
312	Thyagaraj	Paipalyam	Kuppam	Tomato	3200		9703197500
313	Subrahmanyam	Chaldhiganipalli	Ramakuppam	Tomato	1350		
314	Nageshwara Raju	Karvetinagar	Chittoor	Adh	2000		9441866909
315	Hari Krishna Reddy	Penumur	Chittoor	Ujala		2000	
				Adh		2000	
				Tomato		1000	
				Ns295		360	
316	Nageshwara Rao	Keelapata	Gangavaram	Brinjal	3650		9848033480
317	S Malika	Pb Natham	Kuppam	Adh		2000	8374804394
				Ujala		2000	
318	T G Gunashekar	Kenchemballa	Ramakuppam	Bottle gourd	1200		9949502062
319	R Shanmugam	Gonugur	Kuppam	Tomato		2500	9000936660

S No	Farmer Name	Village	Mandal/ Blocks	Crop	Grafted seedlings	Non-grafted seedlings	Phone number
320	Korukonda Muralidhar Rao	Gudijala	Vishakhapatnam	Brinjal	500		9440156217
				Lalitha	500		
				Tomato	100		
321	Chethan Kumar	Gutapalli	Kuppam	Brinjal	23		9573472259
				Tomato	10		
322	Guntlamma	Kenchemballa	Ramakuppam	Bottle gourd	10		9177961231
				Snake gourd	445	160	
323	Bg Lakshmipathi	Chaldhiganipalli	Ramakuppam	Bitter gourd		600	9908662866
324	Subramanyam	Settiballa	Santhipuram	Tomato	500		9885555830
325	S Srihari	Echangur	Krishnagiri	Bottle gourd	1400	500	9443003203
				Lalitha	100		
326	Venkatappa Ramanappa	Malepadu	Madanapalli	Tomato			9704911228
	Bomma Rasi Nagaraju	Malepadu	Madanapalli		18000		6305600431
	Eshwaramma	Malepadu	Madanapalli	Tomato	2000		7993166200
	Kotha Reddeppa	Malepadu	Madanapalli				9701877390
	Gudisi Nagaraju	Malepadu	Madanapalli				9177776343
May 2020							
327	B Chengayya	Belupalli	Bairedupalli	Lalitha	4100	3200	7799565199
328	V Lakshmi	Pb Natham	Kuppam	Bottle gourd	100	1600	7989348496
329	Damma Nuru Manohar Chowdary	Pakala	Pakala	Tomato	9000		9885299911
330				Lalitha	2400	100	
331	Lakshmikumari	Nadigam		Supergulabi	2800		
332	Perumal	Amaravathi		Brinjal	2500		
				Supergulabi	2000		
333	Palmaraju	Vijayawada		Brinjal	2500		9848811761
				Bottle gourd	2000		
				Tomato	500		
334	Subramanyam	Vishakhapatnam		Tomato	6200		9440018660
				Bottle gourd	1000		
335	Edhulamudi Rathnakumari	Agriripalli		Brinjal	4500		7981980489
336	Suryanarayana	Vishakhapatnam		Brinjal	5000		
337	Kodisrinivas Babu	Vishakhapatnam		Supergulabi	1500		
				Adh	1000		
				Tomato	2500		
338	Nageswararaju	Karvetinagaram		Ujala	2700		9441866909
June 2020							
339	Boginenisidama Naidu	Gudur		Tomato	5200		6300641924

S No	Farmer Name	Village	Mandal/ Blocks	Crop	Grafted seedlings	Non-grafted seedlings	Phone number
340	T Sindhuja	K V B Puram					
	C Ravi	K V B Puram					
	T Vanajalakshmi	K V B Puram					
	C Chakrapani	K V B Puram		Ujala			
	A Lokeshwari	K V B Puram					
	Danujay	K V B Puram		Ujala	25800		9000721219
341	Nagesawararaju	Karvetinagaram			5000		
342	Danujay	K V B Puram		Ujala	14000	8200	
343	Nagesawararaju	Karvetinagaram		Ujala	3000		
344	Danujay	Kuppam		Lalitha(Fullcost)	200		9490028470
July 2020							
345	Lakshmikumari	Nadigam		Supergulabi	2800		
346	Perumal	Amaravathi		Brinjal	2500		9848362255
					556692	2049405	

ICRISAT INTERNATIONAL CROPS RESEARCH INSTITUTE FOR THE SEMI-ARID TROPICS

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We believe all people have a right to nutritious food and a better livelihood.

ICRISAT works in agricultural research for development across the drylands of Africa and Asia, making farming profitable for smallholder farmers while reducing malnutrition and environmental degradation.

We work across the entire value chain from developing new varieties to agri-business and linking farmers to markets.

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