Name of Solution:

Vegetable Grafting and Dryland Horticulture

Submitter: (ICRISAT)

Solution Overview:

Vegetable Grafting and Dryland Horticulture" is a climate-resilient solution designed to enhance the productivity and sustainability of horticultural farmers in dryland and stress-prone regions. By grafting high-yielding commercial scions onto hardy, stress-tolerant rootstocks, this approach helps overcome soil-borne diseases (like bacterial wilt and fusarium), abiotic stresses (drought, salinity, extreme temperatures), and declining soil health.

Key Features & Benefits:

- Grafting in vegetables is eco-friendly and helps enhance crop tolerance to drought, salinity, heat, and waterlogging common in dryland regions.
- Controls biotic stresses like bacterial wilt, fusarium wilt, and root-knot nematodes without excessive pesticide use.
- Increases yield by 40–150% compared to non-grafted crops, even under stress-prone conditions.
- Reduces uptake of heavy metals in produce, ensuring food safety.
- Vegetable grafting is compatible with both open-field and protected cultivation systems, offering flexibility in deployment in crops like tomato, brinjal, chilli, cucumber, watermelon, and bottle gourd.
- Promotes sustainable and low-input farming with long-term benefits for dryland communities.
- When integrated with dryland horticulture practices such as water-efficient irrigation and soil conservation, this solution enables stable, high-quality production of solanaceous and cucurbitaceous vegetables in challenging agroecologies

Where It Works and Where It Can Work:

This solution has shown remarkable success in the Rayalaseema region of Andhra Pradesh, with trials covering over 650 ha and over 65 lakh grafted seedlings distributed. It is well-suited for semi-arid, arid, and rainfed regions in states like Maharashtra, Karnataka, Odisha, Telangana, and Madhya Pradesh, where water scarcity and soil degradation are common. It is also applicable in peri-urban zones and in areas with light-textured soils, where vegetables suffer from frequent replanting failures due to disease. With appropriate rootstock-scion combinations, it can be expanded to other parts of South Asia and Sub-Saharan Africa facing similar agro-ecological stress.

Evidence & Impact

On-farm trials across 540 farmers' fields showed 40–150% higher yields with grafted tomato and brinjal compared to traditional crops.

- In Andhra Pradesh, yield enhancement of over 20,000 tonnes and ₹30 crore in additional farmer income was reported across six years (2018–2024) through grafted vegetable adoption.
- Grafted vegetables demonstrated better crop vigour, uniformity, reduced pest/disease pressure, and improved marketability.
- Knowledge generated from this work is being used to formulate state-level policy guidelines and technical packages for upscaling.

Scalability & Adoption Support

Vegetable grafting is highly scalable due to its adaptability across solanaceous and cucurbitaceous crops, regions, and existing nursery systems. It has been successfully implemented through Centres of Excellence and can be expanded via decentralized nurseries led by trained farmers, youth, and SHGs.

Adoption requires quality rootstocks, localized grafting protocols, hands-on training, and institutional support. With active involvement of ICRISAT, state horticulture departments, and private partners, this technology is ready for wider dissemination in dryland horticulture programs across India.

Partners & Contact Info

Who's involved and how to connect? List of key contact and partners + email / phone.

Rohan Khopade: rohan.khopade@icrisat.org

Gajanan Sawargaonkar: gajanan.sawargaonkar@icrisat.org