NICO NANOBUBBLE INDIA CO.

Case Study

Enhancing Crop Productivity Using NICO Nanobubble Technology

Overview

Efficient water quality and oxygen availability play a crucial role in crop productivity, nutrient uptake, and plant health. Conventional irrigation systems often lack dissolved oxygen, leading to sub-optimal root activity and increased susceptibility to soil-borne diseases.

This case study evaluates the impact of NICO Nanobubble (NNB) Technology on improving irrigation water quality, enhancing crop yield, and reducing chemical dependency in strawberry cultivation under open-field conditions.

Project Details

- **Location:** Manouli Village, Sonipat, Haryana
- **Application:** Strawberry Cultivation (Soil-based, Open Field)
- **Water Source:** Borewell
- **Technology:** NICO Nanobubble System
- **Application Duration:** 1 hour treatment cycle
- **Study Objective:** Comparative assessment with and without nanobubble-treated water
- **Operation Type:** Power-Free (Hydraulic Pressure Driven)

Pre-Implementation Challenges

Prior to the implementation of nanobubble technology, the farm experienced typical agricultural limitations:

- Limited dissolved oxygen in irrigation water, affecting root respiration and nutrient uptake
- Moderate crop yield and inconsistent fruit quality
- Higher incidence of soil-borne fungal and bacterial diseases (20–30% loss)
- Dependence on fertilizers and pesticides for crop management
- Standard harvest cycles without accelerated crop maturity

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NICO Nanobubble Solution

The study utilized the NICO AGNIROOT 08, designed to enrich irrigation water with ultra-fine oxygen bubbles (<200 nm), enhancing oxygen availability at the root zone.

Key functional advantages:

- **Improved Root Oxygenation:** Enhanced oxygen diffusion in soil and rhizosphere
- **Better Nutrient Uptake:** Increased absorption efficiency leading to reduced chemical inputs
- **Disease Suppression:** Healthier root systems reduce susceptibility to pathogens
- **Enhanced Plant Physiology:** Improved plant vigor, fruit size, and color
- **Optimized Water Utilization:** Improved effectiveness of irrigation water

Performance Outcomes

Parameter	Unit	Without *NNB Water	With *NNB Water
Average Yield per Plant	g	600	**1,000**
Total Yield per Acre	kg	18,000	**30,000**
Fruit Size & Firmness	-	Medium	**Bigger, firmer, improved color**
Disease Incidence	% loss	30%	**5%**
Fertilizer / Pesticide Use	%	100% (baseline)	**75%**
Harvest Time	days	Normal	**7 days earlier**

**NNB – NICO Nanobubble*

Key Results and Impact

The integration of nanobubble-treated irrigation water resulted in measurable and high-impact agricultural benefits:

- **Enhanced Crop Productivity:** Yield per plant increased from 600 g to 1,000 g (~65–70%), while total yield per acre rose from 18,000 kg to 30,000 kg (~65%).
- **Improved Crop Quality:** Noticeable improvement in fruit size, firmness, and color, leading to higher market value and better grade consistency.
- **Reduced Disease Incidence:** Crop losses declined from 30% to 5%, driven by healthier root systems and reduced pathogen activity.
- **Lower Chemical Dependency:** Fertilizer and pesticide usage decreased by approximately 25%, supported by enhanced nutrient uptake efficiency.
- **Accelerated Crop Cycle:** Harvesting was achieved up to 7 days earlier, improving crop turnover and market timing advantages.
- **Improved Root-Zone Environment:** Increased dissolved oxygen enhanced root activity and supported a more balanced rhizosphere ecosystem.
- **Higher Farm Profitability:** The combined effect of ~65% yield increase, reduced input costs, and improved crop quality significantly strengthened overall farm economics and return on investment.

Conclusion

The implementation of the NICO AGNIROOT nanobubble system has demonstrated clear potential to enhance overall crop performance by improving root-zone conditions and optimizing resource utilization. By strengthening plant health and enabling more efficient input use, the technology supports consistent, high-quality agricultural output.

This study highlights nanobubble technology as a practical and scalable solution for modern farming systems, particularly in high-value crops such as strawberries, where productivity, quality, and efficiency are critical to long-term success.