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# Smart FARM

## (Farmers Adopting Responsible Management)

Bridging the gap in agriculture through IoT, nano-biofertilizers and capacity building.

## Main Outputs:

- Establish 2 IoT-enabled coffee nurseries with real-time digital tracking and smart irrigation.
- Capacitate 40+ IP coffee farmers and agriculture technicians through the FOUR-level farmers scientist training program.
- Showcase the use of Nano-biofertilizers with real-time data monitoring for improved seedling health.
- Accreditation as certified digital coffee nurseries with the Bureau of Plant Industry.





## Successes:

- Strong multi-stakeholder engagement (LGUs, IP leaders, youth, DA-RFOs)
- Adoption of emerging technologies by traditionally underserved communities.
- Real-time data accessibility for climate and pest/disease interventions.
- Increased farmer income by 30% through higher-quality seedlings and better yields.
- Reduction in carbon footprint via sustainable nano-biofertilizers.



## Weather Data Overview of Bansalan, Davao del Sur

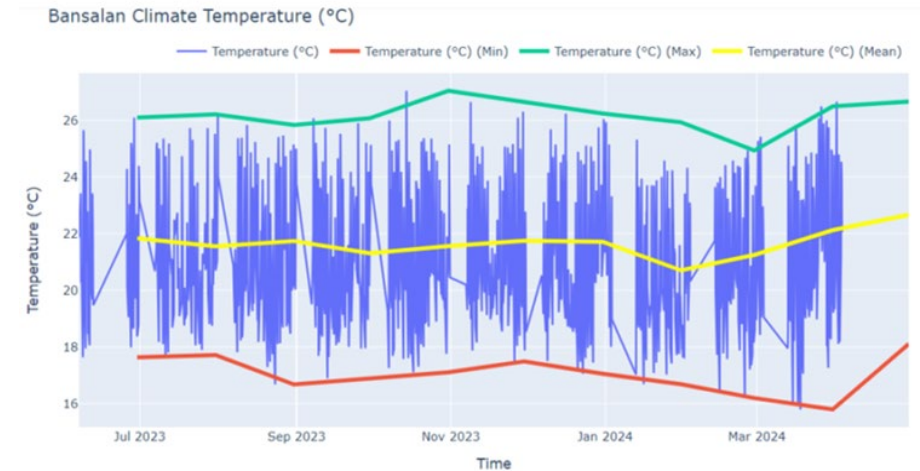
The weather data covers a twelve-month period from June 2023 to April 2024. These parameters are crucial for understanding the climatic conditions affecting coffee cultivation.

### Temperature and Humidity:

- Average monthly temperature ranges from 15.08°C to 26.67°C.
- Average monthly humidity ranges from 51.41% to 95.7%.
- Both temperature and humidity are both at the optimal range for coffee cultivation.

### Solar Radiation:

- Total Radiation varied between 472.55 W/m<sup>2</sup> and 655.09 W/m<sup>2</sup>.
- This provide plants with ample amount of solar energy for photosynthesis and plant growth.





## Seed Germination using Nanofertilizer

- On January 28, 2025 a beta test on seed germination was conducted to assess the number of days to emergence and butterfly stage of coffee seeds.
- Morphological identification techniques were performed on the coffee seeds (Liberica and Excelsa) to confirm the authenticity of the planting materials.
- Excelsa and Liberica coffee seeds soaked in Biogroe (nanofertilizer) successfully germinated 6 WAS and reached butterfly stage 2 weeks after (8 WAS).

\*WAS - weeks after sowing



## Coffee Pest and Disease Occurrence

- On August 4 & 5, 2023, a research study aimed to assess the presence of pests and diseases on Arabica coffee trees in 2 project sites in Impasug-ong and Malaybalay, Bukidnon.
- A total of 105 coffee trees in each site, tagged under the Coffee-based Farming and Entrepreneurship Engagement (COFFEE) Program of VARACCO Inc, were surveyed together with the Bureau of Plant Industry (BPI) - Philippines.
- The results revealed that a majority of the trees exhibited distinct symptoms of pest infestation and disease infection, including physical damage such as holes at the base of immature coffee cherries, premature abscission of leaves and fruits, compromised photosynthetic activity, and reduced overall health and productivity of coffee plants.
- In partnership with ACDI/VOCA and tech consultants, a rehabilitation plan were made to control the coffee pest and diseases.



## Conclusion

### IoT Integration

- Real-time climate and soil monitoring through IoT-enabled nurseries enables precise irrigation and timely interventions against pests and diseases, ensuring optimal growing conditions.

### Nano- Biofertilizers

- Improves seed germination rates and seedling vigor, as demonstrated by the successful early-stage development of showcased coffee varieties.

### FSTP Program

- Capacity-building efforts empower indigenous farmers and agricultural technicians, leading to informed decision-making and sustainable practices.

These innovations have led to higher-quality coffee seedlings, improved yields, and reduced environmental impact, showcasing a scalable model for resilient and climate-smart agriculture.

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# Thank you

Email: [happy@varacco.com](mailto:happy@varacco.com)

Website: [www.varacco.com](http://www.varacco.com) and  
[www.thinnkfarm.com](http://www.thinnkfarm.com)

