NEWSLETTER Vol.3

Rooted in Microbes: A Quiet Revolution in Riau's Plantation Fields

On a sweltering afternoon at an **oil palm plantation in Rokan Hulu Regency, Riau Province**, the sound of **fermenting tanks** filled the air—not with noise, but with **promise**. Beneath the shade of oil palm fronds, **researchers**, **plantation staff**, and the **LULUCF Project Team** gathered—not for ceremony, but for something more urgent: to **reimagine how life is cultivated in degraded soils**.

In June 2025, the **LULUCF Project** and **BRIN**, in collaboration with **PT Andika Permata Sawit Lestari**, organized a two-day hands-on training session on **Plant Growth Promoting Rhizobacteria (PGPR)**—beneficial soil microbes that restore fertility, strengthen root systems, and offer a living alternative to synthetic fertilizers.

This was not a conventional technical workshop. It was the start of a **transformation**.

Engineering from the Ground Up

Led by **Dr. Sarjiya Antonius** and **Mr. Entis Sutisna** of **BRIN** (Plant Nutrition Microbiome research group, the Research Center for Applied Microbiology), the training combined scientific rigor with practical application. Modified stainless-steel rotors and aerators transformed ordinary water tanks into microbial bioreactors. Each component—from agar-agar to bean sprout extract—was meticulously measured,
not to feed people, but to **feed the microbial life that would, in turn, nourish the soil**.

The **fermentation process** is not merely chemical—it is **ecological**. A choreography of carbon, nitrogen, microbial succession, and environmental stewardship. **Agriculture turned inward**.

Composting and Circular Economies

Beyond **PGPR**, the training expanded into biocomposting—transforming palm oil waste and wild-growing weeds into **nutrient-rich humus**. Using **microbial bioactivators** that break down lignin and cellulose, **raw biomass can be reimagined as a resource**.

Even maggots have a role. Black soldier fly larvae, raised on palm oil residue, yielded high-protein animal feed, medicinal oils, and nutrient-dense frass (Kasgot)—an organic soil enhancer rich in micronutrients and humic acids. In this system, nothing is wasted. Not even insects.

Bridging Field and Frontier Science

The work in Riau did not occur in isolation. A **live online dialogue** connected the field site with **JICA Short-Term experts** in Japan to review compost formulations, assess the role of biochar, and align experimental designs for the forthcoming applications of **AeroHydro Culture (AHC)** in both **mineral** and **peat soils**.

What Comes to Life Next

As part of the **next steps**, **PGPR samples** will be analyzed by a BRIN partner lab, and the first trial of compost production by PT Andika is scheduled shortly. Experimental applications in the field are slated for early August, with full **monitoring protocols** soon to follow.

Soil is Not Silent

What took place in Riau was more than training—**it marked a paradigm shift in agricultural thinking**. **Soil is not passive**. It is **alive**: a **biochemical archive**, a **language**, a **network of microbial dialogues** waiting to be reactivated.

The **PGPR** and **compost** prepared in the next couple of months will help **decompose organic matter**, **bind nutrients**, and **enhance plant health**. More importantly, they will **shift mindsets**—redefining how **farmers** and **scientists** think about **productivity**, **resilience**, and **responsibility**.

The **LULUCF Project** continues not just as an **intervention**, but as a form of **translation**: from **science to practice**, from **waste to value**, and from **land to legacy** — advancing the transition to a **green economy.**

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