

TERMINAL REPORT PROJECT HIGHLIGHTS 2021

PROJECT TITLE:

Field verification testing of carrageenan plant food supplement ((CPFS) or **carrageenan plant growth promoter (CPGP)**) for **enhanced growth** and **induced pests and diseases resistance** in **rice** and **corn**.

PROGRAM LEAD:

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PARTICIPATING AGENCIES:

DEPARTMENT OF AGRICULTURE, PHILIPPINE COUNCIL FOR AGRICULTURE, AQUATIC AND NATURAL RESOURCES RESEARCH AND DEVELOPMENT (PCAARRD-DOST), PHILIPPINE NUCLEAR RESEARCH INSTITUTE- DEPARTMENT OF SCIENCE AND TECHNOLOGY (PNRI-DOST), AND LOCAL OFFICES OF THE DA AND DOST.

PROJECT SCOPE:

Most comprehensive research combining both **crop protection and plant nutrition**, in **wet** and **dry seasons** (2018-2020), covering **Luzon, Visayas and Mindanao** (including University of the Philippines Los Banos and regions I, II, III, IVA, VI, IX, and XI).

TECHNOLOGY:

Carrageenan Plant Growth Promoter (CPGP) is a technology developed by **PNRI-DOST through the leadership of Dr. Lucille Abad** as a natural foliar fertilizer **extracted from red edible seaweed** or “guso/gulamang dagat”, an **abundant natural resource in the Philippines**. The extract is irradiated to **break down its components** into smaller chains to be **readily absorbed** by the plants.

MAIN TECHNOLOGY VERIFICATION METHOD:

Two treatments were used to verify the effects of CPGP under different rice fields. **The farmer's practice served as the control treatment** and was compared to the performance of treatment 2 which is applied with the **recommended rate of CPGP in addition to the same farmer's practice**.

SELECTED MAIN RESULTS:

In **each region several thousands of multi-location field trials** were conducted during the wet and dry season. In region I for example, it was participated by 3,387 farmer-cooperators. A **yield increase** in rice of 13.27 - 28% (3,867.20 - 4,860.80 kg/ha) with an additional net income of 7- 49% (php 1,288.90 to php 9,260.98/ha) was obtained on fields applied with CPGP during the wet season. While 16.5 - 22% (3,865.20 - 4,596.05 kg/ha) yield increase with **additional net income** of 21 - 39% (php8,233 - php15,862/ha) was obtained during the dry season within the four provinces in region I. Likewise, rice crop applied with CPGP show **minimal damage against insect infestation and disease incidence**, like Tungro and bacterial leaf blight (BLB).

In Corn trials in Region II, low incidence of pest and diseases was recorded during the conduct of the study. Plots treated with CPGP showed **lowest severity rating of Common Rust and Brown Spot** compared to plots with no-

CPGP applied exhibiting highest severity rating all throughout the trial period. **Highest number of beneficial arthropods** was observed in plots treated with CPGP dominated by spiders that shows that CPGP is environment friendly. **Highest gross benefit** was recorded in the treatment with CPGP amounting to P64,728.00 (Wet Season 2018), equivalent to over 20% increase in yield.

In Region III yield data on areas applied with CPGP in the whole Region III was observed to have a **significant increase** of 12.40% and 8.32% during the wet and dry season, respectively in spite of delays in distribution and application due to logistical and weather constraints.

In Region IVA the on-farm or multi-location trials were conducted in 22 municipalities within CALABARZON. The **use of full RRG (Recommended Rate Granular) + CPP or ½ RRG + CPGP can be recommended** during the dry cropping season where a yield of 7.81 t/ha was obtained. The wet cropping season planting obtained a higher yield of 8.81 t/ha with the use of full RRG + CPGP compared to the other treatments. Financial analysis of rice production in the study showed **a 58% increase in net income** with the application of ½ RRG + CPGP.

In Region VI, the proper timing of application and dosage of CPGP in rice production have shown an **increase in yield** from 9.88 - 50.39% **despite the damage incurred by drought** and other environmental factors.

In Region IX, the rice plants treated with CPGP were found to be disease free. Thus, the **pesticide and fungicide application has been decreased** as well as the production cost. In 2019, the entire Region IX was declared to be under the state of calamity due to dry spell phenomena. The drought spell in Zamboanga Peninsula affected the application of CPGP during the field verification trial. However, based on observations the **dry spell phenomenon had less impact** on the yield performance on some identified farms applied with CPGP. The application of CPGP on rice fields had a good effect in terms of **protective mechanism against severe heat** from the sun.

Low incidence of pest and diseases was also recorded in corn. Plots treated with CPGP showed **lowest severity rating of common rust and brown spot** compared to plots with no CPGP applied exhibiting highest severity rating all throughout the trial period. This result has shown the effect of CPGP as **resistant inducer to pest and diseases**. Moreover, **highest number of beneficial arthropods** was observed in plots treated with CPGP.

SUMMARY CONCLUSIONS AND RECOMMENDATIONS:

With the use of carrageenan plant growth promoter (CPGP) in rice crop for wet and dry seasons, **it increases yield by enhancing crop health amidst unpredictable biotic and abiotic factors**. Application of CPGP in combination with farmers practices makes the **crop sturdier even under extreme weather conditions**. **Despite of drought, strong winds and other drastic environmental conditions**, crops applied with CPGP aid in giving higher yield, taller crop stand, and higher number of productive tillers.

CPGP proved its potential in improving rice production nationwide, as well as for corn in selected locations. Hence, this is a **solution to boost rice and corn production**, regardless of the season. It is **recommended that CPGP could be part of the package of technology (POT) for rice and possibly corn after further field verification testing in more locations**.

Further study on the utilization of CPGP to other crops like sugarcane, fruits and vegetables can be considered as farmers can **increase yield and/or lessen chemical fertilizer** use up to 50%. In addition, CPGP uses an **abundant raw material** to the **potential benefit of seaweed farmers and contribution of foreign exchange savings**. **In sum, CPGP will greatly contribute towards attaining food security with an all Pinoy technology and natural resource**.