

JIRCAS contributes to CARD

Provision of science-based evidence and technologies

Progress Report at the 19th SC meeting

Project leader

Yasuhiro Tsujimoto

2023.7.3-7.5



Development of sustainable rice cultivation and food production system in Africa 【Africa Rice Farming System Project】

Project goal

To develop **sustainable and nutrition-sensitive food production system centered on rice** by integrating **water management technologies, breeding materials** and **cultivation technologies**, and to provide them to the target countries.

Target country

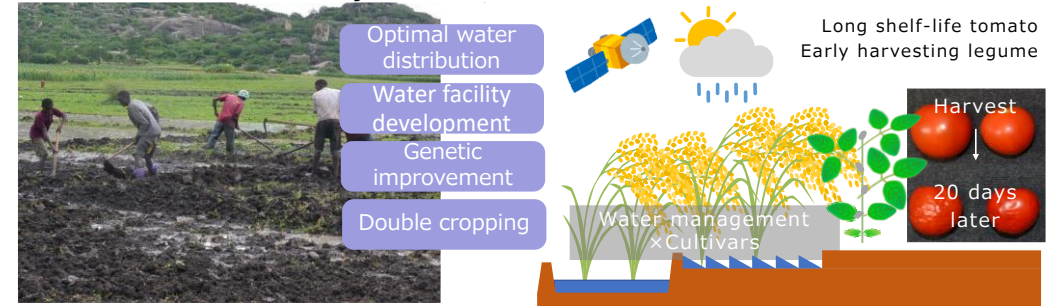
Madagascar, Tanzania, Guinea

Project Period

2021.4~2026.3 (5 years)

SATREPS-Madagascar: 2017.5-2022.9

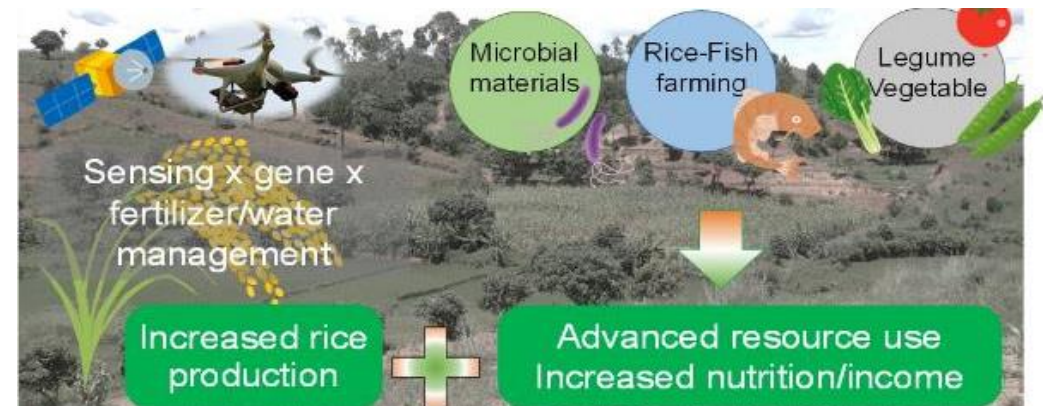
I. Civil engineering and remote sensing for maximizing water use efficiency



II. Rice & Veg breeding for resilience to environ. stresses and enhanced nutrition



III. Sustainable & nutrition-sensitive rice prod. system



New rice varieties: certified seed prod. completed

Productive under poor nutrient cond.

1990s: Finding of *Pup1* locus (from traditional *aus* variety)

2012: Gene and functional mechanism identified (*Nature*)



2015-2019: Repeated selection & generation adv. in Madagascar

2020-2021: Prod. & taste tests

2021.10: Variety released

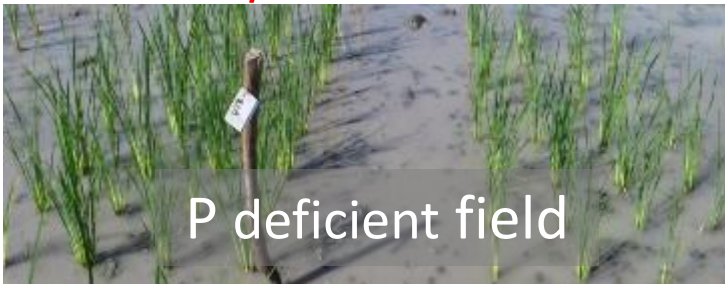


Foundation seed

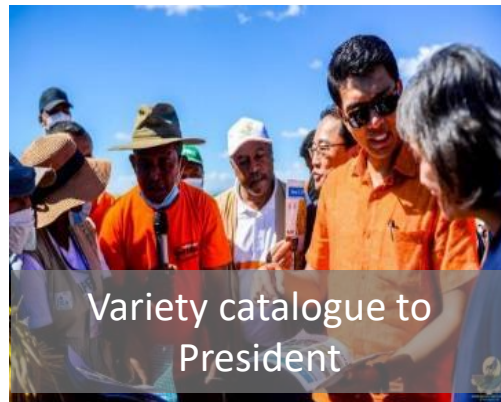
2022.11: Started certified seed prod. in 11 regions (with Papriz)

IR64+*Pup1*

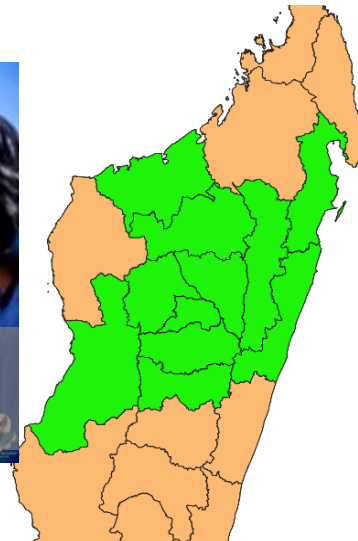
IR64



P deficient field



Variety catalogue to President



2023.5: 20~40t certified seeds produced



Ministère de l'Agriculture et de l'Elevage

2日 · 🌐

FYVARY 85 SY FYVARY 32 : KARAZAM-BARY KELY MASON-KARENA SY MORA AMBOLENA Vokam-pikarohana navoakan'ny Tetikasa PAPRIZ niaraka tamin'ny FOFIFA ny FyVary 85 sy FyVary 32. karazam-bary ahazoana vokatry tsara na ambolema amin'ny toetany tsy ampy fosforo aza, ary azo ambolema in-droa ao anatin'ny taona iray.

Taorian'ny andrana natao tany amin'ny faritra Vakinankaratra, Alaotra Mangoro ary Boeny nahitam-pahombiazana, dia efa miroso tsy ampy amin'ny famokarana masomboly izay ho an'ny tantsaha.

FYVARY 85 ET FYVARY 32 : DE NOUVELLES VARIÉTÉS FACILES A CULTIVER ET A DES COÛTS MOINDRES Issus des résultats de recherches du Projet de collaboration avec le FOFIFA, les variétés 85 et Fyvary 32 démontrent une meilleure performance aux sols peu fertiles. De cycle court, ces variétés sont faciles à cultiver et peuvent être produites en plus faibles coûts, avec les conditions favorables de produire deux fois dans l'année.

Après les résultats satisfaisants des tests effectués dans les régions, Vakinankaratra, Alaotra Mangoro et Boeny, les techniciens procèdent à la production de semences de bases.

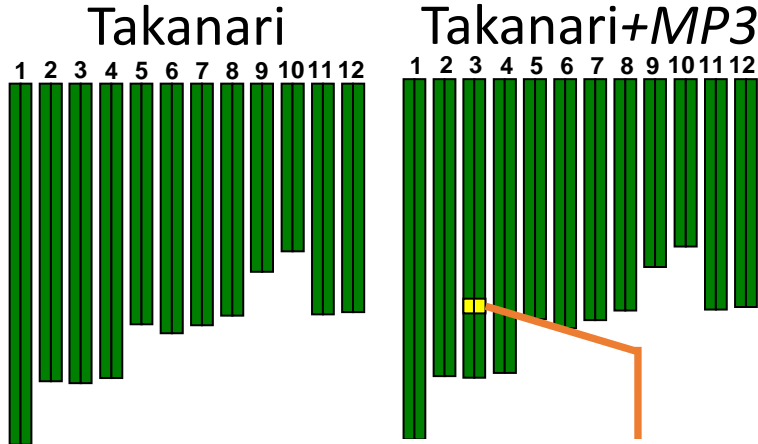
[翻訳を見る](#)



Distributed to farmers

A new genetic resource=MP3 to increase rice yields under climate change

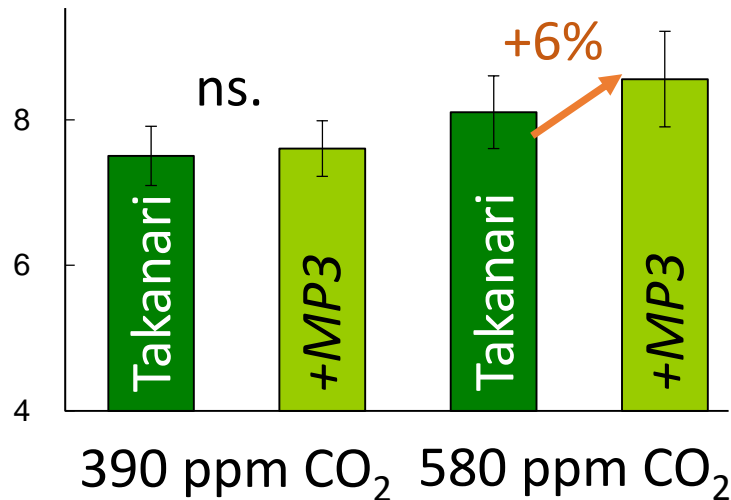
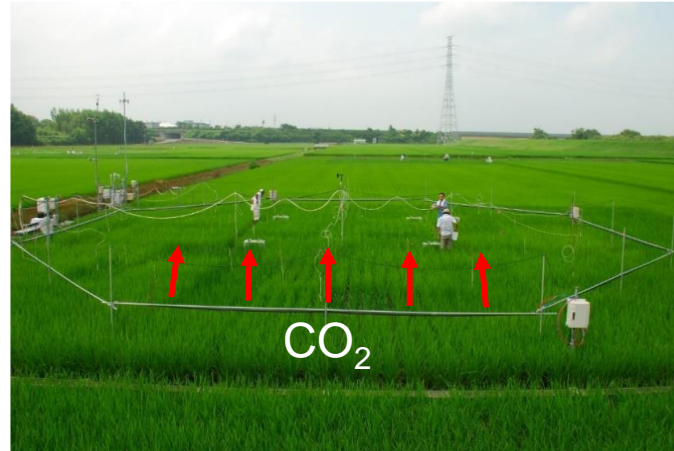
More yields under higher atmospheric CO₂ level



Novel gene from *Koshihikari* accelerates tillering speed



CO₂-enriched field trial



JIRCASなど、高CO₂環境でイネを増収させる遺伝子を発見

気候変動に対応した多収イネの開発が可能に

© 1pt 5分

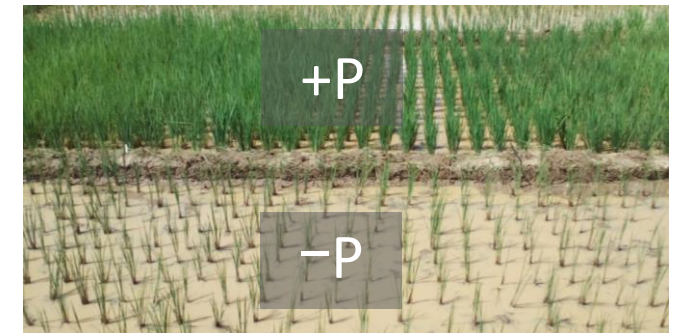
2023.04.19 川島礼二郎=ライター



国際農林水産業研究センター（JIRCAS）などの研究チームが、稲穂の基となる腋芽（えぎ）の生長を促して穂数を増やす遺伝子「MP3」を見つけたと発表した。MP3はコシヒカリから同定されたもので、これを他の品種に導入すると収量の増えを期待するという。 絵文は2023

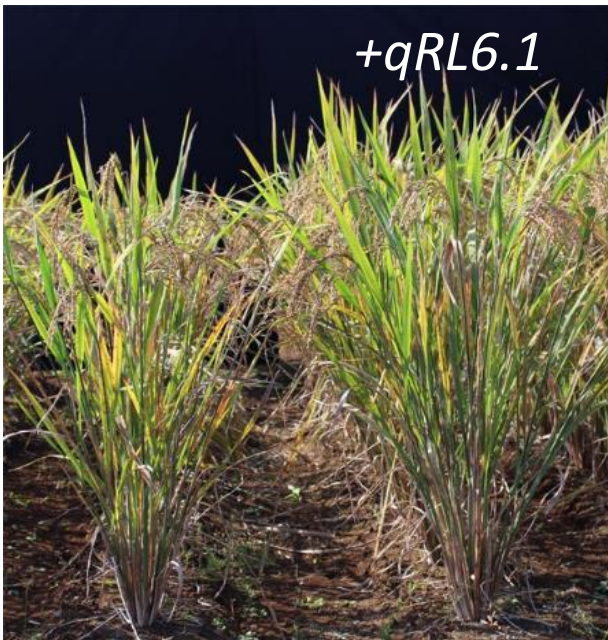


X265+MP3 developed to assess P-def. (tiller-limit environ.) in Madagascar

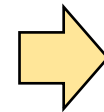


Promising lines using QTL (*qRL6.1*, *Spike*) were transferred to Guinea and started the field evaluation

	NERICA1	NERICA4	NERICAL-19
yield of original (t/ha)	1.4	2.3	7.8
yield of + <i>qRL6.1</i> (t/ha)	2.1	2.8	9.3
yield advantage	+55%	+22%	+19%



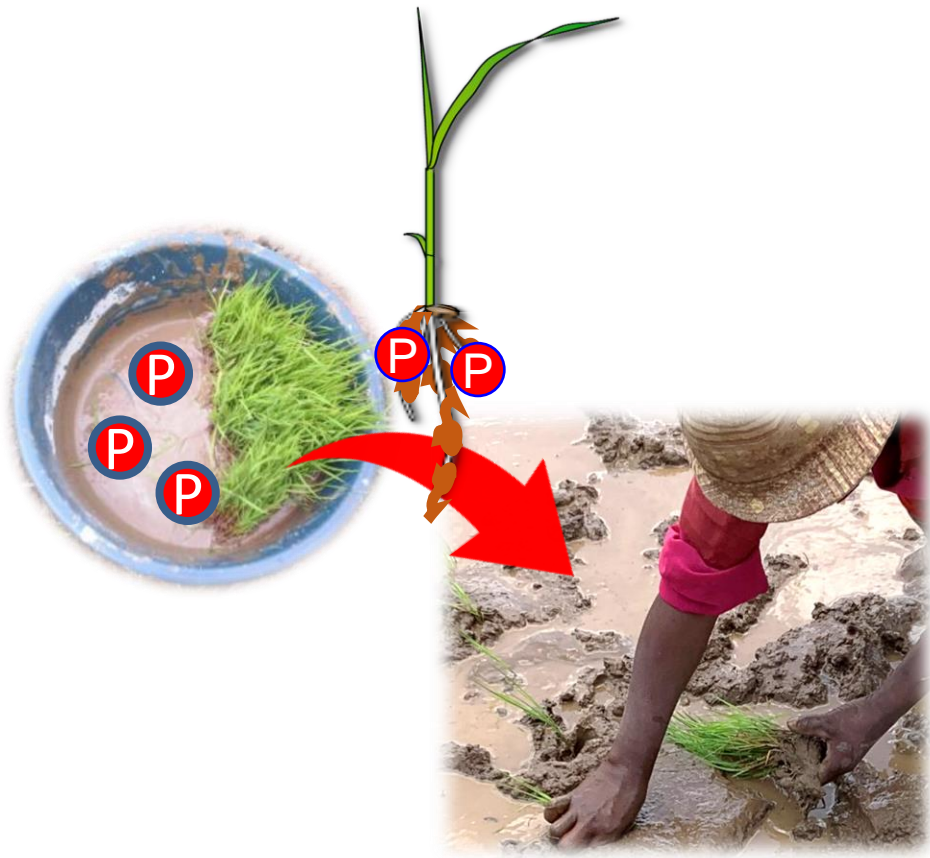
and +*Spike*
(QTL for more grain no.)



IRAG in Guinea

P-dipping is a solution to increase **productivity and resilience** to environmental stresses for lowland rice **with minimal fertilizer** inputs in Madagascar

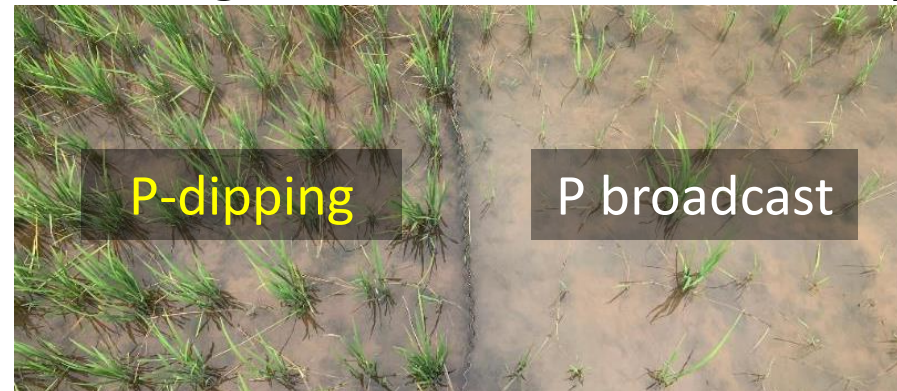
Simple! Mix, dip, and transplant



P-dipping shortens maturity, avoids cold/drought stresses at the end of rainy season (+grain q/t. up)



P-dipping accelerates initial growth and avoids flooding stress at the start of rainy season



Smallholder farmers & private company started buying the P-dipping tech.

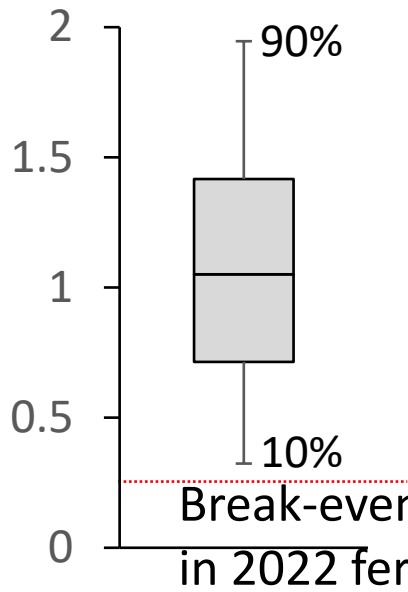


- >1,000 farmers purchased the sacs (adopted the P-dipping)
- A local company procured +50 t of TSP (60,000\$) for P-dipping in 2023.1.



with JICA-Papriz

Yield gain by P-dipping (t/ha)



P-dipping needs much smaller amounts of fertilizer-> less costly, easier to carry, and beneficial even in high fertilizer price



No one left behind



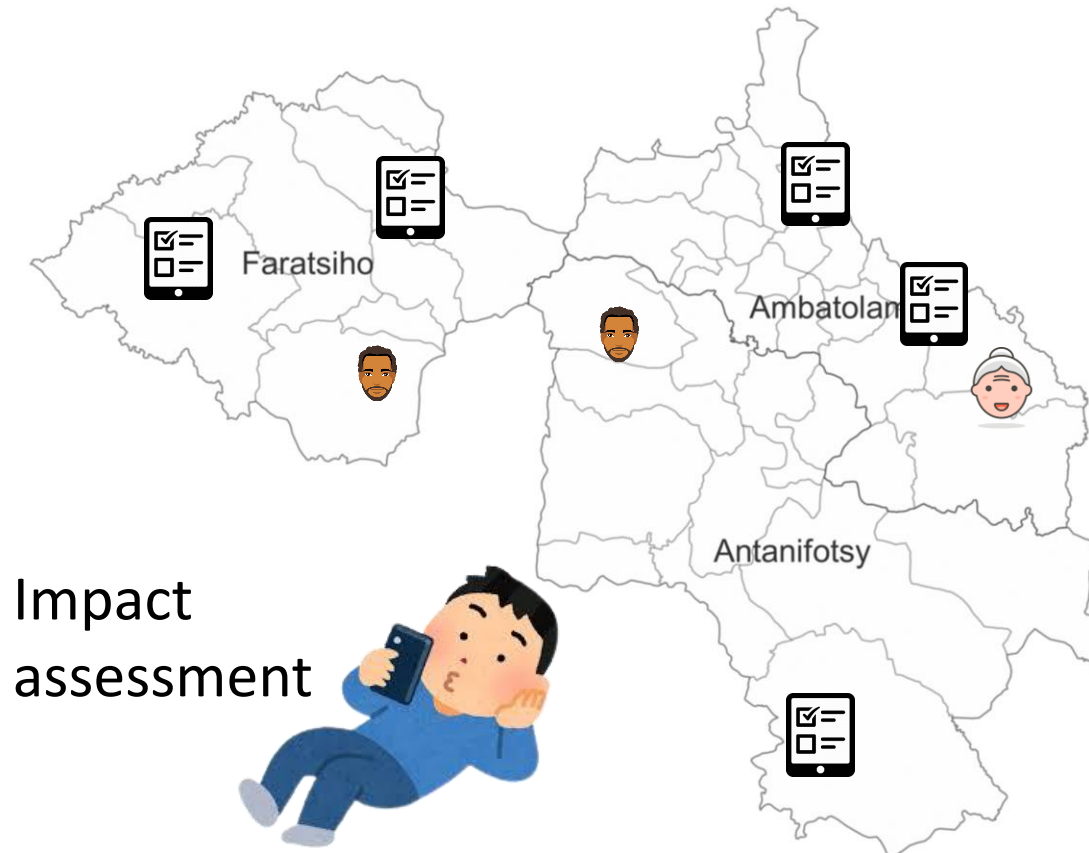
More promotion needed to increase the number of users and enlarge the fertilizer market



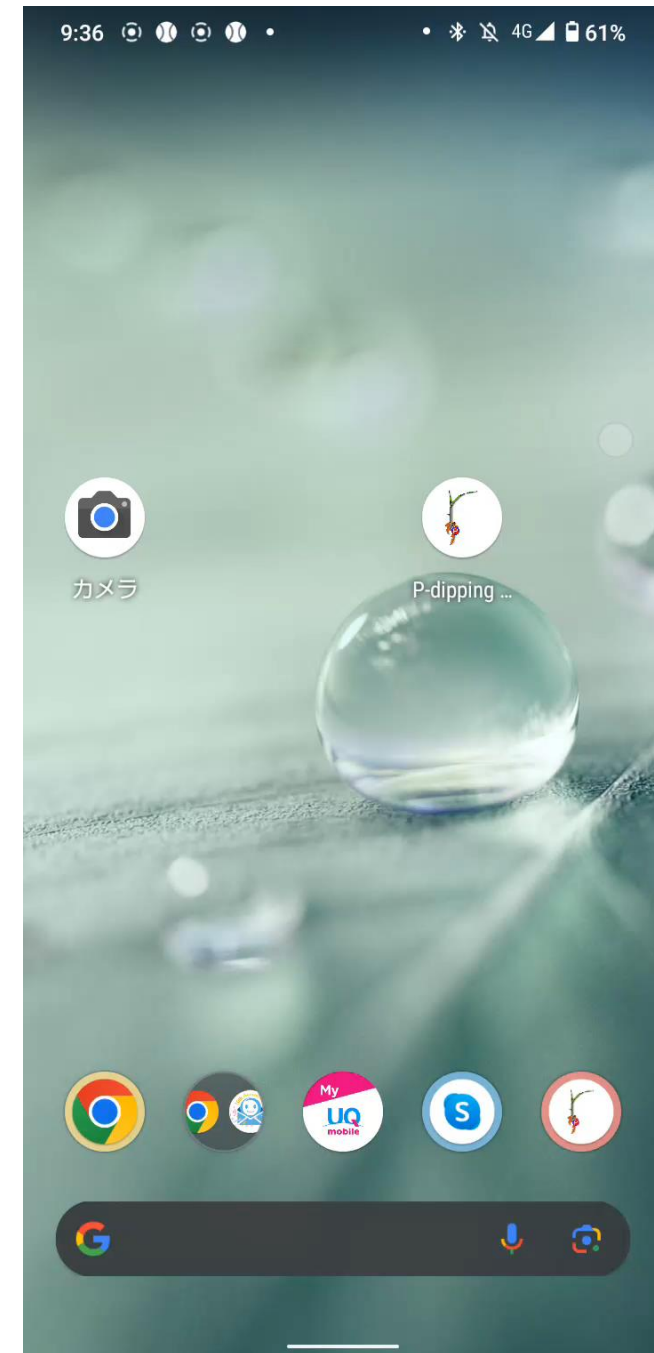
ICT tool (simple POS system) for

1. monitoring the technical impact by remote and real-time with higher accurately and less cost
2. assisting extension policy & business strategy

*those who purchased the sacs $\hat{=}$ technique adopters



Do you have unused Android?



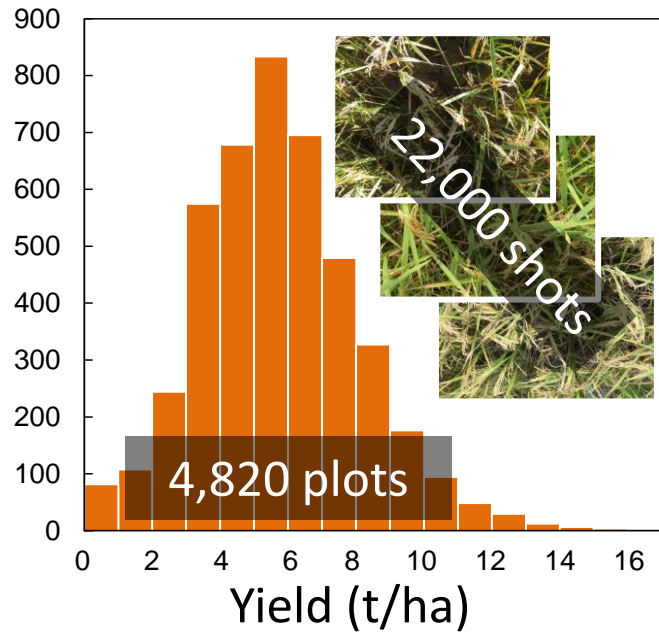
Another ICT tool for estimating rice yield by taking canopy photos

Hojo App open-released at AppStore on May17 and GooglePlay on June 7, 2023.

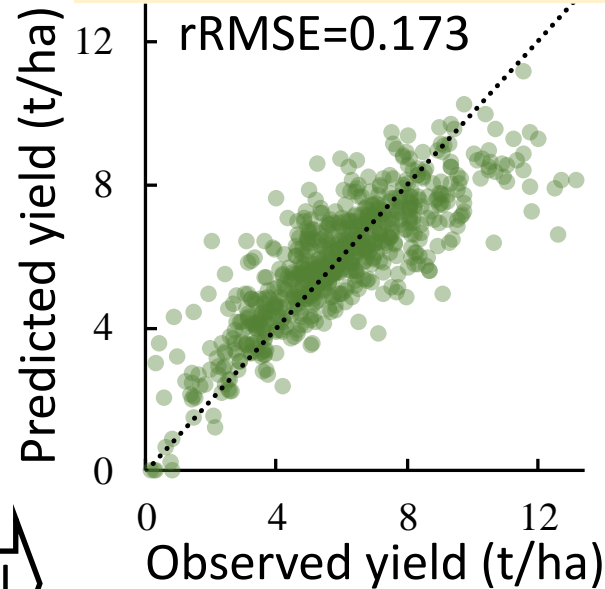


iOS

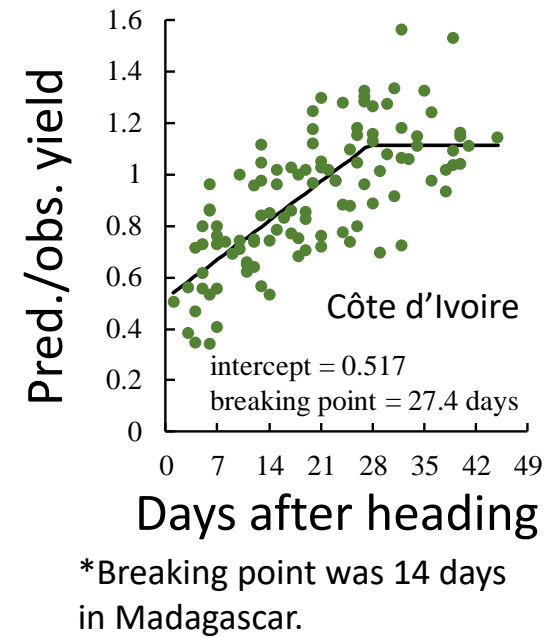
Android



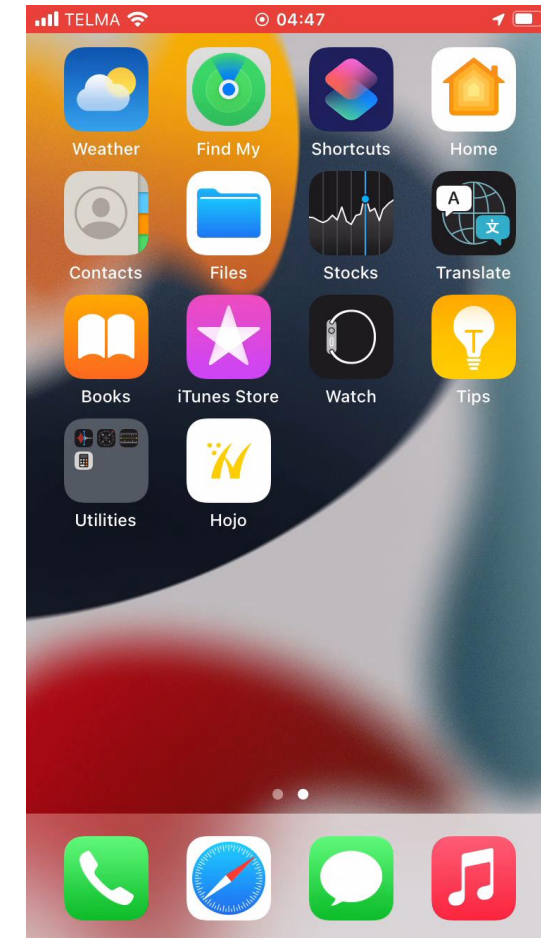
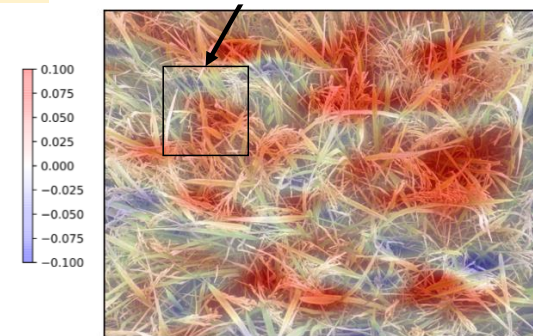
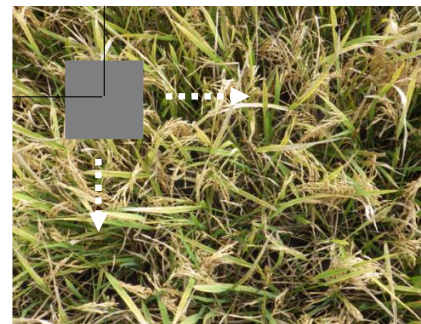
How accurate AI predicts



From when AI can predict



What AI looks at

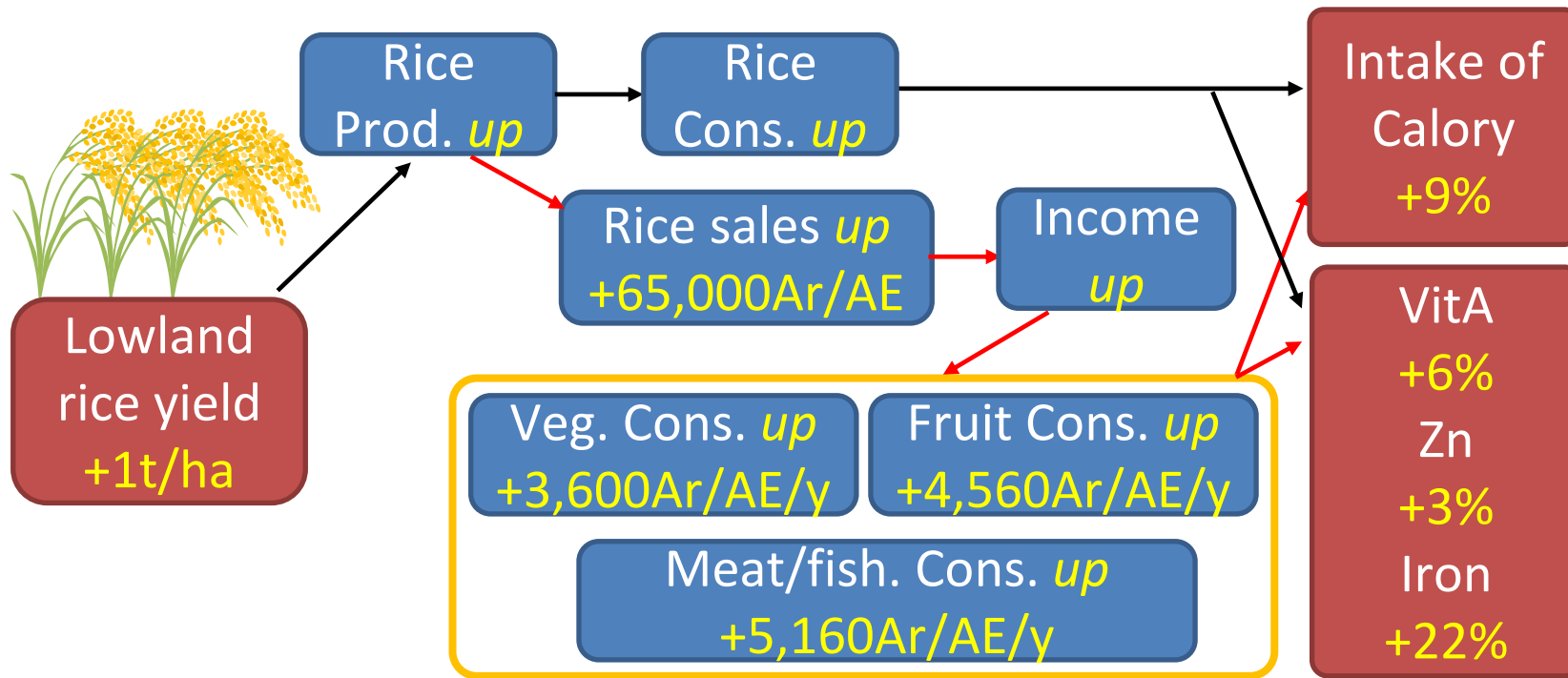


Tanaka et al. (under review)

In collaboration with AfricaRice and others

Rice yield gain contributes to the human nutrition in quantity & quality by increasing the income and purchases of nutritious food items in Madagascar

Based on the survey to 600 HH in 60 villages from 2018 to 2020 → PASAN (IFNA) activities



日本経済新聞

お申込み

ログイン



トップ

朝刊・夕刊

LIVE

Myニュース

国際農研・東大など、コメ増収はマダガスカル農家の栄養改善に有効であることを解明

2023年1月12日 16:37



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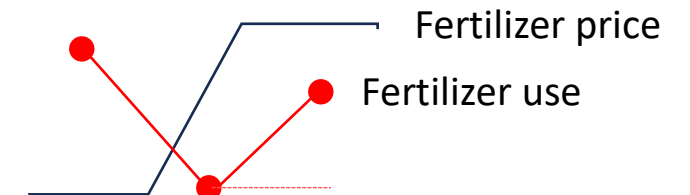
生産・消費などのモニタリング状況

Nikiema et al., 2023



600 HH monitoring continued up to 2023

Impact assesment of high fertilizer price on prod. & cons. at HH level





JIRCAS continues field-based and inclusive research activities to contribute to the CARD



A new activity to assess GHG in Mada
Funded by the MinEnv. (2023-2028)