

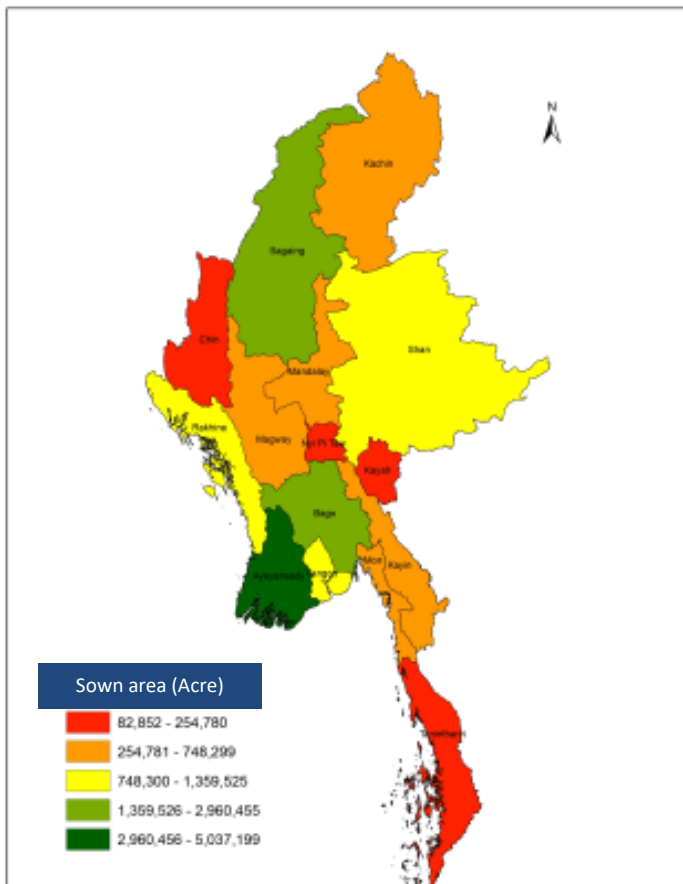


Evaluation of low N-tolerant rice varieties through the use of ^{15}N dilution technique

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Rice sown area in Myanmar, 2016.
Deevi Kumara Charyulu (ICRISAT)
Mar Mar Win & Su Su Win (DAR)

Rice-based cropping in Myanmar

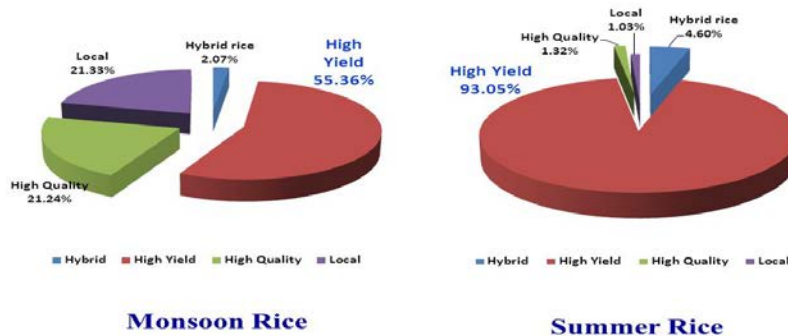
- Low land rice-based cropping system is major cropping system in Myanmar
- Total rice sown area is 7.21 million hectares in 2015-2016
- Delta, Bago and Sagaing Regions
- Then Shan, Mon and Rakhine



High Yielding Varieties

- Fertilizer responsive
- Increasing yield with increasing rate of fertilizer applied

Different Type of Rice Cultivation in Myanmar



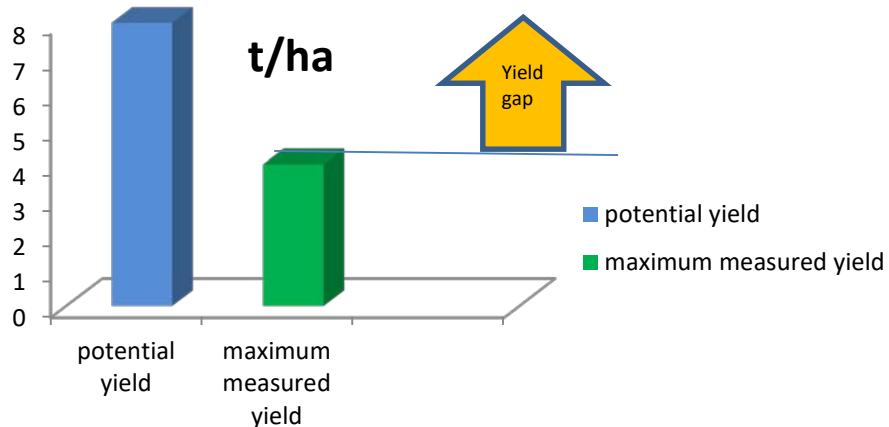
Source: Dr. Ye Tint Tun, DG, DOA, MOALI

- HYVs are common
- Increasing yield with increasing rate of fertilizer applied
- Farmers' affordable rate never meets the requirement
- Low yield



Yield gap

The gap between potential yield of rice variety and yield measured maximum in the field still exists.



- Decreased yield with low-input production is one reason for occurring yield gap between potential yield of HYVs
- Improvement of productivity as well as enhancement of nutrient efficiency is required in the future
- N is the most limiting nutrient for rice production



Low-N tolerant rice varieties



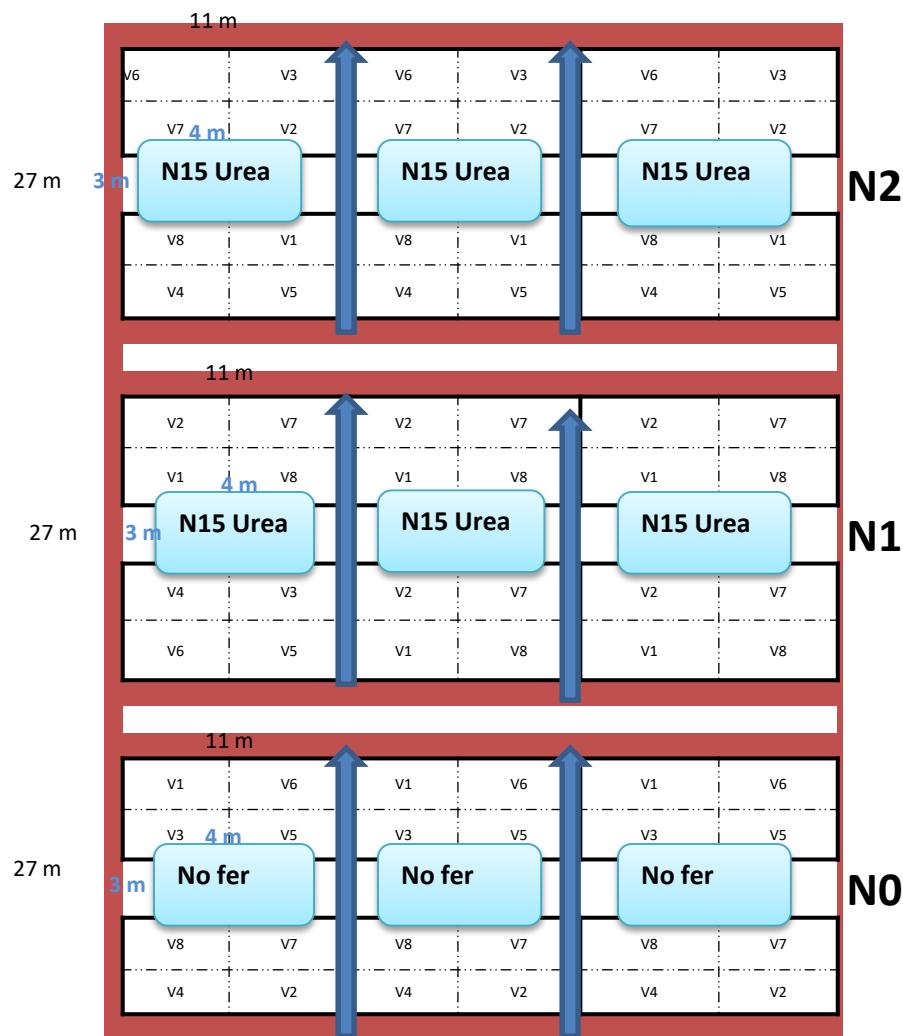
- Low-N tolerant rice varieties were screened from 2007 to 2009 wet and dry seasons at Soil Science Section in Yezin
- Evaluation of low-N tolerant rice varieties through Grain Yield Efficiency Index (**GYEI**) >1, and responsive-efficient rice varieties based on **internal efficiency of nitrogen**



NUE quantified by ^{15}N



- It is needed to validate Nitrogen Use Efficiency of screened low-N tolerant rice varieties
- ^{15}N tracer technique is essential to distinguish N uptake of the rice from added vs. indigenous nutrient supply.



MYA5023- evaluating NUE

TC (Technical cooperation)
project _IAEA-DAR

Soil Science Section
Department of Agricultural
Research, Yezin, Myanmar

2015 Wet season

2016 Wet season

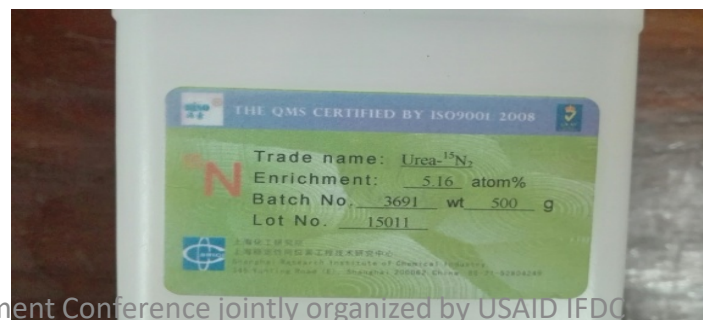
N2: 116 kg N ha⁻¹

N1: 58 kg N ha⁻¹

N0: 0 kg N ha⁻¹

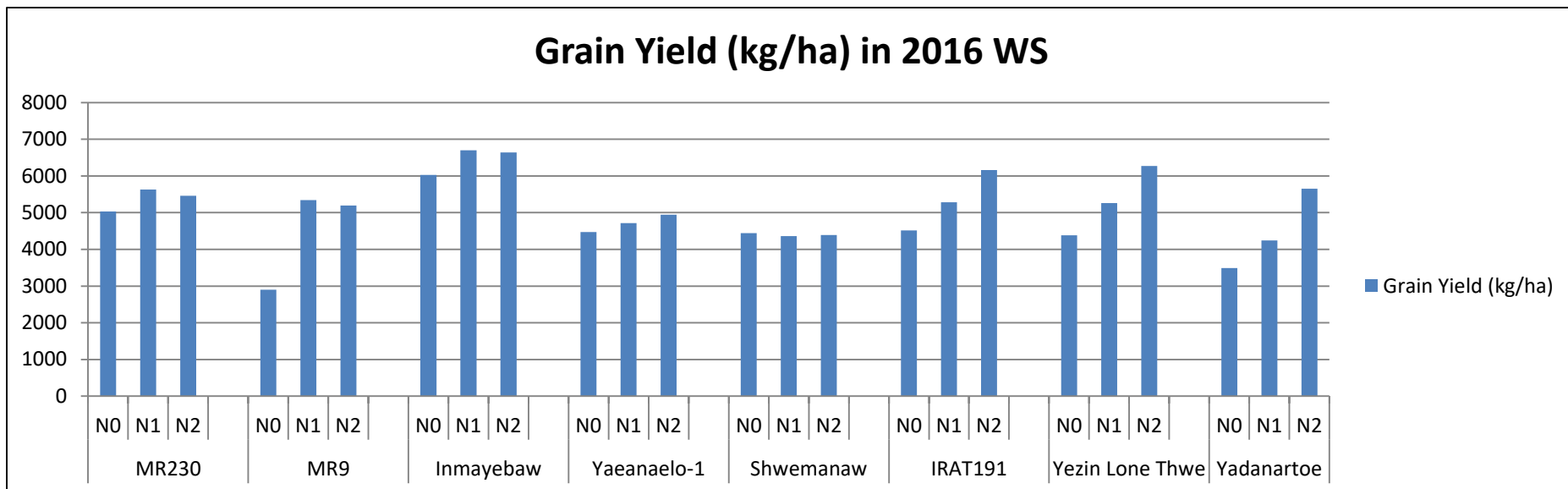
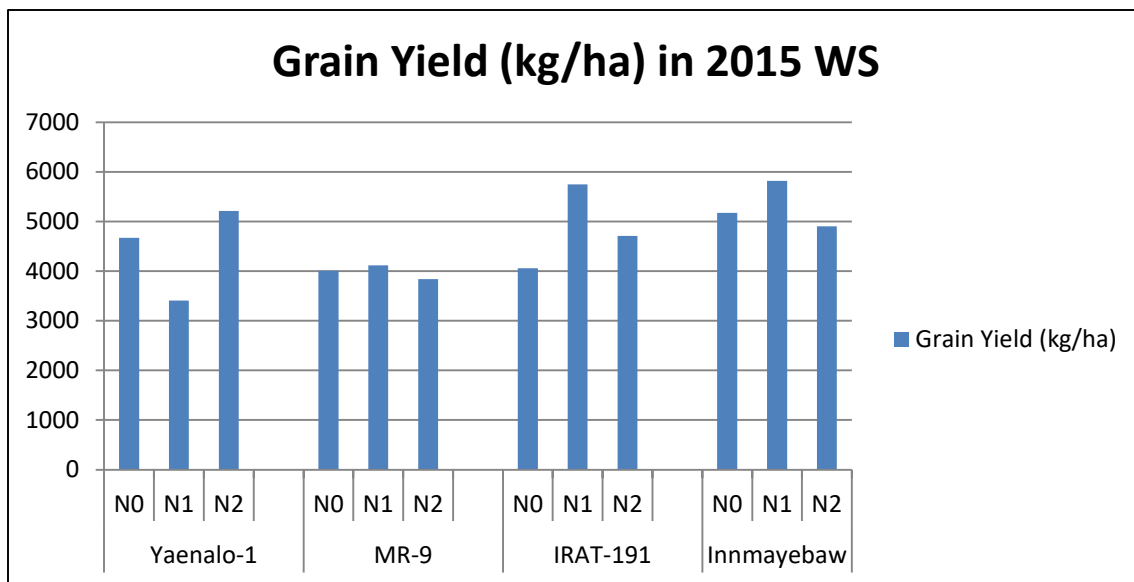
V1	MR 230 (135 days)
V2	MR 9 (120 days)
V3	Innmayebaw (mid-Nov)
V4	Waenaele-1 (120 days)

V5	Shwe Ma Naw (115 days)
V6	IRAT-191 (120 days)
V7	Yezin Lone Thwe (125 days)
V8	Yadanar Toe (115 days)



Grain Yield

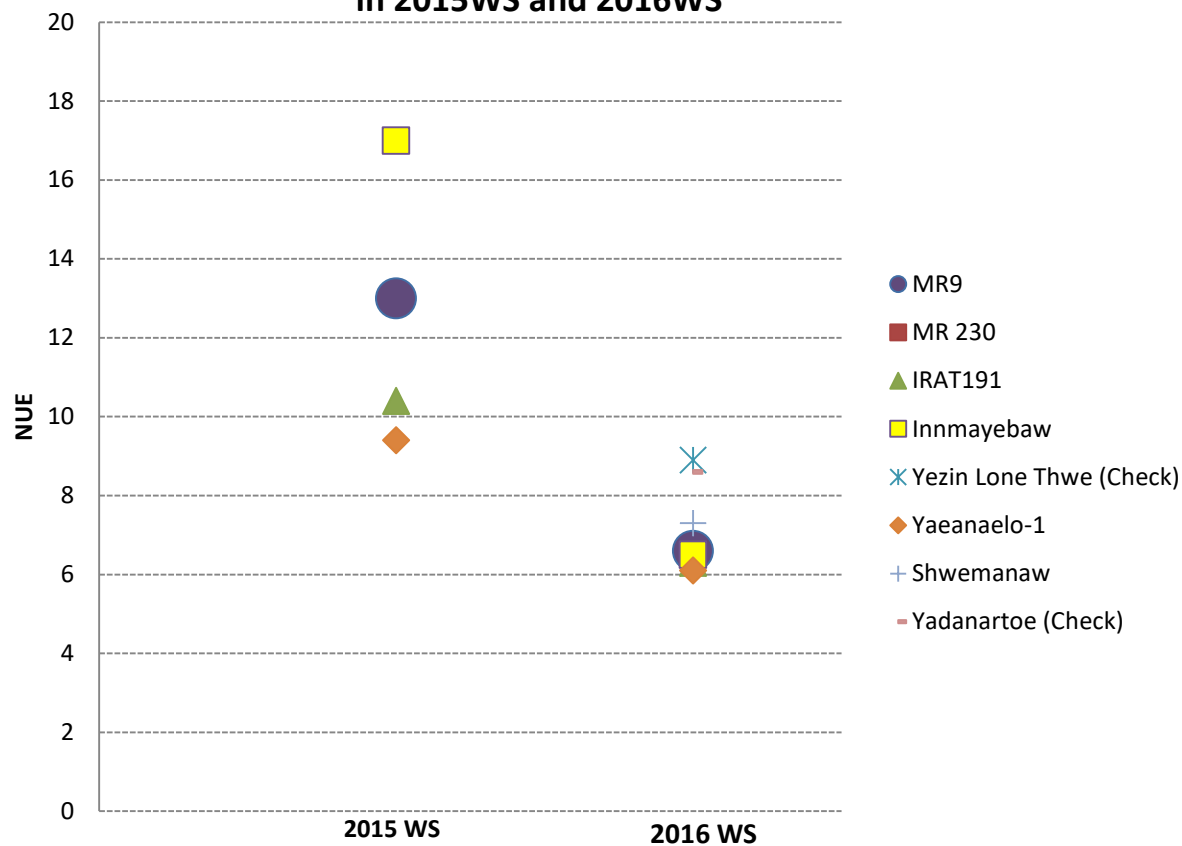
- **2015 WS:**
IRAT-191 and Innmayebaw
- **2016 WS:**
MR 230, Innmayebaw,
IRAT 191,
two check varieties





NUE

NUE of low N tolerant rice varieties evaluated in 2015WS and 2016WS





Conclusion

- The three levels of N fertilizer rates were
 - N0 (without N fertilizer),
 - N1 (58 kg N/ha) and
 - N2 (116 kg N/ha)
- Fertilizer Nitrogen Use Efficiency (FNUE) was determined through the application of ^{15}N labeled urea with 5.16 atom% enrichment into a micro-plot

Innmayebaw gave the highest grain yield (5 ton/ha) in 2015WS and (6 ton/ha) in 2016WS at N1 level of Urea fertilizer.

The highest FNUE was observed with Innmayebaw in 2015 WS .



Research outcome

- The probability of increasing yield with further increase in nitrogen fertilizer was a lesser amount for low N-tolerant rice varieties.
- The research outcome suggested to rice farmers in Myanmar that the judicious application of 58 kg N/ha led to 30% fertilizer saving with 20% fertilizer loss to the environment with optimum yield.



IAEA

International Atomic Energy Agency

Atoms for Peace

Thank you very much



Su Su Win presented on 18th
Oct 2017

Myanmar Soil Fertility and Fertilizer
Management Conference jointly organized
by USAID IFDC ACIAR MOALI at DAR NEW
AUDITORIUM on 18-19 October 2017