

BACKGROUND

More than ten years of experimentation has demonstrated that use of Urea Deep Placement (UDP) results in significantly higher N Use Efficiency (NUE) than broadcasted prilled urea (PU) for lowland rice in Bangladesh. UDP use increases yields, reduces quantities of urea applied, increases farmers' returns, and produces national savings due to reduction of urea imports. Ongoing research indicates that large scale adoption of UDP also has environmental benefits due to reduction of N losses and greenhouse gas emissions.

OBJECTIVES

- To estimate UDP adoption in terms of percent users and percent of land under UDP use for each of the three growing seasons: Boro, Aus, Aman
- Compare PU and UDP with respect to yield and NUE
- Effectiveness assessment of methods used for diffusion of UDP technology
- Identification of factors with potential to constrain UDP adoption

METHODOLOGY

- Sampling:** Two stage cluster sampling. Sample Size Equation Based in the Binomial Probability Distribution:

$$n_h = [z^2 * r * (1-r) * f * k] / [p * \tilde{n} * e^2]$$

Where n_h is the sample size (n households), Z value from the standardized normal dist., r estimate of proportion of the key response variable; f sample design factor which accounts for the degree of variability due to the clusters; k anticipated rate of non-response; p proportion of the population that becomes the target population, \tilde{n} is the average household size in number of persons; and e is the margin of error to be attained.

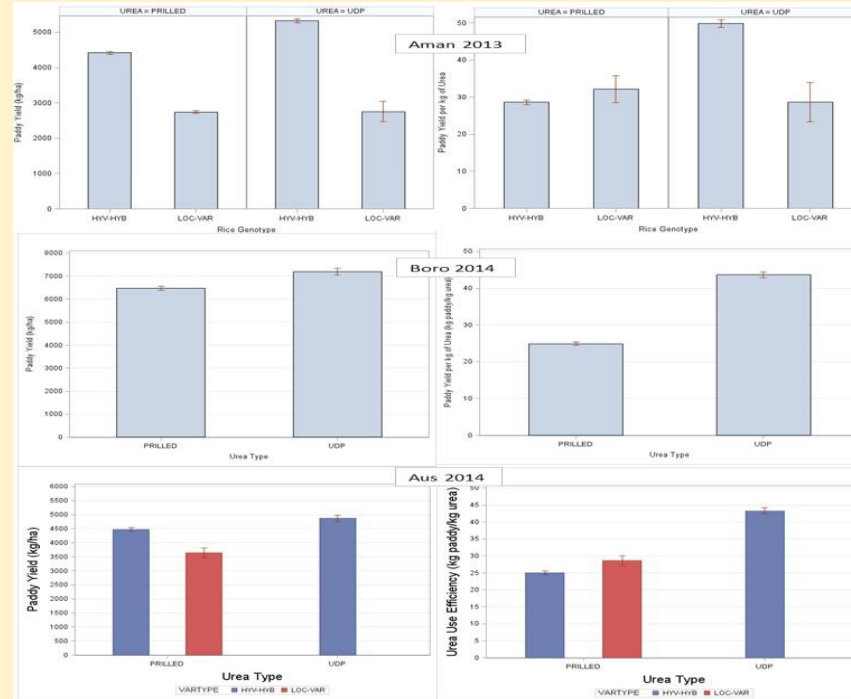
- UDP Adoption:** Weighted Frequency Analysis
- PU vs UDP Comparisons:** Mixed model Analysis of Variance for the Factorial Arrangement of 2 Genetic Materials (Local varieties and Improved Varieties / Hybrids) and the 2 Types of Urea (PU and UDP).
- Effectiveness of Diffusion and Adoption Constraining Factors:** Contingency Tables, Logistic Models, Odd Ratios

RESULTS

UDP Adoption Levels

	Sample Size n households	UDP Adoption		UDP Use in Small plots (<1 ha)		Increase Relative to Prilled Urea	
		% Users	% Land	% Users	% Land	NUE (kg rice/kg N)	Yield (t/ha)
Aman 2013	840	50	31	82	63	45.6	911
Boro 2014	702	49	29	88	70	40.4	861
Aus 2014	660	36	23	99	99	39.1	393

UDP Use Effect on Yield and NUE



Most Effective Diffusion Methods

- IFDC & DAE Training & Extension activities
- Farmer's observation of demonstration plots
- Farmer's involvement in Field Days
- Information from briquette producers

Constraining Factors for UDP Adoption

- Additional labor for line planting and UDP application
- Manual application is physically demanding
- Briquettes not always available
- N rate in briquettes is too expensive



CONCLUSIONS

- Agronomic and environmental advantages of UDP use have been demonstrated
- Large potential UDP use expansion: 50% users and 70% area
- Manual and mechanic applicators would extend UDP use to larger production fields
- Improvements of UDP briquette distribution markets needed for growth of UDP use

Acknowledgments

This research work was implemented by the AAPI project of IFDC in Bangladesh with funds of the USAID Feed the Future Initiative