Urea Deep Placement in Bangladesh

by

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Accelerating Agriculture Productivity Improvement (AAPI) Project

Bangladesh at a Glance

- Area in Sq Km 147,570
- Population 150 million
- Cultivated land in Sq Km 78,410
- Average annual rainfall in mm 2,460
- Agriculture 20% GDP
- Rice is the staple 80% arable land
  - Rice production 32 million mt/an
  - Average yield per season 2.5 tons/ha
  - 3 seasons per year

IFDC

Soils of Bangladesh

- The largest delta in the world
- Landscapes are active, young and old floodplains
- Topography – flat 10 m amsl
- Soil pH 5.5 to 7
- Soils inherently low in N, P, K
- Salinity is a problem in coastal areas
- Inefficient use of fertilizers is leading to declining soil nutrient status

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Use of Fertilizers in Bangladesh

- 4 million tons of fertilizer applied each year
- As much as 75% (3 million tons) is urea
  - The current ratio N:P:K applied is 12 : 0.1 : 0.1
  - The recommended ratio is 1 : 0.3 : 0.6
- Method of application is broadcast by hand
- Efficiency of urea-N in rice cultivation is low (30-35%)
- 70% of N applied is lost

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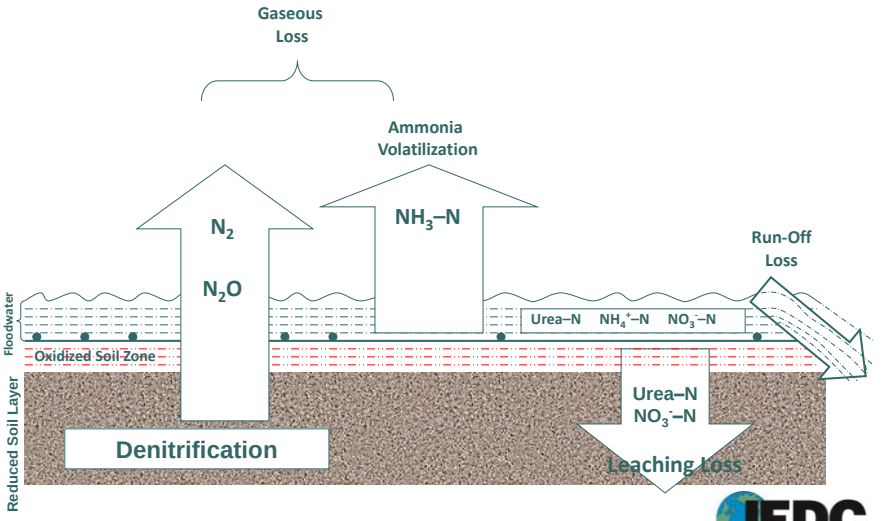
N Loss Pathways when Urea Is Broadcast into a Flooded Paddy Field



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Urea Deep Placement (UDP)

More Efficient Use of Nitrogen

Higher Yields

- Briquettes placed 7-10 cm below the surface
- Briquette size 1.8 or 2.7 gm
- Placement centered between 4 plants (20 x 20 cm spacing)
- Placement 7 days after transplanting by hand or with an applicator

Urea Briquettes
Manufactured Locally from Granular urea

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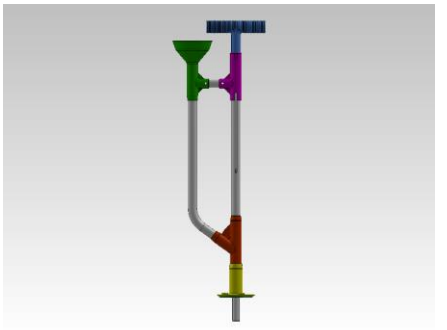
Briquette Machine

Fertilizer Deep Placement

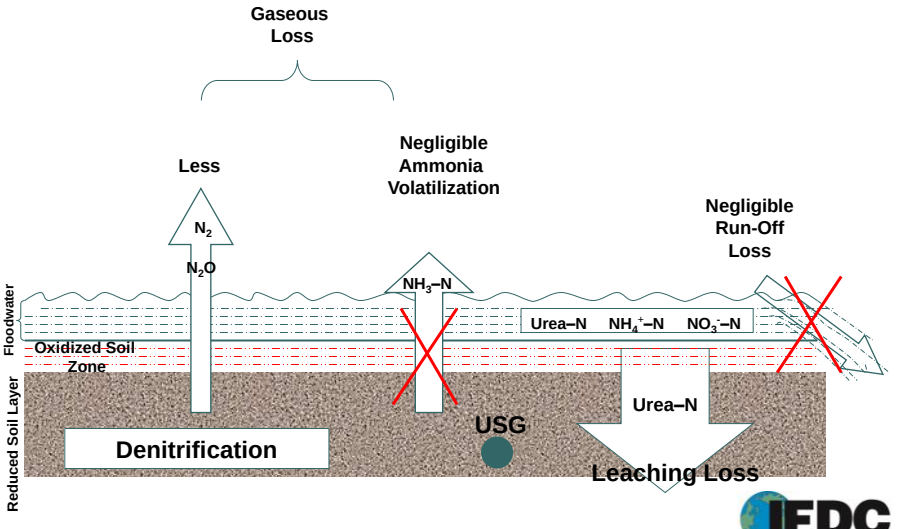


Pros and Cons of UDP

- Less urea applied
- Application is only once in the season
- Increased yield
- Less weeds

- Extra labor required for application
  - (offset by less weeding)
- Works best with row planting
- Best response with HYVs

Urea Deep Placement



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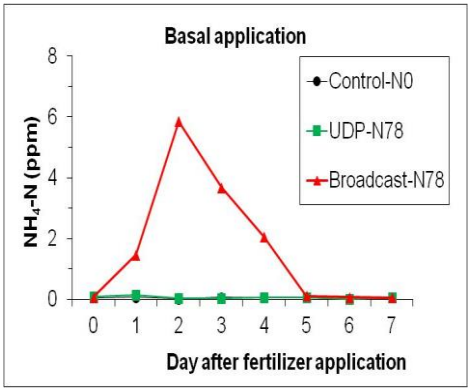
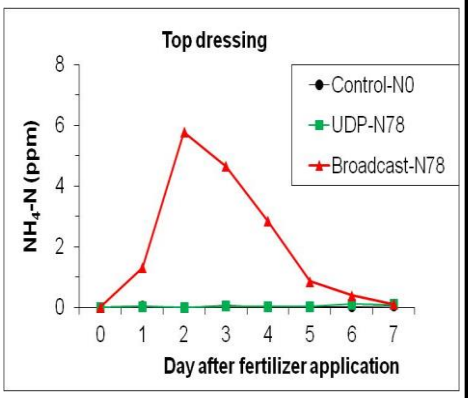
Ammonium N in Water in Rice Field after Application of Urea





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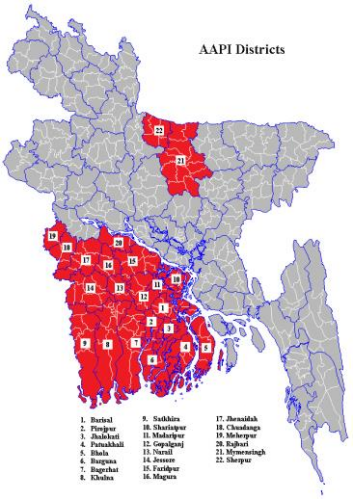
Recent Development in Bangladesh



With USAID funding, IFDC is promoting UDP in 124 sub-districts (about 25% of the 500 sub-districts in the country)

The project has been running for 3 years

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Accelerating Agriculture Productivity Improvement (AAPI)

Supply

- Small business located at point of demand supply the product
- Businesses manufactures the briquettes locally
- Briquetting machines are made in Bangladesh

Demand

- Farmer adoption of UDP technology creates the demand
- Technology promoted through extension services – mainly by government

(Department of Agricultural Extension)

The Scale of the Development

Indicator	Result
Area under UDP – last 3 seasons	1,500,000 ha
Farmers trained over 3 years	650,000
Farmers using UDP in the last year	2,800,000
Small businesses producing briquettes	932
Urea briquette production in the last year	183,000 mt

Impacts of Development

Impact Indicator	Result
Increased yield of rice	500 kg/ha (16%)
Gross Margin	$560/ha under UDP $430/ha under broadcast
Incremental rice production over 3 years	1.35 million tons
Estimated value of incremental production	$477 million
Urea savings over 3 years	200,000 tons
Estimated savings in government subsidy on urea	$65 million