

Cite this article: Ayekpam DD, Anchal D, Jayanta L, Arjun S, Teekam S, Megha K, Kadagonda N, Devika AR. Precision nitrogen management for sustainable rice production: Impacts on nutrient uptake and energy use in Eastern Himalayas. Plant Science Today (Early Access). <https://doi.org/10.14719/pst.13876>

Supplementary data

Supplementary Table 1. Input and output energy equivalents used for rice crops

Particulars	Unit	Energy equivalent (MJ unit ⁻¹)	References
A. INPUTS			
1. Human labour	h	1.95	24
2. Machinery	h	158.30	25
3. Diesel fuel	L	56.31	24
4. Chemical fertilizers/organic manures:			
Nitrogen (N)	kg	60.60	24
Phosphorus (P ₂ O ₅)	kg	11.10	24
Potassium (K ₂ O)	kg	6.70	26
Farmyard manure (FYM)	kg	0.30	27
5. Chemicals			
Fungicides	kg	92.00	28
Pesticides	kg	199.00	28
6. Paddy Seed	kg	14.57	29, 30
B. OUTPUTS			
1. Rice grain	kg	14.57	29, 30
2. Rice straw	kg	12.50	29, 30

Supplementary Table 2. Effect of different nitrogen management practices on nitrogen (N) content in rice grain, straw and N-uptake in straw

Treatment	N-content (%)		N-uptake (kg ha ⁻¹)
	Grain	Straw	Straw
Control	1.11	0.52	24.3
RDN	1.19	0.54	29.9
STCR	1.29	0.64	38.6
30 % RDN + SPAD $\leq$ 35	1.26	0.57	31.4
30 % RDN + SPAD $\leq$ 37	1.27	0.57	32.2
30 % RDN + LCC $<$ 4	1.27	0.58	33.1
75 % RDN + 2 NU	1.19	0.53	29.4
50 % RDN + 2 NU	1.16	0.52	27.9
SEm$\pm$	0.04	0.02	1.68
CD ($p=0.05$)	0.12	0.05	5.09

RDN: Recommended dose of N; STCR: Soil test crop response; SPAD: Soil plant analysis development; LCC: Leaf colour chart; NU: Nano-urea.

Supplementary Table 3. Effect of different nitrogen management practices on phosphorous (P)-content in rice grain, straw and P-uptake in straw

Treatment	P-content (%)		P-uptake (kg ha ⁻¹)
	Grain	Straw	Straw
Control	0.14	0.08	3.8
RDN	0.17	0.11	6.1
STCR	0.19	0.12	7.1
30 % RDN + SPAD ≤ 35	0.19	0.11	6.3
30 % RDN + SPAD ≤ 37	0.19	0.12	6.5
30 % RDN + LCC < 4	0.18	0.11	6.5
75 % RDN + 2 NU	0.17	0.11	6.1
50 % RDN + 2 NU	0.16	0.10	5.7
SEm±	0.01	0.01	0.47
CD (p=0.05)	NS	NS	1.42

RDN: Recommended dose of N; STCR: Soil test crop response; SPAD: Soil plant analysis development; LCC: Leaf colour chart; NU: Nano-urea.

Supplementary Table 4. Effect of different nitrogen management practices on potassium (K)-content in rice grain, straw and K-uptake in straw

Treatment	K-content (%)		K-uptake (kg ha ⁻¹)
	Grain	Straw	Straw
Control	0.29	1.11	52.4
RDN	0.32	1.21	67.3
STCR	0.35	1.30	78.8
30 % RDN + SPAD $\leq$ 35	0.33	1.23	68.3
30 % RDN + SPAD $\leq$ 37	0.35	1.29	73.0
30 % RDN + LCC < 4	0.33	1.26	72.1
75 % RDN + 2 NU	0.31	1.17	65.2
50 % RDN + 2 NU	0.31	1.16	62.6
SEm $\pm$	0.01	0.05	2.97
CD ($p=0.05$)	NS	NS	9.02

RDN: Recommended dose of N; STCR: Soil test crop response; SPAD: Soil plant analysis development; LCC: Leaf colour chart; NU: Nano-urea.