

Supplementary material for:

Organic based integrated nutrient management scheme enhances soil carbon storage in rainfed rice (*Oryza sativa*) cultivation

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Table S0. Two year total C input from crop residue (CR) and from farmyard manure (FYM)

| Treatment | Organic based nutrients | Inherent C (0-15 cm) (Kg ha⁻¹) | Total C input (after two year) (Kg ha⁻¹) | Inherent + input (Kg ha⁻¹) | SOC loss during one crop growth period Kg ha⁻¹ / 18 week (126 days) | C seq (Kg ha⁻¹) after 2 year (0-15 cm) |
|------------------|--------------------------------|--|--|--|---|--|
| T1 | ----- | 24768 | ----- | 24768 | 32410.20 | -1338.0 |
| T2 | FYM | 24768 | 490 | 25258 | 29135.05 | 2042.0 |
| T3 | FYM | 24768 | 490 | 25258 | 32032.99 | 1622.0 |
| T4 | CR | 24768 | 200 | 24968 | 34498.03 | 1052.0 |
| T5 | CR | 24768 | 200 | 24968 | 31835.40 | 1972.0 |
| T6 | FYM+CR | 24768 | 690 | 25458 | 28488.41 | 4492.0 |
| T7 | FYM+CR | 24768 | 690 | 25458 | 25249.18 | 3452.0 |

Table S1. Values of soil moisture content (SMC, %) (two year values)

Values are mean and similar letters are not significantly different in the same column at $P < 0.05$ according to Duncan's multiple range test. T1 (100% NPK), T2 (100% NPK + FYM, 10 ton ha⁻¹), T3 (80% NPK + FYM, 10 ton ha⁻¹), T4 (100% NPK + CR 5 ton ha⁻¹), T5 (80% NPK + CR 5 ton ha⁻¹), T6 (100% NPK + CR 5 ton ha⁻¹ + FYM 10 ton ha⁻¹), T7 (80% NPK + CR 5 ton ha⁻¹ + FYM 10 ton ha⁻¹)

| | Year 1: SMC (%) (0-15 cm) | | | | Year 1: SMC (%) (15-30 cm) | | | |
|----------------------------|---------------------------|---------|---------|---------|----------------------------|---------|----------|---------|
| T1 | 33.29ab | 30.70ab | 28.50a | 26.52a | 31.72a | 32.40ab | 30.32a | 29.05a |
| T2 | 35.97b | 32.85c | 30.62a | 27.85a | 34.50ab | 33.55ab | 31.45ab | 29.82ab |
| T3 | 34.40ab | 32.65c | 31.12a | 27.72a | 36.02b | 33.27ab | 32.27ab | 30.25ab |
| T4 | 34.65ab | 32.50bc | 30.15a | 26.15a | 33.45ab | 32.62ab | 31.275ab | 29.70ab |
| T5 | 32.40a | 30.55a | 29.00a | 26.75a | 32.71ab | 31.80a | 30.75ab | 29.37a |
| T6 | 36.07b | 34.77d | 31.07a | 28.65a | 35.92b | 34.30b | 32.90b | 31.02b |
| T7 | 36.40b | 32.50bc | 31.20a | 28.80a | 35.15b | 34.05ab | 32.90b | 30.42ab |
| | Year 2: SMC (%) (0-15 cm) | | | | Year 2: SMC (%) (15-30 cm) | | | |
| T1 | 31.07a | 31.55a | 28.23a | 23.86a | 28.63abc | 25.89a | 26.58ab | 23.54ab |
| T2 | 34.92ab | 33.72a | 30.80b | 27.26bc | 28.35bc | 26.64ab | 26.12ab | 22.78a |
| T3 | 37.67b | 34.17a | 31.17b | 28.50c | 28.38bc | 27.51bc | 27.95c | 23.85ab |
| T4 | 37.60b | 32.85a | 29.60ab | 24.63a | 27.15bc | 26.99b | 25.42a | 23.34ab |
| T5 | 38.55b | 32.31a | 28.20b | 25.27ab | 29.56d | 26.82b | 26.21ab | 23.82ab |
| T6 | 40.54b | 32.62s | 31.03b | 28.41c | 28.19b | 28.30c | 27.02b | 23.97ab |
| T7 | 38.82b | 33.22a | 30.66ab | 27.21bc | 29.43cd | 29.63d | 26.73abc | 23.42b |
| <i>P</i> -values year | 0.011 | 0.242 | 0.005 | 0.015 | 0.000 | 0.000 | 0.000 | 0.000 |
| <i>P</i> -values treatment | 0.017 | 0.036 | 0.55 | 0.000 | 0.035 | 0.000 | 0.003 | 0.07 |
| <i>l.s.d.</i> | 1.61 | 0.886 | 0.868 | 0.77 | 0.781 | 0.562 | 0.558 | 0.425 |

Table S2. Values of soil temperature (ST, °C) (two year values)

Values are mean and similar letters are not significantly different in the same column at $P < 0.05$ according to Duncan's multiple range test. T1 (100% NPK), T2 (100% NPK + FYM,10 ton ha⁻¹), T3 (80% NPK + FYM,10 ton ha⁻¹),T4 (100% NPK + CR 5 ton ha⁻¹), T5 (80%NPK + CR 5 ton ha⁻¹), T6 (100%NPK + CR 5 ton ha⁻¹ + FYM 10 ton ha⁻¹), T7 (80%NPK + CR 5 ton ha⁻¹ + FYM 10 ton ha⁻¹)

| Treatment | Year 1: ST (°C) (0-15 cm) | | | | Year 1: ST (°C) (15-30 cm) | | | |
|----------------------------|---------------------------|--------|--------|----------|----------------------------|---------|--------|---------|
| | MTL | PI | FL | MT | MTL | PI | FL | MT |
| T1 | 30.27a | 29.18a | 29.81a | 27.62bc | 29.30a | 28.23a | 29.15a | 27.10a |
| T2 | 29.90a | 29.58a | 28.10a | 24.85a | 28.94a | 28.63a | 27.55a | 24.23a |
| T3 | 29.91a | 29.48a | 28.22a | 25.23ab | 28.95a | 28.57a | 27.67a | 24.71a |
| T4 | 30.92a | 29.77a | 29.18a | 28.28c | 30.14a | 28.827a | 28.59a | 27.76a |
| T5 | 31.08a | 29.44a | 29.69a | 28.15c | 30.12a | 28.49a | 29.14a | 27.62a |
| T6 | 29.87a | 29.27a | 29.05a | 25.86abc | 28.91a | 28.32a | 28.55a | 25.34a |
| T7 | 31.04a | 29.49a | 28.70a | 26.63abc | 30.08a | 28.36a | 28.15a | 26.11a |
| | Year 2: ST(°C) (0-15 cm) | | | | Year 2: ST (°C) (15-30 cm) | | | |
| T1 | 31.31a | 27.69a | 28.44a | 27.74b | 30.75a | 27.06a | 27.93a | 27.04b |
| T2 | 31.32a | 28.34a | 26.87a | 23.85a | 30.73a | 27.73a | 26.20a | 23.15a |
| T3 | 31.12a | 28.24a | 26.71a | 28.02b | 30.56a | 27.63a | 26.10a | 27.22b |
| T4 | 32.13a | 28.53a | 28.39a | 27.00b | 31.51a | 27.79a | 27.78a | 26.30b |
| T5 | 32.03a | 28.20a | 28.46a | 27.15b | 31.4a | 27.59a | 27.73a | 26.35b |
| T6 | 31.08a | 28.31a | 27.64a | 24.86ab | 30.52a | 27.52a | 27.03a | 24.16ab |
| T7 | 32.25a | 28.25a | 27.47a | 25.08ab | 31.64a | 27.64a | 26.86a | 24.38ab |
| <i>P</i> -values year | 0.001 | 0.000 | 0.001 | 0.375 | 0.000 | 0.006 | 0.001 | 0.195 |
| <i>P</i> -values treatment | 0.154 | 0.942 | 0.051 | 0.001 | 0.140 | 0.957 | 0.060 | 0.001 |
| l.s.d. | 0.585 | 0.574 | 0.648 | 0.871 | 0.582 | 0.600 | 0.655 | 0.865 |

Table S3. Values of soil pH (two year values)

Values are mean and similar letters are not significantly different in the same column at $P < 0.05$ according to Duncan's multiple range test. T1 (100% NPK), T2 (100% NPK + FYM, 10 ton ha⁻¹), T3 (80% NPK + FYM, 10 ton ha⁻¹), T4 (100% NPK + CR 5 ton ha⁻¹), T5 (80%NPK + CR 5 ton ha⁻¹), T6 (100%NPK + CR 5 ton ha⁻¹ + FYM 10 ton ha⁻¹), T7 (80%NPK + CR 5 ton ha⁻¹ + FYM 10 ton ha⁻¹)

| Treatment | Year 1: pH (0-15 cm) | | | | Year 1: pH (15-30 cm) | | | |
|---------------|----------------------|--------|---------|---------|-----------------------|--------|---------|--------|
| | MTL | PI | FL | MT | MTL | PI | FL | MT |
| T1 | 5.08b | 5.19ab | 5.44b | 5.39abc | 5.06a | 5.41a | 5.73ab | 5.52b |
| T2 | 4.90a | 5.06a | 5.32ab | 5.24a | 5.14ab | 5.34a | 5.44a | 5.34a |
| T3 | 4.94a | 5.17ab | 5.23a | 5.35ab | 5.18ab | 5.46a | 5.47ab | 5.42ab |
| T4 | 5.08b | 5.32ab | 5.41ab | 5.38abc | 5.24ab | 5.49a | 5.66abc | 5.51b |
| T5 | 4.90a | 5.28ab | 5.38ab | 5.39abc | 5.16ab | 5.55a | 5.67abc | 5.50ab |
| T6 | 5.03ab | 5.41b | 5.44b | 5.47bc | 5.23ab | 5.50a | 5.72bc | 5.54b |
| T7 | 4.98ab | 5.24ab | 5.43ab | 5.58c | 5.30b | 5.44a | 5.76c | 5.58b |
| | Year 2: pH (0-15 cm) | | | | Year 2: pH (15-30 cm) | | | |
| T1 | 5.07b | 5.23ab | 5.32ab | 5.34ab | 5.14a | 5.38a | 5.25a | 5.48bc |
| T2 | 4.86a | 4.98a | 5.31ab | 5.41bc | 5.20a | 5.34a | 5.36ab | 5.41ab |
| T3 | 4.88a | 4.99ab | 5.28a | 5.34ab | 5.17a | 5.33a | 5.37ab | 5.34a |
| T4 | 5.05b | 5.17ab | 5.36abc | 5.35ab | 5.25a | 5.51b | 5.45b | 5.47bc |
| T5 | 4.95ab | 5.11ab | 5.43bc | 5.31a | 5.21a | 5.37a | 5.41b | 5.47bc |
| T6 | 5.07b | 5.10ab | 5.48c | 5.50d | 5.28a | 5.44ab | 5.46b | 5.54c |
| T7 | 5.05b | 5.30ab | 5.50c | 5.47cd | 5.30a | 5.36a | 5.47b | 5.55c |
| P values year | 0.917 | 0.015 | 0.893 | 0.717 | 0.352 | 0.018 | 0.000 | 0.369 |
| P values | | | | | | | | |
| treatment | 0.000 | 0.036 | 0.004 | 0.001 | 0.032 | 0.04 | 0.011 | 0.000 |
| LSD | 0.044 | 0.083 | 0.054 | 0.051 | 0.058 | 0.05 | 0.0647 | 0.044 |

Table S4. Correlation of soil and plant parameters

*= correlation is significant at 0.05 level of significance; **= Significant at 0.01 level of significance; NS= Non significant; SOC= soil organic carbon, LB= leaf biomass,

RB=root biomass, N= mineralisable nitrogen, DOC=dissolved organic carbon, TC=total carbon, SMC= soil moisture content

| | SOC (0-15 cm) | SOC (15-30 cm) | Storage (0-15 cm) | Storage (15-30 cm) | LB | RB | N (0-15 cm) | N (15-30 cm) | DOC (0- 15cm) | DOC (15-30 cm) | TC (0-15 cm) | TC (15-30 cm) | Photosyn thesis | SMC (0-15 cm) | SMC (15-30 cm) |
|-------------------------------|------------------------------|-------------------------------|------------------------------|-----------------------------------|-----------|-----------|----------------------------|-----------------------------|------------------------------|-------------------------------|-----------------------------|------------------------------|----------------------------|--------------------------|-------------------------------|
| SOC (15-30 cm) | 0.23** | 1 | | | | | | | | | | | | | |
| Storage (0-15 cm) | 0.78** | NS | 1 | | | | | | | | | | | | |
| Storage (15-30 cm) | 0.18* | 0.98** | NS | 1 | | | | | | | | | | | |
| LB | 0.49** | NS | 0.53** | NS | 1 | | | | | | | | | | |
| RB | 0.33** | 0.14* | 0.31** | NS | 0.4** | 1 | | | | | | | | | |
| N (0-15 cm) | 0.31** | 0.26** | 0.34** | 0.23* | 0.4** | 0.24** | 1 | | | | | | | | |
| N (15-30 cm) | 0.43** | 0.23** | 0.4** | 0.17* | 0.4** | NS | 0.42** | 1 | | | | | | | |
| DOC (0-15cm) | 0.46** | 0.20** | 0.47** | 0.18** | 0.4** | 0.51** | 0.24** | 0.19** | 1 | | | | | | |
| DOC (15-30 cm) | 0.52** | NS | 0.55** | NS | 0.5** | 0.49** | 0.27** | 0.31** | 0.74** | 1 | | | | | |
| TC (0-15 cm) | 0.46** | 0.5** | 0.45** | 0.47** | 0.33** | 0.29** | 0.35** | 0.39* | 0.42** | 0.37** | 1 | | | | |
| TC (15-30 cm) | NS | 0.68** | NS | 0.66** | NS | 0.15* | 0.28** | 0.22** | 0.19** | NS | 0.41* | 1 | | | |
| Photosynthesis | 0.25** | 0.3** | 0.25** | 0.29** | NS | 0.25** | 0.26** | 0.25* | 0.27** | 0.25** | 0.33* | 0.33** | 1 | | |
| SMC (0-15 cm) | 0.23** | 0.29** | 0.19** | 0.27** | 0.14* | -0.24** | 0.39** | 0.43** | NS | NS | 0.21** | 0.31** | 0.13* | 1 | |
| SMC (15-30 cm) | NS | 0.75** | NS | 0.73** | NS | NS | 0.24** | 0.27** | NS | NS | 0.36** | 0.74** | 0.19** | 0.42** | 1 |