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THE ABDUS SALAM INTERNATIONAL CENTRE FOR THEORETICAL PHYSICS

**ORGANIC MANURING THROUGH *GLIRICIDIA MANCULATA*
FOR RICE PRODUCTION**

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Nitrogen requirement of rice crop is very high for potential grain yield. In general, it is a very costly affair for poor farmers to apply inorganic fertilizer to their crops. *Gliciridia maculata*, a green manure has been found as a unique supplement or substitute for urea in rice production (Chandra and Khan, 2001; Khan *et al.*, 1999). *Gliciridia maculata* are fence and decorative plants and also are used for leaf fodder and for furniture wood. It can be propagated by cutting 1-2m long branches and also through seed. Its vegetative growth is very fast. The nutrient composition of fresh leaves of *Gliciridia maculata* was 0.84% P₂O₅, 2.13% K₂O. The nitrogen percentage was 0.857 on fresh weight but 3.457 on dry weight basis (i.e. dry matter content ranged from 23 to 24 per cent). The C/N ratio was 8.8. The moisture percentage in leaves was 75.2. The plant is mostly free from diseases and plots treated by *Gliciridia* are mostly free from incidence of disease. Its residue had pronounced effects on succeeding crops. The available nitrogen content of the soil was 225 Kg/ha and 223 Kg/ha during pre-sowing and post harvested soil samples, respectively.

Materials And Methods

An experiment was conducted to utilize the indigenous source of organic (*Gliciridia maculata*) as green/organic manure as an alternative or/and supplement to chemical fertilizers. Fresh leaves of *Gliciridia maculata* were incorporated into the submerged soil during the monsoon season, a fortnight before transplanting rice, in 5x4 m² size plots @ 8 Kg & 9 Kg for 80 Kg N/ha, respectively. One treatment was supplied 80 Kg N/ha directly from the leaves of *Gliciridia maculata* (T₁) and in another treatment 40 Kg N/ha was supplied from the leaves of *Gliciridia maculata* and the rest 40 Kg N/ha was supplemented from Urea as top dressing during tillering stage (T₂). These treatments were compared with the farmers' traditional method of cultivation without nitrogenous fertilizers/manures. The long duration (155-160 days) semi-dwarf rice variety 'CR-1018' (Gayatri) was transplanted. Pre-sowing and post harvest soil samples were collected to estimate the available N/ha.

Results and Discussion

Results revealed that application of organic manure (*Gliciridia maculata*) alone or in combination with urea gave significantly higher yield in comparison to the farmers' conventional practice. The new technology is more laborious and energy efficient, improves rice crop stand, and gives significantly higher rice yield than the traditional crop establishment system of the farmer. The rice yield under the farmers' traditional system is less than 1/ha, whereas yield was 2.38 t/ha (T₁) and 2.92 t/ha (T₂) in *Gliciridia maculata* incorporated plots. The more rice yield in T₂ may be due to the sufficient nutrients supply to meet nitrogen demand of the rice plants. Green manure N, being a one-time application, may not adequately synchronize with or be sufficient to meet nitrogen demand, particularly on poor soils where a high rice yield is sought. Thus, organic N may have to be supplemented with inorganic N, which can be applied more

flexibly, to match the need of the crop. The farmers can comfortably use *Gliciridia maculata* as a source of organic manure because it allows them to produce subsistence yield at low input levels.

Summary

Gliciridia maculata are fence and decorative plants and used for leaf fodder and for furniture wood. The nutrient composition of fresh leaves of *Gliciridia maculata* is 0.857% N, 0.84% P₂O₅, 2.13% K₂O. Survey of marginal and small farmers in different eastern states revealed that more than 80 percent of farmers do not apply nitrogenous fertilizer to their rice fields with the apprehension that all the applied nitrogenous fertilizers would invariably get lost through run off due to heavy rains and flow of irrigation water from field to field as well as leaching within the field. The faulty irrigation system from field to field is prevalent in states like Orissa, West Bengal and Bihar etc. due to the lack of field channels. *Gliciridia maculata*, a green manure has been found as a unique supplement or substitute for urea and other phosphatic and potassic fertilizers in rice production. An experiment was conducted at Water Technology Centre for Eastern Region (ICAR), Bhubaneswar to utilize the indigenous source of organic (*Gliciridia maculata*) as green/organic manure as an alternative or/and supplement to chemical fertilizers. One treatment was supplied 80 Kg N/ha directly from the leaves of *Gliciridia maculata* and in another treatment 40 Kg N/ha was supplemented from urea as top dressing during tillering stage. These treatments were compared with the farmers' traditional method of cultivation without nitrogenous fertilizers/manures. The long duration (155-160 days) semi-dwarf rice variety 'CR- 1018' (Gaytri) was transplanted. Results revealed that the application of organic manure (*Gliciridia maculata*) alone or in combination with urea gave significantly higher yield in comparison to the farmers' traditional practice. The use of *Gliciridia maculata* gave significantly higher rice yield than the traditional farming system of farmers. A new non-conventional use of green leaves of fence and decorative plant as organic manure is more labour and energy efficient increases soil sustainability, improves rice crop stand and its production.

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