Report of Research done at CDIA-Marolafa/Beforona
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Subject: System of Rice Intensification

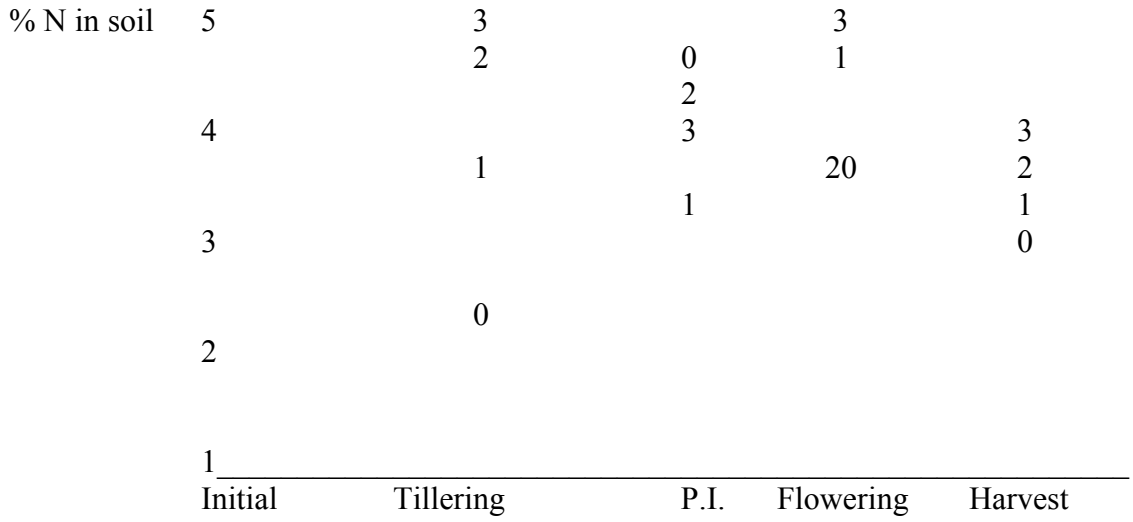
Experimentation with the system of rice intensification (SRI) conducted at CDIA Marolafa contributes to our knowledge of the process of decomposition of organic matter when it is applied to rice paddies under the regional climatic conditions of the lowlands at Beforona. The experimentation was done on 2.5 areas of sandy-loam soil, situated at an altitude of 502 meters, with average daily temperatures of 21.5 degrees C, and an average annual precipitation of 2751.4 mm.

Analysis of the Soil

To study the effects of soil utilization methods (SRI or common practice) on the organic matter status of lowland soil, chemical measurements were done on soil samples from 12 plots, each representing one of the 4 different soil treatments evaluated in this study, repeated 3 times. The carbon/nitrogen (C/N) ratio was the main parameter evaluated for assessment of the organic status of the soil, because it permits one to draw conclusions about the best management of the soil. It provides a summary evaluation of the influence of different cultural practices (fertilization, management of harvest residues, control of weeds, methods for preparing the soil, methods of soil aeration, or management of water) as well as that of the climate (referring to climatic data) on the decomposition of incorporated organic matter in the soil and on the availability of nitrogen for crops grown in that soil.

Samples of soil were taken down to a depth of 20 cm from the suface, at five stages in the development cycle of rice. These are the initial stage (before planting), tillering, panicle initiation, flowering, and harvest (final stage). The WAIVLEY BLACK method was used for the measuring the amount of total C in the soil, and the KJELDAHL method was used to determine the amount of total N.

RESULTS Evolution Over Time of Nitrogen Content in the Soil



About the results, one can say:

* The application of organic manure plays an indicative role for the microorganisms responsible for the decomposition of the organic matter in the soil. In effect, after a certain time of dormancy [blockage] on the part of the organic matter, it assists in the intense release of nitrogen in the soil which is then at the disposition of the plant. This can be seen in the control plots (To = no treatment with organic manure) where the second analyses (30 days later) showed a N rate of 2.07% (compared with the initial condition of 2.3% N).

* The rate of released nitrogen in the soil of every plot was not proportional to the dose of organic manure applied. This confirms the existence of a threshold for the amount of manure applied. Only a small amount of organic manure added to the soil can improve soil fertility.

* Comparing data from the plots, the application of organic manure increases the reserves of the soil and permits a gradual release of nutrients in the soil. Thus, after an important assimilation of plant nutrients, the curve for the release of new nitrogen in the soil rises.

* The biological decomposition of organic material in the lowland soil at Beforona is favored by the climatic conditions in the region: rainfall and temperature are high throughout the whole year.

* SRI methods, using 8-day-old plants, permitted attainment of the maximum yield of 12.490 t/ha on the plot treated with 4 kg of organic manure per m2, and 11.017 kg/ha with the same practices but transplanting 20-day-old plants with two plants per hill. The average rice yield attained in the region of Beforona with standard practices is 2.5 t/ha, according to the Commune Rurale de Beforona.

Comparison of SRI Methods with: 20 day plants-2/hill 8 day plants-1/hill

Averaged for four nutrient applications: no organic manure, and 2, 4 and 8 kg/m^2

Yield (t/ha)	**8.576 t/ha** (8.156-8.930)	**10.03 t/ha** (8.57-11.11)
Root depth (cm)	**25.5** (23-27.5)	**28** (25.5-30) Less difference than expected
Number of tillers	**62.87** (58.66-68.83) T_3 number very high	**63.5** (60.25-64.25) Little difference
Number of fertile tillers	**42.0** (38.5-44.5)	**39.1** (29.75-44.25) T_o number very low
Rate of fertile tillers (%)	**70.29 [66.8]** (71.48-73.74) T_1 and T_2 lower	**74.25 [61.5]** (77.45-70.93) T_o highest rate
Green matter produced	**126.5** (80.83-162.5)	**196.4** (125.5-237.5) Huge difference
No. of grains/panicle	**116.3** (100.66-142.33)	**120.7** (110.5-144.5) Little difference
Grain weight (g/1000)	**27.2** (25.4-27.9) T_1 highest = 28.0	**28.1** (30.0-26.6) No real increase?

Note: The figures on rate of fertility given in Table 2 from which these averages are derived were higher percentages than obtained by dividing the number of fertile tillers (Nb talles) by number of tillers (tailles). The recalculated percentages, shown above in [brackets], indicate a lower rate of fertile tillers with younger plants singly planted.

ANALYSIS OF CORRELATION MATRIXES

(bold fact coefficients are important to consider)

	8-day plant 1 plant/hill	20-day plants 2 plants/hill		On-farm
Yield (RDT)				
***Tillers/hill (TT)**	**.713**	**.350**		**.744**
***** **Fertile tillers/hill (TF)**	**.786**	**.390**		**.768**
***** **Grains/panicle (NGP)**	**.527**	**.405**		**.659**
***** **Grains/m2 (GRm2)**	**.746**	**.416**		**.872**
* Grain weight (PCGP)	-.504	.439	error in sign?	-.009 (?)
* Fertility (F%)	.240	.026		-.533 (?)
***** **Root depth (Pr)**	**.887**	**.312**	big difference	
Tillers/hill (TT)				
***** **Fertile tillers/hill (TF)**	**.849**	**.373**	big difference	**.949**
***** **Grains/panicle (NGP)**	**.784**	**.436**	also big difference	**.300**
***** **Grains/m2 (GRm2)**	**.900**	**.450**	very big difference	**.909**
* Grain weight (PCGP)	-.316	.234	error in sign?	-.014 (?)
***** **Fertility (F%)**	**-.160**	**-.563**	very interesting	-.794 (?)
***** **Root depth (Pr)**	**.513**	**.638**	no real difference	
Fertile tillers/hill (TF)				
***** **Tillers/hill (TT)**	**.849**	**.373**	big difference	**.949**
***** **Grains/panicle (NGP)**	**.640**	**.598**	no diff/very positive	**.314**
***** **Grains/m2 (GRm2**	**.835**	**.836**	no diff/very positive	**.954**
* Grain weight (PCGP)	-.411	.286	error in sign?	-.190
***** **Fertility (F%)**	**.378**	**.553**	positive expected	-.587 (?)
***** **Root depth (Pr)**	**.531**	**.417**	strong relation	
Grains/panicle (NGP)				
***** **Tillers/hill (TT)**	**.784**	**.436**	big difference	**.300**
***** **Fertile tillers/hill (TF)**	**.640**	**.598**	no diff/very positive	**.314**
***** **Grains/m2 (GRm2)**	**.887**	**.938**	very high r expected	**.580**
* Grain weight (PCGP)	-.154	.366	error in sign?	.017
* Fertility (F%)	-.172	.151	low r's; error in sign?	-.358 (?)
***** **Root depth (Pr)**	**.449**	**.545**	little difference	
Grains/m2 (GRm2)				
***** **Tillers/hill (TT)**	**.900**	**.450**	big difference	**.909**
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***** **Grains/panicle (NGP)**	**.887**	**.938**	very high r expected	**.580**
* Grain weight (PCGP)	-.470	.365	error in sign?	-.125
* Fertility (F%)	.017	.349		-.619 (?)
***** **Root depth (Pr)**	**.609**	**.558**	no difference	

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* Tillers/hill (TT)	-.316	.234	error in sign?	-.014
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* Fertility (F%)	-.271	.050	error in sign?	-.356
* Root depth (Pr)	-.570	.437	error in sign?	
Fertility (%F)				
*** Tillers/hill (TT)**	**-.160**	**-.563**	unfortunate	**-.794**
*** Fertile tillers/hill (TF)**	**.378**	**.553**	important high r	-.587 (?)
* Grains/panicle (NGP)	-.172	.151	error in sign? low r's	-.358 (?)
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* Grain weight (PCGP)	-.271	.050	error in sign?	-.356 (?)
*** Root depth (Pr)**	**.126**	**-.174**	low r's; significant?	
Root depth (Pr)				
*** Tillers/hill (TT)**	**.513**	**.638**	very positive	
*** Fertile tillers/hill (TF)**	**.531**	**.417**	very positive	
*** Grains/panicle (NGP)**	**.449**	**.545**	very positive	
*** Grains/m2 (GRm2)**	**.609**	**.558**	very positive	
* Grain weight (PCGP)	-.570	.437	error in sign?	
* Fertility (F%)	.126	-.174	no effect? interesting	