

# GROWTH AND YIELD RESPONSE OF TRADITIONAL UPLAND RICE ON DIFFERENT DISTANCE OF PLANTING USING AZUCENA VARIETY

A BIND Document<sup>1</sup>

## INTRODUCTION

As rural population grows and agricultural lands gets scarcer, farmers face the challenge of increasing their productivity beyond subsistence to ensure the sustainability of their food security within extremely limited land spaces at an average of 1.5 hectares or less. The situation calls for profound improvements in the farmer's agricultural



**ASOFA farmers in Pontevedra gather and document rice agronomic data during SRI on-farm research in So. Sutyay.**

knowledge system in food production. Thus, integrated soil fertility management, ecological pest management and the applicability of various sustainable farming technologies are crucial in attaining this goal.

Negros Occidental's current average rice yields runs to 2.4 tons per hectare in irrigated lowlands and just 1.5 tons in rainfed uplands, both are using conventional farming methods. The output is insufficient to meet farmer's basic needs for food, clothing, shelter and education for a family of six. They opted to diversify their subsistence and cash crops using organic farming methods to lessen production cost,

improve soil fertility, enhance pest-predator dynamics, and boost yields.

A recently introduced technology in Negros Occidental is the System on Rice Intensification (SRI). The system can potentially embody all these concerns while producing higher yields in a limited area. Moreover, mobilizing farmers and

using their indigenous knowledge in conducting SRI field researches strengthen their confidence to adopt and

promote the science, methodology, tools and practice of sustainable agriculture.

Within this framework BIND in collaboration with the Provincial Research Development and Extension (PRDEN) of the Department of Agriculture have jointly undertaken a research on the System of Rice Intensification (SRI). PRDEN is a network of government and non-government organization whose mandate is to improve cooperation among different research bodies and to conduct on farm research (OFR) with participation of the farmers in the field.

## SRI BRIEF BACKGROUND

In the early 1980's, Jesuit Priest Fr. Henry de Laulanie developed during his priestly mission in Madagascar basic modifications in rice planting. This modification, which greatly improves rice yield, was eventually called the System of Rice Intensification (SRI).

Through this system, Madagascar's farmers were able to increase their rice yield from 2 tons per hectare to 8 t/ha., and some have even reached 12–15 t/ha. Surprisingly, they got this great yield in moderately fertile

soil, without synthetic fertilizers, and with less water.

SRI works on three basic principles:

- (a) Transplant **young seedlings** carefully to preserve their genetic potential for profuse tillering and root growth.
- (b) Use **wide spacing** to give the plants' tillers and roots plenty of room, air, soil, sunlight, etc. for maximizing their growth.
- (c) Keep **soil well-aerated though moist**, to provide a good supply of oxygen to the roots and root zone.

## MATERIALS AND METHODS

Since most of BIND SRI studies done are in the irrigated lowland, the research is specifically focused on the yield potentials of traditional rainfed upland variety.

The study, conducted from June-September 2002 and carried out in the rolling mountains of Sitio Sutay in the Municipality of Pontevedra, an area suitable



Farmers from other farming villages in the province visited the SRI rainfed upland research in Pontevedra.

for upland rice, is using a variety known for its aroma—Azucena.

Using randomized design, the study is

focused on the following different planting distances: A: 15 X 40; B: 20 X 40; C: 25 X 40; D: 30 X 40; and E: 35 X 40. The

study occupies a total area of 4,000 square meters and holding 16 plots, representing four treatments and replicated four times per treatment.

For soil fertilization, a recommended nitrogen requirement of 60 kilograms based on soil analysis has been met with the application of chicken manure, seaweed-based foliar, and



Mario Magsalin of ASOFA applies madre de cacao (*gliricidia sepium*) as mulch along rows of Azucena.

SRI in rainfed upland basically works with the same principles in the irrigated lowlands. It only differs from the

latter in terms of planting, thinning, weeding, and most importantly mulching.

In planting rainfed upland variety, the study is just sowing 3–4 seeds per hill, departing from the traditional practices of around 8–12. Thinning started when the plant has two leaves, around 12–15 days from sowing, and leaving just one healthy plant. Together with thinning is side dressing of chicken manure and application of 5-10 cm thick of leguminous plant as mulch, mostly kakawate (*gliricidia sepium*).

The study used the Agro-Ecosystem Analysis (AESA) to determine the development and growth of Azucena. This involved weekly monitoring and documentation of the following: 1) insect dynamics; 2) number of tillers; 3) plant

height; 4) weeds identification; and 4) the correlation of each variable with the yield response.

To minimize border effects, all experimental fields designated two rows of rice plants along the border of every plots thus leaving a 1-meter square harvest areas for determining crops average yield. During harvest, all essentials agronomic data were gathered—including average panicle length and its corresponding number of grain, average number of filled and unfilled grain, average number of productive and unproductive tillers, and maturity from date of transplanting to harvesting.

To determine its economic viability, the study shall also be subjected to cost and return analysis.

## RESULTS AND DISCUSSION

Yield results shows that treatment B: 20 X 40 amazingly topped among five treatments with an average of 7.7 tons per hectare; then closely followed by C: 25 X 40, D: 30 X 40 and A: 15 X 40 with 7.4, 7.2, and 7 t/ha. respectively; and the last was E: 35 x 40 with 6.7 t/ha.

The yield results from all five treatments shows startling discrepancy from the provincial and even national average in rainfed upland rice production that ranging only from 1.5 to 2 tons per hectare.



**Azucena shows off its long panicle and well-filled grains.**

Another impressive result in this study was that maintaining one plant per hill induced profuse tillering. Leading the list was treatment E: 35 X 40, which got the highest with an average of 11.35 tillers per hill, from a minimum of 2 to a maximum of 29. Treatment C: 25 X 40

came next with 10.15 tillers per hill. This was closely followed by B: 20 X 40 and D: 30 X 40—the former got an average tillers of 9.85 per hill—the latter, 9.70; then lagged behind was A: 15 X 40 with just 7.2 tillers per hill.

Moreover, aside from robust, vigorous tillers, all are productive and only just a slight margin of a mere (.1) percent that are unproductive. Again, this is a stark contrast with the conventional practices in which the number of tillers depends upon the amount of seeds sown.

As regard to panicle length, there was no big difference and the results were closed among five treatments. Surprisingly, treatment A: 15 X 40 had the longest panicle length with an average of 30.41 centimeters from a minimum of 27.10 to a maximum of 31.21. This was followed by treatments with almost identical results D: 30 X 40, B: 20 X 40 and E: 35 X 40 with 29.82 cm., 29.44 cm., and 29.19 cm. respectively; and the last but not the least was C: 25 X 40 with 28.17 cm.

On the corresponding total number of grain per panicle, treatment D: 30 X 40 counted with the most number, averaging a total of 374.85 grains per panicle and ninety one percent of which were well-filled. Then trailing behind was E: 35 X 40 with 364.45; next B: 20 X 40 with 338.05;

followed by A: 15 X 40 with 331.15; and last was C: 25 X 40 with 315.35.

Study also shows that mulching provides added advantage. Aside from conserving soil moisture and effectively controlling weed growth, it helps enhancing

biological nitrogen fixation in the soil aided by the abundant presence of soil borne organisms like earthworms, earwig, jumping spiders and collembolans. Consequently, the presence of these organisms attests that organic farming promotes and enhances life underground.

Net income corresponds with yield results in terms of ranking. As expected, treatment B: 20 X 40 gained more than from the rest with a net return of P2.89 for every

peso invested; followed by C: 25 X 40 with P2.73; closed next was D: 30 X 40 with P2.63; then A: 15 X 40 with P2.55; and at the bottom was E: 35 X 40 with P2.42.

Likewise, study also shows that SRI in rainfed upland earns more profit, ranging from 30 to 40 percent higher as compared to the conventional method.



**Mario excitedly counts the number of Azucena's robust, vigorous tillers.**

<sup>i</sup> This document is a collective effort of the following BIND staffer and farmers: Robert Gasparillo, Ronnie Naragdao, Edward Judilla, Junior Tana and Mario Magsalin.