

PROCEEDINGS BOOK



3rd

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Harun Uçak (Ed.)
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BREAKING YIELDS IN RICE PRODUCTION: HIGH YIELDS OR HIGH PROFITS?

Bruno Lanfranco

Instituto Nacional de Investigación Agropecuaria (INIA), Applied Economics, Uruguay
E-mail: blanfranco@inia.org.uy

Bruno Ferraro

INIA, Applied Economics, Uruguay

Enrique Fernández

INIA, Applied Economics, Uruguay

Juan M. Soares de Lima

INIA, Applied Economics, Uruguay

Abstract

Uruguay is the most export-oriented rice producing country in the world. The annual production rounds 1.4 million metric tons (TMT), more than 96% of which is exported globally. The average yields obtained at the national level are among the highest in the world. In the last 5 years, the average yield surpassed 8.1 metric tons per hectare, with a maximum of 8,686 kg/ha in 2014/15. In the last years, the National Institute of Agricultural Research (INIA) of Uruguay has been running a research project, in coordination with farmers and millers, with the objective of generating integrated crop management practices capable to increase yields by at least 10% compared to those obtained with the technology currently used by the top 5% rice growers. The challenge is the generation of economically feasible alternatives to increase productivity with respect to that obtained by producers in the top quintile.

This article shows the results of the cost-benefit analysis performed on different technology alternatives defined for six different locations in the East of Uruguay, which is the in the traditional rice-producing region. Uruguay plants annually about 170 thousand hectares of rice. Sixty-percent of this area is located in the East part of the country. With the objective of defining the best-improved alternative for each of the six locations, an experiment was run for three consecutive years starting with 18 alternatives, three per location. After a screening process to discard the less promising ones, one alternative per location was selected for the production and economic analysis in the last crop season involved in the study (2016/17). Three different plots of 7-10 ha each, were included in the last year in each location.

They were installed on fields belonging to commercial firms consistently ranking in the first quintile in terms of yields. The first plot corresponded to the witness, the second one corresponded to the selected best alternative, and the third one corresponded to an exact copy of what the farmer was doing that year. In essence, the treatments were defined on the basis of four factors: a) rice variety; b) density of seeds and seed treatment; c) levels of fertilization; d) disease control practices (*Pyricularia oryzae*), including use of resistant cultivars. In all cases, the calculation of income and costs was performed using the same set of prices. The money values were expressed per hectare in terms of both US dollars and units of 50-kilo bags.

The obtained results showed that the alternatives were clearly superior in terms of the expected profits in only two of the six locations under analysis, for the conditions expressed in the 2016/17 season. In both cases, the gain was explained mainly by differences in performance achieved with the use of a new cultivar released recently in substitution to the old one currently used by farmers, along with new management practices associated with it. With an expected increase between 27% and 29% in yields, profits multiply from a minimum of 1.9 times to 14 times. The key issues of the new variety apart from being more productive, was its resistance to *Pyricularia*, which derived in a dramatic

reduction in costs related to disease control. In the remaining locations, the technological alternative did not mean an advantage compared to the witness, even assuming a significant loss in any of these cases. In all cases, the benefits obtained by the new technology package were offset by the rising costs implied by this change. In one of the cases, the use of the new technology was indifferent to the old one, from an economic point of view. In the remaining cases, the increment in costs more than surpassed the gains in production; the alternative technology directly led to an economic loss that ranged from 12% to 150%

Conclusions should be taken with caution since the analysis was performed with the production results for only one year, even though a sensitive analysis was performed. Nevertheless, some elements deserve to be highlighted. The results seem to confirm the need for a thorough review in the cost structure at the fieldlevel. Minor adjustments in the technology, such as the election of the variety, could be the difference between getting a positive or negative economic outcome.

Keywords: Rice, Economic, Production Costs, Technology,