

AN ECONOMIC VIEW ON INTEGRATING MARKER-ASSISTED SELECTION AND RAPID GENERATION ADVANCE INTO PUBLIC RICE-BREEDING PROGRAMS IN DEVELOPING COUNTRIES

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Plant breeding for the generation of cultivars adapted to local situations has been an important and strategic concern of developing countries with an agriculture-based economy. Considering the economic constraints, breeders must improve genetic gain to increase the delivery of better cultivars with lower costs, through the implementation of molecular breeding and rapid generation advance. The aim of this work was to assess the actual economic impact of the implementation of these technologies on genetic gain for yield, rice blast disease resistance and grain amylose content in a conventional rice breeding program. This analysis is intended as a case study of public breeding programs in developing countries. To accomplish this objective, cost analyses and genetic gain estimations were performed on four rice breeding scenarios: conventional and marker assisted selection, with and without rapid generation advance. These estimations were used to develop a cost index reflecting the breeding efficiency. The most efficient method depends on the objective trait. For yield, there are small variations in genetic gain, but in terms of costs, the application of technology increases the breeding efficiency. For rice blast resistance, marker assisted selection is not an efficient option when not using rapid generation advance. Conversely, the efficiency of MAS increases when using RGA. For grain amylose content, the greatest effect on genetic gain is obtained when using MAS. RGA always increases the breeding efficiency. The use of new technological tools is recommended in terms of the cost-benefit function.