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Participatory bread wheat variety evaluation through seed producer cooperatives in Amhara region, Ethiopia

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Abstract

Adoption rate of improved crop varieties in Ethiopia is very low. The absence of engaging farmers and their community agents such as cooperatives in the process of variety testing is one of the main factors for lower rates of variety adoption, which resulted in the lower crop productivity and contributes to weak food systems. Participatory bread wheat variety evaluation (PVE) was conducted by breeders, seed producer cooperative (SPC) and development practitioners with the objectives to identify farmers' selection criteria, to assess farmers' preferred varieties and to increase the SPC's variety portfolios. Role, responsibility and contribution of each actor were defined with prior to the experiment. Researchers were responsible for trial management (design, layout, data collection, analysis, reporting and seed provision), SPC was accountable for land allocation, practice all agronomic practices as per the research recommendations and cover local costs. Local practitioners were responsible in capacity building, field days organisation and follow-up. Eleven released varieties (Wane, Abora, Lemu, Tay, Danda'a, Kakaba, Alidoro, Denbel, Ogolcho, Liben, Buluk) were evaluated during 2020 in Amhara region, Ethiopia. Pair-Wise Ranking Matrix was used to identify farmers' selection criteria and Direct Matrix Ranking to prioritise those selected criteria. Randomised complete block design with two replications was used to evaluate the performance of the varieties both with and without lime applications. Seed yield was identified the first preferred trait by farmers followed by early maturity, disease tolerance, tillering capacity, spike length and biomass yield. Combined mean values showed that higher yield was recorded with the lime application than without. Lemu (6.4 t ha^{-1}), Alidor (6.3 t ha^{-1}), Denbel (6.3 t ha^{-1}), Aboro (6.1 t ha^{-1}) and Liben (6.1 t ha^{-1}) were found the highest yielding bread wheat varieties with lime application. The t-test results confirmed the significant variations between with lime application and without lime for the number of tillers per plant (0.005), spike length per plant (0.001), plant height (0.000), 1000 seed weight (0.003), and hectoliter weight (0.018), but non-significant variation for grain yield (0.121). The selected varieties should be included in the production plan of the cooperatives for large scale production to increase the variety portfolios and to address the demand of the farming community.

Keywords: Cooperatives, Ethiopia, food systems, participatory variety evaluation