

Translating genetic evaluation into genetic improvement for smallholder dairy cattle and buffalo in India

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Traditionally, breeds in Indian condition were selected mainly for local adaptation, strong body confirmation and low to moderate milk production. With increasing requirement of milk and milk products and reduced use of bullocks for agriculture, it was desired to increase milk production potential of cattle and buffaloes. Programmes for performance recording of individual animals suited to small holder conditions were devised and implemented along with collection of pedigree data. Since 2012, national level planning was done for systematic genetic improvement of bovines. Widespread recording programmes for various breeds, nation wise unique animal identification and robust information system helped to establish genetic evaluation systems for important cattle and buffalo breeds. The genetic evaluation models were adjusted to suite small holder conditions. Genotyping chips developed for Indigenous cattle breeds, their crosses and buffaloes were used to genotype recorded animals along with AI bulls to create reference populations for various breeds. This led to feasibility of estimation of Genomic Breeding Values (GBVs) with reasonable accuracies for various breeds. Systematic efforts were done for identification of bull mothers based on genomic evaluations and designed mating were carried out for young bull production. The bull calves are now evaluated based on GBVs and are supplied to the semen production centres across the country thus benefitting farmers under smallholder condition. Traits like milk composition, Age at First Calving and Days Open along with milk production are now included in selection process of bull calves based on information available for a breed. Efforts are made to expand performance recording in other breeds and areas as well as for various traits. With genomic methods in place, it will be easier to include more traits like mastitis resistance, heat tolerance and GHG emissions etc. in selection process. It is expected that current efforts will fast track genetic improvement of both cattle and buffaloes in Indian population and make dairying more sustainable.

Keywords: Genotyping chip, genomic breeding values, bovine.