

# Plant Genomics

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## Breeding biofortified crops to alleviate micronutrient malnutrition

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Micronutrient malnutrition affects more than half of the world population. Biofortification, the delivery of micronutrients via micronutrient dense crops, offers a cost effective and sustainable approach. HarvestPlus and its partners breed and disseminate new, more nutritious varieties of staple food crops that provide higher amounts of pro vitamin A, iron or zinc, the three micronutrients identified by the World Health Organization as most lacking in diets globally. Crop improvement activities focus on exploring the available natural genetic variation. To date, HarvestPlus has established productive research networks that link national research programs in target regions of the developing world with advanced agriculture and nutrition research institutes around the globe with more than 100 biofortified crop varieties released. To accelerate breeding process state of art genomic approaches namely genetic mapping and genome wide association studies for the identification of candidate genes for mineral uptake and homeostasis and functional markers associated with favorable alleles for enhanced micronutrients. Recently, with the advent of high throughput cost effective molecular genotyping, genomic selection models are being explored to enhance breeding efficiency. Conventional breeding alone is not always an option in particular where there is limited genetic variability or the target trait is altogether absent in the edible part (e.g. iron and pro vitamin A in rice endosperm). Under these circumstances transgenic approaches are in development. Their practical application, however, also demands visionary changes in regulatory policies and a broader consumer acceptance.

### Biography

Parminder Virk is the Head of Crop Development and responsible for the development of biofortified staple food crops. He spent most of his career at the International Rice Research Institute (IRRI), Los Banos, as lead Rice Breeder for productive environments, biofortified rice and transgenic breeding. Together with his team he has developed 27 rice varieties for major rice growing countries. He has extensive experience in international collaboration with public and private sectors in germplasm development, distribution/testing, research, training, technical assistance and consulting and technology transfer.

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