Chakti - Iron bio-fortified Pearl Millet

Pearl millet is an important staple food in drier regions of Sub-Saharan Africa, including Nigeria, Niger, Senegal, Mali, Ghana, and Burkina Faso. Its tolerance to drought, heat, and soil salinity, and its high water-use efficiency make pearl millet a climate-smart crop. In addition, it has high protein, mineral content, and high dietary fiber.

With support from HarvestPlus, scientists at the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) used conventional plant breeding to develop Africa’s first iron biofortified, extra early maturing, drought tolerant pearl millet variety “Chakti”.

This biofortified variety of pearl millet combining high iron content with high yield was developed through intra population improvement approaches with special emphasis on grain iron (60 ppm) and zinc (45 ppm) density.

As a cheap dietary source for iron and zinc in the region, this iron-biofortified Pearl Millet has the potential to improve nutrition for millions of farming households, and most significantly, enhance the physical and mental performance of adolescents.

Iron deficit diets are causing anemia which is a major public health concern, especially among women and children in Africa. Lack of iron can impair cognitive and physical development, severely impacts women, children, and infants, who are the ‘at-risk’ groups. This is due to greater micronutrient needs during rapid growth and development (i.e., early childhood, adolescents and during pregnancy) and because of blood loss due to menstruation in women. This can increase the risks to both the women and their children during pregnancy and childbirth. Besides, anemia can also cause low birth weight and premature birth, as well as maternal and perinatal death.

Iron biofortified pearl millet varieties are aimed at providing more dietary iron to rural communities in the arid and drought-prone regions where only a few other crops can thrive. Hence, this can also address health problems linked to zinc deficiency such as stunting, loss of appetite, low immunity, and increased risk of diarrheal diseases and respiratory infections.

Due to better resistance to downy mildew and Striga hermonthica, Chakti was recommended for the drought-prone Sahelian zone of West Africa which is characterized by low rainfall.

In 2018, Chakti was released for commercial cultivation in West Africa, where it has been tested in more than ten locations including Niger, Nigeria, Mali, Burkina Faso, Ghana, Senegal involving over 10,000 farmers’ fields.

Senegal reported an adoption of 1,200 ha of Chakti during the rainy 2019 rainy season. USAID in Senegal is promoting Chakti for the nutritional enhancement of school children. In 2020, 22 tons of certified seed was produced and distributed to farmers in Niger through various seed companies. It has since accounted for about 6,000 ha under cultivation of Chakti in Niger.

As a Stage 4 and a Maturity level 3 innovation, this variety of millet has been taken up by users and is contributing to increasing food security and increasing nutrition levels in women and children. Policy and/or practice changes influenced by these innovative crop variety have led to adoption or impacts at scale or beyond the direct CGIAR sphere of influence.

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