

Commercialization of Iron Pearl Millet

HarvestPlus and Biofortification

The CGIAR's HarvestPlus program leads a global movement to rapidly scale climate-smart biofortified staple crops, which are enriched with vitamin A, iron, or zinc using conventional breeding methods. Biofortified crops are internationally recognized as a cost-effective, food systems-based intervention to reduce micronutrient deficiencies while increasing the availability—and lowering the cost—of nutritious foods. In addition to improving nutrition security, biofortified crops strengthen climate resilience: many are drought- and heat-tolerant and resistant to pests and diseases, helping farmers avoid climate-induced declines in agricultural productivity and nutrition.

Building Nutrition Resilience in Nigeria

Climate volatility in northern Nigeria is leading to decreased crop yields, increased food prices, and heightened food insecurity—worsening malnutrition. Smallholder farmers are looking for opportunities to bridge production yield gaps brought about by climatic stress through improved agricultural technologies like biofortified seeds.

HarvestPlus Nigeria generates employment for women and youth in rural and urban communities and works with a strong network of private sector partners who help scale biofortification and ensure that swift, targeted action reaches and supports farmers, aggregators, and SMEs.

Release of Nigeria's First Variety of Iron Pearl Millet

HarvestPlus has expanded access to nutrient-dense, climate smart crops such as enriched iron and zinc cowpea, vitamin A maize, and iron pearl millet in Northern Nigeria through the Scaling Climate and Nutrition Smart Crops through Market Systems project. The project was a two-year market systems development initiative funded by UK International Development through the [Propcom+](#) program in Kano, Kaduna, Jigawa, and Gombe.

Under the project, HarvestPlus supported the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and the Lake Chad Research Institute to release Nigeria's first iron pearl millet variety. Two varieties of iron enriched pearl millet (known as *Jirani* and *Chakti*) are now available to smallholder farmers in northern Nigeria to grow and for commercialization. Iron pearl millet provides more nutrition and food security to rural farming communities in arid and drought-prone regions where few other crops thrive. These naturally nutritious, climate-smart varieties will help address farmers' needs to improve their household nutrition and productivity in the face of global shocks. Following the release of the two varieties, a climate adaptation strategy for the millet production system was also rolled out to enhance the resilience of smallholder farming households by employing climate-smart crop production technologies and providing agronomic training.



Iron Pearl Millet

- Has downy mildew resistance, high temperature and drought tolerance, matures 40 days earlier than traditional varieties
- Provides up to 80 percent of daily iron needs when eaten regularly
- Proven to reverse iron deficiency and improve cognitive performance (memory and attention) in adolescent children



“When farmers come to buy millet seeds, the iron pearl millet varieties Jirani and Chakti are what they usually demand. They only go for the conventional varieties when the IPM is not available. It is fast selling and the demand is currently more than the supply,” – Ali Kyauta, *input dealer in Gumel, Jigawa*

HarvestPlus Nigeria has demonstrated it is possible for new crop varieties like iron pearl millet to be released and commercialized within a year. Promoting the adoption and scaling of these new nutri-cereals with public, private, and national partners can help support a rapid and nutritious transformation of the Nigerian food system.

Swift Commercialization is Key to New Variety Success and Scale

New varieties of biofortified crops that can improve climate and nutrition resilience face barriers to scale in current seed systems and markets in Nigeria. Typical varietal release and commercialization, with enough seed produced for farmers to access, takes a minimum of three years. Within this waiting period, most new varieties are lost and never adopted at scale. This is a major risk in nutrition-related programming where time is of the essence.

To remedy this, the Nigerian government and HarvestPlus partnered to make special efforts for the release and commercialization of nutritious varieties. Careful coordination between national release committees, communication of demand from farmers to private seed companies, and linkages between companies and seed producers saw the release and commercialization of new iron pearl millet varieties in a record one year. HarvestPlus was able to shorten the time to market by about 50% through the following activities:

- **Ensuring Timely Bulking of Early Generation Seed**

Once the release of the iron pearl millet varieties became imminent, HarvestPlus worked with the National Agricultural Seed Council (NASC) to embark on the production of early generation seed (EGS) in preparation for an accelerated delivery of the varieties. At least 2 MT of foundation seed was produced from pre-release multiplication. This foundation seed was able to jump start commercialization of the variety. It was multiplied and seed was sold to farmers for planting in the same year the variety was released. Private sector companies were integrated in both the seed and grain markets to lead the commercialization process.

- **Contract Farming**

By March 2023, Premier Seed and over 30 other seed companies were integrated into the value chain to work with outgrowers to produce iron pearl millet seeds. Under this scheme outgrowers produced 300MT of raw certified seeds, which Premier off took at 15 % above market price to meet demand and build long term relationships with outgrowers. In previous years, Premier Seeds only produced and sold 50MT annually. In 2023, they sold out all 300 MT.

“Now we are doubling that production this year hoping that we will also sell it out,” said Afolabi Samson, Head of Research and Agronomy Unit, Premier Seed.



“The iron pearl millet has more flour content than conventional and its appearance is more appealing to the eyes and even more nutritious,”

— Hajia Abu Gumel, *processor in Gumel, Jigawa*

- **Empowering Women**

Engaging and incorporating women is critical to building equitable and sustainable value chains for new crop varieties. HarvestPlus addressed cultural barriers to their inclusion by training female extension workers, who supported women farmers and entrepreneurs with microprocessing and business training.

- **Demand Creation and Product Development**

HarvestPlus drove adoption of iron pearl millet shortly after release by stimulating private sector investment in the value chain.

HarvestPlus engaged private sector investors, such as Hallilco and Dala Foods, in a product development exercise leading to the adoption of iron pearl millet as a raw material of choice. The companies are now investing in raw material sourcing of millet to be used for their processed

millet products for the markets. As the private sector partners invested in iron pearl millet, HarvestPlus provided demand creation support, so investors were able to sell what they produced while integrating iron pearl millet as raw material.

Iron pearl millet is popular with processors as it provides a high flour yield compared to conventional millet varieties and has an appealing product texture and color. Facilitating early production of seeds and commercialization of the variety has allowed scaling to take off and will enhance accelerated access to nutritious foods by Nigerians.

By the end of the project, 32,890 hectares were planted with, and 253,000 people were consuming, iron pearl millet. Lessons learned about releasing and commercializing iron pearl millet were shared in a [webinar](#) with stakeholders from the private and public sectors.

“We have trained about 2,500 farmers and supported them with IPM seed so that we can buy back from them in October. This massive interest of Hallilco Foods in IPM starts with the amount of flour we get from IPM when we process it. It increased our yield by 18%, what it means is that where we get 100kg of flour from the conventional millet when processed, IPM of same quantity gives 180kg of flour when processed. This extra 80kg is profit. We are planning to increase our production capacity so we can start to meet our high demands.”

— Abbas Fadlallah, *Managing Director of Hallilco Foods, Kano, Nigeria*

HarvestPlus improves nutrition and public health by developing and promoting biofortified food crops that are rich in vitamins and minerals, and providing global leadership on biofortification evidence and technology. HarvestPlus works across CGIAR as part of the International Food Policy Research Institute (IFPRI).

