



DELIVERY

Delivery of Pearl Millet in India

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Staple Food	Daily Per Capita Consumption (all age groups, grams/day) ¹	Total Annual Production (thousand metric tons) ²
Rice	187	152,600
Wheat	158	94,880
Pearl Millet	17	10,330
Maize	14	21,060
Irish Potatoes	58	45,000
	Daily Per Capita Consumption (grams/day) ³	Iron Density
Pearl Millet	Children (4–6 years): 150 g/day Women: 300 g/day	Conventional Pearl Millet: 47 parts per million (ppm) Iron Target increment: +30 ppm Biofortified Pearl Millet Target Density: 77 ppm
		At the target level, biofortified pearl millet provides about 100% of the Estimated Average Requirement (EAR).

¹FAO Stat 2009; ²FAO Stat 2012; ³HarvestPlus Surveys

Current Iron Status

Prevalence of Anemia (2005-06 NFHS)	Children (6–35 months): 70% Pregnant women 59% Non-pregnant women: 55%
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Varietal Release: In 2012, HarvestPlus partner Nirmal Seeds commercialized ICTP-8203-Fe, an improved version of existing variety ICTP-8203, a regionally well-adopted crop with more than 90% of the iron target, in the state of Maharashtra. This improved version is on average 15% higher yielding (which will drive replacement of ICTP-8203 with ICTP-8302-Fe) and has 11% higher iron. ICTP-8203-Fe (Dhanshakti) has been officially released and notified in 2014. HarvestPlus will also collaborate with the publicly run Maharashtra Seeds Corporation Limited for seed production and distribution. In parallel, iron pearl millet hybrids are being developed for commercialization starting in 2014 in partnership with seed companies Shakti Vardhak Hybrid Seeds and Nirmal Seeds. This initiative has a target of reaching at least 1.5 million farm households and 14% of the pearl millet market share by the end of 2018. Delivery channels will include both private and public sector seed companies.



Examples of seed pack design and logo (HarvestPlus)

Strategic Factors Driving Delivery: In India, strong pearl millet breeding programs exist in both the public and private sectors. The commercial market is largely driven by hybrids (95%) with the private sector playing a key role; hence, HarvestPlus engages both actors in mainstreaming iron pearl millet. Private sector seed companies have strong crop research and development programs especially for crops that provide hybrid cultivar options.

Seed Commercialization: To ensure long-term sustainability, seed companies must engage in iron pearl millet breeding and establish their own high-iron product lines. Therefore, the HarvestPlus strategy engages seed companies in genotype-by-environment (GxE) testing of hybrids and inbred lines developed at the International Crop Research Institute for the Semi-Arid Tropics (ICRISAT) and encourage companies to develop their own high-iron hybrids for commercialization. Private seed companies operate a two-tier distribution system, supplying seed directly to distributors who in turn sell to retailers. Generally, each distributor sells to 40–50 retailers, depending on location and crops/products. These retailers ultimately sell the seeds to farmers. Pearl millet seeds are sold commercially in 1.5 and 3 kg packs, in attractive primary packaging with mandatory labeling (according to India's Seed Act).

Marketing: Demand for iron pearl millet seed is created by farmer demonstrations, field days, and promotions at points of sales. Nirmal Seed's channel partners and personnel have been trained in nutrition messaging for iron pearl millet, a crucial component in the delivery process. Building product acceptance is further facilitated by the agronomic superiority of a recently released high-iron variety compared to an older version currently farmed. HarvestPlus initially focused on seed sales, but with increasing market presence, HarvestPlus will collaborate with various actors in food and retail for demand creation of iron pearl millet grains, flour, and value-added products. This includes testing specific promotional messages and product benefits, communication channels and their effectiveness, and the selection of the brand name and advertising.

Stakeholders: Partnerships are extremely important to the delivery efforts in India, and HarvestPlus works closely with ICRISAT, five State Agricultural Universities, and 15 seed companies—most notably Nirmal Seeds and Tempest India for crop delivery.

Government support: The Indian government has endorsed the use of nutrient-rich crops and earmarked about US \$40 million in the budget for 2013-14 to establish nutri-farms, where iron pearl millet, zinc rice and wheat, and protein-rich maize will be grown. Nutri-farms will promote, encourage, and develop commercial cultivation and strengthen the supply chain of nutrient-rich crops to reach vulnerable sections of the population.

Potential Impact: At the end of 2013, a cumulative total of 25,000 farming households in India had been reached with iron pearl millet. It is projected that ICTP-8203-Fe market share will reach the saturation stage by 2015, and iron pearl millet in India will enter the anchoring stage of delivery by 2018. The projected iron pearl millet market share by 2018 in Rajasthan and Maharashtra, where 65% of the production in India is concentrated, is projected at 14%. It is estimated that approximately 1.17 million farming households will have access to iron pearl millet by 2018.

Delivery Challenges and Recommendations:

- Incorporating iron pearl millet grains in the existing institutional government programs, e.g., subsidized public food distribution and mid-day-meal programs for school children
- Creating demand for increasing consumption of iron pearl millet grains on farm and market linkages for grains and value-added products
- Developing technologies to increase the shelf life of pearl millet flour