



## FROM THE DRYLANDS OF INDIA TO AFRICA: COLLABORATIVE RESEARCH FOR IMPROVED SORGHUM AND MILLET

The FAO estimates that 55 percent of the world's arid and semi-arid drylands with rainfed farming potential are located in Sub-Saharan Africa and South Asia, particularly India, and these areas also are characterized by populations with the lowest nutrition levels and highest population growth rates.<sup>15</sup>

**Sorghum and millets are annual grasses that produce small seeded grains and that thrive in the drylands of India and Africa.** These hardy crops are resistant to drought, require short growing seasons (three to four months from planting to harvest), and are used for human consumption or for animal forage and feeds. For millions of the poorest people in the world, sorghum and millets provide the main source of energy and nutrients. Research to improve the nutritional quality and productivity of these crops can dramatically impact the welfare and health of these farmers who produce, consume and market the crops.

In India, research and development to improve sorghum and millets has resulted in highly improved seeds and seed systems for delivering value to growers and consumers. Beginning in 1960s post-independence India, the government led the efforts with public research programs such as the **Indian Agricultural Research Institute (IARI)**, the **National Dry Land Research Center** and the **Directorate of Sorghum and Millet Research**, among others. By 1972, **ICRISAT** (International Crops Research Institute for the Semi-Arid Tropics, part of the Consultative Group for International Agricultural Research, or CGIAR research system) was established, and joined in the collaborative effort with Indian public research

centers to conduct research, collect and conserve germplasm and test new hybrid varieties to improve the seed qualities. These early efforts by the public and international research sectors were rewarded with higher yielding hybrids that improved productivity, paving the way for the next phase of development.

In 1971, India's seed sector was deregulated and allowed the entry of foreign firms to conduct research and develop new lines of improved seeds. With a very large market of farmers who adopted improved seed after several growing seasons, India attracted private companies such as **Pioneer** to begin millet and sorghum breeding programs, producing new cultivars with higher yields and properties such as drought and heat tolerance. In 1988, a new seed policy further spurred additional growth in private sector seed research in India.<sup>16</sup> Firms were now allowed to multiply and sell seeds to farmers with less regulatory interference, avoiding lengthy application and approval processes.

ICRISAT's consortium leadership enabled private sector companies, the government and small and medium-sized domestic Indian firms to collaborate on improving seeds and seed markets and extension of new products and training to farmers. In addition, in Western Rajasthan, a dryland zone, ICRISAT started a 10-year research program of farmers' participatory breeding to improve pearl millet and its ability to withstand drought. The new and improved varieties resulting from this collaborative research program resulted in higher incomes for the farmers, with higher rates of school enrollment for their children, especially among girls, and improved homes and assets, all made possible with the higher incomes from the improved productivity of millet.<sup>17</sup>

**Recent initiatives have included a new ICRISAT-led informal consortium that has come together to sequence the pearl millet genome.**



Pearl millet field in India.

Credit: ICRISAT

Additional initiatives are focused on **improving the nutritional quality of pearl millet and sorghum**. Pioneer's hybrid pearl millet product has one of the highest levels of iron and zinc density and can be used for expanding cultivation throughout India to address anemia and zinc deficiency malnutrition.

Despite the documented productivity of these crops under challenging conditions, the full potential of sorghum and millet is yet to be fully achieved in Africa, particularly in more vulnerable areas of the Sahel and dryland cropping areas. Building on the powerful public and private research experience with sorghum and millet in India, the **Agropolis Foundation, DuPont Pioneer** and other partners in Africa are building a new initiative focused on improving sorghum and millet productivity in Africa, where these crops have been on the decline for 20 years. New innovative partnerships will catalyze productivity and competitiveness of sorghum and millet value chains by improving seed systems and seed product development, and connecting smallholder farmers to markets.