

Objectives of the Expert Meeting on Alternative Uses of Sorghum and Pearl Millet in Asia

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On behalf of the Organizing Committee, I would like to welcome all the participants to this Expert Meeting on Alternative Uses of Sorghum and Pearl Millet in Asia. A special welcome and thanks to Mr Andrey Kuleshov from the Common Fund for Commodities (CFC), and delegates from China, India, Indonesia, Pakistan, Thailand and USA; and of course my colleagues from ICRISAT, including Dr AB Obilana who has traveled from Nairobi. Special thanks to Mr Myles Mielke, Secretary of FAO's Intergovernmental Group on Grains for his support to holding the meeting.

Sorghum (*Sorghum bicolor*) and pearl millet (*Pennisetum glaucum*) are the two most important cereal crops grown largely under rainfed conditions in the semi-arid tropics (SAT) of Asia, Africa and the Americas. Sorghum is grown over 90 countries in the world; Asia accounts 29% and Africa 52% of 42.8 million ha of total world area. In Asia, India accounts 84%, China 8% and Thailand 1.4% of the total 12.5 million ha area. The world estimated sorghum production is 59 million t, with a productivity of 1.4 t ha⁻¹. India's total production is estimated to be 9.5 million t, 74% of Asia, from a total of 10.5 million ha grown. Productivity in India is low, with 1.0 t ha⁻¹ in rainy season and 0.8 t ha⁻¹ in postrainy season. On the other hand, China's productivity is estimated to be 2.8 t ha⁻¹ with a total production of 2.7 million t accounting 21% of Asia's production. Thailand produces 0.17 million t (1.3% of Asia) from 0.11 ha with a productivity of 1.57 t ha⁻¹.

Pearl millet is a crop adapted to drought-prone, low fertility, saline and acid soils and is reported to be cultivated in 30 countries of Asia and Africa over 26 million ha, of which 46% is in Asia (11.5 m ha), with India accounting for 43% (10.7 m ha) of the total world area. Its productivity ranges from 0.6 to 0.7 t ha⁻¹ both in Asia and Africa. India produces 9 million t with a productivity of 0.75 t ha⁻¹, China 1.94 million t with a productivity of 1.43 t ha⁻¹. Thailand has potential to cultivate pearl millet in marginal soils.

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In most of the developing countries of these continents both sorghum and pearl millet contribute significantly to food and nutritional security of the rural and urban poor people. Currently, India, China and Thailand in Asia are playing a major role in the development of sorghum and pearl millet cultivars in public and private sectors in partnership with ICRISAT. The adoption of improved and high-yielding cultivars is variable between crops and countries especially in India having >65% of the area in sorghum, and 80% in pearl millet. However, farmers do not get remunerative prices. One of the reasons for the low farm-gate prices is the several layers of traders between farmers and consumers. In the rainy season, sorghum is affected by grain molds, a disease caused by a complex of fungi, mostly including *Fusarium* spp and *Curvularia* spp, which produce fumonisin, a mycotoxin that is reported to be carcinogenic and immunosuppressive agent.

Both sorghum and pearl millet were staple cereals for the poor people in the SAT when ICRISAT was established 31 years ago. However, both crops are becoming less important in the economies of the SAT countries, and the demand for these grains as human food has been declining in the past 30 years (Source: Ryan and Spencer 2001. Future challenges and opportunities for agricultural R&D in the semi-arid tropics). This is more evident in Asia (especially in South Asia), where their share of food budgets of poor in SAT index fell from 17% in early 1970s to around 6% in early 1990s. The implication is that productivity improvement of these cereals has also led to price reduction. This is made worse by the government policies favoring rice (*Oryza sativa*) and wheat (*Triticum aestivum*), at the cost of sorghum and pearl millet. For example, in India the subsidized rice and wheat available under the Public Distribution System, at prices lower than the price of sorghum and pearl millet have adversely affected the market price of the latter. Naturally, the poor farmers of rainfed SAT who cannot grow crops other than sorghum and pearl millet are economically impacted negatively, as they cannot get reasonable price for the produce and thereby are forced into the vicious cycle of poverty and indebtedness.

However, there is hope. Recent growth and future projections of aggregate demand patterns suggest that there will be substantial increase in the demand for animal products (meat, milk and eggs) in developing countries by 2020 (Source: Ryan and Spencer 2001. Future challenges and

opportunities for agricultural R&D in the semi-arid tropics). In addition to this, there are possibilities of other alternative uses of sorghum and pearl millet such as novel foods, processed foods and industrial uses – starch, beverages and ethanol.

Sorghum and pearl millet improvement research at ICRISAT makes great success stories, especially in the context of India, which is the largest producer of both crops in Asia. More than 50 hybrids of sorghum and more than 70 hybrids of pearl millet are grown on 60–65% of the total area under these two crops in India. About 70–80% of these hybrids are based on ICRISAT-bred male-sterile lines, or on proprietary parental lines developed from ICRISAT-bred germplasm.

Very little of the above would have occurred had it not been for productive public-private sector partnerships with diverse sectors in both crops. ICRISAT firmly believes in the power of partnerships, which brings together their complementary skills and resources to generate the synergy required to enhance the pace of technology development and dissemination.

Commercialization of alternative food, feed and industrial products is one of the ways to increase market demand for sorghum and pearl millet. This, however, would require innovative institutional alliances. I am convinced that this meeting will be able to identify commercializable food, feed and indirect products, identify research and development priorities, and also identify potential partners to develop innovative institutional alliances.

There is urgent need to develop and strengthen new linkages and relationships between commodity producers (the small-holder farmers), commodity-based science, and commodity markets, including industrial users. Innovations, both technical and institutional, need to be promoted through a broader and more iterative set of relationships than those embodied in conventional research-extension-farmer model of agricultural innovation. Giving context and urgency to this is the increasing evidence that lack of access to markets is a greater constraint to the diversified livelihood strategy of contemporary poor rural households, than the lack of access to food per se. In the case of coarse cereals, private sector industrial utilization has created market opportunities and there is potential for expansion both in terms of scope and volume. However, the institutional arrangements (rules and norms) and relationships

(partnerships and alliances) linking science, producers and markets need to operate in a much more effective fashion than they do now.

A majority of the papers at this meeting discuss the various aspects of these existing and potential alternative uses of the crops. Therefore, the three major objectives of the meeting are to:

- Synthesize the available information and assess the future outlook for increasing the demand and expanding market opportunities for alternative uses of sorghum and pearl millet with special reference to alternative novel food products, livestock feed, starch and brewing/distilling industries.
- Assess existing and improved sorghum and pearl millet cultivars for suitability of alternative uses mentioned above.
- Identify potential players and opportunities for stimulating the institutional alliances among public, private, industry and NGO sectors to enhance alternative uses (including industrial utilization) and market demand.

I sincerely hope that together we can map out the strategy for diversified alternative uses and nurture the necessary institutional alliances. I wish you all the best for a successful meeting.