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Importance of Millets ('Sri Anna'), Types of Millets and Value Addition of Millets

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Millet is a collective term referring to a number of small-seeded annual grasses that are cultivated as grain crops, primarily on marginal lands in dry areas in temperate, subtropical and tropical regions. The most important species are pearl millet, finger millet, proso millet and foxtail millet (see Annex I for types of millet). Pearl millet accounts for almost half of global millet production. It is the most important species of millet both in terms of cropped area and contributions to food security in regions of Africa and Asia that can produce little else. Finger millet is widely produced in the cooler, higher-altitude regions of Africa and Asia both as a food crop and as a preferred input for traditional beer. Proso millet is important for bird seed in the developed countries and for food in parts of Asia. Foxtail millet is important in parts of Asia (mainly China) and Europe. The other species (barnyard, kodo and little millets, the fonios and teff) are locally important food grains restricted to smaller regions or individual countries. The various species differ in their physical characteristics, quality attributes, soil and climatic requirements and growth duration.

Developing countries, mainly in Asia and Africa, account for about 94 percent of global output, estimated at some 28 million tons (1992-94 average, Table 1). Of this, pearl millet accounts for about 15 million tons, foxtail millet for 5 million tons, proso millet for 4 million tons and finger millet for over 3 million tons (Annex II). Almost all millet is produced by small-scale farmers for household consumption and localized trade. Pearl millet, in particular, is critically important for food security in some of the world's hottest, driest cultivated areas.

Very limited quantities of millet are produced in the developed countries, primarily for a high-value specialty market as bird seed. Correspondingly, only limited quantities of millet are recorded in international trade.

Millets are better adapted to dry, infertile soils than most other crops, and are therefore often cultivated under extremely harsh conditions - for example, high temperatures, low and erratic precipitation, short growing seasons and acidic and infertile soils with poor water-holding capacity.

Most millets have strong, deep rooting systems and short life cycles, and can grow rapidly when moisture is available. As a result, they can survive and reliably produce small quantities of grain in areas where mean annual precipitation is as low as 300 mm. This compares with a minimum water requirement of 400 mm for sorghum and 500-600 mm for maize. Some species (pearl and proso millets) also appear to tolerate higher temperatures than sorghum and maize, although they do not tolerate long drought periods as well as sorghum.

Importance of Millets

Millets are a major food source in arid and semi-arid parts of the world. Millets are good sources of energy. They provide protein, fatty acids, minerals, vitamins, dietary fibre and polyphenols. Typical millet protein contains high quantity of essential amino acids especially the sulphur containing amino acids (methionine and cysteine). Processing millet by milling removes the bran and germ layers that are rich in fibre and phytochemicals, causing significant loss. The millets are source of antioxidants, such as phenolic acids and glycated flavonoids. Millet foods are characterized to be potential prebiotic and can enhance the viability or functionality of probiotics with significant health benefits. The nutritional significance of millets demands for an examination of the nutritional characteristics and functional properties of different millet cultivars as well as developing value added products from millets.

Millets are important crops for dry land farmers; they are highly nutritious and are a climate-compliant crop. Overall millets consumption in India has declined over the years. In order to revive the demand for millets in India, government and non-government is the led a consortium funding to undertake interventions to bridge the gaps identified in the millet value chain: at on-farm production, processing diversification, nutritional certification, promotion and marketing. It brought together all the stakeholders in the Productionto-Consumption System (PCS) value chain, linking them with poor dry land farmers. India is still one of the major global producers of millets. This is due to productivity gains in some varieties, with the production of millets showing some increase despite shrinkage of area. Thanks to the Green Revolution in 1965-66, which led to an increase in per capita availability of food grains, cereals at the national level kept pace with population growth. However, millet cultivation has reduced drastically

Reasons for the Decline in Area under Millet

✓ **Demand-led factors**

- Rapid urbanization.
- Changing consumer tastes and preferences due to rising per capita income.
- Government policies favouring other crops such as output price incentives and input subsidies.
- Supply of Public Distribution System (PDS) rice and wheat at cheaper price introduced in
- Non-traditional areas of fine cereals.
- Poor social status and inconvenience in their preparation (especially sorghum). • Low shelf life of grain and flour.

✓ **Supply-led factors**

- Increasing marginalized cultivation.
- Low profitability/low remuneration for millets vis-à-vis competing crops.
- More remunerative crop alternatives in kharif competing with millets.
- Decline in production and quality (as in kharif sorghum because of poor quality of grains due to blackening of grains, fetching low price for the farmers).

Nutritional Overview

Millet vs. Major Cereals Millets-the 'noble grains'- comprise sorghum, pearl millet, finger millet and five small millets. Millets are good sources of carbohydrates (60-73%), proteins (6-13%), fat (1-5%), crude fibre (1- 10%), and phytochemicals that have nutraceutical properties. Pearl millet is rich in proteins (11-13%) and lipids (4-6%); finger millet, on the other hand, contains proportionately less protein (6-8%) and fat (1.5-2%) [78]. Crude fibre content is 10–50-fold more in millets when compared to fine cereals, the highest being in barnyard millet. Millet proteins contain high proportions of essential amino acids, being 1.2–1.5-fold higher in essential amino acid content than rice (particularly finger millet). When compared to rice, the essential amino acid histidine content is 1.2-fold higher in sorghum, and the same in pearl millet and foxtail millet. Compared to rice, phenylalanine levels are 1.3-fold higher in pearl millet and methionine levels are 1.4-fold higher in finger millet. Cystine levels are 1.2-1.5-fold higher (or the same as) in rice for all the millets. Isoleucine levels are 1.3-fold higher in proso millet and finger millet. Lysine was always found to be the most limiting amino acid in millets as well as fine cereals. The amino acid presence in all the millets are 1.2-1.9-fold higher than in wheat. Millets also contain important vitamins such as riboflavin, thiamine, folic acid and niacin. When compared to rice, the vitamin riboflavin levels are 2.5–5.2-fold higher and folic acid levels are 1.1- 5.6-fold higher in all the millets, the highest being in pearl millet. Compared to rice, thiamine content is 1.4-fold higher in foxtail millet and similar in finger millet; niacin content in proso millet is similar to that in rice. All the vitamins are similar to the content present in wheat.

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