Sustainable Fruit Production For Nutritional Security In Arid And Semi-Arid Regions Of India

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Introduction:

The successful and viable cultivation of the horticultural crops solely depends on its sustainability in respect of consistent performance even under varied agro climatic conditions comprising biotic and abiotic stresses; no crop can be excluded from this situation as all the crops are said to be commercially, economically, socially and culturally viable. The sustainability not only pertains to particular fruit but enlightens on tropical, sub tropical, temperate and arid crops.

Arid and semi-arid fruit crops such as date palm (*Phoenix dactylifera*), ber (*Ziziphus mauritiana*), aonla (*Emblica officinalis*), bael (*Aegle marmelos*), pomegranate (*Punica granatum*), phalsa (*Grewia subinaequalis*), wood apple (*Feronia limonia)*, custard apple (*Annona squamosa)* fig (*Ficus carica*), guava (*Psidium guajava*), tamarind (*Tamarindus indica*), mulberry (*Morus sp*.) and lasoda (*Cordia myxa*) are rich sources of energy and nutrients particularly micronutrients (like iron and calcium) and vitamins (like vitamin B, C, folic acid, and carotenoids) along with phytochemicals (anthocyanins, carotenoids, phenols and flavonoids) and dietary fibers. Some horticultural crops such as date palm are rich in starch which provides energy in good amount. Therefore, arid fruits can be used to manage calories in our diet for malnutrition alleviation and obesity management.(**Sharma** *et. al*, 2016, Quisumbing *et. al*, 1995)

During last 40 years, the research and development programmes on arid zone fruits particularly AICRP on Arid Zone Fruits have improved the scenario of arid fruit cultivation in the country. In the 1976, most of the crops like pomegranate, ber, aonla and bael were in cultivation in a small area and date palm, jamun, tamarind, lasoda, custard apple, wood apple, fig were introduced under the commercial production. As result of this a total of 1.45 lakh hectare was under arid fruits in early nineties which have grown to 5.0 lakh hectare recently.

Similarly the production of arid fruits was to the tune of 14.5 lakh metric tonnes in early nineties which has increased by leap and bound to the level of 57 lakh metric tonnes (**Anonymous, 2017**). The technologies developed by the coordinated project led to increase in fruits production of pomegranate, ber and aonla and date palm. This has improved the income and nutritional security of the people of arid region. Since all the fruits are presently grown on wastelands/marginal lands and has potential to increase area, production and value addition, therefore, these fruits are future crops which will feed ever growing population of the country.

The production and post harvest technologies has also opened new avenues for self employment by setting up fruit processing industries. Some of the path breaking examples. The cultivar Bhagwa brought revolution in pomegranate cultivation in India.

Nutritional significance of arid fruits:

A balanced diet provides all the required nutrients in appropriate amounts and proportions which can be achieved through a blend of the four basic food groups i.e. carbohydrates, proteins, fat and micro nutrients (vitamins and minerals). The quantities of foods needed to meet the nutrient requirements vary with age, gender, physiological status and physical activity. A balanced diet should provide 50-60% of total calories from carbohydrates, possible from complex carbohydrates, about 10-15% from proteins and 20-30% from both visible and invisible fat. In addition, a balanced diet should provide other non-nutrients for example dietary fiber, antioxidants (vitamins C and E, beta-carotene, riboflavin and selenium) and phytochemicals (anthocyanins, carotenoids, phenols and flavonoids) which protect the human body from free radical damage. The Indian Council of Medical Research recommended 300 g of vegetables (green leafy vegetable 50 g, other vegetables 200 g and roots & tubers 50 g) and 100 g fresh fruits per day for a balanced diet (**Anonymous, 2011**).

Nutrient rich fruits for arid and semi arid regions

Nutrient	Source	Function in human body
Carbohydrate (%)	Date (pind) (67.20), Karonda dry (67.00), Bael (30)	To Meet the energy requirement and calorie malnutrition alleviation
Protein (%)	Date (dried) (25), Mango (0.6), Wood Apple (73)	Structural and functional components of living cell, protein malnutrition alleviation
Dietary Fiber (%)	Guava (6.80). Wood apple (5.10), Pomegranate (5.10)	Bowel movement, constipation, diabetes, obesity, heart disease, colon cancer and satiety treatments
Vitamin A (IU/100 g)	Mango (4800), Orange (1104), Date (dried) (26)	Night blindness, chronic fatigue, heart disease stroke and cataracts treatments
Vitamin B_2 (mg/100 g)	Bael (1200), Wood Apple (77)	Body growth, reproduction and RBC production
Vitamin C (mg/100 g)	Aonla (605), Guava (300), Lime (60), Sweet Orange (50)	Scurvy, wound healing, healthy immune system, cardiovascular-disease treatment
Calcium (%)	Karonda dry (0.16), Wood apple (77)	Osteoporosis, teeth and bones component, blood pressure treatment
Phosphorus (mg/100g)	Khejri (400). Lasoda (275)	Rickets and osteomalacia treatment, bones and teeth component, maintain electrolyte balance
Iron (mg/100g)	Dry Karonda (39.00 g), Date (10.50)	Anemia treatment, immune mechanisms, morbidity rates
Potassium (mg/100 g)	Mosambi (490)	Hypertension (blood pressure), stroke, arteriosclerosis treatments

Conclusion:

Arid fruit crops are rich sources of energy and nutrients particularly micronutrients (like iron and calcium) and vitamins (like vitamin B, C, folic acid, and carotenoids) along with phytochemicals (anthocyanins, carotenoids, phenols and flavonoids) and dietary fibers, which play important role in malnutrition alleviation and obesity management in arid and semi arid regions of India. With the adoption of technologies developed by different centres of the AICRP on arid zone fruits located in different states, a substantial area under ber, aonla, pomegranate, custard apple, fig, bael and tamarind have been increased in Rajasthan, Gujarat, Haryana, Maharashtra, Tamil Nadu, Andhra Pradesh, Karnataka, UP and Punjab. With the

development of Bhagwa, Phule Super Bhagwa and Ganesh of pomegranate cultivars, a large area in Maharashtra, AP and Punjab is being cultivated with these varieties (**Anonymous**, 2019).

References:

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