

Value Addition of Buckwheat (*Fagopyrum spp.*) for Entrepreneurship Development in Tribal Areas

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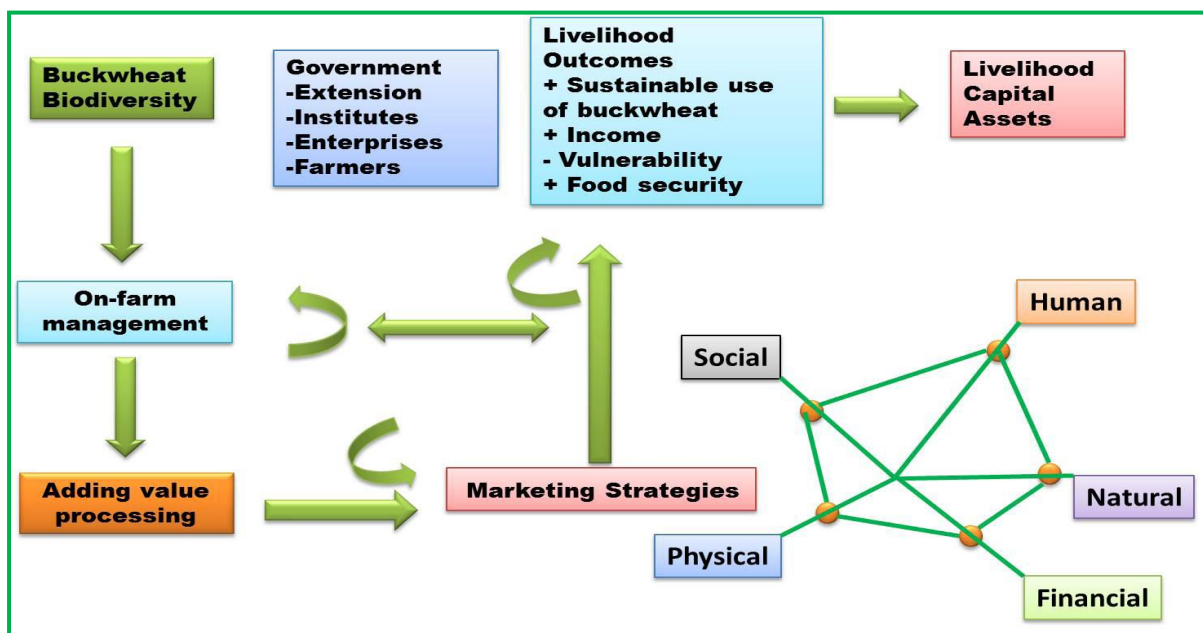
There are two cultivated species in the genus, namely *F. esculentum* Moench (Common or Japanese buckwheat) and *F. tataricum* Gaertn (Tatary buckwheat). *F. esculentum* is a herbaceous, erect, annual plant with hollow stem, swollen nodes and alternate triangular leaves. The inflorescence is axillary and terminal cyme with densely clustered dimorphic white, pink or red colour flowers. This species is cross-pollinated and self-sterile. *F. tataricum* is a taller and coarser annual herb with short internodes and narrow, arrow-shaped leaves. The flowers are all one type and borne on axillary racemes with inconspicuous green sepals. The species is self-fertile. Buckwheat is a multi-purpose crop. The

whole plant, young shoots, flowers and grains are used in a variety of ways. *F. esculentum* is often raised as a leafy vegetable crop in the mid-hills of the Indian Himalayas. The tender shoots are used as leafy vegetables. Buckwheat grains are highly nutritious in proteins (15%), fat (5%) and good source of iron (155 mg/100 g). It has excellent protein quality in amino acid composition, unlike cereals which are deficient in lysine one of the essential amino acid for human health. The biological value of protein is superior to other food plants and is comparable to that of milk and eggs. It is a staple food crop of the people living in the high Himalayas. On fast days when cereals are not eaten by the people, they eat buckwheat grains. Its starchy flour is used as porridge (*kheer*) or soup. The flour is also used as sweet pudding (*Halwa*) for making *chillare*, an un leavened bread fixed with butter or ghee. In Japan, it is mainly consumed as noodles (a popular fast food) called *Soba*. It is mixed with potatoes to prepare *paranthas*, with wheat and barley flour to make *chapattis*. Husked kernels are cooked as rice. The seed is used in the preparation of number of alcoholic drinks. Country liquors called '*pechuvi*' and '*chhang*' are made from buckwheat. Buckwheat flowers and green leaves are used for extraction of *rutin* (glucoside) used in medicine. *Rutin* is used for the treatment of vascular disorders characterized by abnormally fragile or permeable capillaries. Correction by rutin of increased capillary fragility results in a decreased incidence of vascular complications such as retinal haemorrhage, apoplexy and coronary occlusion (Naghski *et al.*, 1955). Buckwheat spp. *F. esculentum*, *F.*



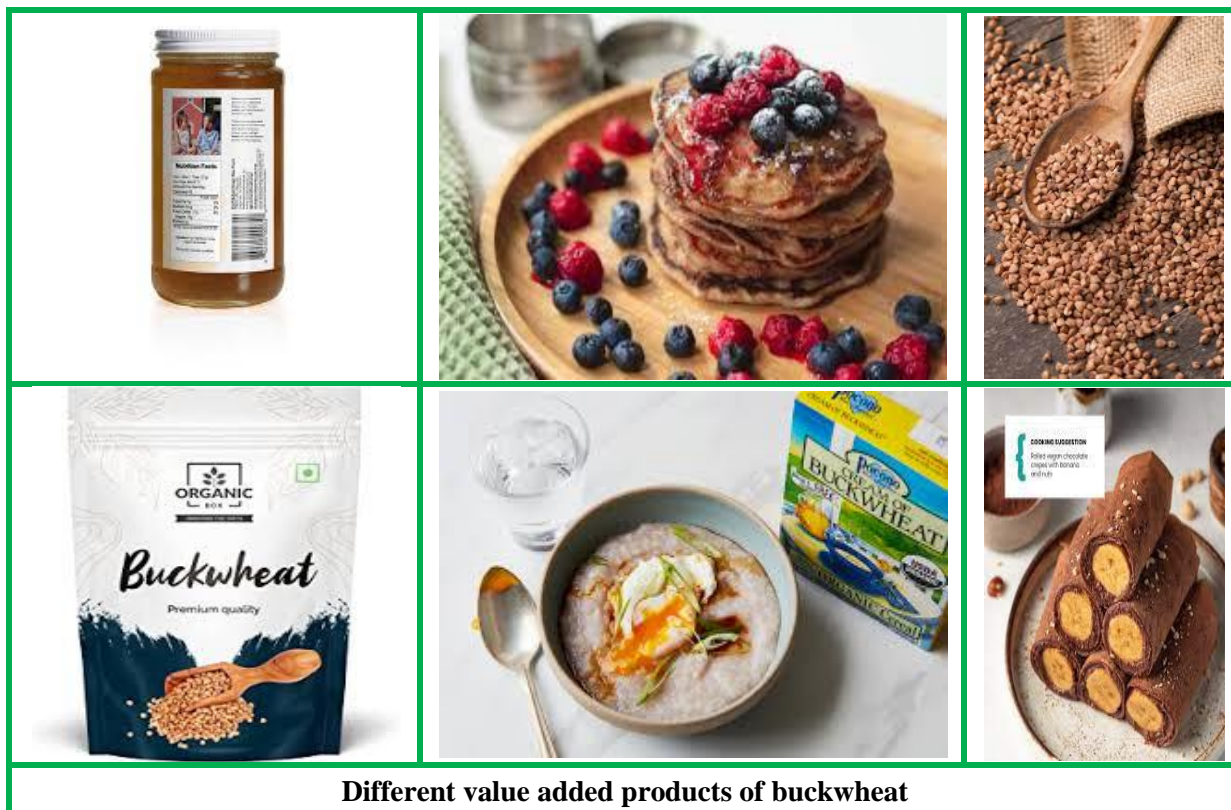
tataricum and *F. cymosum* contains 3-6% rutin on dry weight basis with *tataricum* buckwheat contains highest concentration. Tartary buckwheat has been reported to treat peridontitis and gum bleeding. Patients who brushed their teeth with Tartary buckwheat showed 62% recovery (Song and Zhou, 1992). Poor lands can be improved by cultivating buckwheat as it improves the physical condition and water holding capacity of the soil. The crop helps in soil binding and checks soil erosion during rainy seasons and is a good green manure crop. It is used as a green manure for potatoes in Nilgiri Hills. The flower of common buckwheat produces very good quality honey. It blooms in September when other sources of nectar are limited. The honey is dark in colour and has a strong flavour. Thus, buckwheat crop fulfill the special need of a beekeeper. Buckwheat crop is gaining popularity among apple orchards grower and beekeeper especially in in Kinnaur and Shimla districts of Himachal Pradesh for increased apple production as well as for honey production due to increased bee activity (Joshi, 1999).

Livelihood Plan on Buckwheat



The main aim of developing a livelihood framework on buckwheat is to uplift the socio-economic status of the people especially the impoverished community. Bioprospecting of bioresources leads a key role in alleviating the poverty of a particular nation. Buckwheat being an essential functional food especially in Himalayan regions has the great potential to earn the livelihood of the people. The plan takes various shareholders together to publicize its production, processing and trade. The distinct members of the scheme include growers, enterprises, research and development organizations and other agencies. The framework is assigned with distinct tasks such as training programmes on buckwheat cultivation, production and processing of essential buckwheat functional as well as nutraceutical food products and marketing. Among various members growers play a pivotal role in the production and supplying of raw material to processing industries besides, they also play a lead role in the management of gene pool conservation. Moreover, the traditional knowledge of farmers helps enterprisers to develop novel products. In this way, growers help in buckwheat production and enhance market opportunities for income generation. Community enterprises play a main role in developing value-added products of buckwheat. Besides, the various industries involved in buckwheat processing provide employment opportunities, thus is an essential source of income generation for farmers. The enterprises also play an essential role in expanding the market of buckwheat products by providing suitable marketing

channels. Besides, breeders in collaboration with food scientists play the main role in developing novel varieties of buckwheat to be used as a functional food. Scientists are involved in conservation and management of gene pool. Besides, they are also involved in developing high yielding varieties and transferring the technology to farmers. Moreover, food scientists are also involved in training entrepreneurs to develop novel products of buckwheat like buckwheat tea, wine, cookies, pancakes, *etc.* To boost the buckwheat market especially in impoverished regions government plays a crucial role in coordinating activities and providing policy support through its relevant departments. Besides, the government also will play an important role in creating public awareness of buckwheat products and providing subsidies to farmers for buckwheat production.



Different value added products of buckwheat

Conclusion and future prospects

Considering the requirements of improving our living environment and searching for novel ways to make better use of buckwheat, more work needs to be done in the recent future. Due to the nutraceutical properties of buckwheat and its products, current research is focused to further exploit the distinct bioactive constituents and commercialize various buckwheat products. This will not only help in the prevention and treatment of various human diseases, but will also be helpful in improving various traditional and local buckwheat foods and better use of its by-products. Many landraces, mutants and other varieties such as Rice-Tartary with beneficial characteristics should be included in crop improvement varieties. Efforts are needed for creation of varieties with high sugar content in the flowers and great pollen producing ability which would lead to higher yield of buckwheat honey. Buckwheat could be a leading source of industrial fagopyritols, rutin, vitamin and other essential bioactive constituents provided that the cultivation is increased through the improved technological inputs. This would be of the great benefit to humanity, particularly to the poor.