

FRUIT PROCESSING: A POTENTIAL INVESTIBLE PROJECT IN UTTARAKHAND LEADING TO FOOD SECURITY

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INTRODUCTION

Uttarakhand, formed on 9th November 2000 as the 27th State of India, is largely a hilly State located at the foothills of the Himalayan mountain ranges. The state comprising of the central Himalaya is spread over 53,483 square kms and inhabits 100.86 lakh population. Administratively, it comprises of the divisions of Kumaon and Garhwal, which are further composed of thirteen districts. The plain region of the state known as Tarai-Bhabar region comprises of Udham Singh Nagar, Haridwar and parts of Dehradun and Nainital districts. The hilly region of the state consists of Uttarakashi, Tehri, Pauri, Chamoli, Rudrapur, Almora, Bageshwar, Champawat, Pithoragarh and parts of Dehradun and Nainital districts. Agriculture is the main source of employment in Uttarakhand and around 58 percent of workers earn their livelihood from this sector. The larger part of the state is characterized by a difficult terrain, undulating topography, remote and inaccessible villages, sparse population, tiny land holdings, agriculture based economy and weak infrastructure. Uttarakhand is known for its wide variety of fruit production. The geographical attributes and climatic conditions of the state are ideal for production of temperate and subtropical fruit crops (State Horticulture Mission, Govt. of Uttarakhand). In hilly areas, fruits like apple, pear, peach, plum, apricot and walnut are produced while mango, litchi, *malta*, *santra*, lemon, *aonla*, guava and pomegranate are mostly grown in Tarai and valley areas. Uttarakhand is also known for some unique indigenous fruits like *kaafal*, *dadim*, *hisalu*, *kilmoda*, *ghingaru*, *timil*. A variety of traditional and modern processing technologies are being used to maximize the benefits of processed fruits. Although with the investments of some big food processing industries in Uttarakhand, the fruit processing sector is flourishing but still the processing of indigenous fruits is not common. These fruits are an important part of diets of hilly population providing good amount of nutrients, thus ensuring nutrient adequacy in their diets. The government is continuously working for the development of small scale industries that could reach out the distant rural places. The present study undertakes a thorough review of basic and contemporary literature available and tries to explain the present status and future prospects of fruit processing in Uttarakhand.

Horticulture is one of the most significant and thrust sector of the economy of Uttarakhand state. India ranked second highest in term of fruit and vegetable production although the progress in the processing sector is not line with the production. The state is known for a wide variety of fruit production and the future of fruit processing sector is bright in *Devbhoomi*. Hence the present study has been conducted with the following objectives:

- To identify the present status related to fruits production in India and Uttarakhand state.
- To study the current scenario and future prospects of fruit processing sector in Uttarakhand state.

METHODOLOGY

Descriptive research has been used for this study. The current status of fruit production in the country and in Uttarakhand has been investigated. The present study undertakes a thorough review of basic and contemporary literature available and tries to explain the current scenario and future prospects of fruit processing sector in Uttarakhand. This study also explains the importance of locally available indigenous less known fruits of Uttarakhand in ensuring the nutritional security, so extensive review pertaining to local and indigenous fruits of Uttarakhand was done.

FINDINGS AND DISCUSSION

Fruit Production in India

India has a rich diversity of horticultural crops possibly because of the agroclimatic variations, enormous biodiversity, fertile soil and a large cultivable area (Kaul, 2000). The Fruits and Vegetables (F&V) sector has been a driving force in stimulating a healthy growth trend in Indian agriculture. F&V sector is perhaps the most profitable venture of all farming activities as it provides ample employment opportunities and scope to raise the income of the farming community. Fruits and vegetables account for nearly 90% of total horticulture production in the country. India is now the second largest producer of fruits and vegetables in the world after China and is the leader in several horticultural crops, namely mango, banana, papaya, cashew-nuts, areca nut, potato and okra. However these crops are grown in small plots, fields or in the kitchen gardens of the houses. Many horticulture crops have multiple pickings in a single season. Similarly many fruit trees are scattered, which do not count for

assessment. Over the last decade, the area under horticulture in India grew by about 3% per annum and annual production increased by 5.4%. (NHB, 2017).

Figure: 1 Horticulture Statistics at a Glance-2018, Ministry of Agriculture & Farmer's Welfare, Department of Agriculture, Cooperation & Farmer's Welfare. Horticulture Statistics Division

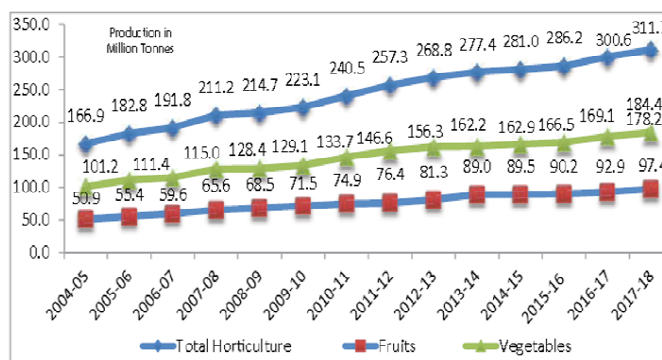


Fig. 1: Horticulture Statistics at a Glance-2018, Ministry of Agriculture & Farmer's Welfare, Department of Agriculture, Cooperation & Farmer's Welfare. Horticulture Statistics Division

India is known to be a fruit basket of the world being the second largest producer of fruits. But due to skilled manpower deficiency, poor cold storage facilities, inefficient post harvest management and minimal technological interventions, India contribute only 1% of the global market of the fruit processing industry. In India, the wastage of fresh fruit produce has been estimated to be of a very high order, i.e. around 30-35% of the total production during harvest, storage, grading, transport, packaging and distribution because of the challenges involved in the industry (Sharma *et al.*, 2016).

Fruit Production in Uttarakhand

An amazing variety of fruits, vegetables, nuts, flowers and herbs grow in *Devbhoomi*. Coupled with the favorable climatic conditions for food processing, makes Uttarakhand an attractive investment destination for agri and food processing. Out of a total geographical area of 5.35 million ha in the state, only about 14 percent of the geographical area is cultivable which is mainly attributed to the topography of the state. Because of its location and diverse climate, the state has certain unique advantages for development of horticulture, agro processing industries which can be gainfully exploited (Tuteja, 2013). According to 2018 Horticulture Statistics Report by Ministry of Agriculture and Farmer's Welfare, the area under the production of fruit crops in 2017-18 for Uttarakhand is 178.7 thousand hectare with a production of 669.9 thousand metric ton.

Uttarakhand is known for the production of a variety of fruits such as mango, citrus fruits like lime, *malta*, pear, apple, peach, plum, apricot, litchi, walnut, guava, *aonla* and local fruits like *kaafal*, *dadim*, *hisalu*, *kilmoda*, *ghingaru*, *timil* etc. As fruit production contributes a major share of the total production of horticulture crops in Uttarakhand, they also contribute to the nutrition to the plate of the native population. Fruits and vegetables are not only rich and inexpensive sources of carbohydrates but also of minerals and vitamins, particularly calcium, iron and magnesium, and vitamin A and C, essential for building resistance against diseases. Their role in combating the global problem of malnutrition and more so of micronutrient deficiency, therefore, becomes obvious (Kaul, 2000). Food and nutrition security is a major global challenge. Reduction of food losses from production to consumption and sustainable enhancements in preservation, nutrient content, safety and shelf life of foods, enabled by food processing will enhance the nutrient availability to the population. A large share of population reside in the distant hilly zones of the state, consumption of these seasonal fruits ensures a nutritive contribution to them. The distant population is not having a better access to the variety of foods available in the global market as well as they don't have the proper exposure to the processed foods. The fruits grown in abundance in the season get wasted due to various reasons i.e. surplus production as compared to the consumption, improper transportation facilities, and improper facilities of fruit processing which could make the product available in their dearth season in form of processed product.

Lesser Known Fruits of Uttarakhand

The diversity in wild plant species offers a variety of family diet and contributes to household food security. Sometimes the nutritional value of wild plant is higher than several known common vegetables and fruits. Uttarakhand state is characterized by a rich diversity of ethno medicinal plants as well as a rich heritage of wild edible plant system (Kumari and Bijalwan, 2019). Arora and Anjula (1996) reported the edible plant species of Uttarakhand total 97 in numbers including 19 crops of fruits and 67 wild edible fruits of nutritional importance. The wild edible plants including fruits satisfy substantially the food requirements of the economically poor population in rural areas. Many of the wild fruits which are gathered by local people are attaining market value in recent years and there are others which are gathered and consumed locally but not sold. The information on such plants may help adding variety to the monotonous diet so that requirements of minerals and vitamins etc. are easily met. Consumption of wild edible fruits meets the protein, carbohydrates, fats, vitamin and mineral requirement of poor rural populace in the region. Namrata *et al.*, 2011 stated that wild edible plants are very important for the well being of rural populations in the region, not only as sources of supplemental food, nutritionally balanced diets, medicines, fodder and fuel, but also for their income generating potential. A few less known fruits grown in Uttarakhand are as follows:

Rubus ellipticus (Hisalu)

Rubus ellipticus also known as *Hisalu/Hinsar* as well as yellow Himalayan raspberry belongs to family Rosaceae which is native to tropical and subtropical India. It is a weedy raspberry. The fruit is edible medicinally for various ailments.

Ficus auriculata (Timul) (Moraceae)

It is commonly known as *Timul*. Fruits are eaten raw and cooked as a vegetable. The Leave and fruit parts reported to have antibacterial, anti-inflammatory and antioxidant activities.

Berberis asiaticaC (Kilmora) V. (Berberidaceae)

It is commonly known as *Kilmora*. The fresh roots are used for curing diabetes. The stems are recommended in rheumatism. The berries are mildly laxative and are given to children.

Rhododendron arboreum (Burash) (Ericaceae)

It is commonly known as *Burash*. Flowers are eaten raw or made into juice to cure stomach diseases.

Pyrus pashia Lin (Mehal)

Pyrus pashia, the wild Himalayan pear, looks like the russet apple and has an astringent but sweet taste when ripe. It is rarely found in local, national and international markets as it is not a major cultivated tree and also the fruit are very soft and highly perishable at maturity.

Myricaensculata Sny.Myrica Negiis (Kaafal)

The tree yields a drupaceous fruit which is one of the tastiest wild fruits of the sub-Himalayan region. This fruit tree carries a lot of commercial importance and every year its fruits worth thousands of rupees are sold. Fruits are utilized in food industries in the Himalayas in different forms like syrups, jam, and squash.

Wild apricot (Prunus armeniaca) (Chulu)

The fruit pulp of apricot is an excellent source of Vitamin C (ascorbic acid). Dried fruits are particularly high in calcium and iron. The major constituents of apricot fruit pulp include fiber, sugars, organic acids, carotene, niacin, minerals particularly Potassium, Sodium, Calcium, Magnesium and Iron.

Ghain (Elaeagnus umbellata)

The *Ghain* bears small pink fruits which are very good to eat. The fruits are offered for sale at many places. The fruits of grain are a fine blend of sweet and sour and have a very good taste.

Daru/Dadhim (Punica)

This is a kind of pomegranate which grows wild in very large numbers in the forests and wastelands throughout the mid-Himalayan region. The fruits are not consumed fresh like the cultivated pomegranate due to the excessive acid content.

Wild edible plants play an important role in food supplements during scarcity for local inhabitants. There is immense scope for the consumption and value addition of these crops. The area under production, productivity and share in processing industry of these locally grown indigenous fruits is not documented.

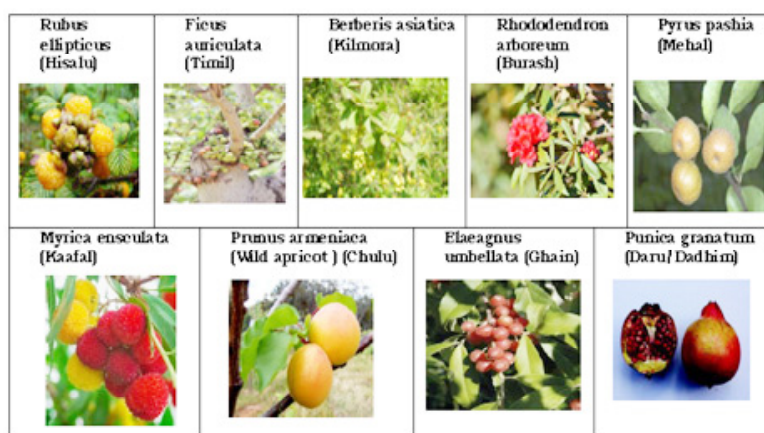


Fig. 2: Few less known fruits grown in Uttarakhand

Fruit Processing Industry in India

Fruit industry in India is one of the leading industries in terms of production, consumption, export and expected growth. India has been considered as the second largest producer of fruits in the world. India contributes 9.54% of the total fruit production of the world. In spite of the India's strong hold on the production of fruits it is alarming to know that India processes just 2% of

the total fruit production with an alarming loss of around 35%. Only 20% of the production of processed fruits is being exported (Bung, 2012). India has the distinction of producing almost all tropical and exotic fruits and vegetables because of varied climatic conditions. Due to the short life span of these crops, a major percentage of the production gets wasted. Hence there is strong need for maximum commercial utilization of fruits and vegetables and to adopt innovative production and marketing practices to the requirements of the world market and also to cater to domestic demand which over the past few years has been increasing because of various socio economic factors (Singh *et al.*, 2012). Maharashtra, Tamil Nadu, Karnataka, Andhra Pradesh, Bihar, Uttar Pradesh, Uttarakhand and Gujarat are the major fruit growing states. Both traditional and modern processing technologies are implemented in the conservation of horticultural produce. Several schemes have been formulated by the Government of India to provide financial support and aid for establishing modern infrastructure, FPU's, research & development support and human resource development and other promotional measures to encourage the growth of the industry. These schemes are Food Park Scheme, Packaging Centers, Integrated Cold Chain Facility, Value Added Centers for value addition to the products, schemes for focus on infrastructure, incentives for development of storage facilities, focus on R&D and modernization like setting up/upgradation of Quality Control/ Food Testing Lab, R&D and promotional schemes are the initiatives launched by the Government of India (Sharma *et al.*, 2016).

Challenges of Indian Fruit Processing Industry

The agro food processing industry is one of the largest in India, employs around 18% of the country's industrial work force and is ranked fifth in terms of production, consumption, export and expected growth. The food processing industry contributed 9 percent to India's GDP and had share of 6 percent in the total industrial production (Merchant, 2008). Value addition of food products is expected to increase from the current 8 percent to 35 percent by the end of 2025. Fruit & vegetable processing, which is currently around 2 percent of total production is expected to increase to 25 percent by 2025. Processing of food products plays an important role in the conservation and effective utilization of fruits and vegetables. India's strong agricultural base, variety of climatic zones and accelerating economic growth holds significant potential for food processing industry that provides a strong link between agriculture and consumers (Singh *et al.*, 2012).

India has a reasonably good supply chain in grapes, apples and bananas. But this is not the case with other fruits and vegetables. As per study by CIPHET (Central Institute of Post Harvest Engineering & Technology) 2010, percentage of losses are as high as 30–35% of the total production because of inefficient cold chain facilities, skilled manpower deficiency and spoilage at various post-harvest stages resulting in decay, flesh softening, and physiological disorder in fresh fruit produce. Despite major production and share, there exist certain crucial challenges in the Indian Fruit Processing Industry leading to heavy wastage and increasing unit prices such as employment in unorganized sector, lack of adequate infrastructure: improper cold chain and warehousing facilities, inadequate infrastructure of different modes of transportation (road, rail, air), lack of adequate skilled manpower, inadequate documentation skills, knowledge, inability to apply technical expertise and understand changing customer preferences, low productivity level, lack of technology for processed products etc.

Current Scenario and Future Prospects of Fruit Processing Sector in Uttarakhand

Uttarakhand is leading fruit producer of India with rank 1 in production of Pear, Peach and Plum; rank 2 in production of Walnut and rank 3 in Apple production. Location and diverse climate, has given the state certain unique advantages for development of horticulture and agro processing industries (Horticulture and Floriculture Sector Profile, Government of Uttarakhand, 2018). Uttarakhand has several agro-geo-climatic zones, making it particularly conducive to commercial horticulture. Uttarakhand has been included in the difficult area category by the Ministry of Food Processing Industry (MoFPI) and hence units being set up in Uttarakhand are also eligible for higher incentives under the scheme of MoFPI. Fruits such as apples, oranges, pear, grapes peach, plum apricot, litchi, mangoes and guava are widely grown in the state and therefore have immense potential for development of horticultural crops and processing units. (IBEF, May 2018).

The state has 512 registered food processing units with 147 central licenses and 365 state licenses. Further, out of these, 403 units are horticulture based and 109 are non-horticulture based. Processing clusters of Fruits and Vegetables are Haridwar, Dehradun, Tehri Garhwal, Udham singh nagar, Nanital. A number of industrial areas and food parks are available in the state for investors keen on setting up food processing units in the state. The key food parks in the state include:

- Himalayan Mega Food Park in Kashipur with an area of 50 acres.
- Patanjali Mega Food Park in Haridwar with an area of 70.15 acres.

A total of 0.16 million tones is the installed cold storage capacity in Uttarakhand. Further, the state has 18 cold chains sanctioned by MoFPI. The state government has undertaken number of reforms to offer an enabling and investor- friendly business climate for investors keen on setting up business in the state (World Food India, 2017).

The state plan seeks to establish agro-processing facilities close to the points of production in rural areas, which will promote off-farm employment. Agricultural Cooperatives and Gram Panchayats can play a leading role in this effort. As a part of post harvest management strategy, additional logistic infrastructure will also be required to be created. Some initiatives taken by the state government like gravity ropeways to provide road head access to the farm produce need to be taken at a larger scale. Private investment must also be encouraged in post harvest technology and infrastructure to bridge the gap in agricultural marketing. In order to develop and strengthen the processing sector, backward and forward linkages can be established by involving private sector and coordination with all concerned departments and agencies of the state and central government (Tuteja, 2013).

RECOMMENDATIONS

Due to diverse agro climatic conditions, having proximity to states like Delhi NCR, Uttar Pradesh, Himachal Pradesh, Punjab and continuous expansion of food processing sector, fruit processing is expected to rise in future. But as the production of fruits is not clustered and organized in majority areas in the state, hilly areas have plenty of indigenous fruit production which have no documented data, the production is not commercialized too and due to lack of proper infrastructural and economic support from the government this production doesn't make to state's total fruit production and processing sector. Moreover the large scale processing industries are confined to the urban pockets of state and they don't give a due attention to these lesser known fruits which in fact are grown and consumed basically in the rural hilly areas on a large scale. A lot of work needs to be done in this context to increase the productivity of fruits grown in Uttarakhand and increase their share in processing sector.

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