

Golden Harvest

Exploring the Riches of Chilgoza Nuts

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Introduction

Chilgoza pine stands as Afghanistan's most prized and pivotal species within the realm of social forestry, carrying significant ecological and economic importance. This tree species is exclusively found within the arid temperate forests of the Hindukush-Himalayan region, encompassing both the eastern and south-eastern parts of Afghanistan. In the eastern regions, including Kunar, Nuristan, Laghman, Kapisa and Nangarhar, Chilgoza pine thrives at altitudes ranging from 2100 to 3350 meters above mean sea level, while in the south-eastern areas, such as Paktia, Khost and Paktika, it flourishes between 1800 and 2300 meters above sea level. The primary forest product obtained from these trees is pine nuts, which serve as a cornerstone of the non-timber forest product sector. Chilgoza pine, however, assumes a critical role in advancing the socio-economic development of rural communities residing in the proximity of these pine forests. Beyond being an economic commodity, these pine forests offer an array of additional benefits like, environmental services, wildlife habitat, pasture, shelter, medicinal plants and fuel wood etc.,

Three types of pine kernels, specifically *P. gerardiana*, *P. koraiensis* and *P. pinea*, have a well-established history of international trade. Among these, *Pinus gerardiana*, commonly known as chilgoza, holds a prominent position in Afghanistan's forests and is a key player in the global pine nut market. Notably, the pine nut trade has experienced significant growth in recent years, with the United States alone witnessing a market value exceeding 100 million US dollars. This surge in demand can be attributed to a recent Irish study, which found that regular nut consumption may contribute to reducing the risk of coronary heart disease (CHD) and sudden cardiac arrest. Pine nuts are prized for their exceptional nutritional value, boasting generous quantities of essential minerals and a high antioxidant content. They also possess carminative, stimulant and expectorant properties. Furthermore, the kernels are a rich source of fats, proteins and carbohydrates and notably, they contain no cholesterol, setting them apart from other edible pine nuts. Global pine nut production, when measured on a kernel basis, reached an estimated 39,950 metric tons, marking an 86%

increase compared to the levels recorded in 2004.

P. gerardiana, as outlined in the Ayurvedic Pharmacopoeia, offers a wide range of therapeutic applications. These include addressing conditions such as Epilepsy (Apasmara), Rheumatism (Amavata), Facial palsy (Ardita), Cough (Kasa), Wounds (Ksata), Hiccup (Hikka), Pthisis (Ksaya), Anaemia (Pandu), Lower back pain (Katisula),

Intercostal neuralgia and pleurodynia (Parsvasula), Arthritis-related Vatadosa (Sandhivata), Paralysis or Hemiplegia (Paksavadha), Gout (Vatarakta) and Asthma (Svasa). The Ayurvedic Pharmacopoeia of India (2008) underscores that *P. gerardiana* provides multiple advantages due to its diverse pharmacological and nutraceutical properties (Singh *et al.*, 2021).

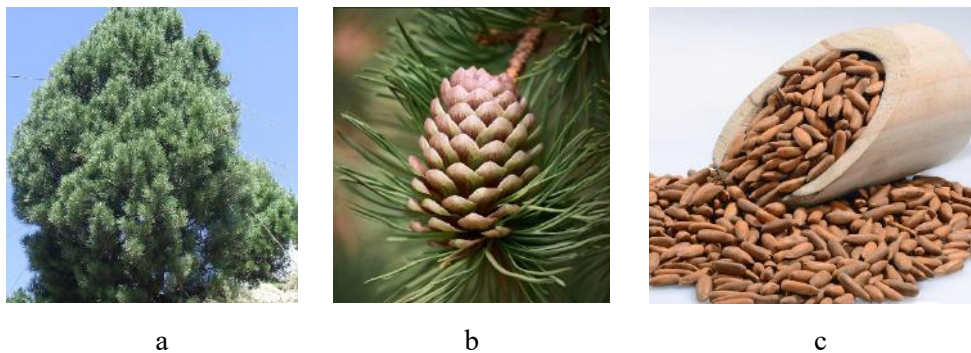


Fig.1. Chilgoza tree (a), Cone (b), Nuts (c)

Harvesting of cones

Trees are typically cultivated in mountainous regions, often on steep and rocky slopes. These trees usually begin bearing cones after a minimum of 20 years from the time of planting. During this period, the trees have grown significantly in height, with numerous delicate branches. The task of collecting cones is carried out either by forest owners or contractors. However, the combination of steep terrain and sometimes careless harvesting practices by contractors, along with the tall trees and delicate branches, has made cone collection a challenging endeavour. Harvesters employ

specialized tools resembling metal hooks attached to long wooden sticks for cone collection. While these tools are effective at gathering cones, they carry the risk of damaging the meristematic tissues or breaking branches, which can subsequently impact seasonal growth and the tree's inherent growth patterns. As the trees age, the harvesting process becomes increasingly arduous. The collection of Chilgoza pine cones typically commences in late August and early September, extending over a two-month period.



Fig.2. Harvesting tool for chilgoza cones

The contract system is commonly employed in larger forests, whereas in smaller forests, local villagers directly engage in harvesting Chilgoza pine cones. Typically, the harvested cones are sold by contractors or traders, but occasionally, villagers take it upon themselves to process the cones, involving drying and extracting the nuts, which they then sell in the local market. Under the contract system, Chilgoza forest areas are leased to contractors for a short duration, specifically during the harvest season. These contractors bring their own workforce and equipment to carry out cone harvesting. In most cases, local villagers also participate as labourers, aiming to minimize any potential harm to the trees. Factors such as the forest's larger size, the absence of suitable harvesting and processing tools, a shortage of processing facilities and the limited availability of technical workers lead communities to lease their forests to contractors. The Tribal Council (Shura), led by tribal leaders, is responsible for the decision-making and the contracting of Chilgoza forests to these contractors. The services offered by local harvesters are primarily directed toward the domestic or regional market. In contrast, contractors play a pivotal role in connecting the market to both the

Packaging and marketing

The process begins by packing the produce in large jute or burlap sacks, which are then transported to either the market or a central collection point. Based on surveys, it was found that contractors or traders harvest chilgoza with cones from the forest. They clean the nuts and convert them into shelled form at Khost, which serves as the primary collection point. Subsequently, these nuts are transported to wholesale markets and chilgoza processing factories. At these facilities, the chilgoza nuts

Conclusion

P. Gerardiana is a modestly sized evergreen tree found exclusively in the eastern regions of the Himalayan mountain range, spanning India, Pakistan and Afghanistan. *P. Gerardiana* yields edible nuts that command a relatively high market value, typically ranging from Rs. 400 to

national and international levels. This distinction underscores the major difference between contractors and local harvesters in terms of market linkage (Rahman *et al.*, 2021). To accelerate the drying process, some individuals opt to cover the cones with dry grass or fodder. Alternatively, a different approach involves storing the cones indoors and subsequently exposing them to sunlight for drying. This drying process typically spans a period of 15 to 30 days, during which the cones are spread out on dry ground, allowing them to be naturally dried by the air and sunlight. However, it's important to note that the efficiency of this drying method varies depending on the prevailing climatic conditions. In Afghanistan, a common technique for nut extraction involves beating the cones with a stick or against a hard surface. This process entails placing the pine nut cones into a sack and then using a stick to beat them or striking them against a sturdy surface. Regrettably, this extraction method may lead to the damage and wastage of some seeds due to the impact of striking and beating. For cones that fail to open their scales after the drying process, an additional step involves cutting them open using shears or clippers.

undergo processing and packaging to meet international standards before being exported, primarily to China. In the retail and domestic markets, pine nuts are roasted and sold to consumers. Roasting is typically carried out manually, utilizing either gas or wood as a heating source. It's worth noting that roasting one kilogram of chilgoza pine costs approximately \$0.75, resulting in an average reduction of 200 grams after the roasting process (Rahman *et al.*, 2021).

Rs. 650 per kilogram. These nuts boast exceptional nutritional value, rich in proteins, moisture, carbohydrates, fats, dietary fiber and a variety of essential minerals. To promote sustainable forest use, it is crucial to provide suitable training and capacity building. This

should encompass various aspects, such as determining the appropriate harvesting time, identifying mature cones, employing correct harvesting methods and effectively processing the nuts. Additionally, raising awareness about international quality and food safety standards is of utmost importance. Achieving these objectives can be facilitated through a variety of

means, including media outlets, newspapers and radio broadcasts. Furthermore, capacity building initiatives should emphasize sustainable forest use. To meet the current demand, there is an urgent requirement for establishing modern processing centres and upgrading existing facilities.

References

1. Rahman, N., Salari, H. and Wiar, A. (2021). Value chain analysis of chilgoza pine nut at south-eastern region of Afghanistan. *European Journal of Agriculture and Food Sciences*, 3(4), 43-49.
2. The Ayurvedic Pharmacopoeia of India, 2008, 1st edition. Part-1, VI. Government of India, Ministry of Health & Family Welfare, Department of Ayush. I(IV), New Delhi, pp. 1-492 .
3. Singh G., Kumar D. and Dash A. K. (2021). *Pinus gerardiana* Wallichex. D. Don. -A review. *Phytomedicine Plus*, 2667-0313.