Present Status of *Pinus gerardiana* Wall. in Pakistan: A Review

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Abstract

The present review paper highlights the current status of *Pinus gerardiana* species in Pakistan. *Pinus gerardiana* Wall. is a Near Threatened species under IUCN red list category. Pure strands of *Pinus gerardiana* are present in Pakistan which are facing threats due to the poor management practices and unsustainable timber harvesting. Therefore it is suggested that sustainable harvesting and good management can help to conserve the *Pinus gerardiana* which requires a suitable action plan and strengthened legal enforcement should be implemented on a priority basis.

Key words: Chilghoza, IUCN Threatened Species, Timber Extraction, Conservation

Introduction

Pinus gerardiana (Wall. Ex.D. Don) is commonly known as "Chilghoza pine" and is found at an elevation between 1800 to 3350 m in Temperate forest (Khan et al., 2015) existing in East Asia, South and South East Asia, West and Central Asia. In East Asia, *Pinus gerardiana* is growing in China (Tibet / Xizang) and in South East Asia it is growing in India particularly at Jamu-Kashmir locality whereas in West and Central Asia Chilghoza is growing in Afghanistan and Pakistan.

In 1965, Champion declared that Chilghoza pine is an economically valuable species (WWF-P, 2012) for it is an edible product. It's often grown and found in association with Blue pine (*Pinus wallichiana* A.B. Jacks), Deodar (*Cedrus deodara* Roxb. G.Don) Juniper (*Juniperus excela* M. Bieb.) and Oak (*Quercus ilex* L.) (Richardson and Rundel, 1998). Chilghoza tree is a very slow growing tree and growing 10-20 m in height. One study showed that its ring counting revealed that it took 64 years to attain a circumference of 2m at stump level (Javed, 2009). In year 2013, it was assessed as Near Threatened (NT) species under IUCN red list (IUCN, 2015).

In Pakistan, a forest of *Pinus gerardiana* is found on Suleiman Mountain Ranges (SMR) which is an extension of Hindu Kush at junction three provinces i.e. Baluchistan, KPK and Punjab and covering a total area about 260 km2. SMR carries the world's largest pure stand of Chilghoza (*Pinus gerardiana*) forests that are spread over the border of southeastern Baluchistan and the KPK. This forest provides habitat to the Markhor (*Capra falconeri jerdonii*) species which is also endangered under IUCN red list category (WWF-P, 2013). Moreover this forest has not only medicinal and economical value to local communities as well as to the country but also has ecological benefits like this species has the potential to reduce soil erosion as the species is a strong soil binder and prevents erosion of soil in the region (Sehgal and Khosla, 1986).

Local people collect green cones by self-picking from trees which are buried for about a fortnight till the cones open. Then seeds are extracted by striking cones on a hard surface. After that pine nuts are roasted in iron containers by mixing with soil over a fire. An individual tree yields minimum 20 kg and maximum 40 kg nuts (Sabra and Walter, 2001). Usually cones from trees are collected by s long pole having an iron hock. Due to this process of picking, injury is caused to the tree and climbing up the tree also causes branches to be broken.

Major Threats to *Pinus gerardiana* Wall.

Major threats to *Pinus gerardiana* are agricultural and aquaculture practices like livestock farming and ranching at small scale. Other threats to *Pinus gerardiana* are logging, wood harvesting, and international use of targeted species by gathering and IUCN categorizes all these threats under the term "Biological resource use". Poverty and lack of alternative energy fuels resulted in degradation of the forest.

WWF-Pakistan has also reported that local communities use Chilghoza forest as a source of timber and fuel wood instead of harvesting nuts, which has higher economic value. The main reason is that *Pinus gerardiana* is a very slow growing species. Another study by Shengji in 1996 highlighted that major risk to forest of *Pinus gerardiana* at Suleiman ranges is from the local community, for timber extraction.

Different researchers have discussed in their studies that anthropogenic activities like tree and plant harvesting for fuel wood, overgrazing, burning and many other factors are responsible for disturbance in forests and result in variation in size distribution and instability (Beg & Khan, 1984; Ahmed et al., 1984, 1988; Ahmed et al., 2009; Wahab et al., 2008; Siddiqui et al., 2009; Khan et al., 2010; Akbar et al., 2013; Hussain, 2013).

In Chilghoza forest local people graze their animals in areas where forests need to regenerate. But due to bad management practices and allowing of grazing in small concentrated places lead to land degradation and stops forest regeneration (WWF-P, 2013).

In one previous study it was indicated that insect attack on Chilghoza is another threat. A total of 18 months is required for cone formation. Insects attack seeds at all stages of growth especially during 16 months which is the cone formation period (Akbar et al., 2014).

WWF-Pakistan reported in 2013 that poor livestock management practices are leading to ecosystem and habitat degradation at many points. Grazing is concentrated into small areas, and is allowed in areas where forests need to regenerate. This leads to land degradation and stops forest regeneration. Also fire is initiated mainly due to negligence of grazers or travelers. According to a local, the Chilghoza forest of Kunday Qaisa burnt due to fire in 1999. This fire resulted in damage to many Chilghoza trees.

Data analysis depicts that the Chilghoza tree harvesting was highest in the year 1995 wherein 16901 trees, corresponding to 120,000 cft, were hewed. Afterwards, there is gradual decline in the tree harvest and in the year 2005, only 1352 trees, corresponding to 9600 cft were felled (WWF-P, 2013).

Timber Harvesting Methods

Chilghoza timber is harvest by three different methods, such as: by the owner; by a petty contractor; and by a 50-50 share between the owner and the logger or contractor. Timber harvesting by owner is the most desirable way of logging because here the logger being the owner has concern for the fruit rather than the timber. The second case involves only the petty contractor who pays a pre-determined fixed amount to the owner of forests and becomes the owner of the lot to be harvested. This is the most damaging logging. In the third case, the logger or contractor may either pays a mutually agreed lump sum amount to the forest owner and cuts a specific number of trees marked by him, or he shares the sale value on a 50-50 basis with the owner when the entire timber has been marketed. The fact is that the revenue generated from Chilghoza is more than revenue generated from timber harvesting (WWF-P, 2013).

Management Priority

Chilghoza forests of Baluchistan are probably the only forests of the country that have never been managed under a formal system of management: "Working Plan" or "Management Plan", for example. The main reason is that these forests are privately-owned and belong to hundreds of families of the so many sub-tribes of Sheranis. However in 1991, WWF-P adopted a two-pronged strategy and initiated efforts to control the commercial logging of Chilghoza forests and hunting of Markhor. Then in 1998, the Federal Ministry for Economic Cooperation and Development (BMZ) sponsored a research project titled "Integrated Conservation and Development Program for the Chilghoza Forest Eco-system and the Dependent Community in the Suleiman Range" which was carried out with the aim to quantify forest problems and know the existing and potential agricultural practices. During 2005-2007, WWF-P conducted a project entitled "Conservation of Chilghoza and associated scrub forest in selected villages of Tehsil Sherani District Zhob". Aims of this project were to improve management of Chilghoza forests, rangeland and enhance alternate livelihood sources (WWF-P, 2013).

Another project conducted by WWF-Pakistan was on Conservation of Chilghoza forest ecosystem through natural resource based livelihood improvement in Suleiman range. Duration of this project was two years (2012-2014). This project had successful efforts like community protected Chilghoza forest area which increased by 260 ha along with increased income from nut production and agricultural practice which reduced the rate of deforestation (WWF-P Factsheet, 2014).

Conclusion

Different addressed threats and conservation efforts by WWF-Pakistan to the *Pinus gerardiana* species have been discussed under a wide spectrum through this review paper. WWF is the main body which is involved in conservation of *Pinus gerardiana* and regulation of timber harvesting. It has also highlighted that revenue generated from Chilghoza nut is much higher than the revenue generated by timber harvesting. Though, the problems are solved by the conservation efforts of WWF to some extent, still there is lack of proper legal enforcement and management plan for conservation.

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