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The role of *Khejri* in indigenous agroforestry systems of Thar Desert

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ABSTRACT

A detailed study cum survey was conducted in the dry zones of Thar Desert to assess the role of *Khejri* in traditional agroforestry systems prevailing in these agroclimatic zones. A total of 08 villages in Mahender garh, Bhiwani, Hisar and Fatehabad districts of Haryana state of India were selected to explore the questionnaire regarding *Khejri* based agroforestry. Based on the above survey and questionnaire, it can be concluded that *Khejri* tree plays a vital role in sustainable agroforestry practices in arid zones of Thar Desert. It provides valuable products to the tillers and enhances the productivity of crops grown in its vicinity. Hence to practice sustainable agriculture in arid zones, this indigenous multipurpose tree species should be conserved and promoted in modern agroforestry systems.

KEYWORDS

Agroforestry;
Desert;
Khejri;
Indigenous;
Thar.

INTRODUCTION

In arid zones of Thar, traditional animal husbandry and agroforestry practices have been used to manage parklands, rangelands, reserved silvipastures near holy places, lay farming, and run-off farming (traditional watershed management). Traditional management of the whole arid zone ecosystem has been developed to minimize the risk of drought in diversified components and to efficiently utilize the scarce available natural resources as well as the products of agroforestry for sustenance of life. The number of tree species is very limited in arid zones, and the native peoples in arid zones have often developed production systems (silivipastoral/agrisilvicultural) in which woody perennials have a very important role[1]. Agroforestry is widespread in all ecological and geographical regions of Indian Thar desert. Highly compatible tree for agroforestry in these agroclimatic zones is *Prosopis cineraria*. It is also known as *Khejri, Sumri, Kandi Jand,* and *Ghaf* and is found mainly in the dry and arid deserts of India. In the hot arid agro climatic zones of Thar Desert, this tree plays an important role in traditional agroforestry practices[2]. The tree is held sacred to *Bishnoies*, an agricultural community of dry zones of Rajasthan and Haryana, and cutting this tree is regarded as sacrilege. The tree is revered by farmers and it is preferred by cultivators to grow in their fields since the time innominous. Therefore this study reflects light on role of this indigenous tree species in traditional agroforestry systems of Thar Desert.

METHODOLOGY

A questionnaire based extensive survey was conducted in June, 2008 in the arid zone villages of Haryana (a part of Indian Thar Desert) to assess the role of *Khejri* to meet the basic needs of cultivators in arid zone agroforestry. A total of 08 villages in Mahender garh, Bhiwani, Hisar and Fatehabad districts of Haryana were selected to explore the questionnaire regarding khejri based agroforestry. Various questions which were asked regarding agroforestry value, productive value, ecological value, medicinal value of *Khejri* and its regeneration in this area are summarized in TABLES 1 and 2. Cultivators especially old age farmers were requested to express their views on Prosopis cineraria and its role in conserving the agro ecosystems of this zone. Focus group discussion with veteran tillers and literature was reviewed to gain indigenous knowledge on *Khejri*.

RESULTS AND DISCUSSION

During the survey of existing agroforestry systems in the arid areas it has been found that, *Khejri* is often found at wide spacing in agricultural fields and forms an important part of dry zone agroforestry systems in India. Higher profitability in agri - silvicultural practices could be attributed in arid zones of Haryana through

TABLE 1 : Questionnaire in arid zone villages

No.	Question	Satnali	Badhra	Kairu	Bahal
1.	Which tree is dominant in the fields?	Khejri (*P.cineraria*)	Khejri (*P.cineraria*)	Khejri (*P.cineraria*)	Khejri (*P.cineraria*)
2.	Do you think the density of Khejri is enough in the fields?	Yes	Yes	No	yes
3.	What is major source of regeneration?	Natural regeneration	Natural regeneration	Natural regeneration	Natural regeneration Afforestation by forest deptt.
4.	What animals are owned by you?	Cow, buffalo, goat, sheep and camel	Cow, buffalo, goat, sheep and camel	Cow, buffalo, goat, sheep and camel	Cow, buffalo, goat, sheep and camel
5.	Which crops are grown in association with Khejri ?	Rabi- mustard, gram and wheat Kharif- bajra, guar, moong and moth bean	Rabi- mustard, gram and wheat Kharif- bajra, guar, moong and moth bean	Rabi- mustard, gram and wheat Kharif- bajra, guar, moong and moth bean	Rabi- mustard, gram and wheat Kharif- bajra, guar and moong
6.	Which basic needs are fulfilled by Khejri in agroforestry?	a) Food? Yes, Khejri pods. b) Fodder? Yes c) Fuelwood? Yes d) Habitat? Yes e) Soil profile? Better near Khejri f) Gum? Yes, it is given to ladies after delivery. g) Medicine?No	a) Food? Yes, Khejri pods. b) Fodder? Yes c) Fuelwood? Yes d) Habitat? Yes e) Soil profile? Better near Khejri f) Gum? Yes, it is given to ladies after delivery. g) Medicine?No	a) Food? Yes, Khejri pods. b) Fodder? Yes c) Fuelwood? Yes d) Habitat? Yes e) Soil profile? Better near Khejri f) Gum? Yes, it is given to ladies after delivery. g) Medicine?No	a) Food? Yes, Khejri pods. b) Fodder? Yes c) Fuelwood? Yes d) Habitat? Yes e) Soil profile? Better near Khejri f) Gum? Yes, it is given to ladies after delivery. g) Medicine?No
7.	What is lopping pattern to gain max. benefits from Khejri.	Annually	Annually	Alternate year	In drought years
8.	What are major impacts on crops?	Strongly positive impacts	Highly positive on kharif crops	Totally beneficial	Highly positive on kharif crops
9.	What are economic benefits of Khejri?	We sale fodder and fuelwood	We sale fodder and fuelwood	We sale fodder and fuelwood	Occasionally, by selling wood
10.	What are major causes of Khejri mortality?	Mechanized farming and insect-pests	Mechanized farming and insect-pests	Insect-pests and intensive agricultural practices	Not observed
11.	Which management strategies should be adopted to conserve Khejri?	Protecting from insects and conserving through natural regeneration.	Conserving through natural regeneration	Pest control and rely on natural regeneration	By promoting plantation artificially as well as protecting natural seedlings.

TABLE 2 : Questionnaire in arid zone villages

No.	Question	Jhumpa kalan	Choudhriwas	Bhattu kalan	Dobhi kalan
1.	Which tree is dominant in the fields?	Khejri (*P.cineraria*)	Khejri (*P.cineraria*)	Khejri (*P.cineraria*)	Khejri (*P.cineraria*)
2.	Do you think the density of Khejri is enough in the fields?	Yes	Yes	No	No
3.	What is major source of regeneration?	Natural regeneration Farmers care the young seedlings.	Natural regeneration Forest deptt. also help in plantation.	Natural regeneration Artificial plantation is also preferred.	Natural regeneration
4.	What animals are owned by you?	Cow, buffalo, goat, sheep and camel	Cow, buffalo, goat, sheep and camel	Cow, buffalo and goat	Cow, buffalo, goat and sheep
5.	Which crops are grown in association with Khejri?	Rabi- mustard, gram and wheat Kharif- bajra, guar, moong and moth bean	Rabi- mustard, gram and wheat Kharif- bajra, guar and moong	Rabi- mustard, gram and wheat Kharif- bajra, guar, moong and moth bean	Rabi- mustard, gram and wheat Kharif- bajra, guar and moong
6.	Which basic needs are fulfilled by Khejri in agroforestry?	a) Food? Yes, Khejri pods. b) Fodder? Yes c) Fuelwood? Yes d) Habitat? Yes e) Soil profile? Better near Khejri f) Gum? Yes, it is given to ladies after delivery. g) Medicine? No	a) Food? Yes, Khejri pods. b) Fodder? Yes c) Fuelwood? Yes d) Habitat? Yes e) Soil profile? Better near Khejri f) Gum? Yes, it is given to ladies after delivery. g) Medicine? No	a) Food? Yes, Khejri pods. b) Fodder? Yes c) Fuelwood? Yes d) Habitat? Yes e) Soil profile? Better near Khejri f) Gum? Yes, it is given to ladies after delivery. g) Medicine? No	a) Food? Yes, Khejri pods. b) Fodder? Yes c) Fuelwood? Yes d) Habitat? Yes e) Soil profile? Better near Khejri f) Gum? Yes, it is given to ladies after delivery. g) Medicine? No
7.	What is lopping pattern to gain max. benefits from Khejri.	Annually	Annually	Alternate year	In drought years
8.	What are major impacts on crops?	Strongly positive impacts	Highly positive on kharif crops	Totally beneficial	Highly positive on kharif crops
9.	What are economic benefits of Khejri?	We sale fodder and fuelwood	We sale fodder and fuelwood	We sale fodder and fuelwood	Occasionally, by selling wood
10.	What are major causes of Khejri mortality?	Mechanized farming and insect-pests	Mechanized farming and insect-pests	Insect-pests	Intensive agricultural practices.
11.	Which management strategies should be adopted to conserve Khejri?	Protecting from insects and conserving through natural regeneration.	Conserving through natural regeneration.	Pest control and rely on natural regeneration.	By promoting plantation in the community lands and fields.

Khejri based agro-forestry. Both food and fodder crops of kharif and rabi seasons, yield is more when grown with *Khejri* than alone[3].

The salient findings of the questionnaire are tabulated in TABLES 1 and 2.

Indigenous knowledge and sayings about Khejri (*P.cineraria*)

1. *Akshya* (secured) + *Jari* (root) = *Akshyajari* = *Khejri* (A tree with secured roots) a common old saying.
2. "*Seer samte rukh rahe, to bhi sasto jaan*" (I would consider it cheap if I could give my life for a khejri tree). Smt. Amrita devi (leader of Chipko movement Jodhpur,1730 AD).
3. "*Man bhawan aur subhawan more khejri ro ped hariya hariya jad nipaje chare, oont, bakri ne dhor*" (Green khejri tree attracts me and provide fodder to camel, goat and cattle). A saying of arid zone farmers.
4. "*Anti tutti khejri, pani fullen chayee; shabash mare sasuji, the latpan beti jayee*" (A twisted khejri tree laded with flowers encourages the newly married bridegroom to thanks his mother in law for offering a beautiful girl like khejri to him).
5. "In a country where shami (*P. cineraria*), neem

(*Azadirachta indica*) and aak (*Calotropis procera*) are available, the diseases never occur." Saying by Dhanvantry, the lord of ancient medicine.

6. "If the roots of people (*Ficus religiosa*), generated from fissures of khejri (*P. cineraria*) are fed to a barren women, she became fertile and bears a male child." - Atharvaveda.
7. "Gaon Gaon Gogo ne Gaon Gaon Khejri." It means every village has a shrine of Gogaji (snake god) under the Khejri tree.
8. "Sanger, Phog thali ko mevo." It states that green pods of Khejri tree and flowers of Phog (Caligonum poligonides) are considered to be dry fruits in the food plate in dry areas of Thar.
9. "Sanghar genhu, kair til, aak ghana kapas, phogus photiya bhadli, bandho samay ki aas. If the growth of Khejri pods are profuse the next wheat crop will be better, if kair (Calotropis procera) is better then possibilities of kapas are more. Similarly if phog (Caligonum poligonidus) blooms then there is possibility of good times.
10. "Samvat Sangri, Kaal chagda." When the growth of the pods of Khejri is good there will be a good crop year and if the growth of ber (fruit of Zizyphus nummularia) is more it is said to be a bad crop year.
11. "Hal bhavta, hakim hua; ghar me gali beer. Marwar me nipaje, ber sangria ne kair." On the whim of rulers, ploughmen becomes administrator and to maintain their prestige they keep a "concubine". Marwar is famous for three things- Ber, Sangri and Kair.

CONCLUSION

Based on the above study and questionnaire, it can be concluded that *Khejri* tree plays a vital role in sustainable agroforestry practices in arid zones of Haryana. It provides valuable products such as food, fodder, fuelwood, to the tillers and enhances the productivity of annual crops grown in its vicinity. *Khejri* based agroforestry systems have been developed and used in this region since time immemorial. This may be because the inhabitants of this region found that no other option was sustainable aside from conserving and harvesting whatever nature is giving. The need of the hour is intensification of these traditional agroforestry systems through a suitable combination of crops and multipurpose indigenous tree species such as *Khejri*. Hence to bring sustainabity in modern agriculture in arid zones, this multipurpose tree species should be conserved and regeneration should be promoted.

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