### Mahua Flower Collection Sheets -A simple Intervention for Facilitating Collection of Mahua flowers and Reducing Forest Fire

All over Central India, collection of mahua flowers is carried out by burning the undergrowth under mahua trees, often causing forest fire. Trials were conducted in Melghat Tiger Reserve using mahua collection sheets made from old saris. Use of mahua collection sheets obviated the need for burning the undergrowth and could be effective in preventing forest fire. A comparison was made of the benefits of using mahua collection sheets vis-a-vis the traditional method. The most significant benefit was the reduction in time required for mahua collection, from 6.78±0.79 hours to 1.58±0.29 hours each day. There were other benefits such as reduction in manpower requirement and reduction in encounters with wild animals. These benefits will encourage the adoption of this technique by forest dwelling communities for mahua collection.

Key words: Central India, Mahua, Mahua flowers, NTFP, Forest fire, Fire control

#### Introduction

Mahua, due to its multipurpose uses, is an important economic and cultural forest produce. Mahua flowers, seeds and fruits constitute a large percentage of income of many tribal communities, and provide the 3Fs, that is, food, fodder and fuel (Pinakin *et al.*, 2018). Looking at the dependence of tribal people on this NTFP and the harmful consequences of the collection technique, there is a need for development of alternative collection techniques that are cheap and easy to use. Furthermore, the techniques should maintain the quality and quantity of the produce.

The Mahua tree is largely found in forest ranges of Madhya Pradesh, Jharkhand, Chhattisgarh, Odisha, Maharashtra and Bihar. Tribal communities such as, Korkus, Gond and Baiga tribes in Madhya Pradesh collect Mahua flowers, fruits, seeds and leaves for their economic importance (Panda et al., 2010). Several folk dances and songs celebrate the resplendent Mahua. Flowers of the tree are preserved and used during festivals, important occasions and rituals. The trees are showered with prayers and love before the onset of flowering season and are worshiped before flower collection begins across tribes and states. Mahua blossoms are preserved to be used as culinary ingredient for sweets such as flavorful Mahua jaggery and other garnishing. Mahua flowers have been traditionally used in the preparation of number of traditional dishes like halwa, kheer, meethipuri and barfi in Mahua producing areas in India (Patel, 2008). Roti and sabzi made of Mahua flowers are considered to be a delicacy among the tribal communities. Additionally, oils from the fruit have medicinal properties and Mahua oil cakes are used as eco-friendly manure. Realizing its cultural and economic importance, forest departments of Maharashtra, Bihar and other state governments have explored production of jams, squashes, biscuits and jellies for value addition to mahua flowers (Dash, 2017).

Trials of mahua flower collection sheets conducted in two villages in Melghat Tiger Reserve, Maharashtra, showed reduced time and effort for mahua flower collection and is likely to be effective in preventing forest fire.

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Mahua flowers, collected from the forest, are sold by the local communities and constitute a source of income for Korkus. Dried flowers are used to brew Mahua liquor which is a traditional liquor consumed by the local people. Hence Mahua is culturally important for the tribal community of Melghat.

Mahua trees start flowering from March onwards. Villagers start collecting these flowers, from March till end of April. After the end of the flowering season, the tree begins to bear fruits from May until June. Locally called *gulli* or *toyi*, it is used to extract edible oil, which has bio-fuel properties, therapeutic qualities and economic value. Mahua leaves are used by villagers in many states to make cutlery, *i.e.* to prepare plates, cones and bowls that are sold and used for dining at home and during traditional festivities (Kumar *et al.*, 2018).

Mahua flowers are rich in sugars. The sugar content is 66 to 72% of their dry weight (Patel, 2008). The high sugar content is the primary reason that mahua flowers are used to brew liquor. On an average, each Mahua tree produces over 200 kg flowers and a household is able to earn ₹ 1000/- to ₹ 3000/- from the sale of the flowers (Kumar *et al.*, 2018).

The traditional technique for collection of Mahua flowers is picking up the flowers from the ground under, and around the trees. Typically, it takes about 5 to 6 hours, for a person to pick a basketful of flowers. To make the collection process easier, mahua gatherers sweep the leaf litter and grass below the tree and burn it. Collection of the yellow flowers becomes much easier on the black background of the burnt ground. However, the fires set to clear the ground are often not doused and escape from the area to cause forest fire. Large tracts of forest are burnt annually all over Central India due to this (Nanda and Sutar, 2003; Reddy et al., 2009). There is considerable leaf litter on the floor during these months which acts as fuel for the fire. Forest fires are highly devastating and cause considerable loss of biodiversity. Forest fires can cause severe mortality of young. Many birds and mammals, which breed during the summer or have young ones in the summer, are severely affected by forest fire. Forest fires can impact prey availability, breeding sites and breeding success of species. In order to reduce fire incidents during Mahua collection season a new concept of mahua flower collection sheets was introduced to facilitate collection of mahua flowers in a sustainable manner without burning the undergrowth under mahua trees. Mahua collection sheets have been promoted elsewhere in Eastern Maharashtra by the Forest Department (The Hitavada, 2020), but have not yet been systematically evaluated.

#### Material and Methods

Two villages *viz.*, Tangda and Chaurakundin were selected inside Melghat Tiger Reserve for deploying and evaluating mahua collection sheets (Fig. 1). Old saris were purchased and stitched to make a large sheet. The crown of the trees is circular in shape, but the sheets were joined in square shape for ease of stitching. It can be stitched in different sizes but the average size of the sheet was 17 m x 17 m. Loops were installed at the corners for tying to poles or nearby trees, by rope. It has a slit on one side till the center for inserting the trunk of the Mahua tree. About 45 to 50 saris of 5.5 m x 1 m size are required to stitch



Fig. 1: Map of village locations in Melghat Tiger Reserve

one mahua collection sheet (Fig. 2). Each sari cost ₹ 20. The material cost of the sari was about ₹ 1000, while the stitching cost was ₹ 500. The total cost of one sheet was about ₹ 1500.



Fig. 2: Mahua sheet

The Mahua collection sheets were deployed under mahua trees at the start of the mahua flowering season. Its corners and edges were pulled up and tied to the branches of trunks or branches of adjacent trees by ropes. If suitable trees were not available nearby, poles were inserted in the ground and the sheet was tied to the poles (Fig. 3). The sheet can be laid on the ground, but in the study area the corners and edges were pulled up by tying to surrounding trees and poles, to prevent domestic cattle or wild animals from feeding on the flowers at night.

Mahua flowers are shed by the tree at night and fall directly on the sheet. Collection of flowers using mahua collection sheets gives a clean harvest and saves a lot of time. Using the Mahua collection sheets, villagers are able to collect almost the entire produce with considerable ease, and without having to burn the undergrowth under the tree (Fig. 3 and 4). The Mahua flowering season is quite short - about 15 to 20 days. The mahua collection sheet is removed at the end of mahua flowering.

Twelve Mahua collection sheets were distributed among the local communities in the selected villages in Melghat Tiger Reserve. The project team helped the



Fig. 3: Traditional mahua flower collection by women, children and elderly members



Fig. 4: Mahua collection using mahua collection sheets. Only two members of the family are needed to collect the flowers

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beneficiaries to deploy the sheets under the Mahua trees. A questionnaire survey was carried out to assess the benefits due to the Mahua collection sheet, using a simple questions in local language. The questions included details about the collection process, and benefits due to deployment of Mahua collection sheets. The persons interviewed included the twelve beneficiaries who had received the Mahua sheets and eighteen community members who had not received the Mahua collection sheet.

#### Results

Most villagers collected mahua flowers from the forests around their own village. There are many mahua trees in agricultural fields, and substantial quantity of mahua flowers is collected from these trees. However, all the families interviewed said that they collected mahua only from the forest and not from agricultural farms. Only one family said that they collected flowers from forests of other villages also.

Mahua flowers are available for 15-20 days a year. In the current year the mahua collection season started from  $4^{\pm}$  to  $23^{rd}$  April 2020. Mahua collection is done by sweeping the floor under the trees in the morning and the flowers are collected in a bamboo basket. Twentysix families collected Mahua flowers from two trees, three families collected mahua flowers from three trees, and one family from four trees. The same trees are used every year by the same families. There is an

Table 1: Summary of Mahua flower collection

understanding that other families do not collect mahua from those trees. However, if the mahua flowers are unguarded, pilferage by other families may take place.

The collected and dried Mahua flowers are used for their personal consumption, or sold in the village, or to traders at the nearby market place in Harisal village. The sale price of mahua flowers varied substantially from ₹ 10/- to ₹ 40/- per kg. The buyers are mostly local tribals who purchase it to brew liquor (Table 1).

It was observed that there was a significant decrease in the time required for mahua collection from 6.78±0.79 hours without using mahua collection sheets to 1.58±0.29 hours using mahua collection sheets. The quality of Mahua flowers collected using the mahua collection sheet was better, but the beneficiaries said that this would not necessarily translate to a higher price. There was no significant increase or decrease in the quantity of mahua flowers collected due to use of the mahua collection sheet. There were several social benefits due to use of mahua collection sheets; women, children and elderly people did not need to go for mahua collection and children did not need to miss school for mahua collection (Table 2). All the beneficiaries expressed considerable satisfaction with the decrease in time for mahua collection. This will encourage the acceptance of the mahua collection sheets by the community in future.

Description	Avg. Value ± Standard deviation
Collection technique	By sweeping the floor under the tree (28 families)
	By sweeping and burning the undergrowth (2 families)
No. of trees Mahua is collected from	Two trees (26 families)
	Three trees (3 families)
	Four trees (1 family)
From where are Mahua flowers collected	29 families collected it from forest of their village. Only one family also collect from
	forest of another nearby village.
Quantity of Mahua collected per day	8.28± 2.18 kg
Quantity of Mahua collected each year	261 ± 76.39 kg
Mahua sale price	₹ 15 to 40/kg

Table 2: Comparison of Mahua flower collection by traditional method and using mahua collection sheets

Description	Mahua collection by traditional method	Mahua collection using mahua collection sheets
Sample size	18 families	12 families
No. of days spent in mahua collection	15	15
No. of family members who participate in mahua collection	Up to 6	Up to 2
Do women and girls from the family help in Mahua collection	Yes, all of them help	Not required
Do elderly members of the family help in Mahua collection?	Yes, they help to collect	Not required
	Mahua from nearby trees	
Do school going children help in Mahua collection?	Yes	Not required
If children participate in mahua collection do they miss school?	Yes	No
Typical collection time	5.30 am - 12.30 pm	7.30 am - 9.30am
Encounters with wild animals	Yes, it is common to	Encounters with wild
	encounter sloth bear, gaur,	animals are rare
	chital, sambar, nilgai and	
	langurs during early	
	morning.	
Time spent in collecting Mahua flowers	6.78 ± 0.79 hours	1.58 ± 0.29 hours
Time spent for cleaning mahua flowers after collection	1 hou <b>r</b>	None

#### Discussion

This study revealed that mahua collection sheets were a useful intervention. It reduced the time required for mahua collection considerably. It prevented the loss of quality of mahua flowers due to hand picking or sweeping. At present the beneficiaries did not expect to get a better price in spite of the improvement in quality. Better marketing may help to get better price for better quality mahua collected through the mahua collection sheet. The significant decrease in time taken and labor required for mahua collection will help in the acceptance of mahua collection sheets by the community.

The main purpose of the mahua collection sheet was to prevent the fires due to the mahua collection process. A larger scale intervention and careful monitoring of forest fire will help to assess the decrease in incidence of fire. The mahua collection sheets were installed on trees near the villages, where the density of wild animals was low. Their performance needs to be tested by installing deeper inside the forest, to test whether they are damaged by wild animals. These sheets proved to be very effective in collection of the flowers and users seemed happy with it.

### महुवा पुष्प संग्रहण शीटें- महुवा फूलों के संग्रहण को सुगम बनाने और वनाग्नि घटाने के लिए एक साधारण हस्तक्षेप जयंत कुलकर्णी और प्राची मेहता

#### सारांश

सम्पूर्ण मध्य भारत में महुवा फूलों का संग्रहण महुवा वृक्षों के अन्तर्गत अधोवृद्धि को जलाकर किया जाता है, जिससे प्राय: वनाग्नि की घटना होती है। मेलघाट बाघ रिजर्व में पुरानी साडि्यों से बनी महुवा संग्रहण शीटों का उपयोग करके परीक्षण किया गया। महुवा संग्रहण शीटों के उपयोग ने अधोवृद्धि को जलाने की आवश्यकता का निराकरण कर दिया और यह वनाग्नि रोकने में प्रभावी हो सकता हैं। पारम्परिक विधि की तुलना में महुवा संग्रहण शीटों के उपयोग करने के लाभों की तुलना की गई। महुवा संग्रहण के लिए वॉछित समय में प्रत्येक दिन 6.78±0.79 घण्टे से 1.58±0.29 घण्टे तक का घटाव सबसे महत्वपूर्ण लाभ था। अन्य लाभ जैसे मानवशक्ति आवश्यकता में कमी और वन्य पशुओं के साथ मुठभेड़ में कमी थे। ये लाभ महुवा संग्रहण के लिए वन निवासी समुदायों द्वारा इस तकनीक के अंगीकरण को प्रोत्साहित करेंगे।

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