

A Study of the Cultivation of *Pan* at Chhuikhadan

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Of all the places growing *pan* in Chhattisgarh division of C. P. & Berar, Chhuikhadan, a State of the E S A., is of the first importance not only for the largest area under *pan* at one place, but also in having the best types of *pan barejas*. The *pan barhies* of this place are found to be the healthiest and the heaviest yielders. The yearly export of *pan* from this place is to the value of about twenty-five to thirty thousand rupees. The business of *pan* has thus attained a paramount importance in this State. Like all other places here too, the cultivation has been specialised by one community called the *barai*. This article is mostly an out-come of the author coming in contact with the growers and also visiting the *barajas* from time to time when different operations were in progress.

Selection of the soil A soil akin to the tank silt in properties is supposed to be best suited for *pan* cultivation. This soil is clayey loam and friable. The second selection is *dorasa* or *kachar*. The majority of the *barejas* are found to have loamy clay of dark brown colour. On analysis of the soil from the best *bareja*, it was found to be a typical *kachar*.

<i>It contains:</i>	Sand	4.7%	Clay	53.25%
	Silt	32.7%	Humus	7.50%

The points of importance in soil selection are that it should be:—

1. Rich in organic matter.
2. Friable.
3. Should not hold superfluous water longer than necessary though it should remain moist.

Selection of site. A well drained spot away from the root and shade effects of big trees in an open sunny situation is an ideal site for *pan barejas*. *Pan* suffers badly from water logging conditions; hence in no case a low lying place is selected.

Rainfall. The rainfall at Chhuikhadan for the last four years was as below:—

Year 1940-41	46.45
1941-42	36.43
1942-43	58.38
1943-44	53.72

The average of these comes to 48.75 inches.

Preliminary cultivation. The area selected for *pan* cultivation is marked rectangularly by slaked lime, or small pegs. The other popular method of marking the plot is by stretching the strings and marking the boundaries by lime water exactly like the method of marking lines on the tennis court.

Some people then dig a trench all round this boundary and spread the dug up earth on the plot to raise its level above the surrounding ground.

The plot is then ploughed once or twice before the rainy season. It is then worked and pulverized by *kudali*. This process is something like making of *okhada* (the Indian wrestling place).

Bareja The *pan bareja* consists of a *mundap* or enclosure of trail roofing and all round fencing made by grass. The main objects of this structure are:—

1. Providing light shade to the vines.
2. Stabilisation of temperature.
3. Protection from strong winds and scorching sun that causes sun burning of the leaves.

This operation is taken side by side with ploughing etc., of the plot. Wooden posts are fixed on the lines at 4 to 6 feet apart. Generally the posts are 2 to 3 inches thick and 8 to 9 feet high. About 1 to 2 feet of it is buried in the ground to attain firm fixing and leaving the height of the *bareja* 6 to 7 feet. Bamboo posts are then fixed in between these wooden ones at two feet apart. The height of these posts above the ground level is also six to seven feet. This height of the *bareja* is taken almost as a standard by every one for two reasons.

(1) It is convenient to walk and work freely in the *bareja*.

(2) The vines generally grow to this height.

Grass *tattas* are then prepared like *khos tatties* used in the offices in the summer months. The grass in this case of course is thinly spread. These *tattas* are then securely tied to the wooden and the bamboo posts. Only one opening is left to serve as an entrance. This has a door of grass *tatta* of the necessary dimensions.

The roofing, too, is made of grass spread thinly and evenly on bamboo *kimchies* and are secured properly by *kimchies* from above. The top and bottom *kimchies* are tied together with *bakkal* fibre.

A *bareja* is generally 100 to 150 feet long and may be of the same width. It is either square or rectangular in shape. It is supposed to be economic to manage a row of 100 feet long than the one which is longer or shorter than this. Making of *barejas* is completed before the commencement of the rainy season. A second enclosure of ordinary type is provided all round the *bareja* at about 4 to 6 feet away from it. This is to protect the main *bareja* from being damaged by stray cattle.

Planting: preparatory cultivation. After pulverizing the plot with *kudali* an irrigation is given to it and the ridges and furrows are made when the plot is yet wet. The ridges are generally two feet apart. They are 4 to 6 inches broad on the top. The seed bed at the time of planting is quite compact.

Varieties. The most popular varieties are *bangla kopuri* and *bilahri*. *Bilahri*, though of tender type and low yielding, is paying because of the

higher prices it fetches in the market. There is a very great demand of this variety from Nagpur where it is liked more than the *bangla* variety. *Bangla* and *kapuri* are both hardy varieties and give almost equal returns. *Bangla* stands second in popularity though there is a great demand of *kapuri* during the summer months as it is supposed to give cooling or soothing effects.

Preparation of cuttings. *Pan* is propagated by cuttings from the old vines. Cuttings are taken only from two to three year old vines. They are taken from the top third of the vines. A cutting consists of two buds but the first cutting from the extreme end of the vine is cut long enough to have five buds. This might be with a view to be sure of getting the vines in case any of the tender top buds fail to develop the roots. (It may be noted here that this system is quite different from the one followed in the northern parts of Central Province where sets of only two inches long and containing only one leaf are made from the old vines.).

Planting the cuttings. Cuttings are planted slanting and deep enough to bury one bud in the ground. Generally about 3 inches of the cutting is below the ground level. They are planted on the ridges at about 4 to six inches apart, and are in two rows. They are planted alternately as shown below:—

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1st row      ×      ×      ×      ×
2nd row           ×      ×      ×      ×

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Both these rows are on the same ridge.

Time of planting. Planting is generally done in August and the first fortnight of September. No planting is generally done after September. *Magha Nakchatra* is supposed to be the best time of planting. The weather at the time of planting must be clear though a cloudy non-rainy day may be helpful. The cutting begins to show signs of growth after about 3 weeks. Under pot conditions in the trials conducted by me they seem to develop roots even earlier i. e., in about two weeks time only. The earliest time taken by a cutting was seven days.

Manures and manuring. No basal dressing is given to the *pan* crop. Oil-cakes, Til, Linseed, Sarso and Neem cakes only are given as top dressing to the crop. Castor cake is never used. It is supposed to be very harmful to the vines. The cake used is the local *Ghani* cake, which surely contains more oil than the milled one. There is a common belief—it may be more due to conservatism than because of facts—that the *Ghani* cake is more beneficial to the *bareja* than the milled one.

Two top dressings are given during the first year of transplantation. The first top dressing is done after about forty-five to fifty days of putting in the cuttings. At the time of first top dressing finely powdered cake is applied round each individual cutting and is quite close to the roots. The second top dressing is given after about a month. At this time powdered cake is applied between the rows.

In subsequent years three top dressings are given. The first one is in the beginning of the rains i. e., in the second fortnight of June or beginning of July, the subsequent ones following exactly one month after the previous ones. No manuring is done in any other season except the rainy season. It is also worth noting that the manure is not forked in the soil but is allowed to get slowly mixed up during irrigations. *Kodon* flour and *urid* flour are also used for top dressing. A few *barai* are even found to give a dose of ghee too.

Water and watering. A common belief amongst the growers is that soft and fresh well water is best suited for irrigation. Using tank water is mostly avoided. Nothing can be definitely said of the superiority of well water over the tank one but it has surely been noted that a few *barejas* grown under tank water are not progressing well. Water from small tanks used for bathing, washing etc. is definitely harmful to the vines.

Frequency of Irrigation. No irrigation is given during the rains unless the break may be of extra long duration. Weekly watering is done during the winter months, whereas in summer it is increased to once in four days. The time of irrigation is judged from the conditions of the vines.

Staking. The vines are staked as soon as they begin to creep. This state generally comes after about 50 to 60 days after planting the cuttings. As a matter of routine staking follows the first top dressing.

Vines are tied with *kans sukai* or *padyal* grass. There is a definite system of providing the stakes which is common with every one. At the distance of two feet, bamboo and wooden posts of about 2" diameter are alternately fixed. These posts are generally fixed at the time of *bareja* making. Bamboo *kimchies* about 7 feet long are then prepared by splitting a bamboo into eight. These *kimchies* are fixed in between the plants. Two *kimchies* are then tied longitudinally at the heights of 2 feet and 4 feet. Thus the total height of the poles get divided into three compartments. A few *barais* are found to give two cross *kimchies* also. The tying of the vines are continued according to their growth and are trailed on these till they reach the *barejas* roof.

Weeding. All weeds are thoroughly and carefully removed by manual labour. In a good *bareja* perfect cleanliness is the rule.

Forking and mulching. No forking and mulching is ever done in a *pan bareja*.

Harvesting. About six months after planting leaves are picked for the first time. This is generally taken up in February or March. Only the lower ripe and bigger leaves are picked up. A vine at this picking yields from two to five leaves.

Soon after this picking, on a clear day the vines are unfastened from the top and the middle compartment of the stakes and are brought down. They are then made in a circular ring *gucchi* and staked in the bottom compartment at the height of one to one-and-half or even two feet. This process is repeated after every six months when the vines reach the roof.

The second picking is got after about a month of the first one. The subsequent pickings are taken once a fortnight. In the second and third year when the vines are at their best and when they yield the highest, weekly pickings are had. Two to three leaves are taken in every picking. Only the ripe and fully developed leaves are plucked.

Life of a *bareja* A *bareja* can yield for five years or even more but the site is generally changed in every 3rd or 5th year when new plantation is taken up. Now-a-days it is noted that a *bareja* begins to deteriorate in the third year as a result of diseases.

Marketing. The growers have their own permanent agents, to whom they sell their produce. Retail sale is generally not taken up. These agents come every week to make the necessary purchase from the growers.

The *pans* are generally packed in the bamboo baskets specially made for the purpose. They are first made into small bundles of one hundred leaves each. The bundles are arranged in circular rows in the baskets. The rows are arranged from the periphery of the baskets and closed towards the centre. Thus rows above rows are arranged. To protect the leaves from damages in transit a layer of *palas* leaves (*Butea frondosa*) is given between the *pan* layers and the walls of the basket.

To facilitate second counting a *pan* is kept facing opposite after every hundred or fifty *pans*. The general and common system, without any exception, is to keep the dorsal side of the leaf above. One such packed basket is called *godri* and it contains 16,000 *pans*.

A few years ago some of the growers at times used to bleach the *pan* before selling. The idea was to give turgidity and colour (faint yellow like a ripe *pan*). The method was to dip the *pan* in milk and arrange them in baskets. They were then washed clean before being packed for sale. This is not in vogue now.

Pan diseases. The *pan* crop is found to suffer from the following diseases:—

1. *Jalka* (Foot-rot):—This Hindi name is given to the disease on the belief that it is caused by water logging. The real cause of the disease is *Phytophthora parasitica* var. *piperina*.

Precoutionary measures:—(1) Water is drained out of the *bareja*. A good *bareja* is always made with a particular gradient so much so that water does not get accumulated.

(2) An open drain all roud the *bareja* is also helpful.

Treatment:—Spraying of the ridges with Bordeaux mixture (4 : 4 : 50) before planting at the rate of one gallon of mixture for every 12 feet of the ridge is very effective. The spraying should be taken up once every two months.

2. *Keen* or *leaf rot*:—This disease is also caused by the fungus that causes the Foot-rot disease. Its attack is noted on the leaves and is at times found to make concentric circles on it.

Precautionary measures adopted by the growers:—

(1) They stop moving in the *bareja* when it is raining

(2) They do not enter the *bareja* without putting a full sleeved shirt on. This is because of the common belief that the disease become serious if the vines are disturbed when it is raining and by the body sweat coming in contact of the vines.

*Treatment:—*Spraying of vines with Bordeaux mixture (2:2:50) at the rate of one gallon of mixture for a row of 150 to 200 feet is recommended.

3. *Tilka (Anthracnose):—*This is also a fungus disease which is found to attack the vines (stems). It is caused by *Gloeosporium sp.* and *Colletotrichum sp.* This is the worst disease attacking a *bareja*. It is noted to destroy the whole plantation.

*Treatment:—*Spraying of vines with Bordeaux mixture 2:2:50 once in every two months is effective enough to keep a check over it.

4. *Pandri:—*It is caused by Coccid soft bodied insects, that suck the vine's juice. The insects are more active on the tender vine tips.

*Treatment:—*The insects are destroyed by hand picking. Spraying with a solution of Nicotine Sulphate and Fish Oil Rosin Soap is very effective.

5. *Katua:—*The damaging agency is the 'mites'. They make small spider-like white web at the tops of the vines. Spraying of the vines with a solution of Nicotine Sulphate and Fish Oil Rosin Soap is recommended.

6. *Leaf Spot:—*This disease is caused by *Bacterium betle*. The disease is characterised by brown coloured spots surrounded by yellow coloured rings. This disease can also be controlled by Bordeaux mixture (2:2:50) spraying.

7. *Tedhgi:—*At times the vines are found not to trail in their natural form but become zigzag. The condition is improved by adequate manuring.

A few remarks on pan diseases. It is practically impossible to eradicate the disease from a *bareja* once they have appeared in it. The best thing, therefore, is to take necessary precautions to avoid them altogether. The following few precautionary measures are found to be very efficient to achieve the aim:—

(1) Secure perfect drainage in the *bareja*.

(2) Spray the ridges with the Bordeaux mixture as previously described.

(3) Use disease-free seed.

(4) Pick up all affected leaves and vines and burn them (*Barais* object to do this).

or

They should be buried deep in the ground covering with a fair amount of earth. These pits should be away from the *barejas*.

(5) Maintain perfect cleanliness in the *bareja*.

Catch crop. *Parwal, Bareja Ki Bhoji, Kundru* and *Poi Bhoji* are at times grown as a catch crop to supplement the income from the *bareja* and

also to get vegetables for home consumption. Not much importance is given to these and only just a few plants are kept for private use.

Cost of cultivation.

First year.		Second year.	
1. Purchase of 1000 bamboos for fencing, roofing & staking	Rs. 100	1. Repairs to the <i>bareja</i>	Rs. 100
2. Wooden posts for fencing	Rs. 50	2. 30 maunds of cake	Rs. 75
3. Purchase of <i>bakal</i> or rope for tying	Rs. 10	3. Labour charges	Rs. 300
4. Grass for thatching	Rs. 25	4. Land Revenue	Rs. 10
5. Purchase of cuttings 44000 at Re. 1 per 100	Rs. 440	5. Overhead charges	Rs. 15
6. Ten maunds cake	Rs. 25		Total Rs. 500
7. First ploughing	Rs. 5	Third year.	
8. Digging with <i>kudali</i> and making ridges	Rs. 100	1. Repairs to <i>bareja</i>	Rs. 125
9. Planting the cutting	Rs. 10	2. 30 maunds cake	Rs. 75
10. Thatching and <i>bareja</i> making	40	3. Labour charges	Rs. 300
11. Labour for plucking etc.	Rs. 300	4. Land Revenue	Rs. 10
12. Land Revenue	Rs. 10	5. Overhead charges	Rs. 25
13. Irrigation charges	Rs. 50		Total Rs. 535
14. Other overhead charges	Rs. 10	Fourth & Fifth year	Rs. 1040
	Total Rs. 1175	Total cost of cultivation in five years	Rs. 3250

Receipts.

1st year :	12 lakhs leaves at Rs. 30 per lakh	Rs. 360
2nd year :	96 lakhs .. at Rs. 30 per lakh	Rs. 2880
3rd year :	80 lakhs .. at Rs. 30 per lakh	Rs. 2400
4th year :	40 lakhs .. at Rs. 30 per lakh	Rs. 1200
5th year :	20 lakhs .. at Rs. 30 per lakh	Rs. 600
	Total	Rs. 7440

Rs. 7440 - 3250 = Rs. 4190.

Profit per acre in five years is Rs. 4190.

Average yearly profit per acre comes to Rs. 838.

Note:-The actual selling rates of *pan* are much higher than the one used here for calculations. Leaves are sold at Rs. 50 a lakh but many leaves are rejected before being sold which brings down the selling rates. The calculations for the receipt side have been kept at the lowest possible rate to make provision for all contingencies arising due to diseases etc. A *Barai* on an average gets about at least a thousand rupees per acre from his *bareja*. To maintain this standard of income he keeps three *barejas* at different places to renew his plantation regularly, i. e., one of the *barejas*, in rotation, is every year put under the new crop.

Other concluding remarks *Pan* growing is not so technical and difficult as an ordinary cultivator views it to be. The initial capital, constant supervision and a little training is all what is needed to raise a good *bareja*. It is worth while for all those, who can have the above things to start trial *barejas* and take up the *pan* cultivation if they give good results.