STATUS OF BETEL VINE CULTIVATION IN BUNDELKHAND REGION OF UTTAR PRADESH: PROBLEMS AND PROSPECTS

Archana Dikshit[1], Satya Vart Dwivedi[2] and Bhanu P. Mishra[3]

INTRODUCTION

Betel vine *(Piper betle* L.) is a perennial dioecious creeper cultivated in India for its leaf since time immemorial (Bhattacharya *et al*., 2012). It belongs to the family Piperaceae. It prefers shady condition and grown in tropics and subtropics for its leaves that are used as a chewing stimulant. In the last 20-25 years, the commercial importance of betel vine cultivation has increased due to the growing trend of betel leaf and its increasing demand.

In Indian subcontinent it is known as pan in Hindi, Tambula in Sanskrit, Villayadela in Kannada, Vettilakkoti in Malyalam, Vettilai in Tamil, Tamalapaku in Telugu, Videch-pan in Marathi, Nagarbel in Gujrati and pan in Bangala (Pattepur *et. al*., 2017). Betel vine is cultivated in many other countries of the world including India such as Pakistan, Bangladesh, Malaysia, Sri Lanka, Mauritius and Myanmar for its nutritional and medicinal properties. In our country, betel vine is mainly cultivated in West Bengal, Maharashtra, Karnataka, Andhra Pradesh, Odisha, Tamil Nadu, Uttar Pradesh and Kerala for its leaves as its leaves are used for mastication purpose along with arecanut due to its stimulatory aromatic taste. In our country, arecanut is cultivated in an area of about 40,000 hectares, of which 965 hectares is in Uttar Pradesh and out of the total area of Uttar Pradesh, 62.1 hectares is in Bundelkhand. (Anonymous, 2018). Historically, the word pan in Hindi and other Indian languages is probably a derivative of the Sanskrit word 'pan' meaning leaf. In India, Betel leaf plays an important role since ancient culture. Its use in India dates back to 400 BC. As per ancient books of Ayurveda, Charaka, Sushruta Samhitas, and Kashyapa Bhojanakalpa, the practice of chewing Betel leaf after meals became common between 75 AD and 300 AD. Towards the 13th century, European traveller Marco Polo recorded betel chewing among kings and nobles in India (Toprani and Patel, 2013). In our Hindu religion, no religious event or festival is complete without the use of betel leaf. Its leaves are used in all types of worships. Apart from this, its use from morning to night in various forms like lime paan, catechu paan, tobacco paan, sweet paan, gutka with paan is very popular among the people in our country and neighbouring countries. The use of betel leaves in the above forms is also used during social gettogether. Considering the different uses of betel leaf, it is the most important commercial and profitable crop among various crops, which plays an important role in the overall livelihood security of the farming families. It provides year-round employment and income to the small and marginal farming community especially farmers with 5 to 10 decimal land due to its capital and labour intensive characteristics.

1 KVK, Lalitpur (U.P.)
2 College of Horticulture, BUAT, Banda (U.P.)
3 Deptt. of Agriculture Extension, BUAT, Banda (U.P.)

Medicinal uses of betel vine leaves

According to traditional ayurvedic medicine, chewing arecanut and betel leaf is a good remedy against bad breath. Betel leaf juice is credited with diuretic, analgesic, anti-carcinogenic, antioxidant and cooling properties. In India, betel leaf is used for deworming. Betel leaves are beneficial in the treatment of nervous disorders. It can be applied to relieve intense headaches. Betel leaves are useful in pulmonary afflictions suffered in childhood and old age. Betel leaf contains a number of phyto-constituents which reveals its uses for various therapeutic purposes. The plant or its individual parts can be used for the treatment of various disorders in human being such as, diabetes, fungal infection, microbial infection, inflammation, antihistaminic, antiulcer, local anaesthetic etc. The betel leaves really as a cheap, natural and easily available appetizer, digestive, mild stimulant, aphrodisiac and refreshing mastication .Still, so much work is required with the betel leaf to investigate the mechanism of actions with other therapeutic activities. This adequately justifies its nomenclature as the "Green Gold of India" (Sengupta and Banik, 2013).

Role of betel vine leaves in the national economy

The vast economic potential of the crop can be adequately established by the fact that about 15-20 million people consume betel leaves in India on a regular basis, besides those in other countries of the world, which may add upto over two billion consumers. The betel farming activities can generate employment opportunities for agricultural workers throughout the year, helping them to support their families. Further, as far as national employment generation is concerned, about 20 million people derive their livelihoods directly or indirectly by producing, processing, handling, transporting and marketing betel leaves in India (Guha, 2006). The Indian betel leaves are in great demand in several other countries of the world where demand far exceeds the local supply. Consequently, that India exported in 2017-18, valued at Rs. 26.8 crores. Most of the production and exports came from the state of Odisha - betel vine farmers of the state supplied betel leaves of around Rs. 10 to 12 crores in domestic and international market. This clearly indicates the profitability of the crop which can be further exploited in the interest of the nation (Anonymous, 2017).

Status of betel vine cultivation in Bundelkhand region of Uttar Pradesh

In Bundelkhand region of Uttar Pradesh, there is considerable diversity have been observed in betel vine cultivation. Cultivation of betel vine is commercially practiced in about 25 districts of Uttar Pradesh, out of which 3 districts *viz*., Mahoba, Lalitpur and Banda are the major production areas fall in Bundelkhand region. In Bundelkhand region of Uttar Pradesh total area under betel vine cultivation is around 62.10 ha where farmers who are owners or lessees of 30 to 60 decimal lands are cultivating betel leaf. The area and production of betel vine in Bundelkhand region is given in Table 1. Betel vine cultivation initiated in 9th century by Chandel rulers in Mahoba. Mahoba district is major betel vine producing area of Bundelkhand region which involves directly or indirectly 620 to 700 farming families. Essentially, betel vine is a less preferred crop in the region because of its intensive farming methods and the amount of labour involved in its cultivation from planting to harvesting, as well as farmers also have to

Table 1. Area and Production of Betel vine in Bundelkhand region of Uttar Pradesh

Sl. No.	District	Area (ha.)	Production (Lakhleaves/ ha/year)
1	Mahoba	34.6	2,246
2	Lalitpur	19.4	1,020
3	Banda	8.2	432
	Total	**62.2**	**3698**

Source: Paan Experiment and Training Centre, Mahoba(U.P.)

face different risk factors several times during its cultivation. Survey details of the villages of different districts of bundelkhand region of Uttar Pradesh where cultivation of betel vine is commercially practiced are given in **Table 2.** Betel vine is cultivated under partially shaded humid microclimatic conditions. Intensity of light in the plantation is regulated by periodical lopping of branches. In parts of Bundelkhand shade is regulated just before the commencement of monsoon (May-June) by lopping the branches of live standards for optimum growth of vine of betel vine. Height of live standards is also restricted by cutting the trees at four to five meter height (Kirankumar *et al.,* 2011). Earlier, it was cultivated on Bareja made up of bamboo and grasses, but now with the development of technologies, it is being cultivated in net houses. Desi and Bangla varieties of betel vine are generally cultivated in the Bundelkhand region, although the Desi variety is more popular among farmers over Bangla. The operation of sowing is performed in the month of February and March. Planting of vine is 25 cm apart with row to row spacing of 75 cm. Initially upto three months' chilli, green leafy vegetables, cucurbits are grown in between the Bareja which provide humidity as well as preferable micro-climate to the crop and also act as a filler crop. The selling of leaves starts from the month of July which generally continues upto the month of March; however, from October to March, betel vine crop gives maximum return. In Bundelkhand region of Uttar Pradesh, there is considerable diversity has been observed in villages surveyed for betel vine cultivation practices. Diversity observed in various agronomical practices in surveyed villages are depicted in **Table-3.**

Problems/constraints in betel leaf cultivation in Bundelkhand region of Uttar Pradesh

Though, betel vine is giving significant economic benefits to its growers, the productivity and quality is affected by several

Table 2. List of villages surveyed under betel vine cultivation

Sl. No.	District	Villages	Varieties Grown	No. of Bareja established
1	Mahoba	Along the Pond side area in Kabrai Block	Desavari, Bangla, Calcuttia, Kapuri	175
2	Lalitpur	Pali, Kailguan, Banpur		126
3	Banda	Baraimanpur, Sherpur		39

Source: Paan Experiment and Training Centre, Mahoba(U.P.)

Table 3. Betelvine cultivation practices followed in Bundelkhand

Sl.No.	Particulars	Practices followed
1.	Planting time	Feb-March
2.	Varieties	Desavari, Bangla, Calcuttia, Kapuri, Desi
3.	Spacing adopted	75 cm (Row to Row) x 25 cm (Plant to Plant)
4.	No. of Plants per ha.	53,333 plants
5.	Planting material required	55,000 per ha.
6.	Vine lowering time	Dec- Jan, June-July
7.	Vine lowering method	Rolling/coiling the vines and burying it under soil leaving it 2 feet above the ground (Com monly practiced)
8.	Nutrient management	200:100:100 kg N:P2O5:K2O/ha./year
9.	Irrigation Method	Flooding, basin, sprinkler
10.	Intercropping	Chilli, Cucurbits, Green leafy vegetables
11.	Pest and disease management	Paan Experiment and Training Centre, Mahoba is the chief source of advice while rarely Line departments like Deptt. of Horticulture, Agri culture and Plant Protection
12.	Harvesting period	July- March
13.	Packing	Usually a typical pack consisting of 1.5 to 2 kg of leaves which is termed as '*Dholi*' in folk. 1 Pari of bareja yield 42 dholis . 0.15 ha. of Bareja yield 16-17 paris.
14.	Harvesting interval	Generally once in 15 days
15.	Yield per acre (Lakh leaves)	11-20

problems. Matrix ranking of agro-biological and costs of input and related aspects is shown in **Table-4.** Among the agro-biological constraints as depicted in table major problem which affect the crops was recorded as natural calamities like hailstorm, frost, fire, drought etc. which contribute almost 89.1% of crop damage followed by crop infestation with insect pest and diseases (77.02%) and high perishable nature of crop (41.89%). When we studied about the cost of input and related aspects then we found that inadequate marketing facilities was found first with 71.62% followed by lack of capital (70.27%) and fluctuations in prices (58.11%).

Economics of Betel Vine in Bundelkhand region of Uttar Pradesh

Cultivation of betel vine involves annual operational and maintenance cost over the economic life of the *Bareja.* The cost components include time to time land preparation/ management, daily intercultural operation, maintenance/repairing by using jute stick, use of manure and fertilizer, pesticides, irrigation/

Table 4. Matrix Ranking of Constraints in Betel vine Production

Sl.No.	Constraints	Growers response (%)	Rank of Constraints
A.	**Agro- Biological**		
1	Disease Severity	77.02	II
2	Pests Severity	37.84	V
3	Non-availability of Good Planting Materials	40.54	IV
4	Winds Severity	25.67	VI
5	High Perishability	41.89	III
6	Hailstorm, Frost, Drought	89.21	I
B.	**Costs of Inputs and Related Aspects**		
1	Lack of Capital	70.27	II
2	High Cost of Labour	48.65	V
3	Inadequate Marketing Facilities	71.62	I
4	Fluctuations of Price	58.11	III
5	High Cost of Bareja Construction	55.41	IV

fertigation, harvesting, packing, transportation and land revenue . The production of betel leaves have been calculated to be around 42 dholi (1 comprised of 2 kg betel leaves) from an average area of 0.15 ha in the study area per year. Average annual total cost of cultivation, gross return and net return have been calculated to be Rs.1,96,872/- Rs.3,44,300 and Rs. 1,47,428/- respectively, for an average area of 0.15 ha during first year. In the consequent years the cost of cultivation gradually decreased with the increasing trend of income generation. The gross income boost up to 6-7 lakhs in third year with cost of Rs. 60,000/- . The cost return analysis indicated that betel vine cultivation is quite profitable venture in the study area which is the primary reason for increasing the area under betel vine cultivation in recent years.

Scope and prospects

Betel vine fetches lot of scope in Bundelkhand region by adoption of few problem based measures. To promote area expansion, incentives and schemes to be formulated and implemented as in case of other horticulture crops through NHM/RKVY, some of the measures like issue of crop loan for betel vine growers through Banks and Primary Agricultural Cooperative Societies at concessional rate of interest, regulation of labour wages in betel cultivation could be initiated by the Government. Besides, betel vine should also be included in the list of priority crops and be covered under Crop Insurance claim, need to develop low cost technique for construction of *Bareja*, standardization of low cost, effective and eco-friendly pest/disease management practices for both the standards and the crop, production of quality planting material for higher production, in order to safeguard the betel vine cultivators during slack season and excessive production period, the Government should construct the cold storage and warehouses at least two or more such cold storage in each block of the district, to extend

the shelf life of betel leaves, it is necessary to standardize the appropriate packing method, need to organize the growers by forming betel vine growers associations (BGAs) and federation for better marketing and bargaining power, training and skill development programmes for betel growers should be organised by the government frequently to upgrade and also to encourage young growers for adopting the cultivation, thereby making it to be an important source of livelihood in rural areas, further in order to reduce the exploitation, the Government should directly procure the betel leaves from the betel cultivators, the cold storage godowns should be offered at cheap rent to the farmers, initiatives should be taken to establish research centre and Centre of Excellence for betel vine in the study area is the need of the hour to improve the techniques and methods for betel vine cultivation and for the betterment of betel vine growers in Bundelkhand region. The central and state governments should jointly take appropriate steps for the management of insects and diseases especially wilt in betel farms, and establish a Betel Research and Development Board, to enhance export oriented activities with regard to global standards, reduce intermediaries in marketing; stabilize the betel leaf prices; increase the area under betel vine cultivation and raise awareness among betel vine growers. These initiatives will enable India's betel vine crop to contribute a significant portion to India's foreign trade in the near future.

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