



Improvement of Local Economy through the Maintenance of the Rural House Hold Bank (Piper Betel Baroj) of South Bengal

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ABSTRACT

The pan baroj (betel vine) found in the South of West Bengal are considered as rural household bank, as a very small pan baroj can at least secure the survival of the marginal and small farmers were boro paddy cultivation and daily laborer job is the main occupation. As betel leaves could be extracted throughout the year in a moderately maintained baroj of small area, it secures revenue earning of the farmers in their crisis period, when paddy cultivation is seized. This cultivation involves a huge number of female agricultural workers of West Bengal and involves the participation of female farming community in strengthening of local economy. The vines are deteriorating due to improper management practices and a huge wastage of surplus leaves. In this paper a simple and efficient solution is given for the rejuvenation of the dwindling betel vines (pan baroj) of South Bengal.

Key words: Rural house hold bank, Piper betle, Female farming community, Essential oil, Local economy

Betel vine is an asexually propagated, shade loving cash crop belonging to Piperaceae family. It is a perennial creeper originated in Malaysia and cultivated in South of Asia. The crop provides ₹ 6000-7000 million of national income per year. The Export revenue of 30-40 million is generated individually by this crop. The betel leaves are directly consumed as quid or pan. The cost of piper betel oil is also very high (10\$ per 5 ml) that contains eugenol and other volatile oil (Muruganandam *et al.* 2017). This crop is medicinally very important with anti-microbial, anti-fungal, anti-oxidant, anti-apoptotic, anti-inflammatory, anti-cancer, carminative, stimulant (Das *et al.* 2016) properties. It has use in food industry, can be used as mosquito repellent as well. Aqueous extract of betel leaves reduces the adherence of early dental plaque bacteria. The phenolic compound can reduce the prostate cancer by ROS driven DNA damage and apoptosis. Southern part of West Bengal experiences some localized problem due to highly

anthropogenic cultural practices. The problems and potentials are identified for rejuvenation of the vines (baroj).

The problems of the vines of South Bengal are unidentified cultivars, unhygienic practices, deadly disease, rotting of surplus leaves in the vicinity of betel vines and use of improper material for construction of vines. Though the positive side of this cultivation is the huge participation of female rural workforce and low cost essential oil extraction technologies.

Synonym of cultivars

There are about 125-130 local cultivars are available in India. The size and color of the leaf is important for the betel producer to categorize the product in the market. In West Bengal mainly *Bangla*, *Sanchi*, *Mitha*, *Kali Bangla* and *Simurali Bangla* varieties are cultivated. The procedure of export of this important horticultural crop is recommended by APEDA. In case of export of fresh betel leaves the size and colour are utmost important. Though for local consumption there is no such strict rules and norms and varieties are given local name and the proper identity of the cultivar is not known due to existence of different synonyms. Knowledge of genetic diversity of this crop is very important for rational planning of conventional and

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modern breeding, for the purpose of improving yield and quality of the produce.

Unhygienic practices

The main problem of the cultivation of this horticultural cash crop is the decline of the barojas. The local soil is not so healthy and requires amendment as close planting of the cuttings reduces the effective area for proper management of the barojas. The baroj are old and the soil are used without solarization and sterilization. Raw cow-dung use increases the contaminating pathogen in the soil. As piper betel is a shade loving plant, the penetration of sunlight is very low inside the baroj and periodic maintenance and cleaning is mandatory for the proper maintenance of the barojas.

Deadly diseases

The disease involves bacterial leaf spot, stem rot, leaf rot. Fungal disease is more prevalent in this region. *Phytophthora palmivora* infestation is high in rainy season. The infection caused by *Sclerotium rolfsii* in root and foot part of the plant is also important. Deficit of minerals also plays a key role in the development of diseases. Nitrogen deficiency and Chloride toxicity are also seen in the baroj. The farmers use uncleansed local pond water that contains different contaminants and pathogen and also saline in nature. *Salmonella* infection is the most deadly one reducing the export value of betel leaves causing compliance problem. This pathogen not only reside on the surface of the leaves but also found in internal spaces, enters through stomata, lenticel, wounds (Fakruddin et al. 2017).

Rotting of surplus leaves

The market demand also fluctuates leading to loss of excess betel leaves, those leaves remain stacked adjacent to the baroj and home. Sometime, human pathogen also originates there leading to human health problem. When old leaves were used for bovine feeding, the rotten and pungent leaves were avoided by bovine population. Though effort may be taken to extract essential betel leaf oil from surplus betel leaves Guha et al. 2006). Amtala, Kakdwip region were very close to proper Kolkata and if proper measures are adopted the betel leaves from this area could be exported to different countries.

Old construction material

In West Bengal betel plantation is done in baroj made of bamboo structure and straw or shade net based system. The bamboo stick with a height of 2.0-2.5 meter's were covered with straw and coconut leaves. The open cultivation or poly-house is not being used. Sometime pathogen also comes from old straw, jute and bamboo stick those were used for vine construction. The increased cost of bamboo and straw adding to the problem.

Involvement of female farmers

Piper betel cultivation is a sustainable side income for the poor and marginal farmers of West Bengal. The land requirement for a small baroj is very low and the farmers maintains the baroj in the adjacent land of their residence and involves the female members of the family for the maintenance and cultivation of this particular aromatic crop. In South Bengal the farmers cultivate boro paddy as the main crop along with betel plants for year-long earning. The female members assist in cultivation, manure preparation, leaf extraction, and pesticide spraying to transport and sell of the cash crop in the local market. Piper betel cultivation occupies a part of their life and as most of the baroj are in vicinity to the mud-house of the female farmers, they divide time between household works as well as baroj maintenance.

Modern technologies

Two technologies are available for extraction of betel essential oil, one is steam distillation method, and another is microwave Distillation method. Out of two technologies the microwave distillation process reduces time with same amount of essential oil (Amaresh et al. 2017). The storing and marketing oil can additionally help the farmers to generate more revenue reducing the loss experienced in direct sell of fresh leaves.

CONCLUSION

The Piper betel orchards of West Bengal are declining due to some localized problems. Old and unidentified cultivars are used by the poor farmers that requires replacement with genetically identified resistant varieties. The bio-materials used for baroj construction are sometimes contaminated and price of straw is increasing in the state. Shade net based baroj construction could be done as a replacement of straw or coconut leaves. The ideal line to line and plant to plant spacing should be maintained for effective post-sowing cultural practices. The use of solarized or autoclaved soil in the land preparation of the orchard, application of oil cake can control diseases. The contaminated pond water requires immediate substitution with potable water, or cleansing of pond water is required for good quality betel leaf production. The post-harvest processing of surplus leaves for extraction of essential oil can reduce rotting of leaves, indirectly controlling bovine infection in some areas. Ethanolic extract of *Terminelia arjuna* bark extract could reduce the external and internal colony of *Salmonella*, the deadliest of pathogen. An integrated management practice with participation of female agricultural community of South Bengal can maintain the rural household bank and aid in the enhancement of poor economy of betel vine farmers.

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