



Indigenous technical knowledge in processing of date palm juice and its implications on livelihood in Nadia district of West Bengal

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ABSTRACT

Silver date palm, *Phoenix sylvestris*, also known as Khejur Palm, is one of the most important sugar-producing plants in West Bengal. In West Bengal, *P. sylvestris* grows naturally in fallow lands, pond bank, agricultural field, and homestead, mostly in a neglected condition. The tapping of the Silver date palm is an age-old practice in rural West Bengal, and it is of considerable importance due to its contribution to the rural economy. Some Palm species can produce sap round the year, but *P. sylvestris* produces sap seasonally. This study was conducted in Nadia district of West Bengal to study the present status of *Phoenix sylvestris* plants in rural areas, to find out the Indigenous Technical Knowledge (ITK) regarding tapping and processing of sap and to access the livelihood of plant owners and tappers. Further, the problems faced by the date palm plant owners and tappers were studied to suggest recommendations for the improvement of their livelihoods where the tapping and harvesting of sap were performed entirely by the male members. In contrast, both sexes performed planting, processing of sap, and maintenance of palms. The contribution to family income from wild date palm among different categories of farmers ranges from 9.4 – 28 percent.

Keywords: ITK, livelihood and *Phoenix sylvestris*

Thirty enlisted palm species are traditionally tapped in different countries in the world (James 1980; Kamal 1969; Dalibard 2007). The most important palms grown in India are Coconut (*Cocos nucifera*), Betel nut (*Areca catechu*), Palmyra Palm (*Borassus flabellifera*) and Date palm (*Phoenix dactylifera* and *Phoenix sylvestris*). *Phoenix dactylifera*, commonly known as date or date palm, is cultivated for its edible sweet fruit. It is one of the most important plants in Africa, Middle East, South Asia. Silver date palm is a species of flowering plant in the palm family Arecaceae present in India, Pakistan, Bangladesh, Myanmar and Sri Lanka. *Phoenix sylvestris* has often been regarded as the wild progenitor of the cultivated date palm *Phoenix dactylifera*. A genetic study recently discarded this hypothesis, suggesting possible occurrences of hybridization events during the expansion of date palm cultivation (Newton *et al.*, 2013). Origin of Silver date palm is Mesopotamia (modern Iraq) around 5000 to 10,000 years ago (Zohary and Hopf, 2000). In West Bengal, *P. sylvestris* grows naturally in fallow lands, pond bank, agricultural field, and homestead, mostly in a neglected condition. Indigenous technical knowledge (ITK) is the accumulated skill and technology of a locality or a community that has been passed on from one generation to another generation. Tapping of the Silver date palm is an age-old practice in rural West Bengal, and it is of considerable importance due to its contribution to the rural economy. Some Palm species can produce sap all the year-round, but *P.*

sylvestris produces sap seasonally. The sap of silver date palm is a good source of vitamins of the B group and also contains a variable amount of ascorbic acid (Rangaswami, 1977). The objective of this paper is to discuss the indigenous knowledge regarding tapping and processing of sap along with analysis of the livelihood of plant owners and tappers.

MATERIALS AND METHODS

A study was conducted in Nadia district of West Bengal, situated between 22°53' and 24°11' North latitude and 88°09' and 88°48' East longitude. It is surrounded by Bangladesh in the East, Bardhaman, and Hoogli district on the West, Murshidabad district on the North and North West, and North 24 Parganas towards South and South East. It consists of 4 sub-divisions, namely Ranaghat, Tehatta, Sadar and Kalyani. The district was purposively chosen because it is a representative site for the processing of Silver date palm. For the study, three villages of Krishnaganj Block in Nadia District were selected, namely Bijoypur, Gede, and Durgapur. The villages were selected based on the opinion of the horticultural officers of the district, considering the activity of tapping and processing of the sap of *P. sylvestris*. A pilot study was carried out to find out the critical socio-economic parameters and to select the respondents for the detailed study. The farmers were categorized into five groups – landless (no land), marginal (<1 ha), small (1-2 ha), medium (2-4 ha), and

large(>4 ha) according to the size of the landholding. Data were collected from 60 farmers on their experiences of implementing selected interventions under the study. A structured pre-tested interview schedule, focus group discussionon their experiences, and participatory tools such as transect walk and matrices scoring were employed for data collection.

RESULTS AND DISCUSSION

Distribution of Silver date palm in the study area

P. sylvestris grows on pond banks, roadside, and agricultural field with minimal or no management. Most of the palms grew up from seeds dispersed by birds and animals. The Palm, however, can propagate vegetatively by the formation of offshoots (FAO 2007). The farmers planted a few of the palms plants. The highest number (559) of palms was in the age group of 15-21 years, and the lowest (253) was below nine years and above 27 years class, as shown in table 1.

Indigenous techniques for the tapping of palm

Silver date palms are tapped during winter months (From mid-November to mid-March). Tapping is generally done during evening hours. Tools used for tapping are *Dao* (small and special Chisel), a small bamboo made tube (*noli*), a cartoon (*tonga*) made of tree leaf for carrying the tools, Earthen pot (*Var*) for collection of sap, rope for climbing the palms. The earthen pots “*Var*” are disinfected with smoke to avoid contamination (Fig. 1). Farmers sometimes use lime in the pots to delay fermentation of the sap. Usually, palms of more than five years (the same age is reported by Dalibard (2007)) are selected for tapping. For tapping the rear leaves from the edge of the Palm are removed at the beginning of the season. (It is called”*GachJhorah*”). A series of pruning is usually done 3 to 4 times. Then the inner delicate tissue coat is exposed (*Chanch*) on removing the bark forming a “V” shaped cut. The minute bamboo made tube (*Noli*) is inserted in the triangle. The earthen pot is placed on the tree for sap collection. Sap collection is done during early morning hours. Generally, two days of sap collection is followed by four days of a rest period. The rest period is essential for the recovery of plants. Generally, the sap is collected from one side of the Palm in one season, and in the next season, sap must be collected from the opposite side of the trunk. This gives the zigzag appearance of the palms.

Processing of jaggery

Boiling of sap is generally done in a square-shaped tin made pan (*Tawa*)(Fig. 2) with a size of 3 x2.5 feet or

4 x 3.5feet on a square-shaped burner (*Baan*)(Fig. 3). A large wooden spoon (*Orong*) is used for stirring the sap during boiling. After the collection of sap, boiling is done. The sap is processed either ex-situ or in-situ(Fig. 4). In the case of ex-situ processing, it is generally done by farm women, where the male members perform the in-situ processing. The sap is screened to remove dust and foreign matter. Then the aluminium pan (*Tawa*) is filled with the sap. After 1 hour of boiling a layer of white foam is produced. It is removed by the wooden spoon (*Orong*). A little amount of juice is taken into an earthen pot where it undergoes crystallization (viz.*Tola*). The crystallized part is mixed with the boiling sap, and it is cooked at a lower temperature to produce jaggery. After cooling of molasses, it is poured into earthen pots. On average, 700-800 grams of jaggery is produced from boiling 5 litres of sap. Usually the pruned branches, dried leaves and weeds are used as fuel.

Flow chart showing the process of jaggery production

Collection of Sap → Screening of sap for removal of dirt → Boiling of sap in Tawa → Removal of Foam produced during boiling → Little amount of boiled sap is taken into earthen pot for crystallization → The crystallized sap is added into the Boiling sap and cooked at low temperature → after cooling it is added into earthen pots

Marketing aspects of silver date palm

Fresh juice is directly sold by the farmers during early morning hours in the village. Delay in the marketing of fresh sap cause fermentation. Farmers generally sell Jhola Gur (liquid jaggery) and Patali (hardened jaggery) to the middlemen. The middlemen supply the products to the retail shops in different areas within and outside the district, namely Ranaghat, Majhdia, Chandanagar, Shrirampore, Howrah market (Fig.5). Generally, farmers get INR.100-120 and INR.120-150 for one kg of jaggery and Patali, respectively. Another product, alcoholic beverage *Tari*(prepared by fermentation of date palm juice), is sold in the rural market. Its production is limited due to legal restrictions, unlike America and Africa, where palms are tapped mainly for wine production (Dalibard, 2007).

Contribution of income from wild date palm husbandry in income of the farmers

The landless farmers fetch nearly 28 per cent of their income¹ from palm products. The landless farmers often lease their plants to the more affluent groups of people. Tappers are mostly small, marginal and landless farmers. They earn a considerable portion of their income from date palm husbandry and for them; it is one of the most

Table 1: Distribution of silver date palm in different sites and their age group

Site	Age group (Years)					Percentage	
	>9	9-15	15-21	21-27	>27		
Pond Bank	26	41	121	87	65	340	21
Road Side	25	52	137	109	98	421	26
Agricultural Field	15	19	62	21	13	130	8
Agricultural Field Side	87	129	163	92	64	535	33
Homestead	28	53	76	24	13	194	12
Total	181	294	559	333	253	1620	100
Percentage (%)	11	18	35	21	15	100	—

Table 2: Income of different categories of farmers from silver date palm

Household Category	Seasonal Income (Rs.)	Mean Annual Income (Rs.)	Percent of Mean annual Income (%)
Large Farmers	17,000	1,80,000	9.4
Medium Farmers	20,000	1,20,000	16
Small Farmers	12,000	90,000	13
Marginal Farmers	11,000	70,000	15
Landless Farmers	14,000	50,000	28

Notes: Income data from the various sources were collected for each adult members of the household, from which total annual household income was calculated.

Table 3: Gender role in various operations of silver date palm

Operation	Male	Female
Planting	85%	15%
Maintenance	50%	50%
Harvesting of Sap	100%	-
Processing of Jaggery	45%	55%
Making Mats, Broom etc.	10%	90%
Marketing	100%	-

Note: The percentages were calculated based on the labour requirement for both male and female during different stages.

important sources of seasonal income (Shown in Table 2). Though the production of *Tari* was on a small scale, the farmers were reported to get a substantial amount of money from its sales. Thus, Silver date palm husbandry plays a vital role in supporting rural people in this particular region.

Gender role in the production of wild date palm in the study area

Tapping and harvesting of sap are done entirely by the male members, whereas both male and female members are engaged in planting, processing of sap, and maintenance of palms (Table 3).

The study suggests that better technology integration is possible through a group approach for which efforts should be made to minimize the drudgery of the artisans and elimination of fundamental problem about the

preservation of sap, storage, and packaging of jaggery. For reducing the risk involved in climbing of trees, a mechanized way for climbing may be introduced. There is good scope for the training of the tappers for improved processing and storage techniques. The art of *gur* (Jaggery) making requires special skills which are not seen in the new generation and the traditional knowledge is passing into oblivion. The Silver date palms grow in neglected condition with zero or low maintenance in rural Bengal, which leads to a reduction in the sap production and inferior quality of the jaggery. The gum produced from the sap is used for preparing delicacies for which better promotion of the value-added products from the plant is necessary. Proper management practice of silver date palm should be practiced along with the creation of organized marketing facilities for the date palm owners and tappers. Virtualization of the value chain from



Fig.1: Disinfection of *Var* with smoke



Fig. 2: *Tawa* and *Orong*



Fig. 3: Square shaped burner (*Baan*)



Fig.4: Processing of jaggery

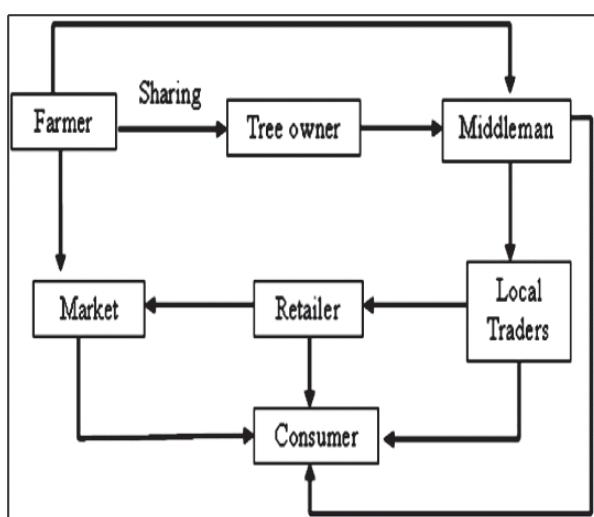


Fig. 5: Flow chart showing the marketing channel of silver date palm

production to harvesting should be introduced for increased markets and the realization of better prices throughout the country.

The paper portrays the indigenous technology of tapping of date palm and processing of jaggery by the farmers and farm women of Nadia district of West Bengal focusing on the value chain, income and gender

dimensions. It tried to depict relatively lesser known areas of the rural people's knowledge and skills which demand proper documentation and preservation. Apart from the studies the authors felt that technology integration and refinement are equally important for making this traditional process efficient, updated and more profitable leading to reduce

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drudgery and exploitation of middlemen. A focused research study should be formulated to throw light in this direction, and that will be instrumental in setting up the research and extension agenda in days to come.

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