

Productivity, Revenue Status and Future Prospects of Wild Date Palm Trees Cultivation in Bangladesh

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Abstract: A descriptive study was conducted in Jessore district (south-west part) and Natore district (north-west part) in Bangladesh to determine the productivity and revenue status and potentiality of wild date palm cultivation. A questionnaire with semi-structured questions was used to collect necessary data from 400 respondents by face-to-face interview during November 2020 to April 2021. The respondents were categorized into three groups based on their land pattern, juice collection and juice processing. The highest 44.50% wild date palm is cultivated in boundary areas of farming land and 24% planted in homestead areas, at the same time 6.25% respondents cultivated date palm trees as a main crop. Most of the respondents (96%) process juice without any cost. Per season TK.1600-2100 net average income can be earned from per tree with a very low maintenance cost. Wild date palm produces a significant amount of molasses without using farming land. Our local growing demand, molasses is great source of sugar. A lot of seasonal job opportunity is created in rural economy for wild date palm cultivation. Besides molasses, it provides fuel wood throughout the year. Its leaves are used in handicrafts industry to make floorplate. At the same time Date trees have environmental importance. Date trees are the evergreen tree. So, it has a great importance on socio – ecological balance.

Keywords: Palm, Molasses, Homestead Areas, Boundary, Fallow Land, Tapper

1. Introduction

Palm is an important agricultural product in many countries. The monocot family (Palmae, or more recently Arecaceae) is distributed throughout the tropics and semitropics [9], and is a key component of tropical forests [8]. It is situated in a tropical environment. One of the most important sugar sources in Bangladesh is the wild date palm (*Phoenix sylvestris*), often known as Khejur. In Bangladesh, the khejur palm is planted as a household crop, although it also grows naturally. It's also grown in non-productive regions including yards, field borders, road sides, canal banks, and ponds. It is also grown as a main crop with other crops on agro-productive soil in Bangladesh's southern and northern regions. In certain parts of the southwestern region,

it is cultivated as a garden by planting seedlings [15]. The Khejur palm is mostly seen growing with other crops on the borders of cultivable land in Bangladesh [1]. Traditional sweeteners have been manufactured from the sap of the Khejur palm for as long as anybody can remember, and they're a mainstay of Bangle cuisine [2]. It has a huge economic influence in Bangladesh, where palm planting for tapping is an age-old custom, due to the extensive use of its sap in the manufacturing of sugar [10]. Some species of Phoenix can be brought under the sap production throughout the year but *P. sylvestris* only seasonally [16]. By tapping a proper Khejur palm for sap, one may generate a large amount of money each year [14] Around 85% of Bangladesh's population lives in rural areas and depends mostly on agriculture and tree-based products [5]. Land is utilized to

develop a range of crops to fulfill the increased demand for sugar since agriculture is the major source of income for rural families. According to the same trade operators, sugar consumption in Asia continues to rise as a result of increasing consumption of beverages, biscuits, candies, and confectionery goods [12]. The traditional technique of harvesting sap from Khejur palm trees is used by the majority of farmers and trappers in Bangladesh. With very little maintenance, the palm may be tapped on a regular basis, year after year, for a long time [6]. A large number of Bangladeshis (from both the north and south) generate a substantial amount of money by tapping the Khejur Palm. Landless people in the north and south utilize it as a seasonal employment and augment their income by working as Gachi (tapper). It gives a chance to examine palm planting and its future prospects in Bangladesh since people have the possibility to generate money and enhance their standard of living.

2. Research Objectives

The main objectives of the research are to observe wild date palm cultivation status, earnings, and production and future prospects. More specifically the objectives are as follows:

- i. To observe wild date palm cultivation status and production.
- ii. To find out the revenue status and future prospects of wild date palm cultivation.

3. Methodology

We employed a convenient sampling method for the research. To meet the objectives the sample size for the research was chosen at 400 participants (see: 3.2). Two districts were purposively selected as Jessore and Natore because these are some of Bangladesh's best areas of Khejur palm planting. Because the bulk of the Khejur palms in these districts are congregated there, Monirampur, Keshobpur, and Jessore Sadar were purposely picked among the eight upazillas in Jessore district, while Lalpur and Bagati Para were purposefully chosen among the six upzillas in Natore district. Five upazillas were selected from the regions where Gur (molasses) is commercially produced from the Khejur Palm. To identify the variables a pilot study were made prior to final survey. The area had been extensively investigated at that time. The researchers prepared a semi-structured questionnaire as the survey tool. A questionnaire was prepared for the survey based on the literature review and the study's goals. Respondents were chosen at randomly. Land layout, juice collection, and juice procedure were used to divide the respondents into three categories. Although data over multiple years (at least five years) yields useful results, just one year's worth of data is gathered and evaluated here. Because the participants in this research are illiterate and do not keep track of past information. Data were collected, classified, and presented in a tabular format. Tabular

analysis, percentage, frequency, and graphical analysis were used to examine the data.

3.1. The Study Area

3.1.1. Jessore District (Khulna Division)

This area is located between 22°48' and 23°22' north latitudes and 88°51' and 89°34' east longitudes and has an area of 2570.42 square kilometers. Jhenaidah and Magura districts border it on the north; Satkhira and Khulna districts border it on the south; Narail and Khulna districts border it on the east; and West Bengal state of India borders it on the west. It encompasses Abhaynagar, Keshabpur, Chaugachha, Jhikargachha, Bagherpara, Manirampur, Jessore Sadar, and Sharsha [3].

3.1.2. The Natore District (Rajshahi Division)

This district covers 1896.05 square kilometers and is located between the latitudes of 24°25' and 24°58' north and the longitudes of 88°01' and 88°30' east. NAOGAON and BOGRA districts border it on the north, PABNA and KUSHTIA districts on the south, Pabna and SIRAJGANJ districts on the east, and RAJSHAHI district on the west. It includes Gurudaspur, Natore Sadar, Baraigram, Bagatipara, Lalpur, and Singra [4].

3.2. Sample Size

Populations that are large, Cochran developed the Equation 1 to yield a representative sample for proportions [7].

$$n_0 = \frac{z^2 pq}{e^2}$$

where,

n_0 = Sample size

$p = 0.5$

$q = 1 - p = 1 - 0.5 = 0.5$

$e = .05$ (the estimate within 5% of the true value)

$z = 1.96$ (as per the table of the area under the normal curve for 5% level of significance)

Using the formula, at a 5% level of significance, the expected sample size is:

$$n_0 = \frac{(1.96)^2 \times (0.5) \times (0.5)}{(.05)^2}$$

$$= 385 \text{ respondents}$$

This formula suggests that in case of infinite population minimum 385 respondents are needed for fruitful result. That's why 400 respondents are selected to get reliable result.

4. Results and Discussion

The study focused on several aspects like wild date palm plantation land, cultivation method, juice collection process, preparing process of molasses, productivity, revenue and its contribution on economy.

4.1. Pattern of Cultivating Land

Bangladesh is small with densely populated country. Agri land has been decreased gradually. Proper utilization of land is very necessary to meet up the growing demand. Multi

cropping is a great way to use land properly. Most of the cases wild date palm is cultivated in unused land. Sometimes it cultivates as main crops.

Table 1. Pattern of cultivating land.

Categories of land on which trees were distributed	Number of respondents		
	Frequencies Of Respondents	Number of Trees	Percentage of land category (%)
Homestead areas	96	1299	24
Roadside areas	43	731	10.75
Garden (main crop, associated with another crop)	25	325	6.25
Boundary of land areas	178	2646	44.5
Others (pond sides, river sides)	58	1275	14.5
Total number	400	6276	100

Source: Field survey, 2020-21

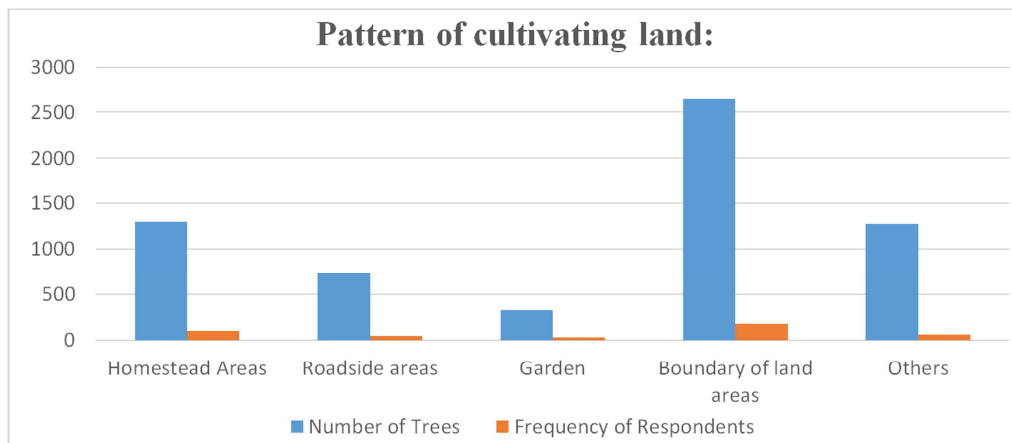


Figure 1. Pattern of cultivating.

Though all the respondents of this study directly involved with wild date palm cultivation, Table 1 and *Figure 1* reveals - most of the respondents (44.5%) use boundary of land areas (ails) to cultivate wild date palm trees and homestead areas are used 24% to plant wild date palm trees. Some respondents use homestead areas, land areas, ponds, road sides and other areas to plant trees simultaneously. 6.25% people cultivate wild date palm trees as a main crop associated with another crop. Results reveal that wild dates are mostly cultivated on boundary land.

4.2. Juice Collection

Wild date palm trees provide us mainly- wood and juice.

Juice is collected by trapper through traditional way. Update technology is not used to collect juice. That's why some people are not interested to collect juice.

Table 2. Juice collection.

Categories	Respondents	
	Frequency of Respondents	Percentage
Don't collect juice	35	8.75
Own	125	31.25
Share	91	22.75
By gachi (tapper)	149	37.25
Total	400	100

Source: Field survey, 2020-21

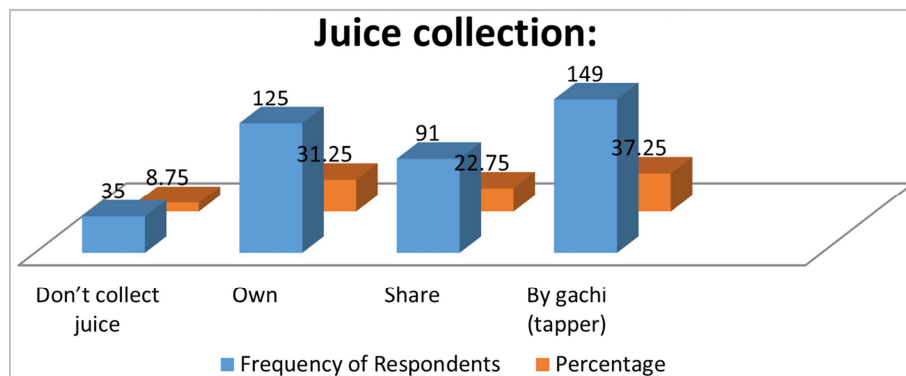


Figure 2. Juice collection pattern.

Table 2 and Figure 2 reveals an interesting finding that the highest proportions (37.25 percent) of the respondents collect juice from their trees by the gachi (tapper). 31.25 percent respondents collect juice by himself. 22.75 percent respondents collect juice with share. i.e take a certain amount of gur in a season from the gachi or take a certain amount of Taka per season from the gachi and so on.

4.3. Juice Processing

The existence of joint family is satisfactory level in rural areas in Bangladesh. Most of the agriculture-based family

cultivates crops by family member. Sometimes they hire some worker on their demand base or seasonal base.

Table 3. Juice processing.

Categories	Respondents	
	Frequency of Respondents	Percentage
Family member	260	65
Himself	53	13.25
Labor	87	21.75
Total	400	100

Source: Field survey, 2020-21

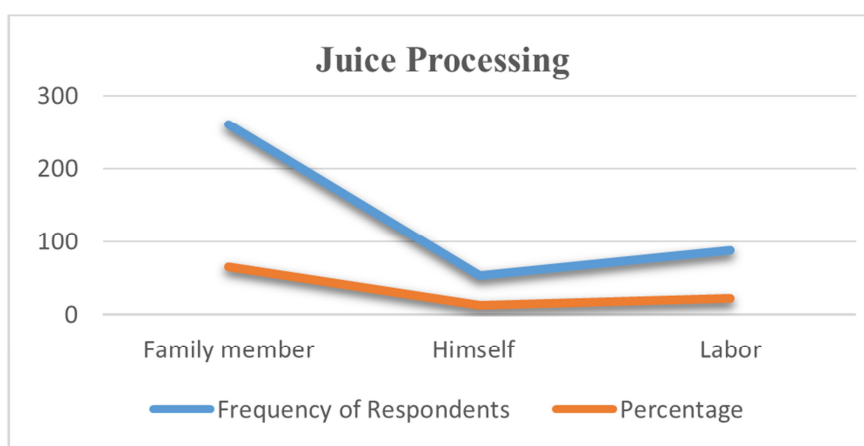


Figure 3. Juice processor categories.

From Table 3 and Figure 3. It indicates that the highest proportions (65+13.25) = 78.25 percent of the respondents' process juice combining by own and family members, only 21.75 percent use labor (hired).

4.4. Amount of Planting Seedlings

One acre land is needed to plant 110-120 trees and besides the road sides 1000-1380 number of trees can be planted in 1 kilometer road (source: Field survey, 2020-21).

4.5. Fuel Cost in Juice Processing

After extracting sap from the tree, it has to be process to get molasses. Old stems and leaves of date palm are used as fuel to process sap. Generally, juice has been processed traditional way. Dead leaves, straw and small branches are also used as fuel.

From Table 4: Most of the respondents i.e. (40+56) = 96% used dead leaves, straw and small branches for juice processing. Therefore, 96% respondents had no expenditure for juice processing. Only (3+1) = 4% of the respondents used wood, wastage cottons, which they had to buy and they had very low expenditure for this purpose. No respondents used gas, solid wood (only wood) or others for this purpose and almost 78.25% (Table 3) respondents process juice combining by own self and family member. So, processing cost is very much low.

Table 4. Fuel cost in Juice processing.

Categories	Frequency of Respondents	Percentage
Dead leaves	160	40
Straw and small branches	224	56
Wastage Cotton	12	3
Wood	4	1
Solid Wood	0	0
Total	400	100

Source: Field survey, 2020-21

4.6. Capacity of Production Per Year Per Trees

Wild date palm trees are cultivated mainly for producing sweets. Per tree remains in production 90 days per year. A huge amount juice can be collected from one tree/ per year. This juice is used to produce molasses. Fresh juice is also used for drinking.

Table 5. Production per year per trees.

Category of production	Per tree (per year)	Price
Juice (Sap)	120 liter	1600
Molasses	20kg	2100

Source: Field survey, 2020-21

Table 6: Indicates that per wild date palm tree gives 120-liter juice or 20 kg molasses and average price of juice per year TK.1600 and average price of molasses TK.2100.

4.7. Income and Expenditure from Date Palm Cultivation

Full employment is not needed to process date juice. It can be done along with other routine work. The processing of date juice can be done at a convenient time with the

help of other members of the family. This creates an opportunity to earn extra income. So, palm trees create seasonal income with very low cost without using main cultivable land.

Table 6. Income and expenditure from date palm cultivation.

Categories (TK. / Season)	Income		Expenditure	
	Frequency	%	Frequency	%
<3000	-	-	77	19.25
3000-5000	-	-	217	54.25
>5000	-	-	106	26.5
<30000	150	37.5	-	-
30000-40000	106	26.5	-	-
>40000	144	36.00	-	-
Total	400	100	400	100

Source: Field survey, 2020-21



Figure 4. Level of income and expenditure.

Data presented in the Table 6 and Figure 4 indicate that expenditure of 54.25% respondent's is TK. 3000-5000 in a season whereas 37.5% respondents' income is more than TK.30,000 in a season. Expenditure of 26.5% respondents is above Tk. 5000 whereas 36.00% respondents' income is above Tk. 40000 in a season.

4.8. Future Prospects and Economic Importance

Date palm is an evergreen plant so it plays a vital role in environmental and ecological balance. It helps to mitigate natural disaster. It also acts as a barrier against storm, cyclone, and other natural calamities. Once upon a time date palm cultivation was only the off-season income

source of the farmers of these areas. Every year Bangladesh has to import a huge amount of sugar to satisfy demand. Bangladesh Sugar and Food Industry Corporation (BSFIC) is going to import more than 50,000 tons of sugar to meet the deficit in the market, costing of \$470 per ton, totaling TK211.32 crore. If we can use our fallow land to cultivate wild date palm, we can meet up our internal demand of sugar. We can use our Railway sides (about 2855 kilometer) [13] and National high way sides (3790.861 kilometer) [11], to cultivate wild date palm. Wild date palm tree plantation protects our road sides land. Per kilometer road sides or railway sides 900-1500 (approximately) trees can be planted.

Table 7. Trees can be planted besides Railway sides and Highway.

Categories of way	Total kilometer	Needed per k.m.	Total number of trees	Per tree molasses (per year)	Total production of molasses
Railway	2,855	1200	3426000	20kg	68520000
National highway	3,790	1200	4548000	20kg	90960000
Total			79,74,000	20kg	159480000

Source: Field survey, 2020-21

4.9. Number of Trees Can Be Planted Besides Railway Sides and Highway Sides

Data presented in the Table 7 indicate that from this number of trees approximately 1,59,480 Ton (159480000/1000 kg) Liquid Gur (molasses) or Patali (a hardened circular cake of molasses) can be produced in per year. After fulfilling local demand, we can export sugar products in abroad.

4.10. The Purpose of Cultivating Wild Date Palm

The date palm takes up very little space. From unproductive land extra seasonal income can be earned by planting date trees. With very low maintenance cost – fresh soft drink, liquid molasses, Patali (a hardened circular cake of molasses) can be produced. Date tree's leaf is used to make floor mate. The branches and old leaf are also used as fuel in rural areas throughout the year. It has a great environmental benefit like – reduce land erosion, protect the country from lightning strikes, thunder storm, cyclone.

5. Conclusion

Without using farming land, a significant amount of sugar products (molasses) can be produced at very low investment. Which can play vital role to meet up internal growing demand of sugar? Besides the meet up internal demand it can open a door to export. Wild date palm cultivation can create seasonal job opportunity of rural people. The research shows -people can earn handsome amount money at without cost or very little cost. Moreover, date trees are evergreen, so it has a great impact on ecological balance. Government should have to take necessary steps to plant wild date palm trees throughout the country and make awareness among the people. This tree plantation program can play a vital role to protect global warming and keep friendly environment.

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